

Draft for Discussion Only

Central Asian Countries Initiative for Land Management

Turkmenistan

National Programming Framework

Prepared by

Turkmenistan UNCCD National Working Group

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ABBREVIATIONS

AC	–	Agricultural Council
ADB	–	Asian Development Bank
CAC	–	Central Asian Countries
CACILM	–	Central Asian Countries Initiative for Land Management
CDW	–	Collector Drainage Waters
CEP	–	Caspian Environment Program
CIDA	–	Canadian International Development Agency
CIS	–	Commonwealth of Independent States
CPIDS	–	Communication Plan and Information Dissemination Strategy
CRIL	–	Complex Reconstruction of Irrigated Lands
CS	–	CACILM Secretariat
CSC	–	CACILM Steering Committee
FAO	–	Food and Agriculture Organization
GC	–	Government Corporation
GDP	–	Gross Domestic Product
GEF	–	Global Ecological Fund
GM	–	Global Mechanism of the UNCCD
GRP	–	Gross Regional Product
GTZ	–	German Development Cooperation Agency
GTZ-CCD	–	German Development Cooperation Agency UNCCD Cooperation Program
HDI	–	Human Development Index
ICARDA	–	International Centre of Agricultural Research on Dry Areas
ICBA	–	International Center for Bio-saline Agriculture
IFAD	–	International Fund for Agricultural Development
IMF	–	International Monetary Fund
IPGRI	–	International Plant Genetic Resources Institute
MAT	–	Ministry of Agriculture Turkmenistan
MWE	–	Ministry of Water Economy
NAP	–	National Action Plan
NCC	–	National Coordinating Council
NEAP	–	National Environmental Action Plan of Turkmenistan
NEAPCD	–	National Environmental Action Plan to Combat Desertification
NFP	–	National Programming Framework
NGO		nongovernment organization
NIDFFNPT	–	National Institute of Deserts, Flora and Fauna of Turkmenistan
NPF	–	National Program Framework
NS	–	National Secretariat
NWG	–	National Working Group (of CACILM)
PDF	–	Project Development Facility
PPMS	–	Project Performance Monitoring System
PPP	–	Purchasing Power Parity
PSF	–	Personal Subsistence Facilities
SC	–	State Commission
SDC	–	Swiss Agency for Development and Cooperation
SLM	–	Sustainable Land Management
SPA	–	Strategic Partnership for UNCCD Implementation of CACs
SRAP-CD	–	Sub-regional Action Program for Central Asian Countries on Combating Desertification and Drought

- TACIS – European Union Technical Assistance program for Commonwealth of Independent States
- TRT – GEF technical review team
- TRP – Technical Review Panel
- UNCCD – United Nations Convention to Combat Desertification
- UNDP – United Nations Development Program
- UNEP – United Nations Environment Program
- WB – World Bank
- WTO – World Trade Organization
- WUA – Water Users Associations

EXECUTIVE SUMMARY

1. In common with other nations in Central Asia Turkmenistan suffered significant economic dislocation at the time of the dissolution of the Soviet Union. Government action has since stabilised the situation, growth has resumed with average per capita income increasing 4.5 times to \$6,900 by 2004 from 1992. Although natural gas, oil and mineral reserves underpin the economic performance of the nation more than 54% of the population is rural and depends on agriculture, livestock or associated service activities for its livelihood. Agriculture is recognised as the second most important sector in the country with some 22% of GDP.

2. The country has embarked on a program to add value to agricultural raw production to generate further wealth and employment. Unfortunately the soils and water resources upon which Agriculture and the majority of the population depends for their livelihood have not begun to recover from the damage inflicted during the rapid agricultural expansion of the 1960's. The last assessment of land and water condition, in 1998 based on data at the end of the Soviet period, indicates that some 64% of irrigated land then suffered from moderate or serious secondary salinity, 54% of rangelands suffered from moderate to serious degradation while water quality for irrigation and human consumption had declined greatly.

3. There is no modern data on the condition of land, vegetation and water but it is believed that all of these indicators have declined further and that the rate of change is increasing. Irrigation and drainage infrastructure has deteriorated further resulting in more water logging and secondary salinity and yields are now also dropping. These systems had very poor water use efficiency at the time of commissioning and are not equipped with appropriate controls and systems for modern more water efficient irrigated agriculture. Livestock numbers have increased sharply while livestock water points have been mostly destroyed and livestock are now concentrated around settlements increasing shifting dune formation. Gas and other resource extraction is taking place with little control