



# Technical Assistance Consultant's Report

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November 2006

## MON: Agriculture Sector Strategy Study (Financed by Japan Special Fund)

Prepared by:

Institute for International Development Ltd in association with  
Agriteam Canada Consulting Ltd.

For Ministry of Food and Agriculture

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Asian Development Bank

# AGRICULTURE SECTOR STRATEGY STUDY

TA No. 4359-MON

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## FINAL REPORT

30 November 2006

Institute for International Development Ltd.  
In association with Agriteam Canada Consulting Ltd.

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**VOLUME 1**

**30 NOVEMBER, 2006**

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## ACRONYMS

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ADB	-	Asian Development Bank
MoFA	-	Ministry of Food and Agriculture
WTO	-	World Trade Organization
GDP	-	Gross Domestic Product
GAP	-	Government Action Plan
EGPRS	-	Economic Growth and Poverty Reduction Strategy
MTBF	-	Medium Term Budgetary Framework
NPA	-	National Plan of Action
MDG	-	Millennium Development Goal
OIE	-	Office Internationale Epizootique
SCVL	-	State Central Veterinary Laboratory
EU	-	European Union



## Executive Summary

### A. Introduction and Background

Mongolia has recorded remarkable achievements in making the adjustment from the former socialist period when the State was responsible for all economic activity. With the enforced financial independence, Mongolia has experienced great hardship and poverty levels have persisted as this structural adjustment has progressively taken place to the extent that Mongolia now is an emerging market economy. The economy is still dominated by agriculture (22% of GDP) with extensive livestock dominating the agricultural (81%), although cropping occupies an important strategic position in terms of domestic consumption (wheat). The sector remains vulnerable to extreme climatic conditions that have had a marked impact on livestock numbers and productivity in general while the high risks and low returns have contributed to low levels of investment in modern production technologies. While the sector has largely recovered from the extreme dzuds of 1999-2001, productivity levels remain low, and the structure of the industry is dominated by a large number of small scale (many subsistence) producers with 58% of crop farmers and 82% of herders having planted areas of less than 300 hectares and 200 head of livestock respectively that collectively contribute less than 10% of production.

Mongolia's international comparative advantage lies in its plentiful natural rangelands used by nomadic herders as a cheap feed source for rearing sheep, cattle, goats, horses, camels and yaks. The higher rainfall areas also have an international comparative advantage in feed production that could be developed to support the higher input domestic livestock production and also meet animal feed demands from neighboring countries. Other agricultural industries (e.g. vegetables) have a domestic comparative advantage because of the high transport costs of supplying Mongolian urban markets from the lower cost producers to the south and also because of chemical residues that are found on many imported fresh food products.

### B. Current Agricultural Development Policies

Current policies for the development of agriculture aim to: (i) create favorable business conditions, (ii) increase agricultural productivity, (iii) ensure sustainability, (iv) improve supplies of hygienic food, and (v) introduce new production technologies into the sector. The policy has been developed into an action plan by the Ministry of Food and Agriculture (MoFA) that proposes investments in improving animal husbandry, rebuilding and expanding crop production, developing the food industry, and conducting research. Funds have been made available through a medium term budgetary framework with resources being allocated for these programs under the Minister's budget being 35%, funding from donors (35%) and funding from foreign loans the remaining 18%.

### C. Existing Agricultural Initiatives

The Government currently implements some 19 sector programs covering various aspects of the main sectors ranging from animal health to water resource development, the impact from which have not always been what was originally intended. Similarly, much of the donor funded initiatives have been undertaken outside mainstream agriculture leading to an uncoordinated and only moderate impact from this important source of funding. Donor support has focused on private sector development as a tool for growth and means for poverty reduction. This strategy document should facilitate greater coordination of donor activity within the sector.

### D. Vision for the Future

The Government sees the sector continuing to grow in real terms contributing to economic development and growth through increased number of livestock (with balanced species composition) with the extensive sector supplying inputs to the higher input and higher

What's w/ all the dominance

Primary comprised of

Permissible but not FORM

QUALITY ADVANTAGE

could impact of Ag (com. new ties)

ACTIVITY

Biofuel options

China's energy demand shortage

Feed in crop/forage

Produce vs. import

That's

NOT SMALL AT ALL

If FEED, THEN PROBABLY GRAINS TOO...

AMBIGUOUS STATEMENT

Page vi

LIVESTOCK - MEAT & DAIRY  
ON RESTRICTED LIST.

INDORE

WHAT  
ABOUT  
ADB?

STRATEGY  
? any  
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GOVT &  
STRATEG

TORIG  
DEVEL  
1

LAND

IRRIG. PLANNING. TA!

## 10 INVESTMENTS

PLACE SYDNEY LR TRIPS + GLENNHOLE... UNLESS SEASON TOO SHORT...

constrains investment and the commercial rates and loan products that are available are not appropriate given the currently low margins in the sector and alternate forms of gaining access to suitable credit are needed. In the past, the Government has offered direct concessional loans and other production concessions that have allowed the perpetuation of inefficient producers and intervention policies of the past have stifled investment in essential services.

### Supportive Government Capacity

The public nature of certain investments in the sector is recognized and the Government needs to improve its monitoring of the impact from these development initiatives. At the lower levels of government where implementation takes place, resources are limited and capacities weak to implement development programs to maximum effect. Sector linkages to markets and processors are tenuous in the absence of private traders and knowledge of market conditions that need to be strengthened.

### Mitigation of Negative Effects

The strategy recognizes that with change, there are likely to be some who are detrimentally affected and initiatives must be put in place to protect those who are not able to adjust to the new market orientation. The strategy recognizes the social obligations of the Government to assist in this adjustment process.

### F. Investments in Support of the Strategy

In order to give effect to the agricultural development strategy, investments have been identified in both livestock and cropping subsectors as well as for industry wide initiatives. The necessary supportive capacity building and policy consolidation is included as part of the respective programs.

#### Livestock Subsector

Five programs have been identified covering: (i) agricultural land utilization, (ii) risk management, (iii) disease monitoring and emergency response, (iv) strengthening market linkages, and (v) livestock management and breeding. The first is aimed at implementing a sustainable pasture management system that is respected by herders and crop producers alike and provides for the sustainable utilization of pasture resources and includes water point rehabilitation, capacity building at the soum level and improved resource mapping together with institutional initiatives to bring pasture management in line with the largest users of the resource. The second seeks to improve the capacity of both herders and the Government to minimize the risk associated with livestock rearing and includes initiatives in forecasting and modeling of rangeland carrying capacities, promoting fodder production through investment incentives, risk sharing initiatives such as livestock insurance and improving the knowledge of herders to better prepare their animals for prevailing conditions. The third is directed at preserving the health status of the herd by enhancing aimag diagnostic capacities and providing for routine sampling in order to monitor disease outbreaks and assist in designing cost effective vaccination programs of Government from notifiable diseases while supporting private veterinarians through revolving funds for veterinary supplies. The fourth aims to strengthen the linkages between the producers and processors to effect improved marketing of herder and crop produce but also as a means of delivery of technical information and input supplies (including credit). The final livestock program aims at strengthening the capacities of producers and breeders to develop supplies of higher productivity animals and to select and better care for genetically superior animals to improve livestock turnover.

JFPR  
GENDER

ADRP  
LEAN

2008  
ADB  
prospects

local

ngt.  
infrastructure

GOOD  
PUBLIC  
GOODS  
ASPECT

### Crop Subsector

Four programs are proposed under the strategy within the crop subsector including: (i) irrigation rehabilitation and development, (ii) expansion of fodder and feed markets, (iii) commercialization of horticulture, and (iv) seed breeding and varietal development. The first is aimed at reducing vulnerability in the cropping sector and involves the rehabilitation of existing facilities and the construction of new irrigation systems. The second is aimed at development of the animal feed producing industry and includes improving security of tenure, investment incentives and capacity building for local administrations to protect hay and fodder areas together with incentives for animal feed processors. The third is aimed at developing the smaller producers into more commercial sized units so they can utilize modern production technologies and involves providing incentives for machinery and equipment supply enterprises together with farmer training and improving market linkages. The fourth aims at improving the quality and availability of seed and planting material and for supporting the development of private multiplication of specialist seed material producers.

### Sector Wide Initiatives

Programs proposed of sector wide impact include: (i) agricultural support services, (ii) access to term credit, (iii) food quality and hygiene, (iv) structural adjustment, and (v) research. The first is directed at improving the provision of technical production and market information through a network to be established using electronic media. The second is aimed at improving access to appropriate credit and proposes risk sharing arrangements, tax credits and concessional interest loans through the formal financial system. The third is aimed at protecting local consumers from unhygienic foods and involves the strengthening border controls, analytical laboratories, and the introduction of regulations for more comprehensive inspection services. The structural adjustment program is aimed at protecting those electing to relocate out of the sector, providing incentives to facilitate their re-establishment in other livelihood activities, vocational re-training and concessional finance for those amalgamating production entities. The final program aims to improve the adaptive research capacity within Mongolia and involves support for research institutions with an associated institutional mechanism for prioritizing research activities and developing links with available extension services.

STATE ROLE

AMBIGUOUS LANGUAGE

TOO BROAD

EXCEEDS GOVT. RESOURCES

ADD ROLE - WHERE IT CAN CONTRIBUTE.

## I. INTRODUCTION AND BACKGROUND

### A. Agricultural Sector in the Mongolian Economy

1. With the collapse of the socialist regime in the early 1990s, the transition to a market economy began in earnest, the Government of Mongolia being forced to deal with limited resources and entrenched expectations that the State would provide. Since then, there has been rapid development of Mongolia's private sector through the privatization of state enterprises, the national herd, and many other state assets. The transition was so rapid that, in many circumstances, voids in essential functions needed for economic growth within the agricultural sector were inadvertently created (e.g. agricultural marketing) causing disruption to rural livelihoods contributing to persistent poverty<sup>1</sup> (currently 36%), particularly in rural areas where there are large numbers of households that exist around the poverty level - also a result of the privatization of the national herd to all engaged in agricultural production creating a large number of relatively small scale (and often subsistence) producers<sup>2</sup>. Rural poverty has indeed been understated in view of migration by the rural poor into urban centers of the Central Region where they dominate the inhabitants of the peri-urban "ger" districts.

2. Mongolia's economy is still dominated by its agricultural sector providing 21.7% of GDP, 14% of export earnings and employing 40% of the country's labor force. While the sector is diminishing in importance from the overall economic perspective, the supply of food items for urban populations has assumed greater importance with the increasing urbanization that, with rising prices and limited supplies, has become highly politicized but is also seen as providing an opportunity to reduce the current levels of high unemployment. The sector remains vulnerable to extremities of weather as seen from the severe *dzuds* of 1999, 2000 and 2001 that saw a decline in agricultural GDP by 7% in 2002 over 2001 in current terms. The sector's overall importance to the economy reduced from 38% in 1995 to 21.7% in 2005, figures that have been influenced by the impressive performance of the construction and mining sectors that are assuming a more dominant role. The rural population is static at about 250,000 households but now represents a declining proportion of the total population (46% in 2001 compared with 43% in 2004). The economic shocks caused by increasingly frequent natural disasters have a direct effect on rural poverty and also on the migration patterns to urban centers. Added to the seasonal variations, a long term trend is becoming evident of reduced precipitation that has a direct impact on agricultural productivity, most notable in the cereal cropping sector.

3. Within agriculture, livestock rearing remains the dominant activity accounting for 81% of agricultural output in 2004, the crop sector accounting for the remainder. While livestock numbers were decimated during the successive *dzuds* of 1999-2002, declining from 30.2 million in 2000 to 23.9 in 2002, their numbers have been steadily increasing since and were estimated at 30.4 million in 2005. Peak livestock numbers were recorded in 1998 and 1999<sup>3</sup> prior to the *dzuds* when many households lost their entire herds/flocks. The camel population has been static at around 256,000 head in recent years as has the number of horses (2 million head). Cattle numbers have remained approximately static for the past four years at around 1.8 million

<sup>1</sup> Poverty in Mongolia is defined in terms of minimum living standards. The National Statistical Office determines the minimum levels by region. Currently, a monthly expenditure level of Tg14,700-19,300 per capita is used to determine the extent of poverty. Households with income less than 40% of the minimum living standards and who are unable to provide for their basic food needs are defined as households in extreme poverty.

<sup>2</sup> It is estimated that 82% of households rearing livestock have herd sizes of less than 200 head. The number of herding households in 2004 was 169,024 compared with 229,437 households rearing livestock.

<sup>3</sup> Camels reached their peak numbers in 1954 of 895,300 head.

while sheep and goat numbers have recorded a slight increase after the *dzuds*. Sheep numbers have increased from their low of 10.6 million in 2002 to their 2005 level of 12.9 million in response to relatively high coarse wool prices. Goat numbers have increased by the greater amount and their proportion of the national herd now is 44% compared with 37% in 2001. This change is a direct response to the high cashmere prices prevailing during the late 1990s and early 2000s that continue today, but is viewed with some concern because of the destructive grazing habits of goats. The country exports both raw fibers and animal carcasses, together with some processed fiber and meat products where there is a surplus over domestic requirements. There is an active trade in livestock products - skins and hides for processing both within Mongolia and in neighboring China. There is also a fledgling dairy industry developing round the urban centers where demand for fresh milk and dairy products is strong where there is a preference for the ecologically sound, fresh product. With milk production being highly seasonal, dairy processors tend to rely on imported milk powder that is reconstituted to complement the small quantities of out of season production to meet urban demands. For food items of animal origin, it is estimated that the dependence on imported products in Ulaanbaatar is 95% for butter and 90% for eggs while it is self sufficient in meat other than chicken and pork. By the end of 2005, prices for meat and meat products in Ulaanbaatar were about 30% higher than the 2000 levels.

4. Cropping output includes mainly cereals and vegetables. While the contribution of crops to agricultural output has remained constant at about 20% over the past four years, this figure masks the increasing importance of vegetables compared to cereal production. Of the 200,000 ha planted to crops in 2004, 173,000 ha was planted to cereal crops (mainly wheat), 9,100 ha to potatoes, 4,900 ha to other vegetables and 5,100 ha to fodder and oil crops. Returns to cereal crop producers<sup>4</sup> declined due to the area sown to cereals has decreased steadily from 263,000 hectares in 2002 to 159,000 ha in 2005. Average wheat yields have ranged between 0.5-0.8 tonnes per ha while total wheat production is around 59,000 tons each year<sup>5</sup>, providing for about 20% of the domestic requirements. By comparison, the potato planted area in 2005 was 9,000 ha while other vegetables area planted has varied between 5-7,000 ha in recent years. The areas planted to, and production of, potatoes and vegetables have shown a steady upward trend over the past ten years in response to increased urban demand because of increased nutritional awareness amongst Mongolia's urban population. Domestic markets remain heavily dependent on imported vegetables to maintain current levels of consumption. Dependence on imported food items of plant origin are estimated at 80%, 100%, 35%, 60%, and 100% for flour, vegetable oil, potatoes, other vegetables and fruit and berries respectively in Ulaanbaatar (MoFA estimates, 2006). Price levels in 2005 for potatoes and vegetables were about 5% higher than the 2000 levels whereas the equivalent for wheat products was 16% above its 2000 level.

5. A further feature common to both the livestock and cropping sub-sectors is their size distribution. During privatization, the larger cereal producing state farms were disaggregated into smaller units while the national herd was similarly distributed to individuals to be managed as independent units. During this period of adjustment, herding also provided a social safety net for the large number of workers previously employed in state owned enterprises who took up herding to provide for their immediate household subsistence requirements. As a consequence, there remain a significant number of small scale producers. In the livestock sub-sector, some

<sup>4</sup> Reduced cereal crop productivity is due to a combination of amongst others: limited and poor quality inputs, obsolete and inefficient machinery, inappropriate production technologies, declining soil fertility from poor cropping rotations and declining precipitation.

<sup>5</sup> The 2005 wheat yield was the worst recorded in Mongolia's history at 0.5 tonnes per ha from an area of 130,000 ha.

82% of herders have herd sizes of less than 200 head<sup>6</sup>, while in the cereal crop sub-sector, an estimated 58% have planted areas of less than 300 hectares. This has significant repercussions in terms of production efficiency in that small crop producers cannot justify large capacity equipment. Similarly, the large number of small but geographically dispersed herders make for both production and marketing inefficiencies<sup>7</sup>. The Government is faced with the challenge of pursuing an efficient agricultural sector yet is conscious of the need to maintain a balanced approach that will incorporate social objectives in support of the smaller scale producers where the incidence of poverty is higher.

## **B. Agriculture's Comparative Advantage**

6. The real comparative advantage of Mongolian agriculture lies in its priority development of extensive livestock husbandry with its expansive natural pastures. Extensive livestock production is specific that it is low cost, energy efficient, eco friendly, and produces ecologically clean organic products. A fodder production system based on traditional livestock production and natural pastures has comparative advantages at international and national levels. In both sub-sectors, the comparative advantage is national and international. Their international competitiveness is also due to the growing demand for natural foods produced outside of an increasingly industrialized food production system and to supply more densely populated neighboring countries with intensive, industrialized animal production systems. The development of both sub-sectors will contribute to achieving national goals of poverty reduction and the efficient use of resources in a market economy. The perpetuation of Mongolia's extensive livestock production systems will also retain the comparative advantage offered by Mongolian tourism that is conceptually integrated with herder livestock rearing.

7. Other agriculture sub-sectors do not appear to have any international comparative advantage. The development of higher productivity livestock production, driven by increasing urban demand and expanding income levels, may have a national comparative advantage relative to attempts at increasing the availability of lower priced food items for consumers. It may also stimulate the generation of employment opportunities, the development of service and processing enterprises, and in the longer term, the possible creation of surplus for export. Any surplus will have to compete directly with products from developed countries that produce large export surpluses and have a strong comparative advantage over Mongolia in terms of geographic location and freight.

8. In the immediate future, Mongolia should focus on improving livestock and feed production sub-sectors, both of which already have a degree of international and national comparative advantage. However, in the medium term as domestic markets develop, the focus will increasingly shift towards the higher productivity livestock sub-sector, especially through the integration of crop and livestock activities that will stimulate further development of the feed sub-sector and the expansion and diversification of the cropping sector. Government strategies should therefore build on existing comparative advantages, providing investment incentives for efficient producers in these areas while, at the same time, providing a social safety net mechanism that allows the less efficient small scale producers to seek other additional livelihood production activities. Providing an appropriate enabling environment for private investment within the next five years will determine whether the necessary investment will be

<sup>6</sup> This level is considered the minimum requirement to achieve a basic livelihood from herding alone.

<sup>7</sup> These include the higher costs of aggregation, the limited opportunities to introduce quality and grading standards, and also has repercussions on reproductive management practices.

made in the sector to make it viable, and if the nature of investments made will contribute to rural poverty reduction in a meaningful way.

## II. CURRENT AGRICULTURAL DEVELOPMENT POLICIES

9. Agricultural sector objectives are established within the broader national objectives<sup>8</sup> of private sector led growth, poverty reduction and the achievement of minimum living standards, food security, and regional policy to spread the benefits of development more equitably across the country. Physical targets include an average annual real sector growth rate of 6%, an average daily per capita energy intake of 2,370 calories, and a reduction in the incidence of poverty to 18% in 2015.

10. The Government is committed to continuing its transition to a private sector led market economy. The primary focus for Government's agriculture strategy is therefore to provide an enabling environment for private investment and business development within the sector. This involves the liberalization of domestic and foreign trade to support access to markets, providing a stable macroeconomic environment, and removing administrative restrictions and other forms of interference to new enterprise establishment and operation within a legislative and regulatory framework designed to ensure fair competition, provide investment incentives, and protect the vulnerable.

### A. Policies for Development of the Agricultural Sector

11. The current policy statement for the agricultural sector is found in the Food and Agriculture Policy of the Government of Mongolia, approved by Parliament in June 2003<sup>9</sup>, that replaced the General Directions of Rural Policy approved in 1996<sup>10</sup>. The overall aim of the current policy is to:-

- create favorable business conditions to increase productivity and capacity of production;
- increase agricultural output through expanded production and increased unit productivity;
- ensure the sustainable development of livestock and crop production;
- improve the availability of locally produced food products that are hygienic, of sound quality, and are ecologically clean; and
- conduct research and the application of new technologies.

12. Through these objectives, the intended outcome is for an increased consumption of domestically produced meat, milk, flour and vegetables, reduced dependence on imports, and

<sup>8</sup> As expressed in the Government Action Plan (GAP) 2004-2008, the Economic Growth Support and Poverty Reduction Strategy (EGSPRS) - 2003-2006 but with consultative mechanisms for revision and rolling forward, and the Medium Term Budgetary Framework (MTBF) - 2005-2007, but being revised for 2006-2008, and the longer term commitment to food security under the National Plan of Action for Food Security (NPA) - 2002-2015 and to the achievement of the United Nations Millennium Development Goal (MDG) by 2015.

<sup>9</sup> State Ikh Hural Resolution No.29, 15 June 2003.

<sup>10</sup> State Ikh Hural Resolution No.32, 20 May 1996.



increased level of exports. These policies are to be applied equally to the extensive pastoral and higher productivity farming systems and should be directed at improving water supplies and water management, risk management, veterinary and breeding services, pastureland tenure and utilization and fodder production and supplies. The policy objectives are to be achieved in two phases, 2003-08 and 2008-15. During the first phase, it is intended to increase the irrigated area 2.5 times to allow wheat production to provide for 50% of domestic requirements and potato and vegetable production equivalent to 70% of domestic requirements. In addition, of the total requirements for fodder in the Gobi and Steppe Zones, the Government seeks to have 20-25% produced within these zones.

13. The second phase (2008-2015) is less specific as to actions but envisages an environment of sustainable pasture utilization management with not less than 20% of herders becoming "semi-settled", and the development of higher productivity milk cattle, pork, and poultry enterprises around the cities and other urban settlements. Crop production is anticipated to satisfy 100% of domestic demand for flour and vegetables and about 10-15% for fruit and vegetable oil. This policy document does not establish how such targets are to be achieved, an issue that was subsequently rectified in the Policy Implementation Action Plan approved in November 2003<sup>11</sup>.

14. The Action Plan proposes activities in the following five areas that mirror those of the Agricultural Policy and include :-

- **Creating a favorable business climate** and increasing productivity and capacity of production. Under this objective, the Plan proposed to (i) improve the legal environment, (ii) use domestic and foreign investment, donor loan and aid funds more effectively, and (iii) establish flexible tax, credit, investment and foreign trade policies.
- **Improving animal husbandry.** This is to be achieved by: (i) increasing the productivity of well adapted local animals and reducing mortalities, abortion causing diseases, and infertility, (ii) to breed high productivity livestock for specific purposes such as milk and meat and promote production of non-traditional livestock products e.g. bees, pigs and poultry, (iii) promoting more intensive livestock entities in regional centers and in the crop producing areas, (iv) strengthening animal health services and develop the capacities for laboratory diagnoses, (v) protecting and improving Mongolia's livestock gene pool, (vi) improving water supplies in pasture areas through the rehabilitation of existing wells and the development of new sources, (vii) introducing eco-friendly technologies for pest and rodent control in pastures, (viii) increase the production of fodder, and (ix) initiate and strengthening disaster protection institutions at national, aimag, and soum levels.
- **Rebuilding and expanding crop production** by: (i) ~~developing~~ <sup>TO LOCAL CONDITIONS</sup> improved crop production technologies (e.g. minimum tillage), (ii) <sup>ADAPTING</sup> increasing the irrigated cropped area, (iii) supporting the rehabilitation of ~~small and large scale~~ <sup>NOT</sup> irrigation systems, (iv) promoting the production of locally adapted seed material to achieve self sufficiency, (v) introducing eco-friendly, advanced plant protection technologies, and (vi) promoting improved availability of agricultural machinery <sup>MEDIUM ?</sup>

<sup>11</sup> Government Resolution No.245, 25th November 2003.

and equipment.

- **Developing the food industry** by: (i) establishing milk collection and storage facilities at the local level and promoting the production of traditional dairy products as well as larger scale milk processing near urban centers, (ii) preserving fruit and vegetables and introducing appropriate modern packaging technologies to diversify production of nutritional dietary food and function food products (iii) improving the mechanisms for controlling food quality and hygiene, (iv) ensuring the supply of hygienic meat to urban consumers and introducing meat production technologies in processing plants to conform with international standards for increased meat exports, (v) promoting the production of a wider range of items that can be locally produced but are currently imported, and (vi) improving the processing and packaging of plant and animal products and upgrading storage and transportation facilities.
- **Conducting research and the application of new technologies**, thereby: (i) improving the quality and effectiveness of research, (ii) strengthening the interface between researchers, research institutes and producers, (iii) strengthening agricultural extension center services, and (v) improving the skills of agricultural specialists.

15. In each these areas, specific actions with associated budgetary requirements have been set for the period to 2008 in accordance with the Ministry of Finance's Medium Term Budgetary Framework, with funding sources proposed from the state budget, grant aid and donor loans, and private capital. Agricultural development initiatives funded by the State Budget are included in the Minister's budget portfolio. This incorporates the majority of the development programs (19 in total) with actual expenditure on these items increasing from MNT4.6 billion in 2000 to MNT8 billion in 2005, while the budget figure in 2006 is MNT11.3 billion. A total of MNT127.4 billion (\$106.2 million) is proposed for the initial five years of the Action Plan of which 47% will be funded from the state budget, 35% from grant aid, and 18% from foreign loans. The latter provides funds for staff salaries and the immediate operations of the MoFA to support the other development initiatives. MoFA's development programs are heavily dependent upon continuing donor support in spite of determined attempts in raising state budget and investments.

## **B. Commitment of Budget Resources to Agriculture**

16. In addition to the agricultural development policies and action plans outlined above, there is also a shorter term mechanism for allocating resources for sector development that occurs as new governments are elected to office giving effect to their respective political agendas. These are termed "Government Action Plans" and are prepared usually at the beginning of each government's term of office. Typically, an outline of government's objectives is presented to the line agencies responsible for preparing actions to give effect to the newly elected government's objectives. While there are common areas with the existing strategic documents, there is the possibility that the development focus of the newly appointed governments could change development priorities. For example, the 2005-08 Action Plan of the then coalition government proposed activities to achieve government objectives in (i) public administration, (ii) social development, (iii) stable economic growth, (iv) urban and regional development, and (v) nature and the environment.

### III. EXISTING AGRICULTURAL DEVELOPMENT INITIATIVES

#### A. Government Programs

17. There are some nineteen sector programs (Appendix 2) that have been undertaken by MoFA, many of which are ongoing. These include programs for the development of: (i) water resources, (ii) cereal crop and vegetable production, (iii) livestock health and breeding, (iv) cooperatives, (v) high productivity livestock industries, and (vi) accommodating food availability and security issues. Program documents tend to be couched in broad terms with indicative action plans and budgetary requirements. In practice, implementation is dependent upon a combination of state budgetary allocations, donor project funding and allocations from the monetarization of commodity aid and other bi-lateral programs. While such focused programs have presentational appeal and can provide the logical framework linking actions to objectives, implementation of the large number of programs requires greater coordination and integration given the different funding sources. All activities, regardless of funding source, should be included in the Medium Term Budgetary Framework that would strengthen linkages to resources and mainstream responsibilities (animal health, plant protection etc.), one of the recommendations from the Paris Round of Talks.

18. MoFA has improved the coordination of donor investments in the sector and has achieved considerable standardization of approaches in a number of areas. However, in the assessment of the impact from these agricultural development programs, MoFA lack the resources to undertake comprehensive analyses using appropriate indicators and information sources. Future program designs therefore cannot benefit from past performances, limiting the effectiveness of resource utilization. Improved analytical capacity would enable a more holistic approach that focused on appropriate actions of the state and the allocation of public funds. With continued pressure by the International Monetary Fund to reduce the size of the public service, the allocation of additional resources for improving the monitoring of government programs (currently severely under-resourced) will be difficult.

#### B. Donor Funded Activities

19. Most donors support the government policies to promote macro-economic stability, poverty reduction through economic growth, and improvements in governance. They include elements to promote private sector development, including fiscal reform, strengthening of the financial sector, as well as provision of social services and social protection to counter increasing social inequalities, particularly in the context of the Government's regional development policies. Some directly support agriculture and the rural sector in their strategies, the main features of which are summarized in Appendix 3.

20. While many of these interventions directly impact on the sector strategy proposed above, integration with established government programs is less successful as donor programs tend to operate in isolation. Donor funded initiatives also suffer from weak assessment of their impact, limiting opportunities for replication and the mainstreaming successful initiatives. Furthermore, the lack of sustainability of some donor programs, often because they operate outside mainstream activities and, sometimes with conflicting approaches, the Government has questioned the value of foreign assistance and why it is achieving less than it should. Hence a central feature of Government's Action Plan for 2004-2008 is to improve the efficiency and effectiveness of the use of donor funds. This has been translated within MoFA into increased

efforts for donor coordination from early 2005. The presence of a comprehensive medium to longer term strategy for the sector should facilitate this by providing a framework for both donor and government interventions, integrating both into a single mainstream sectoral strategy.

#### IV. VISION FOR THE FUTURE

21. To develop a strategy to realize the potential of the agricultural sector to contribute to the national goals of economic growth, poverty reduction, and food security over the medium to longer term, a vision of how the sector will appear in the future is needed. The following outlines how the Government sees the sector in five to ten years time.

22. Extensive livestock will continue as the priority system of livestock production, but will be more financially and environmentally stable as improved risk and resource management becomes integrated into production systems, reducing the risk of investment in herd size and quality and reducing herder dependence on the Government. Increased total numbers of livestock and balanced herd composition will result in increased numbers of commercial herders. In this regard, policies to decrease excessive numbers of goats that are harmful to pastures will be pursued simultaneously protecting and promoting the increase of camel and yak herds. Structural changes within the herd are initially likely to be in response to domestic demand - increased urbanization in the Central Region, increased per capita consumption (income effect) and changing urban tastes such as preference for young beef. Better prices, higher productivity, and improved turnover will in turn improve profitability, trends that will support commercialization of semi-subsistence or marginal herders and prevent them from slipping into poverty. Livestock productivity will also benefit from their integration with crop farming, particularly in the Central Region where there is greater opportunity to conserve fodder - not only to protect against harsh winters but also to reduce the seasonality of meat and milk supplies. Subsistent herder livelihoods will also become strengthened through diversification into other economic activities such as eco-tourism. While many families may continue to own a few animals for domestic consumption, their numbers will be dramatically reduced and livelihoods will be even more dependent on other off-farm activities.

23. Higher input (higher productivity) livestock rearing enterprises will also develop in response to growing urban market opportunities, but will range from semi-intensive production units (beef and dairy) to highly intensive (confined) enterprises (pigs and poultry). Most will remain small to medium in scale. Increased demand in urban areas shall lead to increased investment in higher input production systems to increase productivity. Investment especially shall flow into the provision of fodder and water for breeding of higher input livestock taking into account the fodder requirements of these animals during the cold winter. With increased penetration of fresh dairy products and fresh meat into urban markets, there will be an associated increased demand from milk and meat cattle breeder-farmers for feed both in the form of conserved fodder, milled feed and by-products from agro-processing industries, supporting commercial diversification among crop producers, reducing pressure on pastures, and a providing a market for quality bred animals from the extensive sector. Small animal confinement ventures (pigs and poultry) will become more prevalent around urban centers as higher incomes. The weaker linkages between urban dwellers and rural kinfolk will generate sufficient sustainable demand to justify the investment risk. Production of all types of forage will expand, often by livestock enterprises for their own herds.

24. Wheat production will increasingly become concentrated in the more efficient larger farms of the Central Region of between 500 and 3,000 ha that can achieve sufficient yields to finance the procurement of improved seeds and other inputs, to maintain and replace machinery, and to expand areas under irrigation from operating revenues and profits. Smaller grain producers will founder as input and equipment issues impact on the timing and quality of field operations, though they may be able to diversify into lower cost forage farms. With increased focus on sustainable cropping systems, planting of fodder plants and rotations will provide opportunities for livestock integration and similarly, grain production will become increasingly integrated with livestock through the demand for feed grains. Integration will not necessarily be on the same farm or even within the same enterprise, and will be driven by the demand for livestock products, particularly from livestock production destined for the local market. Also significant will be grain production for the spirit industry, which will remain a buoyant sector both at home and abroad. Production of other specialized grains and oilseeds will also increase, though on a limited scale constrained by the slow growth in viable and sustained market opportunities and the availability of cheaper imported products.

25. Horticulture will become increasingly diversified responding to the growing level and sophistication of demand in Ulaanbaatar, aimag centers and urban areas that are connected with mining. Irrigated plots, improved technologies, expanded use of greenhouses, ornamental and medicinal plants, and small scale fruit and berry orchards will become increasingly significant, as will links with small livestock production, but remain relatively small in scale (from one to five ha) and volume. Backyard vegetable production for home consumption will continue to increase across the country but commercial operations will concentrate around population centers, with success dependent on productivity, storage, transport infrastructure and marketing. Opportunities for the continued expansion of this industry are closely linked with quality and the limited use of chemicals in local production providing a distinct advantage over imported Chinese potatoes. Potato production will expand across the country, based on profitable opportunities in local markets, and become increasingly sophisticated through new varieties that have better storage, handling and processing characteristics.

26. Agro-processing will be less buoyant initially as production systems adjust before becoming more efficient and reliable suppliers to processors with some processing industries ceasing to operate. Numbers of fodder processors, potato and vegetable processing and storage enterprises, small wholesalers, and other processing, storing and retailing enterprises shall increase. However, the foundations for stronger subsequent growth will be laid. Small, and in some cases, experimental enterprises will increasingly appear, including feed mills, vegetable storage, fruit and vegetable wholesaling and home processing, and forage cubing. Meat and dairy processors will consolidate and expand vertically into production and horizontally across other sectors. Small meat and dairy plants will find it increasingly difficult to compete with the enforcement of higher hygiene standards in markets both local and abroad. Improved quality hides and skins from higher productivity livestock rearing enterprises could support improved leather goods processing in competition with imported finished leather goods, but could also lower the price of inferior hides and make them difficult to market commercially. Tighter environmental controls will increase costs and compound this problem.

## V. PRIORITY OBJECTIVES FOR INVESTMENTS

27. Government's primary objective is to support the development of a vibrant agricultural sector by reducing its vulnerability, improving its competitiveness and ensuring sustainability of

the country's natural resources. To achieve this, the Government must provide the appropriate legal and regulatory environment that stimulates private investment in the food and agriculture sector while protecting vulnerable consumers, providing for fair competition and market access. In some policy areas, particularly those relating to the ownership and user rights and obligations over land and water, further development is needed to provide long term security that will facilitate investment to improve the productivity of these natural resources. Furthermore, the preparation and implementation of government policies has been confounded by resource and capacity limitations at both the central level where policies and programs are formulated, and aimag, soum and bag levels, where they are implemented. The Government must also adopt a positive approach towards meeting its social responsibilities with respect to poor and marginal (less efficient) producers or herders through promoting viable employment and income generating alternatives, even if these are within the rapidly expanding urban environment.

28. Based on these government roles and objectives, the main thrust of the strategy is to achieve:-

- **competitiveness in changing markets** - improve the private sector's ability to compete in, and expand production for domestic and export markets;
- **reduced vulnerability** amongst producers - improve livestock and crop producers capacities to deal with the changing climatic conditions and other risks; and
- **sustainability** of the country's agricultural production systems.

29. These will be achieved through government initiatives in:-

- **providing an enabling policy environment** - encourage the private sector to invest in agriculture to exploit market opportunities within the confines of consumer protection and fair trading practices;
- **resourcing supportive implementation capacity** - equipping MoFA and other relevant government agencies, and local governments with the capacity to formulate appropriate programs and effectively implement them; and
- **mitigating the negative impacts** of structural adjustment within the sector on the rural poor.

#### A. Competitiveness in Changing Markets

30. Improved competitiveness is dependent upon achieving improved productivity that will come from new private investment in production technologies (e.g. minimum tillage wheat production) that are essentially on-farm or enterprise investments whereas there are other investments of a more public nature (e.g. the rehabilitation of irrigation head-works) that also support improved competitiveness. The Government can play a supportive role by providing incentives for on-farm investments as well as fund investments of a more public nature. Given the transitional nature of Mongolia's economy and the relatively underdeveloped private sector for input supplies and marketing, and the importance of some of these industries to overall socio-economic activity, the Government has elected to provide additional investment incentives in selected industries such as concessional loans for machinery purchases. These are considered short term measures that will progressively be phased out as private resources return to the sector and essential economic functions are taken over by private operators.

## 1. Livestock Sub-sector

31. Improvements in both the extensive and higher productivity livestock sub-sectors will require increased enterprise profitability and product marketability. Increased profitability, in turn, requires greater productivity, higher farm-gate prices, and diversification to higher value products. This can be achieved by: (i) improving the nutritional status of livestock, particularly during winter and spring (conserving enough fodder and, where economically justified, commercially prepared feeds), (ii) improving access to water to provide for better pasture utilization, (iii) improving livestock management practices to improve livestock breeding technologies, reduce losses over winter and the incidence of disease thereby minimizing risks, (iv) improving selection of custom purpose breeding stock from well adapted local species as well as increase number of high productivity breed and elite breed livestock through artificial insemination<sup>12</sup>, and (v) improving access to technical information. Better marketability will require (i) greater attention to product quality (grading with associated price differentials) and diversification (particularly in the context of developing urban and neighboring country markets), (ii) a sound risk based approach to animal health (to ensure hygienic products are delivered to domestic consumers and international acceptance of sanitary certification), (iii) continued improvements in processing and handling practices to meet both domestic and export market food safety standards, and (iv) better market information and improved market access as a result of trade agreements and promotion by both public and private sector institutions.

## 2. Cropping Sub-sector

32. Prospects for cropping activities are closely linked to the Government's desire for food self-sufficiency, the impact of urbanization on domestic demand for a broader range of quality foodstuffs, and the effect of competition from imports and opportunities for export resulting from developments in neighboring markets. Productivity improvements will require improved (i) access to water resources to secure crop production, (ii) access to quality seeds (affecting yield, product quality, and variety), (iii) access to modern machinery and other production inputs (largely a function of access to appropriate finance), (iv) access to technical information to support improvements in cultivation and processing techniques, and (v) marketability will require improvements in handling, transport and storage (also includes processing), and the improvement in market information and access. Such investment is unlikely without creating the necessary security of land tenure for investors so that their capital investment can be protected into the future. There is also the collateral issue for rural lending that could be addressed by the issue of title or long term user rights for crop producers.

## B. Reduced Vulnerability

33. Reducing vulnerability to shocks is a further means of stimulating private investment in the sector. Based on the experience of the recent *dzuds* and given the current structure of both herders and crop farmers, the Government recognizes the need to provide some form of safety net in the event of natural disasters to preserve the productive base (breeding animals and herder livelihoods in the livestock sector and essential food supplies for the public from the cropping sector). The Government recognizes it has a role to play in preserving the health

<sup>12</sup> The "Improved Quality of Livestock Program" approved in May 2006 supports the identification and breeding of higher productivity local animals through private breeding centers proposed in each aimag. The Government will provide training in animal selection using commercially oriented heritable traits.

status and quality of the national herd through the prevention of infectious diseases and in ensuring that adequate food supplies are available in the event of crop failure.

## **1. Livestock Sub-sector**

34. Closely linked to productivity issues, greater focus must be given to improving the management of livestock so they are better equipped to survive the winter. This extends not only to better nutrition and disease control but also to improved turnoff and culling practices, particularly with the greater proportion of less experienced and young livestock owners engaged in herding. An essential element of the strategy is to increase herders' responsibilities in caring for their livestock whilst the Government should always ensure that emergency supplies can be made available should the need arise. There must be careful assessment of the levels of emergency feed material retained by the Government<sup>13</sup> as part of its emergency reserve program as private herders maintain the view that the Government will protect their stock in the event of a natural disaster. For herders, this is the least cost solution. The introduction of livestock insurance, albeit on a trial basis, and improving breeding operations and services to improve livestock quality will contribute to reducing the vulnerability of herders.

35. The Government must also help in protecting the disease free status of its national herd by maintaining disease surveillance while providing for emergency response to notifiable diseases as specified by Office Internationale Epizootique (OIE)<sup>14</sup>. It has responsibility for responding to outbreaks of contagious diseases and in protecting consumers from zoonotic diseases. As part of the Government's disease control program, vaccines are procured mostly from Biokombinat (a state-owned enterprise) at negotiated prices that are often below the international equivalent. With its aging plant, some of more effective modern vaccines cannot be produced (such as duplex vaccines) and supplies must be imported. Provided quality can be assured, this is a cost effective measure for the Government in meeting its responsibilities for the control of disease outbreaks. Without the national disease control programs, the level of veterinary services in the field would decline significantly. Similarly, the continuation of disease surveillance programs involving routine sampling by private veterinarians with subsequent analyses in aimag level diagnostic laboratories is considered an essential component of the Government's efforts in reducing vulnerability amongst the livestock producers.

## **2. Cropping Sub-sector**

36. As for the livestock sub-sector, attempts to reduce vulnerability are closely linked to improving productivity in the sub-sector. The main source of vulnerability lies in the irregularity of water from all sources. Because of drought frequency producers generally tend to expect there will be a complete crop failure one year in five when standing crops will not even be harvested. In situations where large irrigation systems have fallen into disrepair, the Government could consider their rehabilitation as a public investment as a means of reducing vulnerability to erratic natural precipitation. In situations where localized irrigation facilities either need repair or development, the Government is considering providing concessional term finance to ease the burden of commercial interest rates that cannot be afforded at current levels of

<sup>13</sup> Some conserved fodders such as hay deteriorate and must be consumed in the year immediately following their conservation. As such, it is necessary to buy and sell such food reserves each year to maintain the nutritional value of stored feed reserves for livestock.

<sup>14</sup> The international institution responsible for recommending animal health standards for implementation by governments.



productivity as incentives for producers to secure improved water resources for their cropping activities.

37. With over 480 irrigation schemes throughout the country, most of which have been fully privatized, the Government needs to adopt different strategies depending on the nature of the irrigation systems to be rehabilitated. With the extensive damage that followed privatization<sup>15</sup>, the cost of rehabilitation will be prohibitive i.e. commercially non-feasible in many cases. The process of prioritizing those schemes that can be economically rehabilitated requires considerable technical and economic expertise whilst remaining sensitive to the political pressures of government. Included in the assessment is the need to determine the ownership rights and responsibilities of rehabilitated schemes to ensure that there are appropriate operational and maintenance provisions and a capacity and willingness to pay for the water made available.

### **C. Improved Sustainability**

38. The long term sustainability of the agricultural sector is based on maintaining the productive capacity of its natural resources that are central to the extensive livestock sub-sector (natural pasture lands) and cropping sector (soil fertility). Both of these are currently threatened, the first from uncontrolled overgrazing particularly around rural settlements and destroyed water-points that increases the grazing pressure round operating wells, and secondly by the use of inappropriate land preparation techniques that progressively reduce soil organic matter and damages soil structure in the cropping sub-sector. Extensive damage has been recorded to both with some 90% of cropland considered degraded<sup>16</sup>. Initiatives directed at improving sustainability of the natural resources can be addressed on two fronts - by issuing long term, enforceable user rights to pastures, water resources and crop land so that users can share responsibility for protecting the resources from which they derive their livelihoods, and by direct investment in strategic rehabilitation of water points and pasture improvement through the introduction of drought tolerant species (e.g. *Attriplex* spp.) and by the enforcement of exclusion areas particularly in the Gobi area. Government efforts at structural adjustment of the national herd will also improve sustainability of the extensive grazing livestock industry. As herd sizes increase, there is less dependency on off-farm sources of incomes and herders can move to the more distant pastures away from the soum centers (where the employment opportunities are greater).

### **D. Enabling Policy Environment**

#### **1. Land and Water Tenure and Resource Management**

39. Continuing uncertainty of land and water tenure and user rights is obstructing investment by the better resourced producers (and those that may want to enter the sector) in improving the productive base for their agricultural activities. Security of tenure is a necessary prerequisite for private investors to reap the benefit from undertaking capital improvements on assets that remain state property. For herders and crop farmers to invest in pasture improvement, to adopt sustainable pasture and crop management practices, to invest in fodder conservation, water supplies and other desirable initiatives aimed at increasing productivity, they first require long

<sup>15</sup> Drainage and delivery canals were smashed and metal pipes and gate valves removed for sale to scrap metal merchants.

<sup>16</sup> Selenge Aimag report in May 2006.

term user rights that are legally enforceable and actively policed. Failure to attend to these requirements will accelerate the rate of desertification being witnessed in Mongolia as changing climatic conditions confound the problems of natural resource management.

## **2. Access to Affordable Term Finance**

40. Despite significant improvements in commercial rural lending for carry-on purposes, agricultural producers and small processors require access to medium term investment finance at prices that reflect enterprise profitability and their repayment capability. High interest rates that apply to the limited range of term loan products suggest a distrust of agricultural sector borrowers by financial institutions<sup>17</sup>. The lack of collateral due to unresolved land ownership issues and long periods of under-investment in fixed and moveable assets (and also low returns), support opinions that agriculture constitutes an unacceptable risk. Even so, poor understanding of proposed installment credit and leasing arrangements has denied investors access to the means of financing the renovation of on-farm improvements and small to medium enterprises to finance improvements in technology and stimulate investment from outside the sector (as a taxation minimization strategy).

## **3. Production Intervention Strategies**

41. In the past, the Government has provided input subsidies in a targeted manner aimed at addressing the declining share of domestic production, particularly for cereal cropping, through the Agricultural Development Fund resourced from the monetarization of commodity aid and donations of equipment under the Japanese funded 2KR program. These interventions are now widely recognized by MoFA to have been less effective in achieving the desired outcomes as dependence on imported goods has actually increased. Direct subsidies have also had the effect of perpetuating producer dependence on the Government, but more critically, have dampened any enthusiasm for the establishment of private activities in these areas such as input and machinery supply businesses. The Government is therefore investigating alternative ways of providing incentives for the private sector to provide essential materials and services in agriculture. In view of the importance of the food sector to Mongolia's rapidly increasing urban population and the fact that functional voids still persist following privatization, incentives (at least in the short to medium term) are appropriate to encourage private investment.

## **E. Supportive Government Capacity**

### **1. Formulation and Evaluation of Policy and Programs**

42. Current development programs are designed by staff with limited experience in market oriented economies and are based on poor information due to incomplete monitoring and evaluation of public and donor programs that would enable more critical analysis of the motivating influences on the private sector and the best approaches to support and stimulate private investment. This is confounded by the fact that donor funded projects (that account for the majority of development activities) bypass the main budgetary processes. There is a need to link good program design with sound budget formulation and efficient execution, well monitored

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<sup>17</sup> The extent of direct investment by certain corporate entities from outside agriculture, when combined with good management, suggests that agriculture need not be an unacceptably high-risk investment.

and evaluated within the context of a medium to longer term sector strategy. Some reorientation of approaches and capacity building is therefore needed within MoFA.

## **2. Implementation Capacity at Aimag, Soum and Bag Levels**

43. Responsibility for the implementation of land and water tenure reforms and management systems, as well as a large array of regulatory activities, have been delegated to local authorities (such as water user contracts, licenses, fees, pasture management plans, environmental monitoring, etc.). Aimag administrative units have neither the resources (human and financial) nor the skills to implement centrally conceived programs. Effective rural development is dependent upon improving the capacity of local authorities to effectively, and transparently carry out their duties. This is in conflict with the directions being recommended by the International Monetary Fund in their quest for a smaller public service but is considered necessary if decentralized administrations are to assume responsibility for their expanded list of duties.

## **3. Sector Linkages**

44. Linkages that are characteristic of efficient agricultural sectors have been disrupted in Mongolia, partly due to the transition and partly due to the unique characteristics of the sector with its large number of small scale producers scattered over extensive geographic areas. The linkages between publicly funded activities such as extension services, research, and agricultural education and producers have been disrupted with the limited availability of budgetary resources. On the commercial level, linkages between producers and markets (the market chain) were severed with privatization as processors collapsed under an unfamiliar regime. The participation of the private sector in determining appropriate programs to support agricultural development remains a relatively new concept within government. The restoration and strengthening of these and other linkages is needed to stimulate practical and relevant exchange of information and assistance and to ensure that market signals are relayed to producers.

## **F. Mitigation of Negative Impacts**

45. With a primary focus on improving the efficiency of commercial agriculture (vis a vis subsistence producers) and, given the distribution of farm size in the crop and livestock sub-sectors, only a proportion of small-scale producers will be able to consolidate their operations to benefit from economies of scale. To achieve sustainable household incomes, it will be necessary for other marginal producers to diversify into other sectors, some of which may be related to agriculture but many opportunities lie outside the sector serving either local communities or through migration to local and regional urban centers and major cities. To facilitate this transfer, the Government will need to adopt interim programs of social, technical, and credit assistance if agricultural sector growth is to be achieved and rural poverty reduced.

46. In contrast, the difficult environmental conditions that followed the transition process, particularly with respect to the degradation of pastures close to urban centers and the deterioration of abandoned, marginal crop lands will be resolved through the adoption of sustainable commercial agriculture for which a sustainable productive environment supported by improved resource management systems will be a basic requirement.

## VI. INVESTMENTS IN SUPPORT OF THE STRATEGY

47. In order to give effect to the Government Strategy for development of its agricultural sector, the following investment programs are considered appropriate. Presentation of the programs in this format identifies initiatives that support direct investment programs, associated policy consolidation considered necessary, and capacity building within the supporting institutions to coordinate development. Presented in this manner, the financing source is not identified, be it from consolidated revenue or donor funding (both grant and loan assistance). As such it draws attention to the investment requirements within the sector and allows alternate financiers to identify their preferred area for support given their own investment strategies for Mongolia. Programs presented in this section do not necessarily mirror the framework described in the strategy - competitiveness, reduced vulnerability and sustainability because the programs proposed contribute to each of these strategic objectives in different ways and at different levels of significance. The proposed programs are based on their primary focus that can extend across sub-sectors but each has components of supportive investment, policy development, and capacity building.

### A. Livestock Sub-sector

#### 1. Agricultural Land Utilization and Management Program

48. The objective of this program is to implement a sustainable pasture management system that is respected by herders and crop producers alike and provides for the long term and sustainable utilization of Mongolia's natural resources by the extensive livestock rearing industry. With the collapse of negdels and the privatization of the national herd, grazing patterns are no longer adequately managed yet there are larger numbers of smaller, independently managed herds. The coordination of nomadic herders' seasonal migration is made more difficult by the reduced access to water resources due to the break down of wells and the diminished resources at soum administration offices where grazing patterns are managed. As a result, there has been increased pressure on natural pastures and in some instances, desertification has accelerated in pastoral and cropping areas. A number of pasture management systems with associated well rehabilitation activities have been piloted in Mongolia to better manage its rangelands that have shed some light on the complex interactions between herders and natural resource utilization, it is clear there needs to be additional public investment, supported by some degree of regulation to ensure sustainability of the country's most significant renewable resource. The Land Law classifies land as agricultural<sup>18</sup>, urban, roads and telecommunications, forest resources, water resources, and land for special needs<sup>19</sup>. The Ministry of Construction's Land Administration Agency is responsible for the coordination and regulation of all land related issues, but deals primarily with the 10% of Mongolia's land comprising urban settlements. It has neither the resources nor expertise to deal with the complexities of pasture land management and has delegated this responsibility to aimag and soum administrations that are equally under-resourced and skilled to perform these tasks. The declaration that pasture land constitutes "public" areas<sup>20</sup> under the Land Law has failed to address herders' conflict or provide any incentive to improve the quality of this resource.

<sup>18</sup> This includes hay and fodder producing areas, crop land, non arable land, land upon which agricultural infrastructure is established - e.g. reservoirs, and pasture land.

<sup>19</sup> This includes areas that are preserved for the conservation of fodder for the State Reserve.

<sup>20</sup> Other than high input agricultural production activities.

49. There needs to be clarification of the user rights of herders to seasonal grazing areas so they pursue an agreed pattern in the knowledge that standing feed awaits them at another location for the critical winter spring period or that conserved fodder areas can be adequately protected from grazing at certain times of the year - crucial for nomadic herders. These user rights need to be legally based, respected by all, but most importantly, enforceable. In this regard, there needs to be: (i) considerable capacity building at soum and aimag levels, (ii) improved pasture mapping capacity at aimags to support the administration of agreed pasture management plans by soums, (iii) greater understanding of natural resource management by soum agricultural staff with resources to ensure that agreed plans are honored and desertification concerns are addressed, (iv) increased public investment into water point rehabilitation and establishment that will be an integral part of the program, part of which will involve further clarification of the ownership and water user rights together with increased understanding of the responsibility for operations and maintenance, and (v) a review of the institutional arrangements for administering longer term user rights to herder groups and *khot ails*<sup>21</sup> over pastoral land by either the Ministry of Food and Agriculture or possibly the Prime Minister's Department. The program seeks a change of attitude amongst herders to assume greater responsibility for management of the natural resources and will therefore require significant training of the ultimate beneficiaries of this government funded program.

## 2. Risk Management Program

50. The objective of this program is to improve both government and herder capacity to minimize the risk associated with livestock rearing. It recognizes that the climatic conditions experienced in rural Mongolia are deteriorating and have a significant impact on herder livelihoods with increasing frequencies of droughts and *dzuds*. Given the importance of the livestock sector to overall economic activity and the significant numbers of herders who are directly dependent upon livestock rearing for their livelihoods, the Government considers that emergency measures are needed to protect and preserve Mongolia's livestock sub-sector. Historically, the Government maintained significant reserves of hay and fodder through the State Emergency Fund that were distributed during the severe winters to sustain livestock. It also maintained inter-aimag "*otor*" grazing areas<sup>22</sup> that had their own separate management and administration. Also, the state specially allocated hay fields to build up state hay reserves when the State Fodder Fund was operated. With limited resources to continue these activities, the Government rationalized its emergency reserve activities allocating greater responsibility to herders for conserving their own fodder, but, at the same time, assigning responsibility to local governments for maintaining emergency reserves, albeit at reduced levels.

51. The program therefore is aimed at improving the Government's capacity to assess the emergency fodder requirements without disrupting private initiatives in commercial fodder production. This program, while closely linked to the issue of pasture management, seeks to: (i) establish a system for forecasting the carrying capacity of rangelands and an early warning system for drought and *dzud* linked to defined responses by the State; (ii) strengthen disaster response capacity, including reserves planning, scale and location, based on risk assessment analysis, cost efficiency, impact effectiveness etc.; (iii) to support areas richly endowed in pasture and water resources to be used in times of emergency, and (iv) to have establish

<sup>21</sup> Neighboring families.

<sup>22</sup> A State administered high carrying capacity pasture area used for emergency grazing purposes by herders. The State determines whether to include each particular inter-aimag grazing area as land described under the Land Law as "Special Needs".

criteria that will facilitate the identification of drought and *dzud* effected herders. As a parallel initiative, the Government will provide incentives to herders to better prepare their livestock for the winter spring period. These include: (i) security of tenure of fodder production areas for feed conservation purposes (including standing crops in agreed winter-spring grazing areas); (ii) to protect winter and spring camp pasture reserves, improve its management and its appropriate utilization, (iii) the development of risk spreading mechanisms such as livestock insurance to mitigate possible losses at reasonable economic cost; (iv) increased training in livestock management and risk minimization strategies for herders and livestock producers; (v) incentives for investing in fodder conservation machinery, equipment and pasture improvement; (vi) to expand production of fodder using locally available resources, and (vii) the control of pests and rodents in pasture areas.

### **3. Livestock Disease Monitoring and Emergency Outbreak Response Program**

52. In order to maintain the health of national herd to international standards, this program is directed at strengthening State capacity to monitor livestock and herd diseases according to OIE requirements. Veterinary services have been effectively privatized between 1997-99 with animal health services now being available at soum level through private veterinarians. The livelihoods of these veterinarians are somewhat dependent upon government programs for routine and emergency vaccinations against notifiable diseases. There is limited capacity and willingness to pay for veterinary services by herders although gradually, this attitude is changing (service fees are insufficient to maintain veterinary clinics and provide for veterinarian living expenses, diminishing incentives for new graduates to work in rural areas). Without biological samples being routinely collected and analyzed, the Government is not able to effectively plan the appropriate support for the economically significant infectious diseases. Existing veterinary laboratories are rundown and laboratory staff need further capacity building in modern analytical procedures. Disease surveillance is an important aspect of ensuring the international competitiveness of Mongolia's livestock and livestock products on export markets and the public nature of this investment is appropriate and clearly beyond the realm of private herders and livestock rearers.

53. The disease monitoring and emergency response program will include: (i) support for the rehabilitation of the aimag serum laboratories, upgrading facilities to conduct tests of international standard to be performed closer to the point of collection, (ii) training of laboratory staff and private veterinarians in analytical and sampling procedures, (iii) strengthening of the links for technical support of the aimag laboratories with the State Central Veterinary Laboratory (SCVL), (iv) rebuilding the epidemiological database maintained by SCVL along with its reference laboratory facilities, (v) maintaining routine blood sampling and analyses to provide data for disease surveillance, (vi) support for the ongoing operations of the aimag veterinary serum laboratories, and (vii) based on the favorable experience of an earlier European Union (EU) funded project<sup>23</sup>, establish a drug supply revolving fund facility to support the operations of the soum based animal health service providers.

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<sup>23</sup> The EU funded "Strengthening National Veterinary Services Project" included a revolving fund that was accessed by private veterinarians to obtain veterinary supplies for on-selling to herders. The fund was maintained with repaid funds from the proceeds of sales and operated with minimal administrative costs that enabled competitive interest rates to be levied against goods supplied. Such an activity also promoted the establishment of drug import and distribution enterprises over which the Government could exercise some quality control through its procurement procedures.

#### **4. Strengthening Linkages Between Livestock Producers and Processors Program**

54. The objective of this program is to strengthen the linkages between livestock rearers and the consumer by developing more formal links to provide opportunities for producers to better respond to market demand and provide added security in product disposal, thereby increasing producer returns. With a widely dispersed production base comprising predominantly small scale producers, there are significant inefficiencies in the marketing of livestock and livestock products. Given this industry structure, producers are vulnerable to itinerant traders who capitalize on their isolation and limited knowledge of ruling market prices from both within Mongolia and neighboring countries. Product aggregation is undertaken by these traders who wander through rural areas at certain times of the year for example when cashmere is combed (April May) or when livestock are sold (May, June, October November) etc. While this system is functionally sound, the failure to utilize established grading standards does not allow producers to benefit from producing superior quality goods and ultimately modifying their production systems, nor does it allow consumers to express their preferences. To assist the sector to become more market oriented and quality based (competitive), closer links should be developed between producers and the immediate consumers of herder produce. The program will seek to strengthen the linkages between producers and processors while developing direct producer support mechanisms for technical support, input supply functions, and possible credit against delivery contracts through the processors.

55. The program will: (i) identify suitable agro-processors who have long term intentions of operating in Mongolia based on local raw materials and products and facilitate the upgrading of their processing operations to meet modern standards on either domestic or international markets as appropriate, (ii) identify mechanisms for developing linkages between product suppliers and the processing works providing investment funds to establish the necessary public infrastructure to facilitate agricultural raw materials and products aggregation, storing and transporting to the processing works (developing the marketing networks), (iii) develop the legal framework for operating product grading systems, (iv) support initiatives to deliver inputs including appropriate credit through these processors by providing training and, where appropriate, non market interest rates to allow contracted suppliers to improve their production system to meet the agreed quality standards, (v) promote the organic nature of Mongolian produce while conforming to international standards, and (vi) provide improved market information to enable producers to make informed production, management and marketing decisions.

#### **5. Improved Quality of Livestock (Management and Breeding) Program**

56. The objective of this program is to develop the livestock management skills of the livestock producers and specifically strengthen breeder selection and flock/herd composition that will improve returns from livestock rearing. This program acknowledges the current structure of the herding and higher input livestock rearing enterprises - that some 80% of herders have herd sizes of less than 200 head of sheep equivalents, and more critically, that some 60% of the current herders are considered to have less experience. Herding was an effective social safety net for many households that partly explain the rapid increase in numbers of livestock producers after the period after privatization of the national herd. Many herder lack knowledge and financial means for managing livestock, pasture utilization and improving health of their animals to overcome harsh winters, which limits their management choices to improve their livestock breeds. There is lack in professional personnel to provide livestock genetic and

selection operations and services at local level, and there is a need to strengthen breeding service centers. While management is considered one of the main limiting factors in determining livestock productivity, the genetic variation within the Mongolian livestock is sufficiently diverse to allow an effective breeder selection from amongst the well adapted local animals although small herd size actively works against this opportunity. In the higher input livestock sector, output per head can be raised from the introduction of new genetic material once the other limiting factors have been addressed (such as venue and nutrition).

57. The Government is keen to continue its efforts in improving livestock productivity in both the extensive and higher input livestock sub-sectors. While essentially a knowledge based program, the Government will: (i) support breeding of local adapted breeds and high productivity breeds, regionalize them, and support establishment of optimal livestock types and herd composition. (ii) to improve herder knowledge of methods to improve livestock quality, their sustainable development and adopting new commercial techniques, (iii) support the operations of private regional livestock breeding centers that will give greater focus to the "Elite Breeder" concept, (iv) provide support to private sector breeding high productivity milk and meat cattle, (v) protect the gene pool and support operations of the Centre of National Gene Pool and its branches, (vi) support research into the selection of more commercially oriented heritable traits for breeders (meat and milk productivity and fiber diameter in the case of wool and cashmere), (vii) recognize, through registration and certification, and support the formation of private breed centers<sup>24</sup> with the view to establishing pure bred "suppliers" of high quality breeding stock and semen and support them in their production activities, and (viii) to support education and training of breeding specialist in learning new methods and techniques.

## **B. Crop Sub-sector Program**

### **1. Irrigation Rehabilitation and Construction Program**

58. The overall objective is to reduce the vulnerability of crop producers from climatic influences by securing water supplies in a sustainable manner. This recognizes the increasing importance of crop production within the agricultural sector to provide economic opportunities and employment but also in substituting domestic production for the significant proportion of imported food items. To achieve this outcome, there will need to be: (i) direct investment by the Government in the more public components of irrigation systems (head-works and distribution/drainage channels), (ii) realistic mechanisms for providing land ownership and tenure arrangements within the schemes (long term user rights for the irrigable land and land under irrigation infrastructure), (iii) further development of cost recovery mechanisms (establishing and collection of water service charges) to meet scheme operating costs and maintenance (routine and periodic maintenance of main structures and supply/drainage systems), (iv) strengthening of technical support for irrigated crop production (including water conservation farming and sustainable utilization of irrigated areas), (v) capacity building for MoFA in supervision, contract management and the economic analysis of public investments, (vi) additional resources for research into irrigated production technologies, (vii) increased research into the identification of alternate water resources, and (viii) further producer training. In addition, the Government should further develop its policy in respect of land tenure to remove the uncertainty faced by producers who fail to utilize the irrigated land in two successive growing seasons and support private contracts between scheme owners and those utilizing the water provided by the scheme.

<sup>24</sup> Possibly one per aimag.



## **2. Expansion of Fodder and Feed Markets Program**

59. The objective is to facilitate the development of the animal feed industry based on both natural and improved pastures under irrigated and non-irrigated conditions, depending on the location (land form) and natural precipitation. This stems from the steadily growing demand from the higher input livestock production systems, the need to better care for livestock over the severe winter spring period (that also coincides with the time for parturition), and the potential to supply external markets in neighboring countries of China and Russia. To exploit Mongolia's comparative advantage in feed production, urgent attention is needed to address the rights of those conserving fodder or producing fodder crops to protect their production areas from itinerant grazing by other herders<sup>25</sup>. There also need to be investment incentives: (i) to fence production areas from unauthorized grazing by way of concessional loans and accelerated depreciation of private investments, (ii) for investment in fodder conservation machinery, as well as (iii) developing improved capacity of local administrations to police the exclusion agreements between those conserving fodder and administrations responsible for the land in question. In addition, the Government should support: (i) further research into the establishment and management of seed multiplication and fodder crops with short growing period such as alfalfa (lucerne) and other quality fodder grasses and tree/shrub species under local conditions, (ii) introduce investment incentives for private processing of animal feed material with supply contracts linking the emergency feed program in aimag and soum centers, and (iii) support the establishment of an independent feed quality laboratory to monitor feed quality<sup>26</sup> of both locally produced and imported feeds.

## **3. Commercialization of Horticulture Program**

60. The objective of this program is to facilitate small scale producers to make the transition from small scale subsistence producers to more commercially oriented horticultural enterprises capable of responding to increased and diversified domestic demand for horticultural goods and compete more effectively with imported goods. Currently, subsistent production dominates the sub-sector with 59% of all potato producers and 67% of all vegetable producers having areas less than 0.1 ha of crop. Only 4% of potato farmers and 2% of vegetable producers have areas greater than five hectares. Marketable surpluses in this industry can be generated from about 0.2 ha given current productivity levels emphasizing the dominance of subsistence production for immediate food security. There is a growing demand for a diversified range of horticultural produce in urban centers where increasingly sophisticated tastes and health awareness has increased the demand (and capacity to pay) for quality produce. Transition by small scale producers into commercial production units is made difficult by the limited access to financial resources to scale up their production systems - irrigation equipment and machinery to plant larger areas and their limited crop management skills. In an attempt to achieve import substitution and effect greater protection from the dumping of poor quality produce that threatens the health of Mongolian consumers, the Government sees an opportunity of increasing domestic production of horticultural food items.

61. To facilitate the transition to more commercially oriented production systems, the Government should: (i) provide security of land tenure<sup>27</sup> to facilitate access to credit for the

<sup>25</sup> The Crop Law provides for the protection of fodder conservation areas but the enforcement of this legislation is ineffective.

<sup>26</sup> Feed quality regulations are being prepared to protect buyers from misrepresentation of composition and quality.

<sup>27</sup> Whilst the Law has been passed allowing private ownership of crop land (June 2002), the implementation of the Law is still not taking place due to the limited capital resource base of land users who must first pay the soum-

necessary investment, (ii) support the development of agricultural machinery supply businesses and associated repair services with appropriate financing arrangements (including leasing) to allow producers access to machinery with greater capacities, and (iii) provide incentives to promote private investment. In situations where there are opportunities to rehabilitate irrigation systems for the benefit of a significant number of small producers, there is a role for the Government to meet the cost of irrigation rehabilitation as a public investment provided the operational and maintenance aspects can be addressed. Associated with such investment, the Government should also provide additional producer training as there is limited familiarity with larger scale production techniques including water management and the use of increased inputs (including machinery and equipment) to enhance productivity. Finally, the linkages between the producers and markets must be further enhanced allowing producers to spread their incomes and strategically market their produce aided by storage and downstream processing. The Government should identify investment incentives for the private sector to extend processing capacity and introduce equipment that will generate products of higher quality and value.

#### **4. Seed Breeding and Varietal Development Program**

62. The objective is to improve local access and quality of well adapted seed material for the cropping and fodder producing sub-sectors and to establish a varietal selection and multiplication mechanism for locally developed seed material. This twofold objective recognizes the importance of a viable seed producing industry to support the cropping and fodder production activities but also recognizes the opportunities for selecting better adapted seed material suited to Mongolian conditions. The program requires a combination of direct investment by the Government in what are considered the more public investments in: (i) research, (ii) quality assurance and certification services, together with, (iii) a significant reorientation of private sector investment incentives that apply directly to the seed industry and ultimately the cropping sub-sector. Historically, government initiatives in this area have been through the State Seed Reserve that ensured seed was available for the following year's planting, while the Wheat Fund has provided a disincentive for the development of an independent and commercially viable seed industry. Price incentives must be maintained for the development of the seed industry in parallel with improved demand from commercial crop and fodder producers that will only come from improved on-farm profitability. The Government is aware of the negative impact from earlier support schemes and is revising the means for promoting this important industry. In addition to the direct public investments, the Government needs to complement varietal selection activities undertaken in research centers with the commercial multiplication of quality seed material that involves contracts and associated training of these specialist producers.

#### **C. Sector Wide Initiatives**

##### **1. Agricultural Support Services Program**

63. The Government has responded in a positive manner to the breakdown of agricultural support services that previously were provided through the state farm system. With limited resources, it has sought donor assistance in maintaining some semblance of an extension service to support development of the sector. Recent attempts have been directed at achieving sustainability (users pay) but the Government is rapidly coming to the view that extension is

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established price of land in order to obtain title, the limited capacity of local administrations to deal with land disputes that are being politically fueled, and the social attitudes and beliefs in respect of interpersonal conflict.

more appropriate as a public funded good at this stage of the sector's development. While opportunities exist to link extension services to processing and input suppliers, these cannot be expected to cover all situations for all industries. The Government proposes to establish knowledge based centers in regional centers that can function as a source of technical and market information to: (i) establish network of information/extension linkages involving technical, financial, and market information under the state budget (incorporating extension services, research institutes, producer associations, soum/bag authorities, etc); (ii) build an e-based network to regional level initially then possibly extending to aimag and soum level as a community facility for initial contact; (iii) support this network through managed delivery of technical material appropriate for the location and season (plant pests, animal diseases, seed standards, breed certification, financial products, input suppliers etc.); (iv) support producers/processors with business, technical, marketing and e-system skills development; and (v) link network to international institutions such as the Consultative Group on International Agricultural Research, potential markets, etc.

## **2. Access to Term Credit Program**

64. Possibly one of the most frequently identified constraints to agricultural productivity in Mongolia is the lack of affordable and appropriate credit. The reputation of the sector from the perspective of the formal financial institutions reflects the failed government funded targeted lending programs of the late 1990s and early 2000s. Its reputation has progressively being rebuilt through the efforts of a number of donor funded initiatives and the privatization of the main agricultural bank - Khaan Bank. The issue of market based interest rates is highly politicized even though many producers appreciate having access to credit, in spite of the high rates. But the lack of suitable term lending is a major constraint in allowing producers to invest in machinery and equipment - loans that cannot reasonably be repaid within 12 months. There is a strong argument for the Government to assist producers with concessional loans to stimulate private investment, but any intervention should be implemented through the formal banking system and the authorized non bank financial institutions, not through temporary administrative units to handle disbursement and recovery of targeted loans. The Government will therefore strengthen the sector's access to affordable and appropriate credit. The program will incorporate a composition of: (i) risk sharing through equity participation or suspensory loan, possibly through dedicated venture capital fund resulting in clearly identifiable interest rate subsidies, (ii) the introduction of financial leasing allowing tax credits for lenders and full deductions of lease payments by borrowers, and (iii) risk sharing through guarantee fund, compensating lenders for proportion of bad debts, or interest compensation fund, compensating borrowers for a portion of interest paid. These will require some modification to the legal framework including the tax act and the new leasing legislation approved in July, 2006.

## **3. Strengthening Food Quality and Hygiene Standards Program**

65. The aim of this program is to maintain government efforts in ensuring the Mongolian public is supplied with hygienic food that meets agreed quality standards. This is an ongoing initiative to protect the public from potentially dangerous food items and from the inadvertent ingestion of agricultural chemicals and pesticides used in production or processing. With a high proportion of food items sourced outside Mongolia, food quality standards need to be applied equally to imported and locally produced food items. As such, the Government will support the State Professional Inspection Agency to establish standards and inspection systems for product quality to achieve market competitiveness and consumer safety. The program includes all three elements of investment, policy and regulatory framework development and capacity building.

Included in the investment program are: (i) the strengthening the border check points to ensure they have the capacity to implement inspection procedures; and (ii) strengthening the food quality testing laboratory, upgrading facilities and providing for their ongoing operations in conjunction with a levy on imported goods to finance routine material testing and (iii) establish and develop appropriate mechanism for the exporting countries to test import food products locally and send them with their relevant certification and export the food products with code. Regulatory development is required in: (i) the development of a system to regulate the use of agricultural chemicals and pesticides, their disposal and handling including registration, packaging, merchandising, and licensing; (ii) the establishment of potato, vegetable, flour, meat and milk product inspection system of final consumer products with a trace-back mechanism enabling the identification of the source of the raw product; (iii) the development of regulatory mechanisms for ensuring food safety incorporating processing, marketing, handling, storage, transport and packaging at all situations along the marketing chain; and (iv) the development of quarantine procedures and standards to protect against contagious and zoonotic diseases from the import of plants, animals and their processed products, goods that do not meet either quality or hygiene standards or that are fake products. Associated with these initiatives, there needs to be parallel capacity building for laboratory and quarantine personnel and an awareness raising program with the public at large as to food hygiene matters.

#### **4. Structural Adjustment in Agriculture Program**

66. With the privatization of the State's assets in the early 1990s, the few large scale enterprises were converted into a larger number of smaller scale entities. For livestock recipients, the process was less problematic other than their scale of enterprise and the management practices that followed. Also at that time, herding was one of the few options to maintain subsistent food supplies in the absence of alternative employment opportunities. For the crop sector, few retained a full complement of machinery and equipment to operate their farms efficiently resulting in borrowing and illegal utilization of other's machinery and equipment. The result from these historic events is a skewed distribution of production enterprises dominated by small scale and inefficient producers. Given the Government's objectives for self sufficiency in cereals, meat, milk, potatoes and vegetables, it is logical to direct interventions at the more efficient while making provisions for those who may find better livelihood options in other sectors. Recent poverty reduction studies suggest that the greatest impact from government funded initiatives aimed at poverty reduction come from programs that support vocational training or facilitate the exodus to areas where labor is in greater demand. The Government is therefore committed to facilitating the adjustment of the less efficient and under resourced individuals out of their subsistent operations to other sectors if necessary to improve their livelihood prospects. The program will therefore incorporate: (i) assistance in relocating from rural areas to urban centers where employment opportunities may exist, (ii) vocational training for individuals relocating in search of employment, (iii) concessional term financing for farm buildup and amalgamation that allows buyers (existing producers) to pay market prices to distressed subsistence producers to maximize the value of their farming enterprise, and (iv) support for small and medium enterprise establishment in both rural and peri-urban areas (not just round Ulaanbaatar).

#### **5. Research Program**

67. The Government recognizes the need to adapt technologies that have modern science achievements and are well advanced, which should further enrich and develop national traditions and introduce them after incorporating with national conditions in agriculture, building

on developments achieved in other countries with similar agro-ecological and climatic conditions. The focus of agricultural research should be directed at identifying well adapted, higher productivity species and production systems. By resourcing the established research institutions (including the regional centers), more responsive and collaborative research, training and extension mechanisms will be achieved with effective interfaces with the commercial entities that can assist in identifying and prioritizing topics for research to ensure its relevance. The program will incorporate: (i) an information exchange system that incorporates access to a database of information, determination of research priorities, generating producer/processor technical and market information requirements; (ii) support for adaptive research drawing on developments in technologies elsewhere - linkages with international centers plus determination of systems for testing findings within Mongolian agro-ecological conditions; (iii) determination of research priorities through consultative process involving a combination of producer/processing organizations, academia and other relevant stakeholders (including the private sector); (iv) the incorporation of business/commercial considerations in all research related matters, so that focus is less of production than on profitability; (v) strengthening of market research, information, analysis, and use in policy formulation and program design; and (vi) developing linkages between the results from the applied research programs with the technical extension services.

#### **D. Summary of Program Costs**

68. Indicative costs have been prepared for each of the investment programs. It should be noted that, presented in this manner, it is possible to feed into the Medium Term Budget Framework as will be required by the Ministry of Finance. Details are presented in the second volume for each program but are only first estimates of the overall program costs. In some programs, the details have not been discussed with the Government and there is only "in-principle" agreement on the content of the programs. Further discussions will be needed to refine the content of the programs and adjust the relative cost of each, together with identifying potential financiers for the various activities. A summary of Investment Programs is presented in Table 1 below.

Table 1: Summary of Program Costs

		Total Program Costs (MNT million)										Total
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
<b>A. Livestock Subsector Initiatives</b>												
Land Utilization and Management		6,435.5	5,015.1	5,015.1	4,632.3	3,831.9	3,251.9	1,214.4	1,214.4	1,214.4	1,214.4	33,039.2
Risk Management		8,241.8	9,153.3	31,966.8	32,055.8	31,505.8	29,202.0	28,317.0	4,248.0	4,248.0	3,148.0	182,086.7
Disease Management		4,374.9	4,209.9	4,141.9	4,141.9	4,124.9	2,914.9	2,914.9	2,914.9	1,704.9	1,704.9	33,148.0
Market Linkages		2,458.0	5,348.0	8,413.0	8,392.0	8,362.0	8,062.0	8,062.0	8,062.0	8,061.0	8,061.0	73,281.0
Production Management and Breeding		3,383.9	3,047.9	3,047.9	2,796.8	2,696.8	462.0	459.0	459.0	459.0	459.0	17,271.3
<b>Subtotal Livestock Subsector Initiatives</b>		24,894.1	26,774.2	52,584.7	52,018.8	50,521.4	43,892.8	40,967.3	16,898.3	15,687.3	14,587.3	338,826.2
<b>B. Crop Subsector Initiatives</b>												
Irrigation		2,428.1	2,798.2	2,503.5	10,121.2	11,455.2	10,901.7	10,588.5	10,553.7	2,888.4	104.4	64,342.9
Feed Production		14,957.3	15,897.0	15,688.3	17,312.3	17,463.1	13,247.7	12,946.1	12,946.1	12,922.9	12,922.4	146,303.0
Horticulture Crops		513.9	774.9	653.1	455.9	616.0	126.4	103.2	85.8	80.0	74.2	3,483.5
Seed Production		174.0	408.3	484.9	466.3	249.4	251.7	66.1	80.0	63.8	63.8	2,308.4
<b>Subtotal Crop Subsector Initiatives</b>		18,073.3	19,878.3	19,329.7	28,355.7	29,783.7	24,527.5	23,703.9	23,665.6	15,955.1	13,164.8	216,437.8
<b>C. Sector Wide Initiatives</b>												
Agricultural Support Services - Research		1,189.0	933.8	1,450.0	1,183.2	1,136.8	1,354.3	1,354.3	1,331.1	1,331.1	1,331.1	12,594.7
Credit		-	736.6	4,011.6	4,011.6	4,000.0	4,000.0	4,000.0	-	-	-	20,759.8
Food and Hygiene		266.8	1,200.6	852.6	580.0	452.4	214.6	203.0	174.0	174.0	174.0	4,292.0
<b>Subtotal Sector Wide Initiatives</b>		1,455.8	2,871.0	6,314.2	5,774.8	5,589.2	5,568.9	5,557.3	1,505.1	1,505.1	1,505.1	37,646.5
<b>Total PROGRAM COSTS</b>		44,423.2	49,523.6	78,228.6	86,149.3	85,894.3	73,989.2	70,228.5	42,069.0	33,147.5	29,257.2	592,910.5

## APPENDIX 1: CURRENT AGRICULTURAL DEVELOPMENT POLICIES

### A. Influences Guiding Agricultural Policy Development

#### 1. Economic Growth Support and Poverty Reduction Strategy

69. The guiding development objectives for the agriculture sector outlined in the Economic Growth Support and Poverty Reduction Strategy (EGSPRS) is for agriculture to deliver inputs to a vibrant processing sector that will provide much of the stimulus for economic growth and poverty reduction. It recognizes that agriculture's contribution to overall GDP is likely to decline to under 20% in current terms with the strong performance of the mining and manufacturing sectors. The EGSPRS proposes that, through the continued growth of the agricultural sector, there will be a reduction in rural poverty, improved income and employment levels for both marginal and more viable agricultural producers, processors, and service providers while the non viable less efficient producers will be redeployed to other sectors, ensuring the longer term sustainability of the environment for future generations.

70. The objectives of the EGSPRS are to enhance economic growth and, with the adoption of pro-poor policies, reduce poverty by:-

- accelerating private sector led economic growth through macro-economic stability, an improved business climate and open market competition, appropriate monetary, credit and tax policies, and human capital enhancement; and
- the equitable distribution of benefits from growth through projects and programs aimed at increasing employment among the poor and those existing round the poverty line empowering them to improve their livelihoods through their own initiatives.

71. Priorities for implementation in 2003-4 were for (i) further improvement to the legal environment; (ii) the creation of a more favorable and competitive business climate; (iii) the elimination of unnecessary licensing and other administrative impediments; and (iv) the facilitation of access to financial resources, especially for rural entities and small and medium enterprises. Related priorities included (i) the improvement of the financial sector; (ii) support for regional and rural development; (iii) sustainable development and ecological balance, mainstreaming conservation and environmental policies within socio-economic development; (iv) the speeding up of land reforms; and (v) the mainstreaming of gender equality.

72. Under this Strategy, public resources were to be directed at improving :-

- those households affected by natural disasters by improving access to financial services in rural areas, assisting the development of small and medium sized enterprises, stabilizing and expanding agricultural activities;
- energy, road, communication, and information infrastructure and services development, particularly in rural areas (infrastructure communications and transport (ICT) focus on appropriate policy, legal, regulatory framework; key telecommunications and information infrastructure; business framework for use

of ICT in governance and other applications; and development of human resources for use of ICT);

- promotion of direct foreign investment and facilitation of external trade, especially processing of domestic resources, mineral extraction, tourism, information technology (stability of regulatory environment, simplification of business licensing, use of foreign trade supportive measures and policies in line with global and regional trends);
- privatization of large economic entities;
- deepening of land reforms, particularly in respect of ownership and possession;
- gradual social sector restructuring to ensure continued service delivery and mitigation of negative impacts on the poor;
- improved fiscal sustainability and efficiency (releasing funds for pro-poor policies) through public sector reforms in treasury management, program (output based) budgeting, management, accounting, reporting, and auditing;
- development of the securities market; and
- strengthening of insurance markets.

73. The EGSPRS outlined several priority areas to promote pro-poor rural income growth, including (i) the strengthening of regional and local institutional capabilities, (ii) the development of unique strategies for each region; (iii) the promotion of cattle breeding and the expansion of cropping, (iv) the improvement in agricultural marketing, agri-business and manufacturing to raise off-farm incomes, (v) the development of policies to mitigate against natural disasters, including land reform, and (vi) the improvement of rural infrastructure. These are all reflected in the Government Action Plan where the emphasis on poverty alleviation and diversification of economic activities has been maintained. Their inclusion recognizes the key role that agriculture must play in addressing rural poverty.

## **2. National Food Security**

74. Food security, another national objective, is a function of economic growth, income distribution, and trade policies. It relates as much to general employment, social welfare, health and education policies, as it does to agriculture. Nonetheless, food security objectives have had a significant bearing on the nature of agricultural support programs undertaken to date including the establishment of the State Reserve Fund, the 2KR Program, the more recent fallow loan and seed distribution programs, to name a few. The objective of food security assumes greater importance (that has lead to greater direct interventions by the Government) for commodities considered to be strategic food items<sup>1</sup> e.g. flour, compared with others such as butter. Food security is intended to:-

<sup>1</sup> The "Mongolian Law on Food" was passed on 7 October, 1999 that specifies food items considered to be of strategic importance include meat, cereals, water and salt while a further list of food items eligible for storage under the State Emergency Reserve Fund includes fresh, dried and preserved meat, oils of animal and plant origin, wheat, cereal seed, wheat flour, rice, sugar, tea, dried milk, salt, and certain types of alcohol.



- ensure adequate and timely supplies of foodstuffs to meet domestic consumption. This includes, but is not restricted to, improvements in the ability of the agriculture sector to meet an increasing proportion of domestic food consumption, reducing imports and increasing exports, and also relates to the buoyancy of trade in all sectors to finance imports, the capacity of importers to manage procurement and distribution efficiently, and the ability to speedily access supplies during times of domestic shortages;
- raise nutrition levels through improved access to, and quality of, food, particularly by the urban and rural poor and other vulnerable groups. Agriculture provides a source of income and employment, as well as a source of food through subsistence production, but access depends on income distribution and socio-economic factors that deprive disadvantaged households and individuals of the capacity to procure food of sufficient quantity and quality; and
- raise food safety standards to reduce the incidence of food related diseases<sup>2</sup>. Fundamentally related to health and hygiene, considerations also relate to husbandry practices, storage, handling and processing, and at the same time, supporting access to export markets.

### 3. Regional Development

75. The development of regional centers has become an overarching objective, like poverty reduction, that is influencing government policy in all sectors. Policies for regional development are intimately entwined with policies for rural development. Both promote local opportunities and the efficient use of Mongolia's natural resources, notably its extensive land area, as a means of achieving economic growth and poverty reduction. The development of regional centers is also thought to decrease the extent of inappropriate rural migration to the Central Region. Both focus on access not only to economic opportunities but also to social services and protection. Rural policy, in particular, seeks to address the issue of vulnerability to natural disasters through mechanisms to improve disaster response and the diversification of livelihood activities and production technologies. Regional development priorities<sup>3</sup> center on the de-concentration of population through the promotion of well serviced and connected regional and local centers (such as to areas along the Millennium Road), setting up favorable conditions to accelerate economic activity and social development and hence minimize the differences in development between city and rural areas. Agriculture plays a key role in both rural and regional livelihoods as a source of income and food as well in the provision of raw materials for processing.

<sup>2</sup> The National Plan of Action of Mongolia for Food Hygiene, Safety and Nutrition was approved under government resolution No.242 of October 2001.

<sup>3</sup> Defined by the Regional Development Management and Coordination Law approved in 2003, based on the Regional Development Concept Paper (2001) and the Medium Term Strategy for Development of Regions of Mongolia (2002). The main medium term objectives are to determine regional strategies for the four regions outside Ulaanbaatar (Western, Khangai, Central, and Eastern), being elaborated with assistance from ADB's Capacity Building for Integrated Regional Development Planning ADTA MON-3948, and to improve the financial services and infrastructure network of each region, and communications between regions (including both roads and electronic services). The first phase concentrates on development of two centers or 'pillars' in each region, the second phase on a number of subsidiary or local centers. Ulaanbaatar is to be developed as a separate region, with the main agricultural thrust being the strengthening of settled, and therefore less climatically risky, intensive livestock and crop production to meet growing domestic urban market needs and sophistication.

#### 4. National Plan of Action

76. A third strategic document relating to development of the agricultural sector is the National Plan of Action (NPA) for Mongolia for Food Security, Safety, and Nutrition, approved by Government towards the end of 2001<sup>4</sup>. This paper noted the declining domestic production of foodstuffs since 1990, though recognized the significant recovery since 1995 and the establishment of a future base for expansion of the food industry. Perhaps more significantly it noted the relatively high incidence of food born diseases and food contamination, the failure to comply with national standards, and also that there was "growing evidence that the risk for diet-related chronic disease is increasing in the Mongolian population". Furthermore, while the average rural diet was better in terms of nutrients than those in urban areas, there were significant differences between income groups with poor families receiving only 60-70% of their energy requirements, around half that of higher income groups.

77. The NPA proposed twelve objectives and indicated actions to achieve them. Food security objectives focused on increasing the supply of domestic products to achieve self sufficiency rather than addressing the issues of access to food by vulnerable groups. The NPA does not acknowledge that growing economic wealth in non-food areas could be sufficient to support the import of foodstuffs to meet such deficits. The key problem, however, is that the poor and other vulnerable groups, including those in institutions, suffer nutritional deficiencies as a result of socio-economic imbalances and capacities to pay. These deficiencies are a product of access to food, its hygiene and nutritional quality and also the income levels of the vulnerable groups. The Plan viewed achieving self sufficiency as a means of providing economic opportunities for the unemployed poor and also of addressing the concern as to the quality of cheaper imported food items that were frequently of poor hygienic standards (e.g. chemical residues). The NPA sought to harmonize Mongolian with international food standards, strengthen control laboratories and increase public and producer awareness of food quality issues. The NPA was expected to have immediate short term impacts by 2005, and longer term impacts by 2010. Although a recent, mid-term, assessment of progress has not been undertaken, an update on the status of food security and safety in November 2003 suggests that, while many legislative and regulatory amendments have been implemented and the inspection regime tightened and improved, the expected impacts on domestic food supply, nutritional status<sup>5</sup>, and food safety<sup>6</sup> have not materialized.

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<sup>4</sup> Government Resolution No 242, October 2001.

<sup>5</sup> On average food intake is only 90% of minimum nutritional requirements, and only 70% for poorer groups.

<sup>6</sup> Only 40% of Mongolian food products conform with international norms.

## APPENDIX 2: AGRICULTURE SECTOR INVESTMENT PROGRAMS FROM THE BUDGET

(mln. tugriks)

No. Program	2000 Actual	2001 Actual	2002 Actual	2003 Actual	2004 Actual	2005 Actual	2006 Budgeted
<b>Animal Health</b>							
1 Disease Prevention Program	2,060.9	2,897.3	3,034.6	3,154.0	2,447.6	2,684.7	2,647.7
2 FMD Vaccination Program	460.0	1,866.0	2,341.0	2,049.7	1,710.4	1,996.1	2,000.0
3 Veterinary Services Program					714.2	417.7	688.2
<b>Livestock Management and Breeding</b>							
4 Livestock Breeding Program	13.0	30.0	35.0	35.0	35.0	35.5	35.5
5 Elite Sire Program				180.0	140.0	140.0	-
6 Program for the Protection of Livestock from Drought and Dzuds		1,397.0	1,000.0	427.0	700.0	100.0	-
7 Iodine Deficiency Prevention Program				13.0	10.0	15.0	15.0
8 High Productivity Livestock Program					50.0	294.5	294.5
<b>Water Resources</b>							
9 Identification of New Short Casing Well Sites	18.4	75.0				-	
10 Rehabilitation of Engineered Wells	402.0	394.0	515.0	450.0	880.0	757.5	1,700.0
11 Construction of Engineered Wells							1,500.0
<b>Cropping Initiatives</b>							
12 Plant Protection Program	402.0	565.0	849.0	645.0	950.0	650.0	650.0
13 Green Revolution Program	150.0	180.0	66.0	70.0	150.0	120.0	120.0
14 Irrigated Crop Program					800.0	718.0	870.0
<b>Food Program</b>							
15 Food Availability, Safety and Nutrition Program					25.0	25.0	25.0
16 Food Reserve (meat) Program							700.0
<b>General</b>							
17 Cooperative Development Program				10.0	35.0	35.0	35.0
18 Agricultural Extension Program					12.5		-
19 State Reserve Fund - Emergency Stocks	1,100.0	1,100.0	2,960.0	1,925.2			
<b>TOTAL</b>	<b>3,506.3</b>	<b>7,404.3</b>	<b>7,840.6</b>	<b>7,023.7</b>	<b>8,587.2</b>	<b>7,929.0</b>	<b>11,245.9</b>

## APPENDIX 3: DONOR FUNDED INITIATIVES IN AGRICULTURE

Component	Code	Funding Source	Annual Expenditure						
			2000 (\$ '000s)	2001 (\$ '000s)	2002 (\$ '000s)	2003 (\$ '000s)	2004 (\$ '000s)	2005 (\$ '000s)	2006 (\$ '000s)
Animal Health									
ASDP Veterinary Services	1	ADB	-	-	84.3	475.0	121.0	3.3	-
SVP Veterinary Privatisation	1	GTZ	600.0	600.0	600.0	600.0	600.0	600.0	-
DAS Animal Health and Management	1	TACIS	-	-	-	-	194.0	434.0	194.0
Sub Total Animal Health			600.0	600.0	684.3	1,075.0	915.0	1,034.0	194.0
Pasture and Livestock Management and Breeding									
RPRP Livestock and Natural Resources	2	IFAD	-	-	-	3.5	636.6	1,073.0	1,326.4
SGMP Sustainable Grasslands Management	2	UNDP	-	-	-	70.0	240.0	250.0	212.0
SLP Pastoral Risk Management	2	WB	-	-	-	1,080	1,642	1,892	1,084
CSMNR Pastureland and Risk Management	2	GTZ	-	-	-	50.0	-	-	-
CSMNR Reserve Management	2	GTZ	-	-	-	30.0	60.0	100.0	60.0
CSMNR Community Development	2	GTZ	-	-	-	30.0	100.0	100.0	40.0
GGPEM Pasture Management	2	SDC	-	-	-	-	530.0	620.0	860.0
RASP Ag Support Services (Veterinarians)	2	USDA	-	-	-	-	400.0	400.0	400.0
CBA Pasture Management	2	ADB	-	-	800.0	1,000.0	700.0	-	-
DDP Milk Production Enhancement Program	2	KR2-Japan	-	-	-	-	64.5	273.4	70.0
DDP Milk Marketing Enhancement Program	2	KR2-Japan	-	-	-	-	64.5	388.3	210.0
DDP Dairy Training Program	2	KR2-Japan	-	-	-	-	89	388.3	70.0
Sub Total Pasture and Livestock Management and Breeding			0.0	0.0	800.0	2,263.6	4,527.0	5,485.2	4,332.2
Water Resources									
ASDP Well Rehabilitation	3	ADB	-	-	158.0	393.9	385.3	245.8	50.5
DAS Water Utilization	3	TACIS	-	-	-	-	194.0	194.0	159.0
Sub Total Water Resources			0.0	0.0	158.0	393.9	579.3	439.8	209.5
Cropping Sector									
ASDP Green Revolution	4	ADB	-	-	51.0	235.7	285.7	20.2	53.4
ICLP Seed Multiplication	4	EU-TACIS	-	-	-	229.8	367.7	321.7	-
ICLP Integrated Crop and Livestock	4	EU-TACIS	-	-	-	181.9	291.1	254.7	-
Sub Total Cropping Sector			0.0	0.0	51.0	647.5	944.5	596.7	53.4

Component		Code	Funding Source	Annual Expenditure						
				2000 (\$ '000s)	2001 (\$ '000s)	2002 (\$ '000s)	2003 (\$ '000s)	2004 (\$ '000s)	2005 (\$ '000s)	2006 (\$ '000s)
Others (inc Coops and Credit)										
ASDP	Cooperative Development	5	ADB	-	-	56.0	295.0	672.4	48.6	56.0
ASDP	Credit	5	ADB and Banks	-	-	931.4	2,534.9	3,237.0	1,505.9	1,120.3
ASDP	Project Management	5	ADB	-	-	484.7	518.4	320.8	291.5	350.6
ASDP	Policy Development	5	ADB	-	3,500.0	-	3,500.0	-	-	-
RPRP	Other Economic Activities	5	IFAD	-	-	-	-	194.2	102.9	542.2
RPRP	Rural Financial Service	5	IFAD	-	-	-	57.2	196.5	1,332.0	444.6
RPRP	Social Development	5	IFAD	-	-	-	25.2	553.8	604.3	1,514.2
RPRP	Management	5	IFAD	-	-	-	138.0	273.5	360.1	717.2
ICLP	Agricultural Extension	5	EU-TACIS	-	-	-	62.2	99.6	87.1	-
SGMP	Policy Development	5	UNDP	-	-	-	31.0	120.0	127.4	112.0
SGMP	Alternative Livelihood Resource Dev	5	UNDP	-	-	-	32.0	120.0	127.6	107.0
SGMP	Herder Group Capacity Building	5	UNDP	-	-	-	40.6	163.2	170.0	149.0
SLP	Micro-Finance Outreach	5	WB	-	-	-	1,467	1,534	1,562	1,451
SLP	Local Initiatives Fund - Infrastructure	5	WB	-	-	-	1,448	2,555	2,566	2,594
SLP	Management and Policy Support	5	WB	-	-	-	408	259	278	303
CSMNR	Income Diversification and Generation	5	GTZ	-	-	-	30.0	40.0	100.0	100.0
RASP	Producer-Processor Linkages	5	USDA	-	-	-	-	900.0	900.0	900.0
RASP	Accessing Rural Credit	5	USDA	-	-	-	-	700.0	700.0	700.0
GREGI	Herder Group Commercialization	5	USAID	-	-	-	-	900.0	900.0	900.0
GREGI	Herder Group Market Linkages	5	USAID	-	-	-	-	600.0	600.0	600.0
GREGI	Development of Agricultural Support Service	5	USAID	-	-	-	-	500.0	500.0	500.0
RSHG	Cooperative Development	5	GTZ	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	-	-
CBA	Cooperative Development	5	ADB	-	-	1,500.0	1,500.0	1,500.0	-	-
DAS	Institutional Development	5	TACIS	-	-	-	-	194.0	310.0	194.0
DAS	Rural Enterprise Development	5	TACIS	-	-	-	-	-	194.0	159.0
ASSS	Agriculture Policy and Strategy	5	ADB	-	-	-	-	76.6	111.9	161.5
SFS	Micro-credit	5	France	-	-	-	-	133.9	89.3	205.4
SFS	NGO support for poverty alleviation	5	France	-	-	-	-	303.1	408.4	33.6
CMP	Cooperative Development	5	GTZ	-	-	-	-	-	200.0	400.0
Sub Total Others (inc Coops and Credit)				1,000.0	4,500.0	3,972.1	13,088.1	17,145.7	14,176.9	14,314.8
Total All Donor Activity				1,600.0	5,100.0	5,665.4	17,468.1	24,111.4	21,732.6	19,104.0
Livestock				600.0	600.0	1,642.3	3,732.5	6,021.3	6,959.0	4,735.7
				38%	12%	29%	21%	25%	32%	25%

# **AGRICULTURE SECTOR STRATEGY STUDY**

## **VOLUME 2**

### **LIVESTOCK SUBSECTOR SUMMARY**

**30 NOVEMBER, 2006**

REORDER PAGES.

## INVESTMENT PROPOSALS

UNDER

### MONGOLIA'S AGRICULTURAL SECTOR STRATEGY STUDY

#### INTRODUCTION

Volume II to the Government of Mongolia's Agriculture Development Strategy provides supporting detail of the priority investment programs outlined in Volume I. It provides the justification and rationalization as to why the Government wishes to support the sectors in the manner outlined in the main Volume. The overall thrust of the Strategy seeks to: (i) improve agriculture's competitiveness in a changing market, (ii) reduce producer vulnerability to climatic change and risk, and (iii) ensure the sustainability of agricultural production systems, protecting the country's natural resources for future generations. These objectives will be achieved by (i) providing an enabling policy environment that is conducive for private investment in the sector, (ii) resourcing supportive capacities of relevant agencies, and (iii) mitigating against adverse impact from the inevitable structural adjustment that ~~could arise~~ as the sector becomes more efficient. Volume I of the Government Strategy outlines its objectives under each of these categories, identifying where the main constraints exist and what might be needed by way of investment, capacity building and policy development to achieve the desired outcomes within each of the subsectors, and then similarly for cross subsectoral issues such as credit. The subsequent investment program adopts a subsector orientation dealing with intended investments in the livestock, cropping and other cross subsectoral investments to achieve the Strategy's objectives.

The format for Volume II presents each sub-sector analyses providing background information and assessment that has resulted in the Government's strategic development program. It includes a review of the performance of the subsector, identifies the constraints and opportunities, then discusses the rationale for Government involvement and details what other Government and donor initiatives have been undertaken in the respective areas. For the livestock and cropping subsectors, investment profiles are subsequently identified, outlining the intended objectives and outcomes, the scope of activities, the need for further policy development and capacity building, an estimate of the cost of the investment program, indicative implementation arrangements and a program framework matrix. Similar treatment follows for the cross sectoral issues. In total there are 14 investment programs proposed in this Volume. It is intended that the supportive material will be used by donors and the Government to improve coordination of development initiatives undertaken within the agricultural sector and to assist donors in identifying where they might best support the development of Mongolia's agricultural sector.

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## ACRONYMS

ADB	-	Asian Development Bank
EGPRS	-	Economic Growth and Poverty Reduction Strategy
EU	-	European Union
FMD	-	Foot and Mouth Disease
GAP	-	Government Action Plan
GDP	-	Gross Domestic Product
IMED	-	Information Monitoring and Evaluation Department
MDG	-	Millennium Development Goal
MNE	-	Ministry of Nature and Environment
MoFA	-	Ministry of Food and Agriculture
MTBF	-	Medium Term Budgetary Framework
NPA	-	National Plan of Action
OIE	-	Office Internationale Epizootique
SCVL	-	State Central Veterinary Laboratory
WTO	-	World Trade Organization



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## THE LIVESTOCK SUBSECTOR

### I. GENERAL BACKGROUND

1. Agriculture continues to be the single main component of the Mongolian economy both in terms of its contribution to GDP (22%), to export revenue (14%), to employment (40%), it is equally important to the agro-processing sector, supplying the necessary raw material inputs to manufacturing and industry. Within the sector, livestock rearing is the dominant activity accounting for 81% of agricultural output in 2004. While livestock numbers were decimated during the successive *dzuds* of 1999-2002, declining from 30.2 million in 2000 to 23.9 in 2002, their numbers have been steadily increasing since and were estimated at 30.4 million in 2005. Peak livestock numbers were recorded in 1998 and 1999<sup>1</sup> prior to the *dzuds* when many households lost their entire herds/flocks and an estimated nine million head of livestock perished. The camel population has been static at around 256,000 head in recent years as has the number of horses (2 million head). Cattle numbers have remained approximately static for the past four years at around 1.8 million while sheep and goat numbers have recorded a slight increase after the *dzuds*. Sheep numbers have increased from their low of 10.6 million in 2002 to their 2005 level of 12.9 million in response to relatively high coarse wool prices. Goat numbers have increased by the greater amount and their proportion of the national herd now is 44% compared with 37% in 2001. This change is a direct response to the high cashmere prices prevailing during the late 1990s and early 2000s that continue today, but is viewed with some concern because of the destructive grazing habits of goats.

2. One significant influence on the livestock subsector in Mongolia's recent history is the impact from the transformation period, the collapse of the state farm system that was oriented towards the more intensively managed livestock and crop production systems, resulting in the resumption of more traditional animal management and livelihood strategies in the extensively managed livestock production system (i.e. pastoral livestock production). Herder based pastoral livestock production has subsequently been a major focus, and recipient of, international attention and development assistance. During the transition period, the loss of livestock in the extensively managed pastoral livestock production system generated considerable interest from both national and international communities. Directly and indirectly, this significant losses of livestock from *dzuds* provided the Ministry of Food and Agriculture (MoFA) with the incentive to move livestock production towards more intensively managed production systems, the rationale being (i) that loss of livestock reproductive capacity from natural events can be mitigated, (ii) that Mongolian food security can be improved, and (iii) the diversification of products needed to satisfy demand in a market economy can be satisfied.

3. It is worth noting that a primary reason for the ultimate failure of the rural livestock collective (*negdel*) and state farm production systems were the higher costs associated with intensification previously supported by the former Soviet Union. The organization, management and required production inputs of state farms failed to generate the quantity and quality of outputs needed to at least balance the higher costs. The extensively managed livestock collectives that employed traditional grazing and animal management strategies failed to generate the income needed to overcome the costs of additional inputs. Even though livestock collectives focused on using adapted livestock to maximize the comparative advantage offered by access to natural pasture resources, attempts to maximize long-term production by increasing external inputs such as hay and concentrates were generally

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<sup>1</sup> Camels reached their peak numbers in 1954 of 895,300 head.

curtailed by non-controllable environmental events such as *dzud* and drought. Eventually, the high costs associated with provision of subsidized inputs to marginally increase production proved untenable that was brought to a head with the collapse of the former Soviet Union.

4. But the livestock sector provides the basic raw material for the agro-processing sector, the leading example being cashmere that is the country's third largest export item. The country exports both raw fibers and animal carcasses, together with some processed fiber and meat products where there is a surplus over domestic requirements (that surplus has rapidly diminished with the increased domestic population). There is an active trade in livestock products - skins and hides for processing both within Mongolia and in neighboring China. There is also a fledgling dairy industry developing round the urban centers where demand for fresh milk and dairy products is strong where there is a preference for the ecologically sound, fresh product. With milk production being highly seasonal, dairy processors tend to rely on imported milk powder that is reconstituted to complement the small quantities of out of season production to meet urban demands. For food items of animal origin, it is estimated that the dependence on imported products in Ulaanbaatar is 95% for butter and 90% for eggs while it is self sufficient in meat other than chicken and pork. By the end of 2005, prices for meat and meat products in Ulaanbaatar were about 30% higher than the 2000 levels. This has been major cause for alarm as the Government is conscious of the increasing proportion of urban dwellers that generate an estimated 60% of the demand for meat and dairy products, particularly as the links between rural families and their urban residing relatives are becoming weaker and more food products are sourced from the markets rather than through their families.

#### **A. Human Population Changes**

5. The human population has more than tripled between 1950 and 2005, with the most rapid increase occurring during the socialist collective period (Figure 1). In addition, a steady trend from a predominantly rural to a predominantly urban population has occurred during the past 50 years. An exception to the longer term demographic trend occurred at the beginning of the transition period (i.e. 1990-1995) when considerable numbers of urban residents returned to rural areas following contraction of employment opportunities that previously existed during the socialist period. Later in the transition, the demographic shift reversed (from rural to urban) regained momentum as herders moved out of livestock production and become residents of soum centers, aimag centers, and the three major urban areas of Erdenet, Darkhan, and Ulaanbaatar.

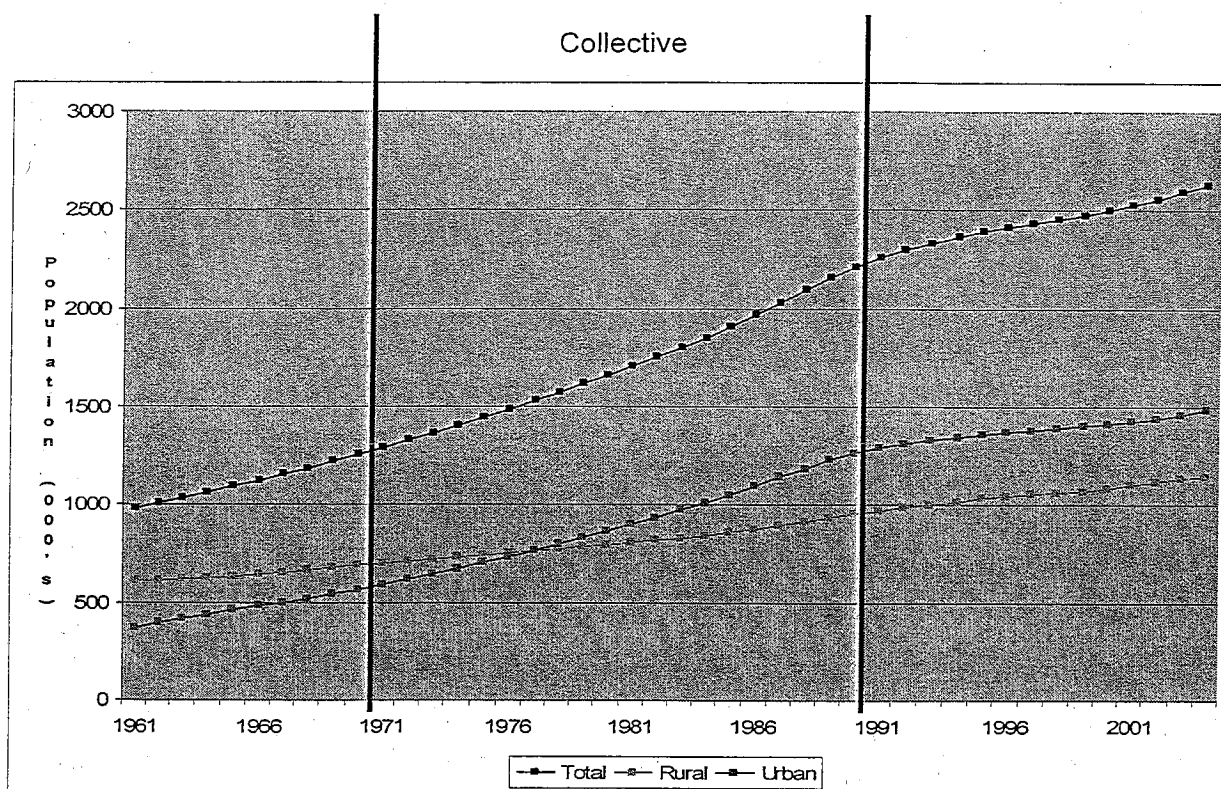
6. One consequence of the increased dependence on these rural urban centers where employment opportunities were greater was that many herding households retained their livestock but became more sedentary, causing considerable overgrazing round these population centers while more distant pastures were left unutilized. The subsector is therefore saddled with an inefficient distribution of livestock holdings with some 61% of herder households maintaining herd sizes of less than 100 head. That same 61% of households are estimated to account for only 2.4% of livestock output. The extent of this dominance by small producers is reinforced when one differentiates between herder households and households rearing private livestock. Government statistics record that, in 2004, 223.4 thousand households reared private livestock yet only 74% of these (169 thousand) were classified as herding households<sup>2</sup>. The percentage of herding households is

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<sup>2</sup> Herder households are considered to be those households with livestock who derive their main livelihood from livestock rearing. About one third of livestock owners are not dependent upon livestock for their livelihoods and derive their main income from other sources.

increasing gradually but the rate is very slow as private owners continue to retain animals for their immediate subsistence requirements.

**Figure 1: Mongolia's Population - Urban and Rural**



Source : FAOSTAT, August 2006

7. The other repercussion from the structural adjustment and the associated rural urban demographic changes is the level of experience that can be found amongst modern day herders. With Mongolia's harsh winters and hot summers, the management skill of herders to achieve the maximum output from their livestock under such extreme conditions requires a depth of knowledge that is not always evident. With 52% of herders between the age of 16 and 35, there is a case for building the skill base of these relatively inexperienced herders.

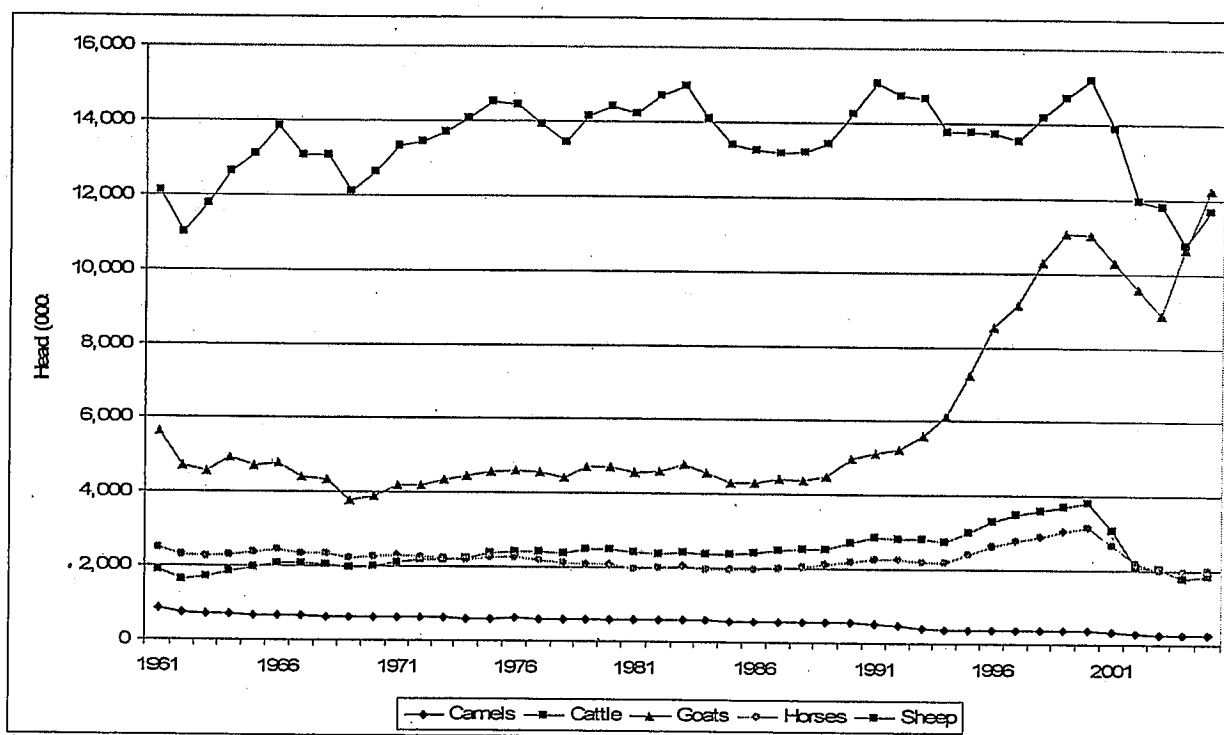
## B. Livestock Numbers

8. Livestock numbers remained constant from the 1960s to the late 1980s. However, with the breakdown of the collective system, subsequent privatization of the livestock herd, and the absorption of unemployed urban residents who had no other livelihood options than livestock production, numbers increased dramatically during the 1990s to a peak of 33.5 million total animals in 1998-99. This increase was mainly due to higher goat, cattle and horse numbers, whereas camel numbers have steadily decreased. Sheep numbers are also decreasing as herders replace sheep with goats. Two consecutive harsh winters (*dzuds*<sup>3</sup>) in 2000/01 and 2001/02 resulted in high livestock mortalities, from which numbers have not recovered (Fig.2).

<sup>3</sup> "Dzud" is circumstance/condition that cause huge loss in livestock because of extreme shortage of grazing pastureland and water during long lasting winter and spring periods. The *dzud* affected area in 2001-2002 winter and spring - 65 soums in 7 aimags, while in 2002-2003, it included 40 soums in 5 aimags.

9. One of the alarming trends is the rapid increase in goat numbers that started during the privatization of the national herd that continued in response to the strong cashmere prices that prevailed during the 1990s, only to be halted by the *dzuds*. Even after the *dzuds*, goat numbers have recovered faster than numbers of other species in spite of the Government's concern at the impact they are having on the natural pastures.

**Figure 2: Long Term Livestock Trends, 1961 - 2003**



Source : FAOSTAT, August 2006

10. Figure 2 presents relatively stable livestock numbers apart for the small cyclical changes in sheep numbers, the rapid increase in goat numbers from early 1991 and the impact of the 2000-2001 *dzuds*. With such stability, one would expect livestock turnover to remain stable as the overall herd size shows only a very slight long term trend of increasing numbers (camels show a slight decline). If the resulting turnover is compared with the steadily increasing population (that nearly trebled over the period 1961 to 2005), then it would be expected that exports would explain the difference between total meat production and increasing domestic consumption, i.e. there should be a steadily declining amount of meat available for export as domestic consumption increased. This has not been the trend.

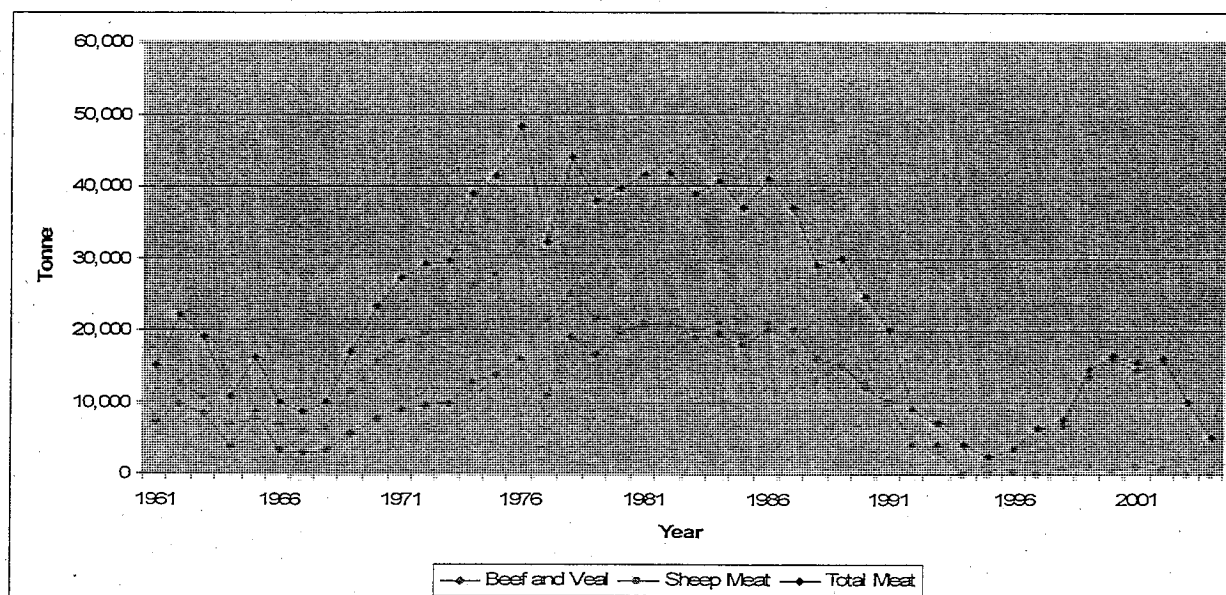
11. Meat exports (mainly beef and sheep meat) peaked in 1977-78 at about 40,000 tonnes per annum. Prior to that, exports increased rapidly from the low figure of 10-15,000 tonnes in the late 1960s under the influence of the collectivized state farms (Figure 3). It also suggests that there has been some change in the composition of the livestock herd in Mongolia - that the proportion of breeding females has progressively declined. Statistics do not support this explanation with the proportion of females in the cattle herd and sheep flock ranging from 40% and 45% respectively since 2003. This is the most logical explanation given the fact that per capita consumption levels have not changed that significantly over this period and the drift between rural and urban dwellers has similarly not affected consumption

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levels to that extent. This also assumes that turnoff patterns remained unchanged. This is known not to be the case during the recent *dzuds* as herders struggled to sell their animals rather than having them die from the cold - hence the slight increase in exports during the 1990-2002 period, (mainly in the case of beef).

12. This scenario must also take into consideration the export of live animals. Mongolia has had an active trade in live animals for about 15 years, mainly in live sheep with the former Russian states of Kazakhstan and Uzbekistan amounting to some 1 million head a year until the mid 1970s when this number decreased by half until the early 1990s. Live cattle exports have steadily declined from 120,000 head in 1961 to zero today (Recent figures reflect the concern by the main importer with the incidence of Foot and Mouth disease that was detected in the west and eastern aimags of Mongolia in 2002 and 2004 respectively. Figure 4 indicates how the trade in live animals has diminished over time.

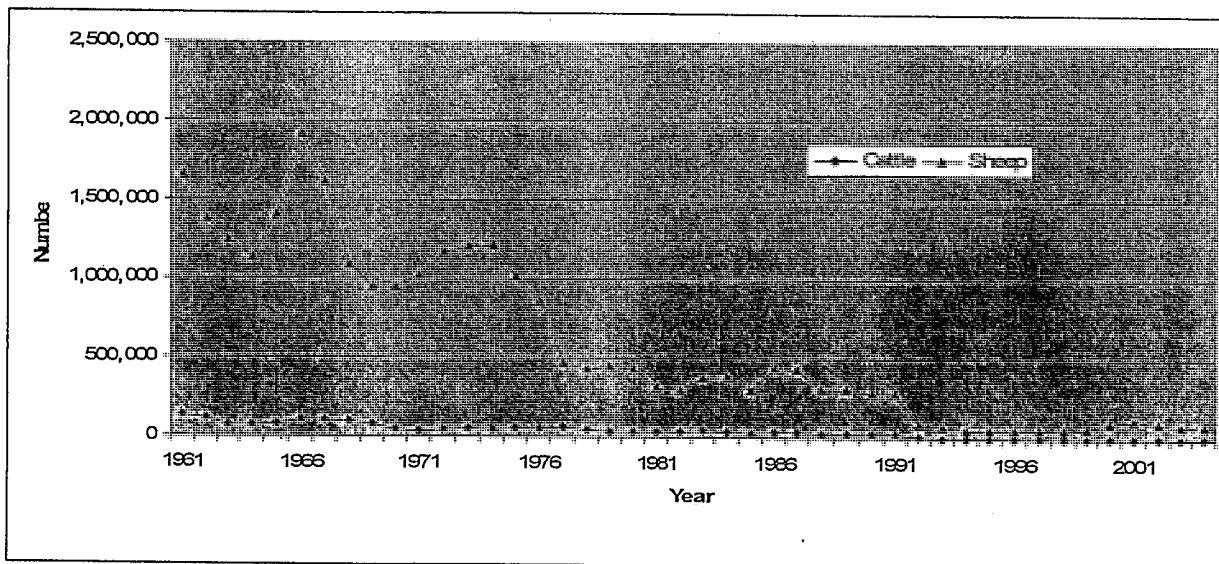
**Figure 3: Exports of Meat to all Destinations**



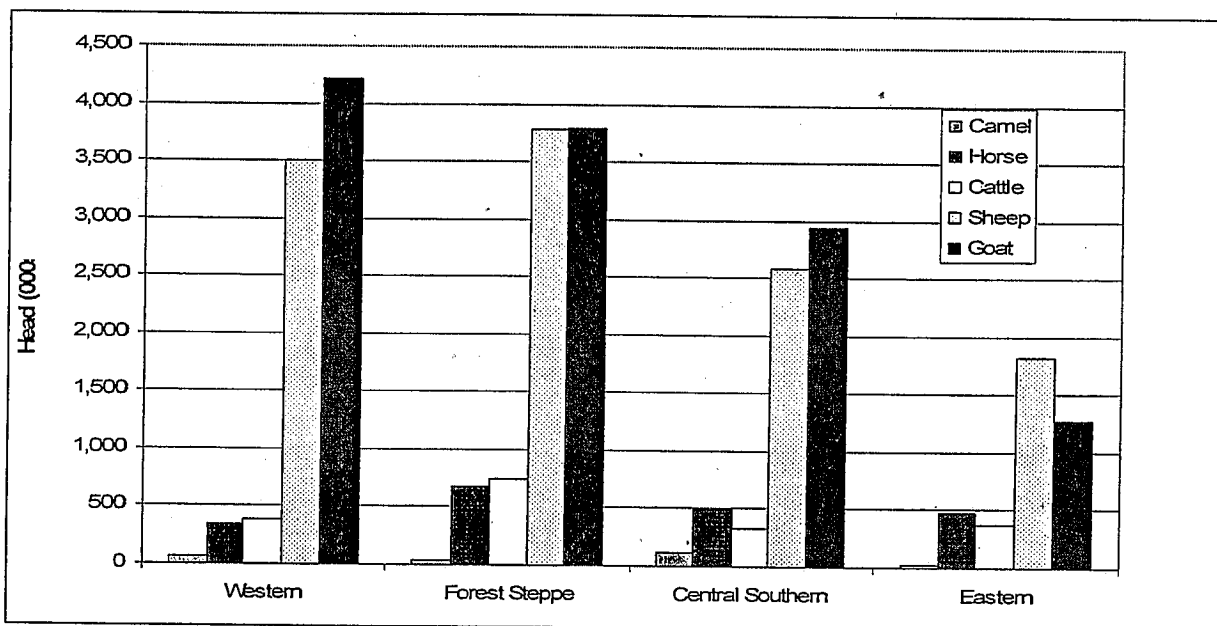
Source : FAOSTAT, August 2006

### C. Regional Distribution of Livestock

13. At the end of 2005, the pastoral, extensively managed national livestock herd was 30.4 million head and comprised 44% goats, 42% sheep, 7% horses, 6% cattle and 1% camels. The regional distribution of livestock has not changed substantially during the transition period other than the increased importance of goats that has been noted in all regions except for the east where sheep remain the dominant species. The region designated the mountain and forest steppe region (the mountain regions in the central and northern portion) has the highest number of cattle and horses which, when combined with the numbers of small ruminants, it confirms this region is the major livestock producing area in the country. Small livestock dominate over large stock throughout all regions.

**Figure 4: Export of Live Animals to all Destinations**

Source : FAOSTAT, August 2006

**Figure 5: Regional Distribution of Livestock**

Source : Mongolian Statistical Yearbook, 2005 National Statistics Office.

**D. Natural Resource Utilization**

14. Part of the comparative advantage of Mongolia's extensive livestock sector is derived from its access to its extensive natural resources - pastures and water. During the collective period, pasture utilization was well coordinated and herd and flock sizes were significantly larger than exist today. Management of these groups was easier to coordinate as they pursued seasonal migration patterns between the winter and spring camps and the summer and autumn grazing areas. Access to these designated areas was respected by the collective employees and conflict amongst those using pastureland was minimal. Mongolia

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has a natural pasture area of 126 million hectares of which 70% is considered degraded, particularly around soum and aimag centers. Of that, a significant area cannot be returned to its original condition while the remainder can be recovered. The carrying capacity of natural pastures varies from season to season and is the single largest influence on livestock productivity. With minimal conservation of fodder currently practiced to address the harsh winter conditions, the condition of pasture land to meet the requirements of current livestock numbers varies widely throughout the country, the most vulnerable areas being in the drier Gobi region to the south. For example, in 2005, it was estimated<sup>4</sup> that 64% of the available pastureland had either sufficient or greater than needed quantities of dry matter to meet livestock requirements through the coming winter. The remaining 36% was assessed as having insufficient dry matter for the winter, some requiring as much as four times the available dry matter.

15. Pastures are only of value to livestock where water was also available. Surface water and snow provide much of the water during the summer and autumn periods while engineered wells are frequently used during the winter and spring periods (although this is changing with some natural water sources drying up, utilization taking place during summer as well). Some 42,731 wells have been established throughout the pastoral areas to permit better utilization of the natural pasture. With the collapse of collectives and the privatization of the national herd, management of the country's livestock was left to private herders that has proved a challenging task. Water points have either been pilfered (for scrap metal) or intentionally destroyed as individuals attempt to prevent access to pastures by other herders at certain times of the year and certainly lack maintenance to the extent that only 7,917 remain operational. Of these, 3,234 are drilled wells, 2,016 are concrete lined wells and 2,667 are short casing wells representing, on average, about 370 per aimag. The rehabilitation of these water points has been one of the main foci of donors and Government alike.

## II. SECTOR ANALYSIS

### A. Sector Performance

16. The transition of Mongolia to an open market economy, that began in 1990 and is ongoing today, is well documented. It is generally accepted that the extensive livestock subsector moderated the negative impacts of the early transition period by ensuring a relatively stable source of food and livelihoods to both rural and urban populations. However, the subsector has struggled during this period with the collapse of institutional and technical support, input supply services and marketing infrastructure that was established during the socialist period. These mechanisms have yet to be fully replaced under the rapidly changing market economy. Re-establishing support services and marketing infrastructure needed to promote more efficient livestock production systems will require high investment costs to both government and the private sector. Unless the incentives (returns on capital invested) are at similar levels to other industries, private capital resources will flow to where the returns are greater and have a lower associated risk factor. In many ways, the market economy continues to exert a destabilizing influence on natural resource dependent communities as the urban populations grow and lose their rural connections. Legislative and economic power is shifting from the rural agricultural base to the urban population yet their dependence on food items continues to grow and their demand for quality and safe produce increases.

<sup>4</sup> Water and Climate Research Institute, Mongolia



17. Current livestock production systems are characterized by: (i) low productivity from the well adapted local species of livestock, (ii) low turn-off rates, (iii) a large number of widely geographically dispersed and small scale herders, (iv) low input systems (including minimal fodder conservation), (v) weak marketing linkages, (vi) variable livestock management skills, and (vii) limited access to technical information. The subsector is heavily dependent upon international development agencies to finance many government support initiatives to assist in delivering meat for human consumption and raw materials for processing that are further confounded by rising expectations from a growing urban population. The sector analysis below addresses concerns at the production level and the equally important market level, the users of the livestock products.

### **1. Productivity**

18. Productivity levels of Mongolian livestock are low. While local animals are well adapted to deal with the natural pastures and the severe climate, a significant amount of energy is needed to keep the animals warm during winter. With only average quality of feed from natural pastures (taken on an annual basis) without supplementary feeding, growth rates are slow. On current feed regimes, there is increased vulnerability to ecto- and internal parasites, and other infectious diseases that depress growth rates and hamper feed conversion efficiency.

19. Herd productivity is also hampered by the flock/herd composition of the various species. The proportion of breeding aged females in the national herd is about 30% for camels and horses compared with 40% for cattle and goats and 44% for sheep. The proportionally low level inhibits the reproductive capacity of the national herd/flock that results in lengthy recovery periods after *dzuds* and drought. Under current management regimes, animals receive limited preventative treatment for parasites and disease while management skills of herders are variable. The combination of these factors explains the current low levels of productivity. In the higher input livestock industries that are developing round urban populations, productivity levels reflect the higher nutritional regimes. It is only when feed sources are no longer limiting that the influence of genetic composition can have an impact on animal productivity. While there have been many programs directed at importing higher yielding varieties of livestock, particularly in the dairy industry, their performance will be limited by the availability of quality feed material. Also previous attempts at achieving higher yields based hybrid vigor from cross breeding programs have failed for similar reasons and the fact that adaptation to the Mongolian environment is the most important consideration.

### **2. Turnoff Levels**

20. Given the low levels of productivity, the time taken to achieve mature body weights is greater than if the animals were raised on higher planes of nutrition. When combined with the low percentage of breeders in the flock/herd and the mortality rates experienced, herd turnoff is understandably low. Traditional extensive systems are characteristically low turnoff systems in other parts of the world - in Australia, turnoff rates<sup>5</sup> in the northern pastoral cattle industry are about 26% per annum. The equivalent figure on a national basis (based on National Statistics Office material) is 13%, 16%, 25%, 30%, and 23% for camels, horses, cattle sheep and goats respectively in 2004. The low figure for horses and camels reflect the fact that these species are kept for other than commercial purposes. Numbers sold is also a function of the prevailing seasonal conditions and whether the herd/flock is undergoing a build-up phase. For example, the number of sheep sold in 2001 was 3.9 million compared with the 2.4 million in 2004 as there was no pressure to sell animals and some incentive to rebuild numbers. Turnoff patterns are seasonal with most animals being sold once they have

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<sup>5</sup> The number of animals sold per annum compared to the total herd/flock number expressed as a percentage.

recovered their full body weights after grazing on green pasture - usually between October and December adding to the difficulties of processors who aim to spread their overheads over a longer period of operation. Slaughtering takes place outside this period for immediate consumption. Wool is traditionally harvested in May and June while cashmere is combed from goats in April-May.

### **3. Disease Status**

21. Mongolian livestock have little by way of infectious diseases, partly because of the low population densities of livestock, but also because of the efforts of the Government and its rapid response to the outbreak of infectious diseases. Outbreaks of Foot and Mouth Disease (FMD) and anthrax have been recorded in the recent years in Mongolia, the former in the western region in 2002 (Erdenburen Soum of Khovd) and in the east in 2004 along the main transport access point to Beijing. There is a range of internal and ecto-parasites that effect animal productivity and also cause blemishes to hides that reduce their value for processing. Mongolian meat is generally considered to be ecologically clean as its animals are reared on natural pasture without fertilizers, chemicals and pesticides and only limited interventions from veterinary treatments. Other notifiable diseases have been recorded in Mongolia but their incidence is very low. Mortality rates again reflect the seasonal influences and are generally related to energy levels of feed rather than infectious diseases or parasites. Adult deaths in 2001 following the *dzud* were recorded at 4.8 million head (all species) while in 2004, the equivalent figure was 0.3 million. Under the extreme conditions of *dzud* and drought in 2001, the annual adult mortality rate was 18% while the more normal figure for 2004 was 1%. Similarly, survival rates of young animals also reflect the seasonal conditions. In 2001, the survival rate was estimated at 79% compared with 97% in 2004. The metabolism of pastured animals in Mongolia is largely dependent upon the contents of the pasture and water resources they drink. There are many geographic sub-regions found in Mongolia where deficiencies in essential minerals are responsible for poor levels of productivity of animals and for higher levels of morbidity in spring.

### **4. Agro-processing**

22. The key characteristic of the manufacturing sector in Mongolia is the wide range of industries that are dependent upon livestock generated raw materials for the manufacturing process. These include meat processing, dairy, leather tannery, leather footwear and products, fur garments, cashmere processing and garment manufacturing, camel hair processing and garment production, wool carpets and blankets, felt shoes and other felt products. Current production levels of these items are only a fraction of their pre-transition levels (except for cashmere) as many agro-processing enterprises collapsed with the transition to a market based economy. Nevertheless, livestock raw materials still form the basis for almost all the textile industry, and a significant proportion of the food and garment industries. Domestic livestock-based industries face keen competition from Chinese manufacturers with their surplus capacities and economies of scale. Chinese traders buy significant quantities of Mongolia's livestock products (mainly fibers and hides). Apart from this competition, domestic manufacturers also face a worsening situation with respect to the quality of raw livestock materials that effect their processing efficiency and marketing of end products. The progressive decline in the quality of Mongolian livestock raw material is due to the rapid buildup of numbers when quality was sacrificed for bulk, resulting in coarser cashmere and wool fibers and blemished skins. These have contributed to the dramatic decline in most livestock-based industries in Mongolia, and serious under-utilization of industrial capacity.

**Cashmere**

23. The demand for classic cashmere garments remains high in the luxury segments of European, American and Japanese market, even though the temporarily higher demand for them created by fashion designers during the early 2000s may have peaked. Mongolia is the second largest producer of raw cashmere, accounting for 25% of world production compared with China's 70%. Mongolian production increased from an estimated 1-3,000 tonnes of raw cashmere between 1990 and 2000. The enterprises involved in cashmere processing and garment manufacturing have sophisticated de-hairing, spinning, dyeing, weaving and knitting equipment, some of which were upgraded in recent years. There are three types of companies, each with their own characteristics, markets and opportunities. First, are the primary processing plants with varying levels of foreign ownership (Chinese, American, Japanese, South Korean and European). These joint ventures were established following the ban on raw cashmere exports in 1993 that was subsequently lifted in 1996. They buy raw cashmere from herders, scour and process it into de-haired cashmere for export to China and Europe (as de-haired cashmere) and Japan (as tops). The second group consists of integrated processors and garment manufacturers that have their own raw material procurement network (contract buyers), scouring, de-hairing, spinning, dyeing and automated knitting and weaving manufacturing capacity. The state-owned Gobi Corporation and private Buyan Company XXK belong to this group. They export both de-haired cashmere and garments depending on the relative prices on international markets. The third group comprises both local and foreign companies that produce knitted cashmere garments from hand-knitting machines using imported yarn (from China or Italy) for the quota-free US market. The gross industrial output from the manufacture of textiles and apparel (dominated by cashmere) was Tg100 billion in 2005.

**Carpets and Other Wool Products**

24. Mongolia produces large quantities of coarse wool, some of which is discarded in the countryside due to the poor transport infrastructure (high transport costs) and limited demand. Ninety four per cent of Mongolia's clip comprises coarse fibers (suitable only for carpets, blankets, felt footwear and insulating products), 4% is semi-coarse, and only 1% is fine or semi-fine and suitable for garment production. There are three major carpet producers and one blanket producer that have been privatized, two in Ulaanbaatar and one in Erdenet. Their combined production capacity for scouring, spinning, knitting and felt making is far in excess of current production levels (UB Carpets XXK is operating at 60% capacity and is anxious to increase production levels if the raw material was available). However, the production technology for carpet manufacturing is out-dated and inflexible. Similarly, felt and felt boot production is operating at about 10% of plant capacity.

**Meat and Small Goods**

25. One of the challenges for the slaughtering/meat processing industries in Mongolia, as in other countries, is the seasonality of supply - although, in Mongolia, it is more pronounced. The main turnoff period is between October to December when abattoirs operate at maximum capacity, some even doing shift work to handle the seasonal flush. With little out of season production, these facilities remain inoperative for the remainder of the year, with only their freezers being used to store meat and carcasses. The situation is made more complex in that about 70-80% of animals destined for domestic consumption are slaughtered outdoors. The Government is concerned at the hygiene of meat produced in this manner and is seeking to direct a greater proportion of the kill through abattoirs with established hygiene standards and where it is possible to introduce trace back mechanisms to monitor disease. Mongolian meat has been very competitive at US\$0.6-0.8/kg of beef (2004), half the price in China and one third of the price in Russia. More recently, as supply shortages have become apparent from increased domestic consumption, meat prices have increased dramatically (\$2.50/kg for beef and slightly less for sheep-meat) to the extent that the Government has

chosen to introduce measures to stabilize meat prices at affordable levels for urban consumers. The industrial output of food products in 2005 was Tg93 billion.

26. There are currently 26 slaughterhouses, four of which were established in 2002, with about 25% being licensed as export meat works. Historically, Mongolia has been a significant exporter of sheep meat and beef (Figure 4) but with the current domestic demand from increased urbanization and changing consumption patterns associated with higher incomes, the domestic market is the more attractive and quantities exported have declined to near zero in 2005 and 2006. Russian demand declined dramatically after transition due to the lower purchasing power of its population and it also imposed a 20% duty on unprocessed meat and a 40% duty on processed meat products such as sausages and salami. With the outbreak of FMD in 2002, the Russian and other markets have been virtually closed although it is doubtful if such an action has had any real impact on the meat industry in view of domestic developments.

### **Dairy Products**

27. The Mongolian population has traditionally enjoyed a high per capita consumption of milk, comparable to that of developed countries due to its high livestock population and traditional dietary practices. Following the collapse of the domestic dairy industry due to hasty privatization, the large domestic demand for milk and dairy products such as cheese and ice cream in urban centers has been met largely from imports. Liquid milk imports have increased five fold in recent years, however due to their high price, milk consumption is only half of its 1990 level. Domestic production of fresh milk is also highly seasonal and marketable surpluses are usually generated for a short period of the year. Milk factories have substituted fresh supplies by reconstituting imported milk powder, some of which is coming in to Mongolia under grant assistance. Some liquid consumption is met from small dairy plants using domestically produced milk in both pasteurized and un-pasteurized form, the latter being sold by middlemen in markets and also on the street, in unhygienic conditions, posing considerable health hazards. There are other small scale dairy processing plants producing a range of dairy produce including yogurt, cheese and other traditional Mongolian dairy products supplying the urban centers and rural urban populations.

28. Before 1990, the largest dairy plant operating in Ulaanbaatar produced 40 million liters of milk a year, supplied mainly by state-owned dairy farms in the city outskirts via a network of collection points and holding centers along a sealed road to the central-northern region. After privatization of the national cattle herd, this collection system collapsed along with the state-run farms. The highly subsidized intensive dairy farms also failed without coal to keep the animals warm and feed to maintain their production levels. The *Suu* plant is now operating at 1% capacity. There has been a small increase in the use of domestically produced milk by processors based on small scale producers surrounding the urban centers and the re-establishment of collection and cooling centers on a private basis but the proportion of total consumption remains low.

### **Leather Products**

29. Most Mongolian hides and skins are exported to China either raw or as semi-processed wet blue hides. Before 1990, the state owned sheepskin tannery and garment manufacturer *Darkhan Nekhii* exported 90% of its production. That plant has closed after difficulties following the transition. The domestic demand for leather jackets, boots and other products is now supplied by imports from as far as Korea and Turkey, whose products enjoy virtually duty-free access to the Mongolian market. Mongolian hides and skins are very competitively priced, almost half the price of those in China, though some price differential is due to the generally smaller size of animals in Mongolia, their lighter skins, and quality aspects (blemishes from ecto-parasites). Chinese traders are regular visitors to rural areas

where they wander at will in search of hides. Since 1990, some 48 small and medium companies have also been established for mainly primary processing (24), but also for processing fur (4), and leather and tannery products (10). These processors face difficulties in procuring raw materials because of their access to capital at reasonable interest rates also coincides with the peak buying period for livestock and plants are run well below their capacities. For example, the processing plant at Buligaar was recently upgraded with Italian machinery under a government-to-government loan. The Company is has a large debt and management difficulties and even closed down in 1997 for four years but reopened in 2001 yet is still operating at only 10% of capacity.

### **5. Support Services**

30. Veterinary services were privatized at the end of the 1990s and are now available in most soums throughout the country staffed by either one or more veterinarian, para-veterinarian or zootechnologist. These provide a limited range of veterinary treatments and rely heavily on the Government disease control programs for their livelihood as there continues to be some reluctance by herders to pay for veterinary services that were previously provided free by the State. The capacity to pay for these services would appear to exist but the willingness to pay is more in question. Veterinary service enterprises also mark-up drugs that are supplied by the Government to contribute to their living. The level of technical skills demonstrated by the veterinary staff is reasonable, but they suffer from inadequate access to diagnostic services and routine submission of samples for analysis does not happen. As such, their skill and diagnostic skills suffer from lack of practice. The disease status of the national herd is therefore not well researched and is dependent upon the irregular internationally funded programs as specific diseases become important. Brucellosis and Avian Influenza are two examples where complete programs cannot be implemented because of limited funding.

31. Most veterinarians purchase their drugs from the Government with most vaccines being produced in the state-owned Biokombinat. The quality of vaccines obtained from this source varies as the plant is old and the technology used in the production process does not always guarantee quality. With the Government being its only customer, prices for vaccines are negotiated and prices are agreed at a level that does not allow reinvestment in upgrading production technologies. Furthermore, it is limited to producing certain types of vaccines and the more effective duplex vaccines cannot be produced in this plant. As a result, tenders are called annually by MoFA to provide these other drugs that are needed in Mongolia.

32. Extension services are nearly non-existent since the collapse of the collectives. Under the previous system, technical specialists (animal production and disease) were retained on the staff of collectives who provided technical support for the herders engaged in rearing livestock. These specialists were subsequently released and many became part of the soum veterinary service providers. While departments of agriculture in the aimags and agricultural officers in the soums exist, they do not have the resources to operate as effective extension staff. Animal production expertise is less prevalent in the aimag and soum offices as the greater focus is support to cropping in the belief that the veterinary services will provide the extension services. Extension has been supported by various donors since privatization and the Government cannot find the resources to maintain this service when it is not funded by donors. Attempts to establish the extension services on a self funding basis has failed because herders do not appreciate the value of such services and are reluctant to pay, a consequence of the former state run system.

33. Veterinary laboratories exist in some form at aimag level although they are in a run down condition and are dependent upon foreign funded projects for their rehabilitation. An

operating laboratory has significant recurrent expenditure requirements for its reagents and glassware etc. that must be financed from the aimag budget. Their operations are accorded low priority by aimag administrations as other more pressing needs are identified as funding at this level is limited. Without the operations of the diagnostic laboratories, routine tests are not carried out and the disease status of the national herd/flock cannot be well understood. Small laboratories are also found in soums where basic analyses can be carried out (worm counts etc.) but for the more sophisticated tests, the aimag laboratory is the main reference. The serum laboratories are progressively being upgraded but this is very much dependent upon donor funded projects. Higher level and standardization tests can be carried out at the State Central Veterinary Laboratory (SCVL) that is self financing (but also somewhat dependent upon donor funding). With the lack of routine sampling and analyses from the field, the Government does not have sound information upon which to develop its disease control program. As such, disease monitoring is not conducted in a comprehensive manner for all diseases and all species.

### B. Constraints

34. From a subsector perspective, the most pressing constraints limiting livestock development are: (i) animal nutrition; (ii) the size distribution of herders and producers; (iii) the marketing of livestock products; (iv) producer access to credit at affordable prices; (v) livestock management skills of producers; and (vi) the genetic composition of the national herd (all species). This list does not imply any priority as all are inter-related each impacting upon the other. Each of these constraints have implications for the level of investment in production, marketing and processing of livestock products, for the sustainability of livestock activities, and for the institutional support mechanisms required to achieve desired development. They also have a direct impact on the risk associated with livestock production under extensive and higher input production systems, and in fact are the main determinants of private investment in the subsector.

35. Animal **nutrition constraints** are possible the most important of all those detailed above and should be understood to incorporate associated issues of natural pasture management and improvement (this also relates to pasture and water utilization rights), and the need for individual producers to protect their animals over the harsh winter period by conserving fodder (including maintaining access to standing fodder in nominated areas). It is clear that the majority of livestock deaths are due to the extreme environment with owners not adequately preparing their animals for the lengthy period of low feed availability (quantity and quality) from natural pastures, their animals dieing from lack of energy to maintain body function rather than from disease or age. Maintaining an appropriate nutritional regime is possibly one of the more effective risk management strategies. Until recently, the Government has assumed responsibility for providing this security through the operations of the fodder reserve fund whereby the Government procured significant quantities of hay as an emergency reserve in the event of a harsh winter. Given the high cost of operating such a scheme, the Government can no longer afford to operate such a safety mechanism and is seeking ways to transfer responsibility for maintaining adequate feed supplies for livestock back to their owners.

36. Related to the nutritional issue is that of **size of holding**. The livestock management and marketing options are constrained by the limited number of livestock owned by the one herder. Economies of scale are important in livestock production where one ram can serve 40 ewes, where transport costs for moving wool and cashmere to market are high because of the greater distances for small quantities of produce for sale by any one individual, where breeder selection (based on commercial traits) is not possible as herders are obliged to retain poor quality animals as breeders that will perpetuate the quality decline. Smaller herds are not as mobile as the larger herds and small livestock owning households tend to

congregate round soum centers to supplement their livelihoods from other income sources leading to overgrazing the natural resource. The reason this represents such a significant issue is that the majority of producers (70%) rear less than 100 head of sheep equivalents. Such a holding is unlikely to generate sufficient income to cover normal household expenses. Being the majority, this represents an influential group of producers who have alerted political leaders to the problems they face and are demanding Government support.

37. Apart for the export of live animals, the subsector does not generate a single product that is ready for final consumption - i.e. the subsector is entirely dependent upon processors to convert output (live animals) into consumption goods. While outdoor killing and dressing of carcasses ready for domestic consumption is an important value adding activity for domestic meat consumption (and one of the cheapest forms of agro-processing), all other products require further processing, often involving capital intensive equipment. The importance of an efficient processing industry for livestock products is often overlooked. The market linkages that facilitate the movement of live animals and raw material from producers to processors are equally important. Under socialism, these linkages were 'arranged'. With privatization, these linkages were broken and the private sector did not have the capital or experience to fill the voids that were inadvertently created. One of the main constraints to livestock development is the parallel development of **livestock product markets**. Marketing constraints should therefore be understood to incorporate considerations of access, price and quality considerations, and the linkages between producers and processors. Access to markets require infrastructure, depending on the product - roads to bring product to processors, cooling facilities to maintain the quality of perishable goods. Quality and price considerations implies that the market should be able to transmit signals indicating consumer preference whereby higher quality goods are rewarded with higher prices and low quality goods receive discounted prices. The livestock subsector suffers from lack of product differentiation and market signals are dampened by the buying practices of traders that work in the short term interests of processors.

38. The subsector has long suffered from limitations imposed by lack of **rural credit**. With privatization of the national herd, the employees of state farms and others shared in the reallocation of the country's livestock. This was carried out in an equitable manner that resulted in a large number of relatively small producers. These individuals did not have the capital resources to upgrade their breeding animals, to entertain the prospect of buying feed, to conserve fodder or to purchase other inputs to achieve higher productivity. Furthermore, the development of rural credit through formal financial institutions had a difficult time with the high level of risk and the poor reputation for non repayment earned by the sector that was not entirely due to the livestock herders. While there is a financial services network throughout the rural areas, production credit is not only expensive but is limited to those with some form of collateral - usually real assets in aimag or soum centers. Certainly term credit has only recently being tested amongst by some of the banks, again at rates that almost preclude its value. Development of the subsector is constrained by the level of resources available but is needed by private entities willing to innovate and embrace new production technologies.

39. While there are significant **livestock management** skills amongst many of the herders and higher input produces that are appropriate for different production systems, the age structure of herders alone (Figure 4) would imply that production knowledge is lacking and certainly familiarity with market oriented production systems is far from common. This is confounded by the out-migration of urban residents to take up herding in the early 1990s who were first time herders. It is possible that the losses experienced during the 2000-01 *dzuds* were due, in part, to the inexperience of herders to prepare their livestock for the winter period. Herders need to improve their level of knowledge of modern production

technologies including nutrition, breeding, and of market requirements, to adopt a more commercial approach to livestock production rather than seeing it as a lifestyle activity.

40. The other constraint relates to the **genetic makeup** of the herd. The locally bred animals are admittedly of lower productivity. However the variation that is found within existing livestock is sufficient to form the basis of a locally based selection program to raise the average quality of production. There have been attempts in the past to infuse higher productivity genetic content - particularly amongst dairy animals, but their ability to adapt to local conditions - nutritional and management regimes, has often resulted in their death. While the subsector should not be denied access to higher productivity genetic material, the first priority should be directed at selecting higher quality breeding stock from local animals that are well adapted to Mongolian conditions and improving productivity through nutrition and management.

### C. Opportunities

41. Mongolia's comparative advantage lies in its extensive livestock production system and the livestock feed production industry, their comparative advantage being both national and international. This advantage is due to the low-input, natural resource based production system and the increasing demand for natural foods produced outside an increasingly industrialized food production system in other countries. The feed production industry has a national comparative advantage because of the requirements of the higher input livestock production system that is developing in response to domestic demand for out of season and higher quality meat products, and the demand for roughage based feeds as herders attend to their risk management strategies. This could extend to export markets in the more densely populated neighboring countries with intensive, industrialized animal production systems. Realization of their development potential will contribute to the national goals for poverty reduction and will contribute to a more efficient, market oriented livelihood activity in rural Mongolia. The continued presence of nomadic herdsman will also support the rapidly growing tourism industry that depends heavily on the unique characteristics of their production system. Other livestock industries do not appear to have international comparative advantage.

42. The higher input livestock production systems may have a national comparative advantage in providing higher quality food items for domestic urban markets in meat and dairy industries, increasing employment opportunities and developing the national economy. However, they cannot compete on export markets with developed countries that produce large surpluses for export and have a comparative advantage given Mongolia's geographic location and access to transport services. In the short term, development efforts should focus on strengthening the extensive production systems and promoting the livestock feed industry. In the medium term, development focus might be extend to the integration of crop and livestock farming activities in close coordination with the livestock feed industry where there are positive benefits for maintaining livestock product supplies - particularly meat and dairy products on the domestic market.

43. With this new market orientation, production systems will develop in response to demand. Mechanisms that allow the differentiation of product quality are slowly being introduced into developing markets that incorporate consumer preferences. The rapidly increasing urban population can no longer rely on rural based relatives to maintain supplies of food - meat, milk and others as the process of product transfer is becoming more difficult in the increasingly commercial cities. Urban residents are not only sourcing increased proportions of their food items through established markets but they are demanding different quality items as their preferences change with changing income levels. Dietary habits also change over time and the consumption of meat generally increases with increases incomes.



There is an apparent trend for lower fat meat products that is developing amongst Mongolia's younger generations and they are prepared to pay price premiums for such product.

44. Internationally, opportunities are evident in cashmere, leather goods, skins and hides, live animals and meat, but are all dependent upon an efficient processing sector that is capable of meeting the quality requirements of international markets. This quality proviso also depends on the responsiveness of livestock rearers in providing reasonable quality inputs for processing. The demand for beef and sheep-meat appears sound in neighboring countries as their own domestic supplies cannot keep pace with their internal demand. There is a potentially large market for machine-made carpets especially in China, but also in other countries that are presently supplied by Belgium, Turkey, and Egypt, the latter producing mostly 100% synthetic carpets. Mongolia can also produce three-meter wide wall-to-wall carpets, for which there is large demand in offices and hotels.

45. These opportunities confront private investors who wish to participate in livestock production systems that efficiently and sustainably convert resources through animals into quality products that meet secondary industry and consumer demand. The primary function of the market economy is in regulating supply and demand through market price incentives that elicit a response from the production system. In this regard, the government function is to facilitate development, encouraging private investment and establishing the environment where investors can conduct their business in a predictable and responsible manner to meet agricultural sector and national development goals. Apart from the role of creating this facilitating environment, the Government should also monitor developments to ensure that only sustainable production will be undertaken that protects the country's natural resources from over exploitation.

### III. GOVERNMENT'S POLICY FOR THE DEVELOPMENT OF THE SECTOR/INDUSTRY

#### A. Sector Policies and Objectives

46. Agricultural sector objectives are established within the broader national objectives<sup>6</sup> of private sector led growth, poverty reduction and the achievement of minimum living standards, food security, and regional policy to spread the benefits of development more equitably across the country. Physical targets include an average annual real sector growth rate of 6%, an average daily per capita energy intake of 2,370 calories, and a reduction in the incidence of poverty to 18% in 2015.

47. The Government is committed to continuing its transition to a private sector led market economy. The primary focus for Government's agriculture strategy is therefore to provide an enabling environment for private investment and business development within the sector. This involves the liberalization of domestic and foreign trade to support access to markets, providing a stable macroeconomic environment, and removing administrative restrictions and other forms of interference to new enterprise establishment and operation within a legislative and regulatory framework designed to ensure fair competition, provide investment incentives, and protect the vulnerable.

<sup>6</sup> As expressed in the Government Action Plan (GAP) 2004-2008, the Economic Growth Support and Poverty Reduction Strategy (EGSPRS) - 2003-2006 but with consultative mechanisms for revision and rolling forward, and the Medium Term Budgetary Framework (MTBF) - 2005-2007, but being revised for 2006-2008, and the longer term commitment to food security under the National Plan of Action for Food Security (NPA) - 2002-2015 and to the achievement of the United Nations Millennium Development Goal (MDG) by 2015.

48. The current policy statement for the agricultural sector is found in the Food and Agriculture Policy of the Government of Mongolia, approved by Parliament in June 2003<sup>7</sup>, that replaced the General Directions of Rural Policy approved in 1996<sup>8</sup>. The overall aim of the current policy is to:-

- create favorable business conditions to increase productivity and capacity of production;
- increase agricultural output through expanded production and increased unit productivity;
- ensure the sustainable development of livestock and crop production;
- improve the availability of locally produced food products that are hygienic, of sound quality, and are ecologically clean; and
- conduct research and the application of new technologies.

49. Through these objectives, the intended outcome is for an increased consumption of domestically produced meat, milk, flour and vegetables, reduced dependence on imports, and increased level of exports. These policies are to be applied equally to the extensive pastoral and higher productivity farming systems and should be directed at improving water supplies and water management, risk management, veterinary and breeding services, pastureland tenure and utilization and fodder production and supplies. The policy objectives are to be achieved in two phases, 2003-08 and 2008-15. During the first phase, it is intended to increase the irrigated area 2.5 times to allow wheat production to provide for 50% of domestic requirements and potato and vegetable production equivalent to 70% of domestic requirements. In addition, of the total requirements for fodder in the Gobi and Steppe Zones, the Government seeks to have 20-25% produced within these zones.

50. The second phase (2008-2015) is less specific as to actions but envisages an environment of sustainable pasture utilization management with not less than 20% of herders becoming "semi-settled", and the development of higher productivity milk cattle, pork, and poultry enterprises around the cities and other urban settlements. Crop production is anticipated to satisfy 100% of domestic demand for flour and vegetables and about 10-15% for fruit and vegetable oil. This policy document does not establish how such targets are to be achieved, an issue that was subsequently rectified in the Policy Implementation Action Plan approved in November 2003<sup>9</sup>.

51. The Action Plan proposes activities in the following five areas that mirror those of the Agricultural Policy and include :-

**Creating a favorable business climate** and increasing productivity and capacity of production. Under this objective, the plan proposed to (i) improve the legal environment, (ii) use domestic and foreign investment, donor loan and aid funds more effectively, and (iii) establish flexible tax, credit, investment and foreign trade policies.

**Improving animal husbandry.** This is to be achieved by: (i) increasing the productivity of well adapted local animals and reducing mortalities, abortion causing diseases, and

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<sup>7</sup> State Ikh Hural Resolution No.29, 15 June 2003.

<sup>8</sup> State Ikh Hural Resolution No.32, 20 May 1996.

<sup>9</sup> Government Resolution No.245, 25th November 2003.

infertility, (ii) improving livestock breeding for specific purposes and promote production of non-traditional livestock products e.g. bees, (iii) promoting more intensive livestock entities in regional centers and in the crop producing areas, (iv) strengthening animal health services and develop the capacities for laboratory diagnoses, (v) protecting and improving Mongolia's livestock gene pool, (vi) improving water supplies in pasture areas through the rehabilitation of existing wells and the development of new sources, (vii) introducing eco-friendly technologies for pest and rodent control in pastures, (viii) increase the production of fodder, and (ix) initiate and strengthening disaster protection institutions at national, aimag, and soum levels.

**Rebuilding and expanding crop production** by: (i) developing improved crop production technologies (e.g. minimum tillage), (ii) increasing the irrigated cropped area, (iii) supporting the rehabilitation of small and large scale irrigation systems, (iv) promoting the production of locally adapted seed material to achieve self sufficiency, (v) introducing eco-friendly, advanced plant protection technologies, and (vi) promoting improved availability of agricultural machinery and equipment.

**Developing the food industry** by: (i) establishing milk collection and storage facilities at the local level and promoting the production of traditional dairy products as well as larger scale milk processing near urban centers, (ii) preserving fruit and vegetables and introducing appropriate packaging technologies to diversify production of nutritional dietary food and function food products (iii) improving the mechanisms for controlling food quality and hygiene, (iv) ensuring the supply of hygienic meat to urban consumers and introducing meat production technologies in processing plants to conform with international standards for increased meat exports, (v) promoting the production of a wider range of strategic goods and items that can be locally produced but are currently imported, and (vi) improving the processing and packaging of plant and animal products and upgrading storage and transportation facilities.

**Conducting research and the application of new technologies**, thereby: (i) improving the quality and effectiveness of research, (ii) strengthening the interface between researchers, research institutes and producers, (iii) strengthening agricultural extension center services, and (v) improving the skills of agricultural specialists.

## **B. Livestock Subsector Objectives**

52. Government objectives for the livestock subsector focus on increasing overall productivity, thereby increasing output to ensure a stable supply of livestock products on domestic markets and capitalize on export opportunities. Objectives at the industry level seek to strengthen the disaster response mechanisms and to reduce the risk associated with livestock production. At the producer level, it seek to increase the production of fodder to improve nutrition and reduce mortalities, reduce the incidence of diseases causing infertility and abortion, and promote diversified production including non-traditional livestock products e.g. bees. It seeks the expansion of the developing high input livestock industries recognizing the greater productivity that can be achieved under this production system, including their integration with crop producing areas, the improvement of genetic content Mongolia's livestock and recognizes the need for strengthening animal health services to monitor animal disease.

## **C. Rationale for Public Involvement**

53. The Government has provided considerable support for the subsector in view of its overall contribution to GDP. Not only is it responsible for 90% of agricultural output but it generates much of the raw material needed for processing where the contribution to

employment and economic activity is equally significant. The Government has taken the view that it is in the overall interest of the economy to support the sector in areas that are unlikely to be financed by private herders and livestock producers. One must also appreciate that the economy is still in transition and some of the functions that would be normally be undertaken by the private sector have remained with the state. Furthermore, there are still lingering expectations amongst the producers that the Government will maintain its presence in the subsector, not necessarily as direct producers but certainly in providing critical inputs to production. For example, herders who conserve fodder are ridiculed by other herders as they maintain the belief that the Government will provide fodder at concessional prices should the need arise. This dependence and expectation remains very strong in the minds of producers. While the power base of agricultural producers is becoming weaker, rural inhabitants still hold considerable sway with political parties and remain influential when elections are contested.

54. The Government is also driven by the needs of the rising urban population and seeks to maintain adequate supplies of food at reasonable prices in the urban centers. Meat prices have recently increased dramatically to the September 2006 level of about Tg2,800 per kg. The Government is conscious of the limited buying power of the urban population and is committed to maintaining supplies of meat at reasonable prices. While this may represent a conflict of interests with herders and producers (depressing prices for livestock), the growing urban population is also becoming influential in political spheres that the Government cannot ignore. Historically, the Government has supported the livestock sector in three main areas: (i) animal health; (ii) livestock management and breeding; and (iii) natural resource management (water point rehabilitation). More recently, with increasing in retail meat prices, it has elected to subsidize the price of meat by providing grants to meat processors in an attempt to reduce prices in Ulaanbaatar.

#### **D. Recent Development Initiatives**

55. The Government has maintained a program of support of the order of Tg7 billion a year until between 2001 and 2005. The planned figure for 2006 has increased to Tg11.6 billion, the biggest increase in the area of water point rehabilitation and the establishment of new wells. The equivalent donor support in the sector has been about Tg20 billion for the past five years, and of that amount, some 25-30% has been directed at the livestock subsector.

#### **1. Government Initiatives**

##### **Animal Health Initiatives**

56. The three main animal health programs funded by the Government include the Disease Prevention Program, the FMD Vaccination Program and the Veterinary Services Program. The first has been by far the most significant with annual budgetary allocations of about Tg2.5-3 billion a year since 2001. This program seeks to maintain the health of Mongolian livestock involving vaccination against Office Internationale Epizootique (OIE) notifiable diseases and protection against other common diseases found in Mongolia. It is implemented through the network of private veterinarians throughout the country who are engaged under contract to administer the treatments and inoculations. The importance of this program cannot be overstated as it enables private veterinarians to remain in the industry and provide a service to herders as required. The program (together with the Veterinary Services Program, is estimated to provide some 70% of veterinary enterprise incomes, without which, the privatization would have seen a mass exodus from this industry and professional services would have been lost to the subsector. This reflects the level of dependence of herders and producers on the Government in the area of animal health. There is not only a lack of willingness to pay for these services but also a lack of capacity in

many incidences, particularly amongst the smaller herds and flocks. Without the Government accepting responsibility for the control of the more potentially damaging infectious diseases, there would be increased risk for the spread of disease throughout the livestock population. Many of the vaccines used under this program are supplied by the State owned and operated Biokombinat. With the limitations imposed by outdated manufacturing plant, some of the more modern and effective vaccines have to be purchased on the open market under tendering arrangements.

57. The second program is a vaccination program specifically designed to protect against the spread of FMD. The annual allocation since 2001 has been about Tg2 billion and is intended to protect the international reputation of Mongolia's livestock. Funds under this program have been directed at ensuring an emergency response capacity to the outbreak of FMD as occurred in 2002 and 2004. It also provides routine vaccination, again administered by the network of private veterinary practices. FMD is one of the notifiable diseases as specified by OIE and Mongolia takes its responsibilities seriously to ensure the reputation of the health status of its animals destined for the international market. The upgrading of the veterinary laboratories that have been funded by donors has assisted in developing a diagnostic capacity in the provinces to assist in the disease monitoring activities. The upgrading of the veterinary laboratories under the Agriculture Sector Development Project allowed the Government to negotiate the reopening of the Russian border for livestock product exports that had previously been banned because of FMD outbreaks. Biokombinat does not produce vaccines for the control of FMD and all vaccines are imported.

58. The impact from these Government programs has been variable and largely dependent upon the level of resources that have been applied and the nature of disease. An estimated 45-74 million head of livestock have been treated each year to protect against contagious diseases. Brucellosis continues to be a problem in cattle that has a major impact on animal reproductive efficiency (causing spontaneous abortion) and while its incidence has decreased slightly, funding will decline after 2007 and the program will lapse unless further funding is identified. The highly contagious diseases of anaemia in horses and glanders and TB in all species remain out of control and the Government funded program has been less successful in dealing with these diseases. The incidence of ecto-parasites (ticks etc.) has been reduced from a figure of 60% in 2002 to a current level of 10%.

#### **Livestock Management and Breeding**

59. Government support in this category has been directed at the genetic content of the herd/flock (elite breeder programs) and the protection of livestock from drought and *dzuds*. Activities directed at genetic improvement of the national herd have been less demanding on budgetary resources at about Tg200 million a year that has been replaced in 2005 by the High Productivity Livestock Program with similar allocation. The main activities funded under this program are through the provision of soft term loans to producers to purchase higher productivity breeding animals and to identify superior quality breeding stock from amongst the national herd and flock in local areas. However, the main consumer of funds in this category is the drought protection program that involved the distribution of emergency feed to ensure animals live through the harsh seasonal conditions. This program was preceded by the State Reserve Fund that was terminated in 2003 (its responsibilities were transferred to the State Emergency Authority -an independent statutory authority headed by a minister). The State Reserve fund allocation varied from year to year but has not been less than Tg1.1 billion prior to its reassignment. Within the Ministers budget, the allocation has varied from Tg1.4 billion in 2001 to Tg0.1 billion in 2005. This program responded to the severe climatic conditions by providing feed for livestock at concessional prices.

## Volume II - Program Investments - Livestock Sector Summary

60. The impact from these programs is less obvious. The quality of fiber produced has not responded to the introduction of so called superior breeding stock as there has been an obvious deterioration in fiber diameter noted above. Similarly, the supply of superior meat producing breeding stock has not been obvious in local markets. This does not mean that the programs have not worked but it suggests that there are other factors that have influenced the outcomes being expressed in the statistics. For example, the desire to increase livestock numbers at the expense of quality has had a greater influence than the Government's breeder improvement program. The impact from the feed distribution programs is difficult to assess as it is impossible to attribute cause and effect where so many variables can influence the final impact on mortality rates.

**Water Point Rehabilitation**

61. Since 1998, the Government has commenced the rehabilitation of the pastoral wells. Established during the collective period, these have not been maintained and have suffered considerable damage with less than 15% of the original wells remaining operational. This has effectively denied access to extensive areas of pasture at certain times of the year. Recognizing the importance of water in these locations to maximize the utilization of the natural resource and reduce grazing pressure on pastures where water resources existed, the rehabilitation program received Government support amounting to Tg0.5 billion a year that is sufficient for the rehabilitation of about 200 wells each year. This compares with the estimated 17,000 wells that have been destroyed. Donors have also provided resources for their rehabilitation. In 2006, the Government allocation to well rehabilitation and the establishment of new wells is estimated at Tg1.7 and Tg1.5 billion respectively.

62. The impact from this investment has been obvious but relatively short-lived. Under the Government program, little attention has been given to the recurrent operating costs of the rehabilitated wells. Once rehabilitation has been completed, the well is registered as an asset of the local administration and responsibility for operations and maintenance has been transferred to the soum. Their resources are limited to maintain the rehabilitated structures and many have been rendered unserviceable due to the lack of maintenance.

**2. Donor Funded Initiatives**

63. There are some 13 projects being implemented either by the Ministry of within the agricultural sector, most of which have elements that are intended to support aspects of the livestock subsector. By arranging their components and associated budgets into similar categories as the State budget funded initiatives, it is possible to estimate the level of donor support for the various subsectors. Approximately 25% of the annual funds provided through donor projects is being directed towards livestock representing about \$4-5 million a year. The majority (about 70%) of the overall allocation is directed at project management (including consultants), credit (that has some element of support to livestock) as well as policy and institutional development. About \$4 million each year is directed at livestock management and breeding, and within that, the main initiatives include pasture management and natural resource utilization while about \$1 million a year is directed at animal health activities, mostly associated with enhancing private veterinary services and upgrading veterinary laboratories. Details of the donor projects and initiatives are presented in Appendix 1.

**3. Institutional Support Functions**

64. Government has an important role in establishing the legal and regulatory framework that provides an enabling business environment, allowing the market system to effectively operate. A central feature is the implementation of sound monetary and fiscal policies to maintain macroeconomic stability, especially of inflation and exchange rates. Also important

is a comprehensive legislative system, backed by an impartial and effective judiciary, with regulatory provisions enforced in a transparent, well defined and unbiased manner that ensures protection for property and individual rights, fair competition, unrestricted market access, and non-fraudulent business practices. Government should also provide the legislative and supervisory framework for the creation of a reliable and accessible financial services sector, and play an active role in assuring market access through its trade related policies, international memberships and diplomatic actions. In addition, where private sector development does not provide the essential services, the Government may also provide support services and risk management mechanisms necessary to protect and support the competitive environment, especially where these initiatives are of a more public nature such as ensuring the hygiene of its meat supplied to urban markets.

65. Whilst promoting the private sector, however, the Government also has a responsibility to protect its citizens from the excesses of private sector activities, and to safeguard them from harm. This includes, as consumers, from fraudulent product claims and low standards (including for agricultural inputs), and from the health hazards of poor food preparation, storage, handling, and packaging; as producers, from uncontrolled toxic chemical use, storage and disposal perhaps as a consequence of poor labeling and packaging; and, as workers, from unsafe handling and processing technologies. It includes protecting small businesses from unfair competitive practices, vulnerable groups from exploitation, and animals and the environment from over exploitation. Such protection is afforded through a suitable regulatory framework, based on legislation and enforced by government. The regulatory environment need not be too prescriptive, inhibiting or seeking to direct the free flow of capital and labor in response to economic opportunities.

66. The Government also has an obligation to protect the basic rights of its citizens, which includes the provision of basic needs: food, water, health, and education to those unable to provide for themselves, securing basic living standards. In this context, the Government has a duty to support those of its citizens adversely affected by natural disasters, external economic and political events, social exclusion, and poverty and to protect them from the negative consequences of similar events in the future. As guardian of national resources, the Government also has a primary role in management of those resources to ensure that they are utilized in the most sustainably productive manner and that all citizens, directly or indirectly, have equal opportunity to benefit from their use. Equally important is the role of Government in conserving and regulating the use of national resources, by both public and private sectors, to ensure that future generations have access to resources needed to ensure sustainable livelihood security.

67. While the primary objective of all public institutions is to support the creation of an enabling environment for an efficient, private-sector led, agricultural sector, responsibilities of key institutions in the sector include:-

- The MoFA has overall responsibility for the introduction of policies to support Government objectives, coordination of their implementation, monitoring and evaluation of their impact, and the coordination of donor and NGO assistance towards their realization.
- The State Specialized Inspections Agency has responsibility for enforcing the regulatory environment designed to protect the competitive environment, the rights and safety of citizens, and the health and sustainability of the physical environment.
- The implementation agencies are designed to deliver appropriate key support services including animal and plant health, resource management (including for land, water, and soil fertility and use), technology and human resource development

- (research and education), information gathering and dissemination (extension and information systems), and biodiversity security (genetic reserves).
- The Ministry of Trade and Industry has responsibilities for harmonization with the World Trade Organization and other international trade arrangements, export promotion and support, and the development environment for the processing and manufacture of non-food agriculture based products.
  - The Mongolian Standards and Metrology Institute has responsibility for establishing product and process quality and safety standards, usually harmonizing these with international market requirements and norms.
  - The Ministry of Finance has responsibility for public sector finance management, including the development and implementation of medium term program budgeting, tax and other revenue collection, fiscal incentives, and overall development of the financial sector (banking supervision being with the Bank of Mongolia).
  - The Ministry of Nature and Environment (MNE) has responsibility for overall policy for conservation and rehabilitation of the environment and protection of biodiversity, including policies for land, water, and forestry resources.
  - The Disaster Management Agency (previously the State Reserve Agency) - with responsibility for preparedness to swiftly respond to protect citizens from the negative impacts of sudden natural disasters and other unexpected shocks from the external political and economic environment.

68. The institutions of specific relevant to livestock apart from MoFA and MNE, include the State Central Veterinary Laboratory and numerous aimag veterinary laboratories, the Veterinary Research Institute, the Animal Husbandry Research Institute, the Mongolian National Agricultural University, and the State Specialized Inspection Agency.

69. The primary role of MoFA, in the livestock subsector is to facilitate an enabling environment that allows private sector producers and processors to develop and benefit from livestock production systems that efficiently and sustainably convert natural resources into quality products that meet consumer demand - both as meat and for processing, and in the process, ensure sustainable livelihoods for those participating as herders, livestock producers, owners or employees. MoFA is progressively making the transition from its former role to a more supportive one of private sector production, processing and marketing in the context of a market economy. Enabling producers to maximize market opportunities rather than directing inputs in pursuit of designated outputs will increase profitability, employment and poverty reduction. But shifting this focus will require reform, restructuring and capacity building in a number of MoFA departments, the strengthening of support services, and investment in public infrastructure. Following restructuring in December 2004, its main areas of activity included:-

**Strategic Policy and Planning** - defines sectoral objectives and determines the strategy to realize them. It also defines policy measures and appropriate amendments to the legislative and regulatory framework to support strategy implementation. It does this particularly in the context of domestic and foreign market developments, private sector motivation and performance, and evaluation of existing and previous policies and programs by the Information, Monitoring and Evaluation Department (IMED), and through coordination with other ministries and public sector agencies and frequent interface with private sector organizations. In order to accommodate political objectives of the Government and the evaluation of past programs, the development of revised strategic objectives requires a capacity for market and policy analysis which is an unfamiliar area, given the country's history. This department also incorporates the Special Agricultural Fund Division and the Wheat Fund, the former using funds generated from the 2KR program and the latter a remnant of the targeted lending to the wheat sector to administer loan recovery.



**Policy Implementation Coordination** - coordinates the implementation of policies and programs determined by the Policy and Planning Department, but does not itself implement, except in the case of assisting in the redrafting of legislation and regulations and advising on standards. These activities require strong links with the Ministry of Justice, the Inspection Agency, and the Standards Institute. Within this department are the livestock, crop and food divisions together with the pasture and irrigation division.

**Information, Monitoring and Evaluation** - undertakes monitoring and evaluation (relevance, efficiency, effectiveness, impact, and sustainability) of policy measures, public sector programs, and all forms of external assistance from donors and NGOs in the subsector. Conclusions from these assessments should be incorporated into policy and program revisions by the Policy and Planning Department. IMED also provides information on production and processing activities and on markets, critical to effective planning and decision making for both the public and private sector. Advanced analytical skills are needed in this department as their findings should be used in establishing priority areas for future public investment.

**Veterinary Department** - responsible for the monitoring and emergency response to animal disease, and for managing the implementation of the Government's vaccination and animal health programs.

**Foreign Collaboration** - is responsible for: (i) providing international donors with a clear indication of what is needed to advance the development process and where their contributions can best be utilized; (ii) facilitating information sharing and collaboration between ongoing projects, (iii) capturing the results of projects (through IMED) so that successful replicable models can be institutionalized (iv) liaison between the MoFA and international donors. The MoFA recently took the initiative to standardize approaches between donors for similar activities such as well rehabilitation.

**State Administration and Management** - performs essential functions of the Ministry. It is responsible for the financial reporting requirements of government and is responsible for the development of the Medium Term Budget Framework required by the Ministry of Finance. The intention is to direct resources to the more effective development programs of the Government that requires increased capacity in impact analysis.

# **AGRICULTURE SECTOR STRATEGY STUDY**

## **VOLUME 2**

### **LAND MANAGEMENT AND UTILIZATION**

**30 NOVEMBER, 2006**

## ACRONYMS

ADB	-	Asian Development Bank
EGPRS	-	Economic Growth and Poverty Reduction Strategy
EU	-	European Union
FMD	-	Foot and Mouth Disease
GAP	-	Government Action Plan
GDP	-	Gross Domestic Product
IMED	-	Information Monitoring and Evaluation Department
MDG	-	Millennium Development Goal
MNE	-	Ministry of Nature and Environment
MoFA	-	Ministry of Food and Agriculture
MTBF	-	Medium Term Budgetary Framework
NPA	-	National Plan of Action
OIE	-	Office Internationale Epizootique
SCVL	-	State Central Veterinary Laboratory
UNDP	-	United Nations Development Program
WTO	-	World Trade Organization

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## AGRICULTURAL LAND MANAGEMENT AND UTILIZATION PROGRAM

### I. BACKGROUND

1. Under the socialist system, pastoral land was used by collectives and the national herd grazed the natural pastureland in an organized and controlled manner. Water points were developed throughout the rangelands at strategic locations to allow better utilization of the pastures where water had not previously been available. Under this system, there was some degree of management of the two basic natural resources - pasture and water. Employees who were tending the livestock would be given clear instructions as to where the animals could be grazed and for how long in that location so as to provide maximum feed for the animals yet at the same time, not degrade the pastures through overgrazing. The system was well policed by the state through the managers of the collectives. Not only were livestock numbers and the herd/flock relatively stable (as was the species composition) mandated by the state as each collective had to generate certain production targets, but the grazing patterns developed did not place excessive demands on the pasture being grazed. Employees respected the grazing patterns whereby agreed areas were left un-grazed as strategic locations for winter and spring grazing purposes. The nomadic migratory patterns in themselves protected the integrity of the pasture resource and water points were maintained by the collective. This all changed with the collapse of the former Russia and the halting of funds to maintain the collective farming structures.

2. Privatization of the national herd/flock soon followed early in the transition period when former collective employees were allocated livestock to assist them in gaining some form of livelihood, in many cases, only a subsistence existence. The impact of this was to create a large number of relatively small scale livestock rearers compared to the smaller number of relatively large herd sizes that previously existed (and that could be easily managed). The immediate response to the new ownership arrangements was to increase the number of animals owned by each household as a means of increasing incomes. During the 1990s, there was a significant increase in livestock numbers to their peak levels of 1998 with an associated increase in the demand on pasture grazing areas for feed requirements. What was previously well organized and controlled now became not only uncontrolled but there was no mechanism to manage the movement of herding households though the grazing patterns that developed. This led to conflict over pasture access and the destruction of many of the water points as herders attempted to prevent others from gaining access to pastures at certain times of the year. The extensive livestock industry existed in turmoil through much of the 1990s in the absence of any mechanism to control the use of Mongolia's most important resources - pasture and water.

3. During this period, a number of detrimental impacts have been observed that resulted from the privatization process including (i) the creation of a large number of small scale producers that have introduced significant marketing complications, (ii) significant levels of conflict between the traditional users of pasture land, (iii) pasture degradation through overgrazing as the smaller herders did not want to undertake lengthy grazing routes far from the urban populations as they needed to supplement their incomes from non herding activities, (iv) extensive destruction of water points throughout the pastoral areas - both intentionally and also through lack of any maintenance as there were no effective "owners", and (v) an effective void created for input supplies and access to technical support services. In 2003, research by the Animal Husbandry Research Institute indicated that nearly 7% of the 124.8 million hectares of natural pasture was heavily degraded and an additional 63% was under threat of heavy degradation, compared with the 1995-1997 figure of 35%. More recent estimates suggest the area currently degraded is closer to 70% of the pasture area.

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4. Management of pastureland involves much more than management of a static resource such as land itself or water or minerals which humans wish to use. Management of pastureland involves managing the interaction between a dynamic set of resources (soil, moisture, plants, and terrain) used by humans through an intermediary agent (livestock). The intermediary agent, which is dynamic itself, has its own set of needs and which, if not fulfilled, can have a negative impact on both the pastureland resource and the livelihood of the livestock producer. Managing pastureland resources is complex because the interaction (i.e., harvesting forage through animal grazing) has to be managed in order to manage the set of resources comprising pastureland. With changing climatic conditions, changing livestock numbers seeking to use the pasture, changing composition of the species using the pasture and the fact that seasons will vary from year to year in the same location, makes for a complex dynamic system that is need of management based on reliable information sources.

5. Added to the complexities of the system itself, the country does not have the resources at the lower echelons of local administration needed to monitor and police the guiding legislation that have only recently been passed by Parliament. The legal framework that addresses utilization of these resources (Land and Water Laws) is considered to be in its development phase as subsidiary regulations are under consideration in view of difficulties that have arisen through their implementation. Stronger legislation needs to take place in order to provide appropriate incentives for sustainable use of the pastureland. The current legislation lacks inducements for herders to protect the very resource on which they depend. It also lacks penalty mechanisms to monitor and enforce land stewardship. The uncertainty of secure, year-around and long-term access to a specific pastureland is a disincentive for herder individuals or communities to invest in land improvements and protect the pastureland. The Government acknowledges the need for urgent attention to the issues of water and pasture management and is proposing a multi faceted approach combining direct investment, policy and legislative development together with associated capacity building within the responsible ministries.

## II. RATIONALE

6. The problems identified above are essentially those of ownership and responsibility. While the constitution states that pasture resources are free to all Mongolians, the lack of direct ownership - or stewardship by herders has contributed to its degradation. While ownership in the legal sense is not possible under the law, there are alternate means for ensuring that the users of the natural resource contribute to its protection. Only by involving those who directly benefit from the resource in its management will its integrity be sustained. Furthermore, improvements to this resource will only be contemplated by the private sector if they can be assured of long term access rights.

7. In December 2004, a conference<sup>1</sup> was convened to discuss the issues of pasture management where it was concluded that the Land Law did not sufficiently address pastureland issues and that a separate "Pastureland Law" was needed. At the same conference, the participants recognized that pasture management was not a priority of aimag, soum, and bag administrations, particularly given their staff resources and expertise in this area (soum agricultural officers tend to have a stronger livestock orientation than pasture management). The responsibilities of these administrations are:-

- Bag governors are responsible for managing livestock utilization of pastureland through herders in their administrative unit. However, regulations and decisions

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<sup>1</sup> "Pastureland Legislation: Challenges and Opportunities" Ministry of Food and Agriculture, Ulaanbaatar 2004.

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made by bag governors are generally ignored they are heads of administrative units limited by artificial boundaries rather than of discrete natural resource management units. Herders' seasonal migration patterns can extend beyond the administrative borders.

- At the soum level where migration patterns should be coordinated, land management plans are generally not developed and there are few attempts to coordinate herder movements. Soums have few (if any) land management staff and the responsibility for pastureland often passes to the environmental officers who are more concerned with environmental issues rather than pastureland management. During the collective management, detailed maps were used to track and control livestock movements but these have mostly disappeared and certainly have not been replaced.
- At the aimag level, few have prepared land management plans other than where projects have funded this activity. Most land management activities at aimag level focus on urban planning in the aimag center. The technical capabilities and equipment to facilitate land management is also lacking at the aimag level.

8. One of the most important omissions in the current Land Law is provision for long term user rights for pastureland that is central to the issue of protection and sustainability. Their definition is necessary because land user rights define the control, organization, access, and permissible utilization of pastureland by individuals or groups of individuals. Their definition will also be instrumental in developing the current subsistence based livestock production systems to a more commercial system because:

- User rights need to document the rights, responsibilities, obligations and costs for both the herder and the government;
- User rights needs to have legal status as a binding lease, contract, or license in force for a specified period of time that provides security for the beneficiary entity;
- User rights facilitate sustainable utilization because possession of pastureland and resources associated with land adds value to the livestock production system of the beneficiary;
- User right agreements/contracts can form the basis for resource management plans for both the beneficiary and government and mitigate environmental and economic risk to the herder; and,
- User rights are the basis for resolving conflict between users.

9. Pasture user rights should take the form of a legal contract between pastureland users and the entity controlling pastureland use (soum government, supported by the land management agency at National level).

10. Similarly, a Water Law of June, 1995 was established to regulate the protection, utilization and rehabilitation of water resources. While amended in 2004, it fails to address the long term user rights of individuals or groups in terms of access, control, managing the use of and associated conditions for use of the water point between potential water consumers. Clearer definition of the rights is necessary because these are important in transforming the current subsistence production systems to a more commercial basis. While a number of donor projects have established group contracts for rehabilitated engineered wells, contracts addressed ownership of conveyance structures (i.e., well pumps, engines, pump houses, etc.) and the right to use land associated with the well. What is also needed is to define the legal basis for assigning rights and resolving conflict among users. The water issues are similar to those of pasture management and should be read in conjunction with the initiatives proposed for pastureland.

11. There remain unresolved issues in respect of pasture utilization and management in spite of the extensive investment through internationally funded development programs. In one sense, these have clarified the thinking of the Government in respect of requirements for tenure and have provided a number of alternative models to transfer ownership as well as responsibility for operations and maintenance of wells. However, there remain questions as to: (i) the cohesiveness of groups that have been granted user rights; (ii) the sustainability of these groups as custodians of the resource, (iii) the capacity of the responsible authority (soums) to issue user contracts, (iv) the capacity of the soums to administer and enforce contracts issued, and (v) the technical capacities of soum administration staff to understand the complexities of resource utilization in a sustainable manner. Further technical assistance is considered necessary to progress the Ministry's efforts in achieving sustainable pasture utilization and management.

### **III. LAND MANAGEMENT AND UTILIZATION PROGRAM**

#### **A. Objective and Outcomes**

12. The establish the institutional mechanisms develop capabilities within the institutions to administer the issuance, monitoring and enforcement of water and pasture user rights in accordance within the legislative framework developed under the Program and use these mechanisms to identify water sources and lead to the development and redevelopment of pastureland and water resources. The main outcomes should include:

- Draft legislation for consideration by parliament that regulates the effective use, protection and improvement of natural pastures and water resources therein.
- An improved capacity of soum administrations to issue, plan and monitor long term user rights to pasture and water resources.
- Upgraded facilities in aimags and soums to prepare pasture management plans including digitized grazing management plans.
- Linkages with the central bureau of meteorology to enable seasonal conditions to be taken into account when planning pasture management plans.
- Incremental resources to monitor pasture utilization and enforce pasture management plans.
- Rehabilitated wells in strategic locations.
- New wells established in strategic locations.
- Water resource inventories for the four regions of Mongolia.

#### **B. Scope and Key Activities**

13. Activities under this Program comprise a combination of direct public investment, institutional capacity building and legislative development in order to achieve the desired outcomes from the Program. The phasing of the activities needs to be coordinated by MoFA in view of the wide range of activities proposed and the need for a multi faceted approach to progressively ensure increased security of tenure amongst the herders over their access to pasture land, as well as their improvement of this productive resource.

##### **1. Public Investments**

14. Under this Program, public investment will be undertaken in developing the water resource inventory (hydrological surveys to identify potential new well sites), the rehabilitation of existing water points and the construction of new water points and in establishing a mapping capacity in each aimag including digitizing tables, computers and



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associated training of aimag staff. Hydrological surveys are considered necessary to identify the technically feasible locations for the establishment of new wells in order to give access to new, previously unutilized areas of natural pasture. With modern survey technologies and the gradually changing demands of herders in accessing pasture areas, new wells are considered appropriate and, given the technical complications of rehabilitation, it is sometimes more cost effective to drill new wells rather than rehabilitate existing ones. Many herders believe this to be an opportunity to relocate the well to a more appropriate location given their changing grazing patterns.

15. The Government has developed guidelines<sup>2</sup> for the rehabilitation of water points covering the beneficiary contribution, responsibility for operation and maintenance of the facility and the beneficiary entity's right to charge for water consumed from the well by others in which it seeks a minimum of 10% beneficiary contribution to the capital cost of the well. There remains some uncertainty as to what the herder or herder group will receive in return for this contribution other than the user rights to the well. It would therefore be appropriate to broaden the terms of reference for the proposed technical assistance outlines below to review the legislative requirements in relation to a possible Pastureland Law and the other relevant statutes. In estimating the cost of the Program, the full price of the wells have been used, \$2,500 for rehabilitation and \$3,500 for new wells. The Government plan on rehabilitating 4,000 wells and establishing 10,000 new wells by 2020. Adjusting this to a time frame of 2015 means the number of wells to be rehabilitated will be 3,000 and new wells will number 7,500. At this level of well establishment, it has been estimated that some 60% of the country's natural pasture will have water sources available.

## 2. Legislation Development

16. There is a need for further technical assistance to ensure the security of tenure by herders over the pasture resources they utilize. While the land and water laws have been developed, they do not provide the level of security that encourages the herders to protect the resource from overgrazing or to make investments in improving the carrying capacity of the resource. Legislative development is considered necessary to ensure that the herder has long term user rights to the pasture and water resources therein, and that there is a competent and resourced institution capable of administering the laws. While it is uncertain whether a new law will be needed or that the existing statutes can be amendment is the challenge for a proposed technical assistance study. The new or amended laws should accommodate the following:

- Develop the concept of herder user rights in the context of a pastureland law by defining rights and obligations of all parties involved in pasture use;
- Develop the rationale for user rights as the basis for resource management and commercialization of livestock production at soum administrative level;
- Develop pasture utilization rights as a means for mitigating environmental and financial risk for herders;
- Provide examples of lease contracts between private livestock producers and public land management agencies from other countries with extensively managed livestock production systems using public pastureland resources;
- Develop the concept of water user rights relative to implementation of water use and defining rights and obligations of all parties involved in water use;
- Develop the rationale for water user rights as a basis for resource management and commercialization of livestock production at the soum government administrative level;

<sup>2</sup> "Standard Regulation on Rehabilitation, Drilling, Financing, Possession, and Utilization of Engineered Wells and Water Points" July, 2005, Ulaanbaatar, Mongolia.

- Develop the role of water user rights in mitigating environmental and financial risk to herders; and,
- Provide examples of water use contracts between private livestock producers and government water management agencies from other countries with extensively managed livestock production systems using public owned water resources.

17. The estimated cost for the TA is \$0.5 million.

### **3. Institutional and Beneficiary Capacity Building**

18. Associated with the proposed investment is a need for the parallel development of institutional structures to effect pastureland management. Capacity building is proposed at four levels, national - where the MOFA need to coordinate initiatives, aimag - where there will be developed a mapping capacity, soum - where there will be need to be technical pasture management skills and resources to carry out routine monitoring activities, and the herder - where there needs to be a change of attitude as to the Government's role in pasture management and water point operations and maintenance. At the national level, the Ministry has a pasture division comprising three specialists, one funded by the Swiss Development Corporation and the other two being public servants. The group is currently supported by UNDP to fund essential coordination activities of donors in pasture management. Capacity needs to be developed amongst this group in both technical knowledge and approaches adopted elsewhere to effect pastoral management.

#### **Aimags**

19. At the aimag level, a mapping capacity is needed to prepare soum base maps on which to prepare their pasture management plans. Maps previously existed in soums that were invaluable in defining seasonal routes and livestock movements between camps. Many of these have either been lost or are in such a dilapidated condition that they are of limited practical use. Soum mapping of herder and livestock movements have been piloted under several donor projects<sup>3</sup> and have proven a useful planning tool. But it is not the sole purpose of the mapping capacity. The need for this capability recognizes the interactive nature of pasture management. The herding patterns must be able to accommodate changes in livestock numbers, in climatic conditions and in herders wishing to use the resource. An iterative capacity is needed to continuously review and upgrade the information captured at that point in time. Associated with the establishment of the mapping capability in each aimag is the need to have trained staff who are familiar with standard GIS software and the skills to generate meaningful outputs from data digitized on-location and captured as externally provided data sets. Training is proposed under technical assistance as there is well known capabilities in this area amongst Mongolia's main donors estimated at \$0.5 million.

#### **Soums**

20. With technical backup from the aimags, soums will receive base maps upon which seasonal grazing patterns can be identified in cooperation with beneficiary herders. In order to appreciate the complexities of pasture land management, it is necessary to increase the technical knowledge of soum staff in pasture management techniques and in the rehabilitation of overgrazed areas. With the installation of computer facilities in the soum, there will also be need for computer literacy training. A training budget has been estimated based on repeat training in technical areas every six months in the aimag for a period of three years with costs including travel, per diems and trainer fees. Similarly, regular computer literacy training will be provided in all soums to facilitate their monitoring and record keeping of contracts issued and other administrative matters.

<sup>3</sup> ADB, September, 2000, "Capacity Building in Agriculture" Manila that developed soum level grazing plans in digital format based upon consultation between herder groups and soum administrations.

#### **4. Recurrent Operations**

21. One of the main concerns in proposing a significant increase in responsibility of lower level administrative structures is the repercussions on recurrent budgetary allocations. While the Government is conscious of not having significant increases in public servants, it there is to be a role for the Government, it is in monitoring the utilization and management of this important resource. Recurrent expenditure will be needed to maintain the operations of the aimag mapping centers, and to allow the ongoing operations of the soums with their additional responsibilities assigned under the law. With incremental staff at the soum level of two per soum, and two per aimag, together with estimated operating costs for the offices and monitoring activities, the call on consolidated revenue for this activity is estimated at approximately \$1 million a year countrywide.

#### **C. Summary Cost Estimate of the Program**

22. The overall investment cost of the Program is dependent upon the extent of coverage and the level of water point rehabilitation and development considered appropriate. Based on the Government's expectations, a total of 1,000 wells will be rehabilitated and new wells will amount to 3,000 to the year 2016. The funding sources are not identified in the summary cost estimates and are likely to be derived from the State budget, donor assisted projects and bi-lateral grants.

#### **D. Indicative Implementation Arrangements**

23. With the recent establishment of the pasture management unit within MoFA, it is logical that implementation be effected through the Ministry. However, given the broader intention of the pasture management initiatives, it is important to gain access to senior levels within other ministries including Nature and Environment, Finance and Foreign Affairs. A Program Coordination Group should be considered to maintain common knowledge of initiatives in this area and their financial implications together with the coordination between ministries. This should be supported by local aimag groups to coordinate the sustainable development of these two resources.

### Table 1: Agricultural Land Management and Utilization

Physical Quantities													
	Unit	Unit Cost	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
I. Investment Costs													
A. Draft Legislation													
	TA for development of legislation		1	-	-	-	-	-	-	-	-	-	1
B. Improved Capacity in Pasture Management													
	TA in GIS operations	580,000	1	-	-	-	-	-	-	-	-	-	1
	Equip aimag mapping units	23,200	22	-	-	-	-	-	-	-	-	-	22
	Equip soum offices	1,740	100	100	100	40	-	-	-	-	-	-	340
	Computer literacy training	9,280	30	30	30	-	-	-	-	-	-	-	90
	Pasture management training	9,280	60	60	60	60	-	-	-	-	-	-	240
Subtotal Improved Capacity in Pasture Management													
C. Linkages with Meteorology Institute													
	Annual allowance for information transfer	580	22	22	22	22	22	22	22	22	22	22	220
D. Resource Study													
	Local water resource evaluations	34,800	5	5	5	5	-	-	-	-	-	-	20
E. Water Point Development													
	Rehabilitation of existing wells	2,900	200	200	200	200	200	-	-	-	-	-	1,000
	Establishment of new wells	4,060	500	500	500	500	500	500	-	-	-	-	3,000
	Training of well operators	150	50	50	50	50	50	50	-	-	-	-	300
Total Investment Costs													
II. Recurrent Costs													
A. Incremental Staff													
	Aimag mapping staff	1,250/aimag yr	22	22	22	22	22	22	22	22	22	22	220
	Soum pasture management staff	1,100/soum - yr	340	340	340	340	340	340	340	340	340	340	3,400
Subtotal Incremental Staff													
B. Office Operating Costs													
	Aimag mapping offices	580	22	22	22	22	22	22	22	22	22	22	220
	Aimag travel allowances	230	22	22	22	22	22	22	22	22	22	22	220
	Soum pasture management activities	560	340	340	340	340	340	340	340	340	340	340	3,400
	Soum travel allowances	560	340	340	340	340	340	340	340	340	340	340	3,400
	total												

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	Unit	Unit Cost ('000)	Base Cost (Million)										Total	
			2007	2008	2009	2010	2011	2012	2013	2014	2015	2016		
I. Investment Costs														
A. Draft Legislation														
TA for development of legislation	study	330,000	330.0	-	-	-	-	-	-	-	-	-	-	330.0
B. Improved Capacity In Pasture Management														
TA in GIS operations	study	580,000	580.0	-	-	-	-	-	-	-	-	-	-	580.0
Equip aimag mapping units	set	23,200	510.4	-	-	-	-	-	-	-	-	-	-	510.4
Equip soum offices	set	1,740	174.0	174.0	69.6	-	-	-	-	-	-	-	-	591.6
Computer literacy training	course	9,280	278.4	278.4	-	-	-	-	-	-	-	-	-	835.2
Pasture management training	course	9,280	556.8	556.8	556.8	-	-	-	-	-	-	-	-	2,227.2
Subtotal Improved Capacity in Pasture Management			2,099.6	1,009.2	1,009.2	626.4	-	-	-	-	-	-	-	4,744.4
C. Linkages with Meteorology Institute														
Annual allowance for information transfer	yr	580	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	127.6
D. Resource Study														
Local water resource evaluations	study	34,800	174.0	174.0	174.0	-	-	-	-	-	-	-	-	696.0
E. Water Point Development														
Rehabilitation of existing wells	well	2,900	580.0	580.0	580.0	580.0	-	-	-	-	-	-	-	2,900.0
Establishment of new wells	well	4,060	2,030.0	2,030.0	2,030.0	2,030.0	2,030.0	2,030.0	-	-	-	-	-	12,180.0
Training of well operators	soum trng	150	7.5	7.5	7.5	7.5	7.5	7.5	-	-	-	-	-	45.0
Subtotal Water Point Development			2,617.5	2,617.5	2,617.5	2,617.5	2,037.5	-	-	-	-	-	-	15,125.0
Total Investment Costs			5,233.9	3,813.5	3,813.5	3,430.7	2,630.3	2,050.3	12.8	12.8	12.8	12.8	12.8	21,023.0
II. Recurrent Costs														
A. Incremental Staff														
Aimag mapping staff	2 aimag yr	1,250/aimag yr	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	550.0
Soum pasture management staff	2 soum - yr	1,100/soum - yr	748.0	748.0	748.0	748.0	748.0	748.0	748.0	748.0	748.0	748.0	748.0	7,480.0
Subtotal Incremental Staff			803.0	803.0	803.0	803.0	803.0	803.0	803.0	803.0	803.0	803.0	803.0	8,030.0
B. Office Operating Costs														
Aimag mapping offices	yr	580	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	127.6
Aimag travel allowances	yr	230	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	50.6
Soum pasture management activities	yr	560	190.4	190.4	190.4	190.4	190.4	190.4	190.4	190.4	190.4	190.4	190.4	1,904.0
Soum travel allowances	yr	560	190.4	190.4	190.4	190.4	190.4	190.4	190.4	190.4	190.4	190.4	190.4	1,904.0
Subtotal Office Operating Costs			398.6	398.6	398.6	398.6	398.6	398.6	398.6	398.6	398.6	398.6	398.6	3,986.2
Total Recurrent Costs			1,201.6	1,201.6	1,201.6	1,201.6	1,201.6	1,201.6	1,201.6	1,201.6	1,201.6	1,201.6	1,201.6	12,016.2
Total			6,435.5	5,015.1	5,015.1	4,632.3	3,831.9	3,251.9	1,214.4	1,214.4	1,214.4	1,214.4	1,214.4	33,039.2

**E. Program Framework Matrix**

<b>Design Summary</b>	<b>Performance Indicators/Targets</b>	<b>Monitoring Mechanisms</b>	<b>Assumptions and Risks</b>
<b>Goal</b> 1.0 To develop and strengthen the institutional mechanisms for issuing and enforcing water and land user rights in pastoral areas	Management plans approved and user rights issued	Aimag reports	
<b>Purpose</b> 2.1 To strengthen aimag and soum capacity to administer the land and water laws of Mongolia  2.2 To improve pasture utilization by herders and herder groups	Water and pasture user rights issued  Area impacted by rehabilitated and established wells	Aimag reports  Aimag reports	Incremental appointments are approved by Government
<b>Outputs</b> 3.1 Draft legislation for the user rights of pasture land and water resources therein  3.2 Improved capacity of soum administrations to issue, plan and monitor user rights for water and pastures  3.3 Information linkages with meteorological institute  3.4 Additional resources to monitoring pasture utilization  3.5 Water resource inventory developed  3.6 Wells rehabilitated in strategic locations  3.7 New wells established in strategic locations	Recommendations for legislation amendment submitted  Staff appointed and equipment installed Management plans approved  Exchange of data for pasture management  Increased operational budgets allocated  Reports submitted  Nos. of wells rehabilitated  Nos. of new wells established	TA report sighted  Procurement reports Soum minutes  Fees paid for data download  Aimag budget statements  Inventory maintained  Well handover reports  Well handover reports	Govt approve incremental staff      Capacity exists for assessment
<b>Activities</b> 3.1.1 TA for the assessment of need for independent legislation and drafting thereof	TA team mobilized and report submitted	Report sighted	
3.2.1 TA for the identification of GIS software, introduction and training	TA team mobilized and report submitted	Report sighted	
3.2.2 Equipping the aimag	Equipment installed	Procurement	

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offices with GIS mapping capability		documents	
3.2.3 Appoint incremental staff to facilitate pasture use monitoring	Incremental staff appointed	Aimag payroll statements	Govt agree to appoint additional staff
3.2.4 Provide computer literacy and pasture management training	Nos. trained and courses provided	Training evaluation reports	
3.2.5 Resource incremental operations of aimags and soums	Incremental resources committed	Aimag budget allocations	
3.3.1 Exchange of data between aimags and central meteorological bureau	Data incorporated and used in mapping exercises	Procurement of data - payment records	
3.4.1 Conduct studies to identify potential water sites	Specialist contractors appointed and reports submitted	Reports sighted	
3.5.1 Rehabilitate water points	Nos. of wells rehabilitated	Aimag reports and contracts issued	Capacity exists in soum offices
3.5.2 Provide operator training	Nos. of training courses provided to well operators	Training evaluation reports	
3.5.2 Issue user rights	Nos. of user rights issued	Legal documents registered	
3.6.1 Establish new wells in identified areas	Nos. of wells rehabilitated	Aimag reports and contracts issued	Capacity exists in soum offices
3.6.2 Provide operator training	Nos. of training courses provided to well operators	Training evaluation reports	
3.6.3 Issue user rights	Nos. of user rights issued	Legal documents registered	

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# **AGRICULTURE SECTOR STRATEGY STUDY**

## **VOLUME 2**

### **RISK MANAGEMENT**

**30 NOVEMBER, 2006**



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## ACRONYMS

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ADB	-	Asian Development Bank
EGPRS	-	Economic Growth and Poverty Reduction Strategy
EU	-	European Union
FMD	-	Foot and Mouth Disease
GAP	-	Government Action Plan
GDP	-	Gross Domestic Product
IMED	-	Information Monitoring and Evaluation Department
LEWS	-	Livestock Early Warning System
MDG	-	Millennium Development Goal
MNE	-	Ministry of Nature and Environment
MoFA	-	Ministry of Food and Agriculture
MTBF	-	Medium Term Budgetary Framework
NPA	-	National Plan of Action
OIE	-	Office Internationale Epizootique
SCVL	-	State Central Veterinary Laboratory
UNDP	-	United Nations Development Program
USAID	-	United States Agency for International Development
WTO	-	World Trade Organization

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## RISK MANAGEMENT PROGRAM

### I. BACKGROUND

1. Since the early 1990s, the transition from the centrally planned to a market economy has had adverse consequences for most of Mongolia's population. Transition has led to an increase in the incidence, depth and severity of poverty; rising fuel prices; lack of spare parts vehicles; broken wells; and a decline in the coverage (and quality) of health and education services. Increasing livestock congestion on pastures closer to existing wells or water supplies, to towns and roads, and to areas of better grazing, led to overgrazing in areas of concentrated livestock use and growing conflict over pasture utilization and camp sites. The less experienced newcomers to herding, who also tended to be the poorer members of rural communities, were often disadvantaged in their access to pastureland resources but also have fewer alternatives during natural disasters. They are most vulnerable to drought and severe weather. Following the harsh winters of 1999/2000 and 2000/2001, many of the new and inexperienced herders who lost their herds moved into soum and aimag centers and Ulaanbaatar and other urban centers seeking alternative livelihoods.

2. These factors have greatly increased the proportion of Mongolia's herding population that is exposed to the covariant risk of drought and *dzud*<sup>1</sup>, and have increased the vulnerability of those exposed to such risks. Until 1999/2000 there were few *dzuds* and none resulted in humanitarian crises of national proportion compared to that particular event. In 1993, at a time when significant numbers of livestock were still under state ownership, *dzud*-affected areas in western Mongolia still had the benefit from stockpiles of hay and fodder maintained by the former State Emergency Hay and Fodder Fund, so livestock losses during extreme conditions were minimal. By 1999, it was unclear whose responsibility it was to respond in the event of a severe drought or *dzud*. While many herders continued to expect assistance from the State as in earlier times, national and local governments took the view that privately owned livestock became the responsibility of private herders. In addition, the State had too few resources and insufficient institutional capacity to respond. The former measures to address pastoral risk management (to respond to natural disasters affecting the extensive livestock production sector) no longer existed. Consequently, the Government was unable to effectively respond when severe drought and *dzud* that occurred in 1999/2000 and again in 2000/2001.

3. The severe winter of 1999/2000 resulted in the loss of 2.8 million head of livestock, 8.6% of the total livestock population. Livestock losses during the previous non-*dzud* years of 1998 and 1999 were 2% and 1.8% respectively, which is considered normal. The figure of 8.6% does not reflect the more severe losses experienced in certain parts of the country. Dundgovi aimag lost nearly 31% of its herd. In Uvurhangai and Zavkhan, the equivalent figures were 18% and 16% respectively while the figure in Uvs was 14%. The *dzud* of 1999/2000 was followed by a severe drought across much of the southern and western parts of the country. Consequently, many livestock were not in good body condition going into the next winter and there was little grass to make hay. The *dzud* of 2000/2001 was even more devastating with an estimated 4.1 million head of livestock perishing (13.8% of the total livestock population). While the entire country was affected by the second successive *dzud* to some degree, many aimags

<sup>1</sup> "Dzud" is a Mongolian word that conveys the meaning of an extremely harsh winter - both in terms of temperature and wind factor. There are varying severities of dzuds ranging from white dzuds to black dzuds.

experienced remarkably high livestock losses. Govisumber lost 36% of its livestock. Zavkhan had losses of 30%. Huvsgul and Tuv aimags lost 24% and 20% respectively. In terms of numbers, Zavkhan lost 969,800 head of livestock in the two *dzud* years while previously, it recorded losses of 123,100 head in 1998 and 1999 combined. Uvurhangai lost 896,100 livestock in the last two years compared with 81,000 in 1998 and 1999, while in Huvsgul lost 635,000 in the last two years but only 54,000 for 1998 and 1999. Arhangai lost 617,500 head of livestock in the *dzud* years but only 17,600 in previous two years.

**Table 1: Livestock Mortalities during Dzud Years**

Year	Type of Disaster	Coverage (%)	Animal Mortality			
			Adult stock		Young stock	
			Million	%	Million	%
44-45	Drought + dzud	9 aimags (65%)	8.1	33.2	1.1	17
54-55	Dzud	9 aimags	1.9	8.2	0.3	4
56-57	Dzud	11 aimags	1.5	6.2	0.9	12
67-68	Drought + dzud	13 aimags (80%)	2.7	11.9	1.7	21.6
76-77	Dzud	15 aimags, 116 soums (90%)	2	8.6	1.6	10.7
86-87	Dzud	11 aimags, 198 soums (80%)	0.8	3.6	0.9	9
93	Dzud	3 aimags, 30 soums	1.6	6.4	1.2	13
96-97	Dzud	11 aimags, 69 soums	0.6	2.1	0.5	5.4
99-2000	Drought + dzud	12 aimags, 157 soums	2.8	8.6	1.2	12.1
2000-01	Drought + dzud		4.1	13.8		

4. The effect of livestock losses on households' livelihoods from successive *dzuds* has been profound. In 1999/2000, almost 2,400 households lost all of their livestock and over 10,000 households were left with less than 100 head. In 2000/2001, about 7,000 households lost all of their animals. Many herders in Zavkhan and Khovd have responded to the large livestock losses by migrating to other areas of the country (mainly to central Mongolia in Tuv aimag) where risks are less and where social services are more accessible. In some soums of Zavkhan, 40% of the herding households have already left the area and some of those have left the industry.

5. This Program is therefore highly relevant to the sustainability of the subsector and is one of the foremost concerns of the Government. While protective mechanisms have been described on an industry basis as well as for individual herders<sup>2</sup>, there remains some confusion as to the respective responsibilities, particularly as this will involve herders incurring additional costs. The Program primarily focuses on development of an early warning system for unusually harsh climatic conditions. There are several known indicators that can be used to predict the incidence of adverse conditions. These need to be complemented by more rigorous analysis of pre-disposed conditions to improve the reliability of predicting adverse situations.

<sup>2</sup> Regulation No. 47 entitled "Support the Protection of Livestock from Droughts and Dzuds" of 13 March 2001.

## II. GOVERNMENT'S POLICY IN RISK MANAGEMENT

6. The five key objectives in the Government's agricultural policy include: (i) the creation of a favorable business environment; (ii) the expansion of agricultural output; (iii) the sustainability of livestock and crop production; (iv) the increase in availability and quality of domestically produced food items; and (v) the improvement in research for the adoption of new technologies. These objectives are to be achieved through improving water management, the adoption of risk management strategies, the improvement of veterinary and breeding services, the introduction of improved pasture management and increased fodder supplies. In this context, the Government places a high level of importance on risk management in its agricultural sector. The Government's Action Plan also recognizes the importance of disaster protection as a means of improving animal husbandry and thus animal productivity. The Government recognizes that risk management can be improved through: (i) promoting group initiatives amongst herders to adopt risk aversion strategies; (ii) by ensuring sustainable pasture management; (iii) by increasing the use of conserved and supplementary fodder; (iv) by improving access to water in pastureland areas; (v) by improving the veterinary services; and (vi) improving risk forecasting, response capabilities and disaster management. While the first five of these initiatives are addressed through other programs under the Government Strategy, the latter is addressed directly under this Program.

## III. RATIONALE FOR PUBLIC INVOLVEMENT

7. Under the former socialist system, the State assumed full responsibility for providing fodder to state farms that allowed more intensive production systems than could be achieved if the animals were left to graze on natural pasture alone. Under the State Emergency Fodder Fund, large quantities of hay were purchased by the Government, stored in strategic locations, and distributed throughout the country to assist in maintaining animals throughout the winter period. This was a costly exercise to the Government that could only be sustained whilst support from the former Russia continued. Based on the quantities of hay and fodder estimated that would be needed under Government Resolution No.47 assessed at current transport rates, the total cost of distributing fodder and hay would be equivalent of \$180 million, quite apart from the cost of purchasing the feed. But expectations, despite Regulation No.47, have been perpetuated, particularly by those seeking to gain from proposing continued State support.

8. The immediate losses during the 2000-01 dzud were estimated at \$260 million yet the impact was certainly greater as the loss in reproductive capacity of the national herd/flock took some years to recover during which period, household turnoff levels were significantly lower as were their corresponding incomes. The indirect impact from the *dzud* was for increased vulnerability that has been expressed through increasing levels of rural poverty currently estimated at 36%.

9. The Government considers it should share the risk for rearing animals in such a harsh environment and reduce the exposure of herders to vulnerability with the view to reducing overall poverty levels. It recognizes that value of livestock as the economic mainstay of the country in terms of livelihoods and also as a supplier of raw materials for its industrial sector, and that the reproductive capacity should be maintained in a condition that enables it to respond to market conditions. More recently, the widespread restocking, as a recovery strategy from

*dzuds*, has reduced meat supplies in urban markets. Slaughter numbers have declined as the process of rebuilding continues. The consequence is a limited quantity of meat on domestic markets, with the inevitable increase in domestic prices, has been observed. The Government, therefore, has sound reasons for sharing the risk associated with livestock production based on economic and social consequences.

#### IV. RECENT DEVELOPMENT INITIATIVES

10. Risk, and the reduction of risk as it affects livestock production, is commonly recognized as an important consideration under Mongolian conditions. A priority of the Government and donor community has been to develop risk management approaches needed for sustainable livestock production. Several international projects have focused on well rehabilitation and forage development programs to reduce risk. Others have focused on increasing capacity of the livestock producer to manage livestock or gain access to credit to improve production systems. Poverty alleviation programs address not only the impact from past *dzuds* and droughts, but act to mitigate risk associated with future natural disasters.

##### A. Government Initiatives

11. The main government initiative in risk management is the Program for the Protection of Livestock from Drought and Dzud that operated from 2001 to 2005. About Tg1.4 billion was allocated to this program in 2001 after which the amount declined to Tg100 million in 2005. The program has a set of integrated goals: (i) to develop and operationalize mechanisms to protect livestock from drought and *dzud*, (ii) to improve the system for disaster protection and relief, (iii) to establish relief mechanisms and to identify responsibilities and roles of private livestock owners, herders and the various government agencies, and (iv) to provide strong policy, monitoring and guidance for national risk management. The regulation outlines far reaching actions including the improvement of pasture management systems, the rehabilitation of water points, genetic improvement of animals, improvement of veterinary services, livestock insurance, the resourcing of *otors*, and also the maintenance of emergency reserves of hay and fodder by herders, soums and aimags.

12. Under this regulation, herders are to be responsible for obtaining household winter feed reserves of not less than 30 kg per sheep equivalent in the forest steppe, 10 kg in steppe and 3 kg in the Gobi region from locally available resources and combined with minerals and other feeds. Similarly, each soum is responsible for, amongst others, progressively implementing measures to create a Soum Emergency Fodder Fund which will provide reserves to feed its entire livestock population for not less than three days at a level of 1kg per day for every sheep equivalent by 2004. Aimags are similarly responsible for accumulating supplementary feed reserves to support the entire aimag livestock population for at least three days at level of 1kg per day for each sheep equivalent in an Aimag Emergency Fodder Fund to be created, financed and managed by the aimag. The regulations also outline the responsibilities of the respective ministries that deal with national disasters.

13. One of the main difficulties in maintaining such a support program (apart from the huge associated cost and the limited resources) is that fodder (hay in particular) cannot be stored for extended periods without losing quality (digestible energy and protein). Hay reserves need to be aggregated and dispatched within a 12 month period otherwise the quality deteriorates to such an extent that renders the hay useless for its intended purpose. Fresh fodder reserves

need to be collected and used on an annual basis. The reserve is therefore not a once off investment of the Government; it must be an ongoing investment if the program is to serve its intended purpose. At the time the regulation was passed, it was estimated that the hay and fodder requirement for the period 2001 to 2005 was 1.6 and 0.7 million tons respectively. The cost of such reserves was estimated at \$120 million. At such a level, it was not possible for this program to be realized. Similarly, the other components of the program have failed to materialize because of the lack of resources. The integrated approach is considered appropriate given the many factors that can influence the degree of disaster preparedness. However, this exercise reinforced the realization that the Government does not have the resources to assume the majority of the risk associated with livestock rearing. It demonstrates that the Government is prepared to share some of the risk but individual herders, the ultimate beneficiaries of such programs, must learn to accept a greater proportion of risk.

14. The actual production of hay and fodder in 2005 was 8,300 tons of fodder crops and 845,000 tons of hay indicating the limited impact from this program against the Government's targets of 0.6 and 1.6 million tons respectively. The challenge in future programs is how to give effect to increasing livestock feed production in Mongolia. This is discussed further in the Feed Production Program.

**Table 2: Production of Hay and Fodder, 2002 - 2005**

	2002	2003	2004	2005
	tons	tons	tons	tons
Fodder Production	3,526.9	9,566.2	9,570.8	8,328.0
Hay Production	760,000.0	840,700.0	850,500.0	845,100.0

## **B. Donor Funded Initiatives**

15. Several donors have contributed to the various aspects of risk management - mainly by directing their attention to securing production systems. Donors have supported the Government in the rehabilitation of pasture wells, promoted the livestock feed production industry and maintained its support for livestock disease through the support of veterinarians - all valid risk management interventions. These are however very much on the periphery of risk management and are necessary components of the overall risk management strategy. The most relevant contribution in this area has been the World Bank's efforts in pastoral risk management and in developing an index based livestock insurance program while Mercy Corps have been active in developing the mechanisms of an advance warning mechanism against climatic abnormalities.

16. Under the World Bank funded Sustainable Livelihoods Project (Risk Management component), there has been a multi faceted approach to improving the capacity of herders and government officials to deal with risk. Initiatives have included the development of herder groups as the vehicle through which initiatives can be undertaken. Activities have included the use of pasture maps for pastoral management, the development of land management plans, the use of geographical positioning systems, the estimation of carrying capacity of pastures, alternate methods for rodent control, the selection of wells for rehabilitation and their operation and maintenance, grazing route migrations and conflict resolution, the control of stocking densities, and emergency grazing route options. The project has produced a manual for trainers and



herders entitled "Community-based Pasture and Risk Management" that has been widely distributed amongst the target aimags (including 24,000 herders).

17. The first component concerns risk forecasting and contingency planning that is based on much of the work of Mercy Corps (see para 19 below). The project has funded the pilot of the system developed by Mercy Corps in two soums of Tuv. The pilot commenced in March 2006. In addition, the project publishes a bulletin on natural and climatic risk forecasting that is distributed to herders and local citizens in the pilot area, providing valuable material that is published over the local radio network.

18. The second component deals with pasture management mapping and planning and prepares maps for use by local authorities containing the following information: (i) a base map detailing winter-spring and summer-autumn grazing areas at a scale of 1:100,000, (ii) a pasture stocking rate map for the four seasons, (iii) locations of wells with surrounding grazing areas, (iv) the seasonal pasture divisions, (v) the current stocking densities, and (vi) the estimated carrying capacity of the area. These have been prepared for about 140 soums in eight target aimags. The other component relates more to the provision of credit for fodder conservation and other income generating activities. Loans for eligible activities are provided directly by the project at concessional rates (10% per annum) for carry-on purposes up to 12 months with a maximum loan of Tg5 million together with term loans for up to Tg30 million over three years. Funds are also channeled through the formal financial system where they are on-lent at interest rates of between 2.5-3.5% per month.

19. Mercy Corps has been the most active in funding the development of a Livestock Early Warning System (LEWS) under the Global Livestock Collaborative Research Studies Program administered in partnership with Texas A&M University. The project is currently implemented under the name, "Gobi Forage", its primary goal being to use risk management technologies to provide drought and winter disaster early warning to improve rural business in the livestock sector. The objectives are to: (i) develop a forage monitoring system that provides near-real time spatial and temporal assessment of current and forecasted forage conditions for Mongolia livestock producers; and (ii) develop an information and communication infrastructure and analysis delivery system to provide herders and local government with information on current and forecasted forage conditions that will assist them to make timely and specific management decisions related to pastureland use and management. The project is currently implemented in seven aimags; Gobi-Altai, Bayanhongor, Uvurhangai, Dundgovi, Umnugovi, Govi-Sumber and Dornogovi. The LEWS has the capacity to forecast *dzuds*, drought and also has the capacity to estimate forage availability throughout Mongolia. The project is funded by USAID and commenced in 2004 and will be implemented until 2008. The project is currently finalizing the production of the forage maps and other forage condition information products that will include radio and television bulletins.

20. Insurance is also another option to reduce the risk for herders and livestock producers. The existing formal financial insurance products related to livestock mortality are unpopular with both insurance companies and livestock owners and are limited almost entirely to a small number of high value livestock. Conventional livestock insurance suffers from the high costs of verifying individual losses in *dzud* conditions and from the moral hazard of inhibiting herders from taking all practicable measures to protect their stock. The fledgling private insurance market has therefore largely steered clear of providing livestock insurance. Government supported insurance is considered an option, however, the scale of the disasters between 1999

and 2002 made it clear that the resources of Government alone cannot provide full insurance, and that market-based alternatives are needed. The new Insurance Law, passed in 2004, is an important step to strengthening the insurance industry through improved regulation and also included a provision for introducing an index-based livestock insurance in Mongolia. Involving the insurance industry on a commercial basis both improves the sustainability of livestock insurance and contributes to strengthening the rural finance sector, which is a key element in the government strategy for rural economic diversification. The World Bank has supported the development of an index-based livestock insurance scheme that is both affordable and relevant to herders and insurance companies alike, in which the Government maintains a risk fund to reduce the exposure of companies to extreme conditions that frequent Mongolian agriculture.

21. The project has four components: (i) piloting the scheme in Bayankhongor, Tuv and Khenti aimags, (ii) institutional capacity building initiatives in the operations of an indexed base insurance scheme within the three participating insurance companies, (iii) promotion and public awareness campaign to improve herder understanding of the scheme, and (iv) monitoring and evaluation to evaluate the impact from the project. The project commenced in September 2005 and will be implemented over four years in the three target aimags. Contrary to other pastoral risk management activities, insurance does not reduce the direct livestock damages caused by a *dzud*. It aims at transferring livestock mortality risks from herders whose survival may be jeopardized by the occurrence of a natural disaster. The benefits of such a financial instrument are thus related to the reduction of the herders' risk vulnerability, and the costs are captured by the insurance premiums.

### C. Future Development Strategies

22. The Government's strategic objectives in respect of risk management include initiatives in pasture improvement, management and utilization, fodder conservation, livestock production, and veterinary services. These are addressed in other investment programs of the Strategy. The other important aspect of the Government's strategy is to improve the early warning system of natural disasters and improving the reliability of predictive mechanisms used in the early warning and response mechanisms. Disaster preparedness is a costly exercise for individual herders and the Government. If the predictive mechanisms can be developed and improved, the cost of preparing for such events could be significantly reduced. In addition, the development of an index based insurance facility for livestock will also benefit from the information generated by the early warning system and provide for more accurate assessment of risk.

## V. PROGRAM PROFILE

23. The Government recognizes that the management of risk in the livestock sector requires a combination of approaches. Investing in institutions and infrastructure for pastoral management can better prepare herders for severe weather events by enabling herding households to better manage low levels of risk. For *dzud* events, however, high levels of livestock mortality are often unavoidable even for the most experienced herders, and pastoral and herd management must be complemented by mechanisms to enable herders to quickly respond to livestock losses. Reducing environmental and financial risk in the livestock sector will require a holistic approach that integrates risk management needs with overall objectives of agricultural production as risk management often incurs additional costs creating a trade-off between environmental risk and economic returns. Inevitably, any risk assessment capability

will have institutional repercussions including training needs, hardware needs and the development of risk assessment and response mechanisms.

#### A. Objectives and Outcomes

24. The objective of this Program is to develop and implement a national risk management system that provides early warning of drought or severe winter weather to livestock producers, government administrations, and the national disaster agency so that an adequate response can be planned and measures taken to mitigate environmental and economic risk to livestock producers. Identified outcomes from the Program include the following:

Output	Description
Operationalized livestock early warning system	<ul style="list-style-type: none"> <li>The capacity to forecast pastureland drought and severe winter weather as a component of a national livestock risk management system.</li> </ul>
Disaster response capacity	<ul style="list-style-type: none"> <li>Develop capacity of government and MoFA to mitigate impacts of drought and severe weather by using advance warning to plan an adequate short-term response with livestock producers.</li> <li>Develop capacity of government to initiate long term disaster mitigation initiatives.</li> <li>The response mechanism will connect to government disaster relief agency, soum government and livestock producers via an information transfer system based on a risk assessment analysis.</li> </ul>
Otors developed and managed	<ul style="list-style-type: none"> <li>Emergency grazing areas identified and resourced as appropriate.</li> <li>Management structures operating in each of the defined areas.</li> </ul>
Established mechanisms for identifying drought and dzud effected herders	<ul style="list-style-type: none"> <li>Criteria will be developed to determine when a herder can be considered to have been sufficiently affected by the disaster to warrant further government assistance.</li> <li>Criteria will be developed to identify the extent of the impact from disasters with an appropriate level of response.</li> </ul>

Expanded national livestock insurance scheme	<ul style="list-style-type: none"> <li>• Develop the livestock insurance program that rewards better management of livestock production system to reduce environmental risk while reducing financial risk.</li> <li>• Extend the area of coverage from the initial three aimags progressively throughout the country.</li> <li>• Conduct associated capacity building and broad dissemination programs promoting the facility.</li> </ul>
Risk management incentives for herders and livestock producers	<ul style="list-style-type: none"> <li>• Pasture tenure rights.</li> <li>• Risk management training.</li> <li>• Fodder conservation and pasture improvement investment incentives.</li> <li>• Public funding for rodent control in pasture.</li> </ul>

## B. Scope and Key Activities

25. Three main areas of activity include: (i) expansion of the early warning system, (ii) rationalizing the government's response to disasters, and (iii) facilitating herders and livestock producers to prepare their animals for risk through improved management, fodder conservation and livestock insurance.

### 1. Livestock Early Warning System

26. LEWS technology involves establishing a series of monitoring sites where vegetation production information is measured and incorporated into a rangeland forage production model. Associated soils, grazing rules, and satellite-based weather data is used to produce daily estimates of forage production, deviation from normal forage on offer and associated percentile ranking. Advanced geo-statistics coupled with National Differentiated Vegetation Index greenness data is used to identify areas of forage deficiency and surplus in relation to the livestock demand for the area. It is a dynamic model providing 90-day forecasts updated on a weekly basis. The institutionalization of this facility will assist in framing the appropriate response of the Government to prepare for the disaster and assist in determining its most appropriate and effective measures to minimize the impact of the disaster.

27. Gobi Forage with USAID funding has conducted much of the early conceptual work although it is known there are other parallel activities funded by the Royal Netherlands Government being implemented by the Ministry of Nature and Environment using a similar predictive approach but different software. The results from the Gobi Forage project have been piloted by the World Bank funded Sustainable Livelihoods Project under its pastoral risk management component in Tuv. Based on encouraging results, it is intended to expand the activities throughout the country and establish the institutional structures to manage the process. This will effectively extend the information via an electronic communication network that will allow the Government to plan a response to situations as they arise.

28. Program activities include the establishment of weather reporting stations throughout the country, maintaining access to satellite imagery on a regular basis, maintaining a ground-truthing and reporting service to provide information to the central computers for further analysis. It also involves establishing the network hub within the General Authority for Disaster Protection that has responsibility for overall emergency response together with associated training in data interpretation.

## **2. Rationalizing Government Response**

29. Historically, the Government has maintained stocks of hay and fodder based on what was considered necessary by the state farms. With privatization of the national herd to employees and others who took up herding, the communication links between the animal managers who can assess their feed requirements and those responsible for fodder reserves has been severed. As such the Government has resorted to making decisions on feed requirements based on reports aggregated and delivered through administrative structures of local government. Such assessments are therefore based on limited information as to the real requirements and often bear no relationship to any economic assessment of the marginal benefit from incremental feed. The role of the State in providing feed and fodder has been substantially reduced and individual livestock owners are now primarily responsible for the provision of supplementary feed for the winter and spring. Because of the risk of *dzuds*, the Government is prepared to share this risk and it considers it appropriate to maintain emergency feed and fodder stocks in accessible locations (the responsibility of the General Authority of Disaster Protection). In principle, improvements in the forecasting of adverse conditions in winter and spring should permit a reduction in the future stock levels needed, both by having storage areas located closer to risk areas and by stimulating herders to prepare greater stocks for times and locations at greatest risk.

30. Another part of the Government's strategy for minimizing the risk associated with livestock rearing is the re-establishment of emergency grazing areas known as "*otors*". These are large areas of grazing land that can accommodate significant numbers of livestock but are areas that do not form part of the regular herder grazing. They are reserved for the production of hay and as an emergency location in the event of *dzuds*. These previously had facilities to accommodate herder families and often had associated animal health services. Many had their own separate management structures that controlled the movement of animals and families into, and out of *otors* during times of adversity. The Government wishes to re-establish such facilities as part of its emergency response mechanism to support *dzud* effected herders.

31. *Otors* need to be identified in conjunction with modern grazing routes and have the areas set aside for special use. There needs to be some management structures to ensure their efficient operations as they often extend across aimag boundaries and considerable capital investment is required to return them to their previous condition. Many have wells and shelters that need rehabilitating or the establishment of new facilities. Conscious of the need to assess the cost effectiveness of such an emergency facility, the Government has identified the need to undertake a full economic analysis for the rehabilitation of such facilities to ensure the value of the public investment. Technical assistance in evaluating identified *otors* is included in the Program.

32. The third area of Government support as part of its emergency response capability is in maintaining emergency fodder reserves. With the additional information being provided from the LEWS, the General Authority of Disaster Protection will be better equipped to make decisions

as to the location and extent of emergency feed reserves to maintain each year. The Government considers it appropriate to maintain emergency feed supplies but recognizes that it has limited resources to maintain former levels of support. Given that hay quality deteriorates over lengthy periods of storage, the use of hay for this purpose may not be the most cost effective means of achieving the desired emergency response capacity. It is therefore proposed to undertake further investigations into the most appropriate means of providing the level of support to herders. This will take the form of a technical assistance study in which the real cost of storage can be estimated for different levels of feed reserves. It will consider the storage of higher quality feeds that have lower unit storage and transport implications and compare these options with the worse case scenario of importing emergency rations as required. Based on the findings of this research, the Government will need allocations of funds to maintain a feed reserve in order to respond to emergency situations.

33. The fourth area for Government initiatives is to ensure the availability of improved quality planting material (including fodder species), their production and multiplication for herders and those owning pasture user rights to improve the productivity of their natural pastures. This is addressed more fully under the Land Utilization and Management Program as is the continued operations of the Government's initiatives in controlling pests and rodents in pastures.

### **3. Herder Risk Management Improvement**

34. With the Government progressively reducing its responsibility for risk in the sector, this period of transfer should incorporate measures to assist private livestock owners to assume increased responsibility for risk. The Government sees a need for additional activities directed at herders that will (i) provide security of tenure of fodder production areas (including standing crops in agreed winter-spring grazing areas); (ii) introduce risk spreading mechanisms such as livestock insurance to mitigate possible losses at reasonable economic cost; (iii) increase training in livestock management and risk minimization strategies for livestock owners; and (iv) introduce incentives for livestock owners to invest in fodder conservation machinery and carry out improvements in the quality of their pastures.

#### **Security of Tenure**

35. Security of tenure is needed before the private livestock owners will have the confidence to invest in pasture improvement. The uncertainty that is associated with the current agreed (but not always followed) grazing patterns means that herders cannot depend on feed being available at certain locations during particular seasons or that hay areas will remain un-grazed by other herdsmen during the summer period. If herders are to assume greater responsibility, they need to be given the right to manage their nominated grazing areas and that there is an expectation that grazing rights will be honored by all. Without such assurance, herders will not make the necessary investment in time and machinery to conserve fodder, thereby exposing their animals to natural disasters.

#### **Livestock Insurance**

36. The World Bank funded Index Based Livestock Insurance Project that is being implemented in three aimags has made a significant step in reducing herder vulnerability to risk from adverse seasonal conditions. While the onus for preparing animals for the harsh winter period remains with the owner, the fact that *dzuds* and drought are rarely so widespread that the whole country is affected provides an opportunity for the successful operation of an index-based insurance system. This involves the analysis of past livestock mortality losses and the forage loss provided by the LEWS technology is used to drive the actuarial process and payment levels

for the livestock insurance instruments. The project has been operating since September 2005 and it is still too early for the financial impact from herder claims on both the insurance companies and the government reserve of \$5 million that has been established in the Ministry of Finance. Subject to a favorable trial period with satisfactory results, it is intended to extend the coverage throughout all aimags in Mongolia. This will involve significant capacity building for insurance agents together with associated information and public awareness campaigns for livestock owners. It will also require an increase in financial reserves held in the Ministry of Finance to cover catastrophic events.

37. Under the pilot project, herders will pay premiums for the Base Insurance Product; while insurance companies will be required to pre-pay the combined indemnity payments into the Livestock Insurance Indemnity Pool. Insurance companies will also pay for low cost reinsurance on the exposure beyond a stop loss for the Livestock Insurance Indemnity Pool of 105% of herder premiums deposited. The government will retain a reserve that includes the reinsurance premiums collected from insurance companies and will use this to pay for losses beyond the capacity of the Livestock Insurance Indemnity Pool and for small Disaster Response Product losses. Finally the government will pay for catastrophic losses, using the contingent loan from the World Bank. Through this mechanism, those raising livestock and insuring their animals will still have the incentive to care for their animals but will be protected from the vulnerability associated with catastrophic losses.

#### **C. Policy Development**

38. Further policy development may be appropriate as responsibilities of government and private livestock owners change in respect of risk sharing. While the Government is clear in its intent to have greater proportions assumed by livestock owners, largely imposed by financial constraints, it also accepts some obligations for maintaining the reproductive capacity of the herd. Pending the outcome of the study, it may also be appropriate to adjust the level of support, particularly in terms of types and quantities of emergency reserves held for such events. A proposed study will look at alternatives for achieving the Government's desired position and consider alternative, less perishable feed sources that could be more easily handled and more efficiently transported, yet deliver the same nutritional content.

39. The re-establishment of *otors* an integral part of the Government's overall strategy for risk management to be considered along with its continuation of provision of emergency livestock feed supplies. The management and operations of *otors* can only be accomplished with public funding and provisions may necessitate legislative amendment that can be reviewed under the pasture management study.

#### **D. Institutional Capacity Building**

40. Capacity building initiatives will be needed to support the introduction of the Index Based Livestock Insurance country wide and also in establishing the institutional structures to maintain the early warning system to protect against drought and *dzud*.

#### **E. Summary Cost Estimate of the Program**

41. Summary cost estimates are presented in Tables 3 and 4.

### Table 3: Physical Inputs for the Risk Management Program

Unit	Unit Cost	Quantities										Total
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
<b>I. Investment Costs</b>												
<b>A. Livestock Early Warning System</b>												
Establish early warning stations at strategic locations		11	11	-	-	-	-	-	-	-	-	22
Equip stations with monitoring facilities	2,320	11	11	-	-	-	-	-	-	-	-	22
Train staff at stations	500	11	11	-	-	-	-	-	-	-	-	22
Establish early warning system in GADP	23,200	1	-	-	-	-	-	-	-	-	-	1
Equip the Center	34,800	1	-	-	-	-	-	-	-	-	-	1
Train staff in its operations	2,500	1	-	-	-	-	-	-	-	-	-	1
Procure digital data sets	11,000	1	1	1	1	1	1	1	1	1	1	10
Provisions for interpreting and appending data	5,500	1	1	1	1	1	1	1	1	1	1	10
<b>Subtotal Livestock Early Warning System</b>												
<b>B. Rationalizing Government Response</b>												
Training in risk assessment	9,000	4	4	1	1	1	1	1	-	-	-	13
Interpretation of LEWS data and maps	9,000	1	1	1	1	1	1	1	1	1	1	10
Determination of appropriate emergency response	6,000	1	1	-	-	-	-	-	-	-	-	2
Purchase of emergency feed supplies	5,500,000	1	1	1	0.85	0.85	0.85	0.7	0.7	0.7	0.5	8.15
<b>Subtotal Rationalizing Government Response</b>												
<b>C. Oror Development</b>												
TA to identify size and locations of orors	350,000	1	-	-	-	-	-	-	-	-	-	1
Rehabilitation of oror facilities	220,000	-	2	-	2	1	-	-	-	-	-	5
Management of orors	23,000	-	2	2	4	4	5	5	5	5	5	37
Essential equipment and vehicles	330,000	-	2	-	2	1	-	-	-	-	-	5
<b>Subtotal Oror Development</b>												
<b>D. Livestock Insurance</b>												
Capacity building initiatives	11,600	4	4	4	4	4	-	-	-	-	-	20
Public awareness campaign	15,000	4	8	12	12	12	8	4	-	-	-	60
Reserve guarantee fund in MoF	1,160,000	1	1	1	1	1	-	-	-	-	-	5
<b>Subtotal Livestock Insurance</b>												
<b>E. Producer Initiatives in Risk Management</b>												
Livestock risk management training	11,600/aimag-course	1	1	1	1	1	1	1	1	1	1	10
Promoting pasture improvement initiatives	1,160/course	1	1	1	1	1	1	1	1	1	1	10
Interest subsidies on conservation equipment	120,000/aimag-yr	-	-	20	20	20	20	20	-	-	-	100
<b>Total</b>												



Table 4: Summary of Costs for the Risk Management Program

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
(Tugrik Million)											
<b>I. Investment Costs</b>											
<b>A. Livestock Early Warning System</b>											
Establish early warning stations at strategic locations	25.5	25.5	-	-	-	-	-	-	-	-	51.0
Equip stations with monitoring facilities	63.8	63.8	-	-	-	-	-	-	-	-	127.6
Train staff at stations	5.5	5.5	-	-	-	-	-	-	-	-	11.0
Establish early warning system in GADP	23.2	-	-	-	-	-	-	-	-	-	23.2
Equip the Center	34.8	-	-	-	-	-	-	-	-	-	34.8
Train staff in its operations	2.5	-	-	-	-	-	-	-	-	-	2.5
Procure digital data sets	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	110.0
Provisions for interpreting and appending data	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	55.0
<b>Subtotal Livestock Early Warning System</b>	<b>171.8</b>	<b>111.3</b>	<b>16.5</b>	<b>16.5</b>	<b>16.5</b>	<b>16.5</b>	<b>16.5</b>	<b>16.5</b>	<b>16.5</b>	<b>16.5</b>	<b>415.1</b>
<b>B. Rationalizing Government Response</b>											
Training in risk assessment	36.0	36.0	9.0	9.0	9.0	9.0	9.0	-	-	-	117.0
Interpretation of LEWS data and maps	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	90.0
Determination of appropriate emergency response	6.0	6.0	-	-	-	-	-	-	-	-	12.0
Purchase of emergency feed supplies	5,500.0	5,500.0	5,500.0	4,675.0	4,675.0	4,675.0	3,850.0	3,850.0	3,850.0	2,750.0	44,825.0
<b>Subtotal Rationalizing Government Response</b>	<b>5,551.0</b>	<b>5,551.0</b>	<b>5,518.0</b>	<b>4,693.0</b>	<b>4,693.0</b>	<b>4,693.0</b>	<b>3,868.0</b>	<b>3,859.0</b>	<b>3,859.0</b>	<b>2,759.0</b>	<b>45,044.0</b>
<b>C. Oror Development</b>											
TA to identify size and locations of otors	350.0	-	-	-	-	-	-	-	-	-	350.0
Rehabilitation of otor facilities	-	440.0	-	440.0	220.0	-	-	-	-	-	1,100.0
Management of otors	-	46.0	46.0	92.0	92.0	115.0	115.0	115.0	115.0	115.0	851.0
Essential equipment and vehicles	-	660.0	-	660.0	330.0	-	-	-	-	-	1,650.0
<b>Subtotal Oror Development</b>	<b>350.0</b>	<b>1,146.0</b>	<b>46.0</b>	<b>1,192.0</b>	<b>642.0</b>	<b>115.0</b>	<b>115.0</b>	<b>115.0</b>	<b>115.0</b>	<b>115.0</b>	<b>3,951.0</b>
<b>D. Livestock Insurance</b>											
Capacity building initiatives	46.4	46.4	46.4	46.4	46.4	-	-	-	-	-	232.0
Public awareness campaign	60.0	120.0	180.0	180.0	180.0	120.0	60.0	-	-	-	900.0
Reserve guarantee fund in MoF	1,160.0	1,160.0	1,160.0	1,160.0	1,160.0	-	-	-	-	-	5,800.0
<b>Subtotal Livestock Insurance</b>	<b>1,266.4</b>	<b>1,326.4</b>	<b>1,386.4</b>	<b>1,386.4</b>	<b>1,386.4</b>	<b>120.0</b>	<b>60.0</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>6,932.0</b>
<b>E. Producer Initiatives in Risk Management</b>											
Livestock risk management training	232.0	232.0	232.0	232.0	232.0	232.0	232.0	232.0	232.0	232.0	2,320.0
Promoting pasture improvement initiatives	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	255.2
Interest subsidies on conservation equipment	-	-	24,000.0	24,000.0	24,000.0	24,000.0	24,000.0	-	-	-	120,000.0
<b>Subtotal Producer Initiatives in Risk Management</b>	<b>257.5</b>	<b>257.5</b>	<b>24,257.5</b>	<b>24,257.5</b>	<b>24,257.5</b>	<b>24,257.5</b>	<b>24,257.5</b>	<b>257.5</b>	<b>257.5</b>	<b>257.5</b>	<b>122,575.2</b>
<b>Total</b>	<b>7,586.7</b>	<b>8,392.2</b>	<b>31,224.4</b>	<b>31,545.4</b>	<b>30,995.4</b>	<b>29,202.0</b>	<b>28,317.0</b>	<b>4,248.0</b>	<b>4,248.0</b>	<b>3,148.0</b>	<b>178,917.3</b>

### F. Indicative Implementation Arrangements

42. With the formation of the National Disaster Preparedness Authority that is a statutory institution with its own budget, the role that the MoFA as the technically competent manager of the natural pasture land (for livestock rearing), and the responsibility of MNE as the custodian of the pasture land area for the use by future generations, the implementation of this Program is considered more complex than some of the others where a single executing agency can be more easily identified. For this reason, it is proposed that overall responsibility of the Program rest with the Prime Minister's Department who will chair the overall steering committee (the vice chairman should be from MoFA) and its composition will be the Ministry of Finance and other technical line departments and agencies including the recently formed national agency. The respective ministries will be responsible for their own technical areas while the Ministry of Finance will be an important inclusion as this will be responsible for ensuring the relevant budgets are allocated for the proposed activities and that future program commitments are recorded in the Medium Term Budgetary Framework.

43. It is also considered essential to involve representatives from the aimags as these will be the implementing arm of the national designed interventions. Senior representation from the aimags will assist in linking the nationally managed program with the aimags and improve the transfer of information between the central and provincial administrations. Critical to the success of this Program will however, as in most cases, be the allocation of resources to carry out the proposed initiatives.

### G. Program Framework Matrix

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<b>Goal</b> 1.0 To develop and implement a national risk management system that will assist livestock producers to better prepare for such occurrences and allow the Government to plan appropriate emergency responses	Losses of livestock from extreme conditions reduced	NSO mortality statistics	
<b>Purpose</b> 2.1 To assist producers in adopting risk management strategies to improve livestock productivity  2.2 To assist the Govt. develop appropriate responses to emergency situations to preserve agriculture's long term productivity	% of herders using insurance to protect against risk  % of herders conserving fodder  Levels of livestock feed stocks held for emergency purposes reduced Otor utilization	Insurance Company reports  Aimag reports  MoFA records Aimag records Soum records  Otor annual reports	Profitability remains high in livestock enterprises   Feed concentrate industries develop locally

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<b>Outputs</b> 3.1 A functioning early warning systems for livestock producers  3.2 A resourced and capable response mechanism of Government  3.3 Otors rehabilitated and being managed as part of the Govt. strategy for disaster management  3.4 A national insurance scheme to protect against extreme livestock loss through drought and <i>dzuds</i>  3.5 Herders with improved management skills in preparing their animals for harsh seasons	System established  Established response mechanism developed  Otors rehabilitated and operating  Livestock insurance offered in every aimag  Annual livestock loss statistics (other than disease)	Emergency Authority reports  Response procedures published and sighted  Otor annual reports  Value of livestock premiums paid for livestock cover  Livestock payouts NSO publications	Software developed is effective  Aimags agree to provide management fees for their operations  Current pilots prove successful
<b>Activities</b> 3.1.1 Establish digital data management capacity in General Authority of Disaster Protection  3.1.2 Resource the capture of digital predictive data on a regular basis  3.1.3 Ground truth with observation sites to substantiate model predictions  3.1.4 Establish reporting stations at key geographic locations linked to the disaster center  3.1.5 Provide training to staff assigned responsibility to manage data processing and entry	Equipment installed  Data captured  Teams mobilized and information provided Feedback provided  Stations established, equipped and staffed  Nos. of training courses provided and nos. trained	Procurement reports  Reports generated  Information from surveys fed into predictive models  Aimag reports  Training evaluation reports	Digital weather data remain freely available and accessible
3.2.1 Develop criteria for triggering emergency responses and the nature of the response for the level of	Criteria approved and published	Revised response publication sighted	

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Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
emergency			
3.2.2 Maintain minimum emergency reserves of animal feed (including more cost effective and durable concentrates)	Emergency reserves purchased	Procurement reports and budgetary allocations	
3.2.3 Review respective responsibilities of herders, soum, aimag and central government in protecting against emergencies	Legislation and regulations amended as appropriate	Revised regulations sighted	
3.3.1 Identify the key otors for rehabilitation	Recommendations of specialists	Reports presented	Aimags agree to allocating these areas for emergency use
3.3.2 Rehabilitate the essential infrastructure in identified otors	Contracts awarded and handover statements Staff appointed	Aimag handover reports from asset register	
3.3.3 Provide the necessary management resources to operate these facilities		Government payroll in identified aimags	
3.3.4 Develop necessary local regulations for the operations of otors including grazing and tenure rights to same	Regulations developed to operationalize otors	Regulations sighted	
3.4.1 Develop a nationwide insurance scheme to protect against livestock loss through natural disaster	No of policies issued No of participating insurance companies	Reports by insurance companies	Livestock insurance is profitable for companies
3.4.2 Support a public information campaign to promote livestock insurance	Public information campaigns conducted	Media evaluation reports	
3.4.3 Provide training to insurance agents on operations of the scheme	Nos. of courses provided and nos. of individuals trained	Training evaluation reports	
3.4.4 Provide the guarantee funds to protect against exceptionally large claims that cannot be covered by reinsurance	Deposits with Ministry of Finance (MoF) for guarantee fund	MoF financial reports	

<b>Design Summary</b>	<b>Performance Indicators/Targets</b>	<b>Monitoring Mechanisms</b>	<b>Assumptions and Risks</b>
3.5.1 Promote the issuance of grazing land user rights to herders and herder groups	Nos. of grazing rights issued	Soum and aimag reports from the administration officers	Soum offices develop the needed capacity
3.5.2 Monitor the movement of herders through protected hay making areas	Site inspections conducted	Soum annual reports	
3.5.3 Provide livestock owner training in risk minimization strategies to protect their animals from catastrophic loss	Nos. of training courses provided and nos. of individuals trained	Training evaluation records	
3.5.4 Provide incentives for the preparation of conserved fodder by herders	Accelerated depreciation allowed  Concessional loans provided	Taxation revisions sighted  Interest subsidies paid	

# **AGRICULTURE SECTOR STRATEGY STUDY**

## **VOLUME 2**

### **LIVESTOCK DISEASE MONITORING AND EMERGENCY OUTBREAK RESPONSE**

**30 NOVEMBER, 2006**

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## ACRONYMS

ADB	-	Asian Development Bank
ASDP	-	Agricultural Sector Development Project
EGPRS	-	Economic Growth and Poverty Reduction Strategy
ELISA	-	Enzyme Linked ImmunoSorbent Assay
EU	-	European Union
FAO	-	Food and Agricultural Organization (of the United Nations)
FMD	-	Foot and Mouth Disease
GAP	-	Government Action Plan
GDP	-	Gross Domestic Product
GTZ	-	German Bi-lateral Aid Agency
IMED	-	Information Monitoring and Evaluation Department
JICA	-	Japan International Cooperation Agency
KOICA	-	Korean International Cooperation Agency
LEWS	-	Livestock Early Warning System
MDG	-	Millennium Development Goal
MNE	-	Ministry of Nature and Environment
MoFA	-	Ministry of Food and Agriculture
MTBF	-	Medium Term Budgetary Framework
NPA	-	National Plan of Action
OIE	-	Office Internationale Epizootique
SCVL	-	State Central Veterinary Laboratory
SDC	-	Swiss Development Cooperation Agency
UNDP	-	United Nations Development Program
USAID	-	United States Agency for International Development
WTO	-	World Trade Organization



## **DISEASE MONITORING AND RESPONSE PROGRAM**

### **I. BACKGROUND**

1. Each year, some 20-23 million head of livestock are treated for the control of contagious and infectious disease (some treated more than once). With Tg2-2.5 billion being allocated from the State budget each year, the average cost of the Government funded vaccination program is just in excess of Tg100 per head treated. Similar figures for the cost of parasitic control are about Tg100 per treated head each year<sup>1</sup>. In addition to direct treatment, the aimag administrations fund the operations of the aimag veterinary diagnostic laboratories that conducted analyses of varying types from about 0.75 million head of livestock at a cost of Tg60 per sample, while the State Central Veterinary Laboratory (SCVL) operates without national government support. In 2005, the three main government funded programs in animal health utilized about Tg5.2 billion (\$4.5 million).

2. While veterinary services were one of the first to be privatized after collapse of the socialist regime, they have struggled with the persistent attitude amongst livestock owners that the Government would pay and in fact should pay for animal health services. Not only is there limited capacity to pay for veterinary services, but the willingness is also wanting. A 2005 herder survey reported that 41% claimed that livestock diseases were increasing while 46% claimed veterinary services were declining, some 19% stating they were dis-satisfied with services provided. Some claim that the services are only being made available to the wealthier herders (those with larger numbers of livestock - understandable given herders' attitude to payment for services and the fact that there are large overheads in traveling large distances between livestock populations for treatment). With limited capacity to pay for services, competition is intense for the better off customers and many veterinarians end up leaving the industry or working only part time on livestock health matters. The other significant influence is that traders have started supplying chemicals and medicines including those considered dangerous such as antibiotics and others which, in western countries, can only be prescribed by veterinarians for animal health (ecto-parasite control and anthelmintics treatment) purposes. This has further eroded the capacity of veterinary enterprises to generate cash from the sale of animal health products.

3. Mortality rates, survival rates and birth rates appear to be more influenced by nutritional considerations than the incidence of disease. This highlights the importance of nutritional regime and management practices rather than diminishing the importance of diseases. With increased urbanization and greater dependence on the market for delivery of meat products in urban centers, ensuring the disease free status of animals and hygienic meat onto the local market are becoming increasingly important.

### **II. RATIONALE FOR PUBLIC INVOLVEMENT**

4. One of the main reasons for Government participation in the control of livestock diseases is its obligation as a member of the international community to assist in controlling the spread of diseases. OIE have established standards and procedures that countries should follow to assist in the global protection of its livestock and ultimately, human population. Not only has the Government international obligations, it is important to protect the health of its livestock so that it may enjoy uninterrupted access to export markets. Mongolia has been a large exporter of sheep meat, beef as well as live sheep prior to the

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<sup>1</sup> The Government has ceased funding parasite treatments, transferring this responsibility to herders.

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1990s. It is still a significant exporter of livestock products - hides, skins, fibers (wool and cashmere) both in unprocessed and semi processed form. These export markets would be denied if contagious diseases were detected as importing countries would close their borders to protect their own domestic industries. The disease status of the livestock subsector is also important (and assuming greater importance compared with the former) from the perspective of domestic meat consumers. With an estimated 70% of the annual kill occurring in the open and subsequent transport to urban markets undertaken in unhygienic transport facilities, the risk of disease to the public in Mongolia is significant. Not only has the Government an obligation to its domestic consumers to have their supplies delivered in a hygienic manner, but the product delivered should be free of any traces from any traces of residues from anti-parasitic and antibiotic treatments administered prior to slaughter.

5. A further significant justification for the Government to allocate resources to its livestock disease control programs is because the private veterinarians (519), veterinary technicians (599), and zootechnicians (111) that provide animal health services in the soums are heavily dependent upon the government disease control program for their livelihoods. With an estimated 70% of income being derived from these programs, substantial change to the level of investment by the Government could see a massive exodus of qualified veterinarians and zootechnicians from the subsector, exposing the industry further to contagious outbreaks for which there would be limited response capacity.

### **III. RECENT DEVELOPMENT INITIATIVES**

6. Both Government programs donor initiatives directly impact on animal health and disease control. The Government funded initiatives tend to be directed at the routine vaccination and animal health programs through the private veterinarians whereas the donor initiatives are more directed at developing the capacities of institutions - the laboratories, veterinary research institute etc and strengthening private veterinarians. Within the field of animal health, the level of coordination between the two funding sources is much better than in others, due in part to the individuals concerned and the fact that this is a very specialized area for interventions. While coordination is satisfactory, there is limited objective assessment of the impact from these programs, particularly the large scale vaccination programs. Furthermore, the donor funded interventions operate outside mainstream Government that has led the Government to increasingly question the usefulness of foreign assistance and why it is achieving less than it should. Hence a central feature of Government's Action Plan for 2004-2008 is to improve the efficiency and effectiveness of the use of donor funds. The presence of a comprehensive medium to longer term strategy for the sector should facilitate this by providing a framework for both donor and government interventions, integrating both into mainstream agricultural policy.

#### **A. Government Initiatives**

7. The Government funded programs in animal health control cost about Tg5 billion a year (\$4.3 million) for the past three years. These have been used almost exclusively to operate the vaccination and parasite control programs through private veterinary services. While the Government places priority on the OIE notifiable diseases, its vaccination program extends to other contagious diseases of significance in Mongolia for reasons outlined above.

#### **B. Donor Funded Initiatives**

##### **Asian Development Bank**

8. The Agricultural Sector Development Project (ASDP) supported private sector led development in the field of animal health through the rehabilitation of the four serum

laboratories of the veterinary laboratories providing new equipment and training that enabled the diagnosis of some 33,000 blood samples collected from livestock in the western aimags as part of a large scale epidemiological survey to detect the incidence of the more economically significant livestock disease (FMD and rinderpest in all species, dourine in horses and surra in camels). This has provided a model for the Government that has subsequently been replicated in other aimag veterinary diagnostic laboratories. ASDP also prepared and published a manual of serum laboratory procedures that has been distributed to all aimag laboratories. Testing procedures described therein conform to OIE requirements adding credibility to the country's diagnostic capacity.

### **EC-TACIS**

9. TACIS support is directed in two areas: (i) the enhancement of the export potential for agricultural products; and (ii) the improvement in the delivery of public services to the rural population in three target aimags. The Development of Agricultural Services Project is managed from within MoFA and seeks to (i) improve rural development planning, enforcement and advisory capacity by strengthening local administrations (aimag, soum, bag), improving soum and aimag extension services, and supporting resource management planning in close cooperation with herders and farmers; (ii) raise the value and productivity of animals through better husbandry practices, improved veterinary services, and better nutrition from fodder and pasture; (iii) increase water supplies and support their use for fodder crops, vegetables and livestock; and (iv) support the development of new enterprises to raise value added, income and employment in rural areas through training, business advice and access to credit. The animal health activities were directed at improving the business skills of private veterinarians. The project also strengthened three aimag laboratories.

### **IFAD**

10. The Rural Poverty Reduction Program (2003-2010) aims to promote a sustainable increase in productive capacity for vulnerable herding and farming households and to improve access to social and economic services. Components include rangeland management, well rehabilitation, rodent control, breeding and veterinary support, and microfinance services for income generating activities backed by skills training. The veterinary activities incorporated the upgrading of four veterinary diagnostic laboratories based on the model provided by ASDP.

### **FAO**

11. FAO has proposed a project to strengthen early warning systems to deal with cross-border animal disease emergencies (rinderpest, FMD, bovine pleuropneumonia, and bluetongue). The objective is to facilitate meat and livestock exports as there is only limited capacity to confirm disease free areas according to OIE requirements. This project is proposed despite the relatively good disease control and border quarantine procedures. The project is to concentrate on disease surveillance mechanisms and corresponding emergency preparedness to handle identified outbreaks.

### **International Atomic Energy Association (IAEA)**

12. IAEA has directed most of its funding for the brucellosis control program that involves bleeding (sampling), serum laboratory analysis and trace back activities together with a government financed compensation scheme for positive reactors that are destroyed. The program has been operating for 10 years as brucellosis is considered to be one of the more important livestock diseases found in Mongolia.

**Japanese International Cooperation Agency (JICA)**

13. Japan is the largest donor to Mongolia and is active in a number of areas of the agricultural sector. It provides assistance to Mongolian National Agricultural University for the diagnosis of animal diseases (following previous upgrading of the laboratory at the Veterinary Research Institute). While livestock development remains in their priority list of agricultural support initiatives, and JICA have funded a number of initiatives associated with animal health including the rehabilitation of the Bayan Ulgii, Dornod and Ulaanbaatar veterinary diagnostic laboratories at a cost of Tg70 million in 2005.

**GTZ**

14. GTZ interventions have focused on support for the creation of herder cooperatives based on common use of pasture resources and included the establishment of an appropriate legislative and regulatory framework for the development of cooperatives in Mongolia. GTZ have also maintained a separate project focusing on the development of Mongolia's private animal health delivery mechanisms and included direct technical training for veterinarians in technical aspects as well as in commercial considerations in operating animal health services. The third phase of this project is currently under implementation. The project was also instrumental in advising the Ministry of veterinary and animal health legislation as well as trained MoFA staff in EU and OIE regulations and provided support for the animal health extension service and eight veterinary supply cooperatives.

**Korean International Cooperation Agency (KOICA)**

15. International requirements for import food products insist the origin country to prove that the food products, in this case livestock originated food is free from radiance, chemicals and heavy metal concentrates. Mongolia, as a country that exports meat and meat products must meet this international requirement and prove that it is free from the above residues. SCVL and local vet laboratories are facing new responsibilities of recognizing and identifying chemical residues in meat and milk products. A residue control lab was established in 2001 within SCVL as a department within its institutional chart and put great efforts in trying to attract international funding in order to strengthen its material and intellectual resources. By the end of 2003, the International Atomic Energy Agency initiated and funded "Residue and Contingency Disease Control" Project between 2003 and 2005 at the SCVL. The Project introduced ELISA, radiology and microbiology simple methods for identifying antibiotics residues in animals and radiance residues in meat and milk.

16. Although this project introduced the first stage to meet international export and import requirements it still was not possible to identify residues from medicines, hormone, pesticides, and some antibiotics against parasitic diseases. Korea's KOICA funded the "Strengthening Hygiene Laboratory for Livestock Originated Food Products" in the SCVL. The Project was implemented between 2004 and 2005 and introduced different laboratory equipment equivalent to over Tg300 million and trained the SCVL staff in Korea. By introducing high sensitive liquid chromatography under this project, Mongolia now can not only control residues in animal but also in plants and other food products. Using the equipment and intellectual capacity introduced by the project Mongolia started doing residue tests in casein, meat and meat products exported to EU, Russian Federation, Korea as well as imported animal products in 2004.

17. All re-equipped labs received accreditation from National Center for Standardization and Metrology in 2005. In 2006, it is planned to design National Residue Monitoring Plan in conjunction with State Professional Inspection Agency and other relevant organizations and work towards achieving the plan in the future. Residue control test is only done in export and import products, although broader range of test activities (planned tests, occasional

/accidental tests, on demand tests) are required to be done in products sold at local markets as well.

#### **USAID/Mercy Corps**

18. With their focus on the Gobi region, four aimag laboratories were rehabilitated in 2006 to improve the diagnostic capacity in performing veterinary analyses of samples submitted the veterinarians trained under the project.

#### **Swiss Development Cooperation (SDC)**

19. SDC's three year strategy (2006-2009) includes humanitarian programs to address disaster management, social welfare issues, and the integration of crop and livestock production. SDC has also developed a program to address aspects of animal disease control such as disease surveillance and sero-monitoring (as part of an approach to strengthen export potential to enhance rural incomes). The project also equipped the National Drug Control Laboratory with two high performance liquid chromatographs used in monitoring drug quality and residue testing.

### **IV. FUTURE STRATEGIES IN DISEASE CONTROL**

20. The Government relies heavily on the donor community to fund initiatives in animal health. As the livelihoods of private veterinarians are dependent upon government programs for routine and emergency vaccinations against notifiable diseases and others, the Government is committed to continue its vaccination program. Diagnostic activities need a regular stream of biological samples that would normally be submitted by private veterinarians when diagnosing diseases. As there is some reluctance to use (and pay) for private veterinary services, this regular supply of samples for analysis is not forthcoming. Consequently, the Government is not able to plan appropriate levels of protection against the economically significant infectious diseases. Some of the existing veterinary laboratories remain rundown and laboratory staff should receive further capacity building in modern analytical procedures to achieve results that conform to OIE standards. Their rehabilitation is an important facet of the Government's strategy in disease monitoring. Disease surveillance is an important aspect to ensure the international competitiveness of Mongolia's livestock and livestock products on export markets. This is clearly a public investment and is clearly beyond the realm of private herders and livestock rearers.

### **V. DISEASE MONITORING AND RESPONSE PROGRAM**

#### **A. Objectives and Outcomes**

21. The objective of this program is to strengthen the disease monitoring capacity of the Government in order to conform to OIE requirements in meeting international standards for the disease status of Mongolia's national flock/herd. The four OIE identified areas requiring attention include the rehabilitation of diagnostic laboratories, to introduce appropriate laboratory management and monitoring procedures, to initiate tests to detect chemical residues following veterinary treatment, and to confirm results through secondary procedures/tests.

#### **B. Scope and Key Activities**

22. Activities proposed under the Program cover three areas: (i) upgrading the veterinary diagnostic capacity, (ii) implementing disease monitoring initiatives, and (iii) maintaining support for private veterinarians through remuneration for services that are contracted by the Government to private veterinarians. While the first two are clearly the responsibility of the

public sector as a member of the international community, the third is considered equally important to maintain relevant and experienced veterinary services in rural areas of Mongolia. While there may be some reluctance for herders to pay for animal health services (previously provided free of charge by the State), the Government considers the longer term interests of the subsector will require the continued operations of private veterinarians. The Government has therefore taken the interim position to support vet service operations until open market conditions are sufficiently understood by herders, together with their capacity to pay.

### **1. Expanding Diagnostic Capability**

23. Mongolia has 22 veterinary diagnostic laboratories outside Ulaanbaatar and one in the city capital. To date, 18 have been rehabilitated to the extent that they can perform diagnostic tests to international standards. The others need to be upgraded including ELISA testing equipment and associated glassware, reagents (including distilled and purified water) and refrigeration equipment, centrifuges etc. Associated with the rehabilitation of laboratories is the need for training in laboratory management procedures and in the performance of new tests made possible with the introduced equipment. The SCVL has recently acquired the skills to produce certain diagnostic kits that form an integral part of the diagnostic process. However, resources are needed to fund the import of other diagnostic kits (e.g. FMD diagnostic kits). Furthermore, the reagents and other disposables used in the process of blood collection (syringes, sample tubes, etc.) are all imported and represent a significant recurrent cost to the program. Aimag governments have assumed budgetary responsibility for recurrent expenditure of diagnostic laboratories but the latter are often accorded low priority when limited aimag funds are being allocated. The Government is therefore seeking support for the operations of the SCVL and the aimag diagnostic laboratories. Given the necessary linkages between the SCVL and aimag diagnostic laboratories, there is an argument for maintaining recurrent funding from the central budget.

### **2. Disease Monitoring**

24. Disease monitoring is an important initiative for Government to maintain the international competitiveness of Mongolian livestock and to protect the domestic consumers of meat products. With the increasing threat from zoonotic diseases (e.g. Avian Influenza) routine surveillance is an essential part of the subsector. Three initiatives are proposed to establish and operate an effective and credible surveillance program. The first involves the re-establishment of the country's data base on infectious diseases. While hard records exist on the outbreaks of infectious and notifiable diseases, these have yet to be recorded in digital form. Only once data is digitally recorded can it be manipulated and analyzed to identify the economically important diseases and subsequently frame an appropriate vaccination program. Mass vaccination is the rational response when there is a lack of detailed knowledge of the health status of the herd/flock. Vaccination programs should be modified in the future based on the analysis of epidemiological data. The second initiative is needed to maintain a routine flow of samples into the laboratories. This will not only build on the data base but also maintain the diagnostic skills of the laboratory technicians. The third is to strengthen the linkages between aimag laboratories and SCVL to facilitate an emergency response capability in the event of an epidemic outbreak. Additional support is needed for the expanded surveillance activities to support the health status of the livestock population.

### **3. Support for Veterinarians**

25. Two initiatives are considered appropriate to ensure that the professional animal health care services operate throughout rural Mongolia, the first being the continuation of the routine vaccination programs although the cost of anthelmintics and ecto-parasite treatments

must now be borne by the producers and the second, the introduction of revolving fund<sup>2</sup> facility to advance supplies of drugs and animal health treatments to veterinary practices for on-selling to herders. Both these initiatives are aimed at increasing the incomes of animal health service providers.

#### **4. Public Investment**

26. Based on the activities outlined above, public investment is needed rehabilitating the laboratories and resourcing their operations, for establishing and operating an emergency response capacity to disease outbreaks, for maintaining routine blood sampling across all species to monitor the health status of Mongolia's livestock and to assist veterinarians to operate through vaccination programs in the short to medium term.

#### **5. Policy Development**

27. Just as responsibility for the fodder conservation is progressively being transferred to private herders, there is the expectation in the longer term that livestock owners will assume greater responsibility for the health of their animals. Current policy for livestock disease control states that the Government should be responsible for vaccinating against OIE notifiable diseases. For other contagious and parasitic diseases, herders themselves must bear the cost of control. This is rarely enforced as there is another ulterior motive for operating the mass vaccination and parasite treatment programs. The Government should maintain close watch on the cost of his program with the view to enforcing the respective responsibilities as producer attitudes change and herder incomes increase.

28. To date, the Government has relied heavily on the State owned Biokombinat for the supply of most vaccines. Prices are "negotiated" as the Government is the sole purchaser of its production. Price levels are low to keep the total cost of the program to an appropriate level, limiting the Company's opportunity to make profits that could be used to upgrade plant facilities. The equipment and production processes are old and output from the plant is of variable quality. While previous attempts have been made to privatize the facility to attract new investment, there has been little interest. While Biokombinat serves a valuable function for the subsector, the longer term interests of the livestock subsector might best be served by procuring higher quality on the international market. In the short term, budgetary constraints may limit opportunities for international procurement.

#### **6. Institutional Capacity Building**

##### **National**

29. Capacity building initiatives will be needed in establishing and operating the epidemiological data base and in interpreting the data generated. While the epidemiological capability in MoFA has been eroded in recent years, there is a pressing need to have an epidemiologist to assist the Government make more efficient use of its resources applied in the interest of animal health. Assistance may also be needed in developing the capacity to monitor the impact from the various disease control programs

##### **Aimag**

30. Capacity building is also needed for veterinary laboratory staff in analytical procedures and in overall laboratory management. With the introduction of new equipment

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<sup>2</sup> Similar to the EU funded "Strengthening National Veterinary Services Project" that included a revolving fund accessed by private veterinarians to obtain veterinary supplies for on-selling to herders. The fund was maintained with repaid funds from the proceeds of sales and operated with minimal administrative costs that enabled competitive interest rates to be levied against goods supplied. Such an activity also promoted the establishment of drug import and distribution enterprises over which the Government could exercise some quality control through its procurement procedures.

and associated tests, laboratory technicians need to develop their skills further to complete procedures prescribed by OIE.

**C. Summary Cost Estimate of the Program**

31. Cost estimates for this Program comprise \$2.6 million for the rehabilitation of labs, and establishing the disease data base and drug revolving fund. These will be once off capital costs. The unique feature of this program is that it recognizes the recurrent implications for the Government and supports the ongoing operations of the laboratories, the routine serum sampling to monitor disease status, and the continuation of the mass vaccination programs albeit at a significantly reduced level. The recurrent implication of the program is estimated at \$12.5 million for five years and \$25 million for a 10 year Program.



Physical Description													(Tugrik '000)
Unit	Quantities											Total	Unit Cost
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016			
I. Investment Costs													
A. Rehabilitated Diagnostic Capability													
Rehabilitate serum labs	2	2	-	-	-	-	-	-	-	-	-	4	11,000
Equip with reagents and glassware	2	2	-	-	-	-	-	-	-	-	-	4	11,000
Train laboratory staff	4	4	4	4	4	4	4	4	4	4	4	40	6,600
Recurrent expenditure for labs	22	22	22	22	22	22	22	22	22	22	22	220	550
Subtotal Rehabilitated Diagnostic Capability													
B. Disease Surveillance													
Develop database	1	1	1	1	1	1	1	1	1	1	1	10	22,000
Identify economically significant diseases	1	1	-	-	-	-	-	-	-	-	-	2	24,000
Routine blood sampling of livestock	340	340	340	340	340	340	340	340	340	340	340	3,400	1,200
Strengthen emergency response by CSVL	1	-	-	-	-	-	-	-	-	-	-	1	165,000
Strengthen linkages	22	22	22	22	22	22	22	22	22	22	22	220	55,000
Subtotal Disease Surveillance													
C. Private Veterinary Support													
Private veterinary training	4	4	4	4	4	4	4	4	4	4	4	40	6,600
Routine vaccinations	22	22	22	22	22	22	22	22	22	22	22	143	110,000
Drug revolving fund	5	5	5	5	5	-	-	-	-	-	-	20	200/aimag
Total													

## Volume II - Program Investments – Disease Monitoring and Response Program

Table 2: Summary Investment Costs - Disease Monitoring and Response Program

		(Tugrik Million)										Total
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
<b>I. Investment Costs</b>												
<b>A. Rehabilitated Diagnostic Capability</b>												
Rehabilitate serum labs	22.0	22.0	-	-	-	-	-	-	-	-	-	44.0
Equip with reagents and glassware	22.0	22.0	-	-	-	-	-	-	-	-	-	44.0
Train laboratory staff	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	264.0
Recurrent expenditure for labs	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	121.0
<b>Subtotal Rehabilitated Diagnostic Capability</b>	<b>82.5</b>	<b>82.5</b>	<b>38.5</b>	<b>38.5</b>	<b>38.5</b>	<b>38.5</b>	<b>38.5</b>	<b>38.5</b>	<b>38.5</b>	<b>38.5</b>	<b>38.5</b>	<b>473.0</b>
<b>B. Disease Surveillance</b>												
Develop database	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	220.0
Identify economically significant diseases	24.0	24.0	-	-	-	-	-	-	-	-	-	48.0
Routine blood sampling of livestock	408.0	408.0	408.0	408.0	408.0	408.0	408.0	408.0	408.0	408.0	408.0	4,080.0
Strengthen emergency response by CSVL	165.0	-	-	-	-	-	-	-	-	-	-	165.0
Strengthen linkages	1,210.0	1,210.0	1,210.0	1,210.0	1,210.0	1,210.0	1,210.0	1,210.0	1,210.0	1,210.0	1,210.0	12,100.0
<b>Subtotal Disease Surveillance</b>	<b>1,829.0</b>	<b>1,664.0</b>	<b>1,640.0</b>	<b>1,640.0</b>	<b>1,640.0</b>	<b>1,640.0</b>	<b>1,640.0</b>	<b>1,640.0</b>	<b>1,640.0</b>	<b>1,640.0</b>	<b>1,640.0</b>	<b>16,613.0</b>
<b>C. Private Veterinary Support</b>												
Private veterinary training	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	264.0
Routine vaccinations	2,420.0	2,420.0	2,420.0	2,420.0	2,420.0	2,420.0	1,210.0	1,210.0	1,210.0	-	-	15,730.0
Drug revolving fund	17.0	17.0	17.0	17.0	-	-	-	-	-	-	-	68.0
<b>Subtotal Private Veterinary Support</b>	<b>2,463.4</b>	<b>2,463.4</b>	<b>2,463.4</b>	<b>2,463.4</b>	<b>2,446.4</b>	<b>1,236.4</b>	<b>1,236.4</b>	<b>1,236.4</b>	<b>1,236.4</b>	<b>26.4</b>	<b>26.4</b>	<b>16,062.0</b>
<b>Total</b>	<b>4,374.9</b>	<b>4,209.9</b>	<b>4,141.9</b>	<b>4,141.9</b>	<b>4,124.9</b>	<b>2,914.9</b>	<b>2,914.9</b>	<b>2,914.9</b>	<b>2,914.9</b>	<b>1,704.9</b>	<b>1,704.9</b>	<b>33,148.0</b>

#### D. Indicative Implementation Arrangements

32. The implementation of the aimag laboratories rehabilitation is complicated by the fact that facilities are the property of the aimag yet aimag funds are insufficient to undertake the rehabilitation. As it is likely to be either central budget funds or donor funds to finance the rehabilitation, and that there is considerable technical expertise needed in determining the most appropriate equipment and tests needed in any one laboratory, the SCVL should assume responsibility for the rehabilitation of the aimag labs. Given the strengthened analytical skills imparted to SCVL during the recent ADB funded ASDP, staff from SCVL should also be responsible for conducting the training of aimag veterinary technicians in laboratory management and test procedures.

33. The disease monitoring initiatives requires the coordination of sample collection (proposed for private veterinarians), laboratory analyses, maintenance of a central data base of disease and the development of an emergency response capability. Given the broader responsibility for coordination involving national and aimag administrations, it is proposed that the MoFA assume responsibility for the implementation of this part of the Program. As has occurred in the past, the MoFA has been responsible for contracting private veterinarians to undertake the mass vaccination campaigns through their aimag departments of agriculture although there are currently discussions that the national Ministry should assume payment of veterinarians in view of the poor payment record of aimag administrations. It is proposed this arrangement be continued under the new Program.

#### E. Program Framework Matrix

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<b>Goal</b> 1.0 To improve the health status of Mongolia's livestock to achieve competitiveness on international markets and hygienic standards for locally consumed livestock products.	Annual mortality rates for each species  Outbreaks of zoonotic diseases	Annual census of livestock  SCVL database	Recurrent funds are available for labs
<b>Purpose</b> 2.0 To strengthen the disease monitoring capacity of the Government to conform to OIE requirements in meeting international standards for the disease control of Mongolia's national flock/herd.	Records appended to epidemiological database  Reported outbreaks to OIE	SCVL database  OIE notices submitted by MoFA	Funds are forthcoming to achieve full program of interventions
<b>Outputs</b> 3.1 Rehabilitated network of diagnostic laboratories  3.2 Disease surveillance programs funded and institutionalized  3.3 Private veterinary	SCVL confirming diagnoses received from aimag labs  Disease status reports generated  Veterinary	MoFA annual reports  MoFA annual reports  Annual survey of	Aimags support the rehabilitations  MoFA sees value in using the data gathered to refine vaccination programs Herders progressively

## Volume II - Program Investments – Disease Monitoring and Response Program

<b>Design Summary</b>	<b>Performance Indicators/Targets</b>	<b>Monitoring Mechanisms</b>	<b>Assumptions and Risks</b>
services operating in soums	enterprises operating commercially	veterinary practices in 10% of soums	accept responsibility for cost of vet services
<b>Activities</b> 3.1.1 Rehabilitate serum laboratories  3.1.2 Equip and provide essential glassware and reagents for labs  3.1.3 Train laboratory staff in lab management and diagnostic procedures  3.1.4 Provide recurrent expenditure for diagnostic laboratories	Nos. of labs rehabilitated  Equipment and others supplied  Training courses conducted Nos. trained  Annual aimag or central budget allocations	Completion reports  Procurement records  Training evaluation reports  Budget reports and actual expenditure - MOF	Basic skills remain in the aimags  Central or aimag funding is available
3.2.1 Develop the epidemiological database  3.2.2 TA to identify economically important diseases  3.2.3 Undertake routine sampling of livestock based on identified economically important diseases  3.2.4 Strengthen the linkages between aimag and SCVL	Database re-established  TA Report of economically important diseases  No. of samples collected, analyzed and incorporated into the database  Transfer of samples to confirm diagnoses	Completion report  TA completion report  Budgetary allocation and contracts executed  Diagnoses confirmation reports	Resources are made available to manage the database  SCVL accepts technical responsibility for lab operations
3.3.1 Undertake private veterinarian training (technical and business topics)  3.3.2 Routine vaccination programs against notifiable diseases  3.3.3 Establish a drug revolving fund that operates for the purchase of veterinary supplies from quality sources	Courses provided, trainees trained  Nos. of animals vaccinated  Fund drawdown and repayment records	Training evaluation reports  Budgetary allocations and contracts executed  Annual reports of fund activities	Training capacity exists in Mongolian institutions  Suitable donor identified

# **AGRICULTURE SECTOR STRATEGY STUDY**

## **VOLUME 2**

### **LIVESTOCK MANAGEMENT AND BREEDING PROGRAM**

**30 NOVEMBER, 2006**

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## ACRONYMS

ADB	-	Asian Development Bank
AHRI	-	Animal Husbandry Research Institute
AI	-	Artificial Insemination
ASDP	-	Agricultural Sector Development Project
EGPRS	-	Economic Growth and Poverty Reduction Strategy
ELISA	-	Enzyme Linked ImmunoSorbent Assay
EU	-	European Union
FAO	-	Food and Agricultural Organization (of the United Nations)
FMD	-	Foot and Mouth Disease
GAP	-	Government Action Plan
GDP	-	Gross Domestic Product
GTZ	-	German Bi-lateral Aid Agency
IMED	-	Information Monitoring and Evaluation Department
JICA	-	Japan International Cooperation Agency
KOICA	-	Korean International Cooperation Agency
LEWS	-	Livestock Early Warning System
MDG	-	Millennium Development Goal
MNE	-	Ministry of Nature and Environment
MoFA	-	Ministry of Food and Agriculture
MTBF	-	Medium Term Budgetary Framework
NPA	-	National Plan of Action
OIE	-	Office Internationale Epizootique
SCVL	-	State Central Veterinary Laboratory
SDC	-	Swiss Development Cooperation Agency
UNDP	-	United Nations Development Program
USAID	-	United States Agency for International Development
WTO	-	World Trade Organization

## LIVESTOCK MANAGEMENT AND BREEDING PROGRAM

### I. BACKGROUND

1. During the transition period, the extensive livestock production system provided food and employment for a large portion of Mongolia's population (including the more vulnerable), without which, the transition to a market based economy would have been more detrimental on rural poverty. As Mongolia continues in its quest for open market economic conditions, livestock production remains the major primary industry to feed its rapidly urbanized population and provide the necessary raw materials for processing that also suffered during the transition period. With restructuring taking place in its industrial sector, the importance of livestock remains the focus of attention and the genetic content of the country's breeding stock is again at the forefront of the attention if quality products are to be achieved as inputs to the processing sector. Improving animal management and breeding and the organization of same remains a primary program priority of MoFA.
2. During the socialist era, animal breeding was one of the major focal topics in livestock production. European and continental breeds were introduced including Friesian-Holstein, Hereford, Charolais, Simmental cattle, Merino, and other breeds of sheep. Introduced breeds were promoted on State farms while collectives focused on upgrading breeding of native livestock or cross-breeding native livestock with introduced breeds in pursuit of hybrid vigor amongst the offspring, raising the average genetic content of the national herd/flock. A relatively sophisticated animal breeding program developed during the socialist era, including an artificial insemination (AI) capacity and breeding research capacity in the Animal Husbandry Research Institute (AHRI). Animal research branch stations were established in the Khangai (for yaks), Gobi (for goats), Eastern Steppe (for beef cattle), and Western Steppe (for native sheep) to maintain stocks of genetically superior (higher productivity) animals and to reproduce pure lines of these animals for distribution throughout the country. A major AI and semen collection station was also established near Ulaanbaatar.
3. Animal management and breeding falls under the responsibility of the Livestock Division within MoFA and each aimag has livestock specialists within their departments of agriculture. Breeding related activities are financed from two main sources, the state budget (including the aimag allocations for the department of agriculture) and the sale of breeding stock and semen. Recent activities of animal breeding specialists has focused on the implementation of state laws and regulations relative to improving the quality of animal breeding services and improvement of animal quality - the "Improving Animal And Breeding Service Quality", and the "Elite Sire Program", both of which have attempted to improve the quality and scope of breeding services; the formation of nuclear herds; and the improvement of animal quality and improving the availability of quality animals.
4. The animal breeding program is an ongoing program that, with broadening and additional support, could provide considerable impetus in commercializing livestock production and improve overall livestock productivity. The proposed broadening recognizes that the limiting factor in livestock rearing in Mongolia is nutrition, therefore incremental productivity gains are possible from the dual approach of improving livestock management and genetics. The primary focus of MoFA's animal management and breeding program should be based on: (i) improving management and breeder selection, (ii) developing AI facilities and network, (iii) linking research in animal breeding to the improvement of locally adapted animals.



### **A. Livestock Management and Breeder Selection**

5. In an endeavor to upgrade the knowledge of livestock producers to improve their understanding of management and breeder selection procedures, it is intended to:

- improve herder and producer knowledge of nutritional requirements of livestock to prepare them for the harsh Mongolian winter.
- improve herder and livestock producer management practices to reduce the risk associated with livestock production.
- improve the genetic quality of native livestock by developing capacity of aimag and *soum* program staff focus on the commercial traits in the selection of potential breeding stock for private livestock producers;
- develop the breeding network by assisting private livestock producers to become purebred producers with associated AI facilities, for local and regional sales; and,
- promote development of animal breed societies that are linked to similar associations internationally and provide access to information and, where appropriate, the exchange of genetic material.

### **B. Artificial Insemination Facilities**

6. The operation of a commercial private AI facility needs to have a source of high quality semen, herders who are familiar with detecting estrus, and trained operators in insemination techniques. While the national AI center may have non commercial functions in terms of preserving the national gene pool, its operating costs can be somewhat offset by the more commercial activities of providing semen storage and insemination services both in support of aimag commercial operations but also in servicing the livestock breeders round Ulaanbaatar as well as the higher input dairy industry where the genetic composition is more of an issue. The Government proposes to support the further development of the AI services and recognizes its dual role - one commercially oriented and the other of national interest. The Government is seeking to:

- rehabilitate the Animal Semen Collection and Storage Station in Ulaanbaatar;
- modernize its germ plasm storage facilities and storage equipment;
- develop relationships with international organizations and provincial breeder centers, both in the public and private sectors; and,
- promote private semen collection and storage facility enterprises in the aimags.

### **C. Linking Research and Livestock Breeding**

7. Rehabilitation of the animal breeding and animal feed research programs at the AHRI and regional branch stations should be undertaken by supporting adaptive research focusing on:

- researching animal forages and nutrient based animal feeding programs suitable for both extensive and higher input livestock industries;
- developing beef cattle breeds suitable for Mongolian conditions that are able to meet the increasing quality demands from changing consumer preferences;
- developing meat sheep production to meet changing consumer preferences that encourages producers to sell lambs (i.e., less than one year of age) improving animal off-take;
- development of research into market characteristics and consumer preferences;
- improving the capacity of regional animal breeding research facilities to support purebred breeder multiplication by the private sector.

#### **D. Animal Identification**

8. An essential component of identifying higher productive animals is the ability to identify individual animals, the need to measure their superior performance, and the need to maintain records of their progeny. Among the most common method of animal identification is marking each animal with some form of unique identifier usually for ownership such as brands (hot or paint), ear marks, skin cuts, horn notches, hair marks, collars, tags, etc. and registering this identifying mark with the responsible authority. In Mongolia, large stock (camels, horses, and cattle) are branded while young animals of large stock and sheep and goats are often identified with a collar or ear tag of colored cloth. Currently, there is no competent authority with whom the identifying marks are registered and it serves mainly as an aid for the owner to identify their own animals should they become mixed with other herds/flocks during watering or grazing. As production systems become more sophisticated and livestock owners wish to identify the higher performing animals to retain for breeding purposes, individual animal identification will become increasingly important. With small herd and flock sizes, many livestock owners will recognize individual animals within their herd flock, but cannot objectively measure the extent to which the animals are superior - in terms of growth rates or the amount and quality of fiber produced.

9. Individual animal identification assumes greater importance when private breeder entities begin to operate commercially. Buyers of the more expensive breeding stock seek some assurance that the animal being purchased for breeding purposes is capable of passing on his/her superior productivity traits. While breed registration goes some of the way to providing this assurance, performance data on the dam-sire will confirm productivity claims by the seller. To maintain such records, animal identification is a necessary prerequisite.

10. A further argument in support of animal identification is to facilitate trace back of diseases detected during post or ante mortem slaughter where animals are subject to inspection services<sup>1</sup>. In controlling diseases, particularly the zoonotic diseases that can be transferred to humans, it is important to be able to identify where the animals were reared to contain the outbreak at its point of origin. Outbreaks of infectious disease such as Bovine Spongiform Encephalitis (BSE), Brucellosis, Anthrax and Avian Influenza must be controlled at their source and a trace-back system is critical to their control. Brucellosis is passed to humans through un-treated milk or direct contact with infected animals and has infected a relatively high proportion of the population. These diseases can also have a detrimental impact on being able to access international markets if they cannot be controlled. While Mongolia has not exported significant quantities of meat in recent years, its livestock products such as skins, hides and fibers could also suffer if notifiable diseases are not brought under control.

## **II. GOVERNMENT'S POLICY IN LIVESTOCK MANAGEMENT AND BREEDING**

11. The Government recognizes the importance of its livestock sector and is prepared to participate in sharing the risk associated with livestock production, maintaining disease surveillance and disease control programs, but also recognizes that support is also needed to improve the quality of Mongolia's livestock products through management and breeding. Based on previous large scale cross breeding activities, the gene pool of the well adapted local species have been effected to the extent that pure lines of the hardier, local genetic

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<sup>1</sup> Currently only 70% of the national number slaughtered are processed through abattoirs, the remainder being slaughtered in uncontrolled environments and either consumed locally or transported using unhygienic means of transferring carcasses to the point of sale.

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**Volume II - Program Investments - Livestock Management and Breeding Program**

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material are becoming more difficult to locate. The Government sees its responsibility to support the development of private breeding enterprises and the associated AI activities that accompany the multiplication of potential breeding animals but also sees the need to maintain the gene-pool of local species.

12. The Government is therefore committed to the identification of "elite" breeding stock and to ensure that the higher productivity genes are retained into the future. At the same time it is aware that higher productivity animals may be resourced from outside the country and that, after proving their suitability as breeding stock in Mongolia (through adaptive research), their higher productivity characteristics can improve the productivity of local animals. This is particularly important in the higher input and higher productivity livestock industries where the limitations of low nutritional levels have already been addressed such as the dairy industry. The Government's quest to develop its higher productivity industry is demonstrated by its approval of Government Resolution No 160 of June 2003 entitled "Intensified Livestock Production Development Support Program". The overall goal of this program is: to produce goods that meet international standards and conform with market requirements; to improve the food supply to Mongolia's population; and decrease imports through sustainable development of agricultural production through the integration of livestock and crop production that is consistent with Mongolia's regional development objectives. This is intended to be achieved by:

- improving the economic and legal environment for development of higher productivity livestock production;
- supporting regional development of higher productivity livestock production and establishing model farms as extension tools;
- supporting capacity building for developing higher productivity livestock production.

### **III. RATIONALE FOR PUBLIC INVOLVEMENT**

13. The rationale for continuing government participation in livestock management and breeding reflects the current state of transition in the industry. With producers still dominated by small herders and livestock owners, there are economies of production that are denied these entities just by virtue of their scale of operation. This is particularly important in the field of animal breeding. Breed societies in other more developed livestock rearing economies have played an important role in developing the quality of goods produced yet these have still not become operational in Mongolia. As a temporary measure, the Government intends to support their establishment and direct public resources to see that private functions are operational and serving the industry. The legitimate role of Government in this area remains in quality control and ensuring that imported goods are of sound quality and free of disease - that imported breeding material is of superior quality and that the material is free from diseases that could be transferred to the local herd/flock.

### **IV. RECENT DEVELOPMENT INITIATIVES**

14. The Government has directed significant resources to three main programs implemented by MoFA including the Livestock Breeding Program, the Elite Sire Program and the High Productivity Livestock Program for about Tg30 million, Tg140 million, and Tg300 million each year when they were operating. In addition, bi-lateral donors have assisted in

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the breed and livestock management improvement. The EU-TACIS has supported the Government's higher productivity initiatives as it has for extension services for improved livestock management and the French have been active in the introduction of superior genetic material. FAO have been involved in developing the local dairy industry but has focused more on securing market linkages with urban consumers.

#### A. Government Initiatives

15. The smallest government program is that for animal breeding and related activities at the aimag and *soum* level amounting to about Tg35 million between 2001-06. Initiatives under that program included:

- **Animal Breeding Classification:** Classification of animals was carried out nationwide in compliance with guidelines provided by Food and Agriculture Minister's Order A/69 from 2002. Over three million livestock were classified with 32% of sheep, 43% of goats, and 45% of cows classified as elite and first-grade animals. During the classification 279,900 head were registered for nuclear herds, and 2,090 families and 50 economic entities were issued a right to rear male breeding animals.
- **Artificial Insemination Development:** Eighteen artificial insemination points for breeding privately owned dairy cattle were established in Darkhan, Selenge, Tuv and Bulgan aimags; Ulaanbaatar city, Saikhan *soum* of Selenge, and Tumentsogt State-owned Enterprise of Sukhbaatar. Over 800 doses of semen from high yielding dairy bulls were made available for AI use. New AI points were established by request in Bayan Ulgii, Bulgan and Uvs breeding departments. In 2003, 654 cows were artificially inseminated, of which 69% were successful.
- **Rearing Breeding Animals:** Animal breeding departments of aimags are responsible for rearing and selling animals from their nuclear herds for breeding purposes. Breeding departments reared and sold over 1,000 animals for breeding purposes.
- **Breeding Animal Sales:** Exhibitions of breeding animals were organized in which over 500 animals were offered for sale, from amongst Mongolia's best breeds, the proceeds from which were Tg20.0 million. Promotions on exhibition activities were carried out. In 2003, 39,000 animals exchanged hands for breeding purposes, about 10,000 greater than the previous year.
- **Evaluation and Registration of Breeding Animals:** In 2004, over 288,000 males were examined for registration as elite breeders with 96% camel stallions, 97% horse stallions, 93% bulls, 94% rams and 94% bucks met the required breeding standards. During this inspection process, 47,700 male breeders were registered. In 2003, a total of 8,118 super-productive animals were identified and entered into breed registries.
- **Training and Promotion:** In 2004, some 312 training seminars were conducted nationwide involving 21,900 trainees. This training was supplemented by dissemination of breeding information through the media on about 180 separate occasions.

16. A recent evaluation by MoFA of its activities concluded that significant training was needed to improve the quality of livestock officers in the soums and aimags and that such training, particularly in AI techniques, would enhance the performance of the Government

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funded program. It also noted that the methods for evaluating the impact of the program should be changed so that the any evaluation should be more "results based" rather than "inputs based". In the more technical areas, the evaluation considered that there needed to be renewed focus on the declining camel population as this had been a persistent trend in the composition of Mongolia's livestock population. While this is considered to reflect the increased use of mechanized transport to assist herders in their trekking movements between seasonal camps, camels are considered to have particular value as a source of high quality milk for human consumption and have a role as an attraction within the tourism sector. They are also a unique species found only in this area and are at risk of disappearing. Finally it recommended that the agricultural fairs at which breeding stock are displayed and compete for awards should be conducted at two levels, an initial local fair in the aimag followed by a regional fair where aimag winners could compete.

17. The more significant was the "elite" sire program with allocations of about Tg140 million a year between 2003 and 2005. This program was directed at identifying superior genetic material and having it made available for others to upgrade their herds/flocks.

18. The third is the more recent and is the best resourced of the three with allocations of nearly Tg300 million in 2005 and 2006. This program directly supported private entities in assisting them to establish pig, poultry, dairy, and meat sheep producing units surrounding Ulaanbaatar and in strategic locations in the four main regions of the country. It provided extensive training to herders and livestock owners in the management methods needed for improving productivity and also provided retraining for professional livestock officers at the agricultural institutions. The program also promoted further development of the livestock feed sector. While the overall objectives are broad, they essentially seek a more productive livestock sector through additional technical knowledge and information, improved feed availability and increased breeding capacity with associated industries. The program was prescriptive as to where the comparative advantage lay for each of the main livestock products, identifying what should be produced and where it might be best produced. While the overall focus was for a more market oriented livestock industry, the inclusion of designated species in different locations has tended to override any market considerations. This resulted from the higher technical knowledge that resides in the Ministry but also reflects the past where producers were instructed what to produce. The current regulation cannot impose production decisions on private livestock owners and as a consequence, the relevance of the regulation must be questioned.

### **B. Donor Funded Initiatives**

19. The EU-TACIS funded "Integration of Crop and Livestock Production" project that was implemented between 2003-05 supported the improved management of livestock with the objective of integrating crop and livestock production systems. It adopted the model farmer approach to the demonstration of new farming systems and supported the extension units in its target area in the Central Region. It provided these model farmers with equipment as incentives to adopt the new technologies for integration of these activities on the condition they could be used as extension tools through field days etc. The project provided some interesting insights into opportunities for supplementary feeding of livestock for the local market - both out of season and for higher quality meat during the seasonal flush. The subsequent EC funded TACIS project entitled "Development of Agricultural Services" project focuses more on the development of the support services including technical extension services and has targeted animal production and management as one of the areas in need of further support.

20. The FAO/Japan funded Dairy Development Project targets the higher input, higher productivity dairy industry round Ulaanbaatar and further to the north where there is

reasonable road access to supply fresh milk onto local urban markets. Whilst the main activities are directed at the linkages between the milk producers and the processors, it also supports the development of technical knowledge in production and management of dairy animals and incorporates some activities associated with AI of breeders based on imported higher producing animals of European origin. Other donors have peripheral activities to livestock management and breeding but are more focused on the capacities of institutions or supporting policy development within the Ministry.

## **V. PROGRAM PROFILE**

### **A. Objectives and Outcomes**

21. The objective of this program is to develop the livestock management skills of the livestock producers, strengthening breeder selection capacities and improving the productivity of the herd/flock. Intended outcomes under the Program include:

- Improved unit value of production from livestock reared for income generation purposes;
- Producers with genetically superior livestock have been identified and trained;
- Breed societies formed and supported in their early operations;
- Commercially based breeder producing farms operating;
- Private AI centers operating in strategic locations throughout Mongolia.

22. The Program recognizes that the drivers of development will be the private sector but in the interim, there needs to be Government support to facilitate their startup and early stages of operation before they are left to operate independent of Government support. It also recognizes that the Government has the only pool of technical expertise in many of these production management and breeding areas and by strengthening their skills, the local industry will benefit in the long run. This Program acknowledges the current structure of the livestock ownership amongst herders and higher input livestock rearing enterprises - that some 80% of herders have herd sizes of less than 200 head of sheep equivalents, and more critically, that some 60% of the current herders are considered "inexperienced" in that they took up herding following the loss of other forms of employment associated with the collapse of the socialist regime. While there is a significant level of local knowledge of animal husbandry, pasture utilization, and animal health, many still lack the knowledge and resources to properly manage their animals through the severe winters and are restricted as to their management options for breed improvement because of their limited knowledge and small herd/flock size. While management is considered one of the main limiting factors in determining livestock productivity, the genetic variation within the Mongolian livestock is sufficiently diverse to allow an effective breeder selection from amongst the well adapted local animals although small herd size actively works against this opportunity.

### **B. Scope and Key Activities**

23. The Government is keen to continue its efforts in improving livestock productivity in both the extensive and higher input livestock sub-sectors. While essentially an knowledge based program, the Government will (i) support the widespread dissemination of technology packages to increase herders' knowledge of management options including the need for higher levels of nutrition and changes in turnoff practices, (ii) support the operations of private regional livestock breeding centers that will give greater focus to the "Elite Breeder" concept, (iii) support the operations of a National Artificial Insemination network responsible for retaining the country's gene-pool and its genetic heritage without interfering with the development of private artificial insemination initiatives in the higher input industries, (iv)

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support research into the selection of more commercially oriented heritable traits for breeders (meat and milk productivity and fiber diameter in the case of wool and cashmere), and (v) recognize, through registration and certification, and support the formation of private breed centers<sup>2</sup> with the view to establishing pure bred "suppliers" of high quality breeding stock and semen and support them in their production activities.

### **1. Improved Management Skills of Producers**

24. Recognizing the age composition of livestock owners and their lack of familiarity with market principles to determine consumer preferences, it is intended to conduct regular training of technical specialists (aimag based) to strengthen their skills in livestock production and management matters (including improved nutrition) so they have the necessary skills to support the implementation of this Program. This will be supplemented by the resources to allow the trained staff to develop work plans and undertake activities to assist in achieving increased producer knowledge. The Program will incorporate dissemination of technical material through the media (in particular local radio broadcasts and through the national short wave network) as well as through the field days and producer workshops.

### **2. Identification and Promotion of Superior Genetic Material**

25. The second main group of activities is directed at breed improvement. It will reinforce the importance of identifying commercial heritable traits in livestock for use as selection criteria for identifying and retained breeding animals. This will involve consultation with the ultimate users of livestock products - the processors, so that only relevant criteria are selected, followed by routine sampling of potential livestock to identify animals with higher genetic content. These animals will be marked with individual identification (to be developed) and recorded in a database to be maintained in the aimag as a register of higher productivity animals. Such a registry will assist private producers to establish themselves as breeders of higher productivity animals for which a price premium should apply based on the relative quality of the animal. As part of this identification process, the Government will support the widespread recognition of superior quality livestock at aimag and regional agricultural exhibitions where producers can show the quality of their breeding animals in a competitive environment. This will not only promote the development of private breeders but it will focus attention on the heritable traits that the market deems important in guiding the genetic upgrading of the national herd/flock.

26. Associated with these activities will be government support for the formation of "breed societies" as has been used to effect in other pastoral-based livestock rearing countries of the world. The government can support their development by facilitating meetings, registering the societies and publishing the characteristics of the various breeds, detailing what their production advantages might be and under what conditions they are best suited in this diverse environment. The government can also support their formation and operation by exposing breed society leaders to the operations of international societies with similar objectives in Northern USA, Canada or Australia where there are excellent examples of how societies can support the development of the breeder industry and how they can contribute to overall genetic improvement of the national herd/flock.

### **3. Support for AI Centers**

27. The third area of government support will be directed to the strengthening of AI services to support the livestock industry and to preserve the gene pool of the country's diversity of livestock. It will provide technical assistance to the Central Gene Pool in

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<sup>2</sup> Possibly one per aimag.

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management and operations of the facility so that it develops the competence and skills for its dual function. It recognizes that some of its responsibilities are not commercially based and therefore will require ongoing support from the budget but that its operating costs can be assisted by supporting private AI initiatives both surrounding the central capital and also in maintaining supplies of semen to the aimag breeding centers. The Program will rehabilitate this central facility as this needs the capacity to support other private sector initiatives in a reliable manner, with the necessary storage and transport facilities to maintain outreach to aimag AI centers.

28. Initiatives aimed at supporting the private sector AI service providers include technical assistance in insemination techniques and providing trainers to assist local inseminators develop the necessary skills to maintain conception rates as well as in the operations of AI centers. It will provide access to concessional loans to upgrade their AI facilities including storage and handling equipment so that the quality of semen is maintained to the point of service delivery. The Program will strengthen the linkages between research institutions with responsibility for proving the suitability of imported genetic material and those responsible for distribution of the material on a commercial basis. Finally, the Government can also assist private operators maintain their skill level and provide routine certification that AI operators are suitably trained and have the necessary facilities to operate an effective AI service to producers.

**C. Policy Development**

29. There are few policy issues in relation to improving the management capacity of producers and assisting in enhancing breeding services. The private nature of these activities is recognized and is supported as an interim measure until private investment is forthcoming. The only policy initiative that may be needed is to establish a timeframe for the proposed support so that the private sector is not competing directly with subsidized government services. This will have to be reviewed on an ongoing basis to ensure financial independence and therefore sustainability of the services within the subsector.

**D. Institutional Capacity Building**

30. The Program is largely an information based program that builds the capacities of the aimag and soum based livestock staff, together with those of the producers. It will also impact upon the capabilities of the AI operators and on the managers of breed centers in each of the aimag. The other groups to be affected are the breed society managers and leaders who will have the advantage of seeing how other societies are operated in other parts of the world so that the principles can be applied under Mongolian conditions.

**E. Summary Cost Estimate of the Program**

31. The physical inputs associated with the Program are presented in Table 1 below and the costs associated with those inputs are presented in Table 2. It should be noted that the cost estimates are preliminary and have not been discussed with the Government in detail. While there is in principal agreement on the scope of activities associated with the Program, the detailed cost estimates need further discussion with the Government. It is also notable that there has been no attempt to identify potential financiers for the Program initiatives.



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### Table 1: Livestock Management and Breeding Program - Physical Inputs

### Table 1: Livestock Management and Breeding Program - Physical Inputs

I. Investment Costs													
A. Management Improvement													
1. Production Management Training													
Train provincial agricultural staff	2 region/yr	4	4	4	4	4	4	4	4	4	4	4	4,000/region/yr
Conduct producer workshops	2 soum w/shop	340	340	340	340	340	340	340	340	340	340	340	400/soum w/shop
Maintain public information dissemination	aimag-yr	22	22	22	22	22	22	22	22	22	22	22	500
Technical specialist support	pmnths	6	6	6	6	6	6	3	3	3	3	48	1,000
Subtotal Production Management Training													
B. Genetic Improvement													
1. Genetically Superior Livestock Identified													
Heritable commercial trait identification	10 products	3	3	3	1	-	-	-	-	-	-	10	10,000/products
Routine sampling activities	4 sample-yr	340	-	-	-	-	-	-	-	-	-	340	100/sample-yr
Support soum agricultural competitions	show	170	-	-	-	-	-	-	-	-	-	170	1,100
Support aimag agricultural competitions	show	22	22	22	22	22	22	22	22	22	22	220	5,000
Support regional agricultural competitions	show	4	4	4	4	4	4	4	4	4	4	40	5,000
Develop and maintain database	unit	22	22	22	22	22	22	22	22	22	22	220	500
Subtotal Genetically Superior Livestock Identified													
2. Breed Societies Operational													
Facilitate society meetings	meetings	22	22	22	22	22	-	-	-	-	-	110	50
Support the production of breed society publications	publications	10	10	10	10	10	-	-	-	-	-	50	50
International study tours	10 person-tour	1	1	1	-	-	-	-	-	-	-	3	5,000/person-tour
Subtotal Breed Societies Operational													
3. Breeder Enterprise Support													
Targeted technical assistance	pmnths	2	2	2	2	2	-	-	-	-	-	10	1,100
Concessional loans superior genetic material	10 aimag loans	22	22	22	22	22	-	-	-	-	-	110	10,000/aimag loans
Subtotal Breeder Enterprises Support													
4. Private AI Center Support													
Rehabilitation of Central Gene Pool facilities	center	1	-	-	-	-	-	-	-	-	-	1	10,000
Technical management support for centers	pmnths	3	-	-	-	-	-	-	-	-	-	3	1,000
Develop linkages with research institutions	22 aimag meets	1	1	1	1	1	-	-	-	-	-	5	500/aimag meets
Assistance with material to promote services	22 material sets	1	1	1	-	-	-	-	-	-	-	3	50/material sets
Concessional loans for equipment purchase	equip sets	4	4	4	4	4	-	-	-	-	-	20	5,000
Subtotal Private AI Center Support													

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Table 2: Livestock Management and Breeding Program Cost Estimates

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
(Tugrik Million)											
<b>I. Investment Costs</b>											
<b>A. Management Improvement</b>											
<b>1. Production Management Training</b>											
Train provincial agricultural staff	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	320.0
Conduct producer workshops	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	2,720.0
Maintain public information dissemination	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	110.0
Technical specialist support	6.0	6.0	6.0	6.0	6.0	6.0	3.0	3.0	3.0	3.0	48.0
<b>Subtotal Production Management Training</b>	<b>321.0</b>	<b>321.0</b>	<b>321.0</b>	<b>321.0</b>	<b>321.0</b>	<b>321.0</b>	<b>318.0</b>	<b>318.0</b>	<b>318.0</b>	<b>318.0</b>	<b>3,198.0</b>
<b>B. Genetic Improvement</b>											
<b>1. Genetically Superior Livestock Identified</b>											
Heritable commercial trait identification	300.0	300.0	300.0	100.0	-	-	-	-	-	-	1,000.0
Routine sampling activities	136.0	-	-	-	-	-	-	-	-	-	136.0
Support soum agricultural competitions	187.0	-	-	-	-	-	-	-	-	-	187.0
Support aimag agricultural competitions	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0	1,100.0
Support regional agricultural competitions	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	200.0
Develop and maintain database	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	110.0
<b>Subtotal Genetically Superior Livestock Identified</b>	<b>764.0</b>	<b>441.0</b>	<b>441.0</b>	<b>241.0</b>	<b>141.0</b>	<b>141.0</b>	<b>141.0</b>	<b>141.0</b>	<b>141.0</b>	<b>141.0</b>	<b>2,733.0</b>
<b>2. Breed Societies Operational</b>											
Facilitate society meetings	1.1	1.1	1.1	1.1	1.1	-	-	-	-	-	5.5
Support the production of breed society publications	0.5	0.5	0.5	0.5	0.5	-	-	-	-	-	2.5
International study tours	50.0	50.0	50.0	-	-	-	-	-	-	-	150.0
<b>Subtotal Breed Societies Operational</b>	<b>51.6</b>	<b>51.6</b>	<b>51.6</b>	<b>1.6</b>	<b>1.6</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>158.0</b>
<b>3. Breeder Enterprise Support</b>											
Targeted technical assistance	2.2	2.2	2.2	2.2	2.2	-	-	-	-	-	11.0
Concessional loans superior genetic material	2,200.0	2,200.0	2,200.0	2,200.0	2,200.0	-	-	-	-	-	11,000.0
<b>Subtotal Breeder Enterprise Support</b>	<b>2,202.2</b>	<b>2,202.2</b>	<b>2,202.2</b>	<b>2,202.2</b>	<b>2,202.2</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>11,011.0</b>
<b>4. Private AI Center Support</b>											
Rehabilitation of Central Gene Pool facilities	10.0	-	-	-	-	-	-	-	-	-	10.0
Technical management support for centers	3.0	-	-	-	-	-	-	-	-	-	3.0
Develop linkages with research institutions	11.0	11.0	11.0	11.0	11.0	-	-	-	-	-	55.0
Assistance with material to promote services	1.1	1.1	1.1	-	-	-	-	-	-	-	3.3
Concessional loans for equipment purchase	20.0	20.0	20.0	20.0	20.0	-	-	-	-	-	100.0
<b>Subtotal Private AI Center Support</b>	<b>45.1</b>	<b>32.1</b>	<b>32.1</b>	<b>31.0</b>	<b>31.0</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>171.3</b>
<b>Subtotal Genetic Improvement</b>	<b>3,062.9</b>	<b>2,726.9</b>	<b>2,726.9</b>	<b>2,475.8</b>	<b>2,375.8</b>	<b>141.0</b>	<b>141.0</b>	<b>141.0</b>	<b>141.0</b>	<b>141.0</b>	<b>14,073.3</b>
<b>Total</b>	<b>3,383.9</b>	<b>3,047.9</b>	<b>3,047.9</b>	<b>2,796.8</b>	<b>2,696.8</b>	<b>462.0</b>	<b>459.0</b>	<b>459.0</b>	<b>459.0</b>	<b>459.0</b>	<b>17,271.3</b>

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**F. Indicative Implementation Arrangements**

32. The Program will be implemented by the Ministry with participation of the provincial aimag agriculture departments and the private sector, the latter in an advisory capacity. While aimag administrations are the most important in building the capacity of the livestock specialists, their training will be coordinated by the national agency. The AHRI will have an important role in the implementation of this Program particularly with its technical expertise in AI related activities but also in its screening of genetic material to assure its suitability for Mongolian conditions. Private sector participation is considered equally important in an advisory capacity, particularly when it comes to developing the criteria to be used in the selection of heritable traits that are to be commercially determined.

**G. Program Framework Matrix**

<b>Design Summary</b>	<b>Performance Indicators/Targets</b>	<b>Monitoring Mechanisms</b>	<b>Assumptions and Risks</b>
<b>Goal</b> 1.0 To develop the livestock management skills of the livestock producers, strengthening breeder selection capacities supported by specialized breeding services to improve livestock productivity	Herd and flock composition  Turnoff rates by species	Annual livestock census of NSO  Annual livestock census of NSO	Exceptional weather patterns are not experienced Market signals (prices) reflect quality of breeders
<b>Purpose</b> 2.1 To educate producers in simple, on-farm management and genetic improvement procedures and techniques  2.2 To support the development of breeding entities involved in generating quality genetic material to improve livestock productivity	Livestock deaths  Livestock sold  Values of livestock product production  Quality of livestock products Fiber thickness Fiber color Average slaughter weight  Breeding centers operating	Annual livestock census of NSO  Industry surveys by MoFA  Aimag reports	Small herd size does not inhibit participation by herders  Breeding services separated from department activities in the aimags
<b>Outputs</b> 3.1 Improved unit value of production from livestock reared for income generation purposes  3.2 A national database that registers animals of superior genetic quality  3.3 A number of breed	Unit value of production  Database operational and maintained  Number of societies	Livestock surveys  Database records  MoFA registry	Commodity prices remain stable

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Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
societies formed	registered		
3.4 Commercially based breeder producing farms operating	Number of enterprises registered	Soum and aimag records	
3.5 Breeding centers operating in strategic locations	Number of entities registered  Profit statements for breeding centers	Soum and aimag records  Aimag taxation returns	
3.6 An upgraded National Center for Livestock Gene Bank stocked with high quality genetic material	Facilities upgraded	Handover statements	
<b>Activities</b>			
3.1.1 Train agricultural officers	No. of courses No. trained	MoFA records	
3.1.2 Conduct producer workshops	No of workshops conducted	MoFA records	
3.1.3 Maintain a public information program	No. of media campaigns broadcast	MoFA records	
3.2.1 Develop the list commercially significant heritable traits as criteria for identifying superior breeding stock	List prepared for each species	MoFA records	Product differentiation is feasible
3.2.2 Conduct routine sampling activities to identify animals and mark accordingly	No of superior animals identified	MoFA records	
3.2.3 Support agricultural competitions	No. of competitions supported	National and aimag budget allocations	
3.2.4 Develop and maintain a data base to record genetically superior animals	Database operational and being maintained	Data printouts from the program	Trained operators are available to manage the database
3.2.5 Maintain progeny testing initiatives to assure quality control	Assessments conducted	Reports generated	
3.2.6 Make breeder information available through international livestock breed societies	Linkages developed	Communications recorded	

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<b>Design Summary</b>	<b>Performance Indicators/Targets</b>	<b>Monitoring Mechanisms</b>	<b>Assumptions and Risks</b>
3.3.1 Facilitate breed society meetings	No. of meeting held	MoFA records	
3.3.2 Support the publishing of breed material promoting commercial traits	Material published	Material sighted	
3.3.3 International study tour for breed society heads	Study tours undertaken	Study tour reports	
3.4.1 Targeted technical assistance	Inputs provided to help breeder associations	TA reports	Administering financial institutions agree to participate
3.4.2 Concessional loans for the purchase of equipment	Loans extended to commercial breeders	Administering financial institution reports	
3.4.3 Concessional loans for the introduction of new genetic material	Loans extended to commercial breeders	Administering financial institution reports	
3.5.1 Technical support for the management of AI and private breed centers	Training material produced and distributed	Training evaluation reports	Research centers receive funding for breed development
3.5.2 Establish regional breeding centers to support breeder upgrading initiatives			
3.5.2 Develop linkages with research centers	Coordination meetings conducted	Minutes of meetings	
3.5.3 Assistance with material to promote services	Promotional material developed	Promotional material sighted	
3.6.1 Upgrade the Gene Bank Center	Building refurbished	Construction completion report	
3.6.2 Equip the Gene Bank Center	Equipment supplied and installed	Procurement documentation	
3.6.3 Provide operational support for the Center	Budget allocations made	Central MoFA allocations	

# **AGRICULTURE SECTOR STRATEGY STUDY**

## **VOLUME 2**

### **CROP SUBSECTOR SUMMARY**

**30 NOVEMBER, 2006**

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## ACRONYMS

ADB	- Asian Development Bank
AHRI	- Animal Husbandry Research Institute
AI	- Artificial Insemination
ASDP	- Agricultural Sector Development Project
CIDA	- Canadian International Development Assistance
DANIDA	- Danish International Development Agency
EGPRS	- Economic Growth and Poverty Reduction Strategy
ELISA	- Enzyme Linked ImmunoSorbent Assay
EU	- European Union
FAO	- Food and Agricultural Organization (of the United Nations)
FMD	- Foot and Mouth Disease
GAP	- Government Action Plan
GDP	- Gross Domestic Product
GTZ	- German Bi-lateral Aid Agency
IMED	- Information Monitoring and Evaluation Department
JICA	- Japan International Cooperation Agency
KOICA	- Korean International Cooperation Agency
LEWS	- Livestock Early Warning System
MDG	- Millennium Development Goal
MNE	- Ministry of Nature and Environment
MoFA	- Ministry of Food and Agriculture
MTBF	- Medium Term Budgetary Framework
NPA	- National Plan of Action
OIE	- Office Internationale Epizootique
SCVL	- State Central Veterinary Laboratory
SDC	- Swiss Development Cooperation Agency
SEFF	- State Emergency Fodder Fund
UNDP	- United Nations Development Program
USAID	- United States Agency for International Development
WTO	- World Trade Organization

## THE CROP SUBSECTOR

### I. GENERAL BACKGROUND

1. The crop sub-sector in Mongolia has experienced significant difficulties in the transition from command to a market economy. Perhaps more than any other, the sub-sector's activities and structure have been disrupted; its weaknesses exposed and its very reason for existence called into question. Even after a decade and a half of transformation, the sub-sector remains in a state of flux, far from settled in its characteristics, its future form and opportunities are still uncertain. The next ten years will be crucial not only to the survival of the sub-sector but also to whether or not it will realize its considerable potential to add both to national wealth and individual household incomes, to make a full contribution to the twin goals of economic growth and poverty reduction, the main thrusts of government policy.

#### A. The Importance of Cropping to the Economy

2. In 2005, agriculture contributed some 21% to GDP at constant prices (Table 1), and of that, about 18% is derived from cropping, the remaining 82% from livestock. This is in marked contrast to the period immediately before transition when agriculture accounted for over 30% of GDP and cropping about 30% of agriculture. Very little of this activity is contributed by the public sector, with private sector activity accounting for over 98% of agricultural GDP in most years. This contrasts with around 75-77% for the economy as a whole.

**Table 1: Significance of Agriculture in the National Economy**

	1995	2001	2002	2003	2004	2005
<b>GDP in current prices (Tg billion)</b>						
<b>Total</b>	538.9	1115.6	1240.8	1461.2	1910.9	2266.5
<b>Agriculture</b>	209.1	277.6	256.6	293.4	399.0	491.1
<b>% Total GDP</b>	38.1	24.9	20.7	20.1	20.9	21.7
<b>Share of the Private Sector (%)</b>						
<b>Total GDP</b>		75.0	74.5	73.0	76.1	77.4
<b>Agriculture</b>		98.3	98.4	91.1	99.8	99.8
<b>GDP in Constant 2000 Prices (Tg billion)</b>						
<b>Total</b>		1029.5	1070.7	1130.3	1251.4	1329.1
<b>% Change from Previous Year</b>		1.0	4.0	5.6	10.7	6.2
<b>Agriculture</b>		242.1	212.0	222.3	261.6	281.7
<b>% Total GDP</b>		23.5	19.8	19.7	20.9	21.2
<b>% Change from Previous Year</b>		-18.3	-12.4	4.9	17.7	7.7

NB: Agriculture includes hunting and forestry

Source: National Statistical Office, Ulaanbaatar

3. Both crop and livestock sub-sectors declined in the early 1990s but whereas extensive livestock recovered in the second half of the decade, cropping activities continued to decline, due mainly to the contraction of the wheat sector and by the almost total disappearance of other grains. By the end of the 1990s, cropping accounted for only about 12% of gross agricultural output. With extensive livestock badly affected by three years of serious climatic disturbances (droughts and *dzuds* from 1999 to 2001), the relative

significance of cropping in the agriculture sector improved, even though output fell. A strong recovery in 2003, when cropping reached 24% of agricultural output, was followed by two stagnant years when the sub-sector's share declined to below 18%. With grains continuing to decline, any buoyancy in the cropping sector has come from other crops: potatoes, vegetables, and fodder (Table 2).

**Table 2: Composition of Gross Agricultural Output**

	1989	1995	1998	2001	2002	2003	2004	2005
<b>Gross Agricultural Output in Current Prices (Tg billion)</b>								
<b>Total Ag Output</b>				394.2	358.2	410.9	578.9	735.5
- livestock				318.5	284.9	316.0	474.9	622.8
- crops				75.7	73.3	95.0	103.9	112.7
<b>% Total Output</b>				19.2	20.5	23.1	17.9	15.3
<b>Gross Agricultural Output Constant Prices (Tg billion)</b>								
	<b>1993 prices</b>			<b>2000 prices</b>				
<b>Total Ag Output</b>	113.5	102.8	119.6	351.4	317.6	338.7	413.1	446.6
<b>% change</b>					-9.6	6.6	21.9	8.1
- livestock	79.1	87.8	105.3	277.5	248.2	259.0	335.0	367.1
- crops	34.4	15.0	14.3	73.9	69.4	79.7	78.2	79.6
<b>% change</b>					-10.6	14.8	-1.8	1.8
<b>% total</b>	30.3	14.6	12.0	21.0	21.9	23.5	18.9	17.8

Source: National Statistical Office, Ulaanbaatar

4. The significance of agriculture in the regional economy, outside Ulaanbaatar, ranges from 31% of regional GDP in 2005 in Khangai to 78% in the West (Table 3). Over the last five years, this share has increased in three of the four regions. However, the contribution to regional GDP does not reflect the relative importance of the region to agriculture and certainly not to cropping (the Central Region far outweighs the others for cropping activities), but rather reflects the strength of alternative economic opportunities, particularly mining (a major feature in the relative decline in the importance of agriculture over recent years in the Khangai Region, for instance). While agriculture is strongest in the Central Region, it is more important to the local economy in the West and East, rendering those regions relatively more vulnerable to the agriculture's changing fortunes and susceptibility to climatic disturbances.

**Table 3: Regional Importance of Agriculture: % Regional GDP at Current Prices**

	2001	2002	2003	2004	2005
<b>West</b>	67.8	62.5	64.6	75.5	77.9
<b>Khangai</b>	54.1	41.0	34.0	27.8	31.1
<b>Central</b>	44.5	40.6	46.2	46.9	46.5
<b>East</b>	64.5	63.0	64.6	68.0	67.5
<b>Ulaanbaatar</b>	1.5	0.9	0.8	0.9	0.8

NB: Agriculture includes hunting and forestry; Khangai Region is the mountainous area to the North-West;  
Source: National Statistical Office, Ulaanbaatar

## B. Cropped Area

5. About 73% of the country's land area was classified as agricultural in 2005, a decline that has been steady from 2000 till now. Only a small portion of this agricultural area is classified as arable, the bulk being meadows and pastures (Table 4). The area classified as arable has itself declined significantly from around 1.35 m ha in the 1980s and 1990s to around 0.7 m ha in recent years, in part because of a reclassification of marginal crop lands as state special use land rather than pasture which has also seen a significant decline.

**Table 4: Land Areas by Type of Suitability**  
(million ha)

	1989	1995	2001	2002	2003	2004	2005
<b>Total Area</b>	156.4	156.4	156.4	156.4	156.4	156.4	156.4
<b>Agricultural Land</b>			130.2	130.2	115.6	115.5	115.2
<b>Agricultural Area</b>			129.7	129.7	113.8	113.7	113.4
<b>meadows and pastures</b>			129.0	128.9	113.1	113.0	112.8
<b>% Total</b>			82.4	81.2	72.3	72.2	72.1
<b>arable land</b>	1.4	1.2	0.7	0.8	0.7	0.7	0.7
<b>% Total</b>	0.9	0.8	0.5	0.5	0.5	0.5	0.4
<b>sown area</b>	0.8	0.4	0.2	285.7	225.9	200.5	225.3
<b>% of Arable Area</b>	60.9	28.2	28.9	37.8	32.0	28.4	32.3
<b>degraded cultivated land</b>					0.4	1.1	0.3

Source: National Statistics Office, Ulaanbaatar

6. Even with this reduction in the arable area, the portion of arable land cropped has also declined significantly from around 60% in the late 1980s to 30% in recent years. The reclassification of arable land masks the full extent of withdrawal from cropping. Immediately prior to transition in 1989, the area under crop was reported as being some 838,000 ha (itself a decline from the mid-80s figure of nearly 950,000 ha). By 1998, the cropped area had fallen to around 326,000 ha, and continue to shrink to about 218,000 ha in 2001. Since then, despite a reported recovery to 285,000 ha in 2002, and an apparent collapse to 200,000 ha in 2004, the area under crop has remained relatively close to the 225,000 ha level reported for 2005. Withdrawal from previously cropped marginally productive areas has led to large areas of degraded land in need of renovation and replanting as pasture<sup>1</sup>, an activity that requires protection in the medium term from grazing.

## C. Composition of Farming by Crop

7. The crop sector has always been dominated by cereal production, accounting for over 90% of the cropped area (Table 5). The decline in the area under crop relates to the withdrawal from marginal areas promoted during the 1970s and 1980s with substantial direct and indirect subsidies during a period of controlled prices and restricted imports. Grain production has been dominated by wheat, for both food and feed, but since the collapse of the subsidized state farm system in the early 1990s previous significant areas of barley and oats having largely disappeared. At the same time, the area under wheat has also

<sup>1</sup> The figure in Table 4 for degraded land in 2004 appears to be inconsistent for no explainable reason.

diminished dramatically. Cereal areas in 2005 were only 44% of those of a decade earlier, themselves only about half pre-transition levels.

**Table 5: Area of Main Crops Planted**  
(000s ha)

	1989	1995	1998	2001	2002	2003	2004	2005
<b>Sown Area</b>	837.9	372.6	326.6	217.6	285.7	225.9	200.5	225.3
<b>Cereal Area</b>	673.4	356.6	306.9	199.6	263.0	207.3	172.9	159.1
<b>% of Total</b>	80.4	95.7	94.0	91.7	92.1	91.7	85.9	70.6
<b>Wheat Area</b>	530.1	348.5	301.1	192.6	208.6	203.0	167.4	153.1
<b>% of Cereal</b>	78.7	97.7	98.1	96.5	79.3	97.9	96.8	96.2
<b>Potato</b>	12.6	6.2	8.1	8.9	10.2	8.4	9.1	9.8
<b>Vegetables</b>	4.2	3.2	5.5	5.6	7.1	5.9	4.9	5.9
<b>Fodder crops</b>	147.7	6.0	4.9	1.9	3.0	3.2	5.1	5.2

Source: National Statistics Office, Ulaanbaatar

8. The area sown to fodder crops has also contracted sharply since the pre-transition period when it was some 30 times the current level when it was integrally linked to the system of supply under the State Emergency Fodder Fund (SEFF). Although aspects of the SEFF still exist at aimag level under the aegis of the State Reserve, the wholesale cultivation of fodder and transportation and storage to vulnerable livestock areas has largely ceased, in spite of regulations for the various administrative levels to hold feed reserves.

9. The area under potatoes and vegetables, although increased about a third from the level of the early to mid 1990s, has not changed substantially in recent years despite significant encouragement through government programs (the Green Revolution). To some extent, areas planted represent a recovery to earlier levels, but they also reflect changing patterns of settlement, with significant production and demand linked to the substantial increase in urban population and the growth in urban middle class income levels.

#### **D. Regional Pattern of Cropping**

10. The pattern for cropping differs substantially from that for extensive livestock. Given the importance of extensive livestock in the sector, this means that the pattern for cropping also varies markedly from that for agriculture as a whole. Cropping activity is heavily concentrated in the Central and Khangai Regions, accounting for 66% and 20% of the total cropped area respectively in 2005 (Table 6). In the western region, Uvs is the dominant crop producing aimag (1.9% of the total), in the Khangai, Bulgan and Khuvsgul (11% and 5% of total production respectively) dominate, in the Central Region, production is dominated by Selenge, Darkhan and Tuv aimags (46%, 15% and 5% of total cereal production respectively) while in the Eastern Region, Khentii and Dornod dominate with 7% and 2% of total production respectively.

**Table 6: Planted Areas of All Crops**  
(‘000s ha)

	2001	2002	2003	2004	2005
<b>Total</b>	217.6	285.7	225.9	200.5	189.5
<b>West</b>	8.9	14.9	9.7	12.2	8.6
<i>Uvs</i>	4.4	9.2	4.6	7.2	3.6
<b>Khangai</b>	43.6	50.7	51.2	42.5	38.6
<i>Bulgan</i>	28.5	30.4	29.7	25.0	21.2
<i>Khuvsgul</i>	7.6	10.0	11.4	8.4	9.0
<b>Central</b>	149.6	195.6	146.9	127.4	124.3
<i>Selenge</i>	100.6	125.1	102.9	87.7	87.3
<i>Tuv</i>	34.2	54.3	28.8	29.4	27.6
<i>Darkhan Uul</i>	14.5	15.9	14.8	10.0	9.0
<b>East</b>	13.5	21.7	16.3	17.3	16.8
<i>Khentii</i>	7.9	14.2	9.7	12.2	13.3
<i>Dornod</i>	5.3	6.2	5.5	4.6	3.7
<b>Ulaanbaatar</b>	2.0	2.9	1.7	1.1	1.1

Source: National Statistics Office, Ulaanbaatar

11. Even within the regions, however, most cropping activity is limited to a few aimags. 65% of the area estimated to have been sown in 2005 was in three aimags in the Central Region, a further 16% in two aimags in Khangai. With one aimag from each of the other Regions, seven aimags account for 90% of the area under crop, a pattern broadly repeated with respect to cereals output (Table 7).

**Table 7: Concentration of Cropping by Aimag**

Aimag	Region	Crop Area		Cereal Output	
		% total	cum.	% total	cum.
<b>Selenge</b>	Central	46	46	41	41
<b>Tuv</b>	Central	15	61	10	51
<b>Bulgan</b>	Khangai	11	72	18	69
<b>Khentii</b>	East	7	79	8	77
<b>Khuvsgul</b>	Khangai	5	84	10	87
<b>Darkhan Uul</b>	Central	4	88	2	89
<b>Uvs</b>	West	2	90	2	91

Source: National Statistics Office, Ulaanbaatar

12. With the response of different crops affected by variations in agro-ecological conditions, it is not surprising that the relative importance of the different categories of crop varies across the country. Table 8 illustrates that while cereals are important everywhere,

they are relatively less so in the West and Ulaanbaatar where horticultural crops, potatoes and vegetables, are relatively more significant.

**Table 8: Relative Significance of Crops by Region  
(percent)**

	2001	2002	2003	2004	2005
<b>Cereal Area as % Regional Sown Area</b>					
<i>West</i>	65.7	68.5	60.8	67.2	32.5
<i>Khangai</i>	95.0	94.4	94.3	89.6	90.9
<i>Central</i>	93.4	94.1	93.7	87.5	85.7
<i>East</i>	93.6	93.1	94.5	87.3	86.5
<i>Ulaanbaatar</i>	-	24.1	5.9	-	-
<b>Potato Area as % Regional Sown Area</b>					
<i>West</i>	16.3	12.8	16.5	13.9	18.6
<i>Khangai</i>	3.1	3.6	3.3	4.2	5.2
<i>Central</i>	28	2.4	2.4	3.5	3.9
<i>East</i>	4.7	3.2	3.7	3.5	3.5
<i>Ulaanbaatar</i>	61.1	44.8	52.9	54.5	54.5
<b>Vegetable Area as % Regional Sown Area</b>					
<i>West</i>	9.5	7.4	11.3	8.2	14.0
<i>Khangai</i>	1.7	2.0	2.0	1.6	2.1
<i>Central</i>	2.0	2.0	2.0	2.0	2.6
<i>East</i>	1.8	1.4	1.8	1.7	1.8
<i>Ulaanbaatar</i>	33.1	31.0	29.4	27.2	36.4
<b>Fodder Crop Area as % Regional Sown Area</b>					
<i>West</i>	7.4	11.4	11.3	9.8	32.6
<i>Khangai</i>	0.1	-	0.3	4.5	1.6
<i>Central</i>	0.7	0.6	1.2	0.5	1.3
<i>East</i>	-	0.5	-	7.5	-
<i>Ulaanbaatar</i>	5.8	3.4	11.8	9.0	9.1

Source: National Statistics Office, Ulaanbaatar

13. Despite this, however, the Central Region dominates in terms of area for all crops. In 2005, 67% of the land sown to cereals, 50% of that sown to potatoes, 54% of that sown to vegetables, and even 31% of that sown to fodder crops was within the Central Region. The West Region, accounting for under 5% of the total cropped area, contributed less than 2% of the cereal area but 16% of the area planted to potatoes, 21% of that for vegetables, and 54% of that devoted to fodder crops.

### **E. Output and Productivity**

14. Table 9 shows the output and average yield for the main crop groups since transition. The dramatic decline in production over the 1990s was reversed over recent years for most crops other than cereals. Cereals saw a relative stabilization in output since 2000 at around 140,000 tonnes (about a sixth of the pre-transition level) until suffering a further collapse by almost half in 2005 (due to a particularly harsh growing season). Despite the withdrawal from more marginal areas, average cereal yields have remained extremely low. Although these mask significant regional and farm variation, basic causes appear to be the continued use of

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very poor seed and limited inputs despite several attempts by government to resolve both seed quality and availability problems and to promote rural credit to support procurement of inputs and mechanization. Poor targeting and concessional mechanisms have resulted in the less efficient and more marginal farmers being encouraged to continue in cropping rather than responding to market signals and supported to seek alternative sources of income.

15. Output levels for potatoes and vegetables have improved above the growth in areas, however, as average yields have increased through better selection of varieties and use of inputs (in contrast to cereals). Yields remain below pre-transition levels. Fodder crop output remains small compared to pre-transition levels under the SEFF, there has been some recovery (in recent years output has been less than 2% of the level in 1989, and 50% of that in the mid-1990s) and a similar strengthening of yields (but these too, are around 45% of pre-transition and 1990s levels).

Table 9: Output and Yield by Main Crop

	1989	1995	1998	2001	2002	2003	2004	2005
<b>Output by Crop ('000 tonnes)</b>								
<b>Cereals</b>	839.1	261.4	194.9	142.2	125.9	165.0	138.5	75.5
<b>Potatoes</b>	155.6	52.0	65.2	58.0	51.9	78.7	80.2	82.8
<b>Vegetables</b>	59.5	27.3	45.7	44.5	39.7	59.6	49.2	64.2
<b>Fodder Crops</b>	551.0	18.7	14.7	2.7	3.5	9.6	9.6	8.3
<b>Technical Crops</b>				0.9	0.2	0.8	5.9	1.2
<b>Output per capita (kg)</b>								
<b>Cereals</b>				58.6	51.2	50.6	55.0	29.5
<b>Potato</b>				23.9	21.1	31.6	31.8	32.3
<b>Vegetables</b>				18.4	16.2	23.9	19.5	25.0
<b>Average Yield by Main Crop Category (tonnes/ha)</b>								
<b>Cereals</b>	1.25	0.73	0.64	0.71	0.48	0.80	0.80	0.47
<b>Potatoes</b>	12.35	8.39	8.05	6.52	5.09	9.37	8.81	8.45
<b>Vegetables</b>	14.17	8.53	8.31	7.94	5.59	10.10	10.04	10.88
<b>Fodder Crops</b>	3.73	3.12	3.00	1.42	1.17	1.13	1.88	1.60

Source: National Statistics Office, Ulaanbaatar

16. Wheat now represents some 98% of cereal output, a position held since the early 1990s. Pre-transition, output of barley and oats was relatively more significant so that wheat accounted for only 82% of the total (Table 10). Average yields of different cereal crops remain low by international standards, and when compared with pre-transition levels.



Table 10: Output and Yields for Main Cereal Crops

	1989	1995	1998	2001	2002	2003	2004	2005
<b>Output ('000 tonnes)</b>								
<b>Cereals</b>	839.1	261.4	194.9	142.2	125.9	165.0	138.4	75.5
<b>Wheat</b>	686.9	256.7	191.8	138.7	123.1	160.4	135.6	73.5
<b>Yields (tonnes/ha)</b>								
<b>Cereals</b>	1.25	0.73	0.64	0.71	0.57	0.80	0.80	0.47
<b>Wheat</b>	1.30	0.74	0.64	0.72	0.59	0.79	0.81	0.48
<b>Barley</b>				0.56	0.82	1.25	0.61	0.60
<b>Oats</b>				0.46	0.39	1.14	0.68	0.69

Source: National Statistics Office, Ulaanbaatar

17. Output of vegetables has grown by 44% over the last five years, and by over 2.3 times since the mid-1990s (Table 11). Although current levels are only 8% above pre-transition levels, this growth represents a major shift in the nature of production. Vegetables are now produced on small plots, often less than a quarter of a hectare, many of them in the areas around Ulaanbaatar and other urban centers. This is in sharp contrast to the large areas planted by state farms and negdels before 1990. Estimates of output for the main kinds of vegetables show increased diversification in recent years. Cabbage and turnip, however, remain the main vegetable crops grown, although more recently carrots have become increasingly important.

Table 11: Output of Main Vegetables  
(‘000 tonnes)

	1989	1995	1998	2001	2002	2003	2004	2005
<b>Potato</b>	155.6	52.0	65.2	58.0	51.9	78.7	80.2	82.8
<b>Vegetables</b>	59.5	27.3	45.7	44.5	39.7	59.6	49.2	64.1
<b>Cabbage</b>				14.1	10.5	15.0	13.8	14.9
<b>Turnip</b>				13.9	11.2	25.4	11.8	14.7
<b>Carrot</b>				8.2	7.5	9.9	12.8	20.9
<b>Onion</b>				1.3	1.4	1.8	1.7	2.8
<b>Cucumber</b>				2.6	3.2	2.0	2.0	2.4
<b>Others</b>				4.4	5.9	5.5	7.1	8.4

Source: National Statistics Office, Ulaanbaatar

18. Table 12 shows the regional variation in average yields for cereals and potatoes over recent years. These averages vary substantially from one aimag to another and for any single aimag from one year to the next for both cereals (mainly wheat) and potatoes. Overall average yields are low, particularly for cereals, and hide much poorer performance by many farms, rendering it difficult to see how they can survive without alternative supplementary incomes. There are also, however, a number of farms achieving relatively good yields, though still low by international standards. This variation has been evident since the early to mid-1990s when a farm management survey concluded that the major factor determining yield was the quality of management, even before the use of quality seeds and inputs. This reflected the fact that the break-up of the state farms and crop areas attached to the negdels resulted in many small farmers without a background in or knowledge of farming, and many managers without experience of decision-making. Where management is efficient, recent evidence suggests that they have been able to overcome problems of poor seed and access funding for fertilizer and other inputs.

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19. Despite marked differences in yields, the broad pattern of output across the regions follows that for planted area (Table 13). With the exception of the East Region, where the small level of cereal production doubled, all regions suffered the effective halving of cereal production in 2005. However, it is evident from the figures that output levels fluctuate significantly over the years for all regions, and not always in the same direction. There is no clear analysis of why this might be, though climatic features, and access to quality seed, both play a role. The variation in yields within any given region illustrate the importance of sound management and the ability to access adequate finance for seeds and other inputs.

**Table 12: Average Yield Variation within and across Regions  
(tonnes/ha)**

	2001	2002	2003	2004	2005
<b>Cereals</b>					
<b>Average</b>	0.71	0.57	0.79	0.80	0.47
<b>West</b>	0.50-1.01	0.30-1.22	0.42-1.66	0.56-1.07	0.67-0.98
<b>Khangai</b>	0.55-1.44	0.24-1.00	0.67-1.53	0.31-1.07	0.06-0.88
<b>Central</b>	0.61-0.67	0.27-0.36	0.77-0.84	0.72-0.88	0.23-0.38
<b>East</b>	0.09-0.40	0.84-1.16	0.02-0.88	0.31-0.44	0.69-0.72
<b>Potatoes</b>					
<b>Average</b>	6.56	5.64	9.34	8.83	8.48
<b>West</b>	7.18-10.96	6.77-10.16	8.49-11.40	6.61-11.98	7.69-10.76
<b>Khangai</b>	2.22-9.29	3.16-6.88	4.12-9.52	6.48-14.34	4.60-9.27
<b>Central</b>	2.06-9.63	2.25-8.57	3.17-12.10	3.38-10.80	2.67-11.89
<b>East</b>	3.06-5.77	3.80-6.95	4.79-6.38	2.64-5.84	5.07-5.25
<b>Ulaanbaatar</b>	6.54	5.10	8.32	7.74	6.97

NB: in 2001, yields in one aimag in the West were recorded as 0.00 tonnes/ha, and in another in Khangai as 0.04 tonnes/ha, but these have been excluded as the areas involved were small.

20. Central Region in 2005 accounted for 53% of cereal output, 52% of potatoes, 61% of vegetables and 20% of fodder crop production. Over time, the Region's output has mirrored developments overall. Compared with five years earlier, these figures represents a relative shift from cereals to horticultural and fodder crops, but they also reflect the marked fall in cereal yields in the Central Region in 2005. With yields relatively more stable in the other regions, and the areas planted to cereals either holding or falling more marginally, they were responsible, despite a fall in output (except for the East where output was maintained), for an increased share of the dramatically diminished cereal output level in 2005. Khangai Region, although less important than Central, accounting for 30% of cereal production and 20% of potatoes remains well ahead of the West and East in terms of cropping, though it is matched by the West in potatoes (19% of the total) and exceeded in terms of vegetables (22% against 10% for Khangai) and fodder (69% against 5% for Khangai and only 22% for Central). Horticulture has particularly been promoted in the West by such programs as the Agriculture Sector Development Project as the potential for cropping in an environment generally unsuitable for cereal production.

**Table 13: Output of Crop by Region**  
('000 tonnes)

	2001	2002	2003	2004	2005
<b>Cereals</b>					
<b>Total</b>	142.2	125.9	165.0	138.5	75.5
<b>West</b>	4.4	5.5	6.2	5.2	2.7
<b>Khangai</b>	46.7	36.7	36.8	33.0	22.7
<b>Central</b>	86.1	64.4	111.9	94.4	39.7
<b>East</b>	4.9	19.2	10.2	5.9	10.4
<b>Potatoes</b>					
<b>Total</b>	58.0	51.9	78.7	80.2	82.8
<b>West</b>	12.1	13.7	15.9	14.2	16.0
<b>Khangai</b>	9.3	8.5	14.2	17.2	16.6
<b>Central</b>	25.9	19.8	37.4	40.8	42.7
<b>East</b>	2.8	3.4	3.9	3.1	3.2
<b>Ulaanbaatar</b>	8.0	6.5	7.3	4.9	4.3
<b>Vegetables</b>					
<b>Total</b>	44.5	39.7	59.6	49.2	64.2
<b>West</b>	7.5	8.0	9.9	9.7	14.3
<b>Khangai</b>	5.5	4.2	8.2	6.1	6.4
<b>Central</b>	24.8	18.8	34.6	29.1	38.9
<b>East</b>	1.6	1.7	1.8	1.5	1.7
<b>Ulaanbaatar</b>	5.2	7.0	5.1	2.9	2.8
<b>Fodder Crops</b>					
<b>Total</b>	2.7	3.5	9.6	9.6	8.3
<b>West</b>	1.3	1.8	4.1	3.5	5.7
<b>Khangai</b>	0.3	0.1	1.6	0.4	0.4
<b>Central</b>	0.7	1.2	3.2	5.0	1.8
<b>East</b>	-	0.1	-	-	-
<b>Ulaanbaatar</b>	0.4	0.4	0.8	0.7	0.5

21. Besides cropping as such, there remains considerable activity in the production of feed for animals, though nowhere near the levels in the 1980s (Table 14). Large areas of land across most aimags, usually in many plots, are dedicated to hay-making, traditionally completed by organized community labor under local government authority. Although well below pre-transition levels, the gross hay harvest and conserving of fodder has remained fairly stable, increasing in recent years in response to the difficulties experienced during the *dzuds* of 1999 to 2001. Overall fodder production remains low and is characteristically of poor nutritional quality. Hay continues to dominate and produced mixed fodder has largely disappeared. Production of barley and oats likewise is now negligible.

**Table 14: Hay and Fodder Production**  
(‘000s tonnes)

	1989	1995	1998	2001	2002	2003	2004	2005
<b>Gross Hay Harvested</b>	1,166.3	743.9	667.0	831.5	767.0	840.7	850.5	845.1
<b>Used Straw</b>	99.0	33.3	15.9	24.5	9.0	22.5	19.2	10.0
	(in fodder units)							
<b>Hand-made</b>	25.6	10.4	20.3	20.1	26.9	30.5	30.4	35.2
<b>Mixed Fodder</b>	169.7	13.8	3.2					
<b>Mineral Fodder</b>	49.2	26.3	26.2	31.8	32.3	42.6	39.0	44.6
<b>Total Fodder</b>	1,027.3	437.3	330.3	438.6	411.4	465.0	464.2	468.5

Source: National Statistics Office, Ulaanbaatar

22. Production of hay and fodder varies across the country, but is more evenly spread than other crop production (Table 15). This differs from the growth of fodder crops which seems to be concentrated in the West (see Table 13).

**Table 15: Hay Production by Region (‘000s tonnes)**

	2001	2002	2003	2004	2005
<b>West</b>	18.1	21.9	20.4	19.4	21.4
<b>Khangai</b>	30.4	27.0	29.7	31.6	30.7
<b>Central</b>	29.5	28.3	28.4	27.9	27.1
<b>East</b>	17.6	18.8	17.2	17.0	17.8
<b>Ulaanbaatar</b>	4.3	3.9	4.4	4.1	3.0

Source: National Statistics Office, Ulaanbaatar

23. While yield shows the average productivity of different crops to land in physical terms, Table 16 illustrates its average financial productivity in terms of other factors of production, i.e. the value added created for every unit of different type of input, comparing cropping with livestock and the general economy. Cropping generates a slightly higher level of returns for each unit of input (just under Tg 4 for each Tg of input) to that of the rest of the economy (under Tg 3) but substantially less than livestock (that is some six to nine times higher). Cropping generates substantially greater returns to labor than does livestock, reflecting the relative lack of labor intensity for cropping compared with livestock, but in contrast, substantially lower returns to capital, raw materials and energy. For cropping this illustrates the high cost and relative inefficiency in the use of machinery and other inputs, and the dependency on labor for production, suggesting that more and better use of labor might also resolve productivity problems.

## F. The Structure of Crop Farming

24. A census of sown areas in 2004 reported that there were some 2000 legal entities and 70,000 households involved in cropping. While the legal entities had an average of 180 ha of land, with some 84 ha planted, households had an average of under 0.5 ha and 0.4 ha planted. Both groups were involved in a full range of crops but whereas 27% of the entities produced cereals on 92% of the land planted by such entities, only 3% of households produced cereals on 58% of the sown area of households. Potatoes, the next most important crop occupied only just over 1% of the sown area and 37% of the number of entities, but 24% of the sown area and 54% of the number of households. Vegetables were also important for households, occupying 40% by number and 13% by sown area, but less so for entities: 26% and 0.4% respectively (Table 17).

**Table 16: Productivity of Input Factors in Agriculture  
(Current Tugrik)\***

	2001	2002	2003	2004	2005
<b>Total Productivity**</b>					
<b>Crops</b>	0.48	0.59	0.59	0.59	0.59
<b>Livestock</b>	2.92	3.00	2.94	2.61	2.62
<b>All Sectors</b>	0.67	0.68	0.68	0.70	0.76
<b>Total Factor Productivity***</b>					
<b>Crops</b>	3.06	3.75	3.77	3.85	3.85
<b>Livestock</b>	27.83	31.04	28.68	23.81	23.81
<b>All Sectors</b>	2.55	2.52	2.55	2.99	3.13
<b>Labor Productivity****</b>					
<b>Crops</b>	2288.7	2697.1	4015.4	3948.4	2170.9
<b>Livestock</b>	580.5	549.5	626.7	943.0	1200.5
<b>All Sectors</b>	1359.5	1457.1	1626.0	2036.1	2362.4
<b>Capital Productivity****</b>					
<b>Crops</b>	9.2	13.0	16.0	13.6	13.6
<b>Livestock</b>	695.4	1296.9	1714.5	441.0	434.8
<b>All Sectors</b>	7.5	8.5	9.2	11.5	11.8
<b>Raw Material Productivity****</b>					
<b>Crops</b>	11.8	22.7	7.0	19.6	19.4
<b>Livestock</b>	128.0	131.8	134.0	69.5	70.0
<b>All Sectors</b>	3.6	3.3	3.4	3.9	4.7
<b>Electricity Productivity****</b>					
<b>Crops</b>	18.8	44.2	31.3	35.2	35.0
<b>Livestock</b>	169.4	202.3	229.7	199.5	196.1
<b>All Sectors</b>	13.6	17.3	16.0	16.8	16.9

Notes: \* efficiency of production: amount of goods and services per unit of input;  
 \*\* ratio of value added to intermediate consumption, labor, and capital expenditure;  
 \*\*\* ratio of value added to sum of labor and capital expenditure;  
 \*\*\*\* partial productivity - ratio of value added to particular factor inputs

Source: National Statistical Office, Ulaanbaatar

25. Households had 82% of their land area under crop, 40% of which was irrigated. In contrast, entities had only 46% of their area planted, with less than 4% irrigated. This was partly due to the fallow system adopted for cereal production, some 29% of the area farmed by entities was ploughed but not seeded, and a further 28% remained untilled.

26. Although entities tend to have much larger holdings than households, the size of both classifications of farmer varies enormously. Of the 556 farming entities engaged in cereal production in 2004, 32% were under 100 ha in size, while about 19% were over 1000 ha. 64% of the farms were under 300 ha cultivating approximately 15% of the land. Furthermore, comparison with a previous census shows increased fragmentation of smaller farms and consolidation of larger farms. In early 1990, only 24% of farms were smaller than 100 ha, as against 32% in 2004, and 12% above 1000 ha, as against 19% in 2004. While the size of plots farmed by households also varies, by their very nature, these are small garden enterprises. Although the average size is less than half a hectare, the majority farm much smaller areas of a quarter hectare or less (the average for potatoes is 0.2 ha, for vegetables 0.1 ha). Although a few households grow potatoes and vegetables on holdings of five

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hectares or more, the larger household holdings tend to be those producing cereals (almost exclusively wheat), the average household area under wheat in 2004 being around 11 ha.

**Table 17: Households and Entities Engaged in Cropping  
Census of Sown Area 2004**

	Total	Cereals	Potatoes	Veges	Fodder Crops	Tech. Crops	Fruit
<b>Households</b>							
<b>Number (No.)</b>	70,175	2,288	37,726	28,162	968	29	1,002
<b>Total Land Area (Ha)</b>	33,397.3	25,698.3	7,698.9				
Sown	27,487.4	15,806.2	6,487.3	3,495.3	1,343.3	318.4	36.9
- irrigated	10,930.8	2,190.8	4,365.1	3,008.9	1,330.0	3.7	32.2
<b>Entities</b>							
<b>Number (No.)</b>	2,045	556	765	539	89	53	43
<b>Total Land Area (Ha)</b>	369,252.9	366,187.1	3,065.8				
Sown	170,959.2	157,553.1	2,199.4	696.6	2,594.6	7,915.9	
- irrigated	6,376.2	4,035.8	1,021.5	693.6	625.3		
Uncultivated	101,849.7	101,163.7	686.0				
- up to 2yrs	86,002.8	85,396.0	606.8				
- over 2yrs	15,846.9	15,767.7	79.2				
Ploughed - left fallow	107,650.8	107,470.4	180.4				

Source: National Statistical Office, Ulaanbaatar

27. The number of legal entities registered in agriculture has remained relatively steady over recent years (Table 18) but the number of those that are active has declined significantly. In 2005 only 58% of registered entities were active, compared with 88% five years earlier. A similar pattern can be observed in the economy generally (with 57% inactive), although the growth of registered entities has been faster (45% since 2001 as against 11% for agriculture). Registered enterprises in agriculture account for less than 6% of the total across all sectors, a decline from over 7% in 2001. A similar pattern has been observed for active enterprises.

**Table 18: Number of Legal Units Registered in Agriculture**

	2001	2002	2003	2004	2005
<b>Agriculture, Hunting, Forestry, and Fishing</b>					
<b>Registered</b>	1986	2098	1928	1958	2208
<b>Active</b>	1743	1701	1432	1304	1300
<b>(% total)</b>	87.8	81.1	74.3	66.6	58.9
<b>All Sectors</b>					
<b>Registered</b>	27271	29142	31478	34218	39677
<b>% Agriculture</b>	7.3	7.2	6.1	5.7	5.6
<b>Active</b>	24954	25523	26552	25356	22547
<b>% Agriculture</b>	7.0	6.7	5.4	5.1	5.8

Source: National Statistical Office, Ulaanbaatar

28. Under the previous command economy, state farms were staffed with technical specialists to ensure that technical approaches were implemented to achieve production targets. With the collapse of these units, specialists were dissipated across the sector, some

remaining as farmers, some offering themselves as support to new owners and managers, some participating as owners of smaller gardens while others left the industry altogether. There has, however, been some recovery since numbers declined back in the mid-1990s (Table 19) reflecting the increased numbers of active larger farms owned by non-agricultural based businesses and businessmen.

**Table 19: Numbers of Agricultural Specialists and Machinery  
(thousands)**

	1996	2000	2003
<b>Agricultural Specialists</b>			
<b>Livestock specialists</b>	0.4	1.1	0.9
<b>Veterinarians</b>	1.5	2.0	2.0
<b>Agronomists</b>	0.2	0.5	0.5
<b>Mechanics</b>	6.2	4.3	3.7
<b>Agricultural Machinery</b>			
<b>Tractors</b>	7.0	4.7	4.2
<b>Grain harvesters</b>	1.4	1.1	1.1
<b>Tractor and drill seeders</b>	2.9	2.0	1.6

Source: National Statistical Office, Ulaanbaatar

29. Interestingly, the number of mechanics has declined, perhaps because of the continuing decline in the machinery stock, owner reluctance to pay for support services, and the difficulties for smaller farms of accessing appropriate new equipment. Between 1996 and 2003, the number of tractors fell by 40% to around 42,000. In part, this reflects the inappropriate scale and consequent inefficient use of the older machinery and equipment. In the 1990s, replacement concentrated on similar machinery to that used under the previous system, but increasingly it has become recognized that equipment must be appropriate for the smaller scale farms.

### **G. Processing and Trade**

30. Manufacture of several food and drink products using domestically grown crops has also grown in recent years, but remains relatively limited (Table 20). Key areas are flour and flour based products, both of which are still well below pre-transition levels and which have become increasingly reliant on imported raw materials (wheat and flour), and spirits (particularly vodka), in contrast a rapidly developing export product. Vodka exports represent a very small proportion of total production, and the main market development has been the growth in domestic demand.

31. Apart from vodka, exports of food produce and manufactures is very limited and the main element of trade in foodstuffs is imports (Table 21). Significant among these are direct and indirect competition for domestic produce. Besides wheat and flour, imports of fruit and vegetables (including potatoes) have also grown in volume.

**Table 20: Output of Crop-Based Food and Drink Manufactures**  
(‘000s tonnes)

	2001	2002	2003	2004	2005
<b>Flour</b>	37.7	49.6	54.1	57.8	58.3
<b>Bread</b>	23.3	21.7	22.1	23.4	22.6
<b>Bakery products</b>	5.7	5.9	6.5	7.1	8.3
<b>Biscuits</b>	1.2	0.9	0.5	0.7	0.5
<b>Noodles</b>	0.5	0.9	0.8	1.3	0.9
<b>Fodder</b>	9.6	13.0	16.8	18.0	16.4
<b>Sweets</b>	0.3	0.2	0.1	0.1	0.1
<b>Spirits</b>	3,964.6	4902.3	2,077.6	2,296.5	3,094.4
<b>Alcohol, wine</b>	8,626.5	9,436.2	8,873.1	9,161.0	7,956.4
<b>Beer</b>	4,267.8	3,375.3	3,027.6	7,980.7	7,996.9
<b>Soft drinks</b>	11,082.7	12,907.3	24,561.1	34,032.7	42,260.6

Source: National Statistical Office, Ulaanbaatar

**Table 21: Imports of Selected Crop-based Products**  
(‘000s tonnes)

	2001	2002	2003	2004	2005
<b>Wheat</b>	29.9	139.3	61.5	114.9	97.5
<b>Flour</b>	92.8	96.9	75.2	79.3	103.9
<b>Vegetable oil</b>	0.3	0.1	0.1	0.6	0.2
<b>Margarine</b>	2.0	2.7	3.0	3.6	4.6
<b>Flavored flour products</b>	5.0	5.7	5.2	5.8	6.1
<b>Canned fruit, nuts</b>	0.5	0.4	0.1	0.0	0.1
<b>Millet</b>	4.4	3.8	6.2	7.8	8.4
<b>Potato</b>	21.9	35.6	40.2	38.4	41.0
<b>Onion, garlic</b>	5.1	5.8	7.1	9.5	5.5
<b>Fresh fruit</b>	12.1	18.7	23.3	22.9	22.6
<b>- apple, pear</b>	10.6	13.7	17.1	16.5	16.3
<b>Soft drinks</b>	9.2	5.0	5.0	4.9	4.2
<b>Alcohol drinks</b>	14.3	15.6	17.2	19.5	9.4
<b>- beer</b>	13.3	14.1	15.7	12.9	7.8

Source: National Statistical Office, Ulaanbaatar

32. Domestic output of milled wheat flour in recent years has met between 40% and 50% of domestic demand (Table 22), but the decline in wheat output and quality has meant that mills have increasingly sourced their wheat from abroad (predominantly Kazakhstan) where millers have greater control over the quality of wheat they use. Following a poor harvest, imports of wheat in 2005 accounted for some 57% of demand, up from 46% the previous year. Although only 18% in 2001 and 28% in 2003, imports of wheat have generally in recent years stood at over 40% of total demand. Imported wheat is attractive to the flour mills not merely because it is competitive in terms of price, but more importantly because of its consistent quality, in sharp contrast to domestic supplies, a reflection of the use of poor quality seeds and inefficient harvest and post-harvest technologies by many local wheat producers.



**Table 22: Output and Imports of Wheat and Flour**  
(‘000s tonnes)

	2000	2001	2002	2003	2004	2005
<b>Wheat</b>						
- production	138.7	138.7	123.1	160.4	135.6	73.5
- import	92.2	29.9	139.3	61.5	114.9	97.5
<b>Total</b>	230.9	168.6	262.4	221.9	250.5	171.0
<b>Flour</b>						
- production	40.2	37.7	49.6	54.1	57.8	58.3
- import	99.2	92.8	96.9	75.2	79.3	103.9
<b>Total</b>	139.4	70.5	146.5	129.3	137.1	162.2

Source: National Statistical Office, Ulaanbaatar

33. Overall, trade in food products has seen a strong growth in imports and a relative collapse of exports compared with previous periods (Table 23). This has been compounded by a negative shift in the terms of trade, with import prices growing faster than export prices, reflecting the gradual decline in the value of the Tugrik.

**Table 23: International Trade in Food Products**

	2001	2002	2003	2004	2005
<b>Volume Index (2000=100)</b>					
<b>Exports</b>	16.0	34.2	14.9	14.0	34.5
<b>Imports</b>	97.7	103.5	114.9	128.6	128.7
<b>Price Index (2000=100)</b>					
<b>Exports</b>	309.6	106.3	101.1	138.0	111.7
<b>Imports</b>	111.7	116.0	121.3	134.0	148.8
<b>Value Index (2000=100)</b>					
<b>Exports</b>	49.5	36.4	15.1	19.3	30.9
<b>Imports</b>	109.1	120.1	139.4	172.3	191.5
<b>Trade in food and live animals (\$m)</b>					
<b>Exports</b>				16.1	12.7
<b>Imports</b>				125.2	121.5

NB: \*excludes live animal products, products of animal origin, and animal and vegetable fat and oil

34. The implication is that domestic production, in the face of increasing competition from imports, has to become more efficient and market orientated. This is particularly true for cropping. There is a need to concentrate on those crops in which Mongolia can offer some element of comparative advantage. This means a shift towards higher value horticulture and feed crops, both of which not only have growing domestic markets but also regional export potential. For grains, the appropriate strategy is for continued consolidation with production concentrated on more efficient, better managed, and better resourced farms, and a shift from earlier rhetoric of recovering former crop production levels and self-sufficiency. Nonetheless, more efficient cultivation methods and access to improved seeds and other inputs will secure a significant level of domestic supply, and one less vulnerable to climatic and economic shock.

## H. Domestic Consumption

35. Overall, in recent years, close to 50% of household expenditure is spent on food, of which two-thirds is purchased, a small portion received from others, and the rest is made at home as part of household economic activity (Table 24). In 2005, the proportion of food prepared in the household business was halved as a result of difficult economic circumstances after the drought, and overall expenditure on food fell to 40% of total household expenditure. There was a marked difference in pattern, however, between urban and rural households. Urban household expenditure generally exceeded that for rural households (though not, for instance, in 2004) by some margin. As might be expected, a higher percentage of rural household expenditure went on food than urban, but, except for 2005, spending on food was also higher in absolute terms in rural than urban households. Food prepared as part of household economic activity, or its own business, was however much more limited, almost non-existent, in urban households, for whom practically all food was purchased.

**Table 24: Household Average Monthly Expenditure  
(Tg '000s)**

	2002	2003	2004	2005
<b>Total Average</b>				
<b>Monetary Expenditure</b>				
- total	132.4	131.0	140.8	171.9
- food expenses	52.2	53.1	56.7	59.3
(as % total)	31.9	32.0	31.0	30.6
<b>Received from Others Free of Charge</b>				
- total	6.4	7.8	7.3	6.7
- food expenses	3.5	3.2	3.5	3.2
(as % total)	2.1	2.0	1.9	1.6
<b>Food Preparation from Own Business</b>				
- total	24.8	26.7	34.6	15.5
(as % total)	15.2	16.1	18.9	8.0
<b>Total All Expenditure</b>	163.7	165.6	182.6	194.1
<b>- Total All Food</b>	80.3	83.0	94.8	78.0
(as % total)	49.1	50.1	51.9	40.2

Source: National Statistical Office, Ulaanbaatar

36. The composition of food consumption also differs between urban and rural areas (Table 25). As might be expected, rural households consume, on a per capita basis, more livestock food products, meat and dairy, than urban consumers, but less crop based products, both fresh and processed. Combined with the larger proportion of marketed foodstuffs consumed in urban areas, these figures reinforce the perception that the market for fruit and vegetables, including potatoes, is more buoyant in urban areas as well as more concentrated and can be more efficiently serviced.

**Table 25: Monthly Consumption of Selected Foodstuffs  
Potentially Derived from Domestic Supply - Kg per Adult Equivalent**

	2002	2003	2004	2005
<b>Flour and Bakery Products, in flour equivalents</b>				
Total (average)	9.2	9.5	8.8	9.9
urban	9.2	9.1	8.7	10.4
rural	10.3	9.9	8.8	9.3
<b>Potatoes</b>				
Total (average)	2.2	2.6	2.8	3.6
urban	3.7	3.6	3.8	4.5
rural	1.3	1.4	1.5	2.3
<b>Vegetables, in fresh equivalents</b>				
Total (average)	1.4	1.5	1.4	2.1
urban	2.5	2.2	2.0	2.5
rural	0.8	0.7	0.7	1.6
<b>Fruit</b>				
Total (average)	0.3	0.4	0.5	1.0
urban	0.6	0.6	0.6	1.0
rural	0.2	0.2	0.3	0.9
<b>Vegetable Oil</b>				
Total (average)	0.5	0.7	0.7	1.0
urban	0.7	0.7	0.6	0.9
rural	0.8	0.8	0.7	1.1
<b>Meat and Meat Products</b>				
Total (average)	8.1	8.2	7.9	8.3
urban	7.2	6.7	6.2	6.7
rural	10.1	9.9	9.9	10.5
<b>Milk and Milk Products, in milk equivalents</b>				
Total (average)	8.4	10.9	11.5	11.7
urban	4.8	4.6	4.8	5.5
rural	16.9	18.1	19.0	20.4

Source: National Statistical Office, Ulaanbaatar

37. Reflecting this pattern of consumption, average rural diets have a higher calorific intake and are significantly stronger in terms of protein, fat, and carbohydrate (Table 26). This is presumably because of the high meat and dairy input of rural households, but could also relate to the higher levels of poverty in urban areas.

38. About 36% of the population falls below the poverty line according to the headcount index (Table 27). Poverty in the urban areas, particularly the aimag centers, exceeded that for the rural areas in the 1990s, this was reversed by 2002-3 after the impact of several years of drought and dzud. Even then, poverty remained higher in the soum centers (at 45%) than in the countryside (43%), and significantly higher in the West (51%) than the central agricultural area (Khangai 39%, Central 34%) and in the East (27%). As more severe poverty measures are considered, the pattern across urban and rural areas is broadly similar, but differences appear in the regional distribution. Poverty may in lower incidences in the East but is deeper, and more severe.

**Table 26: Calorific and Composition of Daily Food Consumption per Adult Equivalent**

	2002	2003	2004	2005
<b>Total (average)</b>	2,697.0	2,699.2	2,553.9	2,881.9
<b>urban</b>	2,469.5	2,455.9	2,379.8	2,656.5
<b>rural</b>	2,950.8	2,977.0	2,750.2	3,065.2
<b>Protein (grams)</b>				
<b>Total (average)</b>	107.5	105.6	101.4	106.1
<b>urban</b>	96.3	90.7	89.2	103.9
<b>rural</b>	120.1	122.7	115.1	130.5
<b>Fat (grams)</b>				
<b>Total (average)</b>	98.2	90.1	84.4	106.3
<b>urban</b>	84.2	68.3	64.4	96.3
<b>rural</b>	113.8	114.9	107.0	139.7
<b>Carbohydrates (grams)</b>				
<b>Total (average)</b>	327.9	374.4	329.0	369.7
<b>urban</b>	315.8	351.8	343.5	378.4
<b>rural</b>	341.4	342.4	312.6	358.6

Source: National Statistical Office, Ulaanbaatar

39. The opposite is true in the West, where poverty is relatively shallow, more susceptible to improvements in broader economic development. The same is true for the urban rural pattern, with rural poverty shallower. The chances are that the adoption of a strong strategy for agricultural growth will have significant impact on rural poverty, particularly in the West and Central Regions and the countryside outside of even the soum centers. However, specific employment and income generating approaches will need to be directed to reduce poverty in the smaller rural and urban centers. Support for horticulture around these centers is one way in which this problem can be addressed, but the Strategy also includes positive assistance to marginal producers to shift to non-agricultural production income opportunities (which might be agricultural service, support, processing, or trading activities). This pattern of severe poverty is reflected in the minimum subsistence level (Table 28), suggesting that relative poverty is, to some extent, a function of relative price levels which, in combination with the variation in the proportion of food provided through subsistence and home processing, affect the income levels necessary to meet minimum food consumption requirements.

Table 27: Poverty Measures

	1995	1998	2002-3	1995	1998	2002-3
	Headcount Index (%)			Poverty Gap Index (%)		
National (average)	36.3	35.6	36.1	10.9	11.7	11.0
Urban	38.5	39.4	30.3	12.2	13.9	9.2
Ulaanbaatar	35.1	34.1	27.3	10.4	13.0	8.1
Aimag Centers			33.9			10.5
Rural	33.1	32.6	43.4	8.9	9.8	13.2
Soum Centers			44.5			14.4
Countryside			42.7			12.6
West			51.1			14.6
Khangai			38.7			12.3
Central			34.4			10.1
East			27.3			12.4
	Poverty Severity Index (%)			Inequality (Gini Coefficient)		
National (average)	4.8	5.6	4.7			0.329
Urban	5.7	7.1	4.0			0.331
Ulaanbaatar	4.5	7.4	3.3			0.332
Aimag Centers			4.7			0.324
Rural	3.6	4.4	5.6			0.313
Soum Centers			6.4			0.324
Countryside			5.1			0.309
West			5.7			0.306
Khangai			5.2			0.320
Central			4.3			0.314
East			6.6			0.332

Source: National Statistical Office, Ulaanbaatar

Table 28: Minimum Subsistence Levels (Tg)

	2002	2003	2004	2005
West	19,200	19,500	20,200	23,200
Khangai	19,100	19,900	20,600	22,600
Central	19,700	19,800	20,600	22,600
East	20,200	20,500	21,200	25,000
Ulaanbaatar	24,600	25,300	26,500	30,000

Source: National Statistical Office, Ulaanbaatar

40. Flour prices, a basic food staple, across the regions, however, (Table 29) do not really reflect the patterns of minimum subsistence, nor indeed is there much consistency in the patterns of prices across foodstuffs over the years. Variations in price are the result of a combination of demand strength and supply availability characteristics, including seasonal production and import price levels.

**Table 31: Consumer Prices (Tg)**

	2001	2002	2003	2004	2005
<b>Annual Average in Ulaanbaatar</b>					
Flour, grade 1 (kg)	355	317	331	455	417
Bread, 'Atar'	266	266	269	298	318
Apple (kg)	735	722	763	860	814
Potato (kg)	377	389	396	337	471
Cabbage (kg)	508	495	500	475	503
Turnip (kg)	413	635	510	436	734
Onion (kg)	483	469	524	467	434
Vodka (l)	3,551	3,741	3,450	2,822	3,000
<b>Flour -range across regions (Tg/kg)</b>					
West	298-354	240-358	248-345	397-488	338-492
Khangai	300-380	264-370	248-368	348-488	428-480
Central	328-399	283-383	293-367	436-515	393-542
East	308-356	278-307	287-332	435-499	410-550

Source: National Statistical Office, Ulaanbaatar

**II. ISSUES AND CONSTRAINTS****A. General**

41. The crop sector is not a homogeneous whole. A few large farms operate alongside a multitude of smaller enterprises. At the same time, a significant element of production derives from small garden horticulture by a myriad of small households. Constraints differ across the sector and across different crops and require different solutions. What all have in common, however, is the need, to a greater or lesser extent, to compete in the market place not only with each other but also with imports brought in, particularly, from neighboring countries. For most producers, issues revolve around profitability, a function of productivity and profit (costs and prices). Solutions address constraints to productivity and margins both within traditional crops and through diversification into higher value commodities.

42. Crop production is particularly constrained by low yields, a function of:-

- the use of poor seeds, usually because of difficult access to high yielding good quality seeds either because of a lack of supply or a lack of access to funding for their procurement;
- inadequate investment in machinery and equipment, especially to suit farms of the scale that currently predominates;
- lack of access to irrigation for some crops in some areas, or inadequate resources for rehabilitation of existing networks; and
- a high level of on- and off-farm losses for reasons of climate, plant health, and harvest and post harvest handling technologies.

43. Returns are also affected through the operation of marketing systems, particularly with respect to crops for processing. Distribution systems remain relatively dysfunctional, and unsophisticated. Producers still operate on the basis of output rather than price, recognizing market requirements and the differentials to be earned through quality and supply contracts. Opportunities for diversification into alternative crops with more buoyant markets, in the short and medium term, such as fodder, seeds, spirits, specialist fruit and

vegetables exist, but require attention to supply and quality issues if local production is to compete with imports. Linked to these is the provision of specialist support services, notably those tied to business or market advice but also of a technical agronomic kind, plus access to finance at acceptable cost and on appropriate terms, particularly with respect to repayment periods. Issues or constraints to sustainable development of a strong crop sector, realizing the potential of Mongolia's arable land resources and climatic conditions, therefore, fall into three areas: (i) markets or demand considerations, (ii) profitability or supply issues, and (iii) institutional factors.

## **B. Market Considerations**

44. The domestic market for foodstuffs is limited, in both size and purchasing power even though it is relatively concentrated. Outside of the three urban centers and a limited number of aimag and, more recently, mining centers, food supply is highly localized and intimately related to subsistence production within the broader family. Consumption patterns in rural areas are heavily influenced by subsistence production, with a dominance of livestock products. Crop consumption is dominated by processed grains, although diets have only recently included more vegetables. Livestock products are available throughout the year, but Mongolia's cropping season is short, creating a mismatch with consumption that is not readily dealt with by the available storage and distribution system. As a result, much of the vegetable consumption is met by imports.

45. The significance of imports in part reflects the price sensitivity of market demand. Local production, particularly after additional costs associated with bringing produce to market, has tended to find it difficult to compete with low priced imports, particularly from China. This has resulted in claims of dumping, particularly in the 1990s with respect to flour, but current evidence for this is not convincing. Mongolian products have the market edge of familiarity of taste, but consumers are willing to pay only a limited premium for this, especially as in practice much Mongolian product has not only been higher priced but also of less consistent and often lower quality. This has also presented problems for exports.

46. Despite this, market developments point to opportunities for Mongolian produce if competitive, a function of solving issues of productivity and technologies and of variety selection and post harvest handling. The market for foodstuffs is expanding rapidly, as also is the proportion of households with increased purchasing power. At the same time more sophisticated meat demand and the expanded need for processed commodities for variety, durability, and distribution reasons stimulate demand for improved feeds, also a product of crop sector development. These are considered further in Section III.

47. Mongolia completed the privatisation of the majority of its state farms in 1998 yet a large proportion of cropping remains production rather than market orientated. This has been made possible partly because of government preoccupation with self-sufficiency in wheat and the consequent direction of support policies bolstering farms in grain production that, for management or resource reasons, were marginal and should have been either allowed to revert to pasture or diversified into other forms of cropping. Under the Strategy, Government will redirect its policy towards raising the productivity of viable farms and away from rescuing the less efficient, with profitability and market competitiveness the overriding objective. Major problems with profitability, linked to cash flow, management capacity, and productivity, will mean that some of the weaker farms will fail, but with the right supportive environment, an industry will sustain.

48. Previous concerns about the market domination of the major flour mills have now given way to recognition that the structure of the grain sector has changed in response to changing market conditions which make a return to self-sufficiency policies difficult to

achieve. Altan Taria, the largest of the mills, which previously sought to secure domestic grain supply through a combination of own farms and contract supply arrangements linked to credit, input supply and technical assistance, now depends on imports, which offer consistent quality and quantity of supply at prices competitive with domestic production. It has had to do this as production from new mills and deregulated imported flour has accentuated competition in Ulaanbaatar and other markets. Processing demand for domestic grain production, excluding retention for seed, has increasingly come from distilleries (perhaps 40,000 tonnes), medium sized regional mills (35,000 tonnes), and the growing though fluctuating number of small mills (at times as many as 500 with a potential demand of some 100,000 tonnes), though more efficient machinery has led to fewer higher capacity units<sup>2</sup>. Feed production units offer further opportunities.

### **C. Profitability and Supply**

49. Profitability of crops farms is synonymous with efficient market orientated production, implying competitiveness on price and quality of produce and of supply (consistency of volumes, delivery, and quality to meet demand requirements). From a commercial point of view, selection of crop is crucial, with higher value higher margin produce a key to sustainability. Key issues for profitability, therefore, include:-

- management capacities;
- diversification into higher value commodities;
- productivity, or physical yield;
- the scale of production, often a function of farmer organization; and
- post-harvest handling and market distribution.

#### **1. Management Capacities**

50. Critical to financial success for cropping, as for other enterprises, is the capacity of management. The key factor determining the difference in performance of farms of all scales and of all specialities is management. Management expertise in the farming community varies widely, many small farmers having come into the sector from other occupations, or existed in environments where others determined business decisions. Larger corporate farms usually have stronger management.

51. Without good management, the prospects for viable crop production are limited. Selection of crop varieties, investment in technologies and land improvement, understanding the requirements of market responsive production, and decisions about pricing and marketing all require a level of business expertise that has yet to be developed among crop producers. Government can support this development through the business orientation of technical advice and research services, as well as more direct business advisory extension services linked to training and education. However, more productive might be support for the organization of farmers and communities in a way that allows for the sharing of expertise as one form of scale economy. In this respect, the development of a strong network of farmers and technicians through a web-based information and extension system probably offers the best opportunity for lasting change and the most efficient way to use this currently limited resource.

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<sup>2</sup> an expansion in the number of small bakeries has also supported competition in flour demand, breaking the previous dominance of previous state bread producers. These bakeries will themselves give way to medium size units, particularly as distribution systems improve with investment in new roads.



## 2. Diversification

52. From a concentration on low price, poor quality, low margin grains, farmers need to recognize the financial benefits of diversifying partly or wholly into higher value and/or higher margin commodities. Critical in any decision, of course, is the situation in the market, the level of demand and the characteristics of market requirements. Analysis of opportunities developing over the next few years points to fruit and vegetables, improved feed and fodder crops, and specialized crops (seeds, medicinal plants etc.) as having growing potential. All of these represent higher prices and margins than grains. Further, although the volume of market demand for each variety has traditionally been seen as more limited than that for grains, the contraction of the competitive domestic wheat supply in the face of competition from consistent supplies of quality imports and the shift to more specialist varieties to meet particular demands (especially spirits and feedstuffs), and the squeezing of margins through increased fuel costs and low productivity, has meant that these alternative crops, particularly where future export potential exists, represent a more buoyant production potential and, at their higher values and better margins, a profitable use of resources.

53. To take advantage of diversification opportunities, however, requires market and technical knowledge, supported by research and development, with access to quality planting material, and the ability to counteract the short growing season by a combination of volume and post harvest handling, storage and processing.

## 3. Productivity

54. Average yields for most crops in Mongolia are low, though in every instance substantial variation exists. Where management is sound, yields approaching international levels have been observed, even where land fertility is not necessarily outstanding. The reasons for low yields are only to a limited extent, the product of climatic factors, though these do limit the choice of crops with potential. Key features, other than management, affecting productivity include:-

- land fertility, particularly given the limited growing season, affected by access to appropriate irrigation and drainage (differing for large grain farms and smaller horticulture units), and soil nutrition and conservation as a result of cultivation techniques, the nature of rotations adopted and the use of fertilizers. Poor land and water management, in part a product of an uncertain legislative framework for tenure and use rights, has limited efficient use of arable resources;
- the cost and availability of different seed varieties and their level of quality in terms of germination reliability and disease resistance. The absence of even a minimum supply of good quality seeds at competitive prices, and the use of poor quality seeds in government initiatives have had a negative impact on productivity over several years;
- plant health and pests control. This has improved, particularly in light of international obligations under WTO and other conventions, but has the potential to reduce yields, especially as climate changes introduce new pests and reduce the immunity provided by the Mongolian winter;
- application of improved cultivation techniques, a product of the success of extension systems and sufficient investment to replicate the results of pilots (such as on minimum tillage and crop rotations); and
- the application of appropriate technologies, using machinery and equipment for tilling, irrigation, treatment, storage etc., appropriate to scale and conditions. This requires a market responsive technology supply network exists, a specialist area that needs support rather than, as in the past, competition from the public sector.

#### **4. Scale**

55. The scale of crop activities varies widely across the sector. Efficiency in different crops requires different levels of production, depending on various technical considerations and the costs associated with them. In the past, government has looked to consolidation of holdings to meet minimum critical scales of production, particularly in the wheat sector, but the key to issues of scale can rest with consolidation through farmer organization with associations of farms or farmers acting together to meet particular service needs, such as in input supply, machinery rental, storage, or business administration or access to finance, or broader production and marketing objectives. To date farmer organization has been relatively limited and confined to certain predetermined legal structures. Producer associations are one option to overcome certain constraints and to take advantages of the benefits of scale. As profitability increases in the sub-sector, greater use might also be made of contract services such as harvesting and seeding with greater capacity to cover extended areas in shorter periods of time in this limited window for planting certain crops.

#### **5. Transport, Storage, and Distribution**

56. Post harvest losses have traditionally been high in Mongolia but have received very little attention from government or donor research and extension programs. Issues of crop handling, treatment and storage affect the marketability of crops in terms of value, volume and time. This is particularly true for horticulture crops where perishability and presentation are crucial to producers receiving the best prices. Access to market, especially for producers beyond the peri-urban belt, depends on transport availability and cost, packaging and handling techniques, and quality control supervision and assurance. Security of payment, involving both financial systems and quality assessment mechanism, is important not only for contract supply arrangements but for all market chain transactions. For exports, these elements become even more crucial. Research, extension, regulatory, financial and other systems all need to be addressed if these constraints are to overcome in a cost effective and consistent manner that supports rather than detracts from producer profitability.

#### **D. Institutional Issues**

57. Institutional constraints to development of the crop sub-sector overlap with other issues of profitability to the detriment of private sector willingness to undertake investment and take risk. Key elements include:-

- land and water tenure rights, access and use - the absence of secure land tenure, and of the registration and transferability of use rights, remain impediments to investment and to access to working capital. They also prevent a lasting solution to the treatment of degraded and abandoned land. They also have an impact on the nature of crop farm ownership since the uncertainties encourage speculative investment without a commitment to profitable farming. Issues over water management, including both natural and constructed irrigation systems, similar impair investment in land improvement and crop diversification;
- access to technologies - a function on the one hand of technology development and dissemination but more significantly a product of access to appropriate and affordable credit. Farmers continue on the whole to face difficulties with accessing term credit, even at the high rates still offered by much of the financial sector. Opportunities for accessing through associations and spreading risk for both borrower and lender need to be coupled with mechanisms to offset the cost of credit for successful and reliable borrowers;
- access to lower cost production and marketing through more effective farmer organization. Early developments in the sustained growth in many now strong agricultural countries included forms of farmer, herder, or joint cooperative activity

ranging from input supply through production to marketing, with often the strongest cooperation being in terms of management or support services. Mongolian producers need to recognize the benefits of self-initiated and organized cooperation devoid of the strictures of previous Soviet style collectives, or donor initiated credit related associations;

- input and output market distortions. Previous government and donor programs have distorted seed, input supply, and machinery provision and service arrangements to the detriment of private sector investment in these areas. Government recognizes the limitations of these earlier policies and intends to adopt systems that support rather than inhibit private entrepreneurs in these activities. A similar interference has existed in product markets with donor supplies and government procurement distorting market channels and undermining profitability and decisions as to the timing and nature of sales;
- poor research, extension, and training linkages. Recent surveys pointed to the need felt by most producers (both producers and herders) for better access to skills and information. The need is for a response mechanism linked to subject matter specialists and research. The NAEC and AEC system has had limited success in providing this conduit for disseminating technical, market, and business expertise to producers and processors, many of which continue to be relative novices. Research needs to be predominantly adaptive and applied, but to be effective, the determination of funding priorities has to be based on factors that affect the bottom line of producers and processors and has to be adequately funded. Linkages with centers of excellence need to be strengthened at all levels, and opportunities exist for strengthening the relevance and delivery of the system through exploitation of the opportunities presented by internet access linked to solar power systems (possibly through schools) providing an integrated system of information and advice incorporating successful as well as inexperienced farmers through the web. The benefits of this include the prospective of interesting the next generation of farming households in cropping through e-based learning at schools and other community institutions; and
- local government - changes in the fortunes of particular farming areas, and in the structures of the farms and the systems for marketing and distribution, will affect the viability of the previous local administrative structure. There is talk of the number of aimags reducing back to the previous level of five or six outside the major urban areas, and within these, the number of soums must be expected to decline significantly. Local opposition to this is expected but changing patterns of activity and population, and constraints on available budgets, will necessitate this consolidation and restructuring. This will have a major effect on the delivery of social services, including health and education, the current pattern of which was the product of the networks of state farms and negdels. It will also affect the pattern of delivery of agricultural support services.

58. Despite significant improvements in the delivery of financial services in rural areas, access to affordable finance remains one of the most quoted constraints. Interest rates are exceptionally high, well above any legitimate calculation of the cost of lending and the risk, while most loan products are of too short a term and too small to meet producer and herder needs. Issues include complications over collateral, in the absence of registered land titles and an effective market for land, poor supervision by Bank of Mongolia, especially with respect to Non Bank Financial Institutions (NBFIs), and the continuing failure to establish tax and other regulations to allow for financial leasing (which would direct financial sector funds to the sector and provide access to assets in a form that meets the cash flow capabilities and term requirements of small and medium producers and processors). Government interventions continue to distort the sector, creating expectations of cheap credit that does

not really need to be repaid, or will be forgiven in the event of a natural disaster, and are largely managed by civil servants unfamiliar with financial services delivery. Such schemes are considered un-sustainable, being dependent on donor funds (often through monetization of food aid), and without any attempt to generate the mobilization of borrowers' own resources and improve their money management. They also tend to be accessible only to larger producers or processors, usually those that have access to the political authority.

59. Rural finance systems have to be developed but should include expansion of NBFIs, local unitary banks, and the use of trade credit (through suppliers, mills etc.). Cash flow has to be improved. Furthermore, recognition of individuals as legal entities by the banking system has to be enforced if small producers and herders are to have access to formal credit.

60. The balance of risks between the Government and the private sector needs to be clarified, and the Government needs to understand that food security can be achieved in a variety of ways without undermining the viability of commercial agriculture. Insurance against normal climatic variation should be the subject of negotiation between insurers and producers, without compulsion or government intervention.

61. Current income tax provisions deny the opportunity to support positive actions towards strengthening farm productivity and sustainability. They need to be modified to a system of investment allowances and other promotional tax credits. VAT exemption on agricultural products should be removed to allow producers to recover VAT on inputs and thereby reduce costs, while domestic food prices could be supported through zero-rating, an action relatively more favourable to the poor. If desired, the imposition of VAT on imports would enable zero-rated domestic food products a price advantage, while the tax on inputs and machinery would be fully recoverable under the normal system and not affect costs.

### **E. Environmental Issues**

62. Environmental issues include: (i) the sustainability of land productivity and product quality, (ii) the protection of national biodiversity, (iii) the use of agro-chemicals, and (iv) the treatment of degraded and abandoned land.

63. Productivity has fallen partly because of poor quality cultivars but also the depletion of soil fertility, the erosion of top-soil, and disturbance with water courses. Much of the solution rests with the adoption of new farming techniques, the introduction of regenerative rotations, and the addition of natural and chemical nutrients. Agro-forestry and control of logging might also have a major role to play.

64. Crop quality has fallen with the deterioration in seed varieties and requires a concerted effort to strengthen endemic and introduce exotic ones. The dangers of introducing western varieties have been experienced in a number of former Soviet Union countries, dangers that include products unacceptable to the market as well as unsuitability to the environment. Linked to this is the need to protect the endemic genebank, its purity and diversity. Financial difficulties at plant research and plant protection institutes have led to a depletion of original seed and plant-stock, an occurrence difficult to reverse. Increased use of agrochemicals can be expected not only as farm cash flow recovers but also because of the requirements of some of the cultivation techniques proposed. This accentuates the need for good residue analysis of both foodstuffs and water supplies for contamination or pollution. In addition, producers and other users of chemicals, as well as members of the public who might come in contact with them, need to be protected by a sound set of regulations on use, handling, storage, and disposal, translated into appropriate packaging and labelling requirements, and by the presence of an effective inspectorate to enforce

same.

65. Productivity, quality, and chemicals all come together in the need to adopt a holistic approach to cultivation and protection. Integrated Plant Management (IPM) has been adopted elsewhere as a solution to resolve already contaminated soils and past mistakes. However, for Mongolia the opportunity exists to introduce environmental and people friendly practices from the start. IPM involves not just the use of natural and biological approaches to pest control, but also the selection of resistant varieties, intercropping of disease combating species, rotation with nutrient enhancing crops, adoption of appropriate harvesting and storage techniques, and so on. To be effective, IPM has to become the environment within which all other developments are made. It will require new research and testing facilities but these can replace or combine with others, providing savings in other areas that will quickly justify the cost. This will also be reflected at the farm level where the same benefits can be achieved with less application of chemical fertilisers, herbicides, and pesticides (as against the current low usage which is detrimental to productivity).

66. Finally, the treatment of degraded and abandoned land remains an important environmental issue. Protecting these areas as they try to regenerate or the active replanting of pasture grasses both seem dependent on resolution of land use issues, but in the meantime the deterioration continues. Similarly, despite new laws, there remain significant issues in the legal and regulatory framework related to the management of resources: land, water, soils, and forests. Much discussion has taken place over ownership of both arable land and pasture but agreement remains difficult to reach and implementation distant. In this, there appears a conflict in approaches between those that focus on conservation and those that focus on sustainable exploitation. To some extent there is a donor perception that all pasture is degraded, that overgrazing is rife, but this is not the case and there are increasing areas of under-exploitation as herders leave for sites closer to the urban markets (though the number of herder families is still large and small herds predominate). Water is also a fundamental issue, both for crop producers (most look to the substantial increase in productivity that accompanies irrigation, even though only a proportion of crop land is suitable), and for herders (where ownership and repair and maintenance responsibilities are recognized areas of conflict). Resource management for Mongolia must take account of significant changes in climate, likely to accelerate over the next ten years. This will have implications for both livestock and cropping activities within Mongolia, but will also impact upon its relationships with its neighbors, opening opportunities for new markets for Mongolia in non-traditional areas such as feed concentrates.

### **III. OPPORTUNITIES AND PROSPECTS**

#### **A. Market Opportunities**

67. Opportunities for crop sector development stem largely from fundamental changes taking place in the market for foodstuffs. The major causes of these changes have been, and are expected to continue to be, the rapid urbanization of the population and the growing wealth of that urban population as industrial and service sectors are stimulated. This is true not only for Mongolia but also for neighboring countries, particularly China, where the conglomeration of population and industrialization in and around Beijing in particular presents a substantial opportunity for those Mongolian crop and livestock producers that address their productivity and cost constraints, become price and quality competitive, and resolve issues of marketing and supply.

68. The dramatic growth in urbanization over recent years, a reversal of earlier backward migration to the rural areas during the periods of high unemployment in the first half of the 1990s, has had a fundamental impact on agriculture sector prospects. This is expected to

not only continue but accentuate. In the late 1990s, the incentive for much of this movement seemed to be a response to the deterioration of services in the rural areas and local centers. Continued ties with families in rural areas, however, meant that consumption was to a considerable extent met by an expansion of subsistence supply into the urban areas and only a slow growth in marketed demand. Where movement was for economic reasons, selected individuals were involved, supporting households in the rural areas through remittances, and supported in turn by foodstuffs from home. In contrast, recent surveys have pointed to it becoming increasingly more usual for complete families to move to Ulaanbaatar and other centers for employment and market access reasons, breaking traditional family links with the rural economy, and increasing dependence on marketed produce. This change appears to suggest that much of the more recent migration comes from a shake out of marginal crop and livestock producers from the rural economy, particularly after the extended period of climatic disruptions through *dzud* and drought during the late 1990s and early 2000s. This growth in urban market opportunities is also reflected in the recent rapid growth of centers for mining, and can be expected over the next decade to be mirrored in areas that act as centers for tourism.

69. Although these developments have had a direct impact on agriculture through the demand for food, low incomes of many of the new migrants have tended to support low cost imports rather than domestic production (especially where domestic margins have been squeezed to the detriment of competitiveness in quality). This has partially been countered by a growth in peri-urban horticulture and small livestock production, particularly in the ger districts, but more sustainable has been the growth in demand as migrants access better employment and household incomes rise. More recently also there has been a substantial growth in urban middle incomes and this has begun to stimulate an expanding demand for better quality and greater variety of both crop and livestock foodstuffs, supporting demand for higher priced and consequently higher margin products as well as the inputs that support them. For the crop sector, this represents a rapidly expanding demand for a wide variety of horticulture products as well as a strong demand over time for nutritious feed products to support high input livestock activities to produce quality beef and dairy products.

70. Faced with these changes, earlier policies to counteract urban migration by re-establishing the traditional character of rural Mongolia, supporting low income high risk agriculture to relieve rural poverty, appear to have been misdirected. Emphasis under the Strategy is now to concentrate on increasing the return to agriculture both by resolving the issues behind low productivity and low margins, and by concentrating on higher value higher quality crops readily accessible to expanding markets. The objective is to realize the opportunities presented by an expanded domestic demand for an increasingly varied range of food produce and food products, the derived demand for quality animal nutrition as the livestock sector grows and diversifies, and the opening up of trade as neighboring countries themselves change in response to domestic and global challenges.

71. These opportunities point particularly to horticulture and feed products as having good potential within the crop sub-sector over the medium term. Imports of fruit and vegetables, including potatoes, have more than doubled over the last five years, responding to a shortfall in competitive domestic supply as demand has expanded in terms not only of volume but also of quality and variety. Meanwhile, with the cost of imported feed still high, nutritional deficiencies have, with food safety issues, acted as impediments to the growth of quality meat products and undermined improvements in productivity and margins in other livestock product markets, including fibers and leather. Alongside these developments, better productivity in the grain sector due to the application of improved seeds and cultivation technologies, will stimulate margins as the concept of quality and returns rather than quantity become the guiding principle, allowing expansion to meet the needs of the blossoming

vodka manufacturing industry (imports of which have represented a major development over the last five years), and the requirements for feed and supplements for high input livestock both within Mongolia and the region. With these improvements in the strength and viability of production and processing, the crop sector will also present significant other opportunities for enterprise development, particularly in relation to a growth in domestic niche opportunities in the provision of input supply, machinery, transport and distribution, and financial and business services.

72. Relevant to these developments is Government's regional policy to support growth centers across the country. While these are designed to draw off some of the movement to Ulaanbaatar and to act as a focus for development in the surrounding rural areas, they are also likely to accentuate the move from less economic rural pursuits. This policy is still in its infancy. Some doubts exist as to its likely effectiveness, except on a small level, in the improvement of service delivery outside Ulaanbaatar. Demand from these centers will be small compared to that from Ulaanbaatar, and the siting of employment in them may not represent an attractive investment opportunity for private entrepreneurs, except at the small enterprise level. Nonetheless, the policy will support the perception that not all activity should be centered in Ulaanbaatar, a misconception perpetuated in regulatory and some development policies, and may support enterprises in the west and east that seek to directly access neighboring Chinese, Russian, Kazak, and Korean markets. Expansion in food demand in these markets, particularly China, is expected to be substantial as success in industrialization results in strong growth in marketed foodstuffs. For this, the Strategy sees benefits for extensive livestock in the supply of young animals for peri-urban feedlots, and in the supply of feed and animal nutrition for these and other high input livestock activities, both activities building on the extensive comparative advantage presented by Mongolia's expansive grasslands, productivity on which is expected to benefit from the changes being brought about by global warming. Competition in horticulture will be more acute, but with the right quality and price, more efficient Mongolian producers should also be able to reverse the previous one way movement of such commodities into Mongolia.

73. However, to achieve this, the Strategy needs to protect the position of more efficient extensive livestock producers in the short term to avoid too strong a contraction as a result of current difficulties. If not appropriately managed, this could result in the shrinking of extensive livestock activity, particularly in more areas distant from centers, to a level that would impair the chance to take advantage of opportunities for growth from peri-urban feedlot expansion, including from changing patterns in China, and from tourism anticipated in the medium term. These issues are dealt with under the livestock sub-sector review.

## **B. Prospects over the Next Decade**

74. Development of the crop sector over the next decade will, therefore, take place within the context of demographic and market trends in Mongolia and abroad, changes in the physical environment, and advances in technology, as mentioned above. Prospects for the sector will depend on the extent to which producers and processors respond to these changes and the market opportunities they present. Government's management of the sub-sector will be judged by the extent to which it stimulates this private sector response, evident from increased investment and enterprise activity as profitability improves and constraints are overcome.

### **1. The Broader Crop Sub-sector Environment**

75. During the next ten years the recent rapid growth of the population in the main urban areas (Ulaanbaatar, Darkhan, Erdenet) and their adjacent aimags (Tuv, Selenge, Bulgan), is expected to continue, though moderating in the later stages. In other areas, the move

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towards some key aimag and soum centers is also expected to continue (including those targeted under the regional policy), driven particularly by improved social service provision and expanding economic opportunities (particularly in relation to mining and tourism). Other centers will decline. Overall poverty levels will fall, but income differentials between the richest and poorest will continue to widen.

76. Global grain markets and prices will steadily expand in real terms. Chinese agriculture is expected to switch from course grains and cereals to high valued horticulture, opening opportunities for Mongolian wheat exports but also increased competition from horticulture imports. Increased income levels will be reflected in expanded quality meat consumption and dietary diversity, presenting opportunities for niche food products and animal feedstuffs if competitive in both price and quality. Improved north-south access will strengthen cross border trade with neighbors and reduce the relevance to other Regions of the Ulaanbaatar and Central Region markets.

77. Term credit and financial leasing (backed by taxation allowances) will become widespread, though it will not be until the end of the ten years that commercial banks will exhibit a broad-based and extensive agricultural loan portfolio. Interest rates will be brought down, closer to the true cost of lending, through monetary and fiscal measures within the next five years but major investment will continue to come from business interests outside the sector. This may slow with resolution of land tenure and ownership issues and with the increased absorption of agricultural enterprises within the tax net.

78. Issues of land ownership and possession will be resolved and legislation amended within the five years. Water rights and responsibilities will also be clarified. By the end of ten years, privatization of land, including pastures close to urban centers, and long-term usage rights will have been established. As a result, resource degradation will have been halted, and programs for recovery of abandoned crop land instituted. Basic cropping areas will remain largely unexpanded, but productivity and quality will have been much enhanced. Following developments in water use and conservation technologies, usage by the end of the period will have been rationalized both economically and environmentally. Small scale irrigation, managed and owned by water users groups will be widespread. Larger private schemes will exist, backed by public rehabilitation of some elements of the primary system, but a significant proportion of the former large-scale irrigation network will have been abandoned.

## **2. Grain Production**

79. Over the next five years wheat production will be increasingly concentrated on larger farms within the north of the Central Region, of between 500 and 2,000 ha, with sufficient yield to finance the procurement of improved seeds and other inputs, the maintenance and replacement machinery, and the expansion of areas under irrigation from operating revenues and profits. Management capacities will be crucial. Smaller grain units will face further difficulties as input and equipment issues impact on the timing and quality of field operations, though they may be able to diversify into lower cost forage farms. Through rotations in response to demand, grain production will become increasingly integrated with livestock through the demand for feed grains, including from abroad. Integration will not necessarily be on the same farm or even within the same enterprise, and will be driven by the demand for livestock products, initially particularly in the local market. Also significant will be grain for the spirit industry, which will remain a buoyant sector both at home and abroad. Production of other specialized grains, and oilseeds, will also increase, though on a limited scale constrained by the slow growth in viable and sustained market opportunities.



80. After ten years, grain production will have become increasingly integrated with livestock and diversified into a variety of livestock feed crops. Secure markets and lower capital costs will support high quality perennial forage production. Barley, primarily for livestock, will have recovered as a significant second crop in terms of area, yield, and income, and the export of malting barley to China at premium prices has high potential. Production will be concentrated on farms of over 1,000 ha, with good managers expanding their businesses through either new areas or integration. Smaller farms will have either scaled up, established alternative avenues for equipment access (such as equipment contractors, cooperatives, or direct rental), or switched from field crops to forage production stimulated by strong demand from the commercial livestock industry. Average yields will have improved substantially as marginal producers have left the industry and production has become concentrated on the most suitable land.

### **3. Horticulture Crops**

81. Over the next five years, horticulture will become increasingly diversified, responding to the growing level and sophistication of demand in Ulaanbaatar and other centers, including those connected with mining. Irrigated plots, improved technologies, expanded use of greenhouses, ornamental and medicinal plants, and small-scale fruit and berry orchards will become increasingly significant, as will links with small livestock production, but remain relatively small in scale (from one to five hectares) and volume. Backyard vegetable production for home consumption will continue to increase across the country where water can be accessed but commercial operations will concentrate around population centers, with success dependent on productivity, storage and marketing. Good management will be crucial to remain competitive with expanding Chinese producers. Potato production will expand across the country, based on profitable opportunities in local markets, and become increasingly sophisticated through new varieties, with better storage, handling, and processing characteristics. Producers will range from smallholders to large farms.

82. After ten years, horticulture production, now mainly irrigated, will have become highly diversified in response to changes in tastes and preferences. Greenhouse production will be well established. A significant proportion of smallholders will be fully commercial, with a range of marketing alternatives, including contract growing for medium scale processors in Ulaanbaatar and Darkhan. In some areas, horticulture will be closely integrated with small livestock. Fruit and berry orchards, and ornamental and medicinal plant production, will have expanded substantially. The country will be close to self sufficiency in potatoes, with a wide range of varieties. Quality seed potatoes will be produced in large volumes. Producers will range from the small to large scale, including some very large operations possibly subcontracting production to smallholders.

### **4. Feed Products**

83. Over the next five years, intensive livestock will develop in response to growing urban market opportunities, but will range from semi-intensive feedlots to highly intensive confinement enterprises. Most will remain small to medium in scale during this period. Feedlots for beef, and to a lesser extent mutton, will appear in response to seasonal demands and increasingly sophisticated tastes that justify high input costs. With growing dairy production, these activities will prompt a strong demand for feed both in the form of milled crops and of processing industry by-products, supporting both commercial diversification among crop producers, reduced pressure on pastures, and a market for quality bred animals from the extensive sector. Small animal confinement ventures (pigs, poultry, rabbits), dependent on high quality feedstuffs, will become more prevalent around urban centers as higher incomes and weaker ties with rural kin generate sufficient

sustainable demand to justify the investment risk. Production of all types of forage will expand, often by livestock enterprise for their own herds.

84. After ten years, intensive feedlots for cattle and sheep will have become well established, and confinement type production for small livestock will have continued to grow, replacing a significant proportion of imports. In both, after initial failures and shakeouts, managers will have identified best practice for Mongolia. A strong commercial dairy sector will serve the urban areas in central Mongolia and its demand for high protein and processed feedstuffs will support commercial forage and feed milling operations that, as a result, can also supply low cost balanced rations for intensive poultry, swine, beef, sheep, and goats.

85. Production and distribution of feed for over-wintering of extensive livestock herds, and as security against climatic shocks, will have become organized along commercial lines by herder groups and specialist suppliers, supported by developments in livestock insurance and livestock financing.

### **5. Crop Processing**

86. Over the next five years agro-processing will be less buoyant and in some sub-sectors decline. However, the foundations for stronger growth in the following period will be laid. Small, and in some cases experimental, ventures will increasingly appear, including feed mills, potato storage, fruit and vegetable wholesaling and home processing, and forage cubing enterprises. Production of spirits and other alcoholic beverages will continue to expand, fed by domestic and export demand. Feed production over the same period will respond to livestock enterprise developments within both the high input and extensive sectors.

87. After ten years, processing of feed, forage, fruit, potatoes and other vegetables will have scaled up. New food processing will have commenced. Exports, including forage and spirits, will have continued to expand.

## **IV. GOVERNMENT'S POLICY FOR DEVELOPMENT OF THE SUBSECTOR**

### **A. Rationale for Government Involvement**

88. The Government's support for the crop sector is based around three basic but closely linked objectives:-

- food security - involving less the supply of food than the creation of incomes to ensure access to food, including from abroad, particularly for vulnerable groups, and improvements in health and human resource productivity through better quality nutrition and food safety;
- poverty reduction - through both support for household consumption, including improved nutrition, through subsistence production and the generation of rural and peri-urban incomes, taking advantage of resource and market opportunities; and
- economic growth - capitalizing on the potential of the agro-ecological environment through improved productivity and higher value output from more intensive use of the country's land and water resources to take advantage of domestic and foreign market opportunities.

89. These are central to Government's political and economic strategy for development. In addition, a sustainably stronger market orientated and commercially viable crop sector adds value to the wealth created by other key sectors, notably mining and tourism, both by

enabling a higher proportion of value added to be retained within the country and, in the case of tourism, improving the viability of the extensive livestock sector, and hence also management of more remote environments, together the backbone of tourist demand.

## **B. The Role of Government**

90. Government's role in the crop sub-sector is to support an enabling and competitive environment for private sector development in the cultivation, processing, distribution and marketing of crops, and their conversion into manufactured food, feed, and other products. As a result, the Government's policy is directed at the removal of constraints to sustainable competitive market development at all stages of the value chain, but within the overall responsibility of government to protect its citizens, particularly the vulnerable, and preserve the potential for future development through physical and human resource conservation and improvement.

91. Creation of an enabling environment for crop related private sector development involves both economic and political stability and a suitably supportive legislative and regulatory environment. Removal of bottlenecks could require a measure of Government provision of support services, but this would take place within the context of a non-interventionist sectoral policy and as with other government procurement seek to stimulate rather than contain private sector service provision.

92. For the crop sub-sector, key legislative requirements relate to continued uncertainties over land and water tenure rights. Highly divisive, these issues have been under discussion throughout the transition period. Step by step resolution has seen the key elements of the legal basis for ownership and use of land and water resources put in place, but there remain important aspects that need to be resolved. Government will continue to pursue a resolution to outstanding issues as a fundamental requirement in the stimulation of investment and the adoption of improved technologies. Important in this respect are also sustainability issues relating to conservation and improvement of resources, as well as access rights for water and common areas.

93. The other main area of legislative improvement relates to support for a competitive environment. These include (i) the elimination of restrictive business and pricing practices, (ii) the opening up of the market chain, and (iii) the removal of unnecessary regulatory restrictions. This latter includes much of the licensing requirements that relate to production and trade, relying on the market to stimulate quality assurance procedures and quality related pricing. Regulations should be directed at protecting consumers, small enterprises, and the environment but government will not use them to direct economic activity to suit perceived economic or social objectives. Thus regulations will define the rules for quality marks, seed certification, product registration, water charging, etc., laying the environment for economic activity but will not enforce enterprises down one particular economic path. Key elements of protective regulation relate to food safety and phytosanitary issues, tying obligations under international agreements and conventions with health and quarantine issues. For cropping this also covers agro-chemical use and disposal. Environmental issues are also affected by these actions, and the quality and sustainability of resources need an appropriate regulatory environment to avoid over-exploitation and misuse in pursuit of short term private gain at the expense of longer term benefit to the community.

94. Despite the strides in private sector activity, key service areas remain poorly served. The Strategy requires competitive production and marketing of seeds and animal breeds but private sector activities in these areas are still fairly limited. A similar situation exists in the supply of agro-chemical and machinery inputs, and in the provision of term credit for equipment and machinery. In the past, the Government has sought to make up these

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deficiencies by direct state intervention but has adopted a concessional rather than competitive approach that has undermined the ability of private sector enterprises to enter the market and led to a perpetuation of the need for intervention, or at least the perception of need. Under the current Strategy, the Government will view any activities in the provision of such services as an interim activity pending development of private sector capacity, and will adopt an approach to service provision that activity promotes the private sector either directly (through, for instance, subcontracting) or over time (such as with suspensory loan participation in equity). Where subsidies are thought appropriate as a temporary stimulatory measure, they will be transparent and equally available to private as to public sector operators. Indeed, wherever possible, subsidies will be used to stimulate private sector enterprises rather than used as a vehicle for public sector service delivery undercutting private sector competitiveness. Similarly, performance awarding benefits (such as tax allowances or credits) will be preferred over cost compensation approaches (which undermine competition and promote inefficiency).

95. The Government proposes to withdraw from previous interventionist policies that undercut the private sector, supported the continuation of activities at levels that are uncompetitive, and detract from diversification into more economically viable crops. Thus Government will discontinue attempts to contain the price of flour and bread by subsidizing the costs of grain producers. This has tended to support the continued existence of inefficient producers and discourage the introduction of more efficient cultivation technologies or diversification into higher value and more competitive crops, while discouraging investment in input supply services. Insufficient resources to procure quality seeds or to support their production and the, at best, arbitrary process of allocation of subsidized inputs, meant that efficient producers relied on their own competitive edge and the Government inadvertently was left supporting poor technical and management practices. In future, Government will support the transfer of land and water resources to those that can successfully compete in the domestic food and processing market with imports or develop market opportunities that are anticipated to expand with changes in the Chinese and other regional economies.

96. It is with this in mind that the Strategy supports expansion in the two key crop industries with substantial potential, horticulture and animal feed products, and the two input industries of seeds and irrigation that stand to have the most immediate impact on productivity and, therefore, competitiveness. However, other programs under the Strategy are also relevant to development of a competitive crop sub-sector. These include those that relate to Term Credit, Research, Support Services, Market Linkages, Land Utilization, and Risk Management. Similarly significant are the programs that address Food Quality and Hygiene Standards, with impacts for both consumers and market competitiveness, and the needs to support the diversification of agricultural households into alternative sources of income and employment generation (the Structural Adjustment Program).

### **C. Recent Development Initiatives**

97. Government programs that have sought to promote the crop sub-sector have, in the past, focused on wheat production. These include the seed and fallow programs of the early 2000s, the operation of the seed and wheat reserve, and the provision of subsidized inputs and machinery through the Agricultural Development Fund. Government recognizes, however, that these failed to achieve its intended objectives of greater self-sufficiency through improved productivity and the recovery of wheat areas previously abandoned to pasture.

98. More relevant has been Government's attempt to stimulate private sector participation in the management and rehabilitation of the irrigation network. Although so far

this has met with mixed success, Government intends to continue to search for a solution to degraded irrigation facilities, in the face of the substantial productivity and diversification benefits from irrigation and drainage, through a new and expanded irrigation program.

99. Government has also reported success with the promotion of horticulture crops under the Green Revolution Program although it recognizes that the recovery of potato and vegetable industries to pre-transition levels resulted from many factors, not just the machinery distribution activities that undercut private sector supplies. Under the Strategy, Government will continue to support horticultural development, but with an emphasis on competitive private sector activity rather than household subsistence or semi-subsistence production. Expectations are that this will meet the demand for higher value and diversified products stimulated by the growth in the urban population, the expansion in middle class and higher income families, and the mushrooming of mining and tourist related activities. At the same time as competing for exports, competitive horticulture products will increasingly find a market in neighboring countries, particularly in China with the rapid expansion of urban demand and wealth.

100. Relevant also to the expansion of cropping is the organization of farmers. This should take a variety of forms, and the legislative and regulatory environment should be flexible enough to accommodate almost any form of self stimulated association. Producers might elect to associate to achieve benefits for production, sharing machinery or storage, or acting together in the procurement of inputs and services. Alternatively, they might recognize benefits for marketing and distribution from association, or in organizing their business services (accounting and procurement etc.). These could be partnerships, subsidiary enterprises, or cooperatives and the Government intends to support these business entities across the board. To date Government has, through the Cooperatives Program, focused on cooperative development with mixed success. In future, the Government will avoid promoting one form of business entity and it will avoid directly stimulating association in order to receive benefits and subsidies under donor programs.

101. Previously, the Asian Development Bank (ADB), GTZ and now the European Commission (EC) Technical Assistance for the Commonwealth of Independent States (TACIS) have assisted with cooperative development. Other crop related donor initiatives include ADB, World Bank, GTZ and Swiss Development Cooperation following on from earlier Canadian International Development Assistance (CIDA) and United Nations Development Program (UNDP). CIDA and TACIS have also been active in promoting improvement in the extension services. Also relevant for crops are events in the extensive and high input livestock sectors. Expansion of dairy herds (supported through the Food and Agricultural Organization (FAO), and previously, the Danish International Development Agency (DANIDA) stimulated the demand for nutritional feedstuffs, while improved feeding in the extensive sector is the subject of various initiatives under World Bank and USAID programs. Feed products represent a significant opportunity for the crop sector, especially if the medium term development of demand from China, and possibly other regional economies, is taken into account. Support for market development has also been forthcoming from TACIS and other donors.

102. The key player in development of the sector is not, however, the Government or the donor community. Rather it is the private sector that will bring about the strengthening and sustainable profitability of crop production in Mongolia. The transfer of state and negdels into private hands, and the more recent incorporation of those holdings, with investment by private businesses from the urban industrial and commercial sector, including a number of crop processing and food manufacturing enterprises, and from the mining sector, has over the last fifteen years substantially changed the cropping environment and its capacity to

compete. Large numbers of small to medium sized farms exist side by side with a few large corporate entities and a myriad of marginal smallholdings, but survival and sustainability remain more a function of management capacity and access to finance than to size. These farms have participated in schemes to overhaul and maintain the irrigation network, and have developed capacities for seed production and other specialist niche market activities. Stimulation of these private sector activities, to competitively expand output in response to market opportunities, will provide the major income and employment opportunities in the rural areas to complement development in extensive livestock and tourism.

## **V. STRATEGY FOR CROP SECTOR DEVELOPMENT**

### **A. Overall Strategy**

103. Government's strategy to realize the potential from the crop sector is summarized in the Logical Framework presented in Section IV. Its overall goal is to raise the profitability of crop production as a prerequisite for longer term sustainability. This requires the establishment of a positive environment for private sector investment and competitiveness within the market economy. The objective of Government policy, therefore, is the development over the medium term of a strong commercial private crop sector able to:-

- provide rural households and enterprises with adequate and reliable income,
- generate significant and increasing domestic retained value added to support economic growth, and
- provide opportunities for employment to relieve rural poverty.

104. To support achievement of this objective, Government will strengthen a number of policy measures and programs to appropriately define the business environment for:-

- crop production, processing, and marketing;
- food, feed and other product manufacture and trade; and
- associated supply and service enterprises;

105. Where necessary, it will provide supportive actions and incentives to overcome constraints or bottlenecks that limit private sector capacity to respond to opportunities in the short term and build strength and sustainability across the sector in the medium to longer term. Success in this will be evident from:-

- a strong growth in the volume and value of marketable fresh and processed produce;
- high and sustainable margins derived from diversification into higher value commodities and varieties with strong market opportunities, and realization of competitive productivity through judicious use of quality seeds and proven cultivation and post-harvest technologies (irrigation, inputs, equipment, etc.); and
- expanding exports of crop based fresh and processed produce, and for high value products, reduced dependence on imports.

106. To support achievement of this objective, the Strategy includes a number of agriculture sector wide and crop subsector specific programs, summarized below. The former, while they reflect on broader sectoral objectives, including for livestock, also have a direct impact on development of a dynamic sustainable commercial crop sector. Those that are crop specific are summarized below.

## **B. Proposed Crop Specific Program Interventions**

### **1. Irrigation Rehabilitation and Construction Program**

107. The overall objective is to reduce the vulnerability of crop producers from climatic influences by securing water supplies in a sustainable manner. This recognizes the increasing importance of crop production within the agricultural sector to provide economic opportunities and employment but also in substituting domestic production for the significant proportion of imported food items. To achieve this outcome, there will need to be:-

- direct investment by the Government in the more public components of irrigation systems (head-works and distribution/drainage channels),
- realistic mechanisms for providing land ownership and tenure arrangements within the schemes (long term user rights for the irrigable land and land under irrigation infrastructure),
- further development of cost recovery mechanisms (establishing and collection of water service charges) to meet scheme operating costs and maintenance (routine and periodic maintenance of main structures and supply/drainage systems),
- strengthening of technical support for irrigated crop production (including water conservation farming and sustainable utilization of irrigated areas),
- capacity building for the MoFA in supervision, contract management and the economic analysis of public investments,
- additional resources for research into irrigated production technologies, and the identification of alternate water resources, and
- further producer training.

108. In addition, the Government should further develop its policy in respect of land tenure to remove the uncertainty faced by producers who fail to utilize the irrigated land in two successive growing seasons and support private contracts between scheme owners and those utilizing the water provided by the scheme.

### **2. Expansion of Fodder and Feed Markets Program**

109. The objective is to facilitate the development of the animal feed producing industry based on both natural and improved pastures under irrigated and non irrigated conditions, depending on the location (land form) and natural precipitation. This stems from the demand of the developing higher input livestock production systems, the need to better care for livestock over the severe winter spring period (that also coincides with the time for parturition), and the potential to supply external markets in neighboring countries of China and Russia. To exploit Mongolia's comparative advantage in feed production, urgent attention is needed to address the rights of those conserving fodder or producing fodder crops to protect their production areas from itinerant grazing by other herders. There also need to be investment incentives: (i) to fence production areas from unauthorized grazing by way of concessional loans and accelerated depreciation of private investments, (ii) for investment in fodder conservation machinery, as well as (iii) developing improved capacity of local administrations to police the exclusion agreements between those conserving fodder and administrations responsible for the land in question. In addition, the Government should support (i) further research into the establishment and management of seed multiplication and fodder crops with short growing period such as alfalfa (lucerne) and other quality fodder grasses and tree/shrub species under local conditions, and (ii) introduce investment incentives for private processing of animal feed material with supply contracts linking the emergency feed program in aimag and soum centers, and (iii) support the establishment of an independent feed quality laboratory to monitor feed quality of both locally produced and imported feeds.

### **3. Commercialization of Horticulture Program**

110. The objective of this program is to facilitate small scale producers to make the transition from small scale subsistence producers to more commercially oriented horticultural enterprises capable of responding to increased and diversified domestic demand for horticultural goods and compete more effectively with imported goods. Currently, subsistent production dominates the sub-sector with 59% of all potato producers and 67% of all vegetable producers having areas less than 0.1 ha of crop. Only 4% of potato farmers and 2% of vegetable producers have areas greater than five hectares. Marketable surpluses in this industry can be generated from about 0.2 ha given current productivity levels emphasizing the dominance of subsistence production for immediate food security. There is a growing demand for a diversified range of horticultural produce in urban centers where increasingly sophisticated tastes and health awareness has increased the demand (and capacity to pay) for quality produce. Transition by small scale producers into commercial production units is made difficult by the limited access to financial resources to scale up their production systems - irrigation equipment and machinery to plant larger areas and their limited crop management skills. In an attempt to achieve import substitution and effect greater protection from the dumping of poor quality produce that threatens the health of Mongolian consumers, the Government sees an opportunity of increasing domestic production of horticultural food items.

111. To facilitate the transition to more commercially oriented production systems, the Government should (i) provide security of land tenure<sup>3</sup> to facilitate access to credit for the necessary investment, (ii) support the development of agricultural machinery supply businesses and associated repair services with appropriate financing arrangements (including leasing) to allow producers access to machinery with greater capacities, and (iii) provide incentives to promote private investment. In situations where there are opportunities to rehabilitate irrigation systems for the benefit of a significant number of small producers, there is a role for the Government to meet the cost of irrigation rehabilitation as a public investment provided the operational and maintenance aspects can be addressed. Associated with such investment, the Government should also provide additional producer training as there is limited familiarity with larger scale production techniques including water management and the use of increased inputs (including machinery and equipment) to enhance productivity. Finally, the linkages between the producers and markets must be further enhanced allowing producers to spread their incomes and strategically market their produce aided by storage and downstream processing. The Government should identify investment incentives for the private sector to extend processing capacity and introduce equipment that will generate products of higher quality and value.

### **4. Seed Breeding and Varietal Development Program**

112. The objective is to improve local access and quality of well adapted seed material for the cropping and fodder producing sub-sectors and to establish a varietal selection and multiplication mechanism for locally developed seed material. This two-fold objective recognizes the importance of a viable seed producing industry to support the cropping and fodder production activities but also recognizes the opportunities for selecting better adapted seed material suited to Mongolian conditions. The program requires a combination of direct investment by the Government in what are considered the more public investments in (i) research, (ii) quality assurance and certification services together with (iii) a significant

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<sup>3</sup> Whilst the Law has been passed allowing private ownership of crop land (June 2002), the implementation of the Law is still not taking place due to the limited capital resource base of land users who must first pay the soum-established price of land in order to obtain title, the limited capacity of local administrations to deal with land disputes that are being politically fuelled, and the social attitudes and beliefs in respect of interpersonal conflict.



reorientation of private sector investment incentives that apply directly to the seed industry and ultimately the cropping sub-sector. Historically, Government initiatives in this area have been through the State Seed Reserve that ensured seed was available for the following year's planting, while the Agricultural Development Fund has provided a disincentive for the development of an independent and commercially viable seed industry. Price incentives must be maintained for the development of the seed industry in parallel with improved demand from commercial crop and fodder producers that will only come from improved on-farm profitability. The Government is aware of the negative impact from earlier support schemes and is revising the means for promoting this important industry. In addition to the direct public investments, the Government needs to complement varietal selection activities undertaken in research centers with the commercial multiplication of quality seed material that involves contracts and associated training of these specialist producers.

### C. Overall Crop Sector Development Program Framework

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<b>Goal</b> To sustainably raise the profitability of crop production.			
<b>Purpose</b> To develop a strong commercial private crop sector able to provide rural households and enterprises with adequate and reliable income, generate significant and increasing domestic retained value added to support economic growth, and provide opportunities for employment to relieve rural poverty.	Strong growth in the volume and value of marketable fresh and processed produce;  High and sustainable margins derived from diversification into higher value commodities and varieties with strong market opportunities, and realization of competitive productivity through judicious use of quality seeds and proven cultivation and post-harvest technologies (irrigation, inputs, equipment, etc.).  Expanding exports of crop based fresh and processed produce, and for high value products, reduced dependence on imports.	Statistics on output, growth, domestic and foreign trade, rural employment;  surveys on household income and expenditure;  agricultural or farm surveys.	Continued commitment to a market led private sector agriculture sector;  Continued macro-economic and political stability and broad consensus on medium term sector policy objectives and mechanisms.
<b>Outputs</b> 1. An economically and environmentally sustainable competitive horticulture sector	<ul style="list-style-type: none"> <li>enabling environment for commercial horticulture development created;</li> <li>strengthened institutional framework to support commercial horticulture;</li> <li>increased profitability of smallholder production;</li> <li>improved access to</li> </ul>		successful implementation of Commercialization of Horticulture Program

## Volume II - Program Investments - Crop Subsector Summary

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
	irrigation; <ul style="list-style-type: none"> <li>strengthened storage, processing, distribution and marketing systems;</li> <li>effective support through research, training, extension and information systems</li> </ul>		
2. An economically and environmentally sustainable competitive fodder and feed sector	<ul style="list-style-type: none"> <li>enabling environment for a commercial animal feed industry;</li> <li>increased production of feed crops;</li> <li>expansion of processed feed production;</li> <li>improved producer-market linkages.</li> </ul>		successful implementation of the Expansion of Fodder and Feed Markets Program
3. A commercial seed sector able to provide farmers with adequate and reliable supplies of high quality seed	<ul style="list-style-type: none"> <li>enabling environment for commercial seed industry;</li> <li>expanded and strengthened capacity in seed breeding and multiplication;</li> <li>seed testing and inspection capacity strengthened and expanded;</li> <li>seed industry organizations and standards developed</li> </ul>		successful implementation of the Seed Breeding and Varietal Development Program
4. An economically and environmentally sustainable irrigation system	<ul style="list-style-type: none"> <li>economically and environmentally sustainable irrigation networks improved and expanded;</li> <li>use of irrigation for higher value crop production increased in response to higher returns to farmers;</li> <li>enhanced MoFA capacity to promote, manage, and supervise investment in irrigation.</li> </ul>		successful implementation of the Irrigation Rehabilitation and Construction Program
5. Resolution of security of land and water tenure issues, including possession rights and management obligations	<ul style="list-style-type: none"> <li>agreement on resolution of outstanding arable, pasture, water management rights issues;</li> <li>appropriate amendments to legislation and secondary acts;</li> </ul>		successful implementation of the Agricultural Land Utilization and Management Program

## Volume II - Program Investments - Crop Subsector Summary

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<p>6. An efficient and effective system for the delivery of agricultural support services (notably business, financial, market and technical extension and ready access to inputs and equipment)</p>	<ul style="list-style-type: none"> <li>• support for establishment of pasture/water management user associations/groups etc.;</li> <li>• institutional strengthening and/or establishment of supervision, registration etc, mechanisms - especially at soum level;</li> <li>• fast-track land registration and pasture rights system introduced, with option for future sophistication through GPS/GIS etc.</li> <li>• development of web-based extension network, with full interactive participation by growers, processors, traders, suppliers etc.;</li> <li>• introduction of information availability and use awareness through rural schools, community institutions, and local authority facilities for farmers and processors and their children;</li> <li>• development of technical messages on cultivation, harvest, post-harvest, processing and marketing technologies (including machinery), on animal and plant health (protection and quarantine), seed and breed developments etc. - linked to user responsive research activities (see Research Program);</li> <li>• link of technical messages to business advisory activities to relate them to good production, financial, marketing etc. management and increased profitability;</li> <li>• networking for regular exchange of information on market opportunities and requirements (including through prices),</li> </ul>		<p>successful implementation of the Agricultural Support Services Program</p>

## Volume II - Program Investments - Crop Subsector Summary

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
	and on market and supplier contacts including overseas - linked or channeled through associations and Chambers of Commerce.		
7. A responsive research system that meets the needs of commercial growers for new high yielding and resistant varieties, improved cultivation technologies (including for irrigated cropping), and post-harvest treatment and handling	<ul style="list-style-type: none"> <li>establishment of independent research council with grower, processor, trader participation to determine research tasks and allocation of funds and contracts;</li> <li>stimulation of private research institutes and supplier/buyer research activities;</li> <li>seed breeding and variety development on horticulture and feed crops;</li> <li>continued testing of alternative cultivation technologies, including minimum tillage etc. approaches, and irrigation/water spreading techniques;</li> <li>examination of harvest and post-harvest technologies (including storage, transport and handling, and packaging, bulking, bundling for domestic/export market);</li> <li>improvement on small-scale processing technologies, and support for larger scale processing development.</li> </ul>		successful implementation of Agricultural Research Program, with elements from seeds, irrigation, etc. programs.
8. Access by producers, processors and investors in agriculture support services to appropriately priced and competitive term credits	<ul style="list-style-type: none"> <li>introduction of mechanisms to support private sector financial involvement in sector financing (leasing, risk sharing, offset mechanisms etc.);</li> <li>support for interest offsetting mechanisms to lower price of credit for efficient market orientated producers, processors, traders etc.;</li> </ul>		successful implementation of the Access to Term Credit Program

## Volume II - Program Investments - Crop Subsector Summary

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
9. Strengthened market linkages between producers, processors, and traders in domestic and key international markets	<ul style="list-style-type: none"> <li>linking credit incentives (tax, interest, collateral etc.) with investment in appropriate production, post harvest handling, processing, distribution, trading etc. technologies (links with public/private research and extension);</li> <li>elimination of concessionary credit managed by Government agencies (concessions to be linked to professional management by bank and non-bank financial institutions.</li> <li>introduction of contract supply mechanisms, including establishment of sound mutually beneficial and protective legal base;</li> <li>support for grower/processor production and trade associations, with links to market support networks, such as Chambers of Commerce and international associations;</li> <li>establishment of product standards and system for certification, verification, inspection etc.;</li> <li>linkages to buyer/supplier networks etc.;</li> <li>support for market infrastructure development, including wholesale as well as retail, and private intermediaries (stores, cold stores, packaging agents etc.).</li> </ul>		successful implementation of the Strengthening Market Linkages Program
10. High level quality and food safety standards enforced through effective and transparent regulatory and support systems	<ul style="list-style-type: none"> <li>strengthening or development of appropriate institution base (SSIA or perhaps independent food standards agency), linking Government responsibilities for food safety with phytosanitary and health obligations</li> </ul>		successful implementation of the Strengthening Food Quality and Hygiene Standards Program

## Volume II - Program Investments - Crop Subsector Summary

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
11. Increased capacity of MoFA for effective sector management, through the implementation of policies based sound economic and environmental assessment, for the creation of an enabling environment for a market led private sector agriculture, mainstreamed through budget and MTBF	<p>(including under WHO, WTO/IPPO/OIE, and other international agreements etc.);</p> <ul style="list-style-type: none"> <li>• adoption of comprehensive legal and regulatory framework for food safety;</li> <li>• allocation of appropriate resources through budget and MTEF for effective implementation of food safety regime;</li> <li>• recruitment and training of food safety officials;</li> <li>• public awareness campaign, including through Government, of food safety issues and requirements;</li> <li>• introduction of penalties for breaches of food safety requirements.</li> </ul> <ul style="list-style-type: none"> <li>• adoption of sectoral strategy as framework for regular and emergency actions, and for control and monitoring of donor support;</li> <li>• full incorporation of economic and institutional analysis and evaluation (technical and financial) of policies and programs (within MoFA, SSIA and associated institutions) to allow for recurrent modification within MTBF/Action Plan structure of programs and resource allocations to ensure effective implementation of soundly based policies and strategies;</li> <li>• improved program formulation recognizing context of market economy (stimulation of private initiatives within framework of checks and balances to protect public/environment etc.), with realistic costing for non-distortionary</li> </ul>		successful implementation of the Institutional Capacity Building Program

## Volume II - Program Investments - Crop Subsector Summary

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
	<p>Government interventions,</p> <ul style="list-style-type: none"> <li>• development/revision of appropriate structures from MoFA/SSIA etc at centre, through aimag and soum to enable effective achievement of objectives and the meeting of obligations;</li> <li>• establishment of realistic regulatory base in each area to enable successful implementation;</li> <li>• allocation of sufficient resources to ensure quality staff and facilities at each level to realize objectives;</li> <li>• training of staff at each level.</li> </ul>		

# **AGRICULTURE SECTOR STRATEGY STUDY**

## **VOLUME 2**

### **IRRIGATION REHABILITATION AND ESTABLISHMENT PROGRAM**

**30 NOVEMBER, 2006**



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## ACRONYMS

ADB	- Asian Development Bank
ADF	- Agriculture development Fund
AHRI	- Animal Husbandry Research Institute
AI	- Artificial Insemination
ASDP	- Agricultural Sector Development Project
CIDA	- Canadian International Development Assistance
DANIDA	- Danish International Development Agency
EGPRS	- Economic Growth and Poverty Reduction Strategy
ELISA	- Enzyme Linked ImmunoSorbent Assay
EU	- European Union
FAO	- Food and Agricultural Organization (of the United Nations)
FMD	- Foot and Mouth Disease
GAP	- Government Action Plan
GDP	- Gross Domestic Product
GTZ	- German Bi-lateral Aid Agency
IMED	- Information Monitoring and Evaluation Department
JICA	- Japan International Cooperation Agency
KOICA	- Korean International Cooperation Agency
LEWS	- Livestock Early Warning System
MDG	- Millennium Development Goal
MNE	- Ministry of Nature and Environment
MoFA	- Ministry of Food and Agriculture
MSUA	- Mongolian State University for Agriculture
MTBF	- Medium Term Budgetary Framework
NAEC	- National Agricultural Extension
NPA	- National Plan of Action
O&M	- Operations and Maintenance
OIE	- Office Internationale Epizootique
PPP	- Public Private Partnerships
SCVL	- State Central Veterinary Laboratory
SDC	- Swiss Development Cooperation Agency
SEFF	- State Emergency Fodder Fund
UNDP	- United Nations Development Program
USAID	- United States Agency for International Development
WTO	- World Trade Organization
WUG	- Water User Group

## IRRIGATION REHABILITATION AND ESTABLISHMENT PROGRAM

### I. GENERAL BACKGROUND

1. Mongolia's climatic conditions are such that water is often the limiting factor in crop production. Secure water supplies for agricultural production will improve productivity and open options for diversification by some producers into higher value crops. Combined with appropriate technical and management training, improved water management will sustainably raise household returns. With risks from both short term climatic variation and longer term climate change, this improved profitability will help to promote new investment in crop production and improve food security at both the household and national level whilst generating opportunities for employment generation in the labor intensive horticultural industry.

2. In 2002, the "Registered Irrigated Area", a concept introduced during the communist period, was about 60,000 ha. This concept first began in the late 1950s to the late 1970s when large scale irrigation systems were established, some 49,500 ha using expensive highly mechanized sprinkler systems and a further 7,500 ha using low cost traditional flood irrigation. The larger mechanized systems were concentrated in the north and west of the country where surface water is more abundant, soil types more suited to crops (mainly wheat). The distribution of irrigated areas by registered systems throughout Mongolia is presented in Table 1. However, in the early transition period, much of this irrigation infrastructure was abandoned and fell into disrepair. In 2000<sup>1</sup>, a command area of 30,000 ha was assessed as rehabilitable given available water resources<sup>2</sup>. This compares to an estimate in 1975 that 518,000 ha of the country's 1.3 million ha of arable land were considered suitable for irrigation.

3. Under the communist system, irrigation systems were based primarily on gravity conveyance that diverted water into lined or unlined canals or pressurized steel pipes. Open canals served 46% of the irrigated area while buried pipes served the remaining 54%. Of the buried pipe systems, 80% required pumping stations. The piped systems are now old, heavily corroded and require replacement. These systems also incorporated 27 dams for flow regulation. Although many were poorly designed and constructed, they are still operational and can still be used with some modification and rehabilitation<sup>3</sup>. In many locations, the iron infrastructure was removed during the 1990s and sold to China as scrap metal while other water management and storage structures received no maintenance. Water users began taking water directly by cutting holes in the supply canals, damaging the concrete and limiting the flow downstream.

4. Mongolia needs an irrigation system that is economically viable and environmentally sustainable, i.e. responsive to the economic and environmental realities faced by the new breed of crop producers, encompassing not only a few large farms but also a multitude of small farms and household gardens.

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<sup>1</sup> ADB TA No. 3686-MON: Crop Production Project, Final Report - Volume II, July 2002.

<sup>2</sup> Utilizing 0.7% of the estimated total water flow of 38.8 bn cu.m. (of which 84% is surface water).

<sup>3</sup> An assessment of these schemes was completed under ADB TA No. 3686-MON: Crop Production Project, Final Report - Volume II, July 2002.

## Volume II - Program Investments - Irrigation Rehabilitation and Establishment

Table 1: Inventory of Registered Irrigation Systems

	Design Command Area	Unusable Area	Irrigated in 1990	Irrigated in 1993
Arkhangai	921	35	628	328
Bayan Ulgii	2,230	0	2,229	1,607
Bayankhongor	1,181	330	843	693
Bulgan	264	27	237	136
Gobi Altai	5,547	259	5,180	3,598
Dornod	1,771	0	1,699	1,143
Dornogobi	319	0	319	319
Dungobi	104	0	104	66
Zavkhan	1,651	347	1,304	920
Uvorkhangai	8,600	60	3,675	3,565
Umnogobi	468	98	370	200
Sukhbaatar	90	0	90	90
Selenge	5,617	0	4,492	4,338
Tuv	3,614	252	2,672	2,508
Uvs	7,063	0	5,586	6,412
Khovd	5,679	0	4,589	2,670
Khuvskhul	307	0	230	289
Khentii	1,394	0	1,394	1,376
Darkhan-Uul	1,185	0	1,185	1,185
Ulaanbaatar	986	0	986	626
Orkhon	547	0	547	547
<b>Total</b>	<b>49,538</b>	<b>1,408</b>	<b>38,359</b>	<b>32,616</b>

Source: MoFA Water Resources Department

## II. SECTOR ANALYSIS

## A. Sector Performance

5. Irrigation systems are rapidly coming back into use, primarily for horticulture production. As of 2002, there were 156 registered irrigation schemes in 21 aimags with a total developed area of 49,538 ha, of which only 3,000 to 4,000 ha were operational<sup>4</sup>. In addition to this, unregistered irrigation areas are known to exist adjacent to water sources using temporary pumping facilities or simple gravity-fed flood systems. By 2004, MFA figures reported 17,307 ha of crop under irrigation, of which 9,089 ha (53%) was used for potato and vegetable production and 6,227 (36%) for cereal production with the remainder used for forages, technical crops (industrial crops including sunflower, rapeseed and linseed), fruits and berries. Household units accounted for 10,931 ha (63%) of the total irrigated area of

<sup>4</sup> ibid

which 7,374 ha was allocated to potatoes and vegetables, or 43% of total irrigated area.

**Table 2: Irrigated Land Utilization by Type of Entity**  
(hectares)

	Total	Cereals	Potato	Vegetables	Fodder Crops	Tech. Crops	Fruit
<b>Households</b>	10,930.8	2,190.8	4,365.1	3,008.9	1,330.0	3.7	32.2
<b>Enterprises</b>	6,376.2	4,035.8	1,021.5	693.6	625.3	0.0	0.0
<b>Total</b>	<b>17,307.0</b>	<b>6,226.6</b>	<b>5,386.6</b>	<b>3,702.5</b>	<b>1,955.3</b>	<b>3.7</b>	<b>32.2</b>

Source: MoFA - Census of Sown Area, 2004

6. The allocation of irrigated areas to horticulture production also indicates the use of this resource by small holder households. Of the 38,491 potato and 28,701 vegetable producers in 2004, 59% and 67% respectively are producing on less than 0.10 ha of irrigated land, while another 37% and 30% respectively farm on 0.2 to 5.1 ha. MFA data (2004) on the use of irrigation indicates the average irrigated area used by households was 0.16 ha and by commercial entities, 3.18 ha. There are few large scale irrigated areas that are most commonly used for potato production. Recently, cereal growers have introduced irrigation for high quality seed production and to assure finishing water supplies needed to achieve increased yields. Some large cereal farms using irrigated systems for production of field crops, oilseeds and forages, many being cross-financed by large companies operating in other sectors. The size distribution of registered irrigation facilities are presented in Table 3.

**Table 3: Size Distribution of Registered Irrigated Areas**

From (ha)	To (ha)	No. of Holdings	Area under Irrigation (ha)	Ave Size of Irrigated Area (ha/holding)
0	50	34	764	22.47
51	100	38	1,846	48.58
101	150	19	1,712	90.11
151	200	13	1,830	140.77
201	300	19	2,811	147.95
301	500	12	3,286	273.83
501	10,000	21	20,367	969.86
<b>Total</b>		<b>156</b>	<b>32,616</b>	<b>209.08</b>

Source: MoFA Water Resources Department

7. The utilization of irrigated areas for various crops has changed also over time in response to economic conditions and commercial opportunities associated with the growing affluence of consumers in the urban areas such as Ulaanbaatar increases steadily in size and also its associated spending power. Furthermore, as consumer preferences change to increasing vegetable consumption on health grounds, the demand for horticultural produce is steadily increasing. As a consequence, much of the opportunist irrigated production is being

## Volume II - Program Investments - Irrigation Rehabilitation and Establishment

developed with makeshift irrigation systems on small scale enterprises that do not require significant expenditure for operations and maintenance and are more of an opportunist activity dependent upon water availability. The declining influence of cereal crops being planted on irrigated areas reflects the greater profitability from horticultural crops compared with cereal crops. In 2000, 65% of the irrigated crop (5,600 ha) area was planted to cereals whereas in 2005, the equivalent figure was 23% of an area that had increased to three times the level (17,800 ha) - see Table 4. The area of irrigated cereal production has remained static throughout the past 6 years at between 3,500 and 4,000 ha.

**Table 4: Summary of Irrigation Crop Application**  
(hectares)

	2000	2001	2002	2003	2004	2005
<b>Irrigated Cereals</b>	3,631.5	3,828.4	3,870.1	3,875.4	4,463.7	4,080.0
<b>Total Irrigated Crops</b>	5,585.5	6,426.6	7,261.9	7,142.9	15,359.3	17,775.0
<b>% cereals</b>	65%	60%	53%	54%	29%	23%

Source: MoFA Water Resources Department

### B. Constraints

8. The recent history of Mongolia as it adjusted from a centrally planned economy to an open market economy has significantly influenced the current state of irrigated agriculture. During the socialist period, state run farms were the legal entities owning and operating the registered irrigation systems throughout the country. The initial collapse of the financial support for state farms saw the irrigation infrastructure fall into disrepair and while ownership remained uncertain, many schemes were looted for scrap metal. With privatization taking place in the early 1990s, many of the state assets - including the irrigation schemes were transferred to the private sector. Some beneficiaries from the change did not have the resources to maintain and operate the irrigation schemes that further contributed to their run-down state. With no funds to maintain water supplies to the command areas, water users refused to pay water charges, particularly as these had previously been covered by the State. Furthermore, the mere size of some of this irrigation infrastructure was significant, requiring large capital reserves to maintain the system in operational condition - quite apart from the technical skills that also departed the sector at about that time. Today, most of the head-works have been privatized along with the delivery canals. The ownership of the secondary and tertiary canals remains uncertain and varies between schemes. With the passage of time and extended periods of limited maintenance, the cost of rehabilitating the schemes will be significant, estimated at about \$1,000 per hectare of irrigated land.

9. While uncertainty remains in the ownership of land upon which these irrigation facilities are established and the rights of those using land in the command areas, further investment is unlikely as owners are uncertain as to how they can recover the cost of rehabilitation and generate a return on their investment. This uncertainty has been partly responsible for the lack of private re-investment in the asset. The other constraint is the access to capital to maintain the facilities when the beneficiaries of the irrigation are reluctant to contribute to operational and maintenance costs as they have become accustomed to the state providing same during the socialist period. The issue of recovering operations and maintenance (O&M) costs from the direct beneficiaries or water users has acted as a constraint to the further development of irrigation facilities.

10. A more deep rooted constraint is the quality of design and construction of these facilities. In some cases, poor designs have been used with inappropriate sloped reservoir embankments making for narrow cores on structures that breach during periods of unusual precipitation or snow melt. They systems tend to be located in the more favorable areas with better quality soils for agricultural purposes but the infrastructure has not been based on sound design. Similarly, construction has been of poor quality that has required higher maintenance than for well constructed systems.

11. Schemes were designed to achieve production objectives with reservoir design being driven by crop requirements without taking into consideration the hydrological characteristics of the catchment area. In many cases, the cost of rehabilitation of existing structures will be difficult to justify on economic grounds, particularly if designed to meet longer return period floods (in cases where available information allows such design parameters).

12. A further constraint to the rehabilitation of irrigation systems is the attitude of beneficiaries to meeting O&M costs for rehabilitated schemes. The reluctance that pervades in the thinking amongst much of rural Mongolia is that the State will provide. With transition to a more market oriented economy, producers are now being paid a reasonable price for their irrigated produce, even though competition from the more cost efficient countries is ever present. Until producers accept responsibility for at least routine maintenance expenses and are able to cover these costs as part of commodity pricing, the long term future for this potentially valuable sector will not be fully realized.

13. Finally, the institutional structure that supports the development of the sector within the MoFA is severely under resourced. Current staff levels are insufficient and budgets are inadequate to manage the development of the sector and supervise the rehabilitation of infrastructure, while aimag departments have limited experience to undertake such investments. While technical expertise exists in engineering design, much of the technologies are based on Russian standards that have proven inadequate in the past under Mongolian conditions. There is little appreciation of community participation in the design and operation of these facilities who ultimately determine the success or otherwise of any rehabilitation initiative.

### **C. Opportunities**

14. Mongolia has the environmental, technical and human resources to sustain irrigated agricultural production in a competitive manner for a range of crop products. Water resources include 3,800 rivers, 3,200 lakes and 7,000 springs, producing a total water flow of 38,800 million cubic meters per year of which 84% is surface water. In 2000, total water demand was estimated at 2% of total flow (800 million cubic meters) of which 30% was utilized in irrigation. In 1975, a National Water Master Plan based on a population of 4 million and irrigation on 500,000 ha estimated a water demand of 16% of total flow. Of Mongolia's total 1.3 million ha of arable land, approximately 518,000 ha (29%) are considered potentially irrigable. Mongolia currently has a registered irrigated area of 60,000 ha of which, up to 30,000 ha could be rehabilitated without threatening the available water resources<sup>5</sup>. In addition, the country has a body of trained agricultural professionals and technicians (agronomists and water engineers) to support irrigation and some producers have experience in the use and management of irrigation systems<sup>6</sup>.

15. Added to this production scenario, the demand for irrigated crop produce is set to increase in the light of uncertain finishing rains, climate change, and a changing dietary

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<sup>5</sup> ibid

<sup>6</sup> ibid

pattern as the local population demand increasing amounts of vegetables. With steadily increasing urban populations, reduced kin rural linkages that previously maintained supplies to urban relations, and the increasing wealth, domestic demand for vegetables, the demand for animal feeds (alfalfa), seed wheat and certain fruit will continue to increase. Competition from external suppliers will continue on a seasonal basis until local production systems can maintain continuous year round supplies (from green house production) but the comparative advantage enjoyed by a number of irrigated crops should ensure a demand for the further development of irrigated agricultural land. While productivity responses to improved water supplies is significant (reliable supplies of water have been shown to treble yields of some crops) and water remains one of the limiting resources in agricultural production, the Government considers the return to further investment in irrigation is well justified.

### **III. GOVERNMENT'S POLICY FOR IRRIGATION DEVELOPMENT**

#### **A. Rationale for Public Involvement**

16. The rationale for public involvement is due in part to the fact that two natural resources are the primary ingredients in irrigated agricultural production - land and water. With the Government accepting responsibility for maintaining the integrity of its national resources for use by future generations, there is not only a public element in the use of the asset but also there is certain logic that requires public investment in the development of irrigation infrastructure - particularly in the case of large scale systems where there is potentially a significant impact on water resource and long term fertility of the soil. The Government considers it appropriate to ensure the resources are used in an efficient and sustainable manner and as such, has a vital interest in the development of the resource.

17. In addition, the scale of the investment for larger scaled schemes and the longer term benefits that are derived for the wider water users, suggests that investment in the development of irrigation infrastructure cannot realistically be considered a private initiative. With average holding sizes as they exist in established irrigation facilities in Mongolia, the number of beneficiaries from irrigation rehabilitation and new construction are large providing further argument that the investment is more appropriate one for the Government.

18. Finally, the current land law does not provide for ownership but only the longer term use of irrigated land. While the improvements on land have been privatized, i.e. the head-works, delivery and drainage canals, the land on which they are constructed remain the property of the State. In the case of the smaller irrigation schemes, ownership of the asset and the beneficiaries are more closely linked and are therefore more appropriate to be considered as private investment. For the larger schemes where beneficiaries can be many, investment in irrigation infrastructure is best considered a public investment.

#### **B. Recent Development Initiatives**

19. As indicated earlier, much of the country's irrigation systems were established using budget resources (supported by Russia). The rehabilitation of irrigation schemes was largely ignored until the past 5 years when the importance of water in agriculture was brought home after a number of years of extended droughts and *dzuds*. The Government has sought development assistance from donors to rehabilitate these structures through bilateral and multilateral assistance programs. Apart from two relatively small scale projects directed at irrigation rehabilitation, there has been little support for such activities. In recent years, the Government has demonstrated its intention to accelerate rehabilitation and has provided significant allocations from the budget for irrigation rehabilitation on a cost sharing basis with its private sector owners.



### **1. Government Initiatives**

20. The Government has promoted the development of small scale irrigation through the Green Revolution Program between 2001 and 2004. These were primarily used for horticultural crops and comprised the supply of irrigation equipment at a 50% subsidy. Funds for the program were obtained through the 2KR Program and implemented through the budget processes. Many producers were able to purchase irrigation equipment for small scale systems to irrigate up to about 3 ha of crop. Repayments to the Government were scheduled over a three year period with no interest being charged on the 50% that was to be repaid by the beneficiary.

21. Government is supporting the rehabilitation of irrigation schemes through its Irrigation Program which provides state budgets on a cost-sharing basis managed by the MoFA. The program commenced in 2004 with a planned 5,000 ha of irrigated land to be rehabilitated at a cost of Tg 2.8 billion (\$2.5 million). The area to be rehabilitated was spread over 13 schemes in eight aimags with areas ranging from 54 to 732 ha. The average budgeted rehabilitation cost was \$194,299 per scheme with a range of \$56,280 to \$482,574. The average cost per ha was \$607 and ranged from \$154 to \$1,575 per ha. The then ownership structure of the rehabilitated schemes included three limited liability companies, nine private companies and one co-operative, none being state owned. The companies were to contribute 72% of the total investment with the Government's 28% being financed from grants (14%) and a loan for the remaining 14%, repayable over 5 years to the Government. In reality, the minimum company contribution was 30% on one scheme while another three contributed between 85% and 91% of the rehabilitation cost.

22. Priority was given to those schemes that provided access to small producers and that were typically of less than 100 ha. Investment proposals were sought by the Government (MoFA) and tenders were reviewed by the Tender Commission which established a committee of technicians, irrigation experts, audit and financial representatives to carry out the bid evaluations. Proposals required professionally prepared designs, budgets, letters from local government showing support and agreements on water use and rates had been established, forecasts of employment generation and financial statements. The Irrigation Rehabilitation Program has been extended into 2006 in spite of the mixed results from this intervention. The Program is now intrinsically linked to support irrigated wheat production as part of the Government's policy to achieve self sufficiency in wheat production, but does not provide for production of more profitable crops. The linking of the two objectives is considered to be a market distortion and, given the relative profitability of wheat production compared with other alternatives, is unlikely to achieve its goal of self sufficiency.

### **2. Donor Funded Initiatives**

23. Three recent projects have had significant irrigation rehabilitation activities that have been donor funded: (i) FAO/UNDP funded Technical Cooperation Project for Small Scale Irrigation; (ii) TACIS funded Integration of Cropping and Livestock Project, and (iii) the ADB funded Agricultural Sector Development Project.

24. The Technical Cooperation Program Project for small-scale irrigation was completed in 1997/8 by the Investment Center of FAO. This work resulted in the installation of thirty-three small-scale hand movable sprinkler irrigation sets (each irrigating 0.86 ha) manufactured in China. These portable irrigation sets were installed within existing irrigation schemes where water supply was assured and irrigation experience available. The engines, pumps, aluminum piping and fittings and sprinklers were all supplied by the China National Agricultural Machinery Corporation, Beijing in 1998. The project relied upon the delivery of water through primary and secondary canals that have subsequently become inefficient in

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delivering water in the required volumes due to lack of maintenance and water supplies are no longer assured. The mechanisms for collecting water user charges had not been developed under the project and the benefits consequently un-sustained.

25. In 2002, the Integrated Livestock and Crop Project funded the installation of a number of pivot irrigators to stimulate the production of seed wheat in both the central cropping area and in the west on existing irrigation facilities. These capitalized on the cheap supply of water at the field being irrigated as the supply infrastructure remained in tact providing for very cheap operations (being gravity fed). This investment was made for the benefit of private companies in the hope that the quality of seed wheat would be dramatically improved from the intervention. Whilst the pivot irrigators remain in sound operational condition, its intended impact has not been achieved as the owners have elected to produce fodder crops on the irrigated area to support their livestock rearing activities.

26. The ADB funded Agriculture Sector Development Project has rehabilitated a number of small scale irrigation systems under its cooperative development component for hastily formed cooperatives to justify the expenditure as specified in the loan agreement. These associations were not natural groups and the cohesion was weak amongst its members with beneficiaries refusing to honor loan repayment obligations (even though they were made on concessional terms) as well as failing to contribute to the operations and maintenance of the system. As a consequence, the structures rehabilitated have fallen into disrepair and the full impact from the intervention has been diminished. Also given the relatively small amount of funds available for rehabilitation (Tg 10 million per scheme), the works completed were not sufficiently comprehensive to provide for the longer term operation of the rehabilitated systems.

### C. Future Development Strategies

27. Given the importance of water in the cropping sector and the Government's commitment to self sufficiency in wheat production, to import replacement in horticulture, and to increasing production of livestock feed material to support its domestic livestock industry, the further development of irrigated agriculture is a major component of the Government's overall development strategy for the sector. The main thrust of the Strategy seeks to improve competitiveness, reduce vulnerability, and improve sustainability of agricultural production through the creation of an enabling environment, developing government capacity to support sector development and minimize the impact from negative occurrences associated with agricultural development. Initiatives in the cropping subsector are closely linked to the Government's desire for food self sufficiency, the impact of urbanization on domestic demand for a broader range of quality foodstuffs, and the effect of competition from imports and opportunities for export resulting from developments in neighboring markets.

28. Productivity improvements will be required to maintain the **competitiveness** of the cropping subsector primarily by improving access to water resources. Such investment is unlikely without creating the necessary security of land tenure for investors so that their capital investment can be protected into the future. In terms of **reducing vulnerability**, the main source of vulnerability lies in the irregularity of water from all sources. Because of drought frequency, producers generally tend to expect there will be a complete crop failure one year in five when standing crops will not even be harvested. In situations where large irrigation systems have fallen into disrepair, the Government considers their rehabilitation as a public investment to reduce vulnerability to erratic natural precipitation. In situations where smaller scale irrigation facilities either need repair or development, the Government is considering providing concessional term finance to ease the burden of commercial interest rates that cannot be afforded at current levels of productivity as incentives for producers to secure improved water resources for their cropping activities. As for **sustainability**, soil

fertility is currently threatened by the use of inappropriate land preparation techniques that progressively reduce soil organic matter and damages soil structure in the cropping sub-sector. Extensive damage has been recorded to both with some 90% of cropland considered degraded<sup>7</sup>. Appropriate land preparation techniques coupled with improved water management practices to irrigated land will assist in preserving the fertility of croplands into the future.

29. The Government is therefore committed to the rehabilitation of large scale irrigation schemes so that the smaller producers who derive their livelihoods from irrigated agriculture can improve their productivity, reduce their vulnerability in a sustainable manner that will contribute to employment creation and poverty reduction. The Government will allocate budgetary resources, international development agency loans and bilateral assistance to the rehabilitation of irrigation systems to achieve this outcome. It will also support the redevelopment and expansion of small scale irrigation systems through the provision of technical advice and where considered appropriate, subsidized credit as an incentive for private investment.

#### **IV. THE PROPOSED PROGRAM**

##### **A. Overall Objectives**

30. The objective of this Irrigation Rehabilitation and Construction Program is to develop such a responsive system, allowing crop producers to sustainably increase their profitability by controlling the risks from drought, improving productivity and quality, diversifying to higher value and higher productivity crops, and adapting to the risks of climate change. It intends to do this by introducing changes into the management and funding process so that future decisions on irrigation are factored into the mainstream of government and private sector decision-making. By creating an enabling environment, it is anticipated that private sector initiatives in crop production will be stimulated and realized to the benefit of individuals and the community.

##### **B. Program Components**

31. Three components to the Program include:

- The physical improvement of the irrigation network, including both rehabilitation of existing systems and construction of new irrigation infrastructure at primary, secondary and tertiary levels, as well as expansion of areas served by these systems through appropriate use of new small-scale sprinkler technology and enhanced tertiary distribution and drainage systems. With both public and private investment envisaged, this component will address issues relating to the economic justification, security of investments, mechanisms for generating an acceptable return, and mechanisms for meeting future O&M costs.
- The more effective use of irrigation by crop producers assisted through technical and business support services and by improvements in land and water tenure rights to support the longer term security of investments.
- Capacity building at central and local government levels to strengthen the process of decision-making, contract management, and engineering supervision for new works. The component will introduce mechanisms for monitoring and supervision of systems

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<sup>7</sup> Selenge Aimag report in May 2006.

operation and provide an enabling environment to promote both irrigation investment and use. An integral part of this will be the development of an overarching policy for irrigation development, determining the criteria and mechanisms for public and private investment and structures and procedures for regulatory supervision of investment, operation, and utilization.

### **1. Expansion of the Irrigation Network**

32. This component seeks to stimulate the expansion of the area under irrigation from the supply side through physically enhancing the supply network, both in terms of infrastructure and the availability of equipment for subsequent water delivery. Elements include:-

- direct public investment in the rehabilitation of existing systems;
- private investment, either in new systems or in the rehabilitation of facilities transferred from the public sector;
- organization of water users, both to properly use the irrigation systems and to promote investment in tertiary distribution and water delivery equipment to expand the area covered.

33. To stimulate such investment in infrastructure requires an enabling environment to remove constraints to investment by the private sector, including tenure rights on facilities and land, contractual arrangements and their management and supervision, and appropriate water resource exploration and management systems to ensure economic and environmental sustainability for both new and existing systems.

#### **a) Public Investment**

34. The Program envisages rehabilitation of existing irrigation structures and investment in new facilities financed from both public and private sources, sometimes in tandem. It is anticipated that the criteria under which the state would consider using public resources would be established in the policy document to be developed under the Program (section a)). With continued tight budgetary resources, public financing would have to take place through the use of donor funding, either directly through investment grants or loans or indirectly through, for example, the use of revenue generated by the monetization of food and other commodity aid. Either way, investment decisions would have to be justified through detailed assessment of the economic and social benefits to producers and downstream processors, and take into consideration the need to generate a return on investment sufficient to meet any capital and operating expenses, including loan repayments. Environmental issues would also need to be addressed, and the impact of both rehabilitation and new schemes assessed.

35. Before any investment can take place, the economic and environmental benefits will need to be assessed. MoFA's capacity to undertake such an assessment is limited and the Program envisages support for strengthening that capacity (section IV.B.3.c)). In this it will coordinate closely with the Institutional Capacity Building Program which, among other things, will enhance the ability to evaluate the impact of programs and investment, and adjust them accordingly, within the context of the sector strategy and its implementation through the medium term budgetary framework (MTBF).

36. For rehabilitation decisions, a detailed inventory of existing facilities will need to be conducted<sup>8</sup>. This must include both an assessment of the hydrology of the catchment and

<sup>8</sup> The existing schemes were laid out to use Russian mobile sprinkler booms for production under State farms. While the sprinkler booms are no longer in use, the systems are suitable in structure and layout for use by

use areas to ensure that the capacity of resources is sufficient to meet the demands of the scheme, and the economic impact of rehabilitation on potential users, to justify the level of expenditure. This inventory will be undertaken as part of the process for formulation of a medium term policy (section IV.B.3.a)). For new works, it may be necessary to conduct survey and exploration work to establish adequate and appropriately located water resources (section IV.B.1.d)). Both these activities could be subcontracted to private organizations.

37. The budget for the Program does not include an amount for capital expenditure on rehabilitation and new works, whether public or private. At this stage, before the criteria are established in the policy and the assessment of the need for and cost of rehabilitation and new works is completed, it is impossible to realistically estimate the sums required. In any case, financing of capital works will come from extra budgetary sources, either the private sector, dedicated donor programs, or non-budgetary revolving funds<sup>9</sup>. While it would be possible to use an estimated cost of rehabilitation of, say, US\$1000/ha, it should be noted that costs under the Government's Irrigation Program in 2004<sup>10</sup> ranged from US\$154 to US\$1,575 a hectare.

### **b) Private Investment**

38. Ownership of irrigation works can take many forms. Public ownership can be at State or local Government, most likely soum level. Private ownership can include corporate ownership of primary and secondary facilities, including the head works, with or without ownership of tertiary distribution networks. Such tertiary networks may generate a rent of service fee from users of the water or, alternatively, these users may seek to own the network, whether as communities, WUGs, or individuals. Ownership may also be through partnerships between the state and private investors and/or user groups. The legal and regulatory environment around ownership and operation of irrigation works, and around the rights and obligations of owners and users, is by no means clear. This presents a potential stumbling block for private investment and development, both in irrigation and farming. Several schemes have already been privatized at the head works, posing a challenge for development of the secondary and tertiary network, and introducing new uncertainties for investment.

39. In recent years, Government has promoted the concept of Private Public Partnerships (PPP) in irrigation rehabilitation and management. For new schemes, the private investor puts up 20% and Government then adds 80% as a concessional loan (zero interest but three years' repayment). For rehabilitation, the private investor has to commit 40% of budgeted costs, after which, based on an assessment by the Ministry, Government provides a grant for the balance of 60%. To qualify, however, the enterprise must plant the irrigated land with a previously agreed crop (usually wheat in support of Government self-sufficiency objectives) for an extended period of years. Should the land be left fallow or an

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smallholder vegetable producers with less than one hectare of land and potato producers with up to five hectares. Both these combine effectively with the layout of the existing schemes and the use of new small scale irrigation equipment.

<sup>9</sup> Use of these funds for longer term investment is preferable to previous short term concessional finance and input provision to failing crop and livestock producers.

<sup>10</sup> The Program is to rehabilitate systems covering 25,000 ha by 2008, further funding being approved for 2005. In 2004, 13 schemes encompassing 4,163 ha were rehabilitated at a total cost of Tg 2.8bn. Spread over eight aimags (four in Selenge, two in each of Dornod andUvs, and one in each of Bulgan, Tuv, Khuvsgul, Ulaanbaatar, and Govi-Altai), and range in size from 54 to 732ha. The average scheme size was 320 ha, and the average cost US\$194,299 or US\$607 a scheme, but costs ranged from US\$56,280 to US\$482,574 and averages from US\$154/ha to US\$1,575/ha. These costs, however, are not complete. As noted in the text, private investors are supposed to put up 20% of the costs of a new scheme and 40% of those of rehabilitation, but in practice the minimum private contribution was 30% on one scheme, while at the other end three contributed 85-91%.

alternative crop be planted, the enterprise is bound to repay the grant. The private contractor is able to use the water for its own land, but can also charge other beneficiaries of the scheme for any water used (based on land area and throughput). Charges are based on a rating system determined by the local Soum Government, which can, therefore, vary across the country.

40. Under this Program, alternative mechanisms for private investment in irrigation systems will be examined, including without restrictive clauses as to crop or the use of concessional funding (although recent practice will make it difficult to encourage investment without such public contribution). Whatever the arrangement, however, it is important to provide investors with security of tenure over the infrastructure and associated land, and rights to water utilization and onward sale (water though technically free of charge under the constitution is subject to use and service charges under the Water Law). This may involve primary or secondary legislative amendment (section IV.B.3.b)), but will also require appropriate transparent mechanisms for dispute resolution both before the investment and after it has been made and the system is functioning.

41. Once requirements for a legal title and tenure security is determined, it will be necessary to institute a mechanism to enable such rights to be registered swiftly if investment is to be forthcoming. This may require the fast-tracking of adoption of legal and regulatory reforms or the operation of a fast track registration process under existing legislation<sup>11</sup>. This will be clear when the need for legislative and regulatory amendment has been determined.

42. The nature of contractual relationships between the State and private investors under these PPP arrangements also needs to be clarified. Agreements should be transparent and rights and obligations of both parties clear. Ownership issues need to be resolved, especially where the agreement transfers ownership of public assets to the private sector, and new ventures need to be fully accountable and fiscally responsible. To achieve this, the Program will examine the legal environment surrounding such agreements and introduce legislative, regulatory, and procedural amendments as required.

### **c) User Organizations - Water Users' Groups**

43. The organization of those farmers able to benefit from the water provided under each irrigation system into one or several water user groups (WUGs) that have already been established as an appropriate mechanism to:-

- develop the tertiary distribution network;
- ensure adequate attention and resources are paid to maintenance and repair;
- organize operation of pumps and sluices (where appropriate) and provide for system security; and
- arrange for the collection and management of charges (both to meet costs imposed by operators of primary and secondary systems and to generate resources for operating, maintenance, and repair activities).

44. Usually a Board of Directors or Management Committee is elected to manage the scheme, with specific responsibility to establish budgets, set and collect fees for water use and ensure that maintenance procedures are properly undertaken. Regular operations and maintenance are undertaken by scheme employees while larger repairs, maintenance and

<sup>11</sup> Under the 2004 Water Law, contracts and licenses for water use are to be registered by the administration at Soum level. Registration of ownership and title to land and facilities is less clear, relating to outstanding issues for the registration of rural land ownership and possession generally.

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upgrades are undertaken under contract by commercial firms, usually after competitive tender. Furthermore, particularly in light of private sector operation of the upstream systems, but equally for publicly owned and management networks, WUGs provide a countervailing power base to protect the rights of farmers and promote their interests. At the same time, they provide a vehicle for the transfer not only of the management of their operation and maintenance but also the ownership of tertiary distribution systems from the public to the private sector.

45. Despite these benefits, however, WUGs are either currently non-existent or inactive, and their legal status yet to be established<sup>12</sup>. Under this Program, Government will ensure that an appropriately facilitating legal environment is in place to support the development of WUGs (section IV.B.3.b)). Once the legal and regulatory framework is established, the Program will seek to promote WUGs in parallel with investments, by both the public and private sector, in irrigation systems. At the same time, WUGs will be organized and strengthened, if appropriate, for existing irrigation systems, including those privatized under the 2004 program.

#### d) Supply of Delivery Systems

46. Most irrigators now use some type of surface irrigation (furrow, bay, basin) for small family-farm vegetable production. Although such surface irrigation will continue to be used for some limited areas, it can be inefficient on Mongolian's sandy soils<sup>13</sup>. Water infiltrates the soil at or near the point of application so that large volumes of water are needed to reach the whole field. Distribution of water is poor and much is wasted at the top end of the field. This can contribute to a rising water table and reactivation of minerals leading to salinization. However, existing schemes commonly use small scale surface irrigation on bays of 20m x 10m. These are operating satisfactory because they can be filled quickly and attain uniform distribution. Although labor inputs are high, capital cost is low and no equipment is required.

47. The small scale of most irrigated farms suggests that equipment provision should focus on small scale sprinkler equipment, with the few larger producers seeking out wheel driven, hose/reel and pivot systems. Several hundred small scale sprinkler irrigation sets are now available. These sets can easily deliver the water required for vegetable production in July on small holdings of less than one hectare, and can be adapted with multiple spray lines to meet the needs of larger holdings up to 5 ha. For larger holdings of up to 30 ha, producers can choose to use multiple sets of small-scale sprinklers, manual or mechanical move side roll systems, or hose reel machines<sup>14</sup>. For very large areas of up to 100 ha, central pivot sprinklers are appropriate<sup>15</sup>. There is also a growing interest in drip irrigation, particularly with greenhouse growers in the Ulaanbaatar area, but its use is likely to be limited to a few operators in the medium term because of the high capital cost, the need for scarce chemical inputs to flush the system, and the high level of management required to properly maintain and use the system.

<sup>12</sup> The legal structure of co-ops, which have a similar function, has proceeded in a fashion that both unnecessarily dictates the size and structure of the group. A legal basis for WUGs would seek to avoid these problems.

<sup>13</sup> Many of the soils in Tuv and Selenge fit this profile and are not suitable for surface irrigation.

<sup>14</sup> EC-TACIS funded ICLP investigated different irrigation equipment, primarily for wheat seed production, but also for potato production. Their results showed that while the Chinese hose reel equipment may be constructed to lower standards than other country suppliers, it was lower cost (due in part to lower transport costs) and access to spare parts was easier. To get maximum use from the equipment, ICLP recommended "charging" irrigation should be done in spring and autumn with machines operated 24 hours a day during the peak growing season.

<sup>15</sup> Although some Russian pivot systems are still in use in Mongolia, new and second hand centre pivot systems are now being imported from Europe and North America by large farming enterprises.

48. An irrigation equipment supply company has recently been established in Ulaanbaatar. Other suppliers provide irrigation equipment and parts upon request. Numerous options for small scale irrigation equipment are available through Russia, Japan, Hungary, and Australia among other countries but have yet to be marketed in Mongolia. Larger companies seeking irrigation equipment do their own research and sourcing through the internet, or through other procurement networks and trips to Europe and North America.

49. Although decisions to procure such equipment rest with private producers, the Program intends to support the spread of such equipment in two ways. First, through MoFA or Mongolian State University for Agriculture (MSUA), the technical and economic performance of these new irrigation equipment systems will be evaluated for their suitability for use in Mongolia (section IV.B.2.e)). Second, MoFA, once its capacity is enhanced, will provide technical support on production technologies (section IV.B.2.d)). In addition, MoFA through the Agricultural Development Fund (ADF) and in conjunction with donors will seek to support sustainable private supply mechanisms linked to access to competitive credit.

50. The viability of irrigated agriculture in Mongolia will rest on economic and financial factors more than technical factors. Irrigated agriculture requires large initial investments in infrastructure and equipment and annual expenditures for operating and maintenance expenses. Current commercial interest rates and loan terms are prohibitive for irrigation development and may be the single greatest constraint to the development of the irrigation sector. Although commercial interest rates have fallen since 2002 from 4% to 5% a month to 2.5% to 4% a month, with some preferential rates for very good clients as low as 1.5% to 2.0% a month, rates are still prohibitive for most types of agriculture investments. Further, irrigation equipment purchases require a repayment term of between five and ten years, currently unavailable in Mongolia for agricultural investments. As a result, investment in irrigation will have to continue to rely on support from private financing from the industrial or commercial sector, personal contact with international financial sources, or Government Programs and Projects (either donor funded or based on monetized commodity aid). This suggests that the ability of poor and vulnerable horticulture producers to access the benefits of irrigation will depend on support under Government Programs. To date, however, such support for irrigation has concentrated on larger ventures, often linked to Government's policy on wheat. Under this Program, access to credit, under rigorous repayment terms, is to be promoted for smaller producers.

51. The commodity and financial markets dictate that irrigation resources must be utilized for high value crops that can generate adequate profits to pay all capital and operating costs of the systems. In the immediate future, this would indicate use for horticulture (vegetables, fruits and potatoes) and seed production (field crops and horticulture). In the medium and longer term, irrigation could also be used for a diversified range of high value crops such as oilseeds and, possibly, irrigated alfalfa for the export market. The broad-based use of irrigation for the production of milling wheat is unlikely to be economically feasible given the large investment costs per hectare, prevailing interest rates and the market price of milling wheat. Irrigation trials under the EC-TACIS ICLP found that European hose reel irrigators were not economically viable when used for cereal production alone, but there was some suggestion that the return on capital might be sufficient if a crop rotation including potatoes and other vegetables was adopted.

#### **e) Water Charges**

52. Water users are subject to a fee for water use and a service charge for delivering water. The fee for use under the new Water Law (April 2004) is set by the State Ikh Khural (upon the recommendation of The Commission for Water Price Regulation, with



responsibility for the establishment and monitoring of water prices), but imposed by the soum or district environment ranger<sup>16</sup> after concluding a contract and granting a license for water use (following the decision of the soum or district governor). In 2002, under the previous Water Law (2002), ground water was charged at Tg 20/cu m and surface water at Tg 5/cu m, but rates are not specified within the new law and revisions are, therefore, subject to recommendation by the Commission.

53. Water service fees are set by the citizen's representative khural of the soum or district following negotiation with the owner or possessor of the water facility. Disputes are to be resolved by the soum or district governor, but if not successful the arbitration process moves upwards, first to aimag and then to national level. The rate is expected to reflect the costs involved in delivering the water to the water user, or for example, in the case of irrigation, into the WUG tertiary network. The thirteen irrigation schemes privatized and rehabilitated under the 2004 Irrigation Program charge water users a service charge of between Tg 10,000 and Tg 30,000 per ha to recover operating and maintenance (O&M) costs, the level depending on the particular cost structures of the irrigation systems in question. Under the Program, both water use charges and water service fees will be examined with a view to determining their deterrent or other effect of development of irrigation facilities and recommendations made for adjustment in the way charges are calculated and applied if appropriate<sup>17</sup>.

#### **f) Water Resource Investigation**

54. According to technical assessments prior to transition, the potential exists to substantially expand the area under irrigation. However, actual development even during that period of subsidy was much more restricted, and much of that is today in a state of decay. Of this network, systems serving only 30,000 ha were assessed as viable in 2000, but even these were in need of substantial rehabilitation. Given this situation, any new irrigation development should proceed with caution and will need to be assessed not only from the point of view of the costs and potential benefits but also of the impact on the physical, social, and economic environment.

55. Irrigation systems require high levels of management and monitoring to remain economically viable and prevent environmental damage. Long-term productivity of the land can be threatened if the irrigation system is not well designed, constructed and managed. Drinking water supplies, particularly in the urban and peri-urban environment, can be affected by pressure on the aquifer from high demand and by the run-off of chemicals used on crops.

56. The soil characteristics of Mongolia are mostly sandy loam topsoil over sandy subsoil which can become semi-cemented, forming an impenetrable "hardpan" layer. The hard pan can create water logging and a rising water table, reactivate leached minerals and salts and lead to salinization, seriously damaging soil productivity. The process of "ripping" this hardpan prior to irrigation development should allow proper drainage of the area and help to avoid these problems. The condition needs to be assessed prior to irrigation development going ahead and then monitored regularly afterwards. Water will also need to be regularly monitored to ensure that it is not polluted by the run-off of agricultural chemicals and fertilizers. These risks can be minimized by careful design and good resource management by local governments and farmers.

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<sup>16</sup> As part of the state administrative organization under the authority of the Ministry of Nature and Environment (MNE).

<sup>17</sup> The ADB Crop Production PPTA identified \$53/ha/year as an indicative value for reasonable O&M estimate.

57. Cumulative irrigation use must not negatively impact surface water supplies. Sustainable long-term water yields must be determined prior to new irrigation developments taking place and for this reason, a water resource audit should be undertaken. Ground water resources are easily over-exploited, making detailed water assessments and careful planning, monitoring and management systems imperative. It will be necessary to drill wells or bores and conduct pump testing over the long-term to monitor water levels. Ulaanbaatar's rapid growth has been accompanied by the uncontrolled drilling of wells and boreholes in the peri-urban and ger areas. This could have a negative impact on the supply and quality of water for the city. There is a need for an objective assessment of ground water resources particularly around key urban areas.

58. Adequate monitoring of long term water use in all these aspects will require the upgrading of monitoring systems, including river gauging at existing sites and new stations.

## **2. Adoption of Irrigation Technologies**

59. This component includes a range of technical advisory support including:-

- The stimulation of demand for irrigation;
- The removal of constraints to expansion of areas under irrigation by water users;
- The removal of constraints to and promotion of markets for produce grown under irrigated conditions;
- The dissemination of technical advice and support for irrigated crop technologies; and
- The expansion of crop varieties and cultivation technologies appropriate for irrigated areas in Mongolia through research and development activities.

### **a) Improved Demand for Irrigation**

60. Although the benefits of irrigation are usually self evident, farmers are not always aware of the benefits in terms of income and cash flow that can be derived from the improvement in water management that irrigation affords. Investment in irrigation, whether as a member of a WUG, independent procurer of water from a larger neighboring system, or through construction of channels or the procurement or hire of sprinkler equipment needs to be stimulated through evidence of the market opportunities to be derived from the enhanced commodity selection and concomitant improvement in margins and achieved prices that stem from the productivity and diversification benefits that may (but not necessarily will) be derived from irrigation. Further, different situations, different land and climatic characteristics, suggest different approaches to irrigation, both in terms of technology and use.

61. The Program will strengthen extension messages about the economic benefits of irrigation, pointing to the business opportunities for improved margins, linked to technical messages on irrigated crop technologies, and an understanding of the expanded market opportunities for irrigated crops. This will be tied in with other programs within the strategy, including the Commercialization of Horticulture and Agricultural Support Services Programs.

### **b) Expansion of Irrigation Areas**

62. Key constraints to expansion of the area under irrigation by water users include:-

- uncertainties over land title and tenure security;
- availability of, and access to, quality seeds and other inputs;
- availability of, and access to, irrigation equipment; and
- the level, transparency, and predictability of water use charges and service fees.

63. Issues over land title and tenure are dealt with under the Agricultural Land Utilization and Management Program (though this mainly addresses livestock and pasture issues), but it will be important to ensure that farmers and households have security of tenure over any areas for which they invest new crops and water distribution equipment.

64. Availability of quality seeds falls under the Seed Breeding and Varietal Development Program and, because irrigation is largely about higher value commodities, the Commercialization of Horticulture Program. Improving linkages with inputs suppliers, including on irrigation equipment, is part of the Agricultural Support Services Program. In all instances: seeds, inputs, and equipment, there are also important linkages with the need to improve access to agricultural credit, dealt with under the strategy in the Access to Term Credit Program.

65. Charging systems are discussed in section IV.B.1.c). The level and system for collection of charges must not only be transparent but also take account of the economic or commercial benefits to be derived from the use of irrigation. The Program will examine these systems to ensure that they do not constitute an impediment to crop farmers transferring to irrigated production, and where they do this will be rectified. With administration at the soum level, this element will be largely addressed in conjunction with subcomponent IV.B.3.b) on the legislative environment and IV.B.3.e) on the strengthening of the capacity of soum authorities to meet their responsibilities in connection with irrigation.

### **c) Constraints to Market Access**

66. With severe constraints on the opportunity for food exports, any decision to invest in irrigation must take into account the size and characteristics of the domestic market. This includes food processors and manufacturers. Key elements to be addressed in this connection include factors affecting market access, such as:-

- quality requirements and price levels;
- competition from imports;
- health and hygiene/food safety requirements; and
- links between producers, processors, manufacturers, and consumers - i.e. market distribution and supply chains.

67. It is important that any extension messages and research activities are focused on the opportunities presented by the market. Other programs in the strategy deal with some aspects of these in detail, including the Commercialization of Horticulture, Strengthening Food Quality and Hygiene Standards, and Strengthening Market Linkages Between Livestock Producers and Processors Programs (the latter less directly though it is expected to be extended to also cover products from cropping).

68. Yields for potatoes and vegetables range from 5.6 - 12.7t/ha, which is well below international levels achieved elsewhere. By comparison, yields of potatoes and carrots in western Canada (Alberta) average 23-28t/ha and 22-37t/ha, respectively<sup>18</sup>, or two to four times higher than in Mongolia which share similar climatic conditions. Relieving input and management constraints could significantly increase local production of potatoes and vegetables without further expanding irrigation<sup>19</sup>. If productivity increases are combined with large expansion in irrigated areas, there is a real potential for local market saturation. It is

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<sup>18</sup> Alberta Agriculture "Fresh Vegetable Market Gardening Industry" April 1, 2004.

<sup>19</sup> Preliminary findings by the Swiss Development Corporation funded Seed Potato Project show up to a tripling of yields with the introduction of new varieties.

important that irrigation development proceeds in response to market demand so that markets are not saturated leading to price decreases, and irrigation investments are accompanied by the training and access to inputs that will improve productivity so that the individual farmer can generate the net returns necessary to pay for the irrigation investment.

#### **d) Technical Advisory Support**

69. Irrigation can not be considered a magic bullet for improving agricultural productivity. MoFA data show that 62% of potato and 88% of vegetable production is already irrigated, yet yields remain very low by any international standard. Water is only one, albeit critical, piece of the productivity puzzle. Without knowledge to properly manage water, quality seed for appropriate varieties, and access to fertilizers and other production inputs, yield will not increase proportionately to the water input. Furthermore, introducing irrigation without simultaneously relieving constraints in input supply and finance (both short and long-term) could lock producers into uneconomic production.

70. Both expansion of the area under irrigation and better use of the existing irrigated area require the adoption of:-

- better crop variety selection (based on market opportunities);
- improved cultivation technologies (taking account of market requirements on size, variety, quality, quantity, and frequency within the context of localized growing conditions: soils, size of holding, topography, weather, etc.); and
- optimal irrigation technologies (based on water sources and volume, equipment and servicing prices and availability, and the margins offered by the market).

71. Farmers will need to learn an entire new set of skills to manage irrigation profitably and in a sustainable manner. This includes, but is not limited to, water principles for irrigation scheduling; operating and maintenance of irrigation equipping (sprinklers, pumps, engines); the impact of nozzle changes on water delivery and pump effort; water and soil resource management; variety selection; economics of fertilizer and chemical application; and financial management.

72. For schemes to be viable, farmers must choose from among the varieties of high value crops that have been developed for use under irrigation. These varieties are not currently available in Mongolia as field crops. Further, to achieve optimum yields under irrigation requires the use of large amounts of fertilizer, which is also not currently available in Mongolia, and which could contribute to environmental problems if their use and the run-off from the land is not properly managed. Minimizing these economic and environmental risks will require institutional strengthening for irrigation design and environmental monitoring, plant breeding and variety trials to introduce suitable varieties, and farmer training to support high quality management of irrigated production.

73. Improvement in these services is the subject of several other programs under the strategy, most notably the Agricultural Support Services Program. The Commercialization of Horticulture Program will also be relevant in this regard, as will the Access to Term Credit Program which will link technology improvement with credit supply.

#### **e) Research**

74. To expand the opportunities presented by irrigation and to stimulate new demand for irrigation facilities in response to market opportunities for new or improved products, the Program will promote research to broaden the crop varieties available and to improve cultivation technologies. The results will then be disseminated through the extension network

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and through the demonstration effect of successful farmers. However, the main thrust will take place in the context of other programs pursued as part of the Agriculture Sector Strategy, notably the Research and the Seed Breeding and Varietal Development Programs, and to a lesser extent the Commercialization of Horticulture Program. Should these programs not be implemented or not in a form that addresses the needs of the Irrigation Program, then these elements will have to be developed as specific sub-components of this program.

75. Research, training and extension organizations will need to upgrade research skills in the area of irrigation engineers, water and soil management, irrigated agronomy, economics and variety selection and plant breeding. New curricula will need to be developed for university and technical school courses and extension programs and reference materials should be created. Accompanying this, train-the-trainers programs will be needed to support farmer training. Target organizations include MSUA, Mongol Farmers College, Technical Schools, NAEC and aimag agriculture offices.

This latter is relevant for all the programs linked to this component, summarized in Table 5 below.

**Table 5: Adoption of Irrigation Technologies - Links with Other Programs**

Sub-Component	Key Elements	Related Strategy Programs
Stimulation of the demand for irrigation (section IV.B.2.a)	<ul style="list-style-type: none"> <li>awareness raising on market and technical opportunities</li> </ul>	Commercialization of Horticulture Program; Agricultural Support Services Program.
Removal of constraints to expansion of areas under irrigation by water users (section IV.B.2.b)	<ul style="list-style-type: none"> <li>land title;</li> <li>seeds and inputs;</li> <li>equipment;</li> <li>charging systems</li> </ul>	Agricultural Land Utilization and Management Program; Seed Breeding and Varietal Development Program; Agricultural Support Services Program; Access to Term Credit Program.
Removal of constraints to access to markets for irrigated crops (section IV.B.2.c)	<ul style="list-style-type: none"> <li>quality and price;</li> <li>competition from imports;</li> <li>health and hygiene/food safety;</li> <li>access/distribution systems</li> </ul>	Commercialization of Horticulture Program; Strengthening Food Quality and Hygiene Standards Program; Strengthening Linkages Between Livestock Producers and Processors Program.
Dissemination of technical advice and support for irrigated crop technologies (section IV.B.2.d)	<ul style="list-style-type: none"> <li>extension services;</li> <li>business advice;</li> <li>access to credit</li> </ul>	Agricultural Support Services Program; Commercialization of Horticulture Program; Access to Term Credit Program.
Expansion of crop varieties and cultivation technologies (section IV.B.2.e).	<ul style="list-style-type: none"> <li>seed varieties;</li> <li>cultivation technologies;</li> <li>market characteristics.</li> </ul>	Research Program; Seed Breeding and Varietal Development Program; Commercialization of Horticulture Program.

### 3. Capacity Building at Central and Local Government

76. This component involves the establishment of a rational approach to irrigation based on economic opportunities within the context of environmental constraints to protect resource potential for future generations and continued safety of drinking water for the public. It provides for an appropriate legislative and regulatory environment both to promote

investment in irrigation and to safeguard users and the general public. At the same time it seeks to strengthen the capacity of central and local government agencies to fulfill their mandates in the area of water resource management as defined in the 2004 Water Law and other legislation. In this, the Irrigation Program links closely with other programs under the Agriculture Sector Strategy, particularly those with a strong capacity building element.

#### **a) Medium-Term Irrigation Policy**

77. This policy and strategy will provide the framework for activities over the medium term in pursuit of further development of irrigation in Mongolia, and identify the most appropriate approaches to be adopted. It will, on the basis of detailed assessment, determine which of the existing facilities represent commercially viable investments and which should be abandoned.

78. The policy will provide the criteria for any investment by the state in irrigation, but also will emphasize the role of the private sector, both as investor and as the user of improved or managed water supplies. This policy and strategy statement will commit Government to a certain approach over the medium term that will provide the private sector with the policy security necessary to make decisions on investment in irrigation facilities, irrigated crop land, and irrigation equipment supply. Investment requires both the opportunity to make a reasonable return and political and economic stability in the business environment in which the investment will take place. By providing a clear insight into government policy, a major element of this stability will be provided, allowing for an accurate and lasting assessment of investment opportunities and future profit streams.

79. The policy will also define the need for public sector finance and will form the basis of allocations in both annual budgets and the rolling MTBF. Investment funding for the public sector will be sourced either through donors directly or indirectly through the use of funds generated by the monetization of commodity aid. The latter has acted as a deterrent to private sector development in key areas of agriculture while failing to resolve the consequent supply and financing difficulties (notably in quality seeds and appropriate equipment).

#### **b) Enabling Environment**

80. Once a clear pathway has been provided by the policy statement, it will be necessary to ensure that constraints to private investment, both in irrigation facilities and crop production that exist in the legislative and regulatory environment are removed. Significant among these is the continuing uncertainties that result from a lack of secure title to tenure of land and water resources. While a continuing problem for the agriculture sector, this is particularly acute where significant investment in infrastructure and land development is being considered.

81. In this context, the legal status of WUGs and of any private share in the ownership of assets needs to be clarified. WUGs in particular need to have a status that enables flexibility in membership and function, yet clearly defines rights and obligations, and needs to avoid the pitfalls experienced by cooperatives of a too restrictive legal and organizational structure. WUGs are both the consumers of irrigation and the owners and managers of tertiary water delivery systems (whether channels or sprinklers). They are also the payers of water charges and service fees. In this area, also, there is a need for transparency and clarity, and a recognition that levels must be fair and appropriate to the potential benefits in farm profitability stemming from irrigation use. At the same time, investors in irrigation infrastructure require an appropriate return to justify their investment. Government will examine the possibility of a fiscal subsidy for such investors based on their performance in delivery of water to farmers. This could relate directly to the water user charges applied to

the beneficiaries of irrigation schemes.

**Table 6: Need for Legislative Amendment**

Area of Concern	Issue	Required Situation	Action
System and resource ownership	Ownership of irrigation resources and infrastructure unclear or in possible conflict with public access	Tenure rights are clearly defined and protected with effective means of arbitration in the case of dispute promoting a safe environment for investment	Fast track legal and regulatory reform
Legal status of WUGs	Legal status unclear and groups not functioning	WUGs have clear roles, responsibilities and rights in irrigation system ownership and management, and operate under favorable legal and taxation conditions.	Clarify legal status, learning from the co-op lessons
Public-private partnerships for irrigation development	Private-public partnerships going forward with high risk of default on private commitments	An effective system for implementing private-public partnerships in infrastructure development	Review best international practice in PPP, and introduce
Water charges	Lack of transparency in determination of service fees. Uncertainties in the application of water user charges, and in the relation to benefits of water use	Transparent criteria for determination of fees and charges based on profit opportunities derived from water use	Evaluation of affordable levels based on additional profits generated from water use
Return on investment	Capped fees and charges threaten returns	Incremental returns to investors to encourage investment	Introduction of fiscal incentives linked to water delivery

### c) Impact Assessment and Analysis

82. Any developments in the management of water resources require a detailed assessment of the impact on the environment and the local community. Set against this are the benefits that will accrue to the service providers and the water users. MoFA needs to undertake such economic and environmental analysis when considering proposals to upgrade or expand irrigation facilities and/or to promote farmers' adoption of irrigated agriculture. Such capacity needs to be developed within MoFA and the aimag and soum authorities, depending on the scale of developments and the division of responsibilities.

83. However, it will be difficult to make such resources widely available. Farmers and local governments will require support from a technical group consisting of irrigation engineers, agronomists and technicians with survey and soil testing skills. This group should be assembled to investigate irrigation resource availability and suitability, plan and design irrigation systems, offer assistance during construction and installation of irrigation development and ongoing management advice on the agronomic aspects of irrigation. The service would minimize environmental risk associated with inappropriate developments and would contribute to good water and soil management. The responsibilities of this group would include, in response to requests from farmers or local governments and in the process of reviewing irrigation development applications, evaluating the suitability and sustainability of proposed irrigation projects before approvals are given and works proceed. Selection of suitable irrigation sites includes assessing the suitability of the water source (yield of rivers,

stream, dam, borehole, well or catchments), suitability of soil and water delivery and drainage capacities of the existing infrastructure. Design must take into account all technical aspects related to the site, cost-effectiveness of construction and any preparation of the site required to deal with impenetrable sub-soils. Profitable management of the system requires knowledge of the correct amount and timing of water application, selection of crops and varieties, optimum use of fertilizers and agro-chemicals and pesticides to make a profit.

84. A detailed assessment of capacity also needs to be carried out regarding laboratory capacity, testing, monitoring and construction equipment (i.e. capacity to "rip" fields) and the professional standards of laboratory and other technical and professional staff in the area of soil and water assessments and environmental monitoring, irrigation engineering, agronomy and economics. Laboratory capacity may need to be upgraded to fully carry out the range and number of tests to be carried out in relation to water yield monitoring and site assessments. Targeted agencies include MoFA and MNE.

#### **d) Contract Management and Supervision**

85. At the MoFA Irrigation Department there is a need for new skills and knowledge in institutional organization and management including WUG mobilization and their roles, engineering management, agronomic management and irrigation economics.

86. MoFA will be responsible both for the arrangement and management of PPP investments and the supervision of private investment in and use of irrigation facilities. This will require the development of skills related to contract negotiation and supervision covering not only infrastructure development but also services such as engineering supervision and soil and water surveys for environmental impact assessment. It is anticipated that, while responsibility for many negotiation and supervision tasks will remain with MoFA, most activities will be subcontracted to the private sector. This will require MoFA to have skills and procedures suitable for the selection and supervision of such contractors.

#### **e) Soum Capacity Building**

87. Governance and resource management is devolving to the aimag and soum levels where there are limited human resources or physical capacity to undertake these roles and responsibilities. Areas of strengthening to be undertaken include: land and water registration, water pricing, conflict resolution, water use monitoring, water and soil quality testing and monitoring.

88. WUGs are instrumental in transferring ownership and management from the public to the private sector. These groups have yet to operate effectively in Mongolia and considerable strengthening is required to promote their emergence as instrumental groups in resource management. Capacity building efforts should include: clarification of WUGs within the legal and regulatory framework; training of key MoFA, aimag and local government staff in the formation, management and motivation of these groups; development of technical support for the registration, formation and training of WUG members; specific training in WUG management and operational procedures, budgeting, pricing, water use and management, infrastructure use, maintenance and repair and other topics as required.

### **V. INDICATIVE IMPLEMENTATION ARRANGEMENTS**

89. The exact nature of further irrigation development will be determined after formulation of the subsector policy and strategy, based on comprehensive economic and environmental assessments of existing and potential irrigation resources and the consequent impact on crop production, diversification, and profitability to be funded under the Program.



### **A. Capital Expenditure**

90. The main thrust of capital expenditure on physical irrigation infrastructure is anticipated to be from the private sector. This is particularly true of rehabilitation works, where investment is to be encouraged through a joint partnership between the private sector, as provider of new capital and recipient of revenue, and the state as owner of the facility (the capital value of which will be enhanced with rehabilitation and operation). If the criteria developed as part of the policy in response to the inventory of current and potential facilities warrants it, Government may approach donors for investment funding. However, where public investment is justifiable, it is expected that the primary source of funding will be the ADF and similar revolving funds generated from the monetarization of commodity aid.

91. Government may adopt a promotional incentive for private sector irrigation development, especially if there is a ceiling on service fees payable to the owners of irrigation structures. This would take the form of a fiscal subsidy (tax allowance or tax credit) related to throughput. A simple but effective formula would be to relate the subsidy to water use charges (reflecting the amount of water used) rather than service fees (reflecting the cost of construction and maintenance of facilities), thereby making it performance related.

92. Although WUG activities, developing tertiary channels and/or extending the range through sprinklers and other equipment, would also be private sector, no subsidy would be justified as the benefits in terms of profitability from diversification and improved yields accrue directly to WUG members.

93. Equipment supply should also be through private sector suppliers, entering into private arrangements with farmers and WUGs for supplier or trade credits. Government will keep at arms' length from such transactions. If donors continue to promote the sector through equipment provision, despite attempts by Government to convert this to cash grants, these will be sold not to farmers but to equipment suppliers so that Government remains out of the interface with producers. Just as equipment suppliers will provide equipment to farmers only on provision of an up-front deposit of at least a third of cost, Government will extend credit to equipment suppliers on commercial terms that ensure risk is shared. Suppliers will pay between a third and a half of the wholesale price of such equipment (i.e. at rates that reflect the cost of procurement through the market), and meet the balance over the subsequent two years. Default by farmers to suppliers, and by suppliers to Government, will both result in immediate repossession without compensation. Repossessed equipment, after servicing, will be available for resale. Servicing contracts will be an integral part of these sales, with suppliers required to maintain equipment on a regular basis until such time as the final payment transfers full ownership to the farmer or WUG. Even then, farmers will be encouraged to maintain a service contract with the supplier to ensure the equipment has a long and fruitful operating life.

### **B. Budgetary and Contract Services**

Recurrent costs of the program fall within the state budget, and should be reflected in the MTBF. Some activities will be conducted by MoFA and other direct budgetary agencies, others by independent non-budgetary agencies and private companies under contract. These activities include:-

- a full inventory of existing facilities and opportunities for recovery and/or new facilities, with clear decisions on the future course of action based on market potential for produce and its ability to finance service fees and water charges associated with capital costs;
- production of a medium to longer term policy statement on irrigation, based on the

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- inventory and realistic market assessment of opportunities for irrigated crops;
- determination of necessary legislative and regulatory amendments to promote investment in irrigation facilities and in irrigated cropping, plus drafting of such changes and the lobbying of these through the government - national assembly process, as necessary;
- contract negotiation and supervision, including of construction works;
- economic and environmental assessments;
- market and technical advisory services on crop and technology selection;
- research into new varieties and alternative cultivation, irrigation and post harvest technologies; and
- soum and aimag management and supervision responsibilities.

For these activities to be performed effectively, government (through MoFA) will have to allocate appropriate manpower and other resources through the budget, and these will be reflected in the MTBF. Donors, increasingly interested in budgetary support, can be stimulated to support the sector against conditions related to performance in irrigation (and, thereby, effectively supporting these budgetary resource costs). Either way, given that MoFA sees this as a priority area, MoFA will adjust its staffing and financial resource allocations to meet these requirements.

### C. Training and Technical Assistance

94. The main thrust of the program is to improve the support structures that will make private sector investment in irrigation and in irrigated agriculture successful. This requires substantial capacity enhancement both within MoFA and the supervision and management functions devolved to the aimag and soum level, and within related sector support agencies dealing with extension, training, and research. Increased capacity will derive in part from training and strengthening of in-house capacity, in part from an extension of resources through sub-contracting to specialist, usually private, service agents, where these exist. Had sufficient private sector capacity existed across all these areas, all of these functions could have been subcontracted and, in the medium to longer term, it is anticipated that the majority will be.

**Table 7: Irrigation Program - Specialist Requirement and Need for Enhancement**

<b>Program Specialist Activity</b>	<b>Anticipated Nature of Supply</b>	<b>Method of Strengthening</b>	<b>Financing Mechanism</b>
Policy development, including inventory and assessment of facilities and support mechanisms, and links into the MTBF	MoFA Strategic Policy Dept with support from Irrigation Division	technical assistance - economists and irrigation/water engineers	possible donor TA project (as initially one-off activity), or subcontracting of local economic and engineering consultants as development expenditure through state budget or ADF etc.
Legal drafting, especially land and water tenure, PPP etc. arrangements, and WUG structures	MoFA Strategic Policy Dept with support from Irrigation Division	technical assistance - legislative and contract lawyers	possible donor project (as one-off activity), or subcontracting (also involves other ministries) as development expenditure under

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<b>Program Specialist Activity</b>	<b>Anticipated Nature of Supply</b>	<b>Method of Strengthening</b>	<b>Financing Mechanism</b>
			state budget or ADF etc.
Contract negotiation and management (incl. PPP)	MoFA Irrigation Division responsibility but implementation through subcontracting	contracting of consulting engineers	recurrent budgetary expenditure
Engineering and/or supervision (PPP contracts, boreholes etc.)	MoFA Irrigation Division responsibility but implementation through subcontracting	contracting of consulting engineers	recurrent budgetary expenditure
Survey and exploration	MoFA Irrigation Division responsibility but implementation through subcontracting	contracting of specialist survey and exploration consultant engineers	recurrent budgetary expenditure
Water resource monitoring - soil and water analysis, periodic inspections	MoFA Irrigation Division responsibility but implementation through subcontracting	contracting of specialist water and soil analysts	recurrent budgetary expenditure
WUG development, support for formulation, management training and related organizational activities (marketing, production, input and machinery purchase etc.)	MoFA Implementation Department, notably, but not exclusively, Irrigation and Crop Divisions	technical assistance - economists, lawyers, etc. with expertise in group mobilization and motivation, business development etc.	possible donor funded project (as one-off activity) or ADF etc.; or budget development expenditure
Economic evaluation of irrigation benefits, alternative cultivation and irrigation technologies (incl. assessment of different equipment), economic level of charges. Translation of results into beneficiary awareness/education	MoFA Strategic Planning Dept, with Implementation Department (Irrigation/Crops), plus Extension (affected by other Programs on support services and institutional capacity strengthening)	technical assistance in economic analysis (and in training in economic analysis - see Institutional Capacity Building Program)	possible donor project, or subcontracting of local consulting firms under state budget
Technical support - business advice on choices of crops and technologies based on market opportunities, backed by technical advice on cultivation and post harvest technologies. Includes training of trainers (advisers - agronomists, economists) and demonstrations,	Extension services, supported by research institutions (affected by the Agricultural Support Services and Research Programs)	technical assistance in extension, business and technical advice packaging and dissemination, backed by resources for training and demonstration activities	possible donor project, or subcontracting of local consulting firms under state budget
Alternative crop and technologies development and assessment against grower/water user	Research institutions under contract (affected by other Programs on seeds and research)	possible technical assistance - technical (crop, and irrigation, cultivation, post harvest technology),	possible donor project, or state budget funding out of research budget, priorities determined by advisory group

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<b>Program Specialist Activity</b>	<b>Anticipated Nature of Supply</b>	<b>Method of Strengthening</b>	<b>Financing Mechanism</b>
profitability		economic/farm business specialists	(including producers, economists etc.)
Soum (plus aimag as determined) level training and development in water management, charges determination etc.	need to resolve mixed responsibilities of Ministry for local government, MNE, MoFA, and Inspections Agency	technical assistance in determination of training package and training of trainers, subcontracting for implementation	possible donor project, including other elements of local government strengthening, but also recurrent element under state budget

**VI. SUMMARY COST ESTIMATES**

95. A summary of indicative cost estimates and possible funding sources is presented in Tables 8 for physical inputs and Table 9 for the cost estimates.

Unit Cost		Quantities										
Unit	(Tugrik '000)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
<b>I. Investment Costs</b>												
<b>A. Expanded Irrigation Areas</b>												
<b>1. Direct Public Investment</b>												
Prepare scheme inventory, hydrological assessments etc.	study	5,800	5	10	20	20	20	20	-	-	-	95
Technical and economic assessments of proposed rehabilitations	scheme	9,280	5	10	20	20	20	20	-	-	-	95
Civil works rehabilitation contracts	ha	1,392	500	1,000	1,000	2,000	2,000	2,000	2,000	2,000	-	13,500
Construction supervision contracts /a	unit											
New civil works contracts	ha	2,552	-	-	-	3,000	3,000	3,000	3,000	-	-	15,000
New civil works supervision contracts /b	unit											
<b>Subtotal Direct Public Investment</b>												
<b>2. Legislation Development for Land and System Ownership</b>												
TA to identify ownership solutions	pnmths	29,000	6	-	-	-	-	-	-	-	-	6
Resources to accelerate issue of land title	owners	2,320	10	20	20	20	20	10	10	10	10	150
TA to develop options for PPP arrangements	pnmths	29,000	-	9	-	-	-	-	-	-	-	9
Support for irrigation equipment supply enterprises	year	5,800	1	1	1	1	-	-	-	-	-	5
<b>Subtotal Legislation Development for Land and System Ownership</b>												
<b>3. Strengthened Cost Recovery Mechanisms</b>												
TA for development of water tariff regulations	pnmth	26,680	12	-	-	-	-	-	-	-	-	12
WUG modus operandi development	year	5,800	1	1	1	-	-	-	-	-	-	3
Promotion of WUGs	Year	5,800	4	4	4	4	-	-	-	-	-	20
Training in estimating the service charge for water delivery	year	2,320	4	4	4	4	-	-	-	-	-	20
Training in roles and responsibilities of WUG members	year	2,320	4	4	4	4	-	-	-	-	-	32
Support for national WUG association	year	3,480	1	1	1	1	1	1	1	1	1	10
<b>Subtotal Strengthened Cost Recovery Mechanisms</b>												
<b>4. Environmental Monitoring and Water Inventory</b>												
Resource assessment survey	pnmth	11,600	4	4	4	4	-	-	-	-	-	16
Routine irrigation system and groundwater monitoring	year	23,200	1	1	1	1	1	1	1	1	1	10
<b>Subtotal Environmental Monitoring and Water Inventory</b>												
<b>Subtotal Expanded Irrigation Areas</b>												
<b>B. Increased Utilization of Irrigation</b>												
<b>1. Producer Awareness Raising</b>												
Farmer training	year	1,160	4	4	4	4	4	-	-	-	-	20
<b>2. Removal of Area Constraints</b>												
Promotion of irrigated crop seed producers	year	23,200	1	1	1	1	1	-	-	-	-	5
Support for irrigation sprinkler and equipment suppliers	year	11,600	1	1	1	1	1	-	-	-	-	5
TA for refinement of leasing law to accommodate irrigation equipment	pnmth	5,800	-	3	-	-	-	-	-	-	-	3
Seminar on water utilization and associated economic costs	seminar	3,867	1	1	1	-	-	-	-	-	-	3
<b>Subtotal Removal of Area Constraints</b>												
<b>3. Improved Market Access</b>												
Market investigations for selected irrigated crops	year	5,800	2	2	2	2	2	-	-	-	-	10
Development of quality standards for irrigated crops	year	11,600	1	1	1	1	1	1	1	1	1	10
Preparation of supply contracts	year	11,600	1	1	1	1	1	-	-	-	-	5
<b>Subtotal Improved Market Access</b>												

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<b>4. Strengthened Technical Support Services</b>														
year	5,800	2	2	2	2	2	2	2	2	2	2	2	2	2
set	2,320	5	-	-	-	-	-	-	-	-	-	-	-	5
course	11,600	-	-	-	-	2	-	-	3	-	-	-	-	5
<b>Subtotal Strengthened Technical Support Services</b>														
<b>6. Applied Irrigation Research Initiatives</b>														
year	23,200	1	1	1	1	1	1	1	1	1	1	1	1	1
year	5,800	1	1	1	1	1	1	1	1	1	1	1	1	10
seminars	2,320	1	1	1	1	1	1	1	-	-	-	-	-	5
<b>Subtotal Applied Irrigation Research Initiatives</b>														
<b>Subtotal Increased Utilization of Irrigation</b>														
<b>C. Enhanced Government Capacity</b>														
<b>1. Irrigation Policy Development</b>														
pmnth	29,000	6	6	-	-	-	-	-	-	-	-	-	-	12
year	580	4	4	-	-	-	-	-	-	-	-	-	-	8
<b>Subtotal Irrigation Policy Development</b>														
<b>2. Identification of Legislative Amendments</b>														
pmnth	5,800	12	-	-	-	-	-	-	-	-	-	-	-	12
year	5,800	1	1	1	-	-	-	-	-	-	-	-	-	3
<b>Subtotal Identification of Legislative Amendments</b>														
<b>3. MoFA Capacity in Economic and Environmental Analyses</b>														
proposal	3,480	20	20	20	20	20	20	20	20	-	-	-	-	100
year	11,600	1	1	1	-	-	-	-	-	-	-	-	-	3
set	1,160	1	1	1	-	-	-	-	-	-	-	-	-	3
year	5,800	2	2	2	2	2	2	2	2	-	-	-	-	10
<b>Subtotal MoFA Capacity in Economic and Environmental Analyses</b>														
<b>4. MoFA Capacity Building in Contract Management and Supervision</b>														
set	2,320	1	1	1	-	-	-	-	-	-	-	-	-	3
year	2,320	1	1	1	1	1	1	1	1	1	1	1	1	10
course	11,600	-	-	1	-	1	-	1	-	-	-	-	-	2
visit	11,600	-	-	2	-	-	-	2	-	-	-	-	-	4
<b>Subtotal MoFA Capacity Building in Contract Management and Supervision</b>														
<b>5. Strengthening Soum Water Management Capabilities</b>														
aimag	2,320	11	11	-	-	-	-	-	-	-	-	-	-	22
set	5,800	22	-	-	-	-	-	-	-	-	-	-	-	22
aimag	580	22	22	22	22	22	22	22	22	22	22	22	22	110
year	1,160	22	22	22	22	22	22	22	22	22	22	22	22	110
<b>Subtotal Enhanced Government Capacity</b>														
<b>Total</b>														

1a Estimated at 3% of development cost.

\b Estimated at 3% of development cost.

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Table 9: Irrigation Rehabilitation and Construction Program - Summary Cost Estimate

Unit Cost (Tugrik '000)		Base Cost (Tugrik Million)										Total
Unit		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
Investment Costs												
A. Expanded Irrigation Areas												
1. Direct Public Investment												
study	5,800	29.0	58.0	116.0	116.0	116.0	116.0	-	-	-	-	551.0
scheme	9,280	46.4	92.8	185.6	185.6	185.6	185.6	-	-	-	-	881.6
ha	1,392	696.0	1,392.0	1,392.0	1,392.0	2,784.0	2,784.0	2,784.0	2,784.0	2,784.0	-	18,792.0
unit		112.8	112.8	112.8	112.8	112.8	-	-	-	-	-	563.8
ha	2,552	-	-	-	7,656.0	7,656.0	7,656.0	7,656.0	7,656.0	-	-	38,280.0
unit		229.7	229.7	229.7	229.7	229.7	-	-	-	-	-	1,148.4
		1,113.8	1,885.2	2,036.0	9,692.0	11,084.0	10,741.6	10,440.0	10,440.0	2,784.0	-	60,216.8
2. Legislation Development for Land and System Ownership												
pnth	29,000	174.0	-	-	-	-	-	-	-	-	-	174.0
owners	2,320	23.2	46.4	46.4	46.4	46.4	46.4	23.2	23.2	23.2	23.2	348.0
pnth	29,000	-	261.0	-	-	-	-	-	-	-	-	261.0
year	5,800	5.8	5.8	5.8	5.8	5.8	-	-	-	-	-	29.0
		203.0	313.2	52.2	52.2	52.2	46.4	23.2	23.2	23.2	23.2	812.0
3. Strengthened Cost Recovery Mechanisms												
pnth	26,680	320.2	-	-	-	-	-	-	-	-	-	320.2
year	5,800	5.8	5.8	5.8	-	-	-	-	-	-	-	17.4
Year	5,800	23.2	23.2	23.2	23.2	23.2	-	-	-	-	-	116.0
year	2,320	9.3	9.3	9.3	9.3	9.3	-	-	-	-	-	46.4
year	2,320	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	-	-	74.2
year	3,480	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	34.8
		371.2	51.0	51.0	45.2	45.2	12.8	12.8	12.8	3.5	3.5	609.0
4. Environmental Monitoring and Water Inventory												
pnth	11,600	46.4	46.4	46.4	46.4	-	-	-	-	-	-	185.6
year	23,200	23.2	23.2	23.2	23.2	23.2	23.2	23.2	23.2	23.2	23.2	232.0
		69.6	69.6	69.6	69.6	69.6	23.2	23.2	23.2	23.2	23.2	417.6
		1,757.6	2,319.1	2,208.9	9,859.1	11,204.7	10,824.0	10,499.2	10,499.2	2,833.9	49.9	62,055.4
B. Increased Utilization of Irrigation												
1. Producer Awareness Raising												
year	1,160	4.6	4.6	4.6	4.6	4.6	-	-	-	-	-	23.2
2. Removal of Area Constraints												
year	23,200	23.2	23.2	23.2	23.2	23.2	-	-	-	-	-	116.0
year	11,600	11.6	11.6	11.6	11.6	11.6	-	-	-	-	-	58.0
pnth	5,800	-	17.4	-	-	-	-	-	-	-	-	17.4
seminar	3,867	0.0	-	-	-	-	-	-	-	-	-	0.0
		34.8	52.2	34.8	34.8	34.8	-	-	-	-	-	191.4
3. Improved Market Access												
year	5,800	11.6	11.6	11.6	11.6	11.6	-	-	-	-	-	58.0
year	11,600	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	116.0
year	11,600	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	58.0
		34.8	34.8	34.8	34.8	34.8	11.6	11.6	11.6	11.6	11.6	232.0

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<b>Strengthened Technical Support Services</b>														
Training for irrigation extension workers	year	5,800	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	116.0
Preparation of extension material for irrigation	set	2,320	11.6	-	-	-	-	-	-	-	-	-	-	11.6
Technical specialist training - international	course	11,600	-	-	-	23.2	-	-	34.8	-	-	-	-	58.0
<b>Subtotal Strengthened Technical Support Services</b>			23.2	11.6	11.6	34.8	11.6	11.6	46.4	11.6	11.6	11.6	11.6	185.6
<b>Applied Irrigation Research Initiatives</b>														
Contract applied research through established institutions	year	23,200	23.2	23.2	23.2	23.2	23.2	23.2	23.2	23.2	23.2	23.2	23.2	232.0
Practical application trials of research findings	year	5,800	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	58.0
Research - extension workshops for irrigation	seminars	2,320	2.3	2.3	2.3	2.3	2.3	-	-	-	-	-	-	11.6
<b>Subtotal Applied Irrigation Research Initiatives</b>			31.3	31.3	31.3	31.3	29.0	29.0	29.0	29.0	29.0	29.0	29.0	301.6
<b>Subtotal Increased Utilization of Irrigation</b>			128.8	134.6	117.2	140.4	117.2	52.2	87.0	52.2	52.2	52.2	52.2	933.8
<b>Enhanced Government Capacity</b>														
<b>Irrigation Policy Development</b>														
TA to develop irrigation policy - all aspects	pnrth	29,000	174.0	-	-	-	-	-	-	-	-	-	-	348.0
Consultative meetings with Govt over policy	year	580	2.3	2.3	-	-	-	-	-	-	-	-	-	4.6
<b>Subtotal Irrigation Policy Development</b>			176.3	176.3	-	-	-	-	-	-	-	-	-	352.6
<b>Identification of Legislative Amendments</b>														
TA to prepare legislative amendments	pnrth	5,800	69.6	-	-	-	-	-	-	-	-	-	-	69.6
Legislative drafting support	year	5,800	5.8	5.8	5.8	-	-	-	-	-	-	-	-	17.4
<b>Subtotal Identification of Legislative Amendments</b>			75.4	5.8	5.8	-	-	-	-	-	-	-	-	87.0
<b>MoFA Capacity in Economic and Environmental Analyses</b>														
Support for economic evaluations of proposals	proposal	3,480	69.6	69.6	69.6	69.6	-	-	-	-	-	-	-	348.0
Curriculum development at MNSU	year	11,600	11.6	11.6	11.6	-	-	-	-	-	-	-	-	34.8
Development of training material	set	1,160	1.2	1.2	1.2	-	-	-	-	-	-	-	-	3.5
Provide training to MoFA and regional staff	year	5,800	11.6	11.6	11.6	11.6	11.6	-	-	-	-	-	-	58.0
<b>Subtotal MoFA Capacity in Economic and Environmental Analyses</b>			94.0	94.0	94.0	81.2	81.2	-	-	-	-	-	-	444.3
<b>MoFA Capacity Building in Contract Management and Supervision</b>														
Preparation of training material	set	2,320	2.3	2.3	2.3	-	-	-	-	-	-	-	-	7.0
Local MoFA training in supervision and management	year	2,320	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	23.2
International project management training	course	11,600	-	-	11.6	-	11.6	-	-	-	-	-	-	23.2
International study tour for maintenance and tariffs	visit	11,600	-	-	23.2	-	23.2	-	23.2	-	-	-	-	46.4
<b>Subtotal MoFA Capacity Building in Contract Management and Supervision</b>			4.6	4.6	39.4	2.3	13.9	25.5	2.3	2.3	2.3	2.3	2.3	99.8
<b>Strengthening Soum Water Management Capabilities</b>														
Assistance for irrigation system inventory	aimag	2,320	25.5	25.5	-	-	-	-	-	-	-	-	-	51.0
Refurbish aimag water analysis laboratories	set	5,800	127.6	-	-	-	-	-	-	-	-	-	-	127.6
Training of soum agronomists	aimag	580	12.8	12.8	12.8	12.8	12.8	-	-	-	-	-	-	63.8
Support for environmental monitoring	year	1,160	25.5	25.5	25.5	25.5	25.5	-	-	-	-	-	-	127.6
<b>Subtotal Strengthening Soum Water Management Capabilities</b>			191.4	63.8	38.3	38.3	38.3	-	-	-	-	-	-	370.0
<b>Subtotal Enhanced Government Capacity</b>			541.7	344.5	177.5	121.8	133.4	25.5	2.3	2.3	2.3	2.3	2.3	1,353.7
<b>Grand Total</b>			2,428.1	2,798.2	2,503.5	10,121.2	11,455.2	10,901.7	10,588.5	10,553.7	2,888.4	104.4	104.4	64,342.9

ated at 3% of development cost.  
ated at 3% of development cost.



## VII. IRRIGATION PROGRAM FRAMEWORK

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<b>Goal</b>  To sustainably raise the profitability of crop production through improvements in water management.			
<b>Purpose</b>  To develop an economically and environmentally sustainable irrigation system to enable Mongolian crop producers to: <ul style="list-style-type: none"> <li>• control drought risk;</li> <li>• improve productivity and quality;</li> <li>• diversify the range of crops produced; and</li> <li>• adapt over time to the risks of climate change.</li> </ul>		Operational network of maintained irrigation systems, not dependent on budgetary funding for upkeep;  new unsupported private investment;  active competitive market in the supply of irrigation equipment;  strong competitive demand for fresh and processed products based on irrigated crops.	Continued macro-economic and political stability;  consensus on medium and longer term sector policy;  commitment to market led private sector agriculture;  sustained growth in demand for irrigated crops;  non-interventionist policies in key target markets.
<b>Outputs</b>  1. Improved and expanded economically and environmentally sustainable irrigation networks.	<ul style="list-style-type: none"> <li>• rehabilitated primary (head works) and secondary systems operational;</li> <li>• new systems completed and operational;</li> <li>• increased private sector ownership and participation in irrigation systems;</li> <li>• increased numbers of operational WUGs.</li> </ul>		existing systems suitable for rehabilitation on basis of physical condition, financial cost, economic benefit both direct (i.e. from sale of water), and indirect (i.e. profit generated from crops), and environmental sustainability;  opportunities for profit/return sufficient to motivate private capital;

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<p>2. Increased utilization of irrigation for higher value crop production, based on improved returns to producers.</p> <p>3. Enhanced Govt/MoFA capacity to promote, manage, and supervise investment in the irrigation network</p>	<ul style="list-style-type: none"> <li>expanded irrigated area sown to crops by households, smallholders, and economic entities;</li> <li>extended and improved tertiary distribution networks;</li> <li>increased sprinkler and other delivery systems procured and in use.</li> <li>medium term irrigation policy approved, backed by appropriate budget allocations and MTBF commitments;</li> <li>improved structure, enhanced and trained manpower;</li> <li>contractual procedures and supervision mechanisms overhauled;</li> <li>enhanced private sector investment in infrastructure and delivery systems.</li> </ul>	<p>statistics on crop and irrigated areas;</p> <p>regular physical audit of facilities;</p> <p>business reports on availability and sales of irrigation equipment.</p> <p>MoFA policy document, reflected in budget and MTBF allocations;</p> <p>regulations and procedures defined for PPP and other private investment.</p>	<p>political acceptance of sale of public assets.</p> <p>demand for fresh and processed produce based on irrigated crops sufficient to justify investment in primary and secondary infrastructure and in channeling and equipment.</p> <p>land and water tenure security established through legislative amendment and local government capacity enhancement;</p> <p>high level of coordination and transparency between MoFA, MoF, MNE, and Chamber of Audit.</p>
<p><b>Activities</b></p> <p>1.1 Direct public investment in primary and secondary irrigation facilities, both rehabilitation and new works.</p> <p>1.2 Development of mechanism to secure private title to land used for irrigation systems and to facilities to promote private investment.</p>	<ul style="list-style-type: none"> <li>detailed inventory of existing schemes, including hydrology and soil evaluations to determine potential for cost-effective, energy efficient designs with maximum economic and social benefit;</li> <li>public funding of rehabilitation and other works using direct and indirect donor sources.</li> <li>resolution of legislative and procedural constraints to secure land and water tenure;</li> <li>acceleration of land title registration for irrigation infrastructure and for land served by such facilities;</li> <li>effective, transparent and fiscally accountable forms</li> </ul>	<p>quarterly monitoring reports, audit reports</p> <p>legislative acts and amendments, secondary legislation;</p> <p>registered land titles</p> <p>regulations and procedures on PPP etc.</p>	<p>adequate non-budgetary financial resources;</p> <p>capacity to undertake water and soil resource evaluations, etc..</p> <p>political and macro-economic stability, particularly of exchange and inflation rates;</p> <p>political agreement on the treatment of land and water tenure rights;</p>

	<p>of public-private partnership created for irrigation infrastructure investment;</p> <ul style="list-style-type: none"> <li>• alternative private sector investment in irrigation facilities and water delivery mechanisms developed, including associated financing.</li> </ul>	<p>reports on private sector investment in irrigation facilities.</p>	<p>adequate capacity to effect registration of land and water rights.</p>	
<p>1.3 Strengthening of user organizations and mechanisms to recover operating and maintenance costs.</p>	<ul style="list-style-type: none"> <li>• nature of legal status of WUGs established;</li> <li>• regulations controlling the creation, roles, and operation of WUGs adopted;</li> <li>• WUGs promoted alongside new and existing irrigation facilities supported by technical and business advisory services and training programs;</li> <li>• umbrella organization for WUGs (possibly within NAMAC) formed to represent irrigation users to national level policy forums, and perhaps to provide advisory and other support services;</li> <li>• evaluation of alternative water delivery mechanisms, and improved access to equipment and related financing from the private sector;</li> <li>• rationalization and increased transparency of water charges and water user fees to reflect potential benefit to users.</li> </ul>	<p>decree, secondary legislation on WUGs;</p> <p>number of registered WUGs</p> <p>WUG hierarchy registered;</p> <p>extension report on technical and financial criteria for adoption of alternative water delivery systems;</p> <p>regulations, normative acts on process for determining level of water charges and service fees.</p>	<p>concept of WUGs acceptable to communities;</p> <p>acceptable water rate levels can be agreed to cover O&amp;M costs;</p> <p>value of irrigated commodities sufficient to profitably cover the cost of irrigated water provision (linked to Commercialization of Horticulture and Expansion of Fodder and Feed Markets Programs;</p>	
<p>1.4 Survey and exploration, for alternative water resources for irrigation; regular monitoring of water levels, toxicity etc. of both ground and surface water resources, whether or not exploited.</p>	<ul style="list-style-type: none"> <li>• new cost-effective, energy efficient dams, canals, wells and boreholes undertaken in a controlled and planned manner, based on high quality water and soil resource evaluations;</li> <li>• regular monitoring of water resource capacity and usage, and of environmental impacts, including those resulting from application of agro-</li> </ul>	<p>survey, evaluation reports;</p> <p>monitoring reports'</p> <p>new facilities constructed.</p>	<p>sufficient new resources exist exploitable within economic and environmental cost limitations;</p> <p>capacity for economic and environmental assessment exists (linked to successful implementation of</p>	

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	chemicals in support of growing, affecting potability		Institutional Capacity Building Program.
2.1 Raising producer awareness of the economic benefits of irrigated crops.	<ul style="list-style-type: none"> <li>advantages of different irrigation options in terms of income levels and profitability (as a result of diversification and increased yields) promoted to farmers of all scales, depending on the nature of their land and access to markets.</li> </ul>	extension reports on technical and market evaluations and dissemination programs.	domestic irrigated crops, fully covering irrigation costs, remain competitive with imports and alternative suppliers in key export markets (links to Commercialization of Horticulture, Expansion of Fodder and Feed Markets, Strengthening Market Linkages, and Agricultural Support Services Programs.
2.2 Removal of constraints to the effective expansion of irrigation areas.	<ul style="list-style-type: none"> <li>development of mechanisms to secure title/tenure to irrigated land for producers;</li> <li>improved availability of and access to quality seeds and other inputs;</li> <li>improved availability of and access to irrigation equipment with private sector providing sale and service for a range of types and sizes of irrigation equipment, supported by commercial financing and/or leasing;</li> <li>transparent and predictable water use charges and service fees.</li> </ul>	<p>registration of titles;</p> <p>availability of diversified high value products and reported yield levels of crops grown from quality seeds;</p> <p>private suppliers of a range of irrigation equipment established and equipment available;</p> <p>clear water charging system.</p>	<p>addressed under Agricultural Land Utilization and Management Program;</p> <p>development of seeds undertaken under the Seed Breeding and Varietal Development Program.</p>
2.3 Support for market access for higher value irrigated crops.	<ul style="list-style-type: none"> <li>extension and research focused on meeting market opportunities in the selection of crops and the characteristics of produce sold in the market and to processors;</li> <li>improvements in food quality and safety standards;</li> <li>development of market linkages, including awareness of opportunities developing in key target markets.</li> </ul>	<p>extension and research reports;</p> <p>reports of market and food safety inspectors on food standards;</p> <p>reports on volume of produce and processed goods sales and exports.</p>	assumes successful implementation of Commercialization of Horticulture, and Expansion of Fodder and Feed Markets Programs, as well as elements of Strengthening Food Quality and Hygiene Standards, Strengthening Market Linkages, and Agriculture Support Systems Programs.

2.4 Strengthening of technical support services for irrigated crop production.	<ul style="list-style-type: none"> <li>irrigated crop farmers fully capable of managing equipment and infrastructure, crop production and input use, water and soil resources, and financial planning and management associated with irrigated crop production;</li> <li>local researchers, teachers/trainers, consultants and economists capable of providing technical assistance and economic analysis for selection of crops, and of cultivation and irrigation technologies suitable for irrigated crop production;</li> <li>small scale low cost methods of water harvesting identified and promoted to farmers, especially very-small scale horticulture producers</li> </ul>	<p>extension reports on dissemination and training in cultivation and irrigation technologies, market requirements and opportunities, etc.;</p> <p>reports on output and sales of irrigated crops.</p>	addressed under Agricultural Support Services and Research Programs.
2.5 Enhancement of research into irrigated production technologies.	<ul style="list-style-type: none"> <li>a diversified range of crops and varieties suitable for irrigation available to farmers;</li> <li>improved cultivation technologies suitable for irrigated crops under specific scales and physical circumstances identified and available;</li> <li>local capacity to design and adapt irrigation and water harvesting technology available.</li> </ul>	<p>extension and research reports;</p> <p>surveys of use and procurement of irrigation, water delivery equipment.</p>	Research Program is implemented successfully.
3.1 Determination of medium term policy for irrigation and drainage, and criteria for further investment in irrigation, including a detailed inventory of existing systems.	<ul style="list-style-type: none"> <li>a clear medium term policy statement and strategy integrated into the MTBF, based on a full inventory of existing facilities and assessment for alternative expansion, defining criteria for further investment by the state, the treatment to be adopted with specific existing facilities, and the support mechanisms to be available for private</li> </ul>	<p>policy statement and strategy;</p> <p>budget and MTBF statements;</p> <p>inventory and evaluation of existing irrigation facilities;</p> <p>criteria for public sector investment;</p>	Capacity building in policy based on economic evaluation and impact assessment under Institutional Capacity Building Program.

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	investment in irrigation and/or irrigated farming.	statements on support for private investors.	
3.2 Identification of legislative amendments and regulatory requirements to promote private investment in irrigation facilities and applications, and to ensure effective private operation and management.	<ul style="list-style-type: none"> <li>a complete and coherent legal, regulatory and institutional framework for irrigation development, management and monitoring (including legal status of WUGs and PPP and other ownership arrangements);</li> <li>transparency and certainty in charges and fees, with possible fiscal subsidies to supplement investment returns.</li> </ul>	<p>evaluation of legislative and regulatory amendments required;</p> <p>adopted legislative amendments, regulations and other normative acts.</p>	includes elements from the Agricultural Land Utilization and Management Program.
3.3 Strengthening MoFA capacity to undertake economic and environmental analysis of public investments in irrigation.	<ul style="list-style-type: none"> <li>institutional capacity developed to assess technical irrigation potential (water and land surveys) and environmental impact of new and existing facilities;</li> <li>strengthened capacity to conduct economic assessment of potential benefits from new construction and rehabilitation of irrigation facilities, and select between alternative approaches;</li> </ul>	<p>reports on training in technical and economic analysis, evaluation;</p> <p>water, soil, land use surveys, and EIAs;</p> <p>economic assessments of proposals for new irrigation works, rehabilitation of existing facilities, alternative water delivery systems etc..</p>	addressed under the Institutional Capacity Building Program.
3.4 Strengthening of MoFA capacity in the supervision and management of contracts for the construction and operation of irrigation systems.	<ul style="list-style-type: none"> <li>institutional capacity to conduct contract negotiations for rehabilitation and construction strengthened;</li> <li>enhanced capacity to contract and supervise the development of plans, the conduct of preparatory work (including ripping of hardpan), and the construction and inspection of irrigation systems;</li> <li>capacity enhanced to carry out periodic environmental inspections, monitoring soil and water quality.</li> </ul>	<p>training records;</p> <p>contracts agreed;</p> <p>supervision procedures;</p> <p>reports on work in progress and completion of works on time and to specification and budget;</p> <p>soil and water quality monitoring reports.</p>	addressed under the Institutional Capacity Building Program.

<p>3.5 Support for soum authorities to manage water resource allocation and supervision responsibilities, particularly with regard to irrigation.</p>	<ul style="list-style-type: none"> <li>increased capacity at soum level to deal with water and land management responsibilities, reflected in budgets and MTBF;</li> <li>training for soum level officials in techniques of supervision of water management and in determination of charges and fees and resolution of disputes.</li> </ul>	<p>records of training sessions;</p> <p>procedures manuals;</p> <p>surveys on quality of water and land management.</p>	<p>addressed under the Agricultural Land Utilization and Management and the Institutional Capacity Building Programs.</p>
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## Appendix 1: Costs Associated with Irrigation Equipment

**Table 1: Irrigation Equipment Costs, Landed in Mongolia, Tax Included**

Type	Year	Description	Capacity	Cost (\$)	\$/ha
Drip Irrigation	2002				3,000 (est)
Hand move sprinkler	2002	Small-scale Chinese sprinkler set	0.86 ha	1,088	1,265
	2002	Portable hand move sprinkler set pumping directly from scheme canal	5.20 ha	5,513	1,060
Wheel Move					
Hose Reel	2002	Chinese jp 100/270 hose reel irrigator	20 ha	40,975	2,049
Pivot	2002	Russian pivot water driven from river. Cost varies by proximity to river and machine make.	95 ha	68,375	720
	2004	TACIS at project site in Uvs. 150 ha with "basic supply already in place".	150		240
	2004	Imported by Gachurt Gold			

The energy used to move water is a major irrigation expense. Typical operating power usage is 280 kWhr per megalitre of water pumped using a 1.5 kW motor delivery 1.5 liters per second per hectare. Based on a water requirement of 3.6 megalitres per ha for vegetables and average power costs in 2002 of \$0.03 per kWhr, irrigation power costs were \$30 USD/ha in 2002. In addition, annual maintenance and repairs costs can be estimated at 3 percent of the original capital cost.

**Table 2: Irrigation Equipment Operating and Maintenance Costs (2002)**

Type	Description	Capital Cost (\$/ha)	Oper'ng (Power) (\$/ha)	Maint. (\$/ha)*	Total O&M (\$/ha)
Drip Irrigation		3,000	30	90	120
Hand move sprinkler	Small-scale Chinese sprinkler set	1,265	30	38	68
	Portable hand move sprinkler set pumping directly from scheme canal	1,060	30	32	62
Wheel Move			30		
Hose Reel	Chinese jp 100/270 hose reel irrigator	2,049	30	61	91
Pivot	Russian pivot water driven from river. Cost varies by proximity to river and machine make.	720	30	22	52
	TACIS at project site in Uvs. 150 ha with "basic supply already in place".	240	30		
	Imported by Gachurt Gold				

note: \* set at 3% of Capital costs



# **AGRICULTURE SECTOR STRATEGY STUDY**

## **VOLUME 2**

### **FODDER AND FEED EXPANSION PROGRAM**

**30 NOVEMBER, 2006**

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## ACRONYMS

ADB	-	Asian Development Bank
ADF	-	Agriculture development Fund
AHRI	-	Animal Husbandry Research Institute
AI	-	Artificial Insemination
ASDP	-	Agricultural Sector Development Project
CIDA	-	Canadian International Development Assistance
DANIDA	-	Danish International Development Agency
EGPRS	-	Economic Growth and Poverty Reduction Strategy
ELISA	-	Enzyme Linked ImmunoSorbent Assay
EU	-	European Union
FAO	-	Food and Agricultural Organization (of the United Nations)
FMD	-	Foot and Mouth Disease
GAP	-	Government Action Plan
GDP	-	Gross Domestic Product
GTZ	-	German Bi-lateral Aid Agency
IMED	-	Information Monitoring and Evaluation Department
JICA	-	Japan International Cooperation Agency
KOICA	-	Korean International Cooperation Agency
LEWS	-	Livestock Early Warning System
M&E	-	Monitoring and Evaluation
MBDA	-	Mongolian Business Development Agency
MDG	-	Millennium Development Goal
MIT	-	Ministry of Industry and Trade
MLG	-	Ministry of Local Government
MNB	-	Mineral Nutrient Blocks
MNE	-	Ministry of Nature and Environment
MoFA	-	Ministry of Food and Agriculture
MSUA	-	Mongolian State University for Agriculture
MTBF	-	Medium Term Budgetary Framework
NAEC	-	National Agricultural Extension
NAMAC	-	National Association of Mongolian Agricultural Cooperatives
NEMA	-	National Emergencies Management Agency
NPA	-	National Plan of Action
O&M	-	Operations and Maintenance
OIE	-	Office Internationale Epizootique
PPP	-	Public Private Partnerships
PSARTI	-	Plant Seed Agriculture Research and Training Institute
SCVL	-	State Central Veterinary Laboratory
SDC	-	Swiss Development Cooperation Agency
SEFF	-	State Emergency Fodder Fund
SPIA	-	State Professional Inspection Agency
UNDP	-	United Nations Development Program
USAID	-	United States Agency for International Development
WTO	-	World Trade Organization
WUG	-	Water User Group

## FODDER AND FEED EXPANSION PROGRAM

### I. GENERAL BACKGROUND

1. The development of fodder and feed is an important component for the future growth and profitability of the agriculture sector, both as an input into the livestock sector, and as a cropping opportunity in its own right. There is a need to provide good quality, balanced feeds to support the profitable and competitive production of livestock and livestock products in Mongolia although there remains some reluctance to purchase feed, a hangover from the past when the Government was expected to provide supplementary fodder to help animals through the harsh winters. This applies to both the high input livestock and extensive livestock industries, both of which require significant improvement in the quality and quantity of good animal nutrition to support opportunities to enhance profitability and competitiveness in livestock product markets. Particularly for extensive livestock, a more efficient and effective feed producing industry is an important part in the reduction of risk inherent in Mongolia's climatic conditions, both as supplies in the defense against *dzuds* and other natural disasters, but also because better nutrition equips animals more effectively to deal with these conditions. Opportunities within the higher input and higher productivity livestock industries are dependent upon the availability of quality animal feed at prices affordable to the producer. Demand for formulated feeds already exists in poultry and pig enterprises but is largely satisfied by imported premix feed preparations, while the growing number of dairy producers rely upon locally produced hay that satisfies current levels of demand for dairy production targeting the fresh liquid milk market. The domestic demand for all types of feed and fodder is expected to increase as the demand for quality animal products develops in response to the growth in urban and middle income consumers, and the expansion of export opportunities for fibers and other livestock products. In addition, the rapid growth of urban demand in China, and to a lesser extent, in other countries in the region, is expected to stimulate substantial growth in the demand for quality and nutritious feeds for their own livestock industries.

2. Mongolia has a particular comparative advantage in the production of fodder and feed crops to meet this demand. Crops grown for animal feed offer substantial opportunities over cereal grains that have traditionally been promoted in the more reliable rainfall areas. The more recently introduced industrial crops, such as rape seed and sunflower, also offer potentially higher returns than cereal cropping. Together with horticultural crops, feed and fodder crops represent the strongest opportunity for successful rehabilitation of the crop sector and warrant significant promotion. Yet to date, these crops have been seen as peripheral and have not been promoted under the Ministry of Food and Agriculture's (MoFA) development policies and institutional support structures. The Strategy seeks to focus greater attention on these opportunities by promoting feed crop production as a source of income and processed animal feed to complement livestock development.

### II. SECTOR ANALYSIS

#### A. Sector Performance

3. Although not achieving pre-transition levels, fodder production and hay making have been on the increase since 2000 in response partly to risk mitigation activities by livestock producers and partly to growth in semi-extensive and confined livestock production systems. Production of alfalfa on rehabilitated irrigated cropland is also increasing.

**Table 1: Gross Hay Harvest and Fodder Production**  
(‘000 tons)

Fodder Type	2000	2001	2002	2003	2004	2005
Gross hay harvest	689.4	831.5	767.0	840.7	850.7	845.1
Straw for feeding	21.8	24.5	9.0	22.5	19.2	10.0
Cereal by-products	3.7	3.6	2.8	5.1		
Hand-made fodder (fodder units)	11.9	20.1	26.9	30.5	30.4	35.2
Produced mineral fodder	25.5	31.8	32.3	42.6	39.0	44.6
<b>Total Fodder Units</b>	<b>357.4</b>	<b>438.6</b>	<b>411.4</b>	<b>465.0</b>	<b>464.2</b>	<b>468.5</b>

4. In 2004, MoFA actively promoted the production of animal feed for winter livestock use by the private sector (through the provision at subsidized hay and fodder harvesting equipment<sup>1</sup>), and 20,000 tons of hay and 11,000 tons of fodder were stocked in response to Government Resolution No. 109 at 32 National Hay and Fodder Reserve points in 21 aimags<sup>2</sup>. The total amount of different types of livestock feed prepared for the winter of 2004/05 by all sources is provided in Table 2.

**Table 2: Livestock Fodder Prepared in 2004**  
(tons)

Types and Names of Fodder	Required	Available	Percentage
<b>Coarse Fodder</b>			
Hay	1,005,014	826,762	82.3
Straw	10,177	20,940	205.7
Green fodder	5,656	10,505	185.7
<b>Concentrated Fodder</b>			
Manufactured	24,695	18,936	76.7
Hand made	42,658	30,432	71.3
<b>Total Fodder Supply</b>	<b>524,134</b>	<b>430,322</b>	<b>82.1</b>
Preserved hay in aimag funds	2,8043	16,556	58.0
Preserved hay in soum funds	96,094	63,783	66.4
<b>Livestock Input Requirements (2004/05)</b>			
Mineral supplies	90,185	84,342	93.5
Water supplies	34,999	31,625	90.4
Water supply (% of households)	189,420	181,316	94.5
Shelter supply (% of households)	118,202	118,986	100.7

Note: \*available or existing wells

Source: Ministry of Food and Agriculture

<sup>1</sup> The Government program on "Protection of Animals against Drought and Dzud", procured 143 small tractors, reapers, trailers, power generators, welding apparatus, ploughs, and disk harrows. These were distributed at 50% discount to selected livestock producers.

<sup>2</sup> The level increased from previously planned levels of 15,000 tons of hay and 10,000 tons of fodder.

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5. Fodder and mineral supplements in 2004 and 2005 winters met 82.1% and 93.5% of the estimated requirements, respectively. However, the availability of fodder and minerals differed by aimag. Production exceeded estimated requirements in Khentii (177.6%), Selenge (132.8%), Tuv (125.5%) and Khovd aimags (103.7%). Availability is lower than demand in Gobisumber (21.2%), Bayankhongor (26.9%), Zavkhan (31.6%), Dornogobi (34.2%), Ovorkhangai (47.2%), and Bayan Ulgii (49.2%). Fodder supplies in other aimags and cities vary from 55.9% to 98.8% of estimated requirements.

6. In locations where naturally occurring feed is sufficient, livestock producers prepare relatively small quantities of hay for use at parturition or for when confinement of an animal is necessary. Increasingly, processed livestock feed is imported from Russia and China to feed confined livestock production systems such as swine and chickens. Currently, no formal market exists in Mongolia to distribute or make available prepared livestock feeds. Marketing of prepared livestock feed is a trader activity, with traders buying wheat and bran from flour mills. Prices of different types of fodders in Ulaanbaatar vary substantially (Table 3 details 2004/05 prices).

Table 3: Livestock Feed Prices in Ulaanbaatar

Fodder Type	Unit	Price (Tugrik)
Bran	25 kg sack	1,800-2,200
Oats imported (Russia)	40 kg sack	15,000-18,000
Oats domestic	40 kg sack	12,000-13,000
Wheat	25 kg sack	6,000
Mineral	30 kg sack	2,000-6,000
Hay (baled)	20-25 kg bale	1,500

Source: Survey Investigations

7. Opportunities to expand activities in this industry are significant. Although estimates suggest that much of current demand is already met, improved supply of affordable quality feed will generate significant expansion of demand domestically through the impact of improved yields on opportunities for competitiveness among livestock products and the continued growth of urban demand, and internationally in response to expanding opportunities for competitive exports. Potential profitability from high yielding, quality crop varieties for conversion to feed will also transform the sustainability of the crop sector and support moves to reduce rural poverty.

## B. Constraints

8. The development of Mongolia's feed production industry has been constrained by: (i) the limited private investment funds, (ii) the limited demand for feed from established livestock producers as they retain the expectation that the Government will provide, (iii) the lack of any form of land tenure that allows private investors to fence their fodder conservation areas to improve and protect the quality of their natural pastures, and (iv) the limited availability of a fodder conservation machinery supply business and machinery repair workshops to maintain the condition of any mechanized production of fodder. The first reflects the general condition of producers following privatization that has resulted in a large

number of small scale producers with insufficient capital to invest in machinery that is capable of covering larger areas within a small time period to affect time critical conservation operations. The second is a consequence of the former Government programs that sought to maintain higher stocking rates than would otherwise be possible left to the natural productivity of rangelands. The Government has been active in maintaining emergency stocks of feed in the event of a natural disaster that has been distributed each year in order to maintain fresh material. Fodder deteriorates significantly if not consumed in the winter immediately following when it was conserved. Thirdly, the lack of tenure has created uncertainty and in some cases, reasons for conflict between herders who seek to preserve certain areas as standing crops for winter - spring consumption. With no certainty of tenure over these areas, there is limited incentive for private livestock owners or dedicated crop producers to invest in machinery and equipment to conserve fodder. This security of tenure is one of the most pressing issues in the development of the feed industry based on natural and improved pastures and crop areas. Finally, the last constraint results from the Government's machinery distribution programs at concessional rates that work against the development of the machinery supply and maintenance industry. While the Government continues to be directly involved in the distribution of machinery and equipment, the private sector will not risk participation in the business. Private entrepreneurs cannot compete against subsidized machinery supplies and will not take up the challenge while such practices continue. The Government is well intentioned in its efforts to provide subsidized inputs as incentives for investment but the impact from such practices is obvious through the activities of the wheat seed fund and other subsidized programs that have achieved less than anticipated outcomes. In this regard, there needs to be further policy consolidation in identifying appropriate mechanisms to promote investment in the sector and such support mechanisms must be based on a real and demonstrable comparative advantage, not merely on historic performance.

### **C. Opportunities**

9. Opportunities for the livestock feed industry exist at two levels, the production of coarse fodder (hay and silage) and the more quality conscious feed premixes (industrial feeds such as pelletized crushed grain with other protein and nutrients added). As is evident from the geographical differences in feed status, there is clearly a need to supplement some areas if they are to maintain their existing numbers of livestock. The Government is clear in its intention to pass responsibility for natural disasters to individual livestock owners and local government administrations, each required to prepare emergency reserves based on the number and type of livestock reared and held in the area. Previous programs to distribute fodder were high cost operations that could not be sustained. As livestock owners progressively accept that better preparation for the harsh winters is a necessary step in maintaining herd productivity, there will be increased demand for fodder.

10. The second comes from the urban centers where higher quality feed supplements are in demand in the higher input and higher productivity livestock industries. The dairy industry, for example, is expanding based on supplementary feeding from the alcohol brewing industry (brewers grain), the flour milling industry (bran), and the oilseed crushing industry (rape and soybean meal) with their valuable bi-products as animal feed. There are opportunities for the preparation of pre-mixes to feed the chicken, pig and other more intensively reared livestock industries seeking to supply the discerning urban markets for diversified meat products. This prepared feed market could well expand to meet the demand for emergency feed supplies as the economics of transporting higher value feed throughout the country is far better than lower quality hay or silage with its greater bulk. Some of the prepared pre-mixes do not deteriorate in quality to the same extent as hay and provide a good alternative to hay.

**B. Scope and Key Activities**

18. The Program seeks to develop the foundation for a feed manufacturing industry that includes primary production, secondary processing and packaging, and marketing links to livestock producers in Mongolia and abroad. This will involve an increased focus on the production of crops used for animal feed, especially alfalfa and barley that are better adapted to Mongolian climatic conditions. The Program provides for improved access for crop producers to quality forage seed material, harvesting equipment, and feed manufacturing equipment together with improved marketing links between producers, feed manufacturers, feed suppliers, and livestock producers. In addition, there are proposed incentives for feed storage facilities of livestock producers to improve feed concentrate production, especially mineral nutrition blocks developed as a forage supplement in extensive livestock production systems.

19. To date, responsibility for the development of a local feed industry, including fodder processing factories, have not been designated to any branch within MoFA - either its crop or livestock divisions, yet there is clearly a role for the government and donors alike to support the development of feed and fodder in parallel with its livestock sector. The Program has four components including: (i) the creation of an enabling legal and policy environment for the development of a commercial animal feed industry; (ii) the introduction of incentives for increased production of animal feed crops to improve availability of inputs, harvesting and processing technologies for manufacturing and cost-effective transport and shipping; (iii) the introduction of measures to support the expansion of processed feed production, strengthening market linkages between the feed producers, processors, and consumers (dairy farmers, the high input more intensive livestock production units, and extensively managed livestock herders), perhaps through the development of agriculture service and marketing (common interest) associations; and (iv) the development of mechanisms to facilitate access to domestic and export markets.

**1. Creation of an Enabling Environment**

20. While the creation of an enabling environment for the development of private sector agriculture is a prime responsibility of MoFA, there are some specific requirements of the animal feed sector, some of which are specific to the industry and others that are of a more generic nature. These include:-

- the establishment of secure land and water tenure rights;
- a flexible approach for producer entities and associations;
- the reform in the management of emergency fodder reserves; and
- the introduction of incentives to stimulate private investment.

**Secure Land and Water Tenure**

21. This issue is discussed in greater detail under the Agricultural Land Utilization and Management Program and the Irrigation Rehabilitation and Construction Program. It remains nonetheless, the primary impediment to investment by producers and enterprises in the development of crop land and is just as critical for fodder and feed crops as for any other commercial activity where capital investment is needed and land improvement desirable. Considerable debate has occurred over recent years to resolve the issues of possession and title with prospects for a binding and lasting solution. Should such a resolution of these issues be reached, there will be no need to pursue one under this Program. In the meantime, however, it remains a necessary pre-requisite for the successful implementation of this Program. Resources to address the issues of tenure are proposed under the Agricultural Land Utilization and Management Program and the results thereof will be highly



relevant (one could say a necessary pre-requisite) for the successful implementation of this Program.

### **Producer Associations**

22. Success in commercial cropping can be facilitated through cooperation with other producers or enterprises in the procurement of inputs and services, in aspects of production and processing of produce, or in post-harvest handling, marketing and distribution. Important, however, is that any grouping should not be proscribed in form or content by restrictive regulatory or legislative provisions. Some producers will benefit from informal periodic cooperation in procurement of inputs or sharing equipment, others through joint contracting of equipment operators or service agents. Others will wish to come together to appoint a joint accountant and business services management agent. Yet others may wish to combine produce to meet volume requirements in supply contracts, others to undertake primary processing in a joint facility. All such agreements should be considered as valid and not bound by restrictive conditions that seek to make them uniform or common (such as has occurred with cooperatives). Agricultural service and marketing associations or herder-producer alliances may fall under the collective name of "cooperative", yet there is no necessity for their legal entity to be formalized as a cooperative. Partnerships and joint ventures, limited liability companies might well be more appropriate. The pattern will vary across different groups of growers, across cropping types with or without livestock rearing activities, across different areas and scales of enterprise, and across time even for the same group of individuals. Government strategy should recognize these as credible commercial entities and not be concerned over the vehicle for investment and commercial operations.

23. The need for flexibility requires a regulatory and legislative regime capable of accommodating such variation without crowding out initiative through restrictive rules and requirements. This will require a very "laissez faire" approach by MoFA and other agencies, particularly as they and extension services should be actively involved in encouraging such groups to come into existence. Once again, however, it will be important not to make the mistakes experienced early on with cooperatives of not only too close a definition but also of organizing or promoting such associations externally in name only. Growers must come together because they see good commercial reasons for cooperation, and it will be the role of the support services (strengthened under the Agriculture Support Services Program) to highlight the benefits whilst leaving the decision for cooperation and the form of any arrangement to the group themselves.

24. Two activities are proposed to achieve the desired outcome, one relating more to government policy in respect of commercial entities, and the second to develop the capacities of the support services to assist individuals wishing to associate to select the most appropriate association structure for the intended purpose. Government policy should be broadened to accommodate all appropriate commercial entities as a vehicle for investment and commercial activity. Incentives developed to assist agricultural producers and processors should not be specific to the type of entity but should promote private investment through whatever the most appropriate vehicle. Following from this, is the need to have the agricultural support services sufficiently au fait with the advantages and disadvantages of the various enterprise structures and where they might be best applied. This is a relatively sophisticated area of financial services and requires a sound understanding of financial matters - securities, taxation etc., far from the standard technical production services that have been the historic focus of agricultural extension. Financial service provision is very underdeveloped, not only within agriculture, but also within the accounting profession as private commercial activity was relatively scarce until the 1990s. Capacity building might best be accommodated through the development of aimag and soum capabilities in financial management through a long term program of technical support.

**Emergency Fodder Reserves**

25. During the socialist period, a major activity of livestock collectives and state farms was the preparation of hay and supplementary feed for livestock. Chaff and straw from harvest of wheat and other cereals also provided sources of livestock feed. By the end of the collective era, the State Emergency Fodder Fund (SEFF), originally established as a drought and winter *dzud* disaster relief program, had evolved into a winter feed ordering program for aimags lacking the capacity to grow and prepare locally grown animal fodder to meet the excessive numbers of animals reared in the respective locations.

26. During the transition period, most state financed animal feed preparation ceased because of the high associated production and transport costs. Although preparation of some quantities of hay and other animal feed was contracted by the Government for emergency response to winter *dzud*, the preparation of winter feed, especially hay, became a private sector activity concentrated in the forest steppe central region. Most hay is now sold to small dairy operations in and around the capital and other major cities. By-products of wheat flour milling (bran), brewing, and distilling have become the main sources for locally available concentrate feed.

27. Nonetheless, in 2004, the Government stocked 20,000 tons of hay and 11,000 tons of fodder at 32 National Hay and Fodder Reserve points in 21 aimags and intervened in the market for machinery and equipment by providing small tractors, reapers, trailers, power generators, welding apparatus, ploughs, and disk harrows at the substantially subsidized rate (50% of cost). While the SEFF may have been technically wound up in the mid-1990s<sup>4</sup>, it is evident that significant intervention by the state in the feed and fodder market has lingered.

28. While the rationale for this intervention, as a safety net for livestock herders caught out in *dzud* or other adverse climatic conditions cannot be faulted, the nature of the intervention has to be carefully managed to avoid undermining the domestic private market and pre-empting any attempts to establish a vibrant and profitable feed sector capable of meeting both standard and emergency needs and of exploiting opportunities for exports that are expected to emerge from the rapid development of China and other neighbors. The Program, therefore, will examine alternatives for the provision of such an emergency security buffer, integrating activities with development of the domestic market to ensure that such activities are not detrimental to the development of a strong private feed subsector. An efficient private sector is likely to be a much more effective mechanism for securing supplies, including in response to emergencies, and the Program will demonstrate that Government's objectives can be better served through private sector participation than under a system of Government managed emergency stocks and distribution initiatives. The more obvious repercussion from an active feed sector will be higher feed stocks at all times, and appropriate storage and transportation arrangements. Further details of the reorientation of the emergency response are presented under the Risk Management Program that seeks to develop the private sector and improve the Government's predictive capabilities and rationalize its response.

**Investment Incentives**

29. Part of the enabling environment for the development of a commercial feed industry will come through investment incentives. Reference has already been made to the need for broad incentives for investment that are not linked to the nature of the entity (cooperatives) as it is the investment that is the objective - not the entity. Incentives can stimulate investment in the production of animal feeds - both on farm through fodder conservation

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<sup>4</sup> in response to conditions under the ADB funded Agriculture Sector Development Project program loan.

initiatives and for the establishment of animal feed milling industries. Typical investment incentives might include accelerated depreciation allowances on equipment and machinery used in the animal feed industry with up to 100% taxation deduction in the year in which the items were purchased. The Program provides for a review of the incentives needed to stimulate new investment in the industry through technical assistance.

## **2. Increased Production of Feed Crops**

30. There are three elements in the production of feed crops to be addressed by the Program - the production of crops such as alfalfa in traditional cropping areas, including on irrigated land, the conservation of native grasses on pasture and hay lands, and the collection of native vegetation by extensive livestock herders or herder groups.

### **Mainstreaming of Irrigated and Dryland Alfalfa Production**

31. Alfalfa is a highly nutritious and palatable feed used in livestock production systems throughout the world including those where winter supplementary feeding is needed in extensively managed production systems, integrated crop-livestock production systems, and high input (including dairy) production systems. It can also constitute the main ingredient for fattening beef cattle and growing lambs, in prepared/processed feeds for confined livestock production programs (involving swine, poultry, and rabbits), and potentially, for the export market.

32. The Program will support research and development of adapted legumes, especially alfalfa and nutritious grasses at the Animal Husbandry Research Institute (AHRI), Plant Science Agricultural Research Training Institute (PSARTI) and other research institutions. Linked to the research program, such research will probably be funded through a competitive grants scheme funded out of state budget and donor funds. The results of this adaptive research will generate the production of seeds and other planting material (supported by the Seed Breeding and Varietal Development Program) and the dissemination of technical and business advice through extension systems (supported by the Agricultural Support Services Program). Private initiatives will be further supported by the Access to Term Credit and Irrigation Rehabilitation and Construction Programs, the latter assisting the development of small to medium scale irrigation schemes and the upgrading of existing irrigation systems where alfalfa production might be undertaken. The aim is to support crop producers and mixed farming enterprises to mainstream the production of alfalfa and other legumes in their farming systems. The Government takes the view that irrigation rehabilitation and construction, particularly for large scale systems constitute a public investment that will provide the incentive for increased irrigated production. Significantly, the intended end purpose of the irrigable land should not be predetermined by the Government but should be determined according to the most profitable activity available to the producer.

### **Expansion of Hay, Fodder, and Seed Production**

33. Native grasses of Mongolia and Central Asia are ideal species for hay production and improved pasture, and are readily incorporated into pasture improvement programs (and the rehabilitation of abandoned cereal cropping areas). Harvested grasses are an important source of supplementary feed for livestock to provide nutrition and energy during the period when climate prevents natural growth. Feeding hay to livestock during winter and spring periods of livestock nutritional deficiency can improve overall livestock production and mitigate environmental and economic risk.

34. A necessary pre-requisite for this component is the improved availability of high quality seeds for species such as *Medicago sativa* var. *burgalti* for non-irrigated areas in the central cropping region and *Medicago falcata* and forage grasses in drier regions. This will involve seed breeding at PSARTI and AHRI facilities and their multiplication in private

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facilities to be supported under the Seed Breeding and Varietal Development Program. The Program will also support development of private sector seed multiplication of alfalfa and native grasses as a commercial activity, and the supportive seed testing, cleaning, and packaging centers, probably on a regional basis associated with alfalfa and grass cropping areas. Registration, certification as to quality, and inspection capacity and procedures to be enhanced under the Seed Program will also form important constituents to support alfalfa and grass production.

35. Linked to improvement in seed availability and quality, the Program will promote the adoption of such crops by producers through extension and other services (strengthened under the Agriculture Support Services Program), backed as appropriate by commercial credits under the Access to Term Credit Program. Advisory services will also be promoting improved storage and handling of feed products, stimulating the domestic market for such products.

**Promoting Feed Production and Conservation**

36. Mongolian livestock producers generally harvest native vegetation as hay in small amounts for their own use. Individual or group capacity to produce livestock feed will also be expanded under the Program, supported by improved access to affordable credit for equipment purchase (stimulated through the Access to Term Credit Program).

37. Animal feed supply for households, individually or in groups, can be developed in several ways depending on which method(s) suit local conditions. Possibilities include: (i) protecting high yielding rangeland from grazing during the growing season to allow harvest of forage as hay or preserving it as a standing crop for seasonal grazing (i.e. creating forage banks); (ii) developing cropland areas to produce large quantities of hay, grain, or fodder; (iii) purchasing hay and other livestock feeds elsewhere; or (iv) combining activities to ensure that a sufficient supply of feed is on hand.

38. Improving feed supplies by implementing any of these techniques will require increased management and usually more inputs. Although finding potentially high yielding natural rangeland is relatively easy in forest and grass steppe regions, it is more difficult in desert steppe and desert regions of Mongolia. In the latter, suitable land may be limited to the relatively few areas with surface water in which natural vegetation can be protected or areas in which wells can be developed to provide water for irrigation and soils are suitable for crop production although this would most likely be limited given the extent of the underground water resources. Achieving high yields of hay or fodder, even with irrigation, will require fertilizer inputs. While all feed options will be available to households or groups in the forest and grass steppe regions, local development of feed resources in the desert steppe and desert regions will require Government intervention and support. The feed options most suited to livestock producers in these desert steppe and desert regions of Mongolia are protection of standing crop for winter and spring use or importing feeds produced elsewhere, though the high cost associated with transporting feed make this latter option impractical for most herders or groups. The Program therefore proposes extensive pasture rehabilitation by the Government in priority locations.

**On-farm Pasture Improvement**

39. A key assumption in proposing activities to stimulate animal feed production is the security of tenure of the land. Improvements to natural pasture land will not be entertained without some form of security of tenure and the confidence to make investments in securing feed supplies. Once herders and producers can be assured that their investments can be preserved for their own benefit, investment incentives will then influence the rate of development of the feed industry. Incentives need to be provided to allow herders and

producers to exclude others' livestock from grazing improved pasture areas. Investment incentives are considered appropriate for fencing material (including electric fencing using solar panels to generate power) and for the purchase of fodder conservation equipment and machinery. These might take the form of assistance with interest rates to provide for concessional lending through the formal financial system, coupled with provisions for accelerated depreciation allowances that will allow primary producers to write off the value of the equipment in the year the investment was made. Such incentives should go beyond investment in fodder conservation equipment to include any capital expense related to pasture improvement.

### **3. Expansion of Processed Feed Production**

40. Following successful increase in the quantity of feed material available, the next step is its conversion into quality concentrated feed products. These provide opportunities for more efficient transportation and storage, and extending the shelf-life of products, opening the way not only for a more commercial distribution on domestic markets but also for realization of export opportunities. There are three elements to this component:-

- the expansion of feed processing capacity to meet domestic and export demand;
- the development of soum level production of mineral nutrient blocks (MNBs); and
- the establishment of feed quality testing facilities to certify whether products meet quality and nutritional standards, hence supporting consumer security and product trade.

#### **Expansion of Processing Capacity**

41. A strong private sector feed processing industry will provide balanced rations and processed alfalfa products (bales, cubes, pellets) to the local and export markets. However, current facilities are limited and output of uncertain quality. The Program will support the rehabilitation of existing feed processing plant capacity, upgrading standards with modern feed processing equipment, to process alfalfa into easily transportable livestock feeds. Where there is substantial newly developing livestock feed production in a region, the Program will promote the construction of private, modern, medium scaled feed processing facilities.

42. The Government will support private interests with technical and business advice (strengthened under the Agricultural Support Services Program), and in the application for investment finance under schemes supported through the Access to Term Credit Program. Important in this respect is the mobilization, or more accurately the stimulation, of growers and/or herders enterprises and associations into collection, processing, and possibly marketing groups. It seems likely that the early moves for enhanced feed processing capacity will be taken by the growers (as suppliers) and herders (as consumers) themselves rather than by independent business interests external to the market/distribution chain. However, as the benefits of such activity, and the prospects for future growth, become more obvious and widely accepted, there should be increased interests from third party business interests.

#### **Introducing Soum MNB Production**

43. Nutrition blocks are used to enhance dietary nutrition of livestock grazing poor quality forage. Ingredients necessary to manufacture MNBs are available in Mongolia and considerable research on block manufacture has already been undertaken at AHRI. The Program will support AHRI to continue this work and provide assistance to farmers and herder groups interested in manufacturing and marketing MNBs. Possible direct participation by soum authorities will also be considered as part of the emergency feed response required under existing regulations but committed on a contractual basis with the miller.

44. Elements of this subcomponent are dependent upon successful completion of other Programs under the strategy. AHRI research activities will be assisted through the Research Program. Technical messages and business advisory support will be developed and disseminated under the Agricultural Support Service Program which, among other things, is designed to strengthen the extension system. Funding for farmers and groups wishing to establish MNB manufacturing and storage facilities will be accessed through credit institutions and loan programs supported under the Access to Term Credit Program. Where the soum authority wishes to establish such a venture access to commercial finance is more complicated and may come through such donor funds as finance the agricultural development fund, again though under commercial terms, even if with opportunities for deferral of repayments.

#### **Testing Feed Quality**

45. The Program will establish testing centers for feed quality near feed production areas to support development of livestock feed industry. This will provide a mark of quality, a nutritional standard, to support acceptance by herders and farmers. However, it will first be necessary to establish appropriate standards against which supplies will be tested. This will involve work by AHRI and could result in a system for certification, backed by an inspection regime, similar to that developed for seeds. Such testing centers could be associated with AHRI branches, but may also be established by the private sector, so long as standards are clear and monitored with confirming analyses as a routine activity to maintain standards. Any testing should be transparent and objectively assessed against industry standards currently being established. The Program provides for the establishment of two facilities initially in Ulaanbaatar to monitor the quality of imported feed material and in Darkhan where it is closer to the main producing areas and where greater potential exists to establish a feed milling facility.

#### **4. Improved Producer-Market Linkages**

46. The success of the feed sector is dependent upon its meeting the demand of herders and livestock producing enterprises both at home and abroad. The opportunities to turn feed into a major dynamic growth subsector relate to the forecast strong demand for quality feed from high input livestock ventures, responding to increased urban demand and growth in middle-income households, from the extensively managed livestock system, responding to the need for fodder security during difficult climatic periods, and from foreign demand, notably in China, based on increased feedlot production as a result of the combination of the urbanization and industrialization of her population. Initiatives under this component could also be included in the Market Linkages Program described in the Livestock Section of this Volume.

#### **Strengthening Market Links with Livestock Producers**

47. The Program will develop production and market links between livestock producers in the extensive livestock and the integrated crop and livestock systems and animal feed production systems in the crop sector.

48. The Program, either directly or through agriculture service, marketing and producer associations<sup>5</sup>, will promote commercial trading relationships between livestock producers, animal feed producers, animal feeders, and animal feed processors. Fiscal subsidies or similar incentives, such as reduced water charges, will be given to livestock producers who develop a winter livestock supplemental feeding program involving supplemental livestock feeding as part of their farming system. Winter livestock animal feeding strategies, based on

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<sup>5</sup> Similar to those promoted by the Gobi Forage Project.

easily transported supplementary, high density, high nutrient feeds will improve livestock production and be a primary market for the livestock feed industry.

49. To support this development, the Program will also ensure livestock producers can access credit to build or purchase storage facilities for processed feed and minerals. Old shipping containers are ideal for alfalfa pellet and grain storage, and could easily be trucked and set up at winter camps, whilst not interfering with the nomadic grazing routes and sustainable pasture utilization.

### **Penetrating Export Markets**

50. Development of a modern and competitive livestock feed industry will provide Mongolia with strong potential to realize opportunities for exports of range of quality high value livestock feed products. Mongolia potentially has a comparative advantage over other regional countries in the production of high quality animal protein and energy feeds. Both alfalfa and barley, which are the main ingredients in rations fed to dairy cattle and growing animals of all types, can, and already are being produced in the crop sector.

51. Development of the livestock feed industry for domestic or export markets will require considerable investment in new feed processing and packaging plants. Small to medium sized feed processing plants should be established near alfalfa and other livestock feed growing areas. The Program will support this development through advisory and other services to promote investment in appropriate technologies to meet market standards, improved business management and decision-making, and through links with the chambers of commerce and other private support organizations assist enterprises to develop contacts and overcome obstacles to export market penetration. Key to success will be the strength of producer based organizations in processing linked to trading companies experienced in export. At the same time, private processing plants, owned by business interest and related to farmers only for supply, are anticipated to develop in response to growing opportunities in both domestic and export markets.

### **C. Policy Development**

52. Two areas where policy development is considered necessary to achieve the desired outcomes in this Program relate to the security of tenure of land and water resources and the operationalization of the Government's commitment to sharing the risk associated with livestock production. The first is discussed more fully under the Agricultural Land Management and Utilization Program where long term user rights are deemed as essential to sustained investment in the development of the country's natural resources. The second relates to the current policy of the Government and the implementation of its policy in respect of emergency response. This is also discussed under the Risk Management Program. While the Government maintains significant responsibility for the risk associated with livestock rearing, its initiatives in respect of the operations of its emergency response to droughts and *dzuds* has the potential to undermine any incentives for the development of the animal feed industry. Measures need to be developed for rationalizing the Government's response so that it is triggered for emergency situations only and that opportunities need to be explored for the complementary development of the Government's emergency response that will provide opportunities for the infant animal feed industry. The adoption of contract feed production based on more durable animal feed sources will also act as incentives for the growth of the industry whereas activities previously undertaken by the SEFF based on highly perishable conserved fodder acted more as a deterrent. The enforcement of Government policy in respect of its requirement for emergency reserves to be held by aimags, soums and individual livestock producers should be enforced as was originally intended where individual herders retain initial responsibility for attending to winter spring feed requirements.

#### **D. Institutional Capacity Building**

53. Incremental capacity building is deemed necessary for the implementation of the improved tenure arrangements to be provided by local administrations. While these will be attended to under the land administration aspects of Agriculture Land Management and Utilization Program, it is considered an important aspect for the development of the animal feed industry. With any change to the legal framework that will facilitate private investment for improvement, there must be an associated development in local capacities of authorities to protect the interests of those with legal user rights to natural resources against those choosing to willful disregard such arrangements. With the constitutional rights of herders to graze natural rangelands in an unrestricted manner, there are many who still do not respect the more recent regulatory changes that provide for user rights.

54. The second area where further capacity development is considered necessary is in financial management services. While not directly related to agricultural production, the benefits from association are considered significant given the size distribution of crop farmers and herders alike. Agricultural support services need to understand alternate commercial structures that may be appropriate to achieve association and the respective benefits of same. Further capacity building is needed in this area as well as in the more technical area associated with seed selection, adaptive research and seed multiplication. The development of the animal feed industry is somewhat dependent upon the achievements of the Seed Breeding and Varietal Development Program where significant capacity building is also proposed.

#### **E. Summary Cost Estimate of the Program**

55. A summary of indicative cost estimates is presented in Table 4 and Table 5. The magnitude and balance of items contained in this Table have not been discussed with the Government. It represents the Consultants initial estimates on what the Government has agreed as to development priorities.



### Table 4: Expansion of Feed and Fodder Markets - Summary Physical Inputs

[illegible]

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Table 4: Expansion of Feed and Fodder Markets - Summary Physical Inputs (Cont.)

<b>C. Expanded Feed Milling</b>										
<b>1. Rehabilitation of Milling Facilities</b>										
Upgrade feed processing equipment - interest subsidy	unit	2	2	2	2	2	-	-	-	10
Establish medium scaled feed mills - interest subsidy	unit	-	-	-	1	1	-	-	-	2
<b>Subtotal Rehabilitation of Milling Facilities</b>										
<b>2. Mineral Nutritional Block Production</b>										
Support private establishment of plants	unit	-	-	5	10	10	-	-	-	25
<b>3. Feed Testing Facilities</b>										
Rehabilitate feed testing laboratories	facility	-	1	1	-	-	-	-	-	2
Feed quality testing equipment	set	-	-	1	1	-	-	-	-	2
<b>Subtotal Feed Testing Facilities</b>										
<b>Subtotal Expanded Feed Milling</b>										
<b>D. Producer to Market Linkages</b>										
<b>1. Strengthening Producer-Miller Linkages</b>										
Training in quality requirements	workshop	-	4	4	4	-	-	-	-	12
Training in feed balance budgeting	4 w/shop	-	2	2	2	2	-	-	-	10
Assistance with storage facilities	unit	-	-	-	20	20	20	20	20	140
<b>Subtotal strengthening Producer-Miller Linkages</b>										
<b>2. Export Market Development</b>										
Studies for export opportunities	study	-	-	-	1	1	1	1	1	5
<b>Subtotal Producer to Market Linkages</b>										
<b>Total</b>										

1a Irrigated areas identified will be rehabilitated under the Irrigation and Water Management Program

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Table 5: Expansion of Feed and Fodder Markets - Program Cost Summary

	Unit Cost (Tugrik '000)	Base Cost (Tugrik Million)										
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
I. Investment Costs												
A. Creation of Enabling Environment												
1. Secure Land and Water User Rights												
TA to study the needs of feed crop producers	580,000	-	580.0	-	-	-	-	-	-	-	-	580.0
Amendments to regulations	11.6	-	-	0.0	0.0	-	-	-	-	-	-	0.0
Resources to monitor and police user rights	23.2/aimag	0.2	0.3	0.4	0.5	0.5	0.5	0.5	0.5	0.5	-	3.8
Subtotal Secure Land and Water User Rights		0.2	580.3	0.4	0.5	0.5	0.5	0.5	0.5	0.5	-	583.8
2. Promotion of Grower Associations												
Modifications to the tax law	580,000	-	580.0	-	-	-	-	-	-	-	-	580.0
Capacity building for support services	5,800	-	-	23.2	23.2	23.2	-	-	-	-	-	69.6
Aimag financial services training	11,600	-	-	-	46.4	46.4	46.4	-	-	-	-	139.2
Subtotal Promotion of Grower Associations		-	580.0	23.2	69.6	69.6	46.4	-	-	-	-	788.8
3. Local Government Emergency Responses												
Study into alternative response mechanisms	580,000	580.0	-	-	-	-	-	-	-	-	-	580.0
Resources to maintain emergency feed stocks	580,000	12,760.0	12,760.0	12,760.0	12,760.0	12,760.0	12,760.0	12,760.0	12,760.0	12,760.0	12,760.0	127,600.0
Subtotal Local Government Emergency Responses		13,340.0	12,760.0	12,760.0	12,760.0	12,760.0	12,760.0	12,760.0	12,760.0	12,760.0	12,760.0	128,180.0
4. Investment Incentives												
Review of investment incentives	580,000	580.0	-	-	-	-	-	-	-	-	-	580.0
Subtotal Creation of Enabling Environment		13,920.2	13,920.3	12,783.6	12,830.1	12,830.1	12,806.9	12,760.5	12,760.5	12,760.5	12,760.0	130,132.6
B. Feed Crop Production for Livestock												
1. Research Initiatives												
Grants for AHRI and PSARTI for adaptive research	23,200	23.2	23.2	23.2	23.2	23.2	23.2	23.2	23.2	23.2	23.2	232.0
Animal feed producing areas identified and prioritized /a	116,000	116.0	-	-	-	-	-	-	-	-	-	116.0
Subtotal Research Initiatives		139.2	23.2	23.2	23.2	23.2	23.2	23.2	23.2	23.2	23.2	348.0
2. Seed Production Initiatives												
Multiplication of adapted seed material	23,200	-	23.2	23.2	23.2	23.2	23.2	23.2	23.2	23.2	23.2	208.8
Private initiatives to establish seed multiplication farms	34,800	-	-	139.2	174.0	208.8	208.8	-	-	-	-	730.8
Seed testing and cleaning facilities	34,800	-	69.6	69.6	-	-	-	-	-	-	-	139.2
Subtotal Seed Production Initiatives		-	92.8	232.0	197.2	232.0	232.0	23.2	23.2	23.2	23.2	1,078.8
3. On-Farm Initiatives for Animal Feed Production												
Pasture improvement initiatives	34,800	174.0	348.0	348.0	348.0	522.0	-	-	-	-	-	1,740.0
Interest subsidies on fencing material	6,960	696.0	1,392.0	2,088.0	3,480.0	3,480.0	-	-	-	-	-	11,136.0
Subtotal On-Farm Initiatives for Animal Feed Production		870.0	1,740.0	2,436.0	3,828.0	4,002.0	-	-	-	-	-	12,876.0
Subtotal Feed Crop Production for Livestock		1,009.2	1,856.0	2,691.2	4,048.4	4,257.2	255.2	46.4	46.4	46.4	46.4	14,302.8

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Table 5: Expansion of Feed and Fodder Markets - Program Cost Summary (Cont.)

<b>C. Expanded Feed Milling</b>											
<b>1. Rehabilitation of Milling Facilities</b>											
Upgrade feed processing equipment - interest subsidy	13,920	27.8	27.8	27.8	27.8	27.8	27.8	27.8	-	-	139.2
Establish medium scaled feed mills - interest subsidy	46,400	-	-	-	46.4	46.4	46.4	46.4	-	-	92.8
<b>Subtotal Rehabilitation of Milling Facilities</b>		27.8	27.8	27.8	74.2	74.2	74.2	74.2	-	-	232.0
<b>2. Mineral Nutritional Block Production</b>											
Support private establishment of plants	11,600	-	-	58.0	116.0	116.0	-	-	-	-	290.0
<b>3. Feed Testing Facilities</b>											
Rehabilitate feed testing laboratories	23,200	-	23.2	23.2	-	-	-	-	-	-	46.4
Feed quality testing equipment	34,800	-	-	34.8	34.8	-	-	-	-	-	69.6
<b>Subtotal Feed Testing Facilities</b>		-	23.2	58.0	34.8	-	-	-	-	-	116.0
<b>Subtotal Expanded Feed Milling</b>		27.8	51.0	143.8	225.0	190.2	-	-	-	-	638.0
<b>D. Producer to Market Linkages</b>											
<b>1. Strengthening Producer-Miller Linkages</b>											
Training in quality requirements	5,800	-	23.2	23.2	23.2	-	-	-	-	-	69.6
Training in feed balance budgeting	5,800w/shop	-	46.4	46.4	46.4	46.4	-	-	-	-	232.0
Assistance with storage facilities	5,800	-	-	-	116.0	116.0	116.0	116.0	116.0	116.0	812.0
<b>Subtotal strengthening Producer-Miller Linkages</b>		-	69.6	69.6	185.6	162.4	162.4	116.0	116.0	116.0	1,113.6
<b>2. Export Market Development</b>											
Studies for export opportunities	23,200	-	-	-	23.2	23.2	23.2	23.2	-	-	116.0
<b>Subtotal Producer to Market Linkages</b>		-	69.6	69.6	208.8	185.6	185.6	139.2	116.0	116.0	1,229.6
<b>Total</b>		14,957.3	15,897.0	15,688.3	17,312.3	13,247.7	12,946.1	12,946.1	12,922.9	12,922.4	146,303.0

1a Irrigated areas identified will be rehabilitated under the Irrigation and Water Management Program

## F. Indicative Implementation Arrangements

56. Although Government responsibilities for promotion of the feed and fodder sector lie with MoFA, several other agencies are involved in the stimulation and support of private sector activity under the Program (Table 6).

**Table 6: Expansion of Feed and Fodder Markets - Implementation Responsibilities**

Activity	Implementation
<b>1. Enabling Environment</b>	
1.1 Land and water rights	MFA, MNE
1.2 Grower organizations	Private Sector, MFE, NAMAC
1.3 Central/local government	NEMA, MFE, MLG, aimags/soums
<b>2. Increased Production</b>	
2.1 Alfalfa and legume crop production	Private Sector, MFA, AHRI
2.2 Hay, fodder, and seed production	Private Sector, MFA, MLG, NEMA, AHRI, PSARTI
2.3 Individual or group feed production	Private Sector, MFA through AIF
<b>3. Expansion of Processing</b>	
3.1 Feed processing	Private Sector, MFA, MIT, MBDA, ChC
3.2 MNB as soum industry	Private Sector, MFA through AIF
3.3 Feed quality testing	AHRI, MFA, Private Sector
<b>4. Market Development</b>	
4.1 Production - market links	Private Sector, MBDA, ChC, MIT
4.2 Export markets	Private Sector, MBDA, ChC, MIT

note: Private Sector includes Agriculture Service and Marketing Centers, Herder and Farmer Alliance Cooperatives and other producer groupings; ChC - Chamber of Commerce, MBDA - Mongolian Business Development Agency; MoFA - Ministry of Food Agriculture, MIT - Ministry of Industry and Trade, MLG - Ministry of Local Government, NAMAC - National Association of Mongolian Agricultural Cooperatives, NEMA - National Emergencies Management Agency; PSARTI - Plant Seed Agriculture Research and Training Institute; AHRI - Animal Husbandry Research Institute;

57. The main thrust for implementation of the Program will come through private sector activity. Central to this will be the organization of farmers, sometimes with herders or livestock producers, into commercial groupings to exploit the benefits from scale in marketing and distribution, the procurement of inputs, production and processing technologies, and access to credit. The Program, through a variety of public and private sector business advisory and technical extension services (including under MoFA, AHRI, chambers of commerce, NAMAC, MBDA etc.) will support this development. Central to success, however, will be the self motivation of formulation of these groupings and the ability to combine for a variety of purposes and under a range of business and legal models.

58. There will be no direct public investment under the Program, but various incentives to encourage private investment will be investigated and introduced as appropriate. These will include tax allowances and tax credits where organizations fall within the tax net, and compensation for other costs, such as water user charges, where they do not. The Program will also, through its Access to Term Credit Program, support organizations to obtain credit

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at affordable rates for investment and working capital. Public sector capital expenditure as such will be limited to the establishment of feed testing centers, but this should largely involve expansion or rehabilitation of existing facilities. In addition, there will be a need to supplement research budgets, preferably through some form of prioritized competitive grants scheme (see the Research Program).

59. Government support under the Program concentrates on the development and strengthening of various business and technical advisory activities, usually provided by the public sector because private sector capacity in this area is still fairly limited, but in this instance including substantial private sector involvement. Such advisory services will be backed by specific research activities and facilitating administration. Policy development and supportive legislative reform is also included. Although mainly within the responsibility of MoFA, a number of other agencies are also involved (Table 6).

60. Expenditure for these services is essentially financed out of the state budget and should be reflected in the MTBF. Opportunities for donor funding exist, though with the objective of mainstreaming this support as a Government program, such donor support would be best provided through budgetary support<sup>6</sup>. Where donors insist on maintaining project separation, Government will require them to ensure that project objectives accord with Program objectives and are integrated into the mainstream Government Program rather than establishing parallel arrangements and further pilot research activities.

**Table 7: Expansion of Feed and Fodder Markets - Specialist Requirements**

<b>Program Specialist Activity</b>	<b>Anticipated Nature of Supply</b>	<b>Method of Strengthening</b>	<b>Financing Mechanism</b>
Policy development, including land and water rights, forms of incentive payments to producers and processors, reforms of emergency reserve mechanisms, and priorities for research and administration activities, based on economic and environmental assessment and linked into the MTBF	MoFA Strategic Policy Dept with support from Crop and Livestock implementation divisions	technical assistance - economists and market assessment experts, technical feed crop production and processing specialists	possible donor TA project (as initially one-off activity or as part of general policy development strengthening - see Institutional Capacity Strengthening Program), or through subcontracting of local economic and engineering consultants as development expenditure through state budget or ADF etc.
Legal drafting, especially land and water tenure reform, grower and herder/farmer organizational arrangements, and changes to emergency reserve structures and arrangements	MoFA Strategic Policy Dept with support from Crop and Livestock Implementation Divisions	technical assistance - legislative drafting lawyers	possible donor project (as one-off activity), or subcontracting (also involves other ministries) as development expenditure under state budget or ADF etc.

<sup>6</sup> especially for instance to support tax and credit offset allowances as incentive payments, to supplement research budgets, or to facilitate establishment of seed and feed quality testing centers.

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<b>Program Specialist Activity</b>	<b>Anticipated Nature of Supply</b>	<b>Method of Strengthening</b>	<b>Financing Mechanism</b>
Agricultural Service and Marketing Centers, Herder-Farmer Alliance Cooperatives and other group development, support for formulation, management training and related organizational activities (marketing, production, input and machinery purchase, business and administration services etc.)	MoFA Implementation Dept, notably Crop and Livestock Division	technical assistance - economists, lawyers, etc. with expertise in group mobilization and motivation, business development etc.	possible donor funded project (as one-off activity) or ADF etc.; or budget development expenditure
Economic evaluation of feed capacity development benefits, alternative production and processing technologies (incl. assessment of different equipment), economic consequences of different incentive mechanisms, and domestic and export markets. Translation of results through private and public dissemination mechanisms	MoFA Strategic Planning Dept, with Implementation Dept (Irrigation/Crops), plus Extension (affected by other Programs on support services and institutional capacity strengthening)	technical assistance in economic analysis (and in training in economic analysis - see Institutional Capacity Building Program)	possible donor project, or subcontracting of local consulting firms under state budget
Technical support - business advice on choices of crops, production and processing technologies, and market penetration and development, backed by technical advice on the introduction of such technologies. Includes training of trainers (advisers - agronomists, economists) and establishment of dissemination mechanisms (including mass media, individual and group consultations and demonstrations)	Extension services, supported by research institutions (affected by the Agricultural Support Services and Research Programs). Private business advisory and support services, including MBDA, Chambers of Commerce, and financial institutions.	technical assistance in extension, business and technical advice packaging and dissemination, backed by resources for training and demonstration activities, plus establishment of support mechanisms (especially for market development).	possible donor project, or subcontracting of local consulting firms under state budget, plus private sector support to private advisory services, financed with dedicated donor or state budgetary funding.
Research and development of alternative crop varieties, cultivation	Research institutions (AHRI, PSARTI, etc.) under contract (affected by other	possible technical assistance - technical (crop, and irrigation, cultivation, post harvest	possible donor research project, or budget support for state research budget,

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Program Specialist Activity	Anticipated Nature of Supply	Method of Strengthening	Financing Mechanism
and processing technologies, and post-harvest/marketing storage, handling and distribution systems, assessed against grower/herder profitability	Programs on seeds and research)	technology), economic/farm business specialists	or direct state budget funding out of research budget, in each case with priorities determined by advisory group (including producers, economists etc.) on basis of business benefits
Administrative systems development, operation, and management - feed quality testing, certification, and inspection; seed testing, registration, certification and inspection	MoFA, SPIA, local authorities	technical assistance in design of systems, infrastructure development, determination of training package and training of trainers, with possible subcontracting for implementation	possible donor project, including other elements of central and local government strengthening (see Institutional Capacity Strengthening Program), but also recurrent element under state budget

## G. Program Framework Matrix

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<b>Goal / Objectives</b>  To expand crop production in a sustainable manner through increased access to competitive markets for fodder and feed products.			
<b>Impact</b>  The development of an economically and environmentally sustainable fodder and feed sector that can: <ul style="list-style-type: none"> <li>respond to the demand for good quality animal nutrition in Mongolia's growing high input livestock sector;</li> <li>meet the needs of Mongolia's extensive livestock sector for feed and fodder security through difficult climatic periods;</li> </ul>	Availability of a range of fodder and feed products, of competitive quality, in sufficient quantity, and at affordable prices to meet the needs of domestic high input and extensive livestock producers and the opportunities anticipated in China and other key international markets.	program M&E and MoFA surveys of output, prices and sales of feed and fodder products;  published agriculture and other survey data on production areas and output;  market and trade statistics;  research studies (academic, private, Government, and donor funded).	stable political and economic environment, including only gradual shifts in tugrik exchange rates and domestic price inflation;  continued Government commitment to a market led private sector economy and agriculture sector, and to a liberalized domestic and international trade regime;



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Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<ul style="list-style-type: none"> <li>penetrate over the medium term the growing market for quality animal feed in key neighboring markets, notably China;</li> <li>respond over time to the risks of climate change and developments in livestock and feed markets.</li> </ul>			<p>redirection of Government sector management from price and volume interventions to promotion of an enabling environment for private sector development maintained;</p> <p>issues on land and water tenure rights resolved.</p>
<b>Outputs</b>			
1. Creation of an enabling environment for a commercial animal feed industry.	<ul style="list-style-type: none"> <li>secure land and water tenure rights established;</li> <li>flexibility enabled in the formulation of grower production, processing, and marketing organizations;</li> <li>local and central Government intervention in fodder collection and supply reorganized and limited to that necessary to meet established requirements for periodic emergencies;</li> <li>enhance capacities of local authorities to police exclusion areas</li> </ul>	<p>legislative amendments, regulatory orders, schedules;</p> <p>registered titles, registered organizations;</p> <p>budget and MTBF allocations;</p> <p>state reserve stocks and sales;</p> <p>figures for losses during emergencies (dzuds etc.).</p>	<p>commitment to private sector development;</p> <p>adoption of more appropriate mechanisms for the management and determination of state security and emergency reserves;</p> <p>successful implementation of Agricultural Land Utilization and Management Program.</p>
2. Increased production of feed crops for livestock.	<ul style="list-style-type: none"> <li>irrigated and dry land alfalfa production developed as an integral component of the crop sector;</li> <li>irrigated and dry land hay, fodder, and seed production increased;</li> <li>expansion of individual and/or group livestock feed production and conservation;</li> <li>incentives for farm improvement - fencing and pasture improvement in conservation areas.</li> </ul>	<p>program M&amp;E surveys;</p> <p>production data, agricultural and research study data, sales and price data;</p> <p>figures for losses during emergencies (dzuds etc.).</p>	<p>acceptance of shift in cropping priorities from grains to feed and horticulture products;</p> <p>successful implementation of Irrigation Rehabilitation and Construction, Seed Breeding and Varietal Development, Agricultural Support Services, and Research Programs</p>
3. Expansion of processed feed production.	<ul style="list-style-type: none"> <li>feed processing capacity expanded to meet domestic and export</li> </ul>	<p>output and sales data;</p>	<p>concentration on appropriate extension and</p>

## Volume II - Program Investments - Fodder and Feed Expansion Program

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
4. Improved producer-market linkages.	<ul style="list-style-type: none"> <li>market demand;</li> <li>soum level production of mineral nutrition blocks (MNBs) established;</li> <li>feed quality testing centre established;</li> <li>investment incentives;</li> <li>quality certification.</li> <li>links between extensive and high input livestock producers and feed production systems strengthened;</li> <li>export markets for alfalfa based and other feed products increasingly penetrated.</li> </ul>	<ul style="list-style-type: none"> <li>domestic and foreign trade data;</li> <li>program M&amp;E surveys and research studies;</li> <li>testing centre reports.</li> <li>program M&amp;E surveys;</li> <li>sales and export data;</li> <li>figures for losses during emergencies (dzuds etc.).</li> </ul>	<ul style="list-style-type: none"> <li>business advisory messages;</li> <li>successful implementation of Strengthening Market Linkages; Institutional Capacity Building, and Research Programs.</li> <li>continued trade liberalization regime, including in key target markets;</li> <li>currency stability;</li> <li>successful implementation of Strengthening Market Linkages Program.</li> </ul>
<b>Activities</b>			
1.1 Securing land and water tenure rights.	<ul style="list-style-type: none"> <li>determination of treatment of land and water tenure rights for crop farmers;</li> <li>amendment to primary and secondary legislation;</li> <li>registration of titles.</li> </ul>	<ul style="list-style-type: none"> <li>legislative acts, decrees etc.;</li> <li>registered titles, land registers.</li> </ul>	<ul style="list-style-type: none"> <li>largely dependent on successful implementation of the Agricultural Land Utilization and Management Program.</li> </ul>
1.2 Promotion of formation of grower organizations .	<ul style="list-style-type: none"> <li>recognition of flexibility in the range of legal forms for groupings, including the legitimacy of informal cooperative arrangements;</li> <li>appropriate amendment to primary and secondary legislation, tax and other regulations;</li> <li>strengthening of support services to improve understanding and facilitate capacity for promotion of such groupings.</li> </ul>	<ul style="list-style-type: none"> <li>Program M&amp;E surveys, responses from growers;</li> <li>reports of support services (extension etc.);</li> <li>number and variation of groupings registered.</li> </ul>	<ul style="list-style-type: none"> <li>involves elements under the Agricultural Support Services Program;</li> <li>assumes flexible approach to organization of groupings adopted by Government and its agencies.</li> </ul>
1.3 Ensure the enabling role of local and central Government.	<ul style="list-style-type: none"> <li>assess the impact of Government interventions for emergency fodder stocks and through equipment supplies;</li> </ul>	<ul style="list-style-type: none"> <li>amendments to Fodder Reserve directives;</li> <li>documents on</li> </ul>	<ul style="list-style-type: none"> <li>Government willing to accept alternative market based approach to meeting security</li> </ul>

## Volume II - Program Investments - Fodder and Feed Expansion Program

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
1.4 Investment Incentives	<ul style="list-style-type: none"> <li>determine a more efficient approach through the private sector to achieve Government security objectives.</li> </ul> <p>Taxation and credit subsidies</p>	<p>adoption of alternative market based arrangements;</p> <p>Program M&amp;E reports/surveys.</p> <p>Regulations for tax amendments</p>	<p>and emergency reserve objectives.</p> <p>MOF agree to incentives.</p>
2.1 Mainstreaming of Irrigated and dry land alfalfa production.	<ul style="list-style-type: none"> <li>grants to AHRI and PSARTI to increase research and development of adapted legume, especially alfalfa, and nutritious grasses;</li> <li>development of small to mid scale irrigation schemes and upgrade existing irrigation systems to encourage production of alfalfa.</li> </ul>	<p>reports of AHRI and PSARTI;</p> <p>Program M&amp;E surveys;</p> <p>output and sales of alfalfa and other legumes;</p> <p>expansion of area under irrigation, sales of irrigation equipment, etc.</p>	<p>successful implementation of Seed Breeding and Varietal Development, Irrigation Rehabilitation and Construction, Agriculture Support Services, and Agricultural Research Programs.</p>
2.2 Expansion of irrigated and dry land hay, fodder, and seed production.	<ul style="list-style-type: none"> <li>improved availability of high quality seeds of Medicago sativa var. burgalti for non-irrigated legume seeding in the central cropping region and Medicago falcata and forage grasses in drier regions;</li> <li>development of private sector seed multiplication of alfalfa and native grasses;</li> <li>development of regional seed testing, cleaning, and packaging centers associated with alfalfa and grass cropping regions.</li> </ul>	<p>Program M&amp;E surveys;</p> <p>Statistics on area and output from agricultural survey etc.;</p> <p>PSARTI, AHRI, and other seed breeding enterprises reports;</p> <p>seed testing, cleaning reports.</p>	<p>successful implementation of Seed Breeding and Varietal Development, Irrigation Rehabilitation and Construction, Agriculture Support Services, and Agricultural Research Programs.</p>
2.3 Promoting individual or group livestock feed production.	<ul style="list-style-type: none"> <li>expanded individual or group livestock feed production, in regions capable of producing hay from native or improved fodder, supported through credit related subsidies for equipment purchase.</li> </ul>	<p>Program M&amp;E surveys;</p> <p>production reports;</p> <p>sales of equipment;</p> <p>credit/bank reports.</p>	<p>may require elements of Access to Term Credit Program implemented.</p>
3.1 Expansion of feed	<ul style="list-style-type: none"> <li>rehabilitation and</li> </ul>	<p>Program M&amp;E</p>	<p>successful</p>

## Volume II - Program Investments - Fodder and Feed Expansion Program

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
processing capacity.	upgrading of existing feed processing plants with modern equipment capacity to enable the processing of alfalfa into easily transportable livestock feeds;	surveys/reports;	implementation of Access to Term Credit and Strengthening Market Linkages Programs.
3.2 Introducing soum level MNB production.	<ul style="list-style-type: none"> <li>construction of modern mid-scale feed processing centers in regions with newly developing livestock feed production.</li> <li>consolidation of RIAH research into the manufacture of MNBs from local materials;</li> <li>extension of RIAH results as technical assistance to soum centers interested in manufacturing and marketing MNBs.</li> </ul>	enterprise reports; enterprise register; credit reports.  RIAH research reports; survey by Program M&E, etc.; livestock project studies/reports; soum reports.	successful implementation of Agricultural Support Services, Research, Risk Management, and Access to Term Credit Programs.
3.3 Testing feed quality.	<ul style="list-style-type: none"> <li>testing centers for feed quality established near to feed production areas.</li> </ul>	Program, MoFA M&E survey; centre reports, test results;	successful implementation of Agricultural Support Services, and possibly other laboratory support programs.
4.1 Strengthening market links with livestock producers.	<ul style="list-style-type: none"> <li>agricultural service and marketing cooperatives link livestock producers with livestock feed producers and processors;</li> <li>livestock producers who develop a winter livestock supplemental feeding program subsidized to initiate planned supplemental livestock feeding as part of their production planning;</li> <li>livestock producers able to access term credit to build or purchase storage facilities (such as shipping containers) at winter camps for processed feed and minerals.</li> </ul>	registration of farmer organizations; credit reports; output and sales reports; Program M&E reports.	successful implementation of Access to Term Credit, Strengthening Market Linkages, and Agricultural Support Services Programs.

## Volume II - Program Investments - Fodder and Feed Expansion Program

<b>Design Summary</b>	<b>Performance Indicators/Targets</b>	<b>Monitoring Mechanisms</b>	<b>Assumptions and Risks</b>
4.2 Penetrating of alfalfa export markets.	<ul style="list-style-type: none"><li>• exports of range of quality high value livestock feed products.</li></ul>	trade data; customs reports.	implementation of Strengthening Market Linkages and Agricultural Support Services Programs.

# **AGRICULTURE SECTOR STRATEGY STUDY**

## **VOLUME 2**

### **COMMERCIALIZATION OF HORTICULTURE PROGRAM**

**30 NOVEMBER, 2006**

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## ACRONYMS

ADB	-	Asian Development Bank
ADF	-	Agriculture development Fund
AHRI	-	Animal Husbandry Research Institute
AI	-	Artificial Insemination
ASDP	-	Agricultural Sector Development Project
CIDA	-	Canadian International Development Assistance
DANIDA	-	Danish International Development Agency
EGPRS	-	Economic Growth and Poverty Reduction Strategy
ELISA	-	Enzyme Linked ImmunoSorbent Assay
EU	-	European Union
FAO	-	Food and Agricultural Organization (of the United Nations)
FMD	-	Foot and Mouth Disease
GAP	-	Government Action Plan
GDP	-	Gross Domestic Product
GTZ	-	German Bi-lateral Aid Agency
IMED	-	Information Monitoring and Evaluation Department
JICA	-	Japan International Cooperation Agency
KOICA	-	Korean International Cooperation Agency
LEWS	-	Livestock Early Warning System
M&E	-	Monitoring and Evaluation
MBDA	-	Mongolian Business Development Agency
MDG	-	Millennium Development Goal
MIT	-	Ministry of Industry and Trade
MLG	-	Ministry of Local Government
MNB	-	Mineral Nutrient Blocks
MNE	-	Ministry of Nature and Environment
MoFA	-	Ministry of Food and Agriculture
MSUA	-	Mongolian State University for Agriculture
MTBF	-	Medium Term Budgetary Framework
NAEC	-	National Agricultural Extension
NAMAC	-	National Association of Mongolian Agricultural Cooperatives
NEMA	-	National Emergencies Management Agency
NPA	-	National Plan of Action
O&M	-	Operations and Maintenance
OIE	-	Office Internationale Epizootique
PPP	-	Public Private Partnerships
PSARTI	-	Plant Seed Agriculture Research and Training Institute
SCVL	-	State Central Veterinary Laboratory
SDC	-	Swiss Development Cooperation Agency
SEFF	-	State Emergency Fodder Fund
SPIA	-	State Professional Inspection Agency
UNDP	-	United Nations Development Program
USAID	-	United States Agency for International Development
WTO	-	World Trade Organization
WUG	-	Water User Group
ADRA	-	Adventist Development Relief Agency
JCS	-	Jesuit Christian Services
NGO	-	Non government organization
HACCP	-	Hazard Analysis Critical Control Point
ISO	-	International Standards Organization



## COMMERCIALIZATION OF HORTICULTURE PROGRAM

### I. BACKGROUND

1. The Commercialization of Horticulture Program represents an important component in the strategy to increase the profitability of the crop sector over the medium term, enabling both improvements in margins of existing production and the increased diversification of cropping into higher value crops with a buoyant domestic market. The Program aims to develop an economically and environmentally sustainable competitive horticulture sector able to: i) respond to the growing demand for good quality and diversified vegetable and fruit products in Mongolia's urban markets, successfully competing with imports, notably from China; ii) provide income opportunities and household food security to rural people; and iii) respond over time to the risks of climate change and the increasing competitiveness of international markets.

2. Besides being a major opportunity for growth, horticulture development also addresses all three elements of food security: providing opportunities to alleviate poverty, and therefore access to food, through income generation and employment, whilst also increasing the supply of food and the quality of nutrition. Market considerations, and transportation limitations, however, restrict commercial opportunities to areas with relatively easy access to population centers. While major markets for fresh and processed produce are in the urban and aimag centers, which are also the location of most commercial fruit and vegetable processors, smaller rural centers also offer potential for supply from local producers.

3. Land and water resources are available for horticulture in areas with ready access to urban markets and rural people have demonstrated their willingness and ability to invest their time and resources into developing small-scale farms. Local production is currently competing effectively with imported product, but productivity is low because of limited technology, water constraints, old varieties, exhausted seed stock and post harvest inefficiencies that create large losses in storage and transportation. Technology to overcome these constraints is readily available and could be used to increase productivity and competitiveness, thus improving farm incomes, stimulating secondary and tertiary industries and services in rural areas, and securing the long-term viability of this emerging industry.

4. Several factors support the strategic development of commercial horticulture at this time. There is a growing local demand for vegetables and fruit on which a commercial industry can be based. Opportunities exist for import replacement of both fresh and processed product, bolstered by Mongolian consumer preference for local produce. While 80% of domestic demand for potato is thought to be met by local production, 64% of that for vegetables is met by imports. Imports of processed vegetables are running at over 4mn jars a year, coming largely from Eastern Europe, Russia, China, and Vietnam. Several Mongolian processors do compete effectively with these imports, but tend to have sold out of their inventory by February or March.

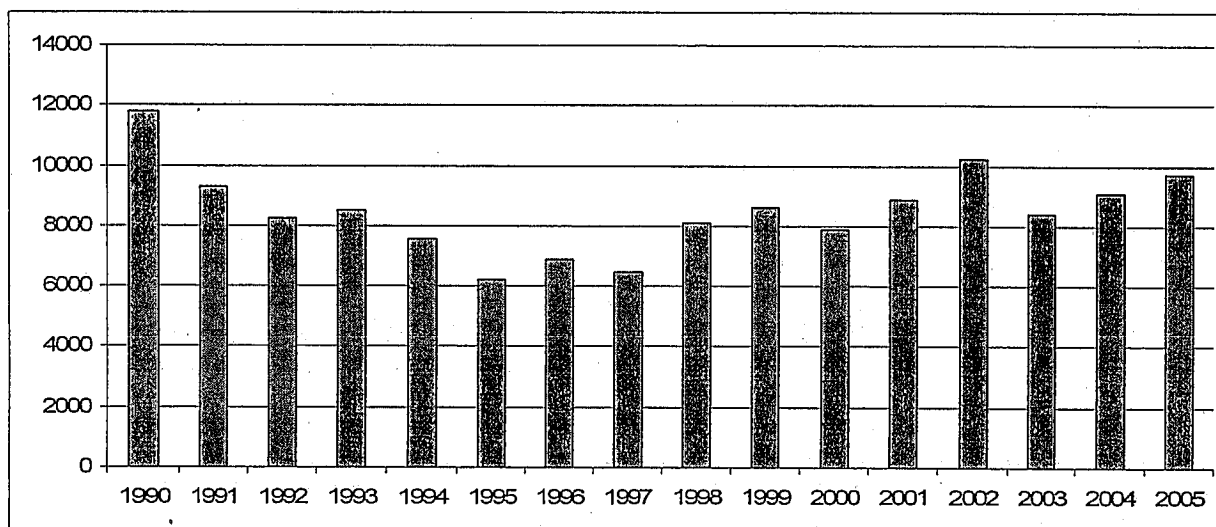
5. Expected outcomes, therefore, are an increasingly vibrant and sustainable crop sector, exploiting opportunities presented by Mongolia's agro-ecological conditions and geo-political location. Significant employment and income opportunities will support substantial reduction of rural, peri-urban, and even urban poverty, whilst also improving the nutritional quality of domestic food consumption, with consequent benefits for health and productivity. At the same time, generation of domestic supply will reduce losses through imports and increase the national value added of such growth sectors as tourism and mining.

## II. SECTOR ANALYSIS

### A. Sector Performance

6. After the initial shocks and structural adjustments of transition, Mongolian horticulture has grown and diversified steadily since the mid 1990s based on private sector investment as smallholder producers have become established and responded to increased market demand, replacing earlier large-scale state farm horticulture production. The area of vegetable production dropped from 4,100ha in 1989 to 2,600ha in 1992. It then grew progressively, reaching a maximum of 7,100ha in 2002 before falling back, after severe drought, to 5,400ha in 2004. The area of potato production fell from 12,600ha in 1989 to a minimum to 6,100ha in 1995 but then recovered to 10,300ha in 2002, contracting slightly to 9,500ha in 2004 (Figures 1 and 2). The drought in 2002 taught many producers the extent of their exposure to the risk of dry weather. As a result, while the overall planted area fell in 2004 (mainly for vegetables) the irrigated horticultural area increased. By 2004, about 60% of the area used for potato production was irrigated (through networks, dams, wells, rivers etc.) as was 75% of that devoted to vegetable production. However, average yields remain poor and production is still below the level achieved before transition. Potato production in 2004 was only 79,200 tonnes compared to 155,600 tonnes in 1989, while vegetable production has 50,500 tonnes in 2004 compared to 59,500 tonnes in 1989. Yields for potatoes and vegetables range from 5.6-12.7 t/ha, well below international standards<sup>1</sup>.

**Figure 1: Area Planted to Potatoes (ha)**



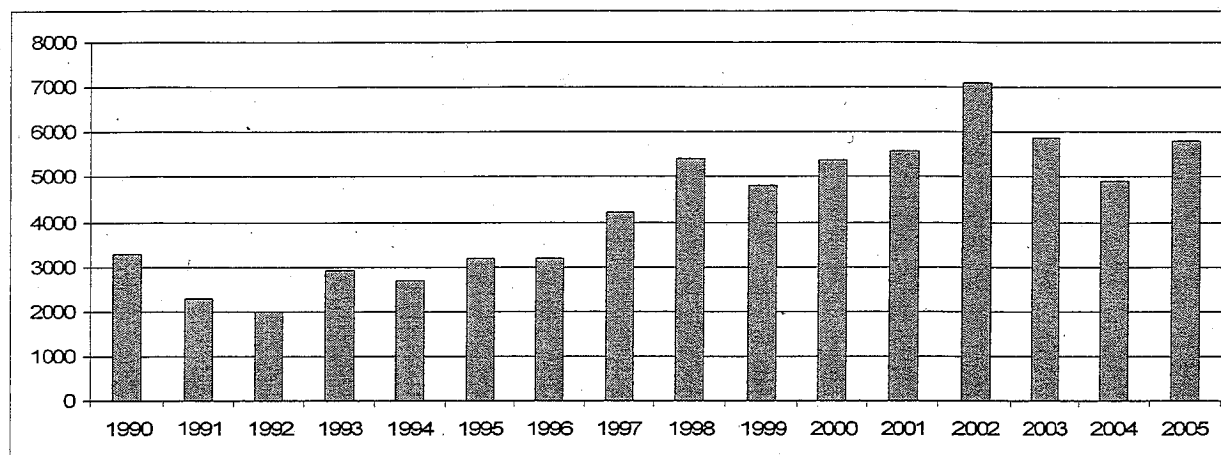
7. Potato and vegetable production is now dominated by small households. Backyard subsistence farms of less than 0.10ha with production intended for immediate household consumption represent 59% of potato producers and 67% of vegetable producers. In the threshold and commercial category (0.2-5.1 ha) there are 14,357 reported potato producers and 8,711 reported vegetable growers representing 37% and 30% of all reported potato and vegetable producers. Only 4% of potato producers and 2% of vegetable producers farm areas of greater than 5 ha. Many small producers are now beginning to expand to more commercial sized operations. Success factors, besides the benefits of scale, include secure access to water, improved management skills and experience, adequate supplies of labor, appropriate technologies and improved access to production inputs. Against this is the

<sup>1</sup> By comparison, yields of potatoes and carrots in Alberta, Canada average 23-28 t/ha and 22-37 t/ha respectively (Alberta Agriculture "Fresh Vegetable Market Gardening Industry" April 1, 2004).

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pervasive shortage of affordable investment and operating capital which makes investment in facilities and new technologies either impossible or uneconomic. Increasingly, small horticulture and cereal producers are incorporating their farms as companies to provide better access to government programs.

**Figure 2: Area Planted to Vegetables (ha)**



**Table 1: Irrigated Crop Production by Type of Entity  
(hectares)**

	Potatoes	Vegetables	Fruit
<b>Irrigated Areas</b>			
Households	4,365.1	3,008.9	32.2
Enterprises	1,021.5	693.6	0.0
<b>Total Area Planted</b>	9,078.6	4,918.5	n.a.
<b>% Irrigated</b>	59.3%	75.3%	n.a.

Source: MoFA - Census of Sown Area, 2004

8. Mongolia has a long established history as horticultural producers but mainly on state farms where production was heavily subsidized. In terms of the total agricultural sector, it remains a relatively small contributor. Recent growth in the industry is largely a reflection of the influence of market forces as small producers see opportunities for supplementing their incomes around the urban areas. Being an industry with highly perishable products, the importance of proximity cannot be overstated. Similarly, access to water severely restricts where horticultural crops can be grown on any scale, hence the buildup in the central region where surface water is more abundant and a road network more developed. The process of commercialization cannot take place across the board for all growers as many face resource access limitations. However, there are an increasing number who are generating cash surpluses from their smaller scale initiatives and are seeking to restructure their operations along more commercial lines. The Program is intended to support them in their endeavors that will have flow-on repercussions for the smaller scale operators throughout the country.

9. There are four levels of operation. Most growers begin as backyard producers, stimulated through projects or observation of others<sup>2</sup>. Production at this level is largely for subsistence purposes. Soil preparation, weeding and watering is done by hand and storage capacity usually non-existent. Expansion of these areas to half a hectare allows subsistence to be supplemented by a small volume for sale or barter. Work is still done by hand, but watering may be provided through some form of flood irrigation. A root cellar, with a capacity of from 5 to 20 tonnes is sometimes found for producers at this level. At this stage, the farm is on the threshold of commercialization. Further expansion to around 5 ha, sees the emergence of small commercial operations. Irrigation is starting to be used and equipment shared between farms. On-farm storage becomes a requirement, and 20-tonne root cellars are more common. At the fourth category (beyond 5 ha), farms become fully commercial, with irrigation, their own equipment, and hired labor is generally engaged. Storage becomes more sophisticated as simple root cellars provide neither the capacity nor humidity and temperature controls to maintain quality.

10. Changes have also occurred in processing. Previous large enterprises succumbed to inefficient technologies, poor management and lack of financing. These were then replaced by a multitude of very small home-based processors selling mainly in local markets and a limited number of small and medium scale commercial processors producing between 20,000 and 270,000 jars a year for sale in urban markets. For all of these processors, the main issues have been access to technology and inputs (including produce and packaging materials such as jars and lids), quality control, management, marketing and finance. Processing provides seasonal employment, peaking in September to December and falling to one tenth by summertime. Food safety issues are pervasive, especially with very small scale production, which sometimes markets under counterfeit labels of larger companies. Better facilities and quality control systems are needed, reinforced by appropriate standards enforced through inspection and testing by Government. Nonetheless, significant opportunities exist for further processing of horticulture products, from simple products that can be produced at the household level to more advanced food and medicinal processing: dried products, jams, jellies, juices, frozen foods, convenience foods, medicinal products and extracts.

## **B. Constraints**

11. Production is characterized by small scale operations, low productivity, high risk, high post-harvest losses and marketing inefficiencies. There is little investment in capital or production inputs because growers have little equity and face difficulties in accessing credit. Therefore, inputs and capital purchases are made on an essential basis only. Input use is minimal, equipment is inadequate and storage facilities may not be present, leading to low productivity and high losses. The greatest single production constraint is secure access to water. There is demonstrable demand for irrigated land and in 2002, rental rates for this land ranged from Tg150,000/ha to Tg240,000/ha. Irrigation infrastructure is being rehabilitated in response to this demand. This trend began in the private sector and is now being supported through a government financed program. However, institutional issues around irrigation development and management exist, particularly in water and soil assessment, monitoring and environmental sustainability; ownership and management rights and responsibilities; and, water user rates and collection, management of irrigation and maintenance of facilities. While the land and water laws establish a relatively clear framework for resource tenure, the

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<sup>2</sup> Long-term support of international NGOs such as World Vision, Jesuit Christian Services and ADRA have had a significant impact on developing the kitchen-garden and small scale horticulture sector, and have been a major source of inputs, training and technical support. MoFA's Green Revolution Program has also supported the provision of inputs and equipment to small producers and undertaken demonstrations.

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regulatory system for land and water tenure is weak, especially at the soum-level where the clarity is most needed to support investment in agriculture development, especially capital intensive irrigated horticulture systems.

12. Producers lack access to technologies and inputs that would improve productivity. Local seed production is inadequate in volume and quality that would significantly enhance productivity. Locally produced seed is often impure, even if it has been inspected by the state laboratory because of limited testing capacity. Chemical fertilizer generally unavailable although there is some microbial fertilizer produced locally that is popular with producers. There is a growing interest in organic fertilizer that could be supplied through stronger integration between horticulture and intensive and small livestock production (pigs and poultry). Herbicides and pesticides are extremely limited and are usually sold without proper labeling in Mongolian, leading to uneconomic use, improper handling and the risks to human health and the environment. The actual content of chemicals sold and their efficacies are not known with any certainty as pesticide and herbicide registrations are out of date and laboratory capacity does not exist to identify these chemicals or their residues in soil, water and products. The use of greenhouses and tunnels is well established around Ulaanbaatar and in rural soums, but has been limited to those producers who can generate the capital internally or through their own networks. Expanding access to these technologies and introducing additional season-extending and water conserving technologies such as mulches and blankets would improve horticulture productivity.

13. The Program addresses each of the constraints to the development of a strong and sustainable commercial horticultural industry including:-

- creation of an environment to encourage investment in horticulture, reducing exposure to risk by settling land and water tenure issues, and spreading risk through such mechanisms as term finance, interest offsetting, and insurance;
- strengthening of the institutional framework, notably with respect to the grading of produce quality, the improving of seed standards, the management of plant health, and the maintenance of food safety;
- support for smallholders to make the transition into sustainable commercial production;
- development of irrigation systems suitable for horticulture to raise productivity and reduce risk;
- improved post-harvest storage, processing, distribution and marketing systems; and
- effective support for innovation and adaptation through improvements in research, training, extension and information systems.

### C. Opportunities

14. Opportunities for the development of a commercial horticulture industry are based on the increased urbanization in Mongolia, changing consumer taste that has increased reliance upon vegetables as a source of protein and other essential vitamins, the increased awareness of quality, in particular the high levels of residual pesticides found in imported vegetable products, and the abundance of suitable land and water resources in locations close to urban markets that are well serviced by rural transport infrastructure. Historically, Mongolia maintained lower dependency on imported vegetables than is found today because of the subsidized production in state run farms. Under open market conditions, domestic production is rapidly adapting to competition from external sources, admittedly on a seasonal basis although there are many who have extended the period of supply through storage and processing to accommodate harsh winter conditions. As family links become more disjointed between rural inhabitants and urban based families, there is increasing

reliance on sourcing vegetables through local markets. Consumers are becoming increasingly aware of quality aspects and, as incomes increase, are prepared to pay higher prices for superior quality food items. Similarly, with its reputation for having a clean environment, Mongolian produced herbs and medicinal plants could well form the basis of a significant export industry providing employment opportunities and significant value added from the extraction of ingredients used in the pharmaceutical and cosmetic industries.

15. Horticulture production provides excellent opportunities for household food security and income generation through small scale farming. Growers have immediate sales in the local community and progressively in all urban centers in the vicinity and, ultimately, in Ulaanbaatar, Darkhan and Erdenet. In soum centers, where jobs are scarce, employment opportunities are created in weeding, watering, processing, transportation and marketing. Small-scale commercial horticulture development is consistent with the Government's poverty reduction strategies. Initial investment requirements can be very low (for backyard gardening \$100 - \$200) and investments are easily staggered for incremental growth in the business. These financing requirements are within the range of existing credit facilities although interest rates are somewhat prohibitive as are collateral requirements. Government and project support is already in place through the Green Revolution and several NGOs, notably World Vision, JCS and ADRA that have long-established community development "kitchen garden" projects. There exists a certain familiarity with horticultural production that has been developed through these initiatives.

### **III. GOVERNMENT'S POLICY FOR THE DEVELOPMENT OF HORTICULTURE**

#### **A. Rationale for Public Involvement**

16. Support for the Horticulture Commercialization is considered appropriate given the way in which the industry has developed since the socialist period. With a predominance of small scale producers, it is evident that horticulture was initially a food security activity in household gardens. With herding becoming a less attractive lifestyle given the extreme conditions and the high risk associated with herding livestock, many small producers elected to become more sedentary, basing themselves round soum centers where they had access to other employment opportunities. The expansion of small scale horticultural production was undertaken as a food security measure by these poorer households as they sought to adjust to their new lifestyles. This explains the high percentage of growers with planted areas of less than 0.01 ha. These tended to be the resource poor who had inadequate cash resources to entertain larger scale production but could provide their own labor to generate food for their families during the summer months. From these, have grown the more proficient operators who have been successful in their vegetable growing enterprises, encouraged by a rapidly developing market in urban centers.

17. Support for these individuals comes on social grounds to assist them achieve higher disposable incomes and to lift themselves out of poverty. The means by which this can be achieved is through the creation of a suitable environment that will enable the more efficient operators to expand their production base by adopting modern technologies and improving market access, converting what were previously subsistence producers into commercial enterprises. Not only is there a significant number of families engaged in horticultural production in rural Mongolia, many of whom live below the poverty line, but there is an under supplied market for horticultural produce that is being supplied by imported goods while there remains potential for local production to meet such requirements. The Government has recognized an opportunity to achieve socio-economic development for its rural population, to impact upon levels of rural poverty, and to protect its foreign currency reserves through import replacement.

18. The rationale for government involvement is therefore to create the appropriate investment environment that will facilitate this transition: to make water, the limiting resource in horticultural production, available for the commercialization and expansion of the industry as such investments are capital intensive and unlikely to be made by private individuals, particularly from relatively poor backgrounds. It has a responsibility to secure the land holdings for those engaged in horticultural production from straying livestock to protect their investments and to stimulate the input supply, marketing and processing businesses that will be needed to support a commercial industry. These are clearly functions of government.

## **B. Recent Development Initiatives**

19. Both the Government and donors have actively supported the development of the horticultural sector in Mongolia that have, in some programs, been broadened to incorporate forage production and animal feed conservation initiatives. The main government activity of recent times is the Green Revolution Program that has been funded partly from the national budget, partly from the proceeds of the 2KR program and partly from the funds generated from the monetarization of commodity aid. Donor funded initiatives include: (i) the ADB funded Agriculture Sector Development Project (ASDP) that attempted to re-orientate the Green Revolution Program, (ii) the Swiss Development Corporation funded Potato Industry Development Project that focused on improving seed potato using imported virus free stock then contract multiplying locally, (iii) the IFAD funded Poverty Reduction Project, and (iv) the World Bank funded Sustainable Livelihoods Project through its micro-finance outreach initiatives. In addition, a number of NGOs have undertaken small scale initiatives usually with a poverty focus or in some instances, food security such as World Vision, JCS and ADRA funded projects that typically have provided production inputs for poor households from which they can generate either food or income.

### **1. Government Initiatives**

20. The Green Revolution was implemented from 1997 to 2004 with a program budget of \$1.7 million and has subsequently been extended to 2008. Annual allocations during the first phase have been of the order of Tg 70 million to Tg 180 million while the planned allocation for 2006 was Tg 120 million (the equivalent of \$100,000). Its main initiatives included the distribution of mechanized equipment to private producers on a subsidized basis requiring 50% repayment over a three year period without interest. The program reported satisfactory repayments from beneficiary farmers in accordance with their agreed schedules. It also provided free seed material and other production inputs as an incentive to grow produce that was more poverty related than to promote commercial production. The program has been evaluated as successful in that household incomes have risen by the target amounts and vegetable yields in particular have achieved the target levels. In assessing the performance of the program, the cause and effect from program interventions were not sufficiently monitored to establish the relationship.

### **2. Donor Funded Initiatives**

#### **ASDP's Green Revolution Component**

21. Implemented between 2001 and 2006, this component sought to impact upon the poor by providing access to new production technologies through a combination of training and pilot demonstrations of new technologies. Initiatives were directed at extending the supply period of vegetables grown in the western aimags that included green house nursery production to start the seedlings, water management through new sprinkler technologies, diversification into new higher valued crops and extending the period of supply through storage and downstream on farm processing. The project attempted to re-orientate the

Government program away from machinery distribution to incorporate capacity building of soum and aimag extension staff and that of the beneficiary producers.

### **Seed Potato Development Project**

22. This was implemented in recognition of the extended period in which seed material had been retained on farms due to the lack of seed growers throughout Mongolia. The project imported higher yielding well adapted seed material from countries of similar agro-climatic zones and the seed material was multiplied by local growers under contract to the project. When sufficient quantities were obtained, limited release of planting material was affected through private input suppliers to assist in the development of private horticultural input suppliers. Implementation of the project is now ongoing with a mid term review scheduled for early 2007. Under the influence of the project, improved seed material has been responsible for significant increases in commercial yields of potatoes.

### **Poverty Reduction Project**

23. The project provided incremental resources to the Government's Green Revolution Program without attempting to influence its overall design and implementation arrangements. The main advantage of this project over the Government program was that associated development initiatives were made possible from other component initiatives such as the rehabilitation of water points and the support for Agroparks to reinforce the adoption of alternate technologies.

### **Sustainable Livelihoods Project**

24. Under the micro-credit facility, funds were advanced for horticultural initiatives targeting the poorer households in participating aimags. Production credit was extended through commercial banks at fixed interest rates for horticultural production that were not tied to any particular sector or enterprise. The program was intended to provide access to credit at affordable interest rates. The fact that borrowers used this facility for horticultural production is evidence of the demand for credit but that credit must be at reasonable rates.

### **Other NGO Programs**

25. World Vision, JCS and ADRA have all participated in promoting small scale producers in their quest for alternative income sources and food sustenance. Most of the NGO initiatives were introduced during the extreme dzuds of 2000 - 2002, not only distributing fodder to maintain livestock but also to promote alternative income generating activities round soum centers where the unemployed gathered. These projects focused more on developing the capacities of producers rather than participating in any equipment distribution activities and were more targeted towards the poor than the government program.

## **C. Future Development Strategies**

26. Future development strategies for horticulture must address its subsistence and commercial duality. With such large numbers involved in the industry, even for subsistence purposes, the Government wishes to facilitate the development of the more commercial entities while continuing to provide support for those with limited options for expansion. Program initiatives have been designed so as to facilitate the transition from smaller scale to commercial operations but individual initiative under the program will have spin off benefits to all participating in the industry e.g. the improvement of seed material that will benefit all producers. The Government's future strategy for the commercialization of horticulture is to:-

- Create a suitable environment for investment by addressing land and water tenure issues, improving access to appropriate term finance and developing risk management mechanisms.



- Strengthen institutions in the sector related to grading and inspection, seed quality standards and plant protection. Additionally, strengthen food safety standards and develop new standards for ecological foods and medicinal plants.
- Support the commercialization of small holder production.
- Develop irrigation systems to improve productivity and reduce risk.
- Improve post-harvest storage, processing, distribution and marketing.
- Support the continued innovation and adaptation within the system through research, training, extension and Information.

27. These strategic objectives address the main constraints to industry development and provide a more conducive investment climate for the private sector. The strategy seeks a withdrawal of government activities that inadvertently undermine development of the private sector but is also committed to ensuring that inputs supplies and marketing functions are maintained at least at minimum levels to maintain the steady growth seen over recent years. It is intended that opportunities will be available to increase the proportion of domestically produced vegetables in the local market to assure local consumers of high quality, safe and nutritional produce.

#### **IV. PROGRAM PROFILE**

##### **A. Objectives and Outcomes**

28. The objective of this program is to facilitate small scale producers to make the transition from subsistence producers to more commercially oriented horticultural enterprises capable of responding to increased and diversified domestic demand for horticultural goods, competing more effectively with imported goods.

29. Intended outputs of the Program include:-

- An investment climate that is conducive to private investment whereby improvements and security of tenure are protected under law;
- Strengthened institutional capacity to coordinate the development of the horticultural industry providing the essential public services that are the responsibility of government including research, technical extension and information systems;
- Enhanced profitability of horticultural production through increased output of superior quality produce;
- Expanded use of irrigation in smallholder production systems both on large scale, public irrigation systems and localized private irrigation systems; and
- Enhanced storage and processing for horticultural produce to extend the supply period of these goods.

## **B. Scope and Key Activities**

30. The Program is an integral part of the Strategy for the agricultural sector as a whole, and the crop sector in particular. The future of cropping involves a shift in emphasis from cereal grains to crops with strong and growing markets, both at home and abroad. Two key areas are horticulture: fruit and vegetables (including tubers), and feedstuffs. Grains remain important where they feed into these opportunities, such as animal feeds, and where they support industrial processing, particularly for alcoholic beverages, but other specialty crops, such as medicinal plants and herbal essences, and quality seeds, also offer potential for successful smallholder and crop farm production. Within the context of the Strategy, however, major emphasis for crop sector recovery and growth has been put on the development of horticulture and feed crops through targeted Programs.

31. Horticulture production provides excellent opportunities for the rural poor and women to participate in commercial income generating activities. Participation of the poor and women will be emphasized under the Program, concentrating on the scaling up of marginal or subsistence surplus producers to a more commercial basis. To facilitate the participation of the poor, the Program will:-

- improve access to financing by providing training and technical support to improve the credit worthiness of the poor and introduce risk-minimizing crops, technologies and management systems that will also improve the credit worthiness of producers;
- address the special needs of the poor through special training programs and services, upgrading training in some literacy and numeracy skills as needed, especially for school dropouts, who are primarily young males;
- provide education in health-nutrition linkages and hygiene and food safety to improve health and nutritional status of rural households;
- use extension groups to provide effective training and peer support to the poor; and
- encourage pro-poor governance through the creation of water user groups (WUGs) and other approaches to group operations and management.

### **1. Creation of an Enabling Environment**

32. Government is to support the creation of an environment suitable to support the development of successful horticulture enterprises. This will include reform or elaboration of aspects of the legislative and regulatory frame work to meet the needs of a positive policy of horticulture promotion, the elimination of impediments to the smooth functioning of the market, improved access to affordable investment finance, and the spreading of risk across crops and areas. The idea is an environment that positively encourages private investment and endeavor in horticulture at all levels, from the very small backyard or kitchen garden operation, initially perhaps only a marginal subsistence surplus operation, through to larger units of 5ha and over, perhaps with significant investment in green houses.

#### **a) Legal and Regulatory Reform**

33. The most fundamental requirement for investment in horticulture, as for other cropping, is security of land tenure and, closely linked, secure access to water. These two areas: land and water rights, have been problematic throughout the period since transition but are reaching an effective conclusion. The Government through this and other Programs under the Strategy (notably the Agricultural Land Utilization and Management, Risk Management, and Irrigation Rehabilitation and Construction Programs) will pursue an early resolution to these issues. For water this will also involve the development of water management structures, for small horticulture producers likely to be in the form of WUGs.

34. Given the strong livestock traditions, and continuing dominance of livestock in the rural environment, the Program will establish producers' rights to protect their crops from livestock, i.e. to fence their growing areas, and will back these through some form of compensation for crop and income losses that result from livestock incursions. To be effective, this will require enforceable, and enforced, mechanisms to recover losses from the owners of the livestock involved, perhaps linked with insurance systems for both crop and livestock production. At the same time, the rights to protect crops must be tied into the landowner's rights to use their agricultural land in any productive endeavor (provided it meets zoning and environmental restrictions), whatever the customary use. Important to the security of land and water access will be the establishment of appropriate and effective dispute resolution procedures, which must be both fair and enforceable. This will require the strengthening of soum level capacities, a process that is an important element of the Institutional Capacity Building Program.

35. Because of the particular opportunity that horticulture presents for the reduction of poverty, the Program will seek to establish a pro-poor orientation both to policy and its implementation. This will be reflected in the removal of barriers to, and positive promotion of, poor and vulnerable household access to land, water, finance, technical skills, and knowledge.

36. The Government will progressively withdraw from the practice of acting as the distributor of agricultural inputs and equipment, and discourage aid programs that support this, which has in effect distorted the input and equipment supply market by undercutting the private sector, thereby discouraging private investment. The result has been to reduce over supply, and to introduce an arbitrary allocation system where access depends not so much on efficiency and productive potential as on local politics and influence. Similarly, the Government will adopt a procurement and supply policy for state institutions that operates through private sector traders and producers, such as by subcontracting, rather than continuing with a distribution system in direct competition with the private sector and which, because of the volumes involved and the links with local administrations, can have a distortionary influence on prices and supply.

#### **b) Access to Term Finance**

37. To achieve the transition from subsistence to commercial producer, growers must have ready access to term finance at affordable rates, i.e. at rates that can be recovered through profitable crop activities. This is likely to be fundamental to their ability to expand cultivation areas and to adopt appropriate and new technologies (in land preparation, cultivation, irrigation and post-harvest treatment), including land improvement such as through irrigation and diversification through the use of new varieties and quality seeds, to support access to horticultural produce markets.

38. Elaboration of this element of the Program will rely on the implementation of the Access to Term Finance Program under the Agricultural Strategy, which will address the issue of limited financing of agriculture through the financial sector, the absence of anything other than short term or seasonal lending, and the charging of interest rates well in excess of the cost of lending and the true risk involved. Through the Access to Term Finance Program, the Government will support the development of a range of financial products through the private commercial finance sector, including longer-term lending, financial and other forms of leasing, and equity or venture capital. It will also investigate the potential for introduction of a risk-offsetting mechanism for agricultural lending, perhaps related to manageable interest rates. This could also involve some form of public-private partnership (which need not be only at the larger end of the enterprise spectrum), particularly in the exploitation of irrigation

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opportunities (which will be pursued under the Irrigation Rehabilitation and Construction Program, and involve examination of successful practice in similar agro-ecological circumstances - Western Canada, Chile, etc.).

39. Particular attention will be paid to removing the barriers to finance experienced by poor and vulnerable households, to assist and encourage their entry into the sector and/or their expansion into commercial marketed production. This may involve innovative approaches to collateral in the absence of mortgageable assets or resource rights.

### **c) Risk Management**

40. Spreading of risk through financing, whether by loan or equity, is considered under section IV.B.1.b). The Program will also examine the feasibility of crop insurance schemes to offset the climatic, and possibly economic, risks of horticulture production in Mongolia, though this would have to be in the context of a similar scheme for other crops (see the Risk Management Program). Any scheme would have to comply with World Trade Organization regulations and should not be a form of hidden subsidy. Consideration will also be given for the introduction of non-distortionary income offsetting or stabilization systems, perhaps for smaller producers and vulnerable groups, tied in with social assistance and other payments, and financed under the budget.

## **2. Institutional Strengthening**

41. The Program will strengthen the various elements of the institutional framework on which successful horticulture development is dependent. These include the establishment of product quality standards, reflected in differential pricing for superior grades and reinforced through inspection, to ensure produce and processed products meet market requirements system for grading quality standards. Development and certification of standards for specialty horticultural produce include for ecological or 'organic' foodstuffs and medicinal plants. Linked to these quality standards are food safety and health and hygiene standards at points of sale and in processing and packaging. On the supply side, productivity is also dependent on the access to quality seeds and effective systems of plant protection. The Program will address each of these areas, although seed quality and plant protection systems fall within the context of other broader Programs under the Strategy.

### **a) Grading Standards and Inspection**

42. High quality standards will improve the marketability of local produce. Prices should reflect different grades of produce, both in the fresh market and with processors (though the economics of processing often relies on the use of low value fresh produce rejects). Nonetheless, the prime consideration is for produce to meet the specific requirements of consumers and processors. Better quality, supported by a system of certified standards will also increase consumer confidence in domestic produce, an important element in its competition with imports. The Program will update product standards, establish grades and strengthen inspection systems for vegetable, potato and fruit crops to reflect consumer and processor demands and allow for the introduction of new varieties, enabling improved marketing and pricing. Inspection staff, processors and producers will be trained and information on quality standards systems disseminated.

### **b) Horticulture Seed Quality**

43. This sub-component aims to improve seed quality and inspection standards to decrease risks to producers and improves farm productivity<sup>3</sup>. The Program will support the

<sup>3</sup> Swiss Development Corporation is supporting improvements to seed potato quality and support for commercial multiplier farms.

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development and upgrading of seed standards for all types of horticulture crops, but this will take place within the context of the Seed Breeding and Varietal Development Program. It includes, first, research and development of new and adaptive varieties of super elite and elite seeds multiplied through private sector seed farms, the establishment of standards for the registration and certification of seed supplies, backed by effective testing and inspection systems. This will require upgrading of State Specialized Inspection Agency and the aimag and soum inspection responsibilities, as well as the State Seed Testing Laboratory and aimag equivalents, including equipment, professional skills development, and linkages with international centers of excellence and information systems.

**c) Plant Protection**

44. Plant health issues, which extend well beyond horticulture, can be expected to emerge over time on fields used repeatedly causing fungus, micro nutrient deficiencies and soil pathogens appear in increasing incidences. Weaknesses in plant protection extend throughout the system. Agro-chemicals are very limited and agricultural professionals, technicians and producers alike are unfamiliar with the proper use and handling of the broad range of chemicals available internationally. Registered lists of chemicals require updating and testing facilities need upgrading. Proper labeling and instruction in safe handling and use is important to ensure economic use, human health and environmental safety.

45. The Program intends to improve plant protection standards and inspection to ensure producers access to a range of reliable products with labeling and instructions in Mongolian. This will lower the risks to consumers, producers and the environment through improper use, residues and run-off. This will involve:-

- revision of the agro-chemical registry;
- development of standards for packaging, labeling, handling and storage;
- development of standards for use: application levels, timing, and methodologies;
- upgrading of testing facilities and procedures;
- reform and strengthening of the inspection service;
- training for researchers, inspection and laboratory staff; and
- broad dissemination of information on agro-chemical use and handling.

46. Activities of the Program in this regard will need to integrate with similar requirements for other crops, and with overall developments in the handling of toxic substances, now carefully controlled. Linked to these activities is the need to establish appropriate surveillance systems for diseases and pest infestations (which should eventually be part of a web-based information system - see Section B6), and for standards to conform with quarantine, health and hygiene, and food safety regulations and international commitments.

**d) Food Safety Standards**

47. Food safety standards and inspection systems need to be improved across the spectrum of food products in Mongolia (and hence are the focus of a separate Strengthening Food Quality and Hygiene Standards Program). Evidence of food born diseases is relatively high, and inspection systems are still being developed. Food safety not only addresses issues of public health, but is also important for successful marketing as they strengthen consumer confidence in local products and improve their competitiveness with imports. For horticulture produce, food safety standards are perhaps less significant for fresh produce since perishability is transparent, but by imposing standards they do help to improve quality and appearance and hence saleability and price. For more distant, and export markets, modes of packaging are important, as is the need to ensure that produce arrives fresh and

not over ripe at the point of sale. However, food safety is important for processed products and inspectors need to be suitably equipped to inspect premises and shipments.

48. Key elements under the Program will ensure that standards for fruit and vegetables will be upgraded, testing capacity strengthened, and inspectors, laboratory staff, and processing technicians trained. The Program will also seek to involve private sector contractors in quality assurance and control systems. This will be coordinated through the Strengthening Food Quality and Hygiene Standards Program with improvements to food safety and phytosanitary control systems across all foodstuffs, for both domestic and export markets, and include the imposition of standards and inspection for imports.

### **e) Ecological Foods/Medicinal Plants**

49. The potential exists to capitalize on niche market opportunities derived from aspects of Mongolia's agro-ecological conditions and pristine environment. The Program plans to establish certification procedures and production standards for ecological or 'organic' foodstuffs and medicinal plants for homeopathic treatments to allow Mongolian products access to international markets at premium prices. This will involve initially the study of standards and certification in key target markets (China, Japan, and Europe), leading to a harmonized program for Mongolian products and an established means of verification.

## **3. Increased Profitability of Smallholder Production**

50. Horticulture production by smallholders requires all the support and improvement faced by the crop sector generally. However, a major thrust of the Program is to lift smaller but more efficient producers from subsistence to commercial production. For this, these marginal smallholders need to be assisted to improve their crop and variety selection, important here being not only knowledge about alternatives but also supportive cultivation technologies and the access to improved quality seed (see Section B2 and the Seed Breeding and Varietal Development Program). Improved cultivation technology implies the optimization of input use, and this relates to improvements in extension and access to research results (see the Agricultural Support Services and Research Programs). Among these improved technologies is the use of irrigation and water management techniques (section IV.B.2.d), the Irrigation Rehabilitation and Construction Program, and the Agricultural Land Utilization and Management Program). Use of inputs includes access to appropriate mechanized equipment. Finally, improvements in post-harvest handling, marketing and distribution (section IV.B.2.e), the Research Program, and the Strengthening Market Linkages Program) are also expected to play a significant role in transforming marginal small holders from subsistence surplus to profitable commercial enterprises.

### **a) Diversification of Smallholder Production**

51. The Program will conduct (in conjunction with the Seed Breeding and Varietal Development Program) variety trials on participating commercial farms and at research stations, testing improved varieties for traditional crops as well as introducing new alternative crops in rotation. Performance, costs and benefits will be evaluated, using a participatory approach to ensure recommendations reflect the assessment and opinion of producers. Results of these trials will be disseminated through field days, publications, websites, newsletters and other media (within the context of the Agricultural Support Services Program which will also introduce a web-based extension system over the medium term). The result will be that producers will be able to purchase locally-grown high quality seed for a wide variety of adapted horticulture crops with proven market demand. At the same time, selection and storage of on-farm or retained seed will be improved.

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52. In conjunction, the Program will support improvements in production, financial, marketing and general business management through training and demonstration programs, and assist infrastructure (irrigation) development and supply of production, storage, cleaning and grading equipment through access to term and operating credits, coordinating appropriate elements of the Agricultural Support Services, Irrigation Rehabilitation and Construction, and Access to Term Credit Programs.

**b) Increased Efficiency of Input Use**

53. The objective of this subcomponent is to get producers to maximize profits by the effective use of fertilizers and agro-chemicals. To achieve this, the Program will conduct full technical and economic trials on various production inputs with cooperating commercial farms, evaluating performance, costs and benefits through a participatory approach to capture producer evaluation of the inputs and application methods. Results of trials will be disseminated through field days, publications, websites, newsletters and other media under the aegis of the Agricultural Support Services Program.

**c) Improved Cultivation Technologies**

54. The Program (linking with the Agricultural Support Services and Access to Term Credit Programs) will support the extensive use of season extending, water conserving, and water harvesting technologies such as greenhouses, mulches, tunnels and blankets through the dissemination of results across a range of media from full technical and economic trials on cooperating commercial farms, using a participatory approach to evaluate performance, costs and benefits to include producers' observations in the assessment.

**d) Improved Mechanization and Post-Harvest Technologies**

55. Most work is carried out manually as producers do not have the scale of farm or the access to financing to be able to purchase equipment. Since production was previously carried out on large-scale state farms, most equipment in use today is too large to be economic for small holders use. Old Russian equipment is also fuel inefficient. There is growing demand for small scale tractors and implements from China for horticulture and forage operations, but the ability to purchase is constrained by the lack of agricultural financing. Small equipment and irrigation supply companies are emerging, but are constrained in their operations by the lack of financing for their own businesses and their clients, and by interventions by Government through aid in kind, ADF operations based on monetization of food aid. The development of the private machinery and input suppliers, including servicing and advisory benefits in financing schemes will be greatly improved by passing the Leasing Law that will come into effect January 1, 2007.

56. Significant losses are suffered through the adoption of inappropriate harvest and post-harvest technologies. The Program (again with the Agricultural Support Services and Access to Term Credit Programs) will conduct technical and economic trials into the use of labor saving, energy efficient, and high performance technologies for production, handling and transportation, evaluating the benefits in terms of productivity and margin, with due cognizance of participating producers' own opinions.

**4. Improved Access to Irrigation**

57. This component is integrally linked with the Irrigation Rehabilitation and Construction Program, but within the context of the Commercialization of Horticulture Program is designed to direct attention at the particular requirements of the relative small horticulture holdings, or horticulture areas on larger holdings. Elements include development of irrigation infrastructure and water spreading facilities, improvements in its management and

maintenance, and the introduction of appropriate mechanisms to establish sustainable water and soil management.

**a) Expansion of Irrigation Systems for Horticulture**

58. The Program will examine the best practice in small-scale irrigation, including the results of ASDP, ICLP, MoFA Irrigation Program and other projects. Programs covering small-scale irrigation rehabilitation and management in other countries with application to Mongolia will also be assessed. Irrigation systems will on the basis of this be upgraded, following environmental impact assessments and the opportunity to generate sufficient revenue to cover O&M costs (in line with the broader irrigation policy). Funding sources will follow developments pursued under the Irrigation Rehabilitation and Construction Program, and include private and public-private arrangements. Under the broader Program, institutional capacity is to be strengthened, from MoFA through to soum level authorities, responsible for agreements on water fees and service charges (see Irrigation Program).

**b) Improved Irrigation Maintenance and Management**

59. Water User Groups (WUGs) have been found to provide effective management and maintenance of irrigation systems provided they have control of sufficient revenue from water fees and charges to sustainably cover costs. Formation of such groups involved in smallholder horticulture production will be encouraged under the Program. Training and technical support in water and enterprise management, in the operation and maintenance of facilities, and in the options for water distribution will also be provided. The distribution of revenue from water between the state, the owners or investors of delivery systems and those responsible for upkeep and operation will be conducted in the context of an agreed Government policy on the subject.

**c) Strengthening Water and Soil Management Sustainability**

60. Resource use planning and management is to be improved at three levels under the Agricultural Land Utilization and Management, Irrigation Rehabilitation and Construction, and the Institutional Capacity Building Programs. Government level planning and approvals will be strengthened with updated water surveys and soil testing. Local soum level capacity to plan and monitor resource use will be strengthened with training, improved processes and procedures and information systems. Producers, the key agents in sustainable resource use, will be the target for knowledge, information and incentives schemes to manage their resources economically and sustainably.

61. With the broader Irrigation Program, the Horticulture Program will seek to mitigate the environmental risks of new and rehabilitated facilities at the assessment and planning stage. No development will be permitted in areas of high environmental risk, and even in other areas selection of appropriate technologies and preparations will be promoted develop areas, such as soil ripping to 60 cm.

62. Producers and WUGs will be trained in environmentally sound management practices for both water and agriculture input use, using resources available under the Irrigation Rehabilitation and Construction Program and the Agricultural Support Services Program. This will include regular soil testing to support balanced fertilizer application, with soum and aimag authorities monitoring for salinity, sodicity, water logging and development of hard-pan; monitoring of water quality, especially regarding fertilizer and chemical run off. This will also require, therefore, the development of soum and aimag capacities (supported under the Institutional Capacity Building Program).



### **5. Strengthened Storage, Processing, Distribution and Marketing**

63. After production, the Program will address issues of post-harvest handling, from on-farm storage to sale through fresh produce markets, fresh produce supply contracts (e.g. for hotels, institutions, or major wholesalers), or for processing (both small-scale backyard and larger scale enterprise processors). Key subcomponents relate to the development of on-farm storage, the development of grower markets, and the strengthening of processing capacity and controls on quality.

#### **a) Improved On-Farm Storage**

64. Home storage losses are reported to up to 40%. On-farm storage can be easily improved through cost-effective "root cellars" which, with proper ventilation, supplementary heating and careful management can reduce losses to less than 5% or 10%<sup>4</sup>. Facilities for 20 tonne storage, enough for 1 ha of production, cost approximately US\$400 for materials with labor provided by the family. With access to financing, small producers, who now sell produce only during seasonal low prices, could extend their sales season. Larger scale storage is feasible through co-operatives and other associations or at privately owned facilities in production or market locations (this is already happening with larger potato companies leasing storage facilities in Ulaanbaatar).

65. The Program aims promote the use of such energy efficient on-farm storage among small-scale producers to prolong the marketing season and increase returns, concentrating on the construction of simple root cellars in household yards. This will be supported through the dissemination of technical and economic advice, backed by demonstrations, to producers, including the provision of information sheets on design and construction, as well as by the inclusion of such storage among options for investment finance under the Access to Term Finance Program.

#### **b) Expansion of Grower Markets**

66. Market distribution for bulk commodity is already established, but operating mostly on an individual basis. The margin from farm-gate to market can be as high as 300%, reflecting the inefficiencies and high costs stemming from small volumes marketed, rudimentary packaging and transport losses of up to 25%, all contributing to high freight and marketing costs<sup>5</sup>. Improved grading and sorting combined with improved packaging at the production site would lower the costs of delivery product to market. There is opportunity for improvement through group and/or private sector involvement in transport and marketing. The City of Ulaanbaatar with MoFA successfully piloted a grower market in 2004. This could be expanded to other locations in the capital and for longer periods in the future.

67. The Program expects to have supported the establishment of a network of permanent and seasonal producers markets in each of the major urban areas: Ulaanbaatar, Darkhan and Erdenet, allowing individual producers and groups to market directly to consumers, thereby increasing their margins. Producers markets will be established, therefore, initially as pilots, in Ulaanbaatar, Darkhan and Erdenet in conjunction with producers, private sector interests and city governments to demonstrate the benefits and potential for profit. Local administrations or private entrepreneurs could provide space, support civil works, and set up hygiene and food safety testing facilities on long-term lease arrangements, with grower associations, distributors and other private organizations competing for the operation and management of the facilities.

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<sup>4</sup> Discussion with vegetable producer in Inget soum, Bulgan aimag.

<sup>5</sup> Crop PPTA 2002

68. At the same time, however, the Program will also look at facilities for sale and storage at each stage of the marketing and distribution chain. The break-up of earlier direct supply relationships between large state farms and state procurement and processing led through the 1990s to essentially dysfunctional marketing arrangements and gaps between supply and the different stages of demand. For horticulture produce, with relatively short shelf life and rapid deterioration in quality after ripening, this disrupted marketing system represents a serious impediment to producers', wholesalers', and even retailers' profits, holding down prices and resulting in significant wastage. The Program will address market distortions and/or gaps in the marketing supply chain by developing wholesale markets, grading standards, and pricing systems (see also the Strengthening of Market Linkages Program).

### **c) Expansion of Quality Processing**

69. Processing has traditionally provided the mechanism for further extension of produce sales seasons and for enabling the ready sale of horticulture produce between regions and across borders. Quality assurance is crucial, however, to ensure consumer confidence and to meet health and safety considerations.

70. The Program will support expansion of the processing of fruit and vegetables at all levels, with inspection and quality assurance regimes (see Section B2) strengthened. Processing facilities will be upgraded, supported under the Access to Term Finance Program, and mechanisms for quality assurance instituted back through distribution to production activities, raising production efficiency, competitiveness and product quality and reducing losses.

71. Technical assistance and training for processors (see Section B6) for the planning and design of new plants and the expansion and renovation of existing ones. Training and information on quality assurance/control programs such as ISO and HACCP will be provided, as well as on business planning and the assessment of the economic benefits of proposed investments. Financing for processing, as for marketing facilities, both for investment and working capital, will be included under schemes promoted through the Access to Term Credit Program through both commercial bank lending and other mechanisms, such as financial leasing arrangements (for equipment) and venture capital funds.

## **6. Effective Research, Training, Extension and Information Systems**

72. Research and development for crops is included under the Strategy through the Research Program and the Seed Breeding and Varietal Development Program, which address the broader policy and institutional issues, as well as the mechanism to develop and test technical and economic recommendations in production, processing, and storage and distribution. Expansion of research results across individuals and economic enterprises is a major element of the Agricultural Support Services Program and, where these relate to market systems, of the Strengthened Market Linkages Program.

73. Under the Commercialization of Horticulture Program, the purpose of research and extension is to ensure that systems and messages reflect the particular needs of horticulture products, and of small-scale production, processing, and marketing (as well as of larger scale activities). Outputs of this components will include strengthened and expand research on horticulture products and production and processing systems; better trained production and processing professionals; extension of improvements to producers, processors, and traders; education of consumers in the health benefits of fruit and vegetables; and improved systems for market, business, and technical information transfer.

**a) Horticulture Crop and Technology Research**

74. Local research and trials are needed on variety selection, water harvesting and economic returns to various crops and farm structures. Processing and packaging systems need improvement and would also benefit from local research. A food technology research center and business incubator supported through budget or project funds and an effective venture capital facility could stimulate innovation and improved competitiveness in the processing sector in the medium term.

75. The Program will ensure a long-term budget commitment to research targeted at improving commercial viability of horticulture producers and processors, capitalizing on the mechanism for producer and processor participation in the setting of research priorities, the evaluation of competing research proposals, and the allocation of research funds across public and private research agencies. Such research will evaluate the technical and financial viability of various technologies, inputs, management systems and crops for intensive horticulture production on different sizes and types of farms (backyard, small, medium and large operations) and greenhouse production units, covering also post-harvest treatment and processing. Effective, implementable solutions will be documented and disseminated for use by producers, MoFA, MSUA, extension and other programs (including through donor projects).

**b) Training of Agriculturalists**

76. Agriculture professionals, technicians and teachers/trainers will receive professional upgrading in irrigation engineering and management, use and handling of chemical and organic fertilizers, and the economics of crop production, post-harvest and processing options. The Program will provide professional upgrading for researchers, technicians and educators in all aspects of irrigated horticulture production and marketing including irrigation technologies, agronomy, engineering and mechanization, marketing and cost of production analysis and environmental impact analysis. This will enable these professionals to provide training and technical advice to the industry.

**c) Training of Processors**

77. The Program will develop training programs, train trainers and deliver training to processors on:-

- plant design and equipment alternatives for efficient and safe food production;
- quality assurance/control programs such as ISO and HACCP; and,
- business planning and economic feasibility assessments on planned investments.

Small and medium-sized processors will receive training and technical assistance in facilities design, quality control programs, marketing and financial management.

**d) Improved Extension to Horticulture Producers**

78. Most vegetable and potato producers have entered the industry since transition because they have lost their primary sources of income. Their backgrounds range from early school leavers to professionally trained former employees of state farms and enterprises. Most have no technical background in agriculture and are learning through experience and support available through projects and the Green Revolution. These owner-managers need training, technical support and information services in all areas of production, irrigation, resource management, business organization and planning, marketing and financial

management. These needs have been met to date through project or Government subsidized training and extension, but if the sector is successfully commercialized, it could become the entry point for private sector extension services provided through input suppliers, processors, producer associations and private consultants. Models found in other countries include horizontal integration into producer or processor groups and vertical integration encompassing, for instance, processors or distributors (enterprises, grower co-operatives or producer associations) and local producers (individual or groups) whereby technology, inputs, technical advice and money flows from processor/distributor to producers who in turn, provide assured supplies of quality product. This is most likely to happen in well established areas with good market access and in cases where contracting is reliable.

79. The Program, therefore, will focus the resource of the grassroots extension system onto those areas where the private sector is not likely to become directly involved; providing support to the poor and small-scale producers entering horticulture. These new entrants from poor background need significant technical support to be successful. Larger commercial growers can obtain advice through commercial channels or directly through subject matter specialists from MoFA, research institutes and private consultants. The Program will support the formation of community-based extension groups to provide a base for training within the community. The groups will be actively involved in the identification of extension training needs and design of extension programs. Best-practices will be evaluated and constraints to community-based extension groups overcome, providing also recommended approaches for future donor and NGO projects (which should operate within a broad Government policy). These will include approaches for sharing of service and service delivery costs between group members and Government. At the same time, anticipated development of a web-based information and extension system linked to other services (including early warning systems) will also need to be considered.

80. The Program will provide training and technical support in:-

- crop production (management of irrigated crops, conservation farming techniques for both dryland and irrigated crops, weed and pest control, integrated pest management, alternative crops, crop rotations, residue management), farm business management (record keeping, calculating costs of production, profits and breakeven prices, cash flow planning, credit management) and marketing (breakeven prices, seasonality and cycles in marketing, finding and using market information, marketing alternatives, risk management);
- best-practices of environmental management and safe chemical handling for agriculture, the use of Community-Based Social Marketing in the environmental education, and the evaluation of results for future use and broader dissemination;
- product processing for small-scale and household production;
- opportunities for group marketing to bulk commodities and processed products;
- irrigation, water management, and water harvesting techniques;
- use of greenhouses, tunnels, blankets and mulches;
- soil management and improvement;
- fertilizer and agro-chemical use;
- new and improved varieties;
- post-harvest technologies including storage, handling, packaging, and processing;
- marketing and financial management and access to finance; and
- group formation for vertical, horizontal, support service, resource management and other purposes.

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81. Various training and demonstration practices will be used, but most notably those that have already been identified as requested by Mongolian producers:-

- fields days during the growing season;
- local demonstration farms;
- opportunities to learn successful crops, technologies, management systems and marketing programs from other producers in their local area and other areas of Mongolia; and
- practical hands-on training closely tied to concurrent field operations and delivered by skilful professionals.

The Program will also encourage the participation of input suppliers, processors, grower associations and private consultants in the delivery of training, technical advice and information to commercial horticulture growers.

**e) Public Awareness of Horticulture Crop Benefits**

82. Activities under this subcomponent have the joint objectives of promoting fruit and vegetables as a means for improving nutrition, and therefore an adjunct to health policies, as well as stimulating demand for such produce, both fresh and processed. Although fruit and vegetable consumption has been a consistent element in Mongolian diets, levels have been below those recommended for nutritional and food security reasons. This has reinforced through health profiles and susceptibility to nutrition related national health problems. The Program will promote a public awareness campaign on the nutrition and health benefits of fruit and vegetables and, in partnership with the private sector (producer associations), provide information sheets and conduct cooking demonstrations for new vegetable products or dishes.

**f) Improved Technical and Market Information Exchange**

83. A good production, marketing and economic information system makes relevant and timely information available to producers, processors, traders, suppliers, and service providers at least down to the soum level. The Program envisages the development of a web-based information system initially collecting and disseminating information to and from soum level offices providing information to producers and technicians, but eventually enabling growers, processors, traders etc. to directly communicate with each other and thereby expand the available expert resource without dependence on a large extended network of outreach offices and personnel. This concept is to be developed under the Agricultural Support Services Program (and includes early warning and disease surveillance systems), but the Horticulture Program will be responsible for ensuring appropriate messages and information reach horticulture producers, processors, and traders as well as researchers, extension agents, suppliers, and local authorities.

84. The Program, within the context of a broader information system, will develop a communication strategy with connections to all major stakeholder groups including; but not limited to key Mongolian agencies and institutions (MoFA, MSUA, MNE, the Standing Committee on Environment and Rural Development), donors (ADB, World Bank, TACIS, CIDA, GTZ, SDC, FAO etc.), NGOs, producers' associations and private enterprises (vegetable processors, equipment suppliers, etc.).

**C. Summary Cost Estimate of the Program**

85. Initial cost estimates have been prepared for the Program as outlines in this document based on cost norms applying in Mongolia and for international and local specialist expertise. It should be noted that the budget attached has not been discussed in

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any detail with the Government and once the content of the Program Framework Matrix has been agreed with government, then costs should be revised accordingly and amended in accordance with the resources the Government considers it has available for the development of the sector. The costs are considered to provide a comprehensive approach to the development of the sector. Nevertheless, with the limited availability of development assistance, further refinement of the proposed activities should enable a realistic and implementable industry investment plan to be developed. The proposed cost summaries are presented in Table 2 (physical inputs) and the consequent financial implications of the Program - Table 3.

### Table 2: Horticulture Commercialization Program - Physical Inputs

[illegible]

**Table 2: Horticulture Commercialization Program - Physical Inputs (Cont.)**

C. Producer Initiatives												
1. Varietal Diversification												
Support for diversification trials	11,600	1	1	1	1	1	-	-	-	-	-	5
Contracts for seed multiplication	11,600	-	-	1	1	1	1	1	-	-	-	5
Subtotal Varietal Diversification												
2. Support for Intensified Production Technologies												
Inventory incentives for input suppliers	116,000	1	1	1	1	1	-	-	-	-	-	5
3. Mechanized Production and Post Harvest Handling												
Pilot schemes for the testing of irrigation technologies on horticulture crops	11,600	4	4	4	4	4	-	-	-	-	-	20
Pilot vegetable processing initiatives	58,000	1	1	1	1	1	-	-	-	-	-	5
Subtotal Mechanized Production and Post Harvest Handling												
Subtotal Producer Initiatives												
D. Irrigation Development												
1. Irrigation Hardware Schemes												
Irrigation headworks and canal development /c		1	-	-	-	-	-	-	-	-	-	1
2. WUG Support Initiatives												
Training of roles and responsibilities for WUGs	232	20	20	20	20	20	20	20	20	20	20	200
3. Resource Protection Initiatives												
Support for environmental monitoring	5,800	1	1	1	1	1	1	1	1	1	1	10
Water management training for producers	3,480	4	4	4	4	4	-	-	-	-	-	20
Subtotal Resource Protection Initiatives												
Subtotal Irrigation Development												
E. Strengthened Marketing Initiatives												
1. Storage Related Initiatives												
On farm storage demonstrations	1,160	10	10	10	10	10	-	-	-	-	-	50
Grower training in storage technologies	2,320	4	4	-	-	4	-	-	-	-	-	12
Subtotal Storage Related Initiatives												
2. Grower Market Support												
Design and operations of grower mart	11,600	1	-	-	-	-	-	-	-	-	-	1
Expansion of grower market in UB	11,600	3	3	3	3	3	-	-	-	-	-	15
Pilot grower market outside UB	3,480	-	-	2	2	2	-	-	-	-	-	6
Subtotal Grower Market Support												
3. Support for Processing Development												
TA for processing alternatives	23,200	-	6	-	-	-	-	-	-	-	-	6
Pilot new processing technologies	23,200	-	1	1	1	1	1	1	-	-	-	5
Development of producer supply contracts /d		1	-	-	-	-	-	-	-	-	-	1
Subtotal Support for Processing Development												
Subtotal Strengthened Marketing Initiatives												
F. Research, Extension and Information Services												
1. Applied Research Initiatives												
Support for horticultural research	11,600	-	-	-	1	1	1	1	1	1	-	5
Publishing research results	5,800	-	-	-	-	-	1	1	1	1	1	5
Subtotal Applied Research Initiatives												



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Table 2: Horticulture Commercialization Program - Physical Inputs (Cont.)

<b>2. Curricula Development at Training Institutions</b>									
TA to broaden horticultural content of tertiary agricultural institutions									
Support for student placements in commercial enterprises									
<b>Subtotal Curricula Development at Training Institutions</b>									
<b>3. Public Awareness Campaigns</b>									
Awareness campaign									
Media programs on nutrition of vegetables									
<b>Subtotal Public Awareness Campaigns</b>									
<b>4. Web-based Information Services</b>									
Technical support for suppliers									
Technical support for farmers									
Development of information system									
Establishing information system									
Support for price reporting and technical info									
<b>Subtotal Web-based Information Services</b>									
<b>Subtotal Research, Extension and Information Services</b>									
<b>Total</b>									

<sup>1a</sup> Needed to assess the dependence upon horticulture and establish the production base

<sup>1b</sup> Services should be developed to recover costs from the exporter.

<sup>1c</sup> Covered under Irrigation Program

<sup>1d</sup> Financed under the Market Linkages Program

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Table 3: Horticulture Commercialization Program - Cost Estimates

Unit Cost (Tugrik '000)		Unit	Base Cost (Tugrik Million)											
			2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total	
I. Investment Costs														
A. Enabling Environment														
1. Legal and Regulatory Reform														
Land use survey of horticultural producers /a TA to ensure horticultural industry requirements are incorporated into re Assistance with amendments to regulations	study	11,600	11.6	-	-	-	-	-	-	-	-	-	-	11.6
	pmnth	23,200	-	69.6	-	-	-	-	-	-	-	-	-	69.6
	year	11,600	-	-	11.6	-	-	-	-	-	-	-	-	11.6
Subtotal Legal and Regulatory Reform														
			11.6	69.6	11.6	-	-	-	-	-	-	-	-	92.8
2. Access to Appropriate Credit														
Addressed under the Credit Program	year		0.0	-	-	-	-	-	-	-	-	-	-	0.0
3. Risk Management Approaches														
TA to study the potential for developing crop insurance products	pmnth	23,200	-	69.6	-	-	-	-	-	-	-	-	-	69.6
Subtotal Enabling Environment														
			11.6	139.2	11.6	-	-	-	-	-	-	-	-	162.4
B. Institutional Strengthening Initiatives														
1. Grading and Inspection Initiatives														
Development of grade standards for vegetables	year	5,800	5.8	5.8	5.8	-	-	-	-	-	-	-	-	17.4
Inspector training in new standards	year	2,320	2.3	2.3	2.3	-	-	-	-	-	-	-	-	7.0
Operationalize inspection activities in UB	year	11,600	11.6	11.6	11.6	11.6	11.6	-	-	-	-	-	-	58.0
Introduce weekly reporting on prices for grades of vegetables	year	5,800	5.8	5.8	5.8	5.8	5.8	-	-	-	-	-	-	29.0
Subtotal Grading and Inspection Initiatives														
			25.5	25.5	25.5	17.4	17.4	-	-	-	-	-	-	111.4
2. Seed Quality Initiatives														
Develop standards for horticultural seed material	year	5,800	5.8	5.8	-	-	-	-	-	-	-	-	-	11.6
Training of aimag based agricultural department staff	year	3,480	13.9	13.9	13.9	-	-	-	-	-	-	-	-	41.8
Upgrade central seed laboratory facilities	set	23,200	-	23.2	-	-	-	-	-	-	-	-	-	23.2
Train central seed lab staff in testing and lab procedures	year	2,320	2.3	2.3	2.3	-	-	-	-	-	-	-	-	7.0
Resource the testing of seed material submitted by aimags	year	5,800	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	58.0
Subtotal Seed Quality Initiatives														
			27.8	51.0	22.0	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	141.5
3. Plant Protection Inspection														
Establish a registry for drugs used in horticulture	year	3,480	3.5	3.5	-	-	-	-	-	-	-	-	-	7.0
Rehabilitate laboratories to test for residues	set	34,800	34.8	-	-	-	-	-	-	-	-	-	-	34.8
Train inspection staff in detection of residues	year	2,320	2.3	2.3	2.3	-	-	-	-	-	-	-	-	7.0
Subtotal Plant Protection Inspection														
			40.6	5.8	2.3	-	-	-	-	-	-	-	-	48.7
4. Food Safety Standards Development														
Train food inspectors from SSIA	course	1,160	1.2	1.2	1.2	1.2	1.2	-	-	-	-	-	-	5.8
Resource routine food testing	year	11,600	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	116.0
Training for food processors	course	2,320	2.3	2.3	2.3	-	-	-	-	-	-	-	-	7.0
Subtotal Food Safety Standards Development														
			15.1	15.1	15.1	12.8	12.8	11.6	11.6	11.6	11.6	11.6	11.6	128.8
5. Quality Certification for Medicinal Products														
Develop standards that confirm with international practices	study	5,800	5.8	-	-	-	-	-	-	-	-	-	-	5.8
Facilitate their harmonization with international organisations	year	5,800	5.8	5.8	5.8	-	-	-	-	-	-	-	-	17.4
Provide certification services /b	year	5,800	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	58.0
Subtotal Quality Certification for Medicinal Products														
			17.4	11.6	11.6	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	81.2
Subtotal Institutional Strengthening Initiatives														
			126.4	109.0	76.6	41.8	41.8	23.2	23.2	23.2	23.2	23.2	23.2	511.6

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Table 3: Horticulture Commercialization Program - Cost Estimates (Cont.)

<b>C. Producer Initiatives</b>										
<b>1. Varietal Diversification</b>										
Support for diversification trials	year	11,600	11.6	11.6	11.6	11.6	11.6	-	-	58.0
Contracts for seed multiplication	year	11,600	-	11.6	11.6	11.6	11.6	-	-	58.0
<b>Subtotal Varietal Diversification</b>			11.6	11.6	23.2	11.6	11.6	-	-	116.0
<b>2. Support for Intensified Production Technologies</b>										
Inventory incentives for input suppliers	year	116,000	116.0	116.0	116.0	116.0	-	-	-	580.0
<b>3. Mechanized Production and Post Harvest Handling</b>										
Pilot schemes for the testing of irrigation technologies on horticulture crops	pilots	11,600	46.4	46.4	46.4	46.4	-	-	-	232.0
Pilot vegetable processing initiatives	year	58,000	58.0	58.0	58.0	58.0	-	-	-	290.0
<b>Subtotal Mechanized Production and Post Harvest Handling</b>			104.4	104.4	104.4	104.4	-	-	-	522.0
<b>Subtotal Producer Initiatives</b>			232.0	232.0	243.6	243.6	11.6	11.6	-	1,218.0
<b>D. Irrigation Development</b>										
<b>1. Irrigation Hardware Schemes</b>										
Irrigation headworks and canal development /c	year		0.0	-	-	-	-	-	-	0.0
<b>2. WUG Support Initiatives</b>										
Training of roles and responsibilities for WUGs	course	232	4.6	4.6	4.6	4.6	4.6	4.6	4.6	46.4
<b>3. Resource Protection Initiatives</b>										
Support for environmental monitoring	year	5,800	5.8	5.8	5.8	5.8	5.8	5.8	5.8	58.0
Water management training for producers	year	3,480	13.9	13.9	13.9	13.9	-	-	-	69.6
<b>Subtotal Resource Protection Initiatives</b>			19.7	19.7	19.7	19.7	5.8	5.8	5.8	127.6
<b>Subtotal Irrigation Development</b>			24.4	24.4	24.4	24.4	10.4	10.4	10.4	174.0
<b>E. Strengthened Marketing Initiatives</b>										
<b>1. Storage Related Initiatives</b>										
On farm storage demonstrations	year	1,160	11.6	11.6	11.6	11.6	-	-	-	58.0
Grower training in storage technologies	course	2,320	9.3	9.3	-	9.3	-	-	-	27.8
<b>Subtotal Storage Related Initiatives</b>			20.9	20.9	11.6	20.9	-	-	-	85.8
<b>2. Grower Market Support</b>										
Design and operations of grower mart	year	11,600	11.6	-	-	-	-	-	-	11.6
Expansion of grower market in UB	market	11,600	34.8	34.8	34.8	34.8	-	-	-	174.0
Pilot grower market outside UB	market	3,480	-	7.0	7.0	7.0	-	-	-	20.9
<b>Subtotal Grower Market Support</b>			46.4	34.8	41.8	41.8	-	-	-	206.5
<b>3. Support for Processing Development</b>										
TA for processing alternatives	pmrthrs	23,200	-	139.2	-	-	-	-	-	139.2
Pilot new processing technologies	pilot	23,200	-	23.2	23.2	23.2	23.2	-	-	116.0
Development of producer supply contracts /d	set		0.0	-	-	-	-	-	-	0.0
<b>Subtotal Support for Processing Development</b>			0.0	162.4	23.2	23.2	23.2	-	-	235.2
<b>Subtotal Strengthened Marketing Initiatives</b>			67.3	218.1	76.6	76.6	85.8	23.2	-	547.5
<b>F. Research, Extension and Information Services</b>										
<b>1. Applied Research Initiatives</b>										
Support for horticultural research	year	11,600	-	-	11.6	11.6	11.6	11.6	-	58.0
Publishing research results	year	5,800	-	-	-	-	5.8	5.8	5.8	29.0
<b>Subtotal Applied Research Initiatives</b>			-	-	11.6	11.6	17.4	17.4	5.8	87.0

Table 3: Horticulture Commercialization Program - Cost Estimates (Cont.)

2. Curricula Development at Training Institutions												
TA to broaden horticultural content of tertiary agricultural institutions												
Support for student placements in commercial enterprises												
Subtotal Curricula Development at Training Institutions												
3. Public Awareness Campaigns												
Awareness campaign												
Media programs on nutrition of vegetables												
Subtotal Public Awareness Campaigns												
4. Web-based Information Services												
Technical support for suppliers												
Technical support for farmers												
Development of information system												
Establishing information system												
Support for price reporting and technical info												
Subtotal Web-based Information Services												
Subtotal Research, Extension and Information Services												
Total												
23,200	-	-	139.2	-	-	-	-	-	-	-	-	139.2
5,800	-	-	-	-	5.8	5.8	5.8	5.8	5.8	5.8	5.8	34.8
	-	-	139.2	-	5.8	5.8	5.8	5.8	5.8	5.8	5.8	174.0
5,800	-	-	5.8	-	5.8	-	5.8	-	5.8	-	-	23.2
5,800	-	-	-	5.8	5.8	5.8	-	-	-	-	-	17.4
	-	-	5.8	5.8	11.6	5.8	5.8	5.8	5.8	-	5.8	40.6
5,800	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	58.0
11,600	46.4	46.4	46.4	46.4	-	-	-	-	-	-	-	232.0
23,200	-	-	23.2	-	-	-	-	-	-	-	-	23.2
116,000	-	-	-	-	116.0	-	-	-	-	-	-	116.0
23,200	-	-	-	-	23.2	23.2	23.2	23.2	23.2	23.2	23.2	139.2
	52.2	52.2	75.4	52.2	191.4	29.0	29.0	29.0	29.0	29.0	29.0	588.4
	52.2	52.2	220.4	69.6	220.4	58.0	58.0	58.0	52.2	46.4	40.6	870.0
	513.9	774.9	653.1	455.9	616.0	126.4	103.2	85.8	80.0	74.2	3,483.5	

### Idea Needed to assess the dependence upon horticulture and establish the production base

**lb** Services should be developed to recover costs from the exporter.

### Ac Covered under Irrigation Program

Ad Financed under the Market Linkages Program

#### **D. Indicative Implementation Arrangements**

86. Program implementation will be overseen by MoFA's Crop Division and a supervisory steering committee established to keep track on the many different elements and organizations involved. The Program requires contributions under a wide range of different programs and participation by, besides MoFA, State Specialized Inspection Agency, Ministry of Nature and Environment, aimag and soum authorities, the various plant research institutes, Mongolian National Agricultural University etc. Most important is participation by the private sector, including growers, processors, and traders, and it is recommended that the Chambers of Commerce and various producer organizations, including cooperative groups, be involved in the oversight arrangements.

87. The Program is to be managed within the mainstream of government budgetary activity with some related donor support through specialist technical assistance projects, with limited equipment provision. Donor funding to support the budget, and hence the resources necessary for implementation, with disbursement conditions linked to annual budgetary allocations against conditions tied to completion of specific reform or implementation actions, will also be encouraged. These must be considered, however, only in the context of future sustainability, so that while they may support temporary or even medium term budget increases to bring about reform, they should not be considered a justification for longer term budgetary expenditure, and may be expected to be seen to phase out within the MTBF.

##### **1. Budgetary and Contract Services**

88. The key to successful Program implementation will be the mainstreaming of reforms within the various budgetary institutions with responsibilities for policy, legislation, regulation, and the support services of research and extension. Implementation will either be carried out by these agencies themselves or subcontracted through them to private service providers. Either way, this will make the cost of Program implementation mainstream budgetary expenditure. Where start up or initial reform costs are substantial and, in a medium term context, one-off, there will be some justification for looking for donor support in financing. Such support should not be at the expense of integration and Government capacity building, and so should take the form of conditional budgetary assistance rather than project financing. Technical assistance may also form an additional resource to supplement budgetary capacity, for instance in legislative and regulatory reform, in the determination of standards, and the establishment of implementation guidelines for inspectorates and local authorities, but once designed and systems put in place, implementation will be a mainstream administrative function. At this stage, much will be carried out within existing budgets (as changes are often in the way things are done rather than in additional tasks) but some areas will require increased allocations in the budget, reflected in the MTBF.

##### **2. Capital Expenditure**

89. Most capital expenditure under the Program will be made by the private sector. This will be supported through the Access to Term Finance Program with credit funds through the commercial banks and other institutions being made available to horticulture producers for such items as on-farm storage and other post-harvest facilities, agricultural machinery, irrigation equipment (water spreading systems), and possibly small-scale processing plant. Financing of enterprise initiatives in larger processing or marketing and distribution facilities (including wholesale storage and packaging units) will also be promoted through the formal financial system. Such promotion may take the form of Government or donor credit lines to commercial lenders and systems to offset interest through tax and other incentives. Government will avoid direct credit to such borrowers, however, and nominal interest rates and other charges will remain as determined by the commercial financial sector. Similarly Government will stay at arm's length from any equipment supply schemes and, where

donors are involved, ensure that these are run through fully private ventures competing for the business in a competitive and transparent process.

90. More direct investment will be made, again using either the Agricultural Development Fund or grant and donor assistance funds to finance irrigation works (within the framework of the Irrigation Rehabilitation and Construction Program), market infrastructure, and the web-based information system. Both irrigation and markets will be run by private enterprises, or possibly local authorities in the case of markets, so that capital investment will also involve some mechanism for sale or lease by the private sector. Efforts will also be made to interest financial institutions to invest in such facilities and lease them out under financial leasing arrangements. The information system will require interconnected physical facilities and equipment and may best be handled through a specific donor funded project, or program. Discussions are ongoing with Japan and the entire information system needs to be linked with telecommunications and e-governance programs. Private investment in this should also be encouraged and it may prove beneficial to run funding through a pool, whereby several different donors could contribute, or by splitting the country into regions enabling several complementary but separate projects by different donors to cover the country.

### **3. Technical Assistance**

91. Many elements where specialist technical assistance (TA) would prove useful are dealt with under the respective programs (e.g. on seeds, irrigation, food hygiene, finance, research etc.). Specific TA for this Program, however, will concentrate on smallholder development as defined in section IV.B.2.c) above, but also include other specialist horticulture elements, such as quality grading and standards on horticulture produce and the opportunities for specialty 'organic' and medicinal products.

92. The TA will cover smallholder production, from varietal selection through cultivation technologies (including different irrigation techniques and the use of machinery), elements of post-harvest handling (notably storage), and even small-scale processing. The emphasis will be on business development, particularly the transition from semi-subsistence to fully commercial operations and include concerns about access to inputs (including finance), technologies and information. Further components will include investigation of market features, notably the opportunity and scale of producers markets (organized through a pilot), and the domestic and market prospects for Mongolian environmentally friendly or 'organic' products and specialty items (such as medicinal plants and herbal essences), plugging into another Strategy Program on Strengthening Market Linkages). Grading and quality standards, also linked to marketability but including food safety issues for both fresh and processed goods, will form another subcomponent, and integrate with development for strengthening of inspection capacities at all levels under the Institutional Capacity Building Program. While the TA will support smallholder access to finance it will not itself be actively involved in credit. However, donor support for the TA could be linked to a credit line to the financial institutions for such items as farm machinery, product washing and grading equipment, packaging equipment etc., but the need for this would first have to be demonstrated on the basis of a shortage of available funds. More likely is a reluctance by financing institutions to participate, in which case, the TA will (in conjunction with the Access to Term Finance Program) support the development of incentives and offsetting schemes to make smallholder financing both more affordable to borrowers and more attractive to lenders.

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## E. Horticulture Program Framework Matrix

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<b>Goal</b>  To sustainably raise the profitability of crop production through the increased commercialization of horticulture.			
<b>Purpose</b>  To develop an economically and environmentally sustainable competitive horticulture sector able to: <ul style="list-style-type: none"> <li>• respond to the growing demand for good quality and diversified vegetable and fruit products in Mongolia's urban markets;</li> <li>• compete with imports, notably from China;</li> <li>• provide income opportunities and household food security to rural people; and</li> <li>• respond over time to the risks of climate change, and the increasing competitiveness of international target markets.</li> </ul>		published statistics, agricultural and other survey, program M&E: output and prices of fresh and processed horticulture products;  sales of quality fruit and vegetables in urban markets;  relative changes in the levels of import and export;  areas under horticulture crops and sources of household income in rural and peri-urban areas.	stable political and economic environment, including only gradual shifts in togrog exchange rates and price inflation;  issues on land and water tenure rights resolved;  redirection of Government sector management from price and volume interventions to promotion of an enabling environment for private sector development maintained;  continued commitment to a liberalized domestic and international trade regime.
<b>Outputs</b>  1. Create an enabling environment for commercial horticulture development.	<ul style="list-style-type: none"> <li>• relevant legal and regulatory reform, particularly in relation to land and water tenure and the competition with livestock;</li> <li>• improved access to term finance for investment and working capital through introduction of innovative funding</li> </ul>	laws and amendments adopted by the National Assembly; Government and Ministry decrees on normative acts, procedures etc.;  reports on the level and term of	continued commitment by Government to private sector agriculture and non-intervention by public sector agencies in pricing and supply;  macroeconomic

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2. Strengthened institutional framework to support commercial horticulture.	<ul style="list-style-type: none"> <li>mechanisms; adoption of sustainable approaches to climatic and commercial risk management.</li> <li>improved grading systems and inspection regimes;</li> <li>enhanced seed quality standards and inspection system;</li> <li>strengthened regulatory inspection for effective plant protection;</li> <li>improved food safety standards and inspection;</li> <li>certification of ecological food and medicinal plant standards established.</li> </ul>	<p>agriculture sector loans;</p> <p>numbers of bankruptcies.</p> <p>regular technical and financial audits of systems operation and effectiveness;</p> <p>regular inspection reports;</p> <p>reduced incidence of food related diseases and health complications.</p>	<p>and political stability and consensus on medium to long term policy goals.</p> <p>elements rely on successful implementation of complementary programs on seeds, food hygiene, market linkages, research and other support services</p>
3. Increased profitability of smallholder production.	<ul style="list-style-type: none"> <li>variety improvement, diversification and multiplication;</li> <li>dissemination of recommendations for the optimization of production inputs;</li> <li>adoption of approved intensification technologies;</li> <li>strengthened mechanization and post harvest handling systems.</li> </ul>	<p>output levels of horticulture crops;</p> <p>international and domestic trade in fresh and processed products based on Mongolian horticulture;</p> <p>regular survey and assessment of horticulture growers and practices.</p>	<p>depends on successful strengthening under seeds, research, and support services programs</p>
4. Improved access to irrigation.	<ul style="list-style-type: none"> <li>enhanced irrigation infrastructure, particularly small-scale schemes;</li> <li>improved user based irrigation management and maintenance systems;</li> <li>sustainable soil and water use management mechanisms established.</li> </ul>	<p>area under different types of irrigation;</p> <p>sales of irrigation equipment;</p> <p>regular survey of land use systems and resource conditions.</p>	<p>depends on successful execution of the Irrigation Rehabilitation and Construction Program.</p>
5. Strengthened storage, processing, distribution and marketing systems.	<ul style="list-style-type: none"> <li>improved and expanded application of on-farm storage systems;</li> <li>producers' markets established in key urban centers;</li> <li>expanded capacity for quality processing.</li> </ul>	<p>surveys on post harvest treatment and losses;</p> <p>inspection reports on producers' markets conditions, including health and hygiene, registration of stall</p>	<p>involves elements under research, support services, and market linkages programs.</p>



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		holders etc.;	
		sales of processed commodities.	
6. More effective support through research, training, extension and information systems.	<ul style="list-style-type: none"> <li>• adoption of program for comprehensive research into profit enhancing production and processing improvements;</li> <li>• implementation of training programs for processors;</li> <li>• effective community based extension systems established;</li> <li>• programs to increase public awareness of new products and health advantages of greater fruit and vegetable consumption;</li> <li>• established integrated web based information exchange system down to soum level, incorporating all relevant private and public sector stakeholders.</li> </ul>	<p>decrees determining reform of research and extension systems, increasing end-user participation;</p> <p>MTBF commitment to research funding;</p>	assumes successful implementation of Research and Agricultural Support Services Programs.
<b>Activities</b>			
1.1 Legal and regulatory reform.	<ul style="list-style-type: none"> <li>• secure land tenure for producers, enabling secure investment;</li> <li>• secure water tenure for producers supported by facilitating user based water management structures;</li> <li>• established rights to protect crops from livestock incursions, backed by adequate and enforceable mechanisms for compensation for crop and income losses;</li> <li>• effective regulatory support for land and water resource access dispute resolution and management through to soum level.</li> </ul>	<p>adoption of new and amended legislative and normative acts;</p> <p>rural sector surveys and assessments, including from donor projects and programs;</p> <p>register of land and water tenure and access rights, evidence of legally backed and operational dispute resolution mechanism;</p> <p>soum and aimag authority reports.</p>	development of land and water use rights will occur under the Agricultural Land Utilization and Management, Risk Management, and Irrigation Rehabilitation and Construction Programs.
1.2 Access to affordable term financing.	<ul style="list-style-type: none"> <li>• changed procedures for agriculture lending through adoption of risk-</li> </ul>	reports of main rural credit institutions showing	improved access will be developed under the Access to

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1.3 Improvements in risk management for crop producers.	<ul style="list-style-type: none"> <li>offsetting mechanisms; financial leasing law approved and implemented;</li> <li>venture capital fund to support the processing sector established;</li> <li>best practice for public-private partnerships in infrastructure development established and introduced.</li> </ul>	<p>introduction of alternative rural term lending mechanisms, and their adoption by borrowers;</p> <p>adoption of effective financial leasing law, plus application for agricultural equipment investment; establishment of rural venture capital fund;</p> <p>transparent policy and procedures on PPP adopted.</p>	<p>Term Credit Program.</p> <p>these elements link with aspects of the Risk Management Program and relate to developments under the Seed Breeding and Varietal Development Program</p>
2.1 Strengthening of inspection system for enforcement of grading standards.	<ul style="list-style-type: none"> <li>improved information flow between producers, processors, and consumers on quality requirements and willingness to pay premia for such quality;</li> <li>updated grades and standards established for vegetable, potato, and fruit crops, including new varieties; reflecting consumer and processor demands;</li> <li>strengthened inspection system, including through training of inspectors;</li> <li>market differentiation based on grades and standards evident through price and demand levels.</li> </ul>	<p>processor purchasing price lists reflecting quality grades and standards, reflected in procurement records;</p> <p>market price surveys/reports showing price differentials for quality;</p> <p>numbers of inspectors and records of numbers participating in training programs;</p> <p>adequate funding in budget and MTBF.</p>	<p>elements of market improvement are covered by the Strengthening Market Linkages and Strengthening Food Quality and Hygiene Standards Programs</p>

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2.2 Improved availability of quality horticulture seeds.	<ul style="list-style-type: none"> <li>seed standards upgraded or developed for all types of horticulture crops;</li> <li>mainstreaming under the State budget of reform of aimag certified seed inspector capacity through staffing, contracting and training;</li> <li>State Seed Testing Laboratory and staff upgraded to meet membership requirements of international organizations;</li> <li>key aimag seed testing laboratories upgraded to meet domestic requirements.</li> </ul>	<p>varieties of seeds available for sale in market to producers;</p> <p>numbers of seed multiplication farms and area under seed production;</p> <p>aimag inspectorate numbers and budgets, inclusion in MTBF;</p> <p>report and site visits of SSTL and aimag structures, and enhanced budgets reflected in MTBF.</p>	these developments will occur under the Seed Breeding and Varietal Development Program
2.3 Plant protection reform.	<ul style="list-style-type: none"> <li>agro-chemical registry revised, and information on products and product use widely disseminated;</li> <li>agro-chemical testing facilities upgraded and staff trained;</li> <li>agro-chemical inspection service reformed and staff trained.</li> </ul>	<p>revised register;</p> <p>documentation and mass media coverage on agro-chemical use and hazards;</p> <p>M&amp;E on execution of budgets in MTBF for testing facilities and inspectorate;</p> <p>inspection reports.</p>	these will be covered under the Agricultural Support Services Program.
2.4 Food safety standards.	<ul style="list-style-type: none"> <li>food safety standards, particularly for fruit and vegetables, upgraded;</li> <li>capacity to test products against standards enhanced;</li> <li>private sector quality assurance and control systems developed;</li> <li>food safety inspectors, and laboratory staff trained;</li> <li>food producers and processors educated in the requirements of food safety standards.</li> </ul>	<p>documentation establishing standards;</p> <p>M&amp;E on execution of budgets in MTBF for testing facilities, extension, and inspectorate;</p> <p>inspection reports showing increased compliance by food processors/traders etc..</p>	these improvements will be brought about through the Strengthening Food Quality and Hygiene Standards Program.
2.5 Ecological foods and medicinal plant standards.	<ul style="list-style-type: none"> <li>standards and certification regimes in key international target markets reviewed;</li> <li>Mongolian standards</li> </ul>	<p>report reviewing standards in key markets;</p> <p>publication of</p>	elements of this will be covered under the Strengthening Market Linkages Program

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	<ul style="list-style-type: none"> <li>established, harmonized with requirements of key markets;</li> <li>certification and verification system established.</li> </ul>	<p>standards;</p> <p>MTBF and budget execution, backed by technical audit of certification system.</p>	
3.1 Diversification of smallholder production.	<ul style="list-style-type: none"> <li>variety trials for traditional and alternative crops conducted and results widely disseminated;</li> <li>expansion of capacity of quality horticulture breeder and certified seed producers.</li> </ul>	<p>reports on trials and dissemination of results;</p> <p>areas planted for quality breeder and certified seed varieties production.</p>	these relate to improvements under the Seed Breeding and Varietal Development and Research Programs
3.2 Increasing the efficiency of the use of inputs by smallholder.	<ul style="list-style-type: none"> <li>participatory technical and economic trials of the use of inputs conducted, and results widely disseminated.</li> </ul>	<p>reports on trials and dissemination of results;</p> <p>surveys on adoption</p>	these fall under the Agricultural Support Services and Research Programs
3.3 Improved smallholder cultivation technologies introduced to counter climatic limitations of Mongolia.	<ul style="list-style-type: none"> <li>participatory technical and economic trials of alternative season-extending and water conserving technologies conducted and results widely disseminated.</li> </ul>	<p>reports on trials and dissemination of results;</p> <p>surveys on adoption of improved technologies.</p>	these fall under the Agricultural Support Services and Research Programs
3.4 Improved smallholder mechanization and post harvest technologies.	<ul style="list-style-type: none"> <li>participatory technical and economic trials of alternative production machinery and post harvest technologies conducted and results widely disseminated.</li> </ul>	<p>reports on trials and dissemination of results;</p> <p>surveys on adoption of improved technologies.</p>	these fall under the Agricultural Support Services and Research Programs
4.1 Expand irrigation systems for horticulture.	<ul style="list-style-type: none"> <li>best practice in small-scale irrigation identified and replicated;</li> <li>irrigation systems upgraded subject to environmental assessments;</li> <li>irrigation support and regulatory institutions strengthen.</li> </ul>	<p>area irrigated;</p> <p>coverage of irrigation infrastructure;</p> <p>sales of irrigation equipment;</p> <p>extension budget.</p>	these improvements form part of the Irrigation Rehabilitation and Construction Program
4.2 Improved management and maintenance of irrigation systems.	<ul style="list-style-type: none"> <li>water user groups (WUGs) established to develop and manage water resource usage;</li> <li>WUGs supported by training in technical and business management, and related technologies.</li> </ul>	<p>WUGs registered;</p> <p>reports on training programs;</p> <p>WUG profit and loss accounts.</p>	these improvements form part of the Irrigation Rehabilitation and Construction Program

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4.3 Strengthening sustainability of water and soil management.	<ul style="list-style-type: none"> <li>environmental risks of irrigation systems mitigated by restricted permission for new development in high risk situations and adoption of environmentally friendly technologies in others;</li> <li>producers trained to adopt environmentally sound management of water and agro-chemical inputs, and to regularly monitor soils to support balanced use of fertilizers;</li> <li>introduction of regular monitoring of water and soil quality by soum authorities.</li> </ul>	<p>decree and supporting regulations to settle disputes and define development parameters;</p> <p>reports on training and dissemination;</p> <p>monitoring reports on operational mechanism for soil evaluation by both producers and local authorities showing the impact on agro-chemical selection and use.</p>	these improvements form part of the Irrigation Rehabilitation and Construction and the Agricultural Land Utilization and Management Programs
5.1 Improved on-farm storage.	<ul style="list-style-type: none"> <li>increased use of improved low technology/low cost on-farm storage facilities;</li> <li>demonstrations of on-farm storage systems and benefits conducted;</li> <li>access to term finance for on-farm storage improved.</li> </ul>	<p>regular surveys on post harvest treatment and losses;</p> <p>finance agency reports on take-up and repayment of term loans for storage.</p>	these developments should form part of the reforms under the Agricultural Support Services and Access to Term Credit Programs
5.2 Expansion of producers' markets.	<ul style="list-style-type: none"> <li>pilot producers' markets established in UB, Darkhan and Erdenet through tripartite agreement between local authority, private traders, and growers;</li> <li>permanent producers markets established with supportive infrastructure.</li> </ul>	<p>markets registered;</p> <p>stallholders register;</p> <p>reports on market visitor numbers;</p> <p>site visit and budget execution audits on market facilities.</p>	these developments should form part of the reforms under the Agricultural Support Services and Strengthening Market Linkages Programs
5.3 Expansion of quality processing.	<ul style="list-style-type: none"> <li>technical assistance provided to processors establishing, expanding or rehabilitating facilities;</li> <li>quality assurance and control procedures adopted to reflect market requirements;</li> <li>business and financial advisory assistance provided to processors;</li> <li>access to investment and working capital financing improved.</li> </ul>	<p>processors registered;</p> <p>employee numbers;</p> <p>reported sales;</p> <p>extension reports;</p> <p>profit and loss statements etc.;</p> <p>number and value of processor loans.</p>	these developments should form part of the reforms under the Agricultural Support Services and Strengthening Market Linkages Programs

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6.1 Improving horticulture crop and technology research.	<ul style="list-style-type: none"> <li>inclusion of producers and processors in the setting of priorities for research;</li> <li>long term research program directed at improving commercial viability of horticulture producers agreed, and reflected in MBTF;</li> <li>technical and financial viability of various technologies, input mixes, management systems, crop varieties tested on a range of farms of differing size and type;</li> <li>results documented and made widely available.</li> </ul>	<p>transparent procedures for determining research priorities and budget allocations;</p> <p>budget and MTBF allocations and supporting program documentation;</p> <p>research results, showing relevant coverage of range of options and linked to bottom line profit implications.</p>	these developments should occur under the Research Program, with links to the Agricultural Support Services Program
6.2 Training of agricultural professionals.	<ul style="list-style-type: none"> <li>professional upgrading linked to career progression for researchers, technicians, etc. in all aspects of irrigated horticulture production and marketing.</li> </ul>	<p>training programs;</p> <p>career progression linked to regular evaluations of performance and results.</p>	these should occur under the Research Program, with links to the Agricultural Support Services and Strengthening Market Linkages Programs
6.3 Training of processors.	<ul style="list-style-type: none"> <li>training programs developed and delivered to processors on plant design and equipment options; quality assurance/control; business planning and assessment of the economic feasibility of proposed investment.</li> </ul>	<p>reports on training programs against budget allocations, plus periodic assessment of impact on processors' performance and resultant increased market access.</p>	these developments will be covered under the Research and Agricultural Support Services Programs
6.4 Improved extension to horticulture producers.	<ul style="list-style-type: none"> <li>community based extension groups established as a basis for training and technology dissemination;</li> <li>training and technical support provided on the management of horticulture crop production, farm business operation, and marketing;</li> <li>training provided in environmental management, handling and use of agrochemicals, product processing, and group marketing.</li> </ul>	<p>extension reports;</p> <p>crop areas and production, quality and variety of products, marketing activities and sales;</p> <p>numbers of producers' and community organizations;</p> <p>incidence of health problems from toxic substances linked to cropping and processing.</p>	these developments will be covered under the Research and Agricultural Support Services Programs

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6.5 Enhanced public awareness on health benefits of horticulture crops.	<ul style="list-style-type: none"> <li>public awareness program on health and nutrition benefits of horticulture crops designed and implemented;</li> <li>information sheets designed and cooking demonstrations given to support consumer acceptance of new products.</li> </ul>	<p>mass media dissemination of health benefits of fruit and vegetable consumption;</p> <p>household surveys on consumption of food products;</p> <p>domestic sales of fruit and vegetables</p>	these items relate to activities under the Strengthening Food Quality and Hygiene Standards and Agricultural Support Services Programs
6.6 Improved technical and market information exchange.	<ul style="list-style-type: none"> <li>a system to enhance communication between all Government, donor, NGO and private business stakeholders (producers' and processing groups etc.) in the sector developed and operational;</li> <li>web based network collecting and disseminating information down to soum level, linking private producers, processors, centers of excellence, input suppliers etc..</li> </ul>	<p>surveys of farm and livestock households on access to technical, market, business information;</p> <p>internet sites/hits;</p> <p>network of links private/public, academic/business, overseas/domestic, input/equipment supplier, producer/processor</p>	these developments will be covered under the Strengthening Market Linkages and Agricultural Support Services Programs

# **AGRICULTURE SECTOR STRATEGY STUDY**

## **VOLUME 2**

### **SEED BREEDING AND VARIETAL DEVELOPMENT PROGRAM**

**30 NOVEMBER, 2006**



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## ACRONYMS

ADB	- Asian Development Bank
ADF	- Agriculture development Fund
ADRA	- Adventist Development Relief Agency
AHRI	- Animal Husbandry Research Institute
AI	- Artificial Insemination
ASDP	- Agricultural Sector Development Project
CIDA	- Canadian International Development Assistance
DANIDA	- Danish International Development Agency
EGPRS	- Economic Growth and Poverty Reduction Strategy
EU	- European Union
FAO	- Food and Agricultural Organization (of the United Nations)
GAP	- Government Action Plan
GDP	- Gross Domestic Product
GTZ	- German Bi-lateral Aid Agency
HACCP	- Hazard Analysis Critical Control Point
IMED	- Information Monitoring and Evaluation Department
ISO	- International Standards Organization
JCS	- Jesuit Christian Services
JICA	- Japan International Cooperation Agency
KOICA	- Korean International Cooperation Agency
LEWS	- Livestock Early Warning System
M&E	- Monitoring and Evaluation
MBDA	- Mongolian Business Development Agency
MDG	- Millennium Development Goal
MIT	- Ministry of Industry and Trade
MLG	- Ministry of Local Government
MNB	- Mineral Nutrient Blocks
MNE	- Ministry of Nature and Environment
MoFA	- Ministry of Food and Agriculture
MSUA	- Mongolian State University for Agriculture
MTBF	- Medium Term Budgetary Framework
NAEC	- National Agricultural Extension
NAMAC	- National Association of Mongolian Agricultural Cooperatives
NEMA	- National Emergencies Management Agency
NGO	- Non government organization
NPA	- National Plan of Action
OIE	- Office Internationale Epizootique
PPP	- Public Private Partnerships
PSARTI	- Plant Seed Agriculture Research and Training Institute
SCSL	- State Central Seed Laboratory
SCVL	- State Central Veterinary Laboratory
SDC	- Swiss Development Cooperation Agency
SEFF	- State Emergency Fodder Fund
SPIA	- State Professional Inspection Agency
SSR	- State Seed Reserve
UNDP	- United Nations Development Program
UPOV	- International Convention on Plant Variety Rights
USAID	- United States Agency for International Development
WTO	- World Trade Organization
WUG	- Water User Group

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## SEED BREEDING AND VARIETAL DEVELOPMENT PROGRAM

### I. INDUSTRY ANALYSIS

#### A. Industry Performance

##### 1. Cereals

1. Most of Mongolian seeds requirements are intended for planting cereal crops. The seed producing industry has deteriorated since transition because of (i) a declining market size and the limited ability (and reluctance) amongst producers to pay for seed material, (ii) institutional changes as to how the industry operated, and (iii) technical and management issues associated with a cessation of the state farm system that engaged technical expertise within each enterprise. In the 1980's, Mongolia needed 120-130,000 tonnes of seed annually, of which 70% met national standards<sup>1</sup>. Currently, only 30-50,000 tonnes of seed are needed, of which only 15-20% meet national standards and more than 80% have a high level of volunteer (foreign commercial crop seeds) and weed seeds. Old or low quality seed contaminated with seed from other cereals and weeds results in poor germination and dirty crops with low yields and decreased profitability.

2. Commercial farmers do not seem to be aware of the economic return to high quality seed. They store seed under poor conditions and do not clean or grade to eliminate weeds, foreign varieties and shriveled grain from retained seed for the next season's crop. Seeding rates of 180kg/ha that have persisted from Russian recommendations, are high compared with other countries of similar climatic conditions. While these high seeding rates are necessary when using poor quality seed, rates can be reduced by up to 40% (to around 110kg/ha) when quality seed is used on well prepared fields, particularly if more effective cultivation practices are introduced<sup>2</sup>, a fact that seems to be understood by only a handful of Mongolian farmers and researchers. At the same time, use of quality seed could have a direct impact on commercial farm productivity of up to 20%<sup>3</sup>. A soundly based extension effort, demonstrating the impact of seed quality, seeding date and seeding rate, backed by solid financial analysis is needed to convince producers of the significant financial benefit from using quality seed in conjunction with improved cultivation practices, even under Mongolia's difficult growing conditions.

3. The Government recognizes that in the past, it has pursued policies that have unintentionally been in conflict with the development of a sustainable private seed producing industry. Policies seeking conflicting goals of self-sufficiency in wheat production and low flour prices for the urban poor have resulted in market distortions that discouraged investment in private seed production, exacerbating problems of the level and quality of supply. The current Program seeks to stimulate private commercial seed production as the solution both to the immediate problems of the seed industry and to improved profitability and viability of the commercial cereal grain sector. These will both contribute to resolution of food security issues, including vulnerability to climatic, economic, and political uncertainties. The private sector is now more developed than in the past and some private farms are

<sup>1</sup> Mongolian standards are low compared with international standards. Mongolian cereal seed standards accept 200 foreign seeds per kilogram of seed tested compared with US standards that allow only 1 seed per 100 grams (or 10 per kilogram).

<sup>2</sup> A limited trial on seeding rates conducted under the CIDA Minimum Tillage Project in 2001 and 2002 showed that seeding rates as low as 100kg/ha produced the same yields as fields planted with 165 kg/ha. CIDA: *Introduction of Minimum Tillage Technologies*, Final Report, 2003

<sup>3</sup> Integrated Crop and Livestock Production Project (ICLP) Final Report, February, 2005.

already reaching the level of experience and technical/financial capacity to consider commercial seed production as a production alternative.

4. Despite the decline in grain production, opportunities exist to supply quality reliable seed to raise productivity and increase margins. This will enable output levels to be maintained, or even enhanced, even if the area under crop decline even further, and improve the viability of grain production as it becomes concentrated in the more suitable cereal cropping areas. At the same time, improved quality seed material would reduce vulnerability of the sector, real or imagined, to political and economic disruptions and market fluctuations. This would reduce the need to hold emergency reserves in physical stocks, with all the complications this entails.<sup>4</sup> It is clear that the demand for cereal seed could easily be supplied by local producers if a private seed industry was promoted. As a result, this Program will assist the Government to modify its policies on management of state reserves<sup>5</sup>, ensuring that food security objectives they sought to address are achieved.

## 2. Other Crops

5. Greater opportunities exist in the production of seeds for other crop sectors<sup>6</sup>, that have exhibited strong growth, catering both to domestic and export markets. The potato sector has grown steadily in the past decade in response to a strong demand for local potatoes. Daily per capita consumption of is around 120g/hd, equivalent to an annual requirement of 124,000 tonnes, 94,000 tonnes as table potatoes and 30,000 tonnes as seed tubers. In 2004, 83,000 tonnes were harvested, and the deficit of 40,000 tonnes was satisfied from imports. It is possible that this deficit could be met from domestic production as the potato area is 25% below the area that was planted in 1989 and current yields (at 5.6-12.7 t/ha) are also lower than pre-transition levels.

6. Existing potato seed is considered inadequate in both quantity and quality. Most farmers use either low quality seed tubers retained from their previous crops for the next season or table quality tubers imported from China and Russia for seed material. Potato seed production is currently supported by Swiss Development Cooperation (SDC) funded Seed Potato Project<sup>7</sup>, introducing new varieties and developing commercial multiplier farms. PSARTI produces about 200-500 tonnes of high quality tubers a year, including some elite tubers using tissue culture at a relatively high price (Tg 300-350/kg) that acts as a deterrent for their use. Inadequate on-farm storage conditions are also damage the quality of seed potatoes. State owned and managed potato storage capacity for potatoes was 100,000 tonnes before 1990, but most specialized stores have been converted to other uses and are no longer available for storage purposes.

7. Diversification in the vegetable sector continues as consumer tastes broaden and more farmers try new crops. Most seed is imported but is of unknown origin and questionable quality. It is not usually labeled so that Mongolian producers understand its

<sup>4</sup> Germination rates deteriorate the longer seed material is stored. Furthermore, the rate of deterioration is greater when storage conditions are not optimal.

<sup>5</sup> The Integrated Crop and Livestock Production Project also called for reform of the SSR.

<sup>6</sup> The Canada International Development Agency funded Training for Rural Development Project is conducting annual trials on selected grains, oil seeds, forages, fruits and berries at Bornur Research Station and PSARTI. The project will continue until 2010. It includes professional development for researchers at both institutions through joint research projects with the University of Saskatchewan and through the Visiting Scholar Program.

<sup>7</sup> The Swiss Development Cooperation Agency is implementing a project on potato seed quality improvement and have tested eight foreign varieties and multiplied 270 tons of high quality seed potato. This was stored at selected seed potato farms. Preliminary trials show up to a threefold increase in yield with new seed material and varieties.

contents or planting requirements. An opportunity exists for local vegetable seed producers to produce quality seed for the growing local market, but developments in China and other neighboring markets could also present opportunities for the expansion of seed production for export. Currently domestic vegetable seed production is sufficient for traditional crops such as carrot, cabbage and beetroot, but packaging and quality are poor. Cucumber and tomato seed for protected field (greenhouse) production are imported as are seeds for other non-traditional crops. Over the last decade, vegetable production has diversified and consumers and producers alike are becoming more familiar with shorter growing period vegetables such as radish, spinach, leaf onion, leaf cabbage, lettuce, parsley and other crops. Seed supplies of these vegetables are often supplied by foreign organizations<sup>8</sup>. PSARTI and the Uvs Horticultural Research Station are producing 50,000 seedlings of black current and sea-buckthorn<sup>9</sup> annually, while other kinds of fruit trees seedlings are produced in very limited number.

8. Crop diversification is also evident in feed crops with the growth in domestic demand for better animal nutrition from high input producers such as dairy farms, a shift to more manageable and nutritious reserves for winter feeding, and the emergence of cash export markets, for instance, in China for canola. As cash markets for feed crops develop so will the demand for quality seeds and seedlings of these species, the demand for seeds being a derived demand based on the crops they generate. The success of this Program, therefore, will be heavily dependent on the success of the Agricultural Sector Strategy generally and specifically on the Commercialization of Horticulture and Expansion of Fodder and Feed Markets Program.

## B. Constraints

9. The main constraints to the development of the seed industry other than those faced by all primary producing enterprises (access to affordable credit, limited technical knowledge and limited availability of input supplies and market outlets) include (i) the availability of well adapted superior seed material suited to Mongolian growing conditions that can be multiplied for commercial purposes, (ii) limited adaptive research into variety selection for all crops, (iii) a well developed expectation amongst commercial producers (reinforced by targeted Government interventions) that the Government will provide necessary seed for the coming season's crop, and (iv) politically motivated government initiatives that provided disincentives for the development of a private seed producing industry.

10. The circumstances under which the seed industry might be expected to flourish require private producers to be able to make reasonable returns on their cropping activities. In the past, there has been pressure on crop producers to grow wheat to achieve the Government objective of self sufficiency. Historically, this crop has generated lower returns for producers in spite of the support programs offered by the Government to the extent that there has been some reluctance to pay for inputs other than for land preparation and harvest. Being financially constrained, many crop farmers cannot afford to provide water and nutrients to achieve a profitable yield. Many producers are stuck in the productivity spiral that prevents them from buying the higher quality inputs needed for higher yields. Given this situation, their reluctance to pay for quality seed is understandable. The key to unlocking their productivity spiral is in providing cropping alternatives that will generate higher returns, even if it means diverting prime wheat producing land into alternative cropping activities. Only when producers start to generate reasonable returns from their cropping activities, will they be able to afford to pay for inputs that in turn further improve productivity. One of the

<sup>8</sup> New vegetable varieties were introduced through an FAO program.

<sup>9</sup> *Hippophae rhamnoides* - a shrub producing orange coloured fruit, the flesh from which are rich in vitamin C with seeds having high oil content used for medicinal purposes.

key constraints in the development of a seed industry is therefore the need for producers to be successful in the cropping activities and for this to happen, they must be free to decide what, when and where to undertake cropping activities.

11. With grower dependence upon the state still foremost in their minds, the recently acquired independence as private enterprises is not fully appreciated. Growers still defer to the state to advise when to plant crops. They are informed when should be the last date for planting crops in different locations. They are advised when crops are ready for harvest through media broadcasts. This reflects not only the limited technical capacities of the producers, but also their dependence on the state for what are essentially private sector decisions that can be made independent of the state. Once producers understand the options they have to plant alternate crops that generate higher returns, one would expect a significant change in attitudes towards the adoption of higher quality inputs and the seed industry would be one of the first to benefit from this change of attitude. Other issues for the seed industry are presented in Table 1.

### **C. Opportunities**

12. The future of the seed producing industry is dependent upon successful cropping enterprises being developed in Mongolia. While historically, the industry has focused more on cereal crops (wheat for reasons outlined above), it is likely that greater opportunities will come from the horticultural industry where margins are better for producers. While the Government pursues its objective of self sufficiency in wheat, there will also be an ongoing need for seed wheat. While there may be concerns for the wheat industry to pay for seed wheat supplies of certified quality at an internationally established price, the demand for this product may well be linked closely to extent of government support for the industry to achieve its objectives.

13. Prospects for the horticultural seed industry appear to be based on a far more open market where price and quality adjustments are not constrained by managed supplies. The importance of quality seed material cannot be overstated in achieving higher productivity levels and producer margins are more attractive for horticultural crops. With the relatively low dependence upon domestic supplies for perishable goods such as fruit and vegetables, many of which can be produced under certain conditions in Mongolia, there is likely to be a strong demand for seed material as local producers progressively become more commercial and compete with the imported products. While the industry adjusts to the seasonal nature of competition from international suppliers, local producers have a distinct advantage with perishable goods, the strong loyalty factor found in Mongolian consumers and the rapidly growing quality conscious market for vegetable products as dietary habits change. These all suggest a strong growth in the horticultural industry and with it, a strong growth in supplying quality seed material.

## Volume II - Program Investments - Seed Breeding Program

Table 1: Seed Breeding Program Major Issues

Level	Current Situation	Desired Situation and Changes Proposed	Role of		
			Government	Private Sector	Projects
Market considerations	SSR operations have distorted the wheat seed market.	Role of government clearly defined and supported by regulation and budget for its industry monitoring responsibilities.	Government support to seed breeding, variety trials and adaptive research.	Multiplication of seed and some elite seed production.	If vegetable seeds are provided as project inputs, they should be purchased from local seed growers at market prices.
	Green Revolution and donor interventions in vegetable seed markets potentially distort vegetable seed markets.	Donors adopt non-distorting procurement and monetization programs.	Ensure standards are adequate and enforced.		
	Insufficient financial incentives for seed producers.	Donors purchase seed in Mongolia at market prices.	Provide sufficient testing facilities.		
Quality standards and enforcement	Regulations on seed quality not applied.	Adequate numbers of seed inspectors available to carry out inspections.	Budget allocation at aimags for inspection services.	Self-regulation an essential part of a commercial seed industry.	Capacity building program for seed inspectors; regulation, organizational development and training.
	Insufficient laboratory and inspection capacity to inspect and test seed quality.	Central Seed Laboratory rehabilitated to perform the full range of tests to international standards.	Allocation of resources to support ongoing operation plus staff continuity and membership in international organizations.		Upgrading of lab equipment, professional upgrading for staff, TA on harmonization with international standards and organization membership
Research and development	Basic capacity exists but funding is inadequate to carry out a range of variety testing and breeding that support current and future needs of a diversified industry.	PSARTI and a select number of regional branches and variety testing locations carry out variety trials and breeding programs for field crops and horticulture.	Allocation of resources. Reform methods of research prioritization.	Variety testing on selected commercial farms.	Professional upgrading; international linkages; import a broad range of crops for testing.



## Volume II - Program Investments - Seed Breeding Program

<b>Certification and organization of seed producers</b>	No seed growers' organization in place. Inadequate contracting and pricing systems to support a private commercial industry.	Seed Growers Association formed that participate/leads in variety selections, standards development and enforcement.	Oversight and regulation.	Driven by private sector	Capacity building for commercial seed growers and the new organization exposing to international best practice.
<b>Technical and management capacities</b>	Ability to raise quality seed (inputs, irrigation, storage, management decisions) and current financial and marketing management skills lacking for commercial seed industry in a market economy.	Well managed, equipped and financed commercial seed farms respond to the ever developing and changing needs of a maturing commercial crop sector based on market signals.	Create the enabling environment for commercialization.		Training programs.

## **II. GOVERNMENT POLICY FOR THE DEVELOPMENT OF THE SEED INDUSTRY**

### **A. Rationale for Public Involvement**

14. The state has dominated the seed industry in Mongolia to support cropping activities in its quest for self sufficiency in wheat. This was possible when production was output based (on state run farms) and not dependent upon enterprise profitability and while there were sufficient funds to maintain input subsidies. This mentality has persisted in view of the limited ability (commercial savvy and resource backing) of the private sector to meet the challenge of commercial seed production in Mongolia. This historic role of the state has developed certain expectations amongst crop producers that the Government will provide all. With significantly reduced resources, the Government is now seeking to extract itself from an active role in supplying seed to a more supportive role of private initiatives whereby it assumes responsibility for setting and regulating industry standards, providing certification that private entities are supplying the stated seed quality, protecting commercial producers from poor quality seed material with consequent impact on the cropping sector.

15. The rationale for a revised role of government is based on the recent performance of the cropping sector and the recognition that the profitability of cropping farmers is inevitably linked to the quality of the seed material it uses. It is an appropriate role for government in that the state remains the foremost independent arbitrator to provide certification of quality and has no vested interest other than to protect the consumer from fraudulent behavior of would be traders. This is a service unlikely to be assumed by any group within the seed industry as additional costs are involved to provide such certification. Given the large number of potential beneficiaries - the crop farmers of Mongolia, the Government considers that the cost of such services represents a public expense and therefore is appropriate to be funded from public resources. The potential benefits from the investment are the development of a viable seed industry that will contribute to improving crop productivity and contribute to socio-economic development in rural Mongolia.

### **B. Recent Development Initiatives**

16. The main initiatives of the Government have been to support activities in the various research institutions engaged in plant breeding and the initiatives associated with the SRS. Donors have supported the private sector in an attempt to develop seed wheat production but have also contributed in a significant way to the development of a private seed potato industry funded by SDC.

#### **1. Government Initiatives**

17. The Government's two main initiatives in the industry relate to support for breeding and varietal selection on the network of research stations and the operations of the SSR. With the limitations of resources since financial independence from the former Russia, Mongolia has had to make some difficult decisions as to its allocation of dwindling resources. Two developments have seriously impacted upon the level of budgetary support given to these institutions, firstly the reduction in consolidated revenue after 1990 that saw national support dwindle to what were previously well supported institutions and secondly, the devolution of aimag and regional institutions to the provinces so that operational expenses were to be obtained from aimag budgets (that in turn were dependent upon national government allocations). The combination of these two factors resulted in a sudden decrease in the support from plant breeding research and seed multiplication initiatives to the extent that prompted the Government to pursue an alternate means of securing seed material - the SSR.

18. As returns from cereal cropping have diminished, producers have become reluctant to pay market prices for seed wheat and have resorted to depending either on retained seed and the Government program to meet its seed material requirements. The repercussions of this intervention are fully explored elsewhere in this Program and need not be duplicated here. Suffice to say that the SSR has not had the desired impact that the Government intended when formulating this program. The Government therefore is seeking new measures to stimulate a private industry where the Government can adopt a more of a monitoring role and one of quality assurance.

## **2. Donor Funded Initiatives**

19. Apart from a number of relatively small scale efforts at introducing foreign seed material under poverty focused projects (often NGO implemented), the two main donor efforts have been directed at the rehabilitation of the State Central Seed Laboratory, support for the seed program being implemented at PSARTI, and support for private seed producers (by way of pivot irrigator to finish seed wheat crops), all of which were funded by the EU Integration of Crop and Livestock Project, and the second major initiative that is on-going is the development of private potato seed suppliers.

### **a) Integrated Crop and Livestock Project**

20. Implemented between 2002 and 2005, one of the components addressed crop seed multiplication. It supported the rehabilitation of the State Central Seed Laboratory and provided support for PSARTI's plant breeding initiatives and also attempted to increase the supply of wheat seed to the local market by providing a pivot irrigator to ensure that pinched grain could be eliminated from the seed wheat crop (the impact from adequate finishing water). The impact from this initiative has only recently been reviewed and results suggest that the issues of government intervention had a far greater impact on the industry than the level of support that could be provided under the project. While the project was able to support the institutions while it continued to be implemented, since completion, the status quo has been returned and the seed industry is no further advanced in meeting its aims. The final review concluded that policy changes were needed for industry support to be more effective.

### **b) Potato Seed Project**

21. The second major initiative in seed is the SDC funded Potato Seed Project that is providing both improved seed material generated at a number of local institutions and multiplied by the private seed producers. The Project has also imported a range of new genetic material that is virus free that is being used on the demonstrations. The Project also provides considerable capacity building to the seed growers to ensure that high quality planting material (tubers) is made available to commercial growers. The impact from this project is very positive and is likely to be better sustained than the efforts in seed wheat production.

## **C. Future Development Strategies**

22. The Government is committed to the development of a seed industry in Mongolia so that the commercial growers can access quality seed material. It recognizes that efforts in the past have failed to generate the desired outcome and now must look to alternative means to support this important industry. It recognizes that locally developed planting and seed material offers some advantage in that the species are better adapted to local conditions but for local varieties to be available, varietal selection initiatives must be funded under the Program. The Government accepts responsibility to finance this less commercial but necessary part of seed production but also recognizes a role for the private sector in multiplying (under contract) the superior genetic material generated in the selection

programs. In view of the advantages of private multiplication of seed material, the Government also sees a role in the certification of standards that are needed to give locally produced seed and planting material credibility amongst those using the planting material. For this reason, it is prepared to establish and operate the necessary inspection services as well as funding the operations of the seed laboratory that initially will be managed by the state until the level of the industry warrants otherwise.

### **III. PROGRAM PROFILE**

#### **A. Objectives and Outcomes**

23. Within the context of a strategy for the crop sector aimed at raising the sustainable profitability of crop production, the Seed Breeding and Varietal Development Program is an important component to eliminate constraints arising from low productivity and poor quality, as well as a niche opportunity for commercial crop producers in its own right. The Program seeks to stimulate the development of a commercial seed industry such that producers will be able to obtain adequate and reliable supplies of high quality seeds for the full range of crops with market potential, notably potatoes and other vegetables, and animal feed and fodder crops, both of which are also the subject of special Programs under the Strategy. The availability of quality seeds for grains, including wheat and other crops will also be improved under the Program.

24. Benefits of a commercial seed industry include:-

- employment and high value added cropping opportunities in their own right;
- secure access to quality, adapted seed varieties that improve productivity of other cropping activities, open the way to sustainable diversification into higher value commodities, and support improved profitability in the livestock sector;
- decreased reliance on imported seed stock and vulnerability to fluctuations in currency exchange rates, transportation costs, and supply access and security; and
- an increased capacity for the crop sector (and indirectly the livestock sector) to adapt over the longer term to climate and market change.

#### **B. Scope and Key Activities**

25. Mongolia needs to develop a commercial seed sector able to provide Mongolian producers with adequate and reliable supplies of high quality seed for the full range of crops grown in Mongolia that can, over time, respond to changing market and environmental conditions. In the past, the Government has attempted to ensure the security of supply through the market activities of the State Seed Reserve (SSR) and Agricultural Development Fund (ADF), but this has proved detrimental to both the quantity and quality of supply and has made it both difficult and unattractive for private sector seed development. The result has been not only to undermine the security of supply but also to condemn grain producers to lower yields.

26. Under this Program, the Government will adopt a more appropriate role in a market based economy focusing on its responsibility for the policy and legislative environment, the nature and management of the regulatory framework and, where the immaturity of the private sector makes it appropriate, support for research and development, technical and business information dissemination, and private sector strengthening. These activities are divided into four distinct but closely integrated components to achieve:

- the creation of an enabling environment for a commercial seed industry, including both the legal environment to support seed development and the elimination or reduction of earlier distortions resulting from non-commercial interventions in pursuit of other objectives;
- the strengthening of seed breeding and variety testing to allow for the expansion of crops better adapted to the Mongolian environment and diversification into new crops and varieties in response to market opportunities, and expansion of productive capacity in commercial multiplication, including through improvements in management, infrastructure (irrigation) and equipment;
- the development of seed standards and certification, and the strengthening of the regulatory capacity for seed testing and inspection (through improved laboratory services and expansion in the numbers and skills of seed inspectors); and
- the establishment of seed industry organizations and standards for business operation, including contractual supply and pricing arrangements, and support dissemination of information on the economic value of using good quality seed in a cost-effective manner.

27. The Program will be active across the crop spectrum, and not merely concentrated on the grain sector. Besides cereals, the Program will also seek to stimulate reliable supply of quality seed material also for oilseeds, forage crops, potatoes, and vegetables as well as, where appropriate, specialty crops<sup>10</sup>.

### **1. Creation of an Enabling Environment**

28. A vibrant private seeds sector requires a business environment that supports productive initiatives and investment, enabling sufficient profits to be made to stimulate activity while ensuring that business and product standards protect consumers (in this instance, crop producers), communities and the environment. Under a mature market system, quality, reliability, and value for money are rewarded by strength of demand and hence prices. Even then, the interests of producers (and of the public at large) are safeguarded through enforcement of standards, through systems for registration (based on testing and adaptation of varieties), certification, and inspection. In Mongolia, where the market is still in its infancy, these aspects are particularly important where producers and seed producers alike have become used to relying on seed derived from retained crop because marketed seed has been of poor quality and inadequate supply.

29. The role of Government needs to be clearly defined and supported by regulation, budget and monitoring. Donors need to adopt non-distorting procurement and monetization programs, preferably purchasing seed in Mongolia at market prices. The SSR actions have distorted the wheat seed market while donors' food aid programs distort output markets, depressing producer margins. Similarly, Green Revolution and donor initiatives in vegetable seed markets potentially distort the market for vegetable seeds. This eliminates any financial incentives for seed producers while market risk and uncertainty is increased by government involvement.

30. This component addresses issues of reform to the policy, legislative, and institutional framework to stimulating private sector activity in the supply of quality seed, including both domestic production and import. It covers both the need for legislation in such areas as

<sup>10</sup> Known as 'technical crops', usually used in industrial processes. Here, however, the range is wider, including for instance medicinal plants, herbs, and essential oils.

breeders' rights and reforms to the SSR and other mechanisms with a distortionary influence on markets.

#### **a) Establish Plant Breeders' Rights**

31. The Program will seek to address outstanding legislative issues, whether through the promotion of new legislation or through amendments to existing legislation and codes that inhibit private seed supply. An initial analysis should identify the key areas and these will then be programmed for amendment early in the Program. They will include issues that relate to the environment for agriculture generally such as improvements to land and water tenure rights dealt with under the Agricultural Land Utilization and Management Program, and improved financing opportunities under the Access to Term Credit Program, but also more specific issues of relevance to seed production and marketing.

32. Important among these specific legislative needs is the protection of breeders' intellectual property rights (also relevant for livestock breeding). This is considered a minimum requisite to support investment by private breeders and state research institutions into new varieties. While the legislation need not be particularly complicated, it needs to be consistent with international copyright arrangements. The Program would also initiate the process of membership of the International Convention on Plant Variety Rights (UPOV).

#### **b) Reform of the SSR**

33. In the past, the Government has dominated the seed wheat sector through the SSR. This has undermined the development of the private seed sector through interventions in supply and price that have led to uncertainties as whether investment in seed production could be profitable in the medium to longer term. As a result, private seed production has tended to be small in scale and focused on the grower's own seed requirements, or those of a close network of associated growers. Such an industry cannot effectively develop in the private sector in the face of direct competition from the Government. Responsibility for the production of seed wheat and other seed material needs to be transferred from the SSR to the private sector and create an enabling environment that will stimulate the development of a private commercial seed sector.

34. Seed is traditionally released by government schemes into the commercial market on a credit basis, directly competing with commercial sellers prior to seeding. Repayment in kind has been allowed, without adequate quality control, resulting in poor quality seed being returned to the Reserve and a downward spiral of future stocks. On a regular basis, there is inadequate cleaning, grading and storage of seed to remove impurities and maintain quality. Ultimately, the majority of outstanding debts were forgiven in early 2004. The pricing mechanism used by the SSR is based on an arbitrary "purchase plus storage cost" calculation created large distortions in the market, as evidenced in 2004 when the Reserve was offering to sell and buy seed for Tg 165,000/tonne while the market price for commercial wheat was in the area of Tg 200,000/tonne. Normally, seed wheat would be expected to trade at a premium of approximately 30% above commercial grain prices that should have put the seed price at around Tg 260,000/tonne.

35. Overall, the actions of the SSR have created levels of uncertainty and risk that have prohibited the development of a commercial seed sector and deprived viable producers access to quality inputs that would have improved farm productivity and allowed marginal producers to remain in the commercial industry. These practices, combined with severe drought in 2002, increased the reliance on the SSR from 39% of all cereal seed in 2001 to 56% in 2003 and 53% in 2004, and 'emergency status' became a routine condition for the seed industry. With an irrational discounted pricing structure competing with strong market

prices for flour milling and grain distilling in 2004, very little seed was returned to the SSR for use in 2005. There was insufficient seed available through retained farm stocks, and the resources of the SSR was unable to supply the balance of seed requirements, even with the decline in sown area to only 168,000 ha. Actions of the SSR paradoxically, therefore, not only undermined the development of the private seed sector, but also the profitability of the grain sector increasing costs and prices and lowering the level of domestic supply. Contrary to SSR objectives, intervention reduced self reliance, raised dependence on imported flour, and increased vulnerability to climatic and other external shocks.

36. An important aspect of the Program, therefore, is the development of an efficient and non-distorting system for the management of strategic seed reserves. This will require the evaluation of alternative approaches to the meeting of strategic objectives, including the possibility of shifting from the holding of physical reserves to management of seed procurement capacity in the form of predominantly financial reserves, with use triggered through forward assessments, based on harvests and private sector market operations, of the need to make up deficiencies resulting from emergencies. Key elements will include:-

- introduction of an effective forecasting or advanced warning mechanism to identify physical and market influences on future seed supplies, linked to decision-making arrangements and responsive actions to meet emergency needs when they arise;
- an evaluation of the level of financial reserves that need to be set aside for strategic purposes with respect to seed, and whether these can be offset, or combined with, other financial reserves held for food security and emergency response purposes;
- the management of such financial reserves to generate income without prejudicing the level of flexibility required to meet strategic security objectives;
- the determination of the appropriate amount and form of physical reserves (including most notably the holding of varieties at the genebank, particularly the tissue-bank at PSARTI to protect genetic diversity);
- introduction of improved cleaning, grading, and storage and distribution systems both for the reserve and across the sector;
- the strengthening or establishment of relationships with international organizations dedicated to the preservation and emergency supplies of plant genetic materials, notable CGIAR;
- the establishment of transparent procurement mechanisms to ensure timely supply in times of emergency, including forecasting procedures and trigger mechanisms; and
- the review of current activities of the SSR based on findings from the above investigations.

37. Not only will this greatly enhance the prospects for growth of private sector seed supply and quality, it will also strengthen the effectiveness of the system of strategic reserves and reduce vulnerability to unforeseen external political, economic, and climatic events.

### **c) Reform of Other Market Distortions**

38. Interference in output market prices has not been restricted to the SSR. ADF activities in the commercial wheat market, intended to ensure low consumer prices for flour, and the monetization of food aid during the harvest period, have further depressed already low seasonal prices. Both actions result in lower margins for producers, most of whom do not have the physical storage capacity or, at commercial interest rates of 3% per month, the

financial reserves to store grain past the autumn. By negatively impacting farm margins, the derived demand for purchased, high quality seed inputs is also depressed, in turn reducing the incentive for the emergence of significant commercial seed production.

39. Market interference has also occurred in the potato and vegetable seed markets. Provision of free vegetable seeds to smallholders through the Green Revolution Program and the activities of various donor projects also inhibit the development of private specialist or niche production. The Green Revolution distributed 540 tonnes of potato seed and 12 tonnes of vegetable seed between 1998 and 2004. The total volume of seed, most of it imported, provided through major NGO and donor projects or programs is unknown, but represents a substantial share of the potential market for domestic seed producers. Wherever possible, these projects and programs should procure locally at fair market prices, supporting private seed producers through demand and extension related to quality and reliability. Care must be taken to ensure that the methods of procurement and distribution used by these agencies stimulates rather than inhibits development of the local horticulture seed sector.

## **2. Expansion of Seed Breeding and Multiplication Capacity**

40. All stages of the seed production cycle in Mongolia need strengthening. These include seed breeding and variety testing, which has predominantly been undertaken by the state, mainly through PSARTI but also various other related institutions. Multiplication of breeder seed into foundation or super elite seed and then through stages to commercial seed remains under developed in the private sector but has also become neglected in the state sector as state seed producing farms have closed or become run down through lack of funds.

41. The Government policy is to continue, for the time being, to undertake seed breeding and variety testing within the state research institutions, while multiplication becomes the preserve of the private sector, both as specialist seed producers while others could apportion part of their land for seed production (the more common approach to date). It is unlikely that the private sector will be able to take over the breeding, and even foundation, levels within the medium term, but where entrepreneurs are interested in investing in such activities, they should be encouraged. It is important, therefore, that there are no legislative, regulatory, or institutional impediments to private seed breeders. Revision of the law on breeders' rights is specifically designed to stimulate such activity in the private sector by protecting any investment in seed breeding or adaptation (most development will derive from adaptation of earlier varieties used in Mongolia or of new varieties from abroad).

42. There are three main elements to this component:

- strengthening of PSARTI;
- rehabilitating and strengthening the capacity for plant breeding and variety testing within Mongolia; and
- supporting the development of commercial seed multiplication.

### **a) Strengthening of PSARTI**

43. With PSARTI the major facility for plant breeding initiatives, the Program will focus initially on strengthening PSARTI. Seed research is conducted at its headquarters in Darkhan and its regional branches in Dornod and Uvs. PSARTI has qualified researchers and has recently received irrigation equipment (to service 40 ha) and seed cleaning and grading equipment through the recently completed Integrated Crop and Livestock Project (ICLP). With the basic human and technical resources in place to carry out crop



development research, PSARTI's main constraint is medium term financial support and commitment to carry out a longer term breeding and variety trials program. The current emphasis of its breeding program is on the development of cereal varieties, predominantly wheat, but also includes barley and oats. The program is not broad enough to meet the variety innovation or crop diversification needs of the industry and does not yet adequately serve the vegetable, fruit and potato industries. Its capacity to multiply breeder seed to sufficient volumes of super elite and elite seed no longer exists.

44. The Program will complete the rationalization of PSARTI as elaborated under ICLP, including the transfer of the Dornod branch to Sumber soum and seed production of Uvs SS from Baruunturuun to the irrigated site at Ulaangom. The upgrading of PSARTI facilities will also be completed under the Program. Physical rehabilitation will be accompanied by improvements in technical and financial management, supporting the viability of PSARTI, which is a major centre of agricultural research in areas other than seeds, as well as a key agricultural training and educational institution. Activities under this Program will be coordinated with those under the complementary Research Program under the Strategy, PSARTI being one of the two major plant research institutions in the country.

45. Besides the physical facilities and management, the Program will also (together with the Research Program) support the professional development of research staff and technicians, not only improving their access to the latest techniques and information but also introducing new proven research methodologies through links with overseas centers of excellence, including both visits by foreign experts and trips to these centers. At the same time, research and technical information exchange will be strengthened through improved links at institutional level with major international bilateral agencies and seed development organizations, both public and private. These will include accession to conventions in seed testing, certification and variety rights.

#### **b) Rehabilitation of Plant Breeding and Variety Testing**

46. Variety testing in Mongolia is currently inadequate to serve the needs of the seed and crop sector either at present or in the future when it will be faced with new and more exacting market demands and competition and, potentially, the effects of climate change. Mongolia used to have 17 variety testing stations linked into the Soviet international variety testing organization. These international linkages have been disrupted and are yet to be replaced by new working partnerships with other international seed testing and strategic reserve organizations (such the Consultative Group on International Agricultural Research (CGIAR)). The 13 variety testing stations lack varieties to test and use testing methods that are now considered obsolete. What testing there is focuses on a narrow range of wheat varieties and other cereal crops and deals inadequately with testing varieties for the potential growth areas of vegetables, potatoes, or fodder crops.

47. The Program will develop the adaptive capacity of the seed sector by:-

- increasing the support for longer term plant breeding programs at PSARTI and other research organizations;
- restoration of variety testing activities, possibly in partnership with qualified private sector seed growers; and
- supporting the participation of the private sector in the selection and registration of varieties.

48. The Program will also strengthen linkages between both the state institutions and the private sector with international organizations involved in variety development and testing (international agencies and universities). Basic research capacity is in place, but funding and

resources have in the past been inadequate to carry out a range of variety testing and breeding necessary to support the current and future needs of a diversified crop sector in a market economy. Under the Program, PSARTI and a select number of regional branches and variety testing locations will carry out a broad range of variety trials and breeding programs for field crops and horticulture, especially where demand indicates a strong market for potential crops. The Government will adopt new approaches to the allocation of research funding, increase its level and modify the method of prioritization. This change in the mechanism for research funding and allocation will be dealt with under the Research Program of the Strategy but it will involve considerably greater participation by stakeholders, including private growers and processors. Funds will be made available for different classifications of research, and although shorter term adaptive research will dominate, longer term research into plant and animal breed development will also be supported. Allocation is likely to be based on some form of competitive bidding to complete identified research priorities, but for this to work, other institutions, including private and foreign research ones, will also have to be eligible. Research priorities will be the result of discussions on a rolling medium term program, linked for state funding to the Medium Term Budgetary Framework (MTBF) but inclusive, where sponsors are available, of private and donor funding. Decisions will be taken by a research committee that includes equal weight to end-users at each stage of the cycle: growing, processing, storage and distribution, shipment and marketing, for both crop and livestock sectors, with those more traditionally selecting priorities: institutions, researchers, and Government. Projects, funded by donors or, in time, the private sector (agro-chemical suppliers, seed producers, processor groups, for instance) could support this strengthening of domestic research capacity with professional upgrading, international linkages, and supply of a broad range of crops for testing.

49. Within the seed sector, private participation will also be encouraged in the selection of varieties for registration. This will develop over time, but private organizations will be able to qualify for funding to develop and test new local and foreign varieties and present their results legitimately for registration, though this will entail some form of accreditation procedure and the adoption of prescribed methodologies and research or testing standards (section III.B.3.a)). The Program recognizes that it may take some time for the private sector to respond to the challenges of seed breeding and variety testing, but the system established will be such that these activities also represent legitimate opportunities for private sector investment and for sustainable, and profitable, economic activity.

### **c) Strengthening Commercial Seed Multiplication**

50. Following the Government's policy to promote the private sector and to limit its own economic activity to those areas where the private sector is currently either unable or unwilling to address issues that act as a constraint on sector development, the Program will stimulate seed multiplication activities within the private sector. The state will be actively involved only in breeding and variety testing, and even then the system will be supportive of private sector involvement through the allocation of research and development funding, with a view to phasing out the dominance of PSARTI and sectoral reliance currently placed upon it. PSARTI will remain a powerhouse of Mongolian plant research, and a key educational institution, but it should expect to compete with other private sector institutions in certain areas, including seed breeding and variety research.

51. It is proposed the Government adopt a two pronged approach to the stimulation of private seed farms and crop producers in the multiplication of seeds. Firstly, PSARTI and other seed breeding and variety testing institutions will contract private growers for the various stages of multiplication (from super elite to elite seed, and from elite through several stages, depending on crop, to commercial seed) of those seeds registered for use in Mongolia. Such contracting may also take place through donor programs or in consultation

with the private imported super elite seeds for multiplication. However, equally legitimate will be the situation where growers, adopting either a seed production specialization or the diversification of part of their crop area into seed production, wish to undertake the multiplication of seed on their own account, either for their use or within a larger farm or group of farms (i.e. as part of a broader farm association), or to sell into the market under their own or a licensed brand name. Similarly, a seed importer or supplier could contract local growers to multiply their seed for onward sale, most likely the domestic market but the possibility also exists to meet the demands of niche export markets. Either way, seed growers and marketers will have to meet the requirements of the registration and certification process (section III.B.3.a)).

52. Besides the establishment of contract growing arrangements, including on contract standards and administration (section 4.c)), the Program will also support seed growers through assistance in the resolution of technical and financial constraints. This will include the provision of business advisory services and technical extension on variety selection and cultivation practices, promoted under the Agricultural Support Services Program, and the legitimizing of seed production as a special activity under the Access to Term Credit Program. Under the umbrella of these Programs, the Seeds Program will support specialized business orientated training and demonstration programs to current and potential seed growers (identified themselves through registration for courses or assistance) designed to strengthen production, financial, and marketing management and introduce technical improvements and market information as appropriate. Also significant will be activities under the Irrigation Rehabilitation and Construction Program, since an expansion of irrigated area, or improvements in the irrigation of certain areas will have important consequences for both the yields and profitability of seed production. This will also depend if seeds are paid a price premium over standard crops, a function of the Program's ability to achieve a significant shift in the process of meeting the government's strategic reserve objectives.

53. Although support for growers through development of contractual arrangements and the provision of technical and financial assistance will prove important, the major impact on private seed industry will be the extent of consistent demand for a range of quality seeds. Although the presence of an export market for seeds within the region is not inconceivable, the future of the sector will largely depend on the expansion of opportunities to supply seed to domestic crop producers. This in turn will depend on the ability of the crop sector to meet domestic and regional export demand for food and technical crops. Activities under the Commercialization of Horticulture and Expansion of Fodder and Feed Markets Programs under the Strategy will also generate demand for seed material.

54. Depending on broader or national policy considerations, the Program may also support private investment in seed farms through some form of fiscal incentive (including accelerated depreciation allowances, valuable to support the benefits of financial leasing, directing financial sector funding into agriculture) or interest offset schemes to reduce the cost of borrowing for such ventures. Both of these relate to proposals under the Access to Term Credit Program to institute a mechanism to offset the current excess of interest charges over the cost of lending and perceptions of the high risk and low returns associated with agricultural investment.

### **3. Strengthening of Seed Testing and Inspection**

55. An integral part of a successful seed industry is consumer confidence, i.e. crop producers, in the quality of the seeds sold. Germination rates and yields claimed are frequently made for varieties and particular batches of seed. In an environment where seeds have traditionally been of poor quality, there is a need to establish a system of registering seed brands and certifying the quality of batches to support claims as to germination, purity

etc. that requires inspection services. Individual batches need to be identifiable as forming part of a particular registered and certified brand (and also needs to be tested), traditionally achieved through packaging and indelible coloring or tinting. This system, from registration of seed brands (different from the process of registration of particular varieties for use in Mongolia) through certification, differentiation, testing and inspection, will be promoted under the Program, building on and improving the current system. Key elements in this component include:-

- establishment of a reliable seeds standards system;
- reform of seed testing and inspection systems and services; and
- upgrading of seed testing laboratories.

Linked across these is the need to improve professional standards of personnel through training and career development.

#### **a) Establishment of Seed Standards**

56. As a first step in the development of a certified seeds system, the Program will need to establish appropriate standards for a number of varieties for a range of crops: including cereals, oilseeds, forage crops, potatoes, vegetables and specialty or technical crops. The standards will be based on fertility and yield characteristics under certain production technologies. Once the standards have been determined, the threshold for registration will need to be established, and a simple system for seed registration introduced, which will include specification of the standards. It will be against this register of seed standards that commercial seeds will be certified and against which they will be tested through inspection.

57. In a mature seed industry, regulation takes the form of self-regulation with standards established by industry and maintained through producers' own quality assurance programs. Although the Program will work towards this as a longer term objective, in the medium term, it is anticipated that regulation will need to be through a state administered system. The Program will support improvements to the system whereby a particular batch or source of seeds is certified to meet the specific standards established for that crop and variety. Producers will certify that their seeds meet particular standards, but the state inspection mechanism both through examination of particular farm production and quality assurance mechanisms and through a process of sufficiently intensive random testing, plus ex-post tests on seeds that have performed below standard, will verify the validity of this certification and impose penalties and fines where seed growers and/or seed traders have either made false statements or have allowed seeds to become contaminated.

#### **b) Reform of Seed Testing and Inspection**

58. The legal and regulatory environment already exists for seed inspection and testing, but the capacity and practice has, to date, been piecemeal. The rules on seed quality, while already established, have not been enforced. Inspection and testing is now the responsibility of the State Specialized Inspection Agency (SSIA), the operational arm of which is aimag based where implementation of seed standards is not enforced. Aimag staff are inadequate in number and lack the skills to perform inspection duties. This situation is similar at the soum level. The problem has increased with the expansion of the number of varieties and crops imported and grown in Mongolia.

59. Inclusion of a fully justified seeds program within the MTBF (backed by the Institutional Capacity Building Program), will result in an increase in state budget allocations made to the aimag level for inspection services. Resources to enable the number of inspectors able to carry out seed inspection duties should be expanded and trained. Under

the Program, the numbers of full-time inspectors will be supplemented through the recruitment of licensed freelance seed experts/inspectors under contract, supported by a certified training program.

60. The Program will: (i) first, examine the institutional arrangements for seed inspection, and, (ii) introduce a system for the training and certification of seed inspectors. Links between SSIA supervision and implementation by the aimags of seed testing and inspection, including contracting arrangements between the inspectorate and seed testing laboratories (section III.B.3.c)) will be enhanced. At both levels, funding will be increased and training introduced. Aimag's will develop a program for the enhancement of soum level capacity to manage, implement, and monitor inspection of marketed certified seeds and of certified seed growers' fields. A system for the certification of specialist inspectors will be established. These experts will be trained to meet the requirements of inspection procedures and subcontracted through the aimag. A mix of full-time and contracted seasonal staff is preferable to reliance on full-time inspectors alone as the timetable for seed inspection is relatively short. While seed growing occurs throughout the production season (about six months), with storage through the rest of the year, both stages requiring regular inspection, the peak activity of testing seeds in the market is highly seasonal (just before and during the planting season during land preparation, and immediately after harvest, when producers not only put aside quality grains but seeds are also bought, including by traders, in preparation for the next growing season).

### **c) Upgrading of Seed Testing Laboratories**

61. In the 1980s, testing facilities in the State Central Seed Laboratory (SCSL) and eight other seeds laboratories in the core agricultural aimags conducted simple tests on purity, foreign mixture content, germination and kernel weight. The SCSL had the capacity to test original and foundation seeds from research institutes, certified seeds from the State Variety Test Stations and specialized seed producers. Specialized tests for economic characteristics included gluten content, water uptake, baking volume and others. Most of these laboratories have ceased operating and those that remain use testing techniques that are time consuming and inefficient. Lack of replacement of obsolete equipment has resulted in SCSL stopping biochemical tests.

62. Appropriate seed testing capacity is essential for development of a domestic seed industry, as it is for a profitable crop sector. Under the Program, SCSL will be supported to carry out a full range of tests to international standards. Government will allocate funding, reflected in the medium term (MTBF), to support ongoing operation, maintenance, staff development and membership in international organizations, such as the International Seed Testing Association, International Union for the Protection of New Varieties of Plants, CGIAR and others. Gaining membership in these organizations requires that national laboratories are able to meet international seed testing standards as regulated by these organizations. For Mongolia this will require upgrading of equipment, standards, methodologies and human resources. These facilities will be upgraded under the Program with modern equipment together with the capacities of professional staff, to support the harmonization of standards and methodologies with international institutions.

63. The Program will improve the capacity not only of SCSL but also a limited network of aimag laboratories. An initial assessment of needs will determine which of the former aimag laboratories should be included in this network and what physical repair and equipment replacement is required for them to meet appropriate standards. Staffing will also need to be up to modern standards and this is likely to require a mix of retraining, new recruitment, or a rotation with SCSL.

#### **d) Enhanced Professional Standards**

64. Training and professional upgrading is required for seed testing and inspection staff at all levels, including public servants and subcontracted private service providers. The Program will provide comprehensive training based on a detailed needs assessment. Many topics will be included in regular training programs of the network: from SSIA, SCSL, aimag inspectorates and laboratories etc., but there is also a need for an initial 'pump-priming' one off upgrading push during the early years of the Program, financed under the Program with linked reform conditions and technical assistance provision.

#### **4. Development of Industry Organizations and Trading Standards**

65. In a commercial industry, private producers are responsible for seed multiplication and commercial sales. Producers can specialize on seed production alone, or they may combine seed production with crop and other activities (including agricultural supplies, marketing, and services provision). As seed producers, they may multiply super elite and elite seed under contract to breeding institutes and/or other seed organizations, including private overseas suppliers, or they may multiply commercial quality seed (registered and certified) on their own account for sale through their own seed businesses. Mongolia has a relatively small number of seed producers with the technical and managerial capacity to take on such commercial activities. Under the Program, development of the commercial seed industry will be facilitated by:-

- establishment of a commercial seed growers' organization to participate in standards development and self-regulation;
- improvements in the contracting, order-taking and pricing procedures between breeding institutions, multiplication farms, and supply companies or traders, including the introduction of trade credit arrangements; and
- strengthened demand and price premiums for certified seed products.

#### **a) Organization of Seed Growers**

66. The Program will support the formation of a Seed Growers' Association (SGA) to represent the interests of producers. The association could include seed research and other seed breeding institutions, and trading enterprises in its membership but the core will be private seed producers. The purpose of the SGA will be:-

- to provide a united voice on seed issues and represent the industry to government and to international organizations. This might include representation on registration and inspection procedures to Government, contract growing arrangements to breeders and traders, or recognition of quality marks and certification procedures to international industry bodies; and
- to channel support for the producers, including market and technical information, business advisory and support services, or even bulk procurement and marketing initiatives. Members will require advanced farm management, business and marketing training as well as access to term and trade finance. These can be facilitated through the Association.

67. The SGA will be linked into the Chamber of Commerce network and much of its early support will come through associated support programs including the identification of seed suppliers and markets. Programs to improve market linkages and strengthen support services under the Strategy will assist in the development and effectiveness of the SGA.

**b) Commercial Contracting and Pricing Mechanisms**

68. The SGA will be instrumental in the development of the contracting and pricing arrangements between breeders, growers, and traders (perhaps also major crop producers) necessary to support a private dominated industry. It would participate in or even lead contractual negotiations. However, before assuming this role, some form of contract system must be established to support the early development of private growers prior to their coming together within the SGA. During this early period, growers will require assistance to organize and secure their position vis-à-vis seed breeders and traders. The Program will assist in this process either through links with other business organizations, such as the Chambers of Commerce or through technical assistance under the Program. Contractual arrangements will be supplemented by trade credit agreements, with contractors supporting input and working capital costs during the growing period through advances on final terms (with growers safeguarded against exploitation). The cost of these financing arrangements in real terms will be linked to the cost of borrowing through the commercial banks and other non-bank financing institutions (enhanced under the Access to Term Credit Program).

**c) Certified Seed Demand**

69. Ultimately the success of the commercial seed sector will depend on the expansion of regular demand from growers for good quality assured seeds for a range of crops and varieties. Given the lack of familiarity of producers with the use of certified (quality) seed, it may be necessary to both stimulate this demand and to provide evidence that the system of registration and certification is effective.

70. The Program will increase the dissemination of performance data relating to certified seed for crop producers to improve yields through quality seed and enhanced cultivation technologies. The benefits of quality seeds, and particularly those grown within Mongolia and marketed by local seed supply enterprises, will need to be reinforced amongst crop producers to encourage them to invest in new quality seed for at least a proportion of their annual requirements. Past experiences through the SSR and earlier programs that distributed substandard quality seed, low fertility, and high detritus have undermined the willingness of producers to procure new seed except under the most desperate circumstances. This perception will need to be reversed and their perception of new seed restored. This will take time and a real commitment for an extended technical support program. Besides the simple dissemination of information of such matters, the Program will demonstrate the benefits of certified seeds through farm trials and in training programs under the auspices of the Agricultural Support Services Program. These will be linked to the promotion of key higher value crops through the Commercialization of Horticulture and Extension of Fodder and Feed Markets Programs.

**C. Policy Development**

71. Apart from the general requirements to promote private investment concerning land tenure and water user rights that are being attended to under other programs, the seed industry specific policy amendments relate to market interventions. While the Government had the best of intentions in supporting the crop sector, the means by which this was carried out did not produce the desired result. In fact, some of the intervention strategies of the Government have actively worked against the development of an efficient private seed industry. Specifically, the SSR initiatives have acted as a disincentive for private investment and have contributed to the declining quality of seed material retained in the Scheme. Under the Program, Government policy will be reviewed so that it can take on a more supportive role for the private sector and adopt more appropriate roles of government - monitoring industry development and providing objective quality assurance against industry agreed (and hopefully) international seed standards. The policy review will determine mechanisms to

support the cropping sector with quality seed material and will recommend intervention mechanisms that will not interfere with seed markets but will provide the necessary safety net that is the role of Government, outlining when such mechanisms might be triggered.

#### **D. Institutional Capacity Building**

72. Institutional capacity building is needed at all stages of the industry from seed producers, seed merchants, seed breeders, seed laboratory staff and seed inspectors. The industry in Mongolia is still relatively underdeveloped and those associated with these functions require considerable capacity building both in technical areas as well as in the management of seed development programs. These have been highlighted through out the Seed Program and are referred to again in the cross sectoral capacity building program. In addition to the capabilities of individuals in the industry, there will be additional resources in the inspection services that will need dedicated training to bring them to a level where they can contribute to overall industry efficiency. The incremental resources will need to be financed from consolidated revenue as part of the recurrent expenses of the SSIA.

#### **E. Summary Cost Estimate of the Program**

73. A summary of indicative physical inputs is presented in Table 2 and the financial allocations in Table 3.



**Table 2: Seed Breeding and Varietal Development - Physical Inputs**

[illegible]

**Table 2: Seed Breeding and Varietal Development - Physical Inputs (Cont.)**

Activity	Year	Personnel	Materials	Equipment	Travel	Other	Total
<b>2. Review Seed Testing and Inspection</b>							
Certification of inspectors	course	3,480	-	-	4	-	8
Operationalize aimag procedures for plant seed inspection	year	3,480	-	1	1	1	8
<b>Subtotal Review Seed Testing and Inspection</b>							
<b>3. Rehabilitate Seed Testing Labs</b>							
Rehabilitate seed labs	set	174,000	-	-	-	-	1
Upgrade aimag facilities for seed analyses	set	34,800	-	-	4	-	4
Establish and institutionalize quality control in labs	year	5,800	-	-	-	1	6
<b>Subtotal Rehabilitate Seed Testing Labs</b>							
<b>4. Capacity Building of Staff</b>							
Initial lab staff training	course	2,320	-	1	-	-	1
Specialist training - international	course	23,200	-	-	-	-	1
Aimag training programs	course	2,320	-	-	1	1	5
Operationalize seed inspectors	year	11,600	-	-	1	1	7
<b>Subtotal Capacity Building of Staff</b>							
<b>Subtotal Seed Testing and Inspection</b>							
<b>D. Industry Organization and Trading Standards</b>							
<b>1. Support for Seed Grower Associations</b>							
Support for Association formation and operations	year	5,800	-	1	1	1	8
International association tour	visit	23,200	-	-	1	-	1
<b>Subtotal Support for Seed Grower Associations</b>							
<b>2. Commercial Contracts and Pricing Arrangements</b>							
Development of pricing structures and contracts	stud	23,200	-	-	1	-	1
Implementation of contract and revision	year	5,800	-	-	1	1	7
<b>Subtotal Commercial Contracts and Pricing Arrangements</b>							
<b>3. Demand for Certified Seed</b>							
Dissemination of performance data	year	5,800	-	1	1	1	4
<b>Subtotal Industry Organization and Trading Standards</b>							
<b>Total</b>							

<sup>1</sup>a Includes oilseeds, cereals and vegetables**\b \$50/ha over 2000 ha**

Table 3: Seed Breeding and Varietal Development - Summary Cost Estimates

Unit Cost (Tugrik '000)		Base Cost (Tugrik Million)										
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
I. Investment Costs												
A. Enabling Environment												
1. Plant Breeders' Rights												
TA to review plant breeder rights	pmnth	23,200	-	-	92.8	-	-	-	-	-	-	92.8
Facilitate entry to international organizations	year	11,600	-	-	-	-	11.6	-	-	-	-	11.6
Subtotal Plant Breeders' Rights			-	-	92.8	-	11.6	-	-	-	-	104.4
2. Reform to the SSR												
TA to review the operations of the SSR	pmnth	23,200	-	69.6	-	-	-	-	-	-	-	69.6
Upgrade storage facilities	unit	34,800	-	34.8	-	-	-	-	-	-	-	34.8
Develop an early warning mechanism to manage the release of seed	study	11,600	-	-	11.6	-	-	-	-	-	-	11.6
Operate the early warning system	year	5,800	-	-	5.8	5.8	5.8	5.8	5.8	5.8	5.8	46.4
Subtotal Reform to the SSR			-	104.4	17.4	5.8	5.8	5.8	5.8	5.8	5.8	162.4
3. Other Market Distortions												
More linked to policy level initiatives rather than investment	year	0.0	-	-	-	-	-	-	-	-	-	0.0
Subtotal Enabling Environment		0.0	104.4	17.4	98.6	5.8	17.4	5.8	5.8	5.8	5.8	266.8
B. Seed Breeding Capacity												
1. Strengthening of PSARTI												
Upgrading facilities	set	58,000	-	58.0	58.0	-	-	-	-	-	-	174.0
Develop international linkages	year	5,800	-	-	5.8	5.8	5.8	-	-	-	-	17.4
Staff development - international	course	11,600	-	23.2	-	-	23.2	-	-	-	-	46.4
Support for operations	year	23,200	23.2	23.2	23.2	23.2	-	-	-	-	-	116.0
Subtotal Strengthening of PSARTI			23.2	104.4	81.2	87.0	29.0	29.0	-	-	-	353.8
2. Plant Breeding and Variety Testing												
Breeding program support	year	11,600	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	116.0
On-farm variety testing program /a	year	2,320	13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.9	139.2
Subtotal Plant Breeding and Variety Testing			25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	255.2
3. Commercial Seed Multiplication												
Training in seed production and storage	course	2,320	9.3	9.3	9.3	9.3	-	-	-	-	-	46.4
Pilot new production and storage equipment	year	34,800	-	34.8	34.8	-	-	-	-	-	-	104.4
Credit support - interest subsidy /b	year	116,000	116.0	116.0	116.0	116.0	-	-	-	-	-	580.0
Subtotal Commercial Seed Multiplication			125.3	160.1	160.1	125.3	-	-	-	-	-	730.8
Subtotal Seed Breeding Capacity			174.0	290.0	266.8	272.6	179.8	54.5	25.5	25.5	25.5	1,339.8

## Volume II - Program Investments - Seed Breeding Program

Table 3: Seed Breeding and Varietal Development - Summary Cost Estimates (Cont.)

<b>C. Seed Testing and Inspection</b>												
<b>1. Develop Seed Standards</b>												
Revision of standards												
Development of enforcement plan												
study	11,600	-	11.6	-	-	-	-	-	-	-	-	11.6
study	11,600	-	-	11.6	-	-	-	-	-	-	-	11.6
Subtotal Develop Seed Standards												23.2
<b>2. Review Seed Testing and Inspection</b>												
Certification of inspectors												
Operationalize aimag procedures for plant seed inspection												
course	3,480	-	-	13.9	-	-	-	13.9	-	-	-	27.8
year	3,480	-	-	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	27.8
Subtotal Review Seed Testing and Inspection												55.7
<b>3. Rehabilitate Seed Testing Labs</b>												
Rehabilitate seed labs												
set	174,000	-	-	174.0	-	-	-	-	-	-	-	174.0
set	34,800	-	-	-	-	-	139.2	-	-	-	-	139.2
year	5,800	-	-	-	-	5.8	5.8	5.8	5.8	5.8	5.8	34.8
Subtotal Rehabilitate Seed Testing Labs												348.0
<b>4. Capacity Building of Staff</b>												
Initial lab staff training												
course	2,320	-	2.3	-	-	-	-	-	-	-	-	2.3
course	23,200	-	-	-	23.2	-	-	-	-	-	-	23.2
course	2,320	-	-	-	2.3	2.3	2.3	2.3	2.3	-	-	11.6
year	11,600	-	-	-	11.6	11.6	11.6	11.6	11.6	11.6	11.6	81.2
Subtotal Capacity Building of Staff												118.3
<b>D. Industry Organization and Trading Standards</b>												
<b>1. Support for Seed Grower Associations</b>												
Support for Association formation and operations												
year	5,800	-	-	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	46.4
visit	23,200	-	-	-	-	23.2	-	-	-	-	-	23.2
Subtotal Support for Seed Grower Associations												69.6
<b>2. Commercial Contracts and Pricing Arrangements</b>												
Development of pricing structures and contracts												
stud	23,200	-	-	-	23.2	-	-	-	-	-	-	23.2
year	5,800	-	-	-	5.8	5.8	5.8	5.8	5.8	5.8	5.8	40.6
Subtotal Commercial Contracts and Pricing Arrangements												63.8
<b>3. Demand for Certified Seed</b>												
Dissemination of performance data												
year	5,800	-	-	5.8	5.8	5.8	5.8	-	-	-	-	23.2
Subtotal Industry Organization and Trading Standards												156.6
Total												2,308.4
	174.0	408.3	484.9	466.3	249.4	251.7	66.1	80.0	63.8	63.8		

<sup>a</sup> Includes oilseeds, cereals and vegetables

<sup>b</sup> \$50/ha over 2000 ha

## **F. Indicative Implementation Arrangements**

74. The main thrust of this Program is the establishment of a viable private sector seeds sector. This is fundamentally, therefore, a question of private sector investment in seed production and marketing, and in the organization, by the private sector, of various industry support structures. However, Government does have a role in establishing the legislative and regulatory framework for private sector activity, implementation of which requires suitably strengthened testing, registration and inspection institutions. Government also, at least in the initial period, will continue to be responsible for the bulk of plant research and seed development activity, including seed breeding and preliminary expansion to foundation or super elite seed. These activities require some initial one-off investments in policy and legislative reform, institutional restructuring and rehabilitation, staff training, and contact with international centers and seed industry regulation, but for the most part what is required, after improvement, is adequate mainstream budgetary funding over the medium to longer term either of direct government services or of services contracted from the private sector. This does not include procurement, storage or distribution of seeds as in the past (except insofar as any new strategic reserve carries a limited physical seed stock).

75. Program implementation crosses the responsibilities of a number of state agencies, as well as the private sector. As such, it is proposed that supervision should be through a Program Steering Committee, combining representatives of the Crop Development Division of the Policy Implementation Department of MoFA, SSIA, SCSL, PSARTI, the National Emergency Management Agency (NEMA) and, when established, the SGA with members from MoFA, SSIA, and SGA as an Executive Committee. The Program will provide a schedule of reforms and a timetable for their completion and link this with technical assistance and capital inputs as appropriate. However, implementation itself (except for the private sector) will be conducted within the mainstream activities of the various institutions themselves, predominantly through the use of their allocations under the state budget.

### **1. Budgetary and Contract Services**

76. While there may be some technical assistance, one-off activities in legislative reform and in reform of management of strategic or emergency reserves, and in the system of food aid should be handled within the regular budgetary activities of MoFA and NEMA. Similarly, the strengthening of PSARTI, other plant breeding institutes, and variety testing facilities, will be implemented by those organizations themselves within the context of Program scheduling and supervision under MoFA. Seed multiplication, essentially a private activity, will be implemented either through contractual arrangements, initially with PSARTI and other seed breeders, or through extension, business, and financing support as any other agricultural enterprise. Stimulation of the private sector to meet this business challenge will be a major Program objective and, even in the face of slow private sector interest (which is not in fact what is anticipated) the public sector will not pre-empt the private sector by direct seed production in its place.

77. Technical assistance may well also be appropriate for the reform and strengthening of the seed testing and inspection system, but the main emphasis for implementation will be on SSIA and the aimag and soum outreach of inspection, and SCSL and the aimag laboratories. Again, the Program overview, providing the agreed content and scheduling of reforms, will be supervised through the Program Steering Committee.

78. Formation of the SGA and the development of appropriate contractual relationships will be done with technical assistance support but by the private sector, probably with organizational assistance from the Chambers of Commerce. Stimulation of demand for

seeds will mainly fall under the extension and crop promotion activities to be strengthened through the Agricultural Support Service Program.

## **2. Capital Expenditure**

79. Capital expenditure under the Program is relatively limited. Support for PSARTI and other research institutes will include elements of equipment and some physical rehabilitation, as will the strengthening of capacity at SCSL and the aimag laboratories. Where possible this should be organized through the state budget and MTBF, except where donors show an interest. Alternatively, this might be funded through the ADF or other funds financed indirectly through aid in kind, ironic given that for a successful seeds sector such donor interventions should be curtailed. Donors could also fund such investment directly through a project, perhaps organized as an adjunct to the provision of technical assistance to the seed sector, or specifically for improvement of PSARTI or SCSL.

80. This analysis of capital expenditure under the Program does not cover the significant investment that will have to be made by private producers and enterprises to establish successful seed farms. This could, and in many instances should, include expenditure on irrigation facilities. Under the Strategy, support for such investment could come through improved access to credit stimulated by the Access to Term Credit Program, backed by enhanced business advisory services under the Agricultural Support Services Program, and developments promoted under the Irrigation Rehabilitation and Construction Program. Fiscal incentives and interest offset arrangements may be introduced for a period, subject to broader policy considerations, to stimulate investment in seed production in the short to medium term.

## **3. Technical Assistance**

81. Technical assistance takes several forms under the Program. It could be provided under a single donor project or several well coordinated ones, or could be financed out of the budget, perhaps linked to budgetary assistance.

There are four main areas of technical assistance:

- legislative and policy reform - including patent/intellectual rights legislation, reform of the strategic reserves system, support for SGA establishment and strengthening, and consideration of fiscal incentives and interest offset allowances;
- plant breeding and variety testing systems development - including structural reform and institutional rehabilitation and investment of PSARTI, other breeding institutes, and variety testing establishments, as well as professional development through training on methodologies and multinational links for information exchange and standards development;
- standards and inspection development - including establishment of standards and registration systems, structural reform and investment in the inspection chain from SSIA through aimags to the soums and the testing regimes of SCSL and aimag laboratories, as well as professional development through training and links with international seed standards agencies;
- crop extension and seed farm business advisory support - involving specific inclusion of seeds production within the specialist high value cropping activities to be promoted, and the use of quality seeds in other priority crop areas (horticulture etc.), under TA support provided through the Agricultural Support Services Program.

82. Each of these areas could be supported as a separate activity, with coordination through the Program Steering Committee.

## G. Program Framework Matrix

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<b>Goal</b> To sustainably raise the profitability of crop production through improvements in seed supply and quality.			
<b>Purpose</b> To develop a commercial seed industry able to provide producers with adequate and reliable high quality seed for field crops, potatoes, and vegetables, that can respond to changing market and environmental conditions over time.	Availability of competitively priced high quality seeds sufficient to meet demand of horticulture, feed and grain producers over the medium to longer term, and in varieties to compete with imports and in key target export markets.	Surveys and market inspection reports on the volume and varieties of high quality seeds available through domestic market channels.  Yields achieved by crop producers.	Continued commitment to a market led private sector agriculture sector.  Continued macro-economic and political stability and broad consensus on medium term sector policy objectives and mechanisms.
<b>Outputs</b> 1. Creation of an enabling environment for the commercial seed industry.  2. Capacity in seed breeding and multiplication expanded and strengthened.  3. Seed standards developed. Capacity for seed testing and	<ul style="list-style-type: none"> <li>establishment of plant breeders rights;</li> <li>reform of the operations of the SSR (SSR);</li> <li>reform of other distortions in the seed sector.</li> </ul> <ul style="list-style-type: none"> <li>PSARTI strengthened;</li> <li>plant breeding and variety testing capacity expanded;</li> <li>commercial multiplier farms strengthened.</li> </ul> <ul style="list-style-type: none"> <li>seed standards developed;</li> <li>seed testing and</li> </ul>	Legislation on breeders' rights and other legislative amendments.  Government decrees on reform of operations and objectives of the SSR.  Reform of charter, structure, staffing etc. of PSARTI.  Increased budget reflected in MTBF.  Commercial contract growing by private seed breeding and multiplication farms.  Formal definition of seeds standards.	Commitment to a market led private sector agriculture sector.  Shift to horticulture and feed from grain.  Support from donor community for non-interventionist, non-distortionary grant aid mechanisms.  Strong seeds demand generated by growth in demand for horticulture and feed crops.  Inadequate private sector seed breeding capacity to meet demand.  Cooperation between MoFA and SSIA continues.

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inspection expanded and strengthened.	<ul style="list-style-type: none"> <li>inspection systems reformed;</li> <li>seed testing laboratories upgraded;</li> <li>professional development systems enhanced.</li> </ul>	<p>Procedures and protocols for testing and inspection.</p> <p>Increased budget reflected in MTBF.</p> <p>Training and career development schemes introduced.</p>	
4. Seed industry organizations and operating systems developed	<ul style="list-style-type: none"> <li>seed growers' association (SGA) established;</li> <li>contracting and pricing systems developed.</li> </ul>	<p>SGA charter and memorandum, plus members' register.</p> <p>Procedures and criteria for contract growing and supply including rules for price determination.</p>	<p>Government involvement in seed production and marketing restricted to breeding and regulatory functions of testing, registration and certification.</p>
<b>Activities</b> 1.1 Establish plant breeder rights.  1.2 Reform of the SSR.	<ul style="list-style-type: none"> <li>incentives for private plant breeders and research institutes to develop new varieties strengthened through the establishment of a simple form of plant variety rights;</li> <li>timetable for membership in International Convention on Plant Variety Rights (UPOV) established.</li> <li>distortionary activities of the SSR (provision of commercial seed, credit, debt forgiveness, non-market pricing mechanisms) eliminated;</li> <li>reform decision on the form and level of seed reserve, notably the balance of financial and physical reserves;</li> <li>storage, cleaning and grading capacity upgraded;</li> <li>early warning system for emergency seed requirements and procedures for procurement developed;</li> <li>market based dispersal and pricing mechanisms</li> </ul>	<p>legislation and supporting regulations of plant breeders' rights.</p> <p>Membership of UPOV etc.</p> <p>SSR reports on levels and prices of seed traded (bought and sold), and volumes stored (and how sourced);</p> <p>review of State Reserve procedures and mechanisms;</p> <p>Decree of SSR (and State Reserve) financing and procedural reform.</p>	<p>plant variety rights are a sufficient incentive (perhaps supported by fiscal cash inducements) to stimulate research into new varieties for Mongolia.</p> <p>Government commitment to market led private sector agriculture is recognized as appropriate mechanism to meet food and other security objectives;</p> <p>Government response to emergency food shortages moves to establishment of a cost efficient market based mechanism, to effectively meet risk assessed specific emergency supply requirements rather</p>



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1.3 Reform of other market distortions.	<ul style="list-style-type: none"> <li>developed; international linkages strengthened.</li> <li>reform of ADF buying and selling activities in the commercial wheat market and removal of price distortions;</li> <li>reform of food aid management to avoid harvest season and activate appropriate non-distortionary trigger mechanisms based on inventory thresholds;</li> <li>rationalization of commodity aid to reflect a response to emergency deficiencies in the commercial market, and switch donor support from physical commodity aid to financial support;</li> <li>adoption of revised, non-distortionary approaches to the distribution of potato and vegetable seeds to poor families under Green Revolution and other Govt Programs and donor projects, supporting Mongolian commercial seed producers.</li> </ul>	<p>ADF/Wheat Fund reports;</p> <p>independent assessment of impact of ADF operations on seed and input supply subsectors;</p> <p>policy statement on support for private sector market systems with amendments to procedures for Green Revolution and other programs and donor projects involved in seeds and other input provision;</p> <p>amended donor agreements.</p>	<p>than broad brush attempted manipulation of food self-sufficiency.</p> <p>Government can (and is prepared to) convince donors to adopt a more developmental approach and replace commodity aid with cash grants or concessional loans.</p>
2.1 Institutional strengthening at PSARTI.	<ul style="list-style-type: none"> <li>rationalization of PSARTI operations based on EC-TACIS ICLP recommendations, including transfer of Dornod branch to Sumber soum and seed production of Uvs SS from Baruunturuun to irrigated site at Ulaangom;</li> <li>completion in short term of upgrading of PSARTI facilities (following EC-TACIS support under ICLP);</li> <li>professional development program to upgrade and update knowledge of researchers and</li> </ul>	<p>PSART reports;</p> <p>restructuring of PSARTI in line with EC-TACIS recommendations, reflected in budget and management plans;</p> <p>audit of physical upgrading of PSARTI facilities;</p> <p>training and career development programs for PSARTI staff on latest best practice and research methodologies;</p>	<p>PSARTI remains under cohesive management free, but accountable, to develop market competitive alternative revenue streams and compete for public funding, to support medium and longer term research alongside results based adaptive research, with minimal technical interference from MoFA;</p> <p>implementation of the closely linked</p>

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	<p>technicians and their research methodologies;</p> <ul style="list-style-type: none"> <li>links with international organizations and conventions in seed testing, certification, and variety rights strengthened, including ISTA, OECD, UPOV, CGIAR, etc..</li> </ul>	<p>membership of international organizations, with direct interface established.</p>	<p>Research and Agricultural Support Programs is successful;</p> <p>sufficient demand is generated under the Commercialization of Horticulture and Expansion of Fodder and Feed Markets Programs.</p>
2.2 Rehabilitation and strengthening of plant breeding and variety testing systems.	<ul style="list-style-type: none"> <li>increased funding under MoFA direction of long term plant breeding programs at PSARTI and other research organizations;</li> <li>restoration of variety testing activities, under MoFA direction, in partnership with qualified private sector seed growers;</li> <li>private sector participation in the selection of varieties for registration.</li> </ul>	<p>budget and MTBF allocations;</p> <p>PSARTI reports on variety testing etc.;</p> <p>establishment of forum for private participation in registration of varieties.</p>	<p>involves links with, and, therefore, requires successful implementation of, the Research and Agricultural Support Services Programs.</p>
2.3 Strengthening of commercial farms for seed multiplication.	<ul style="list-style-type: none"> <li>business orientated training and demonstration programs to strengthen production, financial, marketing and business management;</li> <li>improved irrigation infrastructure and access to production, storage, cleaning, and grading equipment;</li> <li>improved access to commercial credit for working capital and investment.</li> </ul>	<p>reports on training and demonstration programs;</p> <p>survey of increase in numbers and improvement in profitability of private seed breeding and multiplication farms;</p> <p>credit agency reports on size and purpose of loans, and repayment records.</p>	<p>successful implementation of key elements of the Agricultural Support Services, Irrigation Rehabilitation and Construction, and Access to Term Credit Programs;</p> <p>demand generated under the Commercialization of Horticulture and Expansion of Fodder and Feed Markets Programs.</p>
3.1 Development of an effective seeds standards system.	<ul style="list-style-type: none"> <li>staged development of breeder and certified seed standards for cereals, oilseeds, forage crops, potatoes, vegetables, and specialty crops;</li> <li>simplified seed registration system.</li> </ul>	<p>agreed timetable for development of standards;</p> <p>decree establishing system/procedures for registration and certification;</p> <p>regulations defining</p>	<p>sufficient sustainable demand generated by the Commercialization of Horticulture and Expansion of Fodder and Feed Markets Programs</p>

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3.2 Reform of seed testing and inspection institutions.	<ul style="list-style-type: none"> <li>• system for certification of seed inspectors, including under contract, established;</li> <li>• improved links between SSIA supervision of seed testing and inspection and implementation by aimags;</li> <li>• enhanced staffing and state budgetary funding for inspectorate at both SSIA and aimag level;</li> <li>• enhanced capacity at soum level to manage, implement, and monitor seed and field inspection.</li> </ul>	<p>standards;</p> <p>register of tested and certified seeds.</p> <p>decree establishing system supported by regulations on certification and inspection procedures;</p> <p>procedural arrangements for SSIA and aimag links;</p> <p>budget and MTBF allocations;</p> <p>aimag and soum authority reports;</p> <p>increased quality certified seed available in rural markets.</p>	<p>coordination between MoFA, PSARTI, and SSIA plus aimag and soum level authorities.</p>
3.3 Upgrading of seed testing laboratories.	<ul style="list-style-type: none"> <li>• State Central Seed Laboratory upgraded (equipment, methodologies, and quality control to meet certification, plant health, seed breeding, and crop agronomy requirements;</li> <li>• SCSL membership of international authorities;</li> <li>• limited network of key aimag laboratories identified and upgraded to meet regular domestic requirements.</li> </ul>	<p>SCSL reports and site visits;</p> <p>site visits to aimag laboratories;</p> <p>SCSL membership of international organizations;</p> <p>survey to verify increased reliability of testing procedures.</p>	<p>suitable sources of funding identified for non-recurrent expenditures.</p>
3.4 Enhancement of professional standards.	<ul style="list-style-type: none"> <li>• training programs developed and trainers trained for professional upgrading of seed testing staff at SCSL and aimag laboratories and certified seed inspectors;</li> <li>• training completed and participants tested.</li> </ul>	<p>SCSL, aimag reports;</p> <p>test results;</p> <p>quality of SCSL, aimag laboratory work, evaluated periodically through peer review.</p>	<p>willingness of professional staff to participate in upgrading programs.</p>
4.1 Organization of seed growers into effective support and	<ul style="list-style-type: none"> <li>• Seed Growers' Association (SGA) established;</li> </ul>	<p>SGA charter and memorandum;</p>	<p>sufficient numbers of private growers involved in</p>

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representative body.	<ul style="list-style-type: none"> <li>structures established within SGA for market information gathering and exchange, technical information dissemination, and representation to Government and international organizations.</li> </ul>	SGA reports and information dissemination records.	production of seed for the market;  willingness to come together into SGA.
4.2 Enhancement of commercial contracting and price setting mechanisms.	<ul style="list-style-type: none"> <li>efficient systems for contract arrangements between seed breeders and commercial multiplication farms established, covering super-elite, elite, registered, and certified seed.</li> </ul>	procedures and criteria for contract growing and supply including rules for price determination;	successful disengagement by Government from seed supply activities.
4.3 Strengthened demand for quality assured certified seeds.	<ul style="list-style-type: none"> <li>dissemination of comparative performance information on different classifications of seeds;</li> <li>use of certified seeds in farm trials and training programs;</li> <li>demand for products based on specific seed inputs;</li> <li>credit arrangements linked to use of certified seed inputs.</li> </ul>	trials and training programs;  seed price premiums in markets;  certified seed sales;  credit agreement specifications.	successful establishment of regular quality assured seed supplies;  enhancement of extension and credit services under the Agricultural Support Services and Access to Term Credit Programs.

# **AGRICULTURE SECTOR STRATEGY STUDY**

## **VOLUME 2**

### **SUPPORT SERVICES AND RESEARCH PROGRAMS**

**30 NOVEMBER, 2006**

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## ACRONYMS

ADB	-	Asian Development Bank
ADF	-	Agriculture development Fund
ADRA	-	Adventist Development Relief Agency
AEC	-	Agricultural Extension Center
AHRI	-	Animal Husbandry Research Institute
AI	-	Artificial Insemination
ASDP	-	Agricultural Sector Development Project
CIDA	-	Canadian International Development Assistance
DANIDA	-	Danish International Development Agency
EGPRS	-	Economic Growth and Poverty Reduction Strategy
EU	-	European Union
FAO	-	Food and Agricultural Organization (of the United Nations)
GAP	-	Government Action Plan
GDP	-	Gross Domestic Product
GTZ	-	German Bi-lateral Aid Agency
HACCP	-	Hazard Analysis Critical Control Point
ICLP	-	Integrated Crop and Livestock Project
IMED	-	Information Monitoring and Evaluation Department
ISO	-	International Standards Organization
JCS	-	Jesuit Christian Services
JICA	-	Japan International Cooperation Agency
KOICA	-	Korean International Cooperation Agency
M&E	-	Monitoring and Evaluation
MDG	-	Millennium Development Goal
MIT	-	Ministry of Industry and Trade
MNB	-	Mineral Nutrient Blocks
MNE	-	Ministry of Nature and Environment
MoFA	-	Ministry of Food and Agriculture
MSUA	-	Mongolian State University for Agriculture
MTBF	-	Medium Term Budgetary Framework
NAEC	-	National Agricultural Extension
NAMAC	-	National Association of Mongolian Agricultural Cooperatives
NEMA	-	National Emergencies Management Agency
NGO	-	Non government organization
NPA	-	National Plan of Action
OIE	-	Office Internationale Epizootique
PPP	-	Public Private Partnerships
PSARTI	-	Plant Seed Agriculture Research and Training Institute
SCSL	-	State Central Seed Laboratory
SCVL	-	State Central Veterinary Laboratory
SDC	-	Swiss Development Cooperation Agency
SEFF	-	State Emergency Fodder Fund
SPIA	-	State Professional Inspection Agency
SSR	-	State Seed Reserve
TACIS	-	Technical Assistance for the Commonwealth Independent States
UNDP	-	United Nations Development Program
UPOV	-	International Convention on Plant Variety Rights
USAID	-	United States Agency for International Development
WTO	-	World Trade Organization
WUG	-	Water User Group

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## AGRICULTURE SUPPORT SERVICES AND RESEARCH PROGRAMS

Given the strong linkages between agricultural support services, technical extension services and research, the research program is incorporated in this description under the one investment program while they are presented separately in Volume 1 of the Strategy.

### I. GENERAL BACKGROUND

1. Mongolian agriculture is characterized by low productivity that stems from its use of outdated and inefficient production, storage and processing technologies, low quality inputs, limited management skills needed to operate in an open market economy, and is based on production systems developed during the socialist period. Agricultural produce generated under these conditions no longer meet today's consumer needs. As a consequence, producers suffer from low returns and there are limited incentives for investment. In the socialist period, production targets were the primary objectives of state run enterprises with little attention being paid to product quality. Production inputs were arranged by the state - fuel, seed, fertilizer, chemicals etc., as were the marketing outlets for the disposal of state-farm produce with marketing also undertaken by state enterprises. With the collapse of the centralized economy, input supply and marketing functions failed along with the cessation of financial support arranged by the Government. This left significant voids in the operations of the agricultural sector in particular the input supply functions and marketing chains.
2. The Government has attempted to fill these voids by maintaining supplies of production inputs. In the early 1990s, fuel coupons were in operation as the Government controlled fuel supplies. The Government has also met the shortfall in seed requirements for the crop sector in view of the private sector's slow response to take up what were formally state functions. The state has participated in a range of input supply initiatives in recent years that have been a deterrent to a strong and independent private sector. Whilst the Government has clear understanding of the role of the private sector, it has responded in situations where the pace of private development has been slow. Government programs have attempted to fill certain voids created by the demise of state enterprises.
3. With the privatization of state farms and their resident technical specialists, access to the technical support services was severed. The Government has attempted to provide technical services to rural producers but limited resources have resulted in the relocation of former specialists, sometimes becoming producers in their own right but others, outside agriculture. There have been a number of attempts to develop a "user pays" system for agricultural extension that have failed as producers have neither the capacity nor willingness to pay for technical advisory services. Furthermore, there remains a long held belief that the Government will provide such services free of charge as a public service. While such a mentality persists amongst rural communities, it is unlikely that an effective technical service will operate.
4. Similarly, the sudden reduction in the research budget has contributed to steady declines in productivity relative to the rest of the world. A program of adaptive research (trials) associated with technology transfer is required for Mongolian agricultural productivity to regain former productivity levels, particularly in the areas of dairy genetics and nutrition, wheat and cereal crop productivity, extensive livestock/pasture management and intensive livestock production. The main research institutes and agricultural university have very limited resources to conduct research programs and certainly cannot entertain the prospect of conducting research that might extend over a number of years because of funding uncertainty. Investment in agricultural research and extension has been proven, in other countries and on a global basis, to generate sound returns. A recent study of the Consultative Group on International Agricultural Research (CGIAR) showed a benefit to cost

ratio of 9:1 on investment into research amounting to \$7.12 billion, and a ratio and 17.3:1 when program results were extrapolated out to 2011<sup>1</sup>. Studies of various programs undertaken in the USA between 1949 and 1987 show rates of return of 30-60% overall and 28-49% on programs where research and extension were combined<sup>2</sup>. Research and extension result in: (i) lower costs per unit of production, increased supplies and lower costs to consumers; (ii) improved productivity, international competitiveness and expanded markets opportunities; (iii) multiplier effects extending to jobs and incomes in the non-farm sector leading to tax revenues; (iv) improvements in food quality, safety and nutrition; (v) technical and institutional innovations for environmental quality (e.g. minimum tillage, integrated pest management); and, (vi) a synergy between research, extension and teaching that leads to a more competent and innovative body of government personnel, researchers and producers<sup>3</sup>.

## II. ISSUES

5. The livestock and crop sector analyses should be read in conjunction with the issues outlined herein. The weak performance of the crop and livestock sub-sectors reflects the limited access to quality input supplies, to the lack of technical advisory services, to inaccessible and inappropriate credit all of which have been complicated by limited research to improve the productivity of agriculture.

### A. Constraints

6. The main constraints identified in many of the programs outlined in the Strategy include the lack of sound management expertise and of technical production skills by producers in an open market situation. This is made worse by the relative inexperience of producers and herders alike. The age structure of herders is such that more than 50% of the herders are less than 35 years of age and many are relatively inexperienced, coming into the industry after other employment opportunities became closed. Similarly, for crop producers, many are little more than opportunist producers who have limited resources and lack production expertise. It is little wonder that productivity levels are low given this relatively limited knowledge of agricultural production systems under the difficult conditions found in Mongolia. Given this situation, there is a clear need for an effective extension service that can support the producers in their quest for greater productivity. However, while the Government has limited resources to fund such activities, it must look to alternative means of providing the technical support to the agricultural sector.

7. The sector has been denied significant research due to the budgetary constraints with consequent impact on agricultural productivity. Applied research is needed to adapt production technologies to the changing conditions in Mongolia, to identify better adapted seed material, to find varieties more resistant to drought and crop diseases for example. Without an ongoing research program, productivity levels will be constrained by the genetic content of the animals and plants, as will their adaption to local conditions. The main constraint in the area of research is the funds to undertake research projects, not the institutional framework to implement research as this still exists through the various education and agricultural institutions.

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<sup>1</sup> David A. Raitzer, 2003. Benefit-Cost Meta-Analysis of Investment in the International Agricultural Research Centres of the CGIAR. Report prepared on behalf of the CGIAR Standing Panel on Impact Assessment, Scientific Council Secretariat, FAO, September 2003, p. xv.

<sup>2</sup> George W. Norton, "Benefits of U.S. Agricultural Research" Department of Agricultural Economics, Virginia Polytechnic Institute and State University, Blacksburg, VA.

<sup>3</sup> Ibid

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8. Two other key constraints are the availability of credit and input supplies. Well intentioned efforts by the Government to supply production inputs have worked against the development of private input supply businesses. This has also been confounded by the limited capacity of the newly privatized producers to pay for production inputs and as a result, there has been relatively weak demand for inputs given the poor returns to farming.

9. With limited capital resources available when privatization took place, few producers were in a position to replace machinery, to prepare their land to ensure a good crop, or to buy the necessary inputs to production. Credit is an important aspect to agricultural productivity that could have substituted for the limited capital resources but it is both too expensive and with inappropriate repayment arrangements (capital purchases must be fully repaid within the year in which items were purchased). Without access to affordable and appropriate credit, there has been limited demand for production inputs as most producers make the best of what they have or can borrow from other producers in the area.

10. The commercial environment in the agricultural support service industry provides few incentives to attract private investment. With the Government assuming a major role in the supply of certain inputs, it is difficult for the private sector to compete when prices offered by the main supplier are subsidized. In order to attract new investors into this important aspect of agriculture, the Government needs to understand the full impact of its interventions on the private sector. These issues are summarized below.

11. Finally, the industry is constrained by lack of reliable market information. Without adequate descriptions of quality and prices that reflect the demand for such quality, producers are not sufficiently aware of the benefit to be gained from producing better quality produce. While there have been attempts to establish a market and price reporting system that has been run outside the Ministry, this has been somewhat localized and does not report on all commodities. There is a need to establish a price and market reporting service that is readily accessed. This is difficult under Mongolian conditions where communications are limited by the weak rural infrastructure. Whilst media coverage is extensive, the development of the electronic media may provide additional opportunities to establish a web based facility to pass valuable market information to producers to ensure they are not disadvantaged when selling their produce in remote locations - particularly for those who might make the effort to improve the quality of their produce based on market preferences.

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Level	Current Situation	Desired Situation and Change Required	Role of		
			Government	Private Sector	Projects
<b>System Level</b>	Role of government and private sector remain unclear in research and extension.	Collaborative systems and public-private partnerships for adaptive research and training well established and roles clearly defined.	MoFA: Overall coordination of programs. MSUA: Lead role in adaptive research, curriculum development. Ministry of Education: Support middle-school curriculum and access to information networks. Aimag and <i>soum</i> governments: Operation of regional extension centers and outreach to <i>soums</i> .	Demonstration farms and herders. Private training delivery by extension consultants. Training and support deliver by agri-business to their clients. Industry cost-shares for research and training.	
	Memberships and linkages to international organizations not established.	Mongolian research and inspection organizations meet international standards and are active in related international organizations.	Provision of budgets required for membership and related requirements.		Facilitate linkage development. Support capacity building to meet membership standards.
	Inadequate budgetary support to carry out adaptive research and technical training.	Adequate resources for research and training have been found through public-private-project partnerships.	Establish long-term budgets for adaptive research and training.	Agri-business, associations and individual demonstration sites cost-share research.	Project support to demonstration activities and training, especially for the poor.
	Inadequate amount of information sharing between government, institutions, private and projects.	Readily accessible information system provides research, training and development results and upcoming events.	Provision of resources to ensure sustainability of the site at the MoFA.	Provision of information through producer focus groups for cost of production; information from agricultural business. Payment of fees for specialized information.	Project support to web site development, design, training.

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Level	Current Situation	Desired Situation and Change Required	Role of Government	Role of Private Sector	Role of Projects
<b>Institutional Level</b>	Research organizations require upgrading on methodology and equipment.	Research organizations have reformed methodologies, membership/subscriptions to international groups and journals and new labs and equipment for research and teaching.	Provision of funding to research and educational institutions.		Capacity building programs for facilities, standards, management, trace-back programs.
	Curricula require updating.	New curricula with greater emphasis on results based research.	Led by research and training organizations with support from Ministry of Education.		
	Producer and industry associations not well developed for their role in a market economy, often operating as private consulting firms.	Producer and industry organizations operate as mature and democratic representatives of their members and take on lobbying, agricultural policy development, marketing development and service functions.	Include industry associations in decision-making and planning.	Join and support representative organizations through active membership and leadership and payment of member fees.	Study tours to see best practice internationally and training in Mongolia.
<b>Individual Level</b>	Extension agents, formal and non-formal, require new teaching methods, extension methodologies and updated technical skills. No formally trained extension professionals.	Skilled and competent extension agents able to deliver adult education training and technical support through various programs targeting different industry and social groups.	Policy and program support for extension evidenced in budgets for various Ministries and organizations involved in service delivery and support, such as MoFA/NAEC, MSUA, MFC, NAMAC and others.		Capacity building for adaptive research and extension. Training in adult-learning methods and related skills.
	Rural people require retraining for agriculture production, processing and marketing in a market economy	Rural people have technical and managerial skills needed to run profitable and environmentally sustainable agricultural enterprises in a market economy.	Provision of funding for long-term programs.	Training and services to association members, commercial enterprises and clients.	Financial support of programs targeted at the poor and the vulnerable.

## **B. Opportunities**

12. With productivity levels in agriculture being low, there is the potential for significant gains with relatively small inputs of input supplies, extension services and also research. Opportunities exist for improving input supplies as independent commercial enterprises, particularly as productivity levels increase and profitability returns to those enterprises in which Mongolia has a comparative advantage. Producer willingness and capacity to pay for increased inputs into the production process will improve as sector profitability increases.

13. Similarly, there are many opportunities to increase overall productivity from adaptive research initiatives. The returns to research have been demonstrated to be significant in other countries and the adaptation of research finding elsewhere to local circumstances will offer significant changes in productivity. The institutional structures are already established with competent staff to conduct applied research programs. With relatively small incremental resources, the opportunity for having a significant impact on overall sector profitability is high.

14. The dissemination of research findings and of technical information throughout the rural community is a challenge in such a diverse climatic area and with geographically dispersed population. However, with the advent of modern technology, electronic information systems may be an alternative that is significantly cheaper than attempting to maintain a rigorous structure of extension centers throughout rural areas. Furthermore, there are opportunities to involve the private sector in a role of technical support services, particularly where downstream processing of produce is necessary. There are opportunities for those performing input supply, credit delivery and marketing functions, with further capacity building, to simultaneously provide technical support for Mongolia's producers.

## **III. GOVERNMENT'S POLICY FOR THE DEVELOPMENT OF THE SECTOR/INDUSTRY**

### **A. Rationale for Public Involvement**

15. Mongolia's economy remains heavily dependent upon agriculture for employment, livelihoods, export earnings and as a generator of raw materials for its agro-processing industries. The status of the agricultural sector is closely linked with the overall health of the economy. The Government has played an active supporting role in the sector as it has struggled with the transition from a state dominated economy to one where it responds to market forces, where preferences are expressed through the price mechanism and the influences of supply and demand. In view of the limited financial resources of the private sector and the limitations created by a developing financial sector, the Government has maintained a role in the supply of critical agricultural inputs, particularly in those areas where it sought self sufficiency in the end product. With a steadily developing private sector, these functions are progressively being undertaken by private enterprise - such areas as input supplies, seed production, chemical and fertilizer distribution and machinery supply and maintenance services. The rationale for continued government involvement in these areas has diminished considerably in recent years.

16. However, there are certain support services where the Government has a vested interest in maintaining some initiatives based on the assessment that the private sector will not be interested in providing such services (as they do not generate a cash profit). These are therefore public responsibilities that are needed within the sector but are not likely to be taken up by the private sector. They include education, research and possibly extension services in support of agricultural development.

17. Investment into agricultural research is typically provides longer term benefits and has relevance for a broader section of the agricultural community. Depending on the nature of the research, programs can involve considerable financial resources and as such are commonly accepted as public responsibilities.

18. Agricultural education, like most basic education services are still considered the responsibility of the Government. While private education institutions exist in Mongolia for basic education, the foremost agricultural institutions operate under the public funding arrangements.

19. Agricultural extension services have traditionally been provided free of charge by the Government but with their dwindling resources, areas of agricultural support have been rationalized and extension services have suffered as a result. There have been several attempts at establishing a self funding extension service but results have not been sustained for a number of reasons. While the Government recognizes the value from maintaining a technical extension service, it is looking to alternative ways of maintaining such services through private - public partnerships whereby those providing other services can assume an increased role in providing technical advisory services. The Government appreciates that it will not be possible in all situations to deliver such services and for that reason is investigating alternate means of maintaining technical support services to aimag and then ultimately to soum level through the use of web based electronic interactive programs.

## **B. Recent Development Initiatives**

### **1. Government Initiatives**

20. The main government initiative in the development of input supplies have been the direct interventions in seed supply, credit supply and animal health treatments under the animal health programs - the disease prevention program, the FMD vaccination program and the veterinary services program. The latter are discussed at greater length in the animal health program of the strategy. As mentioned in the background, these have acted as a deterrent to the development of private services to take on the functions of input supply.

21. In the case of the extension services, the Government has established the National Agricultural Extension Center (NAEC) that has been funded almost entirely from donor programs other than for staff salaries. It has tried to provide technical support for aimag based specialists in the departments of agricultures but has little by way of personnel resources. Most extension initiatives by the national center have been donor funded.

### **2. Research Institutions**

#### **Mongolian State University of Agriculture**

22. Mongolia's State University of Agriculture (MSUA) was established in 1958 to provide agriculture education and research and played a leading role in extension to state farms. Its current mission is to "maintain the lead position in academic education, modern research and technology advancement in the priority fields of rural development in Mongolia<sup>4</sup>." MSUA is a nationally accredited university with seven schools<sup>5</sup>, three rural branches<sup>6</sup> and four research institutes, including the Research Institute of Animal Science, the Veterinary Research Institute, Research Institute of Plant Protection and the Plant Science and Agricultural Research Training Institute (PSARTI). Apart from its role as a specialist

<sup>4</sup> Mongolian State University of Agriculture, "Undergraduate and Graduate Study Guide Bulletin"

<sup>5</sup> School of Veterinary and Biotechnology, School of Animal Science and Management; School of Agrobiolgy, School of Engineering; School of Economics and Business; School of Natural Sciences and School of Ecology and Technology Development

<sup>6</sup> Altai Regional Training and Research Branch; Dornod Regional Research Branch; Branch School in Orkhon

education to the diploma, bachelor, masters and doctorate level and research, another area is technical and professional training for rural producers and business people through extension activities. The University has relations with over 30 development agencies, scientific organizations and universities worldwide.

### **PSARTI**

23. PSARTI has three core areas of operation: research, seed production and training. Administratively, it is under the responsibility of the MSUA and hence, the Ministry of Education. PSARTI has a total of 300 staff of which 43 are involved in research and 15 in seed multiplication. It has a land area of 1,200 ha for cereal production, 400 ha of potato, 40 ha for vegetable production and nine ha for fruit cuttings production. PSARTI is the only official elite seed farm in Mongolia. Elite seed (breeder and foundation seed) is produced for potatoes, wheat and vegetables. The institution also produces fruit tree cuttings. Seed production is financed by own resources, primarily seed sales. It produces approximately 300 tonnes of potato seed, 400 tonnes wheat seed, 20 kg early and 50 kg of medium maturing cabbage, 100 kg of turnip and 100 kg of onion seed.

24. Research is financed by the state through the Science and Technology Fund. Proposals are submitted annually and funding is approved for three to five year projects on an individual case basis. The current funding to PSARTI is Tg 82 million for six projects. These funds cover salary and operational costs for experiments to approximately 70% of the total cost. The greatest challenges facing PSARTI are resource constraints and the need for professional capacity building.

## **3. Donor Funded Initiatives**

### **TACIScrop**

25. Implemented between 1999 and 2002, the project aimed to re-establish the extension network on a pilot basis and was responsible for setting up five aimag extension centers.

### **Integrated Crop and Livestock Production**

26. Implemented between 2002 and 2005, the overall aim was to increase incomes of rural citizens, contributing to poverty alleviation and reducing unemployment, improving efficiency of farming enterprises and increase self-sufficiency in domestic food production. More specifically, it aimed to improve the supply of quality wheat seed and to integrate crop and livestock production systems. One of its six intended outcomes was for technical and economic know-how to be disseminated through a well functioning network of Agricultural Extension Centers (AECs). The project funded the establishment and equipping of a further three aimag level AECs, a number of soum level extension centers and agroparks as well as developing a considerable quantity of training material. The project also developed the concept of demonstration farms or pilot farms that were used for technical extension initiatives. The project supported the National Agricultural Extension Center and developed a plan for the development of the agriculture extension service in Mongolia. Initially it was intended that all AECs should become self funding after three years. This proved unrealistic and the requirement was modified so that aimag AECs were to obtain a significant part of their income from paid services has been maintained (currently estimated at 66%). However, most of this is comprised of (i) paid services (not always relating to technical advice), (ii) leasing of equipment, (iii) training courses funded by the state, (iv) income from the sale of produce grown on agroparks, (v) contributions from the aimag agricultural departments such as staff salaries and providing office space or the land as a grant. The amount generated from the provision of technical advice remains very small and will not sustain the service.



**Development of Agricultural Services**

27. This TACIS funded project has attempted to develop the capacities of the Ministry staff to support rural enterprise development and has funded initiatives in animal health and management, water utilization and rural enterprise development. While not an extension service as such, it has focused on developing the capacities of the aimag based agricultural staff to provide technical knowledge to farmers and herders alike. The project adopted similar approaches to the previous TACIS funded ICLP that funded technical trials on demonstration farms developed under the project. It has not been directed at developing the extension network to the same extent that former TACIS funded projects have been.

**Gobi Regional Economic Growth Initiative**

28. This USAID funded initiative has been implemented independent of the MoFA. It has developed herder groups and other common interest groups and supported them with market information, business development training and other technical support. The project has been an excellent model in bringing about changes and benefits to target groups but has been less successful in developing the institutional capacities to sustain similar support after completion of the project. The project has also been instrumental in developing a market information reporting service for agricultural products reporting commodity prices on a regular basis at aimag markets as well as at wholesale markets in Ulaanbaatar.

**Other Initiatives**

29. There have been numerous other NGO funded initiatives to support agricultural activity usually with some component of technical training or producer capacity building. They tend to be poverty focused and many have been associated with disaster relief providing production inputs directly - vegetable seed, laying chickens etc and have had associated capacity building objectives for the farmers concerned - the beneficiaries. Few have worked through the network of technical support facilities in the aimags and soums although some have had a greater focus on the extension machinery than others - e.g. ADRA with their support of agoparks.

**IV. PROGRAM PROFILE****A. Objectives and Outcomes**

30. The overall objective of the combined Programs is to improve agricultural support services to producers and provide more relevant adaptive research into the production agricultural produce in Mongolia.

**1. Agricultural Support Services**

31. The objective of this Program is to support alternative mechanisms for the delivery of extension services either by the private or public sectors by strengthening the market and technical information exchange mechanisms, linking information sources with research outcomes.

**2. Research Program**

32. To develop an applied research capability in Mongolia capable of responding to industry-identified priorities by strengthening the linkages between industry associations, technical specialists, research institutions, and relevant international research organizations.

## **B. Scope and Key Activities**

### **1. Agricultural Support Services**

33. The Government proposes to establish knowledge based centers in regional centers that can function as a source of technical and market information. This recognizes that information storage and management has progressed to such an extent that technical solutions can be readily committed to electronic formats from where it can be more accessible to a far wider range of potential users. Resource centers using a web based medium to gain access to the technical information is considered a realistic option that can be accessed by an increasingly large proportion of the rural population. Through these centers, it will be possible to gain access to technical information on crop production, animal health, nutrition and management through the internet that will also provide the opportunity for users to provide comments and observations through an interactive mode. A facility similar to web sites will be developed to facilitate user access to a wide range of technical information and also to obtain market price reports and demand estimates for agricultural produce throughout the year. Initially it is intended that the facility be piloted at regional centers. If the concept is widely used and accepted, then the facilities could be expanded to aimag centers and then subsequently to soum centers depending on the need as technological options are most likely to provide for improved access without establishing a significant physical resource center.

34. Such a facility will need to have a core staff to maintain the information on a centralized network that will be managed and updated on a regular basis. The facility will have the capacity to report on price movements and relate individual commodity prices to the quality or grades as provided for under the Strengthened Market Linkages Program. This would not replace the need for extension services as interpretation or application of information sources in this manner might still be required until the producers developed the necessary interpretive skills in their searching procedures and then applying recommendations obtained from the center. Linked to the facility would be research institutions and other extension centers such as the AECs, agroparks and the local government officers at both aimag and soum levels. The facility would provide an enhanced method of communicating research findings, technical recommendations and financial and price information, including seasonal material for plant pests, animal diseases, seed standards, breed certification, financial products, input suppliers etc.

35. The Program would also facilitate stronger linkages between producers and research institutions based outside Mongolia but with similar climatic conditions. It would provide a platform for exchange of views on technical matters and give Mongolian researchers access to international researchers of repute.

36. Details of the facility would need to be developed initially then resourced to establish the facility on a pilot basis. Critical to the success of the concept is user access. The technology would need to be conveniently accessed to provide the widest exposure and utilization. The Program would provide for an initial evaluation of the technical options, the cost of establishing the facility and the recurrent expenditure requirements for its operation. There will need to be significant investment to establish the facility and commit the technical information in electronic formats. There will also need to be some rationalization of the volume and range of information to be established on the system. For this reason, strong government and stakeholder participation will be needed throughout the development of this concept to ensure it provides useful information in a reasonably accessible and convenient manner. Furthermore, as one of the main constraints to extension services over recent years has been financial constraints, it will be important to understand the exact recurrent expenditure implications for the proposed facility before commitment to proceed is given.

With that commitment would be tacit agreement that the necessary funds would be made available to maintain the price information reporting system as it would be to maintain current technical information on the system. Inevitably these would be expected to have a cost but such cost is likely to be at a far lower cost than for maintaining a physical network of extension offices throughout the country.

## **2. Research Program**

37. The focus of agricultural research should be directed at identifying well adapted, higher productivity species and production systems. Resourcing the established research institutions (including the regional centers) can be used to advantage either through the proposed electronic information systems outlined herein or the existing physical extension network of AECs, or by the private input suppliers and agro-processing enterprises, the latter who might develop contract growers to achieve their required quality of raw material inputs.

38. To achieve this, there needs to be far greater participation of industry in determining research priorities that will be publicly funded. Mongolia does not have the resources to contemplate broad research topics that might, at some time in the future, have relevance to the sector. Such research is not only expensive but it is very difficult to justify in the short term based on a future benefit that cannot be quantified at an early stage of the program. Research needs to be immediately relevant and have direct application for producers in today's current market. There needs to be a far more informed process for assigning research priorities backed by solid evidence of a real benefit to the industry as a result of the research. The development of well adapted potato varieties that can be grown under Mongolian conditions is an excellent example where research is highly relevant and will generate a clearly identified value that warrants research expenditure. More examples of this nature are needed in Mongolia.

39. In order to improve the relevance of agricultural research, it is proposed that consultative research panels be established to elicit response from industry to improve the relevance of research. These should comprise representatives from grower associations, traders who are responsible for bringing produce from the areas of production to markets, processors who have certain quality requirements that need to be taken into consideration in directing research topics, and consumer representatives. There also needs to be the technical specialists who are leaders in the area of research in Mongolia who can relay what technical solutions might be achieved as well as some economic evaluation capacity to ascertain the potential return on the investment. The latter is an area in which Mongolia has limited capacity. This is in part due to the recent history of agriculture where production was output oriented and there was no interest in assessing what was economically or financially viable for the producer. Under competitive market conditions, this situation cannot be sustained. There needs to be developed a capacity within the Ministry of Food and Agriculture to be able to assess potential benefits from research programs and this should form the rationale for allocating scarce public resources into any one research topic. While much of the agricultural research is undertaken by institutions that are responsible to the Ministry of Education, the importance of the research panel cannot be overstated in making investment decisions into agricultural research.

40. To assist in this, there needs to be stronger links with international organizations and professionals who can provide guidance and much of the broader research that is currently beyond the resources of the country. Mongolia's research initiatives need to have immediate relevance and therefore, the longer term research topics performed elsewhere can feed into the shorter timeframe program needed in Mongolia. In order to have access to international research institutes, there needs to be a well developed dialogue between Mongolian researchers and those from international institutions. Such linkages are often formed through

country visits and are often based on inter personal relationships developed through attendance at international conventions and meetings. The Program therefore intends to assign some resources to allow local technical specialists the resources to attend international conferences where the linkages - both at personal and institutional levels can be developed. The intention from building such linkages is that the more expensive broader research can be undertaken outside Mongolia yet local researchers will have access to the results and will be able to undertake more applied research under Mongolian conditions. In this way, the cost of the initial research can be met by other institutions rather than the Mongolian public.

41. In order to assign research priorities based on potential benefits, there must be reliable means for assessing benefits. This means the enhancement of information systems and the reporting of prices for various qualities of goods produced. Such a mechanism is proposed under the Strengthening Market Linkages Program and is also supported under the Agricultural Support Services Program. Informed decisions as to potential benefits from research can only be made if there is access to reliable price information (and a capacity to quantify the extent of the benefit). Armed with these tools, it will be possible to make better informed decisions as to the relative merit of public investment into research in agriculture.

42. Finally, the Program will strengthen the linkages between the research institutions in Mongolia and the extension services, be they electronic dissemination or the more traditional mechanisms of the mass media and publications through physical extension centers. Linkages will also be forged between the research institutions and private organizations that might be extending technical advice to producers or groups of producers through common interest marketing or input supply groups. If the information being generated from research activities is highly relevant and directly applicable, there will be strong interest in gaining access to this information and in extending same to producers.

### **C. Summary Cost Estimate of the Program**

43. The Program costs have been estimated based on the proposed activities outlined in the logical framework that follows. Items included have not been discussed with the Government and as such represent a preliminary first draft of the Program Costs. It should also be noted that the allocation of the research program proper is split into livestock and cropping initiatives. The balance between the two reflects the relative contributions to agricultural GDP. The level of support for research initiatives is an estimate and also requires further discussion with the Government. Indicative physical inputs are presented in Table 1 while cost estimates of the physical program are presented in Table 2.

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Table 1: Physical Inputs to the Agricultural Support Services and Research Program

	Unit	Unit Cost (Tugrik '000)		Quantities												Total
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016					
I. Investment Costs																
A. Information Related Initiatives																
1. Evaluation of Alternate Extension Mechanisms																
TA to identify and develop alternatives /a	pnmt/s	29,000	-	-	-	-	-	-	-	-	-	-	-	-	20	
International study tours	studies	23,200	-	2	2	-	-	-	-	-	-	-	-	-	6	
Subtotal Evaluation of Alternate Extension Mechanisms																
2. Establish E-Based Technical Information System /b																
Establish information center within MoFA	building	116,000	-	1	-	-	-	-	-	-	-	-	-	-	1	
Equip facility	set	116,000	-	1	-	-	-	-	-	-	-	-	-	-	1	
Appoint and train staff at facility	year	11,600	-	-	10	10	10	10	10	10	10	10	10	10	80	
Support routine operations of the facility	year	-	-	-	-	1	1	1	1	1	1	1	1	1	7	
Subtotal Establish E-Based Technical Information System																
Subtotal Information Related Initiatives																
B. Research Related Initiatives																
1. Support for Prioritizing Research																
Develop operational procedures	study	11,600	1	1	-	-	-	-	-	-	-	-	-	-	2	
Support for the operation of the research panels	year	11,600	-	10	10	10	10	10	10	10	10	10	10	10	90	
Train staff in economic evaluations of research /c	year	23,200	-	-	1	1	1	1	1	1	1	1	1	1	5	
Subtotal Support for Prioritizing Research																
2. Resource Agricultural Research																
Rationalization of research institutions	study	58,000	-	1	-	-	-	-	-	-	-	-	-	-	1	
Funding for livestock research	year	348,000	1	1	1	1	1	1.5	1.5	1.5	1.5	1.5	1.5	1.5	12.5	
Funding for crop research	year	87,000	1	1	1	1	1	1.5	1.5	1.5	1.5	1.5	1.5	1.5	12.5	
Subtotal Resource Agricultural Research																
3. International Research Affiliations																
Study mechanisms for incorporation into information system	study	34,800	-	-	1	-	-	-	-	-	-	-	-	-	1	
Incorporation of research results into information systems	year	5,800	-	-	1	1	1	1	1	1	1	1	1	1	8	
Institutional affiliation costs	affiliation	34,800	2	5	10	10	10	10	10	10	10	10	10	10	87	
Resource researcher convention visits	studies	9,280	10	10	10	10	10	10	10	10	10	10	10	10	100	
Subtotal International Research Affiliations																
Subtotal Research Related Initiatives																
Total																

/a Comprehensive study to design appropriate system - including recurrent responsibilities.

/b Costs to be confirmed when system has been identified.

/c Intended for MoFA and MSUA staff.

Table 2: Budget Estimates for the Agricultural Support Services and Research Program

Unit	Unit Cost (Tugrik '000)	Base Cost (Tugrik Million)										Total
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
I. Investment Costs												
A. Information Related Initiatives												
1. Evaluation of Alternate Extension Mechanisms												
TA to identify and develop alternatives /a	29,000	580.0	-	-	-	-	-	-	-	-	-	580.0
International study tours	23,200	-	46.4	46.4	46.4	-	-	-	-	-	-	139.2
Subtotal Evaluation of Alternate Extension Mechanisms		580.0	46.4	46.4	46.4	-	-	-	-	-	-	719.2
2. Establish E-Based Technical Information System /b												
Establish information center within MoFA	116,000	-	-	116.0	-	-	-	-	-	-	-	116.0
Equip facility	116,000	-	-	116.0	-	-	-	-	-	-	-	116.0
Appoint and train staff at facility	11,600	-	-	116.0	116.0	116.0	116.0	116.0	116.0	116.0	116.0	928.0
Support routine operations of the facility	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal Establish E-Based Technical Information System		-	-	348.0	116.0	116.0	116.0	116.0	116.0	116.0	116.0	1,160.0
Subtotal Information Related Initiatives		580.0	46.4	394.4	162.4	116.0	116.0	116.0	116.0	116.0	116.0	1,879.2
B. Research Related Initiatives												
1. Support for Prioritizing Research												
Develop operational procedures	11,600	11.6	11.6	-	-	-	-	-	-	-	-	23.2
Support for the operation of the research panels	11,600	-	116.0	116.0	116.0	116.0	116.0	116.0	116.0	116.0	116.0	1,044.0
Train staff in economic evaluations of research /c	23,200	-	-	23.2	23.2	23.2	23.2	23.2	-	-	-	116.0
Subtotal Support for Prioritizing Research		11.6	127.6	139.2	139.2	139.2	139.2	139.2	116.0	116.0	116.0	1,183.2
2. Resource Agricultural Research												
Rationalization of research institutions	58,000	-	58.0	-	-	-	-	-	-	-	-	58.0
Funding for livestock research	348,000	348.0	348.0	348.0	348.0	348.0	522.0	522.0	522.0	522.0	522.0	4,350.0
Funding for crop research	87,000	87.0	87.0	87.0	87.0	87.0	130.5	130.5	130.5	130.5	130.5	1,087.5
Subtotal Resource Agricultural Research		435.0	493.0	435.0	435.0	435.0	652.5	652.5	652.5	652.5	652.5	5,495.5
3. International Research Affiliations												
Study mechanisms for incorporation into information system	34,800	-	-	34.8	-	-	-	-	-	-	-	34.8
Incorporation of research results into information systems	5,800	-	-	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	46.4
Institutional affiliation costs	34,800	69.6	174.0	348.0	348.0	348.0	348.0	348.0	348.0	348.0	348.0	3,027.6
Resource researcher convention visits	9,280	92.8	92.8	92.8	92.8	92.8	92.8	92.8	92.8	92.8	92.8	928.0
Subtotal International Research Affiliations		162.4	266.8	481.4	446.6	446.6	446.6	446.6	446.6	446.6	446.6	4,036.8
Subtotal Research Related Initiatives		609.0	887.4	1,055.6	1,020.8	1,020.8	1,238.3	1,238.3	1,215.1	1,215.1	1,215.1	10,715.5
Total		1,189.0	933.8	1,450.0	1,183.2	1,136.8	1,354.3	1,354.3	1,331.1	1,331.1	1,331.1	12,594.7

/a Comprehensive study to design appropriate system - including recurrent responsibilities.

/b Costs to be confirmed when system has been identified.

/c Intended for MoFA and MSUA staff.

### D. Indicative Implementation Arrangements

44. Implementation of the Program will require considerable coordination as the Ministry of Education is responsible for many of the research institutions in agriculture although the technical expertise in certain areas resides in the Ministry or associated institutions. To recognize this dual responsibility, it is proposed that three Ministries assume responsibility for implementation of the Program with the Ministry of Finance assuming the chair of the Research Coordination Committee. Composition will be of senior technical specialists from all three ministries but will also have representation of the private sector to bring a greater commercial focus into the allocation of public funds.

### E. Program Framework Matrix

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<b>Goal</b> 1.0 To improve agric. support services to herders and producers and provide more relevant adaptive research into the production of agricultural commodities in Mongolia.	Commodity productivity levels increased by 10%.	National statistics	Funds are available for to conduct applied research.
<b>Purpose</b> 2.1 To support alternative mechanisms for the delivery of extension services either by the private or public sectors by strengthening the market and technical information exchange mechanisms, linking information sources with research outcomes.  2.2 To develop an applied research capability capable of responding to industry-identified priorities by strengthening the linkages between industry associations, technical specialists, research institutions, and relevant international research organizations.	Alternate mechanisms established with comprehensive technical and market information.  Research institutes participating in applied research programs	Ministry annual reports.  Institute annual reports	Resources are made available to fund recurrent expenditure.  Resources are made available to fund research programs.
<b>Outputs</b> 3.1 Alternate extension mechanisms evaluated.  3.2 E-based technical extension service established with links to market and price information as well as research	TA report received.  Office established, equipped and operating with trained staff.	Government acceptance note.  Budgetary allocations in MoFA budget.	TA funds made available.  Govt budget available.

## Volume II - Program Investments - Support Services and Research Program

<b>Design Summary</b>	<b>Performance Indicators/Targets</b>	<b>Monitoring Mechanisms</b>	<b>Assumptions and Risks</b>
<p>outcomes.</p> <p>3.3 Established procedures and technical capacity for prioritizing research fund allocations.</p> <p>3.4 A resourced research and extension facility.</p> <p>3.5 Linkages developed with international research institutions.</p>	<p>Review panels formed and meeting on regular bases. MoFA staff trained.</p> <p>Research reports submitted.</p> <p>Affiliated international institutions.</p>	<p>Minutes of research panel meetings.</p> <p>Annual reports sighted.</p> <p>Letters of formal association.</p>	<p>Availability of funds.</p>
<p><b>Activities</b></p> <p>3.1.1 TA to study alternative mechanisms to provide a sustainable extension services.</p> <p>3.1.2 Study tour of countries where alternate extension systems have evolved.</p>	<p>Team mobilized.</p> <p>Numbers of staff visits, and countries visited.</p>	<p>Government comments on Final Report.</p> <p>Program visit reports</p>	<p>TA funds available</p>
<p>3.2.1 Establish and equip central facility.</p> <p>3.2.2 Staff the facility as recommended.</p> <p>3.2.3 Provide an operational budget for the establishment and incorporation of information into the system.</p>	<p>New facilities sighted.</p> <p>Staff appointed.</p> <p>Routine market and technical information generated from the facility.</p>	<p>Project completion reports.</p> <p>Ministry budget.</p> <p>Reports sighted.</p>	
<p>3.3.1 Develop procedures for the establishment and operations of research panels.</p> <p>3.3.2 Resource the functioning of research panels.</p> <p>3.3.3 Provide capacity building for MoFA in the evaluation of research benefits.</p>	<p>Procedures considered by Government.</p> <p>Numbers of research panels established.</p> <p>Number of staff trained and sample reports sighted.</p>	<p>Procedures confirmed by regulations.</p> <p>Minutes of panel meetings.</p> <p>Training completion reports.</p>	<p>Appropriately skilled personal are available for training.</p>
<p>3.4.1 Investigate the institutional needs to conduct applied research in Mongolia.</p> <p>3.4.2 Resource applied research in livestock</p>	<p>Study completed.</p> <p>Research institutions rationalized.</p> <p>Research program annual reports.</p>	<p>Report accepted by Government.</p> <p>Annual reports.</p> <p>Budgetary allocations.</p>	



## Volume II - Program Investments - Support Services and Research Programs

<b>Design Summary</b>	<b>Performance Indicators/Targets</b>	<b>Monitoring Mechanisms</b>	<b>Assumptions and Risks</b>
subsector.			
3.4.3 Resource applied research into cropping subsector.	Research program annual reports.	Budgetary allocations.	
3.5.1 Develop the means for extending research findings through the extension systems.	Study completed.	Government acceptance of report.	Appropriate conferences are conducted.
3.5.2 Register research institutions as associated of international research agencies.	Number of affiliated institutions.	Forma acceptance notes.	
3.5.3 Resource the attendance at international conventions for researchers from Mongolia.	Exchanges undertaken and conferences attended.	Study and conference attendance reports submitted.	
3.5.4 Support the incorporation of research findings into extension systems.	Research results published.	Final reports sighted.	

# **AGRICULTURE SECTOR STRATEGY STUDY**

## **VOLUME 2**

### **AGRICULTURAL CREDIT PROGRAM**

**30 NOVEMBER, 2006**

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## ACRONYMS

ADB	-	Asian Development Bank
ADF	-	Agriculture development Fund
ADRA	-	Adventist Development Relief Agency
AEC	-	Agricultural Extension Center
AHRI	-	Animal Husbandry Research Institute
AI	-	Artificial Insemination
ASDP	-	Agricultural Sector Development Project
CIDA	-	Canadian International Development Assistance
DANIDA	-	Danish International Development Agency
EGPRS	-	Economic Growth and Poverty Reduction Strategy
EU	-	European Union
FAO	-	Food and Agricultural Organization (of the United Nations)
GAP	-	Government Action Plan
GDP	-	Gross Domestic Product
GTZ	-	German Bi-lateral Aid Agency
HACCP	-	Hazard Analysis Critical Control Point
ICLP	-	Integrated Crop and Livestock Project
IFC	-	International Financing Corporation
ISO	-	International Standards Organization
JCS	-	Jesuit Christian Services
JICA	-	Japan International Cooperation Agency
KOICA	-	Korean International Cooperation Agency
M&E	-	Monitoring and Evaluation
MDG	-	Millennium Development Goal
MIT	-	Ministry of Industry and Trade
MNB	-	Mineral Nutrient Blocks
MNE	-	Ministry of Nature and Environment
MoFA	-	Ministry of Food and Agriculture
MSUA	-	Mongolian State University for Agriculture
MTBF	-	Medium Term Budgetary Framework
NAEC	-	National Agricultural Extension
NAMAC	-	National Association of Mongolian Agricultural Cooperatives
NEMA	-	National Emergencies Management Agency
NGO	-	Non government organization
NPA	-	National Plan of Action
PFI	-	Participating Financial Institution
PPP	-	Public Private Partnerships
PSARTI	-	Plant Seed Agriculture Research and Training Institute
RPRP	-	Rural Poverty Reduction Project
SCSL	-	State Central Seed Laboratory
SDC	-	Swiss Development Cooperation Agency
SEFF	-	State Emergency Fodder Fund
SLP	-	Sustainable Livelihoods Project
SPIA	-	State Professional Inspection Agency
TACIS	-	Technical Assistance for the Commonwealth Independent States
UNDP	-	United Nations Development Program
UPOV	-	International Convention on Plant Variety Rights
USAID	-	United States Agency for International Development
WTO	-	World Trade Organization
WUG	-	Water User Group

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## AGRICULTURAL CREDIT PROGRAM

### I. GENERAL BACKGROUND

1. Mongolia's financial system continues in transition having survived some turbulent times during the late 1990s when the banking system was subject to a series of economic shocks and crises. It is currently on the road of recovery after showing signs of considerable fragility and dysfunctionality, with recurring insolvencies. These weaknesses, together with the narrow range of available financial services, seriously constrain private sector growth. In a recent World Bank funded survey of Mongolian entrepreneurs, 96% reported the lack of long term financing and 65% reported inadequate working capital as the main constraints to their business operations. A recent International Finance Corporation (IFC) study found that although the informal sector is estimated to generate economic activity equivalent to as much as 30% to 38% of national GDP, private operators obtain their finance mainly from personal and family savings (82%), followed by individuals (11%), and only 0.5% from bank loans. Mongolia's financial system is characterized by: (i) a lack of confidence in banks; (ii) the predominant state ownership and concentration of assets; (iii) the limited availability of and access to financial services in rural areas; (iv) poor corporate governance; (v) lack of management experience and skill; and (vi) serious rent-seeking behavior of those responsible for directing credit. It was estimated in 1999 that some 95% of cash circulating in Mongolia's economy was concentrated in Ulaanbaatar with the vast proportion of trade in rural areas being conducted on a barter basis. The environment for financial services has improved dramatically over recent years with the restructuring of Khaan Bank (formerly Agriculture Bank) and the success of XAC Bank which has rapidly achieved financial and institutional sustainability in micro-credit with some group lending approaches.

### II. SECTOR ANALYSIS

#### A. Sector Performance

2. Since the difficulties of the late 1990s, the formal financial sector has shown great resilience under the guidance of sector reforms initiated by Mongolbank with the improved prudential requirements needed to operate as a banking institution<sup>1</sup>. With the recent transformation to a market economy, a great deal of inexperience resided in the banking sector and much of the senior management could only respond to situations based on their knowledge of targeted lending as was common during the socialist period. Since then, the sector has developed quickly, making the necessary adjustments to an open market economy even though it was still being managed (for the safety of its depositors) by the more demanding prudential requirements of Mongolbank. In view of the recent transition, a great deal has been achieved in terms of facilitating development, especially when one recalls that considerable capital resources were needed to rejuvenate the economy and that personal savings were virtually non-existent immediately following the socialist period. After some initial shocks, there is now the foundation of a sound financial sector that is developing both its outreach and range of lending products for the benefit of the economy.

<sup>1</sup> Registered banks are authorized to accept deposits; disburse loans; provide transaction services; on behalf of itself, provide payment guaranties to third parties; purchase, sell, deposit and place on deposit foreign currency; purchase, sell, deposit and place in deposit precious metals and stones; receive valuables into custody; conduct foreign exchanges and transaction services; issue, buy, and sell securities; deal in financial leasing transactions; provide investment, financial consultancy and/or information services; engage in other financial activities or services permitted by the laws and regulations and licensed by the Bank of Mongolia.

3. At the beginning of 2000 Mongolia had 13 banks. Of these, Khaan Bank had by far the largest rural network with branches and sub-branches in most provincial and soum centers. During the banking crisis of 1998, Khaan Bank became illiquid and insolvent, and in 1999 Mongolbank placed it under conservatorship and later, receivership. Lending activities were stopped, but other services including the distribution of salaries and pension payments were continued. A restructuring plan was finalized, and a business plan prepared with the aim of transforming the bank into a commercially viable entity. Following recapitalization in mid 2000, control of the then Agricultural Bank was passed to a new board of directors and executive management, including two United States Agency for International Development (USAID) funded staff. In September 2000, Mongolbank and the World Bank approved the business plan for the period up to July 2002.

4. Since that time, total lending has increased markedly to the extent that the now 16 major banks had outstanding loans of Tg 859.5 trillion at the end of 2005. The level of loans has increased markedly over the past five years growing at over 40% per annum during this period with earlier increases being over 70% per annum. This compares with the total outstanding loans at the end of 2001 of Tg 135 trillion, reflecting the growing trust in formal financial institutions by depositors through deposits of savings. The extent of mobilization of the local savings has increased dramatically in parallel with the increased confidence in banks. The outstanding loans for agriculture, hunting and fishing by comparison has also shown a substantial increase from Tg 7.5 trillion in 2001 to Tg 57.4 trillion by the end of 2005. The increase has been more erratic and reflects the seasonal conditions within the sector. It is not surprising that the level of agricultural lending only increased marginally between the end of 2001 and 2002, a period that corresponded to two years of successive dzuds that made banks cautious about rural lending. Since 2002, the growth of agricultural lending has been greater than the total lending increase at 186%, 17% and 102% in the subsequent three years (Table 1).

**Table 1: Total Lending and Agricultural Lending, 2001-2005**

	Unit	2001	2002	2003	2004	2005
<b>Total Loans</b>						
Loans Outstanding	Tg billion	135,066	231,450	441,052	606,178	859,449
Growth Rate	%		71%	91%	37%	42%
<b>Agricultural Loans</b>						
Loans Outstanding	Tg billion	7,551	8,453	24,218	28,373	57,355
Growth Rate	%		12%	186%	17%	102%
Less than 1 year	Tg billion	5,910	5,250	12,960	21,258	44,306
Between 1-5 years	Tg billion	253	2,099	6,028	2,389	3,709
Over 5 years	Tg billion	502	446	970	1,406	537
% Term Loans	%	10.0%	30.1%	28.9%	13.4%	7.4%
Production Credit Growth	%		-11%	147%	64%	108%
Agricultural Share	%	5.6%	3.7%	5.5%	4.7%	6.7%

Source: Mongolbank

5. Of significance is the type of lending that has been directed at the agricultural sector. About 90% of rural lending is extended as short term production credit of duration usually less than 12 months. Term credit increased in 2002 and 2003 accounting for about 30% of rural lending but since then, the proportion has declined to more traditional levels of 13% in

2004 and 7% of total agricultural lending in 2005. As a consequence, the growth in short term credit (less than 12 months) has shown a dramatic increase growing at 147% in 2003, 64% in 2004 and 108% in 2005, keeping the proportion of term lending low.

6. High interest rates have long been seen as a deterrent to investment, not only in agriculture but across all sectors. Mongolia is still suffering from its recent history when targeted lending was common practice, when external influences as to whom would receive loans were common (with associated poor repayments). With lending being network based rather than merit based, the risk associated with lending was high and the interest rate splits reflected this additional risk. Views as to the relative risk of lending have persisted although the recent performance of borrowers and the improved capacity of financial institutions to monitor loans have resulted in significantly lower risk associated with all lending (along with their requirement for collateral and the legal basis for recovery of bad debts). Nevertheless, interest rate splits between deposit and lending rates remain high. Splits of 25% per annum between deposit rates and lending rates are widespread amongst the financial institutions and have persisted well into the early 2000s. With increasing competition between banks, lending rates have decreased and deposit rates increased in an attempt to gain a larger market share. Khaan Bank for example offered 2.4% per annum on its deposit rates and was using these funds for lending at 34% per annum. In 2005, the equivalent figure was 7.2% on deposits and 31% per annum for loans. This also reflects the increasing knowledge of their client base and a significant improvement in their capacity to independently assess individual risk from amongst their loan applicants.

7. Interest rates are still relatively high on borrowed funds and there are few agricultural pursuits that can afford to pay the high interest rates that are required. Many borrowers have the view that they are "working for the bank" rather than improving their own financial position when taking loans. Having said that, there are others who consider the greatly improved access far outweighs the difficulties associated with high interest rates and are just pleased to be able to access loan funds. Exactly how these loans are used is another question as the fungibility of money in the rural environment is significant - where borrowers have a diversity of livelihood pursuits and borrowed funds can be used in a number of ways, while still meeting repayment obligations.

8. Apart from the issue of high interest rates, many rural inhabitants do not have the collateral to qualify for credit. As banks seek to minimize their exposure by taking collateral over assets (and not just any assets but fully negotiable ones that can be readily liquidated) to protect against bad debts, many potential borrowers do not have the resources or asset backing to qualify for a loan. Some banks have attempted to seek joint servicing responsibilities through producer groups to overcome this constraint but the amount of money that is lent through such mechanisms remains small. The largest rural bank - Khaan Bank for example require a minimum of 200 head of livestock as security against a herder loan. At this level, over 60% of the herding population is precluded from accessing loans from this bank.

9. One also must be realistic when commenting on interest rates that are offered in rural Mongolia. The population is widely disbursed and the transaction cost of obtaining a loan is high as is the cost for monitoring performance of borrowers. As such, there are higher administration costs associated with rural lending that justified higher interest rates. The Government is naturally concerned at this level and has attempted to apply additional pressure on banking institutions to lower rates. With their new found independence, banks are resisting this pressure and continue to make their own assessments of risk and set associated charges for their perceived level of risk. Many still hold the view that banks are making very attractive returns based on current market interest rates.



## B. Constraints

10. The main constraints for agricultural credit include :-

- Limited access to credit services in view of the weak branch network throughout rural areas.
- High collateral requirements needed to be granted a loan.
- High transaction costs in applying for credit and in making repayments.
- High interest rates severely limit how borrowed funds can be used to generate a profit for the borrower.
- Limited familiarity of banks with the special requirements of rural borrowers (cash flows).
- Previous lending policies of banks have resulted in poor loan recovery that has seriously damaged the reputation of the agricultural sector.

11. While there has been significant progress in the past five years in the provision of rural credit stimulated by a number of donor funded initiatives such as the Agriculture Sector Development Project (ASDP), the Sustainable Livelihoods Project (SLP) and the Rural Poverty Reduction Project, access to credit remains only limited and those that have access cannot always afford to direct it to agricultural purposes given the relatively high cost of borrowing. There has been increased competition amongst banks and some of the more urban based institutions have ventured further a field into soums opening representative offices for servicing loans. Certainly, in soums where there is more than one financial institution represented, interest rates are lower than where only one is operating. Such competition has also had an impact on the level of services and on the range of loan products that are available to producers. However, given the collateral requirements and the high cost of funds, rural credit still remains a distant hope for many.

## C. Opportunities

12. There are a number of encouraging developments that have taken place in recent years in Mongolia that auger well for the further development of the financial sector and in particular, its support of the agricultural development. The first of these is the increased availability of funds through the mobilization of demand deposits throughout the country but in particular from rural areas. Many banks are drawing on their rural network of branches to attract deposits from individuals and business entities as they develop strengthened financial operations. The earlier reservations as to the stability of certain banks seems to have been answered by strong financial performances of some - particularly the non state banks, to the extent that renewed resources are being made available for investment through the financial system.

13. Secondly, the branch networks are extending deeper into rural Mongolia, improving access and are providing a wider range of services to rural inhabitants. While Khaan Bank has the most extensive branch network extending to all soums, it is well positioned to provide financial services to rural areas. In addition, there is increased competition from the other more established banks in what have traditionally been Khaan Bank areas and that competition has been responsible for introducing options both in terms of rates and loan products. Within these branches exists a growing capacity to identify capable borrowers and to monitor performance to ensure a higher quality portfolio. The improved capabilities are supported by a more positive legislative framework that supports recovery of assets in the event of non performing loans.

14. In addition, the sector is undergoing significant adjustment that will require substantial investment in the rehabilitation of plant and equipment, the improvement of

production areas (pastures and crop lands), and the restocking with quality breeding stock and other production inputs requiring both production and term credit. While there has been some cross sector financing from the mining and resources sector as well as some vertical integration from processors, existing agricultural producers tend to lack capital resources to undertake the productivity enhancing initiatives. The demand for both production and development credit from the agriculture sector is likely to be strong during this adjustment period, particularly in view of the lengthy period when little investment has been made in maintaining the productivity of the country's natural resources. Progressively there is greater awareness of the open market environment and a steady reduction in producers' reliance upon the Government to support production initiatives - all of which are consistent with the development approach of the financial sector. However the investment climate could be made more conducive with appropriate investment incentives relating to accelerated depreciation and other initiatives that will be developed under the Strategy.

### **III. GOVERNMENT POLICY FOR THE DEVELOPMENT OF THE INDUSTRY**

#### **A. Rationale for Public Involvement**

15. The main requirement for public participation in the financial sector is to provide the necessary safeguards to the investing public and to manage the money supply within the economy. This does not extend to state ownership of banks or any other financial institutions under open market conditions. With Mongolia only recently adopting a more open economy, its financial services sector is relatively under developed. This prompted the Government to play a more active role as a direct owner of certain banks that still remain operational this day. The Government however understands its role in developing a sound privately run financial sector as is outlined in its strategy described in section III.C. Its desire to influence the banks and their interest rates is promoted because of the high cost of finance and therefore inaccessibility to credit by private investors. For agriculture, there is a special case as production characteristics are such that large margins are not easily achieved and repayment arrangements must conform with the seasonal cash flow as cashmere is sold, livestock are slaughtered and crops are sold.

16. With many financial institutions failing in the late 1990s losing depositors' funds, there is a clear need to establish appropriate prudential requirements and operational standards to protect the public's interest. Equally, it is necessary for the Government to manage the supply of money in circulation and to monitor price levels. The rationale for government participation in this capacity is clear. What is less clear is the government's desire to direct credit, to offer interest rate concessions below the established market rate. While agriculture may find it difficult to pay the higher interest rates, this is not a strong argument to maintain support schemes to subsidize interest rates. Such activities lead to a misallocation of resources and create inefficiencies in an economy. Ideally, scarce resources need to be channeled to the investment that provides the greatest return - and this may not be agriculture. But given the government commitment to the development of the sector for both economic and social reasons, it considers that providing concessions on borrowed funds is an appropriate form of support to the sector. In the past, it has provided targeted credit to the cropping industry in its quest for wheat self sufficiency but the performance and recovery rates achieved were less than 18% and then, did not generate the desired outcome. The Government is therefore keen to support some form of interest rate subsidy through the formal financial institutions as a stimulus for investment in the sector recognizing it has a major role in economic growth, employment and as a provider of the raw materials for downstream processing.

## **B. Recent Development Initiatives**

17. Comments in this section will be restricted to agricultural initiatives alone as distinct from other initiatives such as small enterprise development. Most of the government initiatives have come in the form of targeted lending, usually associated with initiatives in the cropping sector. While credit as cash has not always been provided, credit in kind has been offered by the Government (using funds from the monetarization of commodity aid) for fallow loans, seed supplies etc aimed at increasing wheat production. Donor funded credit initiatives have tended to be delivered through the banking sector but with a limited amount of targeting to achieve a project objective in say poverty reduction, rather than any specific commodity output objectives. Recent donor credit initiatives include ASDP, the Rural Livelihoods Project, Rural Poverty Reduction Project and the Support for Food Safety project funded by France.

### **1. Government Initiatives**

18. In an attempt to encourage wheat cultivation while recognizing the limited cash resources of the cereal crop producers, in 2001, the Ministry of Food and Agriculture (MoFA) provided "fallow loans" to crop farmers based on an estimate of unit costs for fallowing land and areas to be planted. Operating through local administrations, advances were made in three tranches that was equivalent to Tg 7,200 /ha that was due to be repaid after harvest the following year. In 2002, poor seasonal conditions resulted in a poor crop and few producers met their obligations (18% of loans were recovered). At that stage, the Government paid Khaan Bank - with its comprehensive branch network, a fee of 2.8% of collected funds to recover the outstanding debts. In 2002, the same incentives were offered to crop producers but this time, it was administered by banks on behalf of the Government. Banks could not determine who should or should not receive loans but were held responsible for the repayment of the credit to the Government. Under such arrangements, some banks declined to participate in the program as interest rates were concessional and did not reflect the risk involved. With banks being responsible for repaying the Government, recovery rates have improved dramatically under this arrangement.

19. Similar activities have been undertaken for the provision of seed wheat to crop producers on credit until after the following harvest. The outcome of this program and its impact on the quality of returned seed is discussed further under the Seed Quality and Multiplication Program. The resources in the fund needed to be topped up regularly as the scheme was not financially sustained.

20. The Government has also provided advances in kind under its Green Revolution Program whereby 50% of the capital cost of machinery distributed to certain beneficiaries was to be repaid over a three year period without interest. This scheme is administered by local government offices in the aimags and recovery rates are said to be satisfactory. This is also a form of subsidy of interest rates through a targeted program of selected beneficiaries. Quite apart from the other impacts these concessional schemes have had on the agricultural sector, they have also been at odds in developing a sound financial services sector to support agriculture. The Government wishes to maintain its objective of reducing interest rates to primary producers but remains unsure as to how to achieve interest rate subsidies to promote investment in the sector. Past experiences have confirmed that previous ways of directing and subsidizing credit have failed and new ways are being considered by the Government.

## 2. Donor Funded Initiatives

### Agriculture Sector Development Project

21. The Asian Development Bank funded ASDP has a line of credit implemented through the formal banking system<sup>2</sup> without any controls as to the on-lending of the funds other than a ceiling of \$10,000 per loan that was raised to \$20,000 at the mid term review. A total of \$4.4 million was loaned to the Government to which a further \$1.1 million was financed by the participating financial institution (PFI). The funds were disbursed through the formal credit system that was complemented with capacity building for bank staff and borrowers. Credit was provided to PFIs at concessional terms (5% per annum) as an incentive for participation while the on-lending conditions were determined by individual PFIs. This was particularly important in selecting who should receive loans, in determining what collateral was needed, and in setting the interest rates and repayment arrangements. Responsibility for such decisions remained with PFIs.

22. By the end of December 2006, a total of 29,300 loans had been issued using the credit (and repaid credit) amounting to a total of Tg 35 trillion (equivalent of \$30 million), most of which were short term production loans. While efforts were made to restrict lending to agricultural production purposes, due to the fungibility of loans, far wider use was made of the facility for household and essential family expenditure as well as for trading, not necessarily in agricultural produce. About 83% has been used for production credit i.e. 60% for herding activities, 8% for horticulture, 5% for cropping activities, plus 17% for trading and other purposes. Recovery rates were over 99% with some of the early loans in default because of external pressures from within the aimag over the bank staff. This was rectified early in the implementation of the project. Since then, with routine loan monitoring, recovery rates have been excellent. It should be noted this was not a targeted poverty initiative and therefore, PFIs could direct loan funds to their more reliable customers. Under these circumstances, the high recovery rates were to be expected as it was not considered risky lending. Nevertheless, interest rates (started at 4% per month) were market based and declined during project implementation due to the increased competition amongst PFIs for the better clients.

### Sustainable Livelihoods Project

23. The World Bank funded Sustainable Livelihoods Project adopted a new approach to promoting improved, secure and sustainable livelihood strategies developed, demonstrating, and validating same in selected areas, and institutional capacity created so that these strategies that might be replicated and scaled-up in subsequent phases. The project consists of four components: (i) pastoral risk management to reduce the vulnerability of herders and enhance their resilience to drought, *dzud* and other shocks through risk forecasting and contingency planning, grazing and pasture management, herder self-help initiatives, and hay and fodder enterprise development; (ii) micro-finance outreach to provide micro-finance services to targeted poor and vulnerable non-poor households and individuals in remote rural areas of the eight core aimags<sup>3</sup> through the creation of a micro-financed development fund and the strengthening of revolving loan funds; (iii) a local initiatives fund to assist targeted communities in identifying their key infrastructure development needs and prioritize them for potential sub-project financing; and (iv) project management to build on existing program management structure for project implementation.

<sup>2</sup> Participating aimags included Zavkhan, Uvs, Khovd and Gobi Altai. At the mid term review, approval was given to include Bayankhongor in the target project areas for credit related activities.

<sup>3</sup> Participating aimags include Bayan-Ulgii, Uvs, Bayankhongor, Overkhangai, Omnogov, Dundgov, Tuv and Dornod.

24. The Micro-finance Development Fund provides a line of credit through the formal financial sector. Wholesale loans have been extended to nine participating banks and six non bank financial institutions (NBFIs) from the Microfinance Development Fund. By the mid term review in 2004; approximately \$3.5 million has been allocated to the participating financial institutions as wholesale loans, from which a total of \$8.74 million has been on-lent to rural residents (including re-disbursements). It has extended a total of 10,017 loans to some 50,000 in eight target aimags and achieved a repayment rate of 98.2% on loans. Almost 55% of the loans have been extended at the soum level or below, 94% of which have been used for income generating purposes. Terms and conditions for sub-loans are determined by the issuing institution and are market based interest rates. While term loans are possible under the credit, most of the lending has been for production purposes. The overall objective of the microfinance component is to increase outreach and access of microfinance services in rural areas. The project has contributed towards reducing interest rates that have declined from almost 5% to 2.9% on average in the areas where the PFIs are operating. In addition, the rise in the number of financial institutions operating in the soums has also increased as have the number of loan products available to rural residents.

#### **Rural Poverty Reduction Project**

25. The long term goal of the Rural Poverty Reduction Project (RPRP) is to achieve sustainable and equitable poverty eradication for vulnerable rural households living in an environment with increasingly degraded natural resources. The overall objective is to achieve a sustainable increase in productive capacity of herders, cultivators and the general public and to offer increased access to economic and social resources, including education, health and social networks. The total program cost is \$19.1 million of which \$14.8 million is financed by the International Fund for Agricultural Development, XAC Bank contribute \$1.6 million as counterpart credit contribution and the Government provide the equivalent of \$2.7 million. The main objective of the credit component is to increase the family income by offering financial services, and supporting activities to rural residents in Arkhangai, Huvsgul, Bulgan and Khentii aimags to increase their incomes.

#### **Support for Food Safety Project**

26. A small project of \$1.3 million of which, a credit line of \$1 million was disbursed through a number of participating banks with targeting based on poverty criteria. Interest rates were set at below market rates and participating financial institutions do not accept responsibility for the recovery of the funds. As such, funds accessed under this scheme were not for on-lending, providing a resource for the bank but were more a line of credit administered through the banking network. This provides one model for reducing interest rates to borrowers.

### **C. Future Development Strategies**

27. The Government has devised a medium-term strategy that will lay the foundations necessary for achieving its longer term vision for the financial sector. This strategy incorporates important lessons learned during the earlier stages of the reform process, including: (i) the importance of having in place the essential building blocks required to support a market based financial system; (ii) that well functioning financial markets cannot develop without a credible government commitment to honor contracts and to ensure protection of private property rights; (iii) that policy reforms are much more effective when properly sequenced in order to have in place the essential institutions without which markets function less efficiently; (iv) that a pervasive involvement of the state in the allocation of financial resources is incompatible with the development of a market-based financial system; (v) that recapitalization of insolvent state banks leads to greater losses in the future; (vi) that liberal entry requirements lead to too many poorly managed banks; and (vii) that a sound

and effective financial system cannot be built without a legal and institutional framework that encourages debtors to discharge their commitments to creditors.

28. Drawing on the above lessons, the Government's Medium Term Strategy for the Development of the Financial Sector involves the introduction of reforms that:

- establish the foundations for a market-based financial system, including the development of modern banking skills, enhancement of auditing and accounting standards, the enforcement of financial contracts and the establishment of an exit policy process for troubled banks;
- signal the government's commitment to uphold private property rights and financial contracts, beginning with the timely servicing of interest payments on government bonds held by banks;
- reduce the pervasive role of the state in the allocation of financial resources. (Government-controlled banks account for 84% of the assets in the banking system);
- facilitate the development of sustainable rural financial institutions to provide payment systems and banking services appropriate to conditions existing in a sparsely populated country such as Mongolia;
- prompt the consolidation of the banking system by doubling the minimum capital requirement to Tg 2 billion (\$1.9 million equivalent);
- strengthen the legal framework for effective supervision and regulation by Mongolbank including the requirement for prompt corrective action;
- develop a resolution and liquidation framework for failed banks; and
- provide the foundations for the development of a market for government bonds.

#### **IV. PROGRAM PROFILE**

##### **A. Objectives and Outcomes**

29. The aim of the program is to develop an effective mechanism that allows commercial financial institutions to extend production and term credit for rural development initiatives under terms and conditions more appropriate to the special characteristics of the agricultural sector. Through this Program, it is envisaged that any interest subsidy that might be offered as an investment incentive will be clearly identified and made available to all in a transparent manner, enabling the cost of the intervention to be established and the impact from same to be measurable.

##### **B. Scope and Key Activities**

30. The Government is seeking to strengthen the sector's access to affordable and appropriate credit and will incorporate: (i) investigations into risk sharing options through equity participation or suspensory loan, or dedicated venture capital funds resulting in clearly identifiable interest rate subsidies, (ii) the introduction of financial leasing allowing tax credits for lenders and full deductions of lease payments by borrowers, and (iii) risk sharing through guarantee fund, compensating lenders for proportion of bad debts, and (iv) an interest compensation fund, compensating borrowers for a portion of interest paid. These will require some modification to the legal framework including the tax act and the new leasing legislation approved in July, 2006.

31. The program will commence with a comprehensive investigation into the alternative means available to the Government for providing investment incentives in agriculture that are consistent with the stated objectives of Mongolbank, the manager of credit in Mongolia.

The study will include the identification of changes to existing legislation to accommodate further incentives through tax credits for financiers and deductions for lessees. The Study will investigate the full range of alternatives open to Government as a means of stimulating investment in agriculture. Two other alternatives worthy of further examination is the establishment of a compensation fund for covering bad debts of lenders, the operations of which need to be further developed. The second is a fund to compensate for the difference between open market interest rates and the rates the Government wishes to establish to support agricultural producers. Funding of this differential should be clearly recognized as a public responsibility and therefore fully accountable as a separate line item in financial accounts and reported on a regular basis to the public. The mechanics of operating such a facility needs to be identified and administered, the cost of which would be included in the administration costs of the Program.

### **C. Institutional Capacity Building**

32. There is little needed by way of capacity building for the financial sector institutions. Commercial banks have developed significantly and are generally in far better condition to operate within an open competitive market environment. While many of the longer serving employees (who are more familiar with directed credit programs) may still be employed within these institutions, there has been considerable capacity building in the financial sector through the World Bank, ADB, USAID and also Mercy Corps through the late 1990s and into the early 2000s that, together with the changing ownership and infusion of international management standards, have led to a strong and capable range of staff who are well skilled in banking matters. The coordinating role of the Central Bank is now clear and a new wave of young and capable graduates are beginning to have their influence within Mongolbank as they progress within the institution charged with responsibility for managing the financial sector. Perhaps the only area where capacity building might be appropriate is in making newly elected politicians aware of the

### **D. Summary Cost Estimate of the Program**

33. Summary cost estimates for this Program are difficult to assess because of the imprecise nature of the support needed. Initially, the Program will require few resources other than to conduct the comprehensive study into support options. However, as recommendations from the study become clearer, it will be possible to estimate financial requirements for the level of assistance agreed by the Government. For the purpose of the Strategy, two items have been included, the first a reserve fund, the interest from which will cover bad debts estimated at 2% of the current outstanding debt to agriculture and the interest rate subsidy estimated at 20% that can be applied to say 20% of agricultural debt. It is unlikely however that both options will be introduced. Table 2 outlines the physical inputs to the Program while Table 3 presents the cost of such a Program. It should be noted that these cost estimates have not been discussed with the MoFA although the concepts have been agreed to form part of the Strategy.

### **E. Indicative Implementation Arrangements**

34. As responsibility for credit is the responsibility of Mongolbank, the Executing Agency of the Program should reside with this government statutory authority. However, part of the issue with rural lending is in catering for the special needs of agriculture, its seasonality and the high risk associated with production activities. While the Programs attempts to address the high level of risk by securing water supplies, improving management capabilities, providing security of tenure etc., additional input may well be needed from the MoFA to assist Mongolbank in its understanding of the issues. For this reason, a joint Steering Committee is proposed to deal with the cross sectoral issues so that both financial knowledge and agricultural expertise can be combined to achieve a more appropriate

outcome. The Steering Committee should be headed by Mongolbank and its deputy, a representative from the MoFA. It is intended that this Steering Committee should supervise any technical assistance that might be identified to direct such studies.

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Table 2: Agricultural Credit Program - Physical Inputs

	Unit	Unit Cost (Tugrik '000)	Quantities										
			2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
I. Investment Costs													
A. Legislative Modification													
Provisions for legislative amendment	year	11,600	-	1	1	1	-	-	-	-	-	-	3
B. Investigatory Studies													
Alternatives Study /a	pminths	29,000	-	25	-	-	-	-	-	-	-	-	25
C. Credit Facilities													
Bad Debt Compensation Fund /b	Dollars	2,000,000	-	-	1	1	1	1	1	1	-	-	5
Interest subsidy /c	Dollars	2,000,000	-	-	1	1	1	1	1	1	-	-	5
Total													

/a Includes consultants and support costs

/b Estimated on Tg 60 trillion at 2% for bad debts generated annually from an investment of the equivalent of \$10 million invested at 10% per annum

/c Estimated at 20% split on about 20% of the current outstanding debt of Tg 60 trillion

## Volume II - Program Investments - Agricultural Credit Program

Table 3: Agricultural Credit Program - Cost Estimates

Unit	Unit Cost (Tugrik '000)	Base Cost (Tugrik Million)									Total
		2007	2008	2009	2010	2011	2012	2013	2014	2015	
<b>I. Investment Costs</b>											
<b>A. Legislative Modification</b>											
Provisions for legislative amendment	year	11,600	-	11.6	11.6	-	-	-	-	-	34.8
<b>B. Investigatory Studies</b>											
Alternatives Study /a	pmnths	29,000	-	725.0	-	-	-	-	-	-	725.0
<b>C. Credit Facilities</b>											
Bad Debt Compensation Fund /b	Dollars	2,000,000	-	2,000.0	2,000.0	2,000.0	2,000.0	2,000.0	-	-	10,000.0
Interest subsidy /c	Dollars	2,000,000	-	2,000.0	2,000.0	2,000.0	2,000.0	2,000.0	-	-	10,000.0
<b>Total</b>			-	736.6	4,011.6	4,000.0	4,000.0	4,000.0	-	-	20,759.8

/a Includes consultants and support costs

/b Estimated on Tg 60 trillion at 2% for bad debts generated annually from an investment of the equivalent of \$10 million invested at 10% per annum

/c Estimated at 20% split on about 20% of the current outstanding debt of Tg 60 trillion

**F. Program Framework Matrix**

<b>Design Summary</b>	<b>Performance Indicators/Targets</b>	<b>Monitoring Mechanisms</b>	<b>Assumptions and Risks</b>
<b>Goal</b> 1.0 To increase rural borrowing in proportion to agriculture's contribution to national GDP.	% of rural lending compared to the total loan portfolio	Mongolbank quarterly reports and NSO national accounts	The demand for credit from within the sector is sustained.
<b>Purpose</b> 2.1 To extend production and term credit for rural development initiatives under terms and conditions appropriate to the special needs of the agricultural sector.	Volume of production credit extended to agriculture  Volume of term credit extended to agriculture	Mongolbank annual statistics	
<b>Outputs</b> 3.1 Mechanisms identified to effect interest rate subsidies.  3.2 Bad debt guarantee fund established and operational.  3.3 Interest rate subsidies being applied in critical production and processing enterprises.  3.4 Regulations modified to provide tax incentives through financial leasing.	Government adopts consultant recommendations  Fund established and bad debts claimed not exceeding 2% of rural loans.  Interest subsidies of 20% paid on 20% of rural loans  Quantity of tax credits from agriculture investment	Cabinet minutes  Mongolbank quarterly reports  Mongolbank quarterly reports  Ministry of Finance - taxation reports	Mongolbank and Ministry of Finance support the concept  Funds are available  Funds are available  Commitment to reform continues
<b>Activities</b> 3.1.1 TA to study alternative means to support reduced interest rates	Consultants completed	Final acceptance report	
3.2.1 Develop procedures and implementation arrangements for guarantee fund.  3.2.2 Provide funding for the required level of the fund.  3.2.3 Support the operations of the fund managers.	Procedures published  Funds allocated  Administrative structure operational	Consultant's report  Fund quarterly reports  Budget allocations to the management entity	Availability of funds

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3.3.1 Develop procedures and implementation arrangements for interest rate subsidy.	Procedures published	Consultant's report	
3.3.2 Provide funding for the required level of the support.	Funds allocated	Fund quarterly reports	Availability of funds
3.3.3 Support the operations of the administrators of the scheme.	Administrative structure operational	Budget allocations to the management entity	
3.4.1 Support the development of regulations and legal amendment.	Regulations developed and legislation amended	Parliamentary ratification	

# **AGRICULTURE SECTOR STRATEGY STUDY**

## **VOLUME 2**

### **FOOD QUALITY AND HYGIENE PROGRAM**

**30 NOVEMBER, 2006**

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## ACRONYMS

ADB	- Asian Development Bank
ADF	- Agriculture development Fund
ADRA	- Adventist Development Relief Agency
AEC	- Agricultural Extension Center
AHRI	- Animal Husbandry Research Institute
AI	- Artificial Insemination
ASDP	- Agricultural Sector Development Project
CIDA	- Canadian International Development Assistance
DANIDA	- Danish International Development Agency
EGPRS	- Economic Growth and Poverty Reduction Strategy
EU	- European Union
FAO	- Food and Agricultural Organization (of the United Nations)
GAP	- Government Action Plan
GDP	- Gross Domestic Product
GTZ	- German Bi-lateral Aid Agency
HACCP	- Hazard Analysis Critical Control Point
ICLP	- Integrated Crop and Livestock Project
IFC	- International Financing Corporation
ISO	- International Standards Organization
JCS	- Jesuit Christian Services
JICA	- Japan International Cooperation Agency
KOICA	- Korean International Cooperation Agency
M&E	- Monitoring and Evaluation
MDG	- Millennium Development Goal
MIT	- Ministry of Industry and Trade
MNB	- Mineral Nutrient Blocks
MNE	- Ministry of Nature and Environment
MoFA	- Ministry of Food and Agriculture
MSUA	- Mongolian State University for Agriculture
MTBF	- Medium Term Budgetary Framework
NAEC	- National Agricultural Extension
NAMAC	- National Association of Mongolian Agricultural Cooperatives
NEMA	- National Emergencies Management Agency
NGO	- Non government organization
NPA	- National Plan of Action
PFI	- Participating Financial Institution
PPP	- Public Private Partnerships
PSARTI	- Plant Seed Agriculture Research and Training Institute
RPRP	- Rural Poverty Reduction Project
SCSL	- State Central Seed Laboratory
SDC	- Swiss Development Cooperation Agency
SEFF	- State Emergency Fodder Fund
SLP	- Sustainable Livelihoods Project
SPIA	- State Professional Inspection Agency
TACIS	- Technical Assistance for the Commonwealth Independent States
UNDP	- United Nations Development Program
UPOV	- International Convention on Plant Variety Rights
USAID	- United States Agency for International Development
WTO	- World Trade Organization
WUG	- Water User Group

## FOOD QUALITY AND HYGIENE PROGRAM

### I. GENERAL BACKGROUND

1. Food safety is becoming an increasingly important issue in Mongolia as the rural-urban supply channels become more commercialized. When the rural population dominated food consumption, the difficulties of processing, transporting and storing food items assumed less importance than they have recently with the majority of consumers now residing in urban areas. The fact that an estimated 80% of all livestock killed is slaughtered in outdoor areas, and that carcasses are transferred to wholesale and local retail meat markets and other retail outlets in makeshift transport without refrigerated storage facilities, are cause for concern for the general well-being of the population. Similarly, this meat finds its way to processing outlets for subsequent manufacture of small goods and other processed meat products where hygienic conditions are rarely maintained and certainly not enforced. For fresh dairy products, the risk is similarly high as non pasteurized milk is delivered to local retail outlets in metal vats and plastic urns under conditions that are far from hygienic and the quality of the raw product in the first instance is also of concern. For processed dairy products, traditional processing improves the shelf life considerably, lowering the hygiene risk associated with storage and transport. With the increasing dependence upon imported vegetable items, there is concern at the quality, in particular, the level of pesticides and the uncertainty of whether they have been withheld from the market for the necessary period after application. Increasing reliance on chemical means for managing the production environment in neighboring countries is of concern to the Government as these pose significant health threats to Mongolians. Chemical residues and bacteria associated with perishable food items are two areas that the Government are seeking a greater role in monitoring food hygiene.

2. Food safety is identified in the Government's food policy as a priority area. However, Mongolia's food safety standard enforcement is weak as evidenced by recent reports of increasing incidence in food related diseases, suggesting the failure to enforce these standards. Food safety standards include health and hygiene requirements for factory processing, packaging, slaughter of animals and storage of commodities, especially perishables with a short shelf life (meat, dairy, eggs, vegetables etc.). They are important because:-

- Government accepts the responsibility to protect its consumers, a requirement that has repercussions on budgetary expenditure in two ways - firstly, that the cost of maintaining food safety surveillance can be significant and secondly, that the repercussions from not maintaining vigilance expresses itself in the government public health services. It is often cheaper to attend to preventative care than curative treatments.
- Poor food quality standards have an effect on general price levels that can be achieved and on the marketability of produce, affecting the profitability of both processor and producer.
- A poor food safety reputation undermines local produce and supports the perception that imported equivalents are of higher quality. Poor quality is less important to consumers than poor safety. Other countries use health and hygiene as non-tariff barrier to maintain the competitiveness of locally produced goods, particularly where



the production conditions are more favourable in neighbouring countries. Such practices are still valid under World Trade Organization (WTO) rules.

#### **A. Meat Hygiene**

3. With such a low percentage of the annual kill destined for the domestic market being slaughtered in registered (and by implication, hygienic) premises, there is a considerable challenge in maintaining the quality of meat and meat products delivered onto local markets. There are two meat hygiene issues - firstly, at the time of slaughter, that the animal was in sound health, free from zoonotic diseases and free from the residues of any vaccinations or antibiotics, and secondly, that the animal was slaughtered in hygienic facilities to ensure that the product delivered to consumers is free from harmful bacteria and other toxins. Such assurances are not possible under current conditions found in Mongolia. Ideally, the inspection service at the point of slaughter should be able to screen animals for zoonotic diseases (such as Brucellosis) and prevent them from entering the human food chain. An animal identification and trace back systems is needed to use information obtained during meat inspection to identify herds with infected animals so that appropriate treatment can be administered or destruction (with compensation) arranged. With the small proportion of animals being killed at registered facilities (less than 20%), there is limited opportunity to conduct routine pre and post mortem inspections to improve the health of the national herd/flock.

4. Meat destined for the international market must conform with higher hygiene standards, guidelines for which are available from OIE but also importing countries impose their own sanitary conditions to protect their domestic consumers. Recently, meat exports have been accorded less attention because of buoyant domestic prices, but the Government should retain the export capacity should domestic markets fail to consume the available domestic production.

5. The organization responsible for maintaining meat hygiene standards is the State Professional Inspection Agency (SPIA) that was recently separated from the Ministry of Food and Agriculture (MoFA) to separate the technical advisory functions from those of standards enforcement. The SPIA maintains a corps of trained (to international standards) meat inspectors (based in Ulaanbaatar) who are sent to provincial export abattoirs throughout the country if inspection services are required. If export is not contemplated, processors are not required to involve inspection staff in the killing process. Inspectors of meat destined for the domestic market do not exist because of the difficult logistics in attending all slaughter locations.

#### **B. Dairy Produce**

6. Under the socialist period, state owned dairy farms generated liquid milk for urban consumption to be processed through the state-owned dairy processing plants. The process of transporting milk to the factory was well organized with appropriate infrastructure (cooling and transport facilities) to ensure that milk was delivered in reasonable condition for processing and distribution. With the collapse of this marketing infrastructure, the industry was reduced to small-scale opportunist traders where producers and some traders transported liquid milk to urban markets where they were sold in street markets and retail outlets. Much of the seasonal flush was converted into traditional dairy products that have good storage properties. With the revival of the liquid milk industry by a significant and growing number of small-scale producers, the quality of the raw material is often suspect and the process of marketing this highly perishable product at the hottest time of the year when milk production is cheapest, has created significant health implications for consumers. It is estimated that 5% of milk delivered to urban markets passes through processing facilities. In many ways, the quality standards achieved with reconstituted imported milk

powder are better than the locally produced fresh product. With the likelihood of locally produced fresh liquid milk assuming increased importance in the liquid milk market, certainly during the summer flush, the issue of milk hygiene is of major concern. The FAO/Japan funded Dairy Development Project has attempted to address the quality issues by adopting an holistic approach "from cow to consumer" to maintain the quality of locally produced milk. Even so, with a large number of small-scale producers supplying the market, the Government is keen to maintain surveillance of the health status of milk produced in this manner, just as it is to monitor the quality of reconstituted milk.

### **C. Vegetable Products**

7. The main vegetables grown in Mongolia are potatoes, cabbage, other root crops, mostly at small scale for immediate consumption although there are signs of emerging commercial units that have introduced mechanized land preparation and irrigated production systems giving them increased capacity to generate marketable surpluses. While these suppliers are increasing in number, their produce suffers from inferior quality, being produced under more difficult conditions compared with Chinese producers. It is estimated that only 40% of vegetables consumed are supplied by local producers, the balance being imported. The introduction of stricter phytosanitary requirements could assist in assuring that the safety<sup>1</sup> of imported goods. Any regulations that might be introduced will have associated resource limitations to enforce new standards. Vegetable items come across the porous southern border to meet the shortfall of domestic production and often contain high levels of pesticides from not observing the required withholding periods. Many of these vegetables present better in the market by comparison with the locally produced equivalent as they have been grown under very different production systems. The Government is keen to protect its consumers from unsafe products and is interested in developing quarantine inspection points with a capacity to check the level of residues on imported vegetables.

8. The Government has a role to play in support of research, standards and grades, inspection and laboratory testing, animal health, greater food product safety and, in the longer term, development of trace back systems for food products. There is a potential link with other forms of standards related to quality plus also differential commodity pricing based on grades. In addition, quality standards associated with storage, handling and processing also need to be taken into consideration. Secure international market access increasingly relies on the ability to meet specific importer and/or global standards for product health and safety. Over the next 10 years, these requirements are likely to increase significantly under the influence of a more health conscious consuming population. The Government can strengthen and secure long term access to international markets by establishing grading and inspection systems, food/product safety standards, sanitary and phyto-sanitary standards and agreements that are harmonized with international standards to facilitate export.

9. It is in the country's best interest to have effective and efficient agriculture and food product standards, inspection and reporting system to assure productivity and incomes, human health and domestic and international market access. Development of effective control programs for animal diseases that affect human health, such as brucellosis transmission to humans through raw milk consumption should be an immediate priority of both national and international organizations. Longer-term program development should focus on eradication of zoonotic animal diseases, effective programs to ensure safe food products are available to consumers, regulating pesticides, herbicides, and fertilizer use, and developing and complying with national and international standards throughout the food production chain.

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<sup>1</sup> In this context, food safety refers to pesticide residues.

## II. ISSUES - STANDARDS, INSPECTION AND REPORTING

Level	Current Situation	Desired Situation and Change Required	Role of		
			Government	Private Sector	Projects
Standards and Enforcement	Pesticide policies, standards and chemical registry need to be harmonized with international standards since all agriculture chemicals are imported.	Updated agricultural chemical registry to ensure plant health and safe, appropriate use within Mongolia.	Review of international agriculture chemical registries and update of Mongolian list.	---	---
	Standards are not enforced in the market place. Inadequate number of inspectors and those working are not appropriately trained or provided with the resources necessary to carry out their responsibilities.	Adequate number of full-time and contracted inspectors able to carry out assigned functions, supported by regular professional upgrading and resources to ensure timely field visits.	Budget allocation to aimags for inspection services.		Capacity building program for inspectors; regulation, organizational development and training.
Testing	Seed laboratory unable to carry out a complete range of tests on biological and genetic traits or to reliably identify pesticide residues.  No quality control program for test results is in place.  Volume of tests is 30 to 40% below the required level.	Seed laboratory capable of reliably carrying out a full range of tests to international standards supported by a quality control program.  Volume of tests is adequate for industry needs.	Development of quality control program.  Allocation of resources to support ongoing operation, maintenance, staff continuity and membership in international organizations.	Private sector cost-sharing of inspection, testing and trace-back systems.	Upgrading of laboratory equipment, professional upgrading for staff.  TA on harmonization with international standards and organization membership.
	Pesticide residue testing capacity within Plant Research Institute and border control is inadequate for modern chemicals. Testing takes 7 - 10 days and slows importation of product.	Laboratory capacity in place with trained staff and quality control programs to provide timely and reliable tests on pesticide residues in soil, water and products to government and industry.	Development of quality control program.  Allocation of resources to support recurrent expenses. Staff trained. Membership in int. organizations.	Private sector cost-sharing of inspection, testing and trace-back systems.	Professional upgrading for staff.  TA on harmonization with international standards and organization membership.

## Volume II - Program Investments - Food Quality and Hygiene Program

Level	Current Situation	Desired Situation and Change Required	Role of		
			Government	Private Sector	Projects
	Animal health - quarantine stations under resourced to carry out an effective protection program.  Limited holding facilities at border posts add to the pressure for inadequate protection procedures.	Border posts equipped with appropriate laboratories and livestock handling equipment.	Streamline procedures and improve enforcement of quality standards.	Contract testing as appropriate.	Support for training of laboratory analytical staff and for inspectors at border posts.
	Food safety standards are not uniformly enforced. Hygiene standards in agro-processing works are poor and food inspectors are not adequately trained to perform their duties.	A well resourced food hygiene inspection service with well trained and adequately resourced inspectors enforcing a well documented inspection program.	Refine hygiene standards for food and agro-processing industries.	Assist with self regulation by exception reporting to SPIA.	Provide resources for capacity development of inspectorial staff.
Reporting and Trace Back Systems	Trace back facilities are non existent with low % killed in registered premises.  Government disease control programs not supported with trace back for zoonotic diseases.	Develop a trace back system including an animal identification.  A renewed capacity to identify herds within Mongolia from which infected animals have been sourced.	Revision of regulations, introduction of appropriate trace back systems	Private meat and dairy processors develop internal measures and incorporate in the cost for processing.	Finance a pilot project on the trace back of animal diseases.  Support the routine blood testing of livestock.
Industry-based quality assurance programs	Few industries have adopted quality assurance programs in terms of input supplies or of processed product output.	Quality assurance program supported by grading initiatives with associated price differentials for quality.	Negotiate industry standards with private operators and regulate accordingly.	Observe standards introduced and incorporate quality certification into marketing initiatives.	Adhere to industry standards as appropriate and also support the development of certification mechanisms.

### III. ANALYSIS OF GOVERNMENT'S REGULATORY ROLE

10. The Government has responsibilities for quality control of both livestock and plant items to protect the domestic industries from diseases that might exist in other countries and therefore accepts this as a public responsibility to maintain the health standards of its agricultural produce to maintain its competitiveness on international markets. Its second obligation in respect of food safety is to protect its population from unsafe food items. These obligations of the Government are outlined in the Food Law of 1999 and are currently under review with amendments<sup>2</sup> due to be considered during the 2006 parliamentary sessions. Under the existing law, the MoFA is responsible for the development of policy on food safety while other ministries such as the Ministry of Health, and agencies such as the SPIA are responsible for their implementation. The separation of policy development from implementation has led to reduced cooperation as they come under two separate ministers. The SPIA is by far the larger institution with over 300 staff in Ulaanbaatar, 900 staff in the aimags and a further 800 contracted staff, but it also has far broader responsibilities other than food. Food is only one of its 18 areas of responsibility. MoFA staff number about 70 (including contract personnel) and the Food Division has four individuals responsible for meat and dairy products, plant products, and processed food items. The Food Division is responsible for policy development in respect of food safety and has developed regulations describing sanitary conditions required in food processing plants based on standards set by the Standardization Agency and issues certificates of conformity with these standards. Most of the Ministry's activities are directed at domestically produced food items, both fresh and processed.

11. The main thrust of Government policy on food safety addresses: (i) locally produced food items (MoFA), (ii) food safety aspects of imported food items (SPIA), and (iii) the nutritional aspects of food supplies (Ministry of Health). The first category has been described above while the second is the responsibility SPIA and is becoming increasingly important with more than 60% of the country's food being imported. The country has 23 official points of entry and has an extremely open border making border control not only logistically difficult but very expensive to administer. These border posts are staffed with over 200 officers of SPIA. With limited facilities or analytical equipment at their disposal, they are forced to depend upon their senses to detect illegal or substandard food items. Holding perishable goods at borders is not an option as storage facilities do not exist and the turnaround time to analyze samples is about two months in SPIA's Central Foods Laboratory in Ulaanbaatar (that is also in need of rehabilitation). SPIA staff are allocated to four areas of operation in respect of food inspection including (i) those responsible for the larger regular traders including *Makh Impex* Company, *Suu* Company etc., (ii) those with responsibilities for checking the smaller traders in food items, (iii) those stationed in Ulaanbaatar with responsibility for checking the storage and handling facilities of small traders, and (iv) those with responsibility for maintaining food safety checks at retail outlets.

12. The third area of government attention (food nutrition) has evolved along with Mongolia's progressive transition. Previously, the Government was preoccupied with maintaining supplies of essential goods to its consumers during times of food shortages. More recently, the attention has been directed at maintaining food safety for their protection. With increasing affluence and progressively changing tastes in a market economy, there has been new interest in the nutritional status of food items. It does not however, suggest that

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<sup>2</sup> The revisions seek to establish a separate agency for food hygiene under MoFA with overall responsibility for food inspection. This would mean a significant change in the institutional structures within the Ministry and require a significant increase in human resources to give effect to the proposed amendments.

the Government is neglecting its 36% poor families (higher in rural areas) where the nutritional status is less important than the minimal requirements of energy and protein to sustain a livelihood. A new initiative funded by United Nations Children's Fund (UNICEF) is to address the nutritional requirements of this disadvantaged group of Mongolians.

### **A. Livestock Industries**

13. Within the livestock subsector, the Government has a role in assuring standards in respect of: (i) meat safety standards (meat inspection), (ii) animal quarantine, (iii) the quality of production inputs used for livestock production including veterinary medicines and treatments, livestock feed quality etc., and (iv) the sanitary condition of imported genetic material.

#### **1. Meat Inspection**

14. The incidence of disease in animal based food items can have national and international repercussions that can devastate local, national and international economies. It is estimated that half of MoFA's budget is appropriated to agencies tasked with ensuring animal health and safe food products. The effectiveness of these activities are constrained by limited resources as is its disease control program and laboratory capacity for disease diagnosis, together with the limited capacity of producers to pay for veterinary and animal health treatments. Meat inspection initiatives are also less effective because of the low proportion of animals killed in registered premises making any inspection service incomplete and the opportunity for disease control (using trace-back mechanisms) impossible. One of the main challenges in this area is to increase the proportion of the kill through registered premises. While the Government is committed to pursuing the "hazard analysis critical control point" (HACCP) into meat processing plants throughout the country, it is also aware that its introduction will add significantly to the cost of killing livestock. There is already concern at the high meat prices in markets of urban centers and further upward pressure on prices will not be appreciated. Increasing the proportion of the kill through registered premises will no doubt also to increasing the cost of meat in the cities and the Government is aware of the cost implications of improved monitoring. The Government therefore sees a longer term objective of increasing the volume of livestock slaughtered through registered premises with the associated introduction of HACCP procedures and for improving the level of meat inspection services.

15. In the immediate future, the Government's objectives in disease control and meat hygiene will continue to be addressed through the national disease surveillance activities and the upgrading of aimag serum laboratories (Disease Management Program), while it will strengthen the capabilities of its meat inspectors and encourage private slaughter houses to improve hygiene standards in their plants to at least maintain currency with international requirements. In many ways Mongolia is fortunate in that winters provide a natural freezer and meat safety is less of a threat at that time of the year.

#### **2. Animal Quarantine**

**Animal Health:** It is a legitimate and needed role of the GoM to improve the capacity to inspect, monitor and develop programs to address the problems of animal disease. Animal and plant health protection systems are an extremely important component of modern agriculture. The purpose of protective systems is not only to reduce health risks to human consumers but also to ensure the health of animals and plants that form the basis of a country's agriculture production. OIE recommend procedures for the importation of live animals and also for animal products so as to minimize the opportunity of bringing disease into the country. These regulations place the onus on the exporting country to conform to the international requirements. In addition to these, some countries have added more rigorous

requirements for the import of such items, particularly in respect of breeding stock. Australia for example has a significant livestock industry and is considered free from FMD. The Australian Government has introduced more rigorous measures on the import of meat products in an attempt to protect its domestic industry from disease that could be imported into the country. It is not uncommon also for importing countries to use the health status of potential suppliers to create artificial barriers to trade even though the threat may be relatively insignificant. Mongolia has adopted OIE recommendations for the trade in livestock and livestock products.

16. The country is justified in establishing and maintaining high standards to confirm the health status of any animals imported in view of the economic importance of its livestock population. While the health status of animals is the prime responsibility of the owners, the Government is justified in protecting livestock from the threat of imported animals and as such, wishes to maintain an effective quarantine service. With a large number of official border crossings with the associated quarantine facilities, it is difficult to maintain an adequate quarantine inspection service over such an extended area for the full range of products that constitute a threat to the livestock population. The situation is made more complicated by the extensive international borders between the former Russia and People's Republic of China that remain porous to illegal trade in livestock and livestock products. In spite of this, there are compelling reasons why the Government must adopt a vigilant approach to the threat from imported animal diseases - both those that can be transmitted to humans as well as those impacting upon livestock productivity.

### **3. Animal Health Products**

17. With such a large livestock population in Mongolia, the country offers considerable opportunities for the sale of animal health products. As indicated in the Agricultural Support Services Program, it is acknowledged that the input supply services remain relatively under developed in Mongolia yet there is a demand for certain animal health products - anthelmintics, ecto-parasite control, antibiotics and vaccines. While some of these are produced in Mongolia, an increasing proportion is imported. The quality of the imported material (and the locally produced product) can vary considerably between batches and also, depending on the way items are stored and transported, their potential value as a treatment is similarly effected. Importers and distributors do not always have the expertise to assure the quality of imported material and are dependent entirely upon the certification of the supplier.

18. Two issues relate to the import of animal health treatments. The first concerns whether or not the active ingredients are appropriate for use in Mongolia while the second relates to the effectiveness of the active ingredient - is the drug what it is stated to be, is it of the stated concentration, and is it of sufficient purity to be used for animal health purposes. With minimal equipment and laboratories to test imported (and locally produced) medicines, distributors cannot provide any assurance that, what they are selling conforms to prescribed government standards. Many vaccines for example have been imported in good faith but have had no impact in controlling the disease for which the vaccine was administered. The quality of drugs in Mongolia is therefore variable and their effectiveness cannot be assumed. Many consider that drugs are not worth buying because the animals die without treatment and they also die with treatment because of the ineffective active chemicals.

19. The Government is therefore committed to developing regulations concerning the import of animal health products to ensure quality standards are met and that the goods are handled and stored under conditions that will protect the interests of the livestock owner. The Government maintains a register of permissible drugs for use in the treatment of livestock diseases that is reviewed on a regular basis (the SPIA). Lacking however, is quality

certification. The Government is therefore committed to the rehabilitation of drug testing facilities that can be used for domestically produced or imported medicines. While the operations of such a facility will have heavy recurrent implications, it is appropriate that the cost for random checking will be met by importers based on a fee for goods tested or inspected. To operate such a service, there needs to be an operational laboratory with trained staff in analytical procedures. Parallel with this facility needs to be the regulations to confiscate cargoes that do not conform with established industry standards that needs to be applied without favor to any party.

## **B. Plant Hygiene**

### **1. Plant Hygiene and Quality**

20. **Seed Inspection:** The legal and regulatory environment is relatively complete for seed inspection and testing, but the implementation of these regulations is inadequate. Inspection and testing is now the responsibility of SPIA. In the 1980s, testing facilities in the State Central Seed Laboratory (SCSL) and eight seeds laboratories in the main agricultural aimags conducted simple tests on seed purity, foreign seed content, germination rates and kernel weight. The SCSL was recently rehabilitated with seed testing equipment with the capacity to test foundation seeds from research institutes, certified seeds from the State Variety Test Stations and specialized seed producers for basic as well as specialized tests for economic characteristics. Most of these laboratories have ceased operating and those that remain use techniques that are time consuming and inefficient. The SCSL has stopped running biochemical tests due to obsolete equipment. Capacity building for seed testing is essential for providing service to the domestic seed industry and qualifying for future membership international seed organizations such as International Seed Testing Association, FIS, The International Union for the Protection of New Varieties of Plants and others which require that national laboratories are able to meet international seed testing standards as required by these organizations. This will require upgrading equipment, standards, methodologies and human resources.

21. Implementation of seed standards at the aimag level is more problematic. Aimag staff are inadequately trained and are too few to satisfactorily execute their inspection duties in their regions. The SPIA plans training programs, but has no budget to deliver same. As more varieties and crops are imported and grown in Mongolia, this problem is becoming progressively worse. The development of licensed specialist seed inspectors supported by a comprehensive training program would assist in alleviating the problem.

## **C. Constraints**

22. Constraints identified herein are related to productivity constraints through the quality of production inputs. They also have public health repercussions for the public. Constraints in respect of the former include:-

- An under-resourced inspection service that has neither the manpower to implement existing legislation nor the financial resources to undertake these activities given Mongolia's porous borders.
- An analytical capability that cannot respond to current trading practices with traditional trading partners.
- As a consequence, there are unenforceable statutes that are easily avoided under current procurement and delivery practices that allow inferior products to enter the market for production process.



23. Constraints identified in the latter are those relating to public health matters and are more urgent issues than those identified above. They include:-

- An under-resourced inspection service that has neither the manpower to implement existing legislation nor the financial resources to undertake these activities given Mongolia's porous borders.
- An analytical capability that cannot respond to current trading practices, particularly in respect of pesticide residues in fruit and vegetables with traditional trading partners that pose an immediate public health risk.
- An under-resourced food hygiene inspection service with widespread reluctance to conform with existing regulations as to hygiene standards in agro-processing factories.
- A high percentage of livestock killed in open areas where there are no pre and post mortem inspections for zoonotic diseases or the capacity to introduce trace back measures to design a disease eradication program.

#### **D. Opportunities**

24. Opportunities to contribute to improved agricultural productivity are based on the quality of production inputs. For example, the response to seed quality in cropping situations has the potential to significantly increase yields. Similarly, for livestock, the assured quality of vaccines will assist in reducing mortalities. As herders and crop producers see the benefits from increased inputs expressed through increased family incomes, it will be important that quality of the inputs will actually generate such responses. By using sub-standard materials and inputs, the response sought will not be as obvious. Hence the increased use of inputs must be accompanied by a parallel improvement in the quality. This will only be achieved if standards and procedures are observed in sourcing, storing and distributing agricultural supplies.

25. The same applies for food items, be they imported or produced domestically. There is an opportunity to safeguard the public against inferior quality food items for which the potential return is great. It is far better to attend to food hygiene before it becomes necessary to attend to public health issues - salmonella poisoning etc. Both are not considered opportunities in the economic sense but are more public responsibilities for any Government to protect the interests of its farming community and also of its consuming public.

### **IV. GOVERNMENT'S POLICY FOR THE DEVELOPMENT OF THE SECTOR/INDUSTRY**

#### **A. Rationale for Public Involvement**

26. The SPIA is responsible for enforcing the regulatory environment through inspection and, where necessary testing. Activities relevant to agriculture fall under three the Divisions of the Food Safety and Agricultural Control Department covering:-

- Agriculture Plant Protection and Quarantine Inspection;
- Veterinary and Animal Breeding Inspection; and
- Food Industry and Technology Inspection.

27. SPIA also operates centralized laboratories that are active in testing for food safety and plant and animal quarantine tests. Under the proposed readjustment within the organization, SPIA should also be responsible for seed and breed certification, based on testing and trials by the research establishment, and for control of the use, storage, and disposal of toxic chemicals. Because of its quarantine function, the Agency must have close links with Customs and Excise and with Border Control.

28. The Government has the responsibility for safeguarding public interests as this is not an area where it might be possible to generate a profit for entrepreneurship. The inspection services are clearly public domain and there needs to be trained inspection staff to perform these public functions, just as there needs to be some capacity to support this inspection service by way of laboratories where the essential tests can be conducted. While it is possible in the longer term to contract analytical services to private laboratories, the latter are yet to be established (other than for mineral exploration) yet an analytical capacity is needed from the outset. The Government therefore must accept responsibility for providing inspection services and, at least in the interim, provide the necessary support services to enable inspection services to operate effectively.

## **B. Recent Development Initiatives**

### **1. Government Initiatives**

29. Food hygiene, animal and plant quarantine, and material inspection services are areas commonly provided by governments. In Mongolia, the Government has committed significant resources to its inspection services operated under the SPIA. With a staffing level of over 700 country wide and a staff level of about 70 for the Ministry itself, it is obvious the importance the Government sees inspection services. Most of these functions have been funded under the national budget although some activities have been funded under donor programs - such as the rehabilitation of veterinary diagnostic laboratories. The Government has traditionally provided the recurrent expenditure for the inspection services and the operations of the analytical and diagnostic laboratories while the capacity building for its staff is often funded under donor programs. The Government has attempted to decentralize many of its inspection functions that were formerly under the central government's control thereby transferring responsibility for recurrent expenditure to the aimag administrations. Aimag administrations are also finding difficulties in raising revenue to cover their immediate recurrent costs. As a consequence, the resultant inspection services remain under-resourced as are the laboratories that perform the analyses.

### **2. Donor Funded Initiatives**

30. There have been two initiatives in support of meat inspection to institutionalize international standards of meat inspection in export abattoirs in recent years, the first being the USAID funded initiatives implemented by ACDI/VOCA in which significant training was provided to meat inspectors when they resided in the MoFA. The Agriculture Sector Development Project also provided training to meat inspectors (that had been subsequently transferred to the SPIA) to adopt internationally recognized inspection standards and also left modularized training material for subsequent training of new staff.

31. A number of projects have been undertaken in recent years to address the re-establishment of the dairy industry funded by DANIDA in the early 1990s to more recent initiatives by the World Bank and FAO with Japanese financial support (Dairy Development Project). The most relevant in terms of food safety is the latter that has adopted a cow to consumer approach to market development, one aspect of which is milk quality. While this

project has not supported direct initiatives in quality monitoring by the SPIA, it has addressed quality aspects with producers, marketers and processors.

32. There have been no donor funded projects that have addressed the phytosanitary requirements of imported vegetable requirements or at the chemical residues in imported vegetables. In view of Mongolia's dependence on imported vegetables, and in the absence of a significant domestic industry, little attention has been paid to vegetables coming into the country. With greater public attention given to food safety, the Government is also interested in attracting donor funding to address this increasingly significant issue.

### **C. Future Development Strategies**

33. The Government's future development strategy seeks to strengthen the effectiveness of its inspection services. It intends to maintain its focus on food hygiene given the increasing threat from imported fruit and vegetables and the increasing incidence of pesticide residues on same. Similarly, it intends to increase attention on domestic processing facilities to ensure they maintain at least minimum standards of hygiene as specified in the regulations. It also is keen to maintain active quarantine services to protect its extensive livestock sector upon which the economy is dependent. Finally, the Government considers it must accept a monitoring role to ensure the quality of agricultural inputs - vaccine quality, feed quality, fertilizer quality etc, and intends to increase its activity in this area by upgrading quarantine facilities, training its inspectors and providing, in the short term, public laboratories where samples can be diagnosed as part of the public services. Progressively, however, it expects the private sector to share in the cost of providing such services and will seek ways of operating self funding services such as inspection fees at border posts, meat inspection fees at processing works and license fees to contribute to inspection charges of food processing premises.

## **V. PROGRAM PROFILE**

### **A. Objectives and Outcomes**

34. The aim of this program is to maintain government efforts in ensuring the Mongolian public is supplied with hygienic food that meets agreed quality standards, that agricultural producers have access to inputs of reliable quality, and that consumers and livestock producers are protected from the import of animals and animal products with zoonotic and other diseases that pose a threat to humans and the overall well-being of the livestock sub-sector.

35. This is an ongoing initiative to protect the public from potentially dangerous food items and from the inadvertent ingestion of agricultural chemicals and pesticides used in production or processing. With a high proportion of food items sourced outside Mongolia, food quality standards need to be applied equally to imported and locally produced food items. As such, the Government will support the SPIA to establish standards and inspection systems for product quality to achieve market competitiveness and consumer safety. Similar assurances will be developed for other agricultural inputs including animal health products, animal feed, seed and other agricultural inputs.

36. Proposed outcomes from the program include (i) a more comprehensive food hygiene protection program in operation using rehabilitated laboratories for conducting the required food tests, supported by regulations and an enhanced team of food inspectors (including meat inspectors) operating from border posts and in the main domestic food

processing industries in the main urban centers, (ii) increased confidence supported by product certification that the inputs being used in agricultural production are free from disease and other foreign material, that the active ingredients are as described on the labels and that they are in sound condition to be used for their intended purpose. This renewed confidence in the quality of goods to be used in production will be supported by the establishment of standards for chemicals, vaccines etc that will be reviewed under the Program and supported by a trained and resourced inspection service operating out of the SPIA, and (iii) an efficient quarantine service that effectively protects the domestic agricultural industry from pests and diseases and other critical biological species by a trained cadre of inspectors that have strengthened regulations to monitor the import of animal and plant matter and the appropriate facilities on location to test for prohibited substances.

## **B. Scope and Key Activities**

37. The proposed scope of activities cover three areas: (i) food standards, (ii) the quality of material inputs, and quarantine services. Descriptions of the proposed activities are summarized below.

### **1. Food Standards**

38. A three pronged approach is needed to generate the desired outcomes under this part of the Program. This involves the review of food hygiene regulations with the view to broadening the commodities covered and to extend their coverage to address chemical contamination issues of plant and animal based food products. In order to enforce the revised regulations, there will be considerable upgrading of the testing facilities and of capacities of the food inspectors engaged by SPIA. The Program will rehabilitate and broaden the range of tests that can be conducted in the national laboratory as well as expand the analytical capacity at border areas to facilitate the trade in hygienic food items. This will allow the timely identification of substandard food items that can be rejected on location without incurring expensive storage charges whilst awaiting results from laboratory tests. The Program will need to incorporate significant capacity building for laboratory staff as the range of tests to be performed will differ significantly from the current testing procedures as new, internationally recognized procedures are adopted. Under the Program, there will be further resourcing of the inspectors to more effectively administer the regulations that will involve initial technical training plus follow up refresher training as new procedures are developed. The initial review will also be responsible for recommending the changes needed for a more efficient food hygiene inspection activity including changes to the institutional responsibilities as well as the resourcing issue, identifying opportunities for contribution of the private sector in meeting the cost of such services.

39. It is proposed to strengthen the protection of domestic consumers by focusing on the main food items consumed including potato, vegetables, flour, meat and milk products. The Program will develop identification and trace-back mechanisms for these food items allowing the SPIA to trace the origin of non-conforming and unsound food items so that the offending source can be identified and an appropriate remedial action taken. This is particularly important with dairy products where there are significant risks to the public during the summer months when fresh milk supplies are delivered to urban markets in open containers. New regulations will be developed for these more perishable products to ensure they are handled and stored to minimize the risk from quality deterioration. The regulations will be reviewed to deal with the food safety standards associated with processing, marketing, handling, storage, transport and packaging at all stages along the marketing chain.

40. The rehabilitation and construction of the analytical laboratories will provide the necessary facilities that will enable the food inspectors to better go about their work. By

further training and resourcing these personnel, it is anticipated that the quality of food items on local markets - from export or domestically produced foods, will substantially improve. Given that three separate ministries are likely to be involved in the development of program activities, it is likely that implementation will be confounded by poor communications and responsibility linkages. For this reason and in order to obtain views from other countries where similar problems have been encountered, it is proposed that the initial review be conducted by an experienced international food inspection specialist, preferably one from a similar central government background.

41. The third area under this component will be the improvement of the meat inspection services. While frozen meat has traditionally been transported around the country for years in Mongolia, the increased urbanization has created challenges for this distribution system. The increasing consumption of meat that is sourced from wholesale and retail markets as well as the rising incidence of food hygiene related illness, suggest the time has come for greater attention to be given to the transport, storage and handling of meat products. The process begins at the meat works where animals are slaughtered and prepared for further processing or fresh consumption. Even at this early stage, it is important to conduct ante and post mortem inspections to ensure that meat is of satisfactory quality. The Program will strengthen meat inspection services by reviewing current regulations in respect of slaughtering animals. It will investigate the opportunity and practicality of introducing a disease trace back mechanism to identify outbreaks of disease of public concern on meat destined for both export and domestic markets. The inspection services are currently constrained by limited resources and the study will also investigate alternatives for processor funding of meat inspection initiatives as aimags will not have the resources to dedicate for these purposes.

## **2. Quality of Inputs**

42. The second component of the Program addresses the issue of quality inputs to agricultural production. While current utilization of inputs is relatively low, there is widening appreciation that the quality of production inputs used can have a significant impact upon productivity. In recognition of the wide range in quality of animal health products, animal feeds, seed material and others, the Government intends to more closely monitor the quality of locally and internationally sourced agricultural inputs.

### **Animal Health**

43. The quality of drugs, anthelmintics, vaccines needs to be upgraded to encourage their widespread use in livestock rearing. The current list of accredited drugs will be reviewed under the Program as well as the labeling and marking of same so that there is no confusion as to its intended use, contents, or means and rates of application. The SPIA currently maintains such a list but that list needs to be rationalized in relation to the new pharmaceuticals available on the market today. Furthermore, the Program will develop regulations and mechanisms for testing the active ingredients to ensure that vaccines remain effective and are correctly handled and stored in accordance with manufacturers specifications. The mechanisms for screening and testing drugs and pharmaceuticals will be reviewed and procedures recommended for streamlining the import and testing of same. Simultaneously, it will be important to review the procedures for their handling and disposal together with product registration, packaging, merchandizing and licensing.

### **Animal Nutrition**

44. With the increasing importance of the higher input livestock industries round urban centers, there is a growing demand for feed and feed additives. These are currently supplied from imported and local agro-processing industries in Mongolia (brewer's grain, wheat milling etc.) but their quality is variable. Mongolia does not have the feed laboratories to test

feed material available to assist producers in formulating rations. The Program will therefore establish a feed analytical laboratory that it will operate in partnership with a private investor. This recognizes that there are public responsibilities to attend to be confirming feed quality to protect buyers' interests but it also recognizes that there are opportunities to operate these services on a commercial basis after there is some familiarity with test procedures. Staff will be appointed to the facility to be attached to one of the research institutes - possible the Animal Husbandry Research Institute where facilities can serve the purposes of the Institute on a fee for services basis. The Program will supply the facility with necessary equipment and train staff in analytical procedures that can be used in the monitoring and certification process to be developed under the Program.

### **Seed Quality**

45. Similarly, the Central Seed Laboratory no longer can provide the seed testing services to confirm genetic content, viability, germination rates or other aspects of seed quality. In order to protect the interests of consumers, the Government intends to strengthen its seed testing capability. This will involve the rehabilitation of the laboratory, the introduction of additional equipment and the training of laboratory technicians in modern testing procedures. Buyers of both local and imported seed have been disappointed with their experiences in the recent past and are seeking some form of quality assurance that the item purchased is what it is purported to be. This is a public service that is considered necessary in order to regain the confidence of crop producers in the use of the more expensive seed material.

## **3. Quarantine Services**

46. Animal and plant quarantine inspection services are needed in Mongolia to protect the industry from the threat of contagious diseases that have been declared by OIE. Secondly, an effective quarantine service will also protect Mongolians from zoonotic diseases such as bird flu and brucellosis. The Program will upgrade the border control points with facilities to better monitor the health status of animals, animal products and plants being imported - be they for immediate consumption or for breeding purposes. The Program will strengthen the analytical facilities at the State Central Veterinary Laboratory to test for OIE declared diseases and provide training to its staff in laboratory procedures to be adopted in conjunction with food hygiene activities mentioned above. A study will be undertaken to rationalize the development of strategic border posts where improved quarantine facilities can be developed. While policy and regulations in respect of quarantine matters are well established, the Government continues to face difficulties in finding the resources to maintain an effective protection service. With this in mind, the Program will investigate alternate mechanisms for financing an enhanced quarantine service.

## **C. Policy Development**

47. The main policy changes will be directed at providing the regulatory instruments that will enable greater powers and enforcement of food hygiene standards. Regulations need strengthening to authorize the inspectors to perform more rigorous inspections supported by modern laboratories that will add credibility to establishing standards. Further policy refinement is considered appropriate in order to share the cost of certain certification and inspection costs proposed under the Program. It is reasonable that beneficiaries from the food hygiene program should contribute to its cost through fees. Similarly, the policy to recover a contribution to operating costs for other analytical laboratories - such as the animal feed laboratory will significantly reduce the public burden.

#### **D. Institutional Capacity Building**

48. Initiatives under this Program call for the strengthening of analytical skills in a number of the specialist laboratories. In view of the new equipment to be installed that will enable modern tests to be undertaken, there is a need for further capacity building for a range of new tests. It will also require advanced training in new technical areas that have not previously been used in Mongolia on a reasonable scale. Similarly, technical inspectors will need refresher training in the new food hygiene standards to be developed and the meat inspection staff will need further training in disease identification at slaughtering as well as in the detection of residues in tissue and other aspects of meat quality. Finally, with the generation of significant information in relation to food hygiene, input material quality, and quarantine services, there will be a need to develop an information management system to record data and to make it available on demand. The capacity for information management does not reside within SPIA, the Ministry of Health, or MoFA. Staff recruitment and training will be needed to address these deficiencies.

#### **E. Summary Cost Estimate of the Program**

49. Cost estimates for this Program have been estimated based on what is considered necessary to achieve the outcomes. The figures in this section have not been discussed with the Government and the composition of the Program activities have been agreed in principle but exact details have not been ratified. Furthermore the allocation to the most likely financier of the activities has not been attempted. This should be attended to after the Government has agreed on the framework matrix and the detailed activities under the Program. Only then will it be appropriate to identify respective financiers.

## Volume II - Program Investments - Food Quality and Hygiene Program

Table 1: Food Quality and Hygiene Program - Physical Inputs

	Unit	Unit Cost (Tugrik '000)	Quantities												Total
			2007	2008	2009	2010	2011	2012	2013	2014	2015	2016			
<b>I. Investment Costs</b>															
<b>A. Food Hygiene Initiatives</b>															
Review of existing regulations /a	pmnth	23,200	-	10	-	-	-	-	-	-	-	-	-	-	10
Upgrade food hygiene laboratories	labs	116,000	-	1	1	1	-	-	-	-	-	-	-	-	3
Train laboratory analytical staff	courses	5,800	-	2	2	2	2	2	-	-	-	-	-	-	10
Resource inspection services	year	116,000	0.5	0.5	0.5	0.75	0.75	0.75	1	1	1	1	1	1	7.5
Study to review existing meat inspection procedures	pmnth	23,200	-	8	-	-	-	-	-	-	-	-	-	-	8
Development of a traceback system	study	58,000	-	1	1	-	-	-	-	-	-	-	-	-	2
<b>Subtotal Food Hygiene Initiatives</b>															
<b>B. Standards for Agricultural Chemicals and Inputs</b>															
Review drug and chemical handling regulations	study	58,000	-	1	-	-	-	-	-	-	-	-	-	-	1
Rehabilitate testing laboratories	labs	116,000	-	1	1	1	1	-	-	-	-	-	-	-	4
Rehabilitate animal feed laboratory	lab	58,000	1	-	-	-	-	-	-	-	-	-	-	-	1
Train laboratory staff in analytical procedures	course	11,600	1	1	1	1	-	-	-	-	-	-	-	-	4
Rehabilitate seed laboratory	lab	116,000	1	-	-	-	-	-	-	-	-	-	-	-	1
Train seed lab staff in procedures and tests	course	5,800	-	2	2	2	2	-	-	-	-	-	-	-	8
Support for seed lab operations	year	23,200	-	-	1	1	1	1	1	1	1	-	-	-	5
Provisions for attendance at international conventions	conf.	11,600	2	2	2	2	2	-	-	-	-	-	-	-	10
<b>Subtotal Standards for Agricultural Chemicals and Inputs</b>															
<b>C. Quarantine Initiatives</b>															
Study to review strategic border points	study	58,000	-	1	-	-	-	-	-	-	-	-	-	-	1
Establish and or upgrade quarantine facilities	units	116,000	-	1	1	1	1	-	-	-	-	-	-	-	4
Rehabilitate and equip SCVL	set	116,000	-	1	1	-	-	-	-	-	-	-	-	-	2
Incremental resources for quarantine surveillance	year	58,000	-	0.5	0.5	0.5	0.5	0.5	1	1	1	1	1	1	7
<b>Subtotal Quarantine Initiatives</b>															
<b>D. Information Networks</b>															
Design information system	study	69,600	-	-	1	-	-	-	-	-	-	-	-	-	1
Equip the information center	set	58,000	-	-	1	-	-	-	-	-	-	-	-	-	1
Support for mainenance of system	year	34,800	-	-	1	1	1	1	1	1	1	1	1	1	5
<b>Subtotal Information Networks</b>															
<b>Total</b>															

/a Includes proposal for cost sharing options.



**Table 2: Food Quality and Hygiene Program - Cost Estimates**  
(Tugrik million)

	Unit	Unit Cost (Tugrik '000)	Base Cost (Tugrik Million)										Total
			2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
<b>I. Investment Costs</b>													
<b>A. Food Hygiene Initiatives</b>													
Review of existing regulations /a	pmnth	23,200	-	232.0	-	-	-	-	-	-	-	-	232.0
Upgrade food hygiene laboratories	labs	116,000	-	116.0	116.0	116.0	-	-	-	-	-	-	348.0
Train laboratory analytical staff	courses	5,800	-	11.6	11.6	11.6	11.6	11.6	-	-	-	-	58.0
Resource inspection services	year	116,000	58.0	58.0	58.0	87.0	87.0	87.0	87.0	116.0	116.0	116.0	870.0
Study to review existing meat inspection procedures	pmnth	23,200	-	185.6	-	-	-	-	-	-	-	-	185.6
Development of a traceback system	study	58,000	-	58.0	58.0	-	-	-	-	-	-	-	116.0
<b>Subtotal Food Hygiene Initiatives</b>			58.0	661.2	243.6	214.6	98.6	98.6	87.0	116.0	116.0	116.0	1,809.6
<b>B. Standards for Agricultural Chemicals and Inputs</b>													
Review drug and chemical handling regulations	study	58,000	-	58.0	-	-	-	-	-	-	-	-	58.0
Rehabilitate testing laboratories	labs	116,000	-	116.0	116.0	116.0	116.0	-	-	-	-	-	464.0
Rehabilitate animal feed laboratory	lab	58,000	58.0	-	-	-	-	-	-	-	-	-	58.0
Train laboratory staff in analytical procedures	course	11,600	11.6	11.6	11.6	11.6	-	-	-	-	-	-	46.4
Rehabilitate seed laboratory	lab	116,000	116.0	-	-	-	-	-	-	-	-	-	116.0
Train seed lab staff in procedures and tests	course	5,800	-	11.6	11.6	11.6	11.6	-	-	-	-	-	46.4
Support for seed lab operations	year	23,200	-	-	23.2	23.2	23.2	23.2	23.2	-	-	-	116.0
Provisions for attendance at international conventions	conf.	11,600	23.2	23.2	23.2	23.2	23.2	-	-	-	-	-	116.0
<b>Subtotal Standards for Agricultural Chemicals and Inputs</b>			208.8	220.4	185.6	185.6	174.0	23.2	23.2	-	-	-	1,020.8
<b>C. Quarantine Initiatives</b>													
Study to review strategic border points	study	58,000	-	58.0	-	-	-	-	-	-	-	-	58.0
Establish and/or upgrade quarantine facilities	units	116,000	-	116.0	116.0	116.0	116.0	-	-	-	-	-	464.0
Rehabilitate and equip SCVL	set	116,000	-	116.0	116.0	-	-	-	-	-	-	-	232.0
Incremental resources for quarantine surveillance	year	58,000	-	29.0	29.0	29.0	29.0	58.0	58.0	58.0	58.0	58.0	406.0
<b>Subtotal Quarantine Initiatives</b>			-	319.0	261.0	145.0	145.0	58.0	58.0	58.0	58.0	58.0	1,160.0
<b>D. Information Networks</b>													
Design information system	study	69,600	-	-	69.6	-	-	-	-	-	-	-	69.6
Equip the information center	set	58,000	-	-	58.0	-	-	-	-	-	-	-	58.0
Support for maintenance of system	year	34,800	-	-	34.8	34.8	34.8	34.8	34.8	-	-	-	174.0
<b>Subtotal Information Networks</b>			-	-	162.4	34.8	34.8	34.8	34.8	-	-	-	301.6
<b>Total</b>			266.8	1,200.6	852.6	580.0	452.4	214.6	203.0	174.0	174.0	174.0	4,292.0

/a Includes proposal for cost sharing options.

## F. Indicative Implementation Arrangements

50. This program incorporates both regulatory development, support for the inspection services that is the responsibility of the SPIA, policy development that is the responsibility of MoFA, and implementation of food nutritional standards that is the responsibility of the Ministry of Health. With many interested parties, it is appropriate to gain the technical expertise within each institution but also the coordination of all stakeholders as they have mutual and common areas of interest. This is particularly the case for the networking of information and the ability of all parties to gain access to same. With large areas of common information requirements, the system should receive the support of all interested parties - a challenge in any country.

51. Nevertheless, the most appropriate means of gaining full support for an integrated program is to appoint the Executing agency as one of the technically neutral ministries to coordinate activities in the Program. For this reason, it is proposed to appoint either the Ministry of Finance as overall executing agency or the Prime Minister's Office with implementation being carried out by the respective concerned line agencies. In view of the fact that much of the inspection resources now reside in the aimags and are the responsibility of local administrations, it is considered necessary to appoint aimag representation on the national steering committee even though many of the development and investment decisions will be centrally made. Their involvement will add commitment to the implementation of the Program. In view of the complexity of implementation of this Program, it may also be of some advantage to establish a statutory authority to oversee the development of the program, much along the lines of the disaster preparedness agency that has been established under the Prime Minister's Office as an independent agency with its own budget.

52. Implementation will be the responsibility of the concerned agencies in their respective areas of responsibility so that the institutional development can be retained within the appropriate ministry and the budget to operate any facilities established under the Program can be incorporated into the Medium Term Budget Framework towards which Mongolia is now working.

## G. Program Framework Matrix

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<b>Goal</b> 1.0 To ensure the public has access to hygienic food that meets established quality standards, that agric. producers have access to quality inputs, and that consumers and livestock producers are protected from zoonotic and other diseases that threaten the industry.	Incidence of food related disease declines by 10%.  Incidence of zoonotic and contagious diseases reduced.	Ministry of Health annual statistics.  Ministry of Health annual statistics.	
<b>Purpose</b> 2.1 To enhance food hygiene regulations and inspection services.	New regulations introduced. Inspectors trained and operating.	Great Khural notices.	Resources available for increased inspection services.

## Volume II - Program Investments - Food Quality and Hygiene Program

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
2.2 To assist agricultural producers to have access to inputs of reliable and high quality.	Access to hygienic and quality seed improved. Access to effective animal health products improved.	Inspection reports by state laboratories. MoFA animal health surveys.	Farmers and herders appreciate the value from quality seed and animal health treatments.
2.3 To protect humans and producers from the import of agricultural products with diseases or chemical residues.	Incidence of reportable diseases.  Rejections from pesticide residues.	Government reports to OIE.  Quarantine service reports.	No extraordinary disease outbreak occurs.
<b>Outcomes</b> 3.1 A comprehensive food hygiene protection program.	Program developed and approved.	Parliamentary documents.	
3.2 Established standards for handling, transporting and storing chemicals, vaccines and other agricultural inputs.	Standards specified in approved regulations.	Regulations published.	
3.3 An effective and efficient quarantine service with a trace back mechanism in operation.	Quarantine services operating at key border posts.	Annual quarantine reports.	Resources are made available.
3.4 An integrated information network that can be accessed form relevant organizations in Mongolia.	Information network established and operating.	Annual agency reports.	Staff are appointed to manage information generated.
<b>Activities</b> 3.1.1 Conduct a review of existing regulations and recommend cost sharing arrangements.	TA study to review existing regulations.	Final report sighted.	Funding is available.
3.1.2 Upgrade prioritized laboratory facilities.	Labs upgraded.	Immovable property registry.	
3.1.3 Train staff at central and border post laboratories.	Nos. of staff trained.	Training completion report.	Staff are appointed with appropriate qualifications.
3.1.4 Resource inspection services.	Budget allocations.	National and aimag budget reports.	
3.1.5 Review meat inspection procedures and develop cost sharing arrangements.	TA to review inspection arrangements and procedures.	Final report sighted.	% of kill in licensed premises increases.
3.1.6 Design and establish a trace back system for meat inspection linked to disease	Trace back system approved.	Budget allocations to the trace back system.	Herders accept the need for the additional identification

## Volume II - Program Investments - Food Quality and Hygiene Program

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
reporting.			procedures.
<p>3.2.1 Review drug and chemical handling regulations.</p> <p>3.2.2 Upgrade facilities for testing effectiveness of drugs, vaccines and other animal health treatments.</p> <p>3.2.3 Rehabilitate animal feed laboratory with necessary equipment.</p> <p>3.2.4 Train lab staff in analytical procedures.</p> <p>3.2.5 Support for the development of the Central Seed Laboratory.</p> <p>3.2.6 Provide training for laboratory staff.</p> <p>3.2.7 Support the attendance of laboratory staff at international conferences.</p>	<p>TA to review current procedures for handling drugs etc.</p> <p>Facilities upgraded.</p> <p>Feed laboratory rehabilitated.</p> <p>Nos. of staff trained.</p> <p>Seed laboratory rehabilitated.</p> <p>Nos. of staff trained.</p> <p>Nos. of conferences attended.</p>	<p>Final report sighted.</p> <p>Immovable property registry entries.</p> <p>Immovable property registry entries.</p> <p>Training evaluation records.</p> <p>Immovable property registry entries.</p> <p>Training evaluation records.</p> <p>Post conference briefing notes.</p>	<p>Appropriately qualified staff appointed.</p> <p>Suitable conferences for development are organized.</p>
<p>3.3.1 Upgrade quarantine facilities at border points based on findings of review.</p> <p>3.3.2 Rehabilitate testing facilities at SCVL and provide staff training.</p> <p>3.3.3 Provide incremental resources to improve standards of vigilance at border posts.</p>	<p>Facilities upgraded.</p> <p>Facilities upgraded in SCVL.</p> <p>Budgetary allocations for border post and quarantine activities.</p>	<p>Immovable property registry entries.</p> <p>Immovable property registry entries.</p> <p>Aimag and central budgets.</p>	
<p>3.4.1 Design an integrated information management system.</p> <p>3.4.2 Resource the establishment of the electronic network.</p> <p>3.4.3 Routine maintenance of the system to allow for modifications and software upgrading.</p>	<p>TA to design system characteristics and cost.</p> <p>Facilities installed in participating agencies and aimags.</p> <p>Budget allocations for the operations of the information system.</p>	<p>TA completion report.</p> <p>Agency annual reports and training reports.</p> <p>Central and aimag budget reports.</p>	<p>Funding is made available.</p> <p>Government supports the need for the facility.</p> <p>Resources are available.</p>

# **AGRICULTURE SECTOR STRATEGY STUDY**

## **VOLUME 2**

### **STRUCTURAL ADJUSTMENT PROGRAM**

**30 NOVEMBER, 2006**

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## ACRONYMS

ADB	-	Asian Development Bank
ADF	-	Agriculture development Fund
ADRA	-	Adventist Development Relief Agency
AEC	-	Agricultural Extension Center
AHRI	-	Animal Husbandry Research Institute
AI	-	Artificial Insemination
ASDP	-	Agricultural Sector Development Project
CIDA	-	Canadian International Development Assistance
DANIDA	-	Danish International Development Agency
EGPRS	-	Economic Growth and Poverty Reduction Strategy
EU	-	European Union
FAO	-	Food and Agricultural Organization (of the United Nations)
GAP	-	Government Action Plan
GDP	-	Gross Domestic Product
GTZ	-	German Bi-lateral Aid Agency
HACCP	-	Hazard Analysis Critical Control Point
ICLP	-	Integrated Crop and Livestock Project
IFC	-	International Financing Corporation
ISO	-	International Standards Organization
JCS	-	Jesuit Christian Services
JICA	-	Japan International Cooperation Agency
KOICA	-	Korean International Cooperation Agency
M&E	-	Monitoring and Evaluation
MDG	-	Millennium Development Goal
MIT	-	Ministry of Industry and Trade
MNB	-	Mineral Nutrient Blocks
MNE	-	Ministry of Nature and Environment
MoFA	-	Ministry of Food and Agriculture
MSUA	-	Mongolian State University for Agriculture
MTBF	-	Medium Term Budgetary Framework
NAEC	-	National Agricultural Extension
NAMAC	-	National Association of Mongolian Agricultural Cooperatives
NEMA	-	National Emergencies Management Agency
NGO	-	Non government organization
NPA	-	National Plan of Action
PFI	-	Participating Financial Institution
PPP	-	Public Private Partnerships
PSARTI	-	Plant Seed Agriculture Research and Training Institute
RPRP	-	Rural Poverty Reduction Project
SCSL	-	State Central Seed Laboratory
SDC	-	Swiss Development Cooperation Agency
SEFF	-	State Emergency Fodder Fund
SLP	-	Sustainable Livelihoods Project
SPIA	-	State Professional Inspection Agency
TACIS	-	Technical Assistance for the Commonwealth Independent States
UNDP	-	United Nations Development Program
UPOV	-	International Convention on Plant Variety Rights
USAID	-	United States Agency for International Development
WTO	-	World Trade Organization
WUG	-	Water User Group

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## STRUCTURAL ADJUSTMENT PROGRAM

### I. GENERAL BACKGROUND

1. The transition of Mongolia to an open market economy, that began in 1990 and is ongoing today, is well documented. It is generally accepted that the extensive livestock subsector moderated the negative impacts of the early transition period by ensuring a relatively stable source of food and livelihoods to both rural and urban populations. However, the subsector has struggled during this period with the collapse of institutional and technical support, input supply services and marketing infrastructure that was established during the socialist period. These mechanisms have yet to be fully replaced under the rapidly changing market economy. Re-establishing support services and marketing infrastructure needed to promote more efficient livestock production systems will require high investment costs to both government and the private sector. Unless the incentives (returns on capital invested) are at similar levels to other industries, private capital resources will flow to where the returns are greater and have a lower associated risk factor. In many ways, the market economy continues to exert a destabilizing influence on natural resource dependent communities as the urban populations grow and lose their rural connections. Legislative and economic power is shifting from the rural agricultural base to the urban population yet their dependence on food items continues to grow and their demand for quality and safe produce increases.

2. Current livestock production systems are characterized by: (i) low productivity from the well adapted local species of livestock, (ii) low turn-off rates, (iii) a large number of widely geographically dispersed and small scale herders, (iv) low input systems (including minimal fodder conservation), (v) weak marketing linkages, (vi) variable livestock management skills, and (vii) limited access to technical information. The subsector is heavily dependent upon international development agencies to finance many government support initiatives to assist in delivering meat for human consumption and raw materials for processing that are further confounded by rising expectations from a growing urban population. The sector analysis below addresses concerns at the production level and the equally important market level, the users of the livestock products.

3. In the cropping sector, two distinct cropping subsectors are recognized - cereal cropping and horticultural production, the former tending to be mechanized and carried out on a larger scale while the latter is more subsistence based linked to fresh markets round urban populations. Characteristics of the cereal cropping sector include: (i) low productivity (low inputs and low outputs) that is of poor quality for flour milling purposes, one of the main market outlets; (ii) heavy dependence upon seasonal rainfall as irrigation infrastructure has not been maintained; (iii) the use of inappropriate production techniques that impact upon soil structure contributing to environmental degradation; (iv) a large number of relatively small-scale producers that has repercussions on the extent of mechanization to undertake time critical operations; (v) limited access to affordable credit to effect the rehabilitation of irrigation infrastructure and modernization of machinery; and (vi) variable managerial skills of those with tenure rights to the cropping land. In the horticultural industry, characteristics include: (i) a large number of small scale producers whose main objective is subsistence production, few being dedicated commercial producers; (ii) labor intensive production systems using manual tools for land preparation; (iii) limited use of agricultural inputs such as fertilizer other than organic material gathered from livestock; (iv) variable management skills; and (v) poor quality of produce that is cleared on local markets rather than being produced for the market.

4. One of the more significant constraints to improving overall livestock and cropping productivity is the size structure of producers. The livestock management and marketing options are constrained by the limited number of livestock owned by the one herder. The smaller sized farms in the cereal cropping industry deny them economies of scale for time critical operations such as land preparation, planting and harvesting. Economies of scale are also important in livestock production where one ram can serve 40 ewes, where transport costs for moving wool and cashmere to market are high because of the greater distances for small quantities of produce for sale by any one individual, where breeder selection (based on commercial traits) is not possible as herders are obliged to retain poor quality animals as breeders that will perpetuate the quality decline. Smaller herds are not as mobile as the larger herds and small livestock owning households tend to congregate round soum centers to supplement their livelihoods from other income sources leading to overgrazing the natural resource. The reason this represents such a significant issue is that the majority of producers (70%) rear less than 100 head of sheep equivalents. Such a holding is unlikely to generate sufficient income to cover normal household expenses. Being the majority, this represents an influential group of producers who have alerted political leaders to the problems they face and are demanding Government support.

5. This unusual farm size distribution has resulted from the dismantling of the state cropping farms and the privatization of the national herd. During the socialist period, production units were organized into negdels that were of sufficient size to achieve economies of scale. On crop farms, there were the funds and machinery to carry out the cropping operations on a large scale employing mechanized production systems. Quite apart from the subsidies that made such production systems possible, farm managers were able to plant significant areas of wheat (mainly) over large areas in the limited time available for these operations while the machinery stood by idle for the remainder of the year. With the privatization of these state farms, necessitated by the cessation of financial support from the former Russia, both land (as land use rights) and equipment were distributed amongst state farm employees to continue crop production on their smaller allocated areas. Not only was there a mismatch of machinery for the area of land allocated to individuals, but no individual received a full complement of machinery and equipment needed in cropping operations. Borrowing machinery became common amongst producers for which rents were seldom collected and as such, the condition of the machinery rapidly declined through lack of access to spare parts and poor maintenance. Essentially, there existed a large number of small units that did not have the capital to purchase equipment for their farming operations at the reduced scale, nor did many have the production expertise to continue in the industry. As a consequence, the industry has defaulted to its current status of being largely opportunist in nature where producers gamble on the season, gamble they can gain access to the necessary machinery during the critical times, and depend to a large extent on government support to fund the few inputs of production, the repayment for which has been poor.

6. A similar situation existed for livestock negdels whereby employees were the recipients the state livestock assets after privatization. Numbers were distributed equitably and most received at least a few animals from which they could generate their livelihood. With grazing land considered to be free (as stated in the Constitution), herders were left to develop their own grazing patterns with their reduced numbers in a uncontrolled and unmanaged manner that lead to not only conflict between crop farmers and livestock producers, but between herders who competed for the better grazing areas and seasonal camps. The situation was exacerbated in the case of the livestock sector as it provided a social safety net, absorbing the large number of unemployed from urban areas after the collapse of socialism who had few choices but to becoming herders where at least their immediate food requirements could be satisfied. As a result, there are a large number of very small scale livestock producers found in rural areas. Because of these small numbers,

herding families have had to diversify their sources of livelihoods and have taken to part time employment round soum centers that has also had a detrimental impact on the condition of pastures in these overgrazed areas. The heavily biased herder population distribution is therefore having a major impact on overall herd efficiency and is expressed as low productivity, poor herd structures (breeding animal percentages), high marketing costs and limited opportunity to effect herd improvement programs in pursuit of superior quality production.

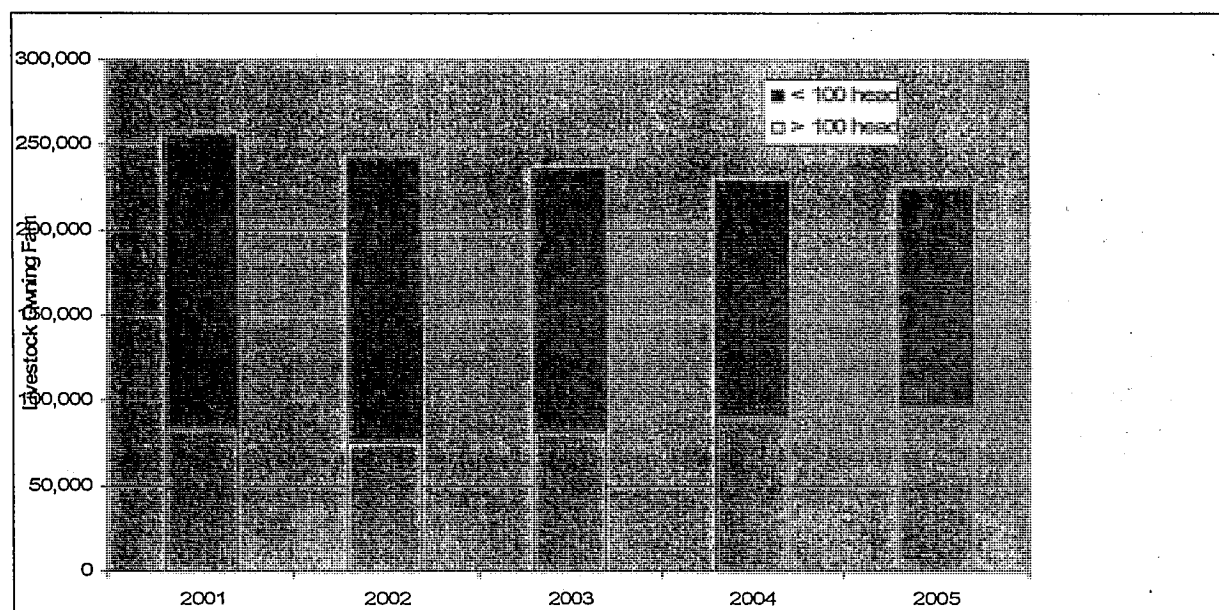
7. It is clear that the presence of this significant number of small-scale producers is not supportive of the Government's longer term objectives in the sector - in their quest for self sufficiency in wheat, or in their desire for a reliable supply of quality food items (vegetables and meat) at reasonable prices on domestic markets, or for vibrant export markets in livestock products. These small producers are not the main contributors to domestic food supplies nor do they contribute significantly to the country's exports. They are however, the majority of producers and are important part of the agricultural sector to consider in planning development initiatives. The social repercussions of ignoring this part of the sector would be significant as would the political ramifications. The Government recognizes this conflict of interest and wishes to address the matter through a managed approach rather than let the gradual adjustment take place without consideration of the social repercussions.

## **II. ANALYSIS OF FARM SIZE**

8. The following analysis is intended to demonstrate the extent of the problem within the sector and establish the rationale for Government action. The proposed initiatives outlined in subsequent sections of the Program are designed to protect those who inevitably will be victims of the already ongoing process of structural adjustment rather than having them linger under the protection of subsidized government programs. By taking a more proactive role in facilitating structural adjustment, the Government is not only supporting the improved efficiency of arguably one of its most important sectors, but is doing so in a manner that protects those who elect to pursue a different source of livelihood.

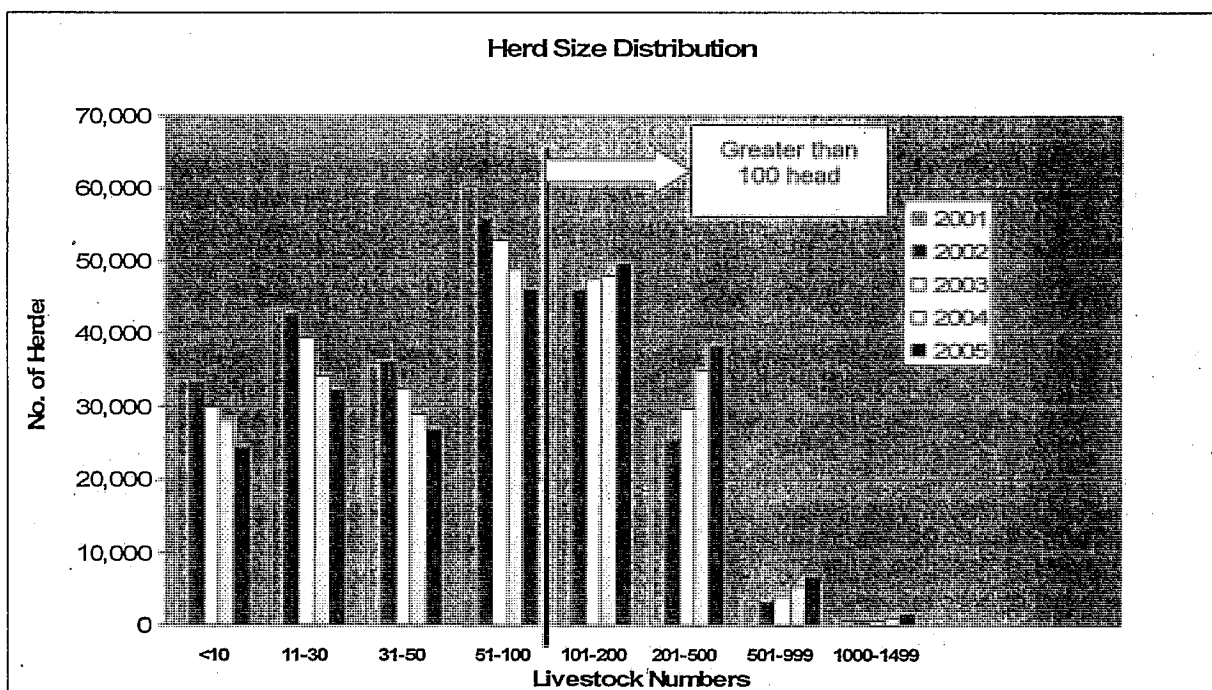
### **A. Livestock Subsector**

9. The National Statistics Office differentiates between owners of private livestock and herders, the latter being those who derive the main part of their livelihoods from rearing livestock. In 2005, there were 225,391 households that owned private livestock. Of these, it is estimated that 167,900 were herding households or some 74% of the total. The remaining 26% were small-scale owners who have other sources of income. The number of individual herders has declined steadily since 2001 when they numbered 389,765 compared to the 2005 figure of 364,293, an average decline of about 4,500 each year. Based on an average herder family size of 2.17 herders per herding household, this represents a decline of about 2,000 a year. But the steady decline masks what is happening within the distribution of livestock owners. Figure 1 shows the changing composition in ownership amongst this decreasing total number. The number of households with more than 100 head of livestock has increased in recent years while the number with less than 100 head has decreased. The proportion of households with less than 100 head has changed over the past five years from 68% in 2001 to 58% in 2005. Clearly, the changing structure of Mongolia's livestock population ownership is what would have been expected as the more efficient (larger) producers remain in the industry and others leave. If one was to assume that the 74% of herders did not include the very small producers and the 60,000 private livestock owners dominated the two first categories in the size distribution (i.e. less than 10 and 11 to 30 head of livestock), the magnitude of the problem changes little. The Government is still saddled with the difficulties of a large number of livestock dependent producers.

**Figure 1: Distribution of Livestock Ownership**

Source: National Statistics Office of Mongolia - various publications

10. The more critical interpretation from the size distribution comes from the analysis of the various categories and how their contribution to the total has changed.

**Figure 2: Owner Distribution by Size of Herd**

Source: National Statistics Office of Mongolia - various publications

11. Below the 100 head ownership level, the number of households rearing livestock has declined, even though part of this may have been due to the dzuds between 2000 and 2002.

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This compares with the over 100 head categories in which all have reported increasing numbers during the past five years (again allowing for the impact of the dzuds). This confirms that there is an ongoing structural adjustment taking place within the Mongolian herd/flock. But the more important implication is their respective contributions to overall production.

12. Based on the crude analysis using average annual meat production<sup>1</sup> and applying this to cell midpoints for the 2005 livestock population, the contribution of the less than 100 head owning households is estimated 18.3% of all meat produced while the greater than 100 head category produces 81.7%. In simple terms, 58% of all livestock owning households produce 18% of meat produced and 42% of the larger producers generate 82%. It should be noted that such analysis does not take account of the different species that might be reared by herders as 100 head of cattle for example would generate an excellent level of income for one family. Furthermore, it does not take account of the higher input industry (a special case) for similar reasons that a 20 cow dairy farm can generate a good income for the family. But these are exceptions and their numbers in the analysis remain small when using total livestock numbers.

13. The implications of this skewed size distribution for the Government in achieving its development objectives in the food and livestock sector are significant. It suggests that the smaller producers (particularly under the extensive pastoral system) are less efficient as is discussed in other programs. There are associated management difficulties with smaller sized herds/flocks, limited management and breeding options, limited opportunities for breeder selection to effect quality improvement, limited options and consequent higher marketing costs associated with small herd/flock size, quite apart from the environmental impact from their more sedentary peri soum grazing patterns.

14. It suggests that to have any impact on the total production of meat, either for domestic consumption or export, then it should focus its efforts on the larger more efficient producers. Any incremental increase in productivity that can be achieved in the larger, more efficient herds/flocks will have a far greater impact than the same incremental increase in the smaller, less efficient. An alternative interpretation would be for the Government to promote the expansion of livestock numbers amongst the category just under the 100 head category so that they became more efficient. Both are considered appropriate. What is clear though is that the large number of extremely small producers should not be the focus of its development initiatives. Any program that inadvertently enabled these small scale producers to remain in production would be working against the overall efficiency of the subsector. What is also clear is that the smaller producers will always be there, either as subsistence producers, as hobbies of urban based families, even in response to economic shocks as was the case during transition. With the exception of the latter category, these producers are not dependent upon livestock rearing for their livelihoods and as such, should not be accorded full attention of development programs.

15. For that category that has used livestock production as a social safety net in the past, this Program is designed to assist in finding alternate livelihood sources. It is also designed to facilitate the amalgamation of livestock under larger management systems even though the ownership may not change, a facility not dissimilar to contract farming or agistment<sup>2</sup>.

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<sup>1</sup> This is the estimate of meat production divided by the total number of livestock (7.11 kg per head of livestock).

<sup>2</sup> Livestock are managed by a party that does not own the beasts but receives a fee - either in cash or kind for tending and caring for the animals.

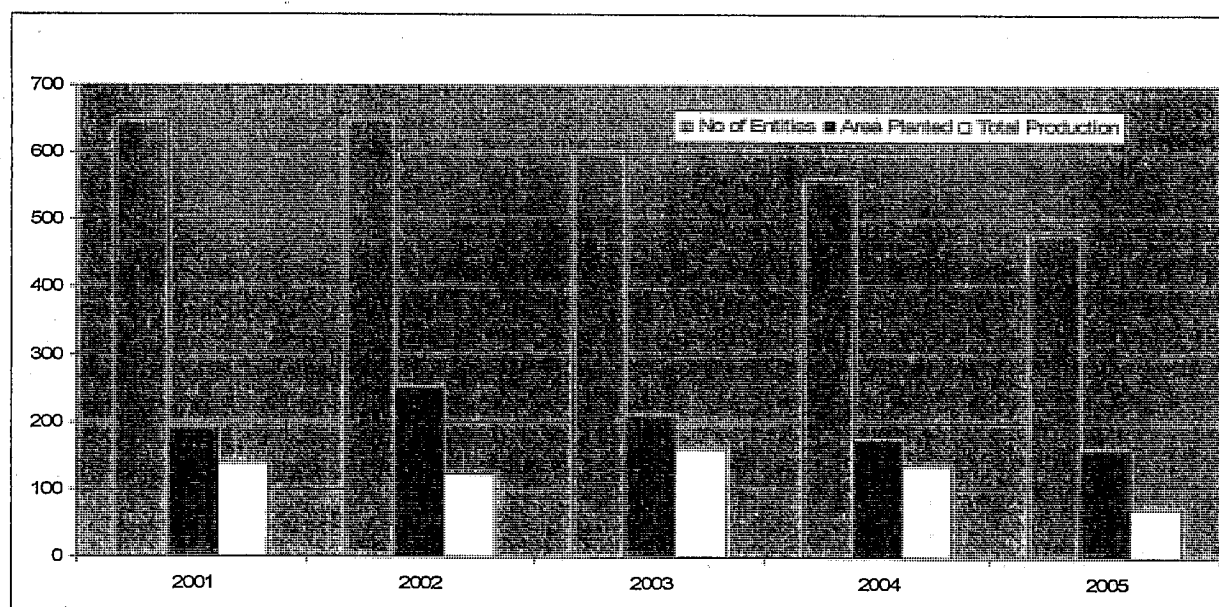
## B. Cropping Subsector

16. A similar analysis can be undertaken for the cropping sector as it also suffers from the same skewed ownership distribution following from privatization of state farms.

### 1. Cereal Cropping

17. During the socialist period, there were some 56 state farms that were well equipped with motorized vehicles to accommodate the short growing season for cereal crops with the capacity to till the soil, plant the crop, prepare the fallow for next years crop and harvest the current crop. Mechanization was an important part of the success of the industry as it allowed significant areas to be planted within the limited time available. Failure to plant the crop by a certain date would almost certainly result in its failure. Under this subsidized production system, inputs including fuel, seed and fertilizer were provided by the State at such levels to achieve reasonable yields. Under this structure, Mongolia's wheat production increased to over 600,000 tons between 1985 and 1990 although production levels were closer to 225,000 prior to this time. Average yields of 1.0 to 1.4 tons/ha were achieved during this period when inputs were significant and irrigation facilities remained operational. The area harvested has steadily increased since 1960 to a peak area of 533,000 ha in 1990 but has steadily declined after the collapse to its current level of 154,000 ha in 2005 when only 74,000 tons of wheat was produced. Needless to say, today the industry uses little fertilizer, poor quality seed material (usually retained from the previous year's crop) and has become increasingly dependent upon natural precipitation as irrigation systems fail. These issues are discussed further in the crop subsector summary.

**Figure 3: Number of Wheat Producers, Area Planted ('000s ha) and Production (tons)**



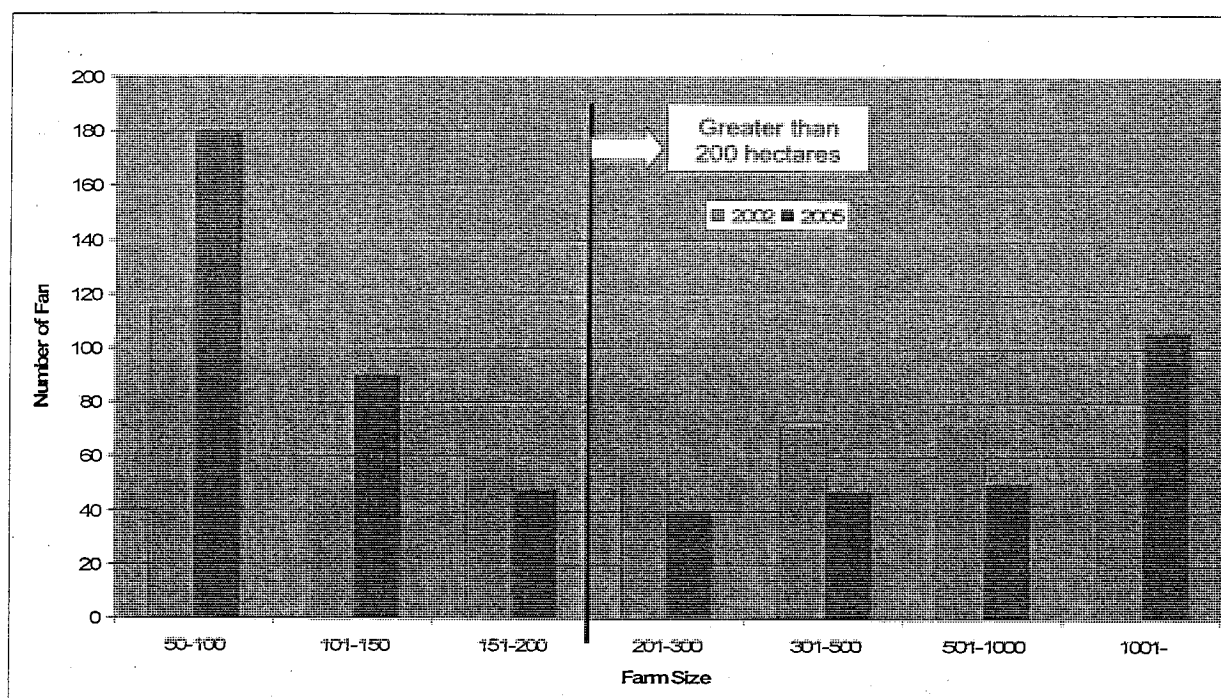
Source: National Statistics Office of Mongolia - various publications

18. Figure 3 indicates that the decline has continued in the past five years to the extent that Mongolia produces only 20% of its wheat requirements for flour milling and it is of such poor quality that grain is often used in the production of vodka rather than the higher quality requirements for milling into flour. Being a strategic commodity, the Government is concerned at this extended decline and has, in recent years attempted to encourage expanded production through the provision of concessional loans, subsidized inputs and the



allocation of prime irrigated crop land to private organizations in an attempt to increase supplies. Part of the problem stems from the structure of the individual holdings in the subsector. In 2001, there were 650 crop producers planting wheat while the number in 2005 was 560. As for the livestock subsector, the distribution of cropped area amongst the producers provides some valuable insights into the efficiency of the industry.

**Figure 4: Wheat Area Harvested by Number of Holdings**



Source: National Statistics Office of Mongolia - various publications

19. By comparing the distributions that existed in 2001 to that of 2005 indicates there has been some expansion of the cropped area for the larger producers while the number of producers, the area has contracted further. There has been a shift in the distribution from the category round 200 hectares, some increasing their area of production while others have significantly reduced their harvested areas. In the case of cereal cropping, much of the trends can be attributed to the use of mechanized equipment. Those with ready access to machinery that can cover the ground in the limited time available have tended to increase their planted areas while those who are dependent on others to carry out the time critical operations have tended to reduce the size of their plantings as they fall back on smaller scale equipment and manual labor to produce the crop.

20. By applying varying yields to the size categories to reflect this access to mechanized production, it is possible to estimate the relative contributions the categories make to overall wheat production. In deriving these estimates, the average yield during the period 2001 to 2005 was adopted to eliminate the influence of exceptionally poor seasons. By assuming planted areas of the mid point of each cell and applying the average yields adjusted for the possible mechanization, it is estimated that 57% of crop producers - i.e. those with harvested areas of less than 200 hectares contribute about 13% of total wheat production while the remaining 43% generates the remaining 87%.

21. The implications for the Government are clear. If they are to succeed in their pursuit of self sufficiency of this strategic commodity, greater focus needs to be directed at the more efficient producers rather than sustain the smaller, less efficient ones that have difficulty raising the capital to operate on a commercial basis. The practice of providing subsidies should be reviewed with the aim of providing investment incentives to facilitate the modernization of the subsector. The larger producers are more likely to have access to capital resources and certainly have greater capacity to repay loans. The Government can assist the larger more efficient crop farmers by improving their access to water resources to stabilize yields and protect the private investment in production equipment. The focus of the Government should be on promoting efficiency within the sector, not on maintaining the status quo. If the Government was to adopt a passive role in this inevitable process of structural adjustment, then there are likely to be casualties with social repercussions. The Government is behaving responsibly by recognizing the inevitable change that is already apparent and is proposing, under this program, to be proactive in facilitating adjustment within the subsector.

## 2. Horticulture

22. The horticultural sector is dominated by an large number of very small scale producers following the provisions in the land law that allow individuals to register their ownership of up to 0.7 ha of land. This has stimulated a massive claim on land surrounding Ulaanbaatar and other urban centers, many using the land for horticultural production, essentially for their own household consumption. The statistics are not well developed in this area and some of the information provided herein should be treated with caution. In 2004<sup>3</sup>, there were 37,726 households growing potatoes with an average area of 0.2 ha while there were 28,162 households growing other vegetables (these may have been growing potatoes and other vegetables) with an average area of 0.1 ha. In addition to these, there were some 765 enterprises growing potatoes with an average area of 2.9 ha and some 539 enterprises growing other vegetables with an average area of 1.3 hectares. It is interesting to note that two thirds of household produced potato areas were irrigated and three quarters of the vegetable growing household areas were irrigated. The proportions were 50% and 100% respectively for the two crops produced by business entities.

**Table 1: Cropped Areas by Type of Production Unit  
(2004 data)**

	Households				Business Entities			
	Units	Planted area	Area/HH	Irrigated area	Units	Planted area	Area/Entity	Irrigated area
	HHs	Ha	Ha/HH	Ha	Entities	Ha	Ha/Ent.	Ha
Cereal crops	2,288	15,806	6.9	2,191	556	157,553	283.4	4,036
Potatoes	37,726	6,487	0.2	4,365	765	2,199	2.9	1,022
Vegetables	28,162	3,495	0.1	3,009	539	696	1.3	694
Fodder plants	968	1,343	1.4	1,330	89	2,595	29.2	625
Industrial crops	29	318	11.0	4	53	7,916	149.4	-
Berries	1,002	37	0.0	32	43	203	4.7	-

Source: TACIS funded Crop Census

23. This reinforces the large number of subsistence type producers who grow vegetables principally for their immediate requirements and for disposal to friends and relatives or

<sup>3</sup> TACIS funded a census of Mongolia crop producers gathering information on the households and business entities for a range of crops including cereal crops and vegetables.



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possible sale if production exceeds their immediate requirements. But of greater interest is the distribution of the scale of production that exists for the two main vegetable lines - potatoes and other vegetables (Table 2).

Table 2: Distribution of Area of Production by Vegetable

	Households					
	Potatoes			Other Vegetables		
	HHs	Planted area	Area/HH	HHs	Planted area	Area/HH
< 0.1 ha	22,708	274	0.0	19,122	188	0.0
0.1 - 1.8	14,357	4,164	0.3	8,711	2,421	0.3
1.9 - 3.5	527	1,206	2.3	286	663	2.3
3.6 - 5.3	90	413	4.6	31	133	4.3
5.4 - 7.0	16	100	6.2	6	36	5.9
7.1 - 8.8	8	63	7.9	2	15	7.4
> 8.8 ha	20	267	13.3	4	40	10.1
<b>Total</b>	<b>37,726</b>	<b>6,487</b>	<b>0.2</b>	<b>28,162</b>	<b>3,495</b>	<b>0.1</b>

24. The distribution of production area for vegetable growing enterprises is similar – but shifted further to the right - i.e. larger scale units with the average area of potatoes being 2.9 ha and the average vegetable area being 1.3 ha. For potatoes, 32 entities account for over half the total planted area while for other vegetables, 97 producers (18%) are responsible for 72% of the planted area.

25. The situation with regard to vegetable crops is significantly different than for the broad acre cereal cropping. The smaller holdings in the case of horticulture do not need sophisticated machinery to prepare the soil, care for the crop and harvest same. Mechanization at lower levels of production is not needed for these more intensively managed crops and therefore, do not pose the same problem in terms of structural adjustment as the cereal farmers. Small scale horticultural production can proceed on small plots with significant labor inputs alone that usually has zero associated opportunity cost.

### C. Opportunities

26. There are sound opportunities for Mongolia's livestock and cropping subsectors both domestically and internationally based on their natural comparative advantage. In livestock, greater attention is needed in product quality to meet the changing consumer tastes while in the cropping subsector, it faces increasing competition from imported goods from crop products that are produced under kinder agro-climatic conditions than are found in Mongolia. However, the demand for quality and hygienic food items is increasing with the rapidly urbanized population and the increasing disposable incomes creating opportunities for expanding crop production. The opportunities in the respective subsectors are addressed further in their programs but are based on the competitiveness of the sector. Part of the improved competitiveness will be achieved through structural adjustment within the sector. Agriculture in Mongolia is dominated by a large number of small producers whose production efficiency could be markedly improved with the adoption of new production technologies,

increased market orientation and greater attention to quality considerations. The smaller scale producers are less likely to be in a position to avail themselves of such opportunities. Structural adjustment therefore provides an opportunity in itself to move towards a more efficient agricultural sector.

### **III. GOVERNMENT'S POLICY IN RESPECT OF STRUCTURAL ADJUSTMENT**

27. The Government has no specific policy on structural adjustment within the sector. In its dealings with the privatization process, the Government was meticulous in ensuring all its former employees of state farms and negdels participated in the distribution of state assets. The current situation with large numbers of small holders reflects the efficiency with which they followed the equitable re-distribution. More recently, State policy in respect of its primary producers has been directed at issues of access to natural resources, land and water and the user rights and entitlements to both as well as to sustainability issues in respect of the use of these state assets. There is an indirect linkage between the current structure of livestock owners and the sustainable utilization of natural pastures. The large numbers of small livestock owners are less mobile because of their dependence on alternate income earning activities, usually round soum and aimag centers. As such they pose a threat to peri-urban pastures exposing them to overgrazing and consequent desertification. The Government's longer term objective of sustainable use of this resource is challenged by the smaller, more sedentary herders and livestock owners.

#### **A. Rationale for Public Involvement**

28. The rationale for public involvement in this Program is based on the Government's objectives of achieving self sufficiency in wheat production, in increasing the proportion of domestically produced vegetables in total vegetable consumption, and in achieving reliable supplies of meat at reasonable prices on domestic markets. These are strategic objectives that cannot be contemplated by individual producers on their own but require a larger industry perspective to achieve the overall aim. In addition, the rationale for public involvement is based on the sustainability argument in that one of the contributing factors to pasture and land degradation is the unwitting overgrazing by smaller more sedentary herders and livestock owners and the use of inappropriate land preparation techniques that, over time, render the soil unproductive and vulnerable to wind erosion. While also found amongst the larger crop producers, these practices are common amongst the smaller crop producers with limited resources to attend to environmental initiatives to stabilize soils and retain their organic content. Both land and pasture remain assets of the State and it is in the interests of the Government to ensure that the productivity of these assets remain for the benefit of future generations.

29. The Government also sees a need to be proactive in this process, the negative impacts from which are already evident. The social repercussions from inactivity are significant as those less capable of making the necessary adjustment fall into poverty. The Government wishes to assist the disadvantaged and those electing to leave the sector by ensuring they depart under reasonable terms rather than being rejected without any prospect for future employment or livelihood. Without the existence of a functioning term credit market and where land remains the property of the state, the opportunity for individuals leaving the sector to liquidate their assets is limited. Furthermore, the resources to aggregate parcels of land by those remaining in the industry are not readily available, hence the need for the Government to facilitate the asset transfer. The Program is designed to ensure that they are compensated for any user rights they may have received from the Government, and to provide them with the opportunity of seeking alternate livelihoods through vocational retraining programs. Such social obligations are clearly the realm of

Government rather than any private interest. Recent poverty reduction studies suggest that the greatest impact from government funded initiatives aimed at poverty reduction come from programs that support vocational training or facilitate the exodus to areas where labor is in greater demand. The Government is therefore committed to facilitating the adjustment of the less efficient and under resourced individuals out of their subsistent operations to other sectors if necessary to improve their livelihood prospects.

#### **B. Recent Development Initiatives**

30. There have been no initiatives to facilitate structural adjustment. The main impact from the Government support programs has been to allow the inefficient to remain in production under increasing pressure from diminishing returns. These initiatives, while well intentioned, have masked the natural forces that promote the more efficient, but in reality, only delay the inevitable.

### **IV. PROGRAM PROFILE**

#### **A. Objectives and Outcomes**

31. The overall objective is to promote increased agricultural efficiency through structural adjustment resulting from the aggregation of smaller less efficient production units into entities where there are benefits from economies of scale whilst protecting the interests of those electing to leave the sector, protecting the value of their assets, providing relocation assistance and vocational training.

32. The key outputs under the Program are an increased number of more efficient livestock producing enterprises and crop farms that access economies of scale and management. Specific outputs include:

- Land user rights issued to those crop producers who elect to relocate in search of other livelihood activities.
- Pasture user rights issued to those herders and livestock owners who have utilized established grazing areas but wish to trade these with other herders for a price in return for departing the area in search other livelihood activities.
- Financial institutions providing term loans to individuals and business entities to assist them in aggregating land holdings or livestock flocks/herds.
- Households relocated from being crop and livestock producers but subsequently engaged in alternate income generating activities and no longer dependent upon their former source of livelihoods.

#### **B. Scope and Key Activities**

33. The Program will therefore focus in three main areas: (i) the issuance of user rights to agricultural and grazing land particularly for those wishing to relocate to other forms of livelihood activities so that they can liquidate any value they may have accumulated in the asset they use; (ii) the financial institutions to encourage them to support term financing to facilitate structural adjustment; and (iii) providing assistance to those electing to relocate out of the sector in pursuit of alternate livelihoods.

34. The first area includes facilitating the identification of the less efficient seeking alternative income sources but consider themselves to be locked into agricultural producing

activities for fear they will not be compensated for the assets that they control. Herders who have established winter camps with associated grazing reserves will be able to negotiate a fee for the transfer of their historic rights if those rights can be recognized by the competent authority. It recognizes that such historic utilization has a value rather than have the family leave without any form of compensation for their management of their traditional grazing areas. It also assists in establishing a market value for user rights that is important in improving overall management of the pasture area. By way of example in the cropping sector, there are cases where a small land owner occupies an area in the middle of another's allocated area making it impossible for the larger owner to manage the land efficiently. The smaller owner may want to sell this parcel to the larger but without any form of land user certificate may consider that the value does not reflect its real value. By issuing title to these parcels of land, the departing owner/user will at least be compensated at a value to be agreed by the buyer and seller. As for pasture land, it will assist in establishing a value for land that is important in encouraging owners to maintain the value of the land (its productive value). Most of the initiatives in this area are directed at identifying those who may wish to leave the sector, providing the necessary support for the issue of their user right certificates by the local authority (soums) that may extend to support to the soums, depending on their resources available to perform the task and undertake boundary identification surveys on which user rights can be clarified and recorded on a cadastral data base.

35. The second area comprises capacity building for staff of financial institutions to develop their skills in appraising applications for term loans that requires a different set of skills than exists when institutions are reluctant to extend term credit, particularly within the agricultural sector. While banks confidence has improved in rural lending and the loan portfolio directed at the sector has increased significantly (see Program on Rural Credit), there remains considerable reluctance to extend credit on a term basis without solid collateral. This activity is needed to encourage financial institutions to broaden their lending products to facilitate the much needed capital for expansion so that those leaving can receive remuneration for the asset that has been in their control. Being a new product, it is anticipated that institutions will seek additional security with the new product that might take the form of a guarantee fund. The Program will establish such a fund and develop the rules of access in the event of defaulting borrowers. Finally, in order to maintain reasonable interest rates for this type of lending, there needs to be access by the financial institutions to concessional credit so that it may pass on lower interest rates to the borrowers. Credit funds will be needed to finance the adjustment process but should be administered by banks.

36. The third area relates to direct assistance for those electing to leave the sector and who may seek retraining to improve their prospects for alternate employment. The Program will support these individuals by funding vocational training as required at appropriate institutions and it will provide assistance in identifying employment opportunities rather than depending on livestock and cropping activities. There may be some need for assisting these individuals with some form of relocation assistance by way of transport of household effects or providing land for their relocation on a priority basis to facilitate their decision to relocate. This aspect recognizes that such individuals do not have the resources to fund any change of livelihood activity and the Government is seeking to protect their interests during the difficult transition.

### **C. Policy Development**

37. While the Government maintains no clear policy on the issue of industry structure, it is seeking to improved overall efficiency in order to maintain food supplies to its population, to provide export revenue, and to maintain many of the manufacturing activities that are dependent upon agricultural raw materials. Government objectives are clearly articulated in

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the policy documents yet some of its previous initiatives have not achieved the desired outcomes. The Government has often attempted to fill the voids created during the privatization process and provide inputs, subsidized machinery supplies and targeted credit in an attempt to provide production incentives of the private sector, particularly in the cropping sector. One consequence of these initiatives has been the survival of many of the less efficient producers as, without such support, their commercial activities would have failed. Inadvertently, the Government has allowed the perpetuation of the less efficient. The social aspect of this should not be overlooked as subsistence production was responsible for the livelihoods of many of the unemployed during the early years of privatization.

38. With the development of other sectors of the economy, there are other employment opportunities in the mining sector, construction industry, and in the growing manufacturing sector in the regional centers. Alternative livelihoods are becoming increasingly possible that with some support, will facilitate the adjustment process. The Government policy to support efficient agriculture remains foremost while preserving the productivity of its most important assets of natural pastures and water. Future government funded and donor initiatives must be carefully structured and implemented so that well-intentioned support does not interfere with the screening of the less efficient, nor should it interfere with the development of agricultural support services such as input suppliers that remain the domain of the private sector.

#### **D. Institutional Capacity Building**

39. Capacity building needed under this program should be directed at the soum and aimag offices where the program will be managed. Staff need the skills to identify those seriously interested in seeking alternate livelihoods. They need to be able to support application for user rights and to assist in the process of boundary identification. Soum staff need to develop closer links with the inhabitants of the area to be able to provide support for those electing to relocate and to administer the level of support available. This will require interaction with the social welfare division of the aimag offices and coordination of vocational training initiatives. To achieve the interpersonal skills aimag and soum staff will need to undergo training in communications and program options for vocational training. In addition, the soums administrations will need to be strengthened to assist in the issue of land and pasture user rights, to record boundaries established and to forward same for inclusion in the cadastral register, and to maintain a record of user and land use rights issued by the soum office. This institutional capacity building is dealt with further in the program on capacity building.

#### **E. Summary Cost Estimate of the Program**

40. At this stage of the design of the Program, it is not possible to estimate the costs of this initiative as there is insufficient information on the size of holdings and the extent to which they are dependent upon agriculture for their main source of livelihoods. Further detailed analysis is needed, based on reliable survey data, to allow the Government to take a position on the extent of assistance that should be provided and what would constitute reasonable criteria for participation in such a scheme. This is considered an important initiative in order to mitigate against the negative impact from the natural process of structural adjustment that is already happening in Mongolian agriculture. The social repercussions of the adjustment process are already significant and likely to become worse as the adjustment process gains momentum in response to market forces. The Government has an opportunity to facilitate the adjustment process while at the same time, attend to the interests of those who would otherwise have been disadvantaged through the process. After an initial study involving both local and international specialists, the extent of funding needed for the Program will become more obvious.

### F. Indicative Implementation Arrangements

41. The implementation of this Program will require the coordination of a number of organization including the Ministry of Finance, MoFA, The Ministry responsible for land administration and the Ministry of Social Welfare and Labor. The Program has both social objectives as it has for achieving economic efficiency in the sector. It is proposed that a joint steering committee be established to manage the initial survey and investigations and that a working committee be established to develop the criteria and conditions of the agreed support. The Ministry of Finance should be the lead Executing Agency as the repercussions on budgetary reserves could well be significant. The Working Group should have the Director of Policy Implementation Department from the MoFA as its deputy chairman as the agricultural production aspects will be critical in establishing the eligibility criteria for the Program.

### G. Program Framework Matrix

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<b>Goal</b> 1.0 To promote increased agricultural efficiency through structural adjustment	Unit value of output per agricultural enterprise	Derived from National Statistics Office data	Inefficient producers are not supported to remain in production
<b>Purpose</b> 2.1 To promote farm and herd size aggregation to achieve economies of scale  2.2 To protect the interests of those electing to leave the sector by protecting the value of their assets and providing vocational retraining	Average size of holding increased  Transaction values of land and animals exchanged	National Statistics office and annual livestock surveys  Soum records	Alternative livelihood sources can be identified  Capacity exists to maintain detailed records
<b>Outputs</b> 3.1 Land user rights issued to those wishing to leave the industry  3.2 Pasture user rights issued to those wishing to leave the industry  3.3 Financial institutions providing term loans for farm aggregation and herd amalgamation  3.4 Relocated producers engaged in alternate income generating activities	Nos. of certificates issued  Nos. of user right certificates issued  Value of term loans outstanding for farm build-up and aggregation  Numbers of producers with alternative livelihoods	Land administration reports  Pasture management reports  Mongolbank quarterly reports  Soum records of registered inhabitants	Soums have the capacity to issue titles  Soums have the capacity to issue pasture grazing rights  Financial institutions interested in participation  Soums have the capacity to maintain records
<b>Activities</b> 3.1.1 Conduct survey of small-scale operators	Survey completed	Survey report sighted	

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3.1.2 Prepare a prioritized list of those wishing to liquidate their farming interests	Aimag lists prepared and priorities assigned	List sighted	
3.1.3 Provide assistance with applications to soum and aimag authorities for user right certificates	Nos. of applications submitted for land possession certificates	Soum records	Capacity in soums exist to register interests
3.1.4 Support for boundary identification and definition	Cadastral data registered with land office	Land administration office records	
3.2.1 Conduct survey of small scaled livestock owners in pastoral areas	Survey completed	Survey report sighted	Capacity in soums exist to register interests
3.2.2 Prepare a prioritized list of those wishing to sell or have their livestock available for agistment	Aimag lists prepared and priorities assigned	List sighted	
3.2.3 Provide assistance with applications to soum and aimag authorities for pasture user right certificates	Nos. of applications submitted for pasture management rights	Soum records	
3.2.4 Support for boundary identification and definition	Cadastral data registered with land authority	Land administration office records	
3.3.1 Train bank staff in term loan appraisal procedures	Nos. of training activities and Nos. of staff trained	Training evaluation reports	Financial institutions are interested in participation
3.3.2 Provide a guarantee fund that can be accessed for defaulted term loans	Guarantee fund established in Mongolbank	Mongolbank quarterly reports	
3.3.3 Provide a concessional line of credit to facilitate farm aggregation, herd buildup	Value of credit extended for farm amalgamation and herd aggregation	Mongolbank quarterly reports	
3.4.1 Provide vocational training to interested producers	Nos. of training courses funded and Nos. trained	Training evaluation reports	Suitable employment opportunities exist
3.4.2 Provide relocation support to other geographic areas for employment	Value of relocation assistance provided	Aimag budget reports	
3.4.3 Assist in the identification of alternative livelihood identification	No of assisted placements outside the agricultural sector	Socio-economic surveys of resettled persons	Beneficiaries can be identified after resettlement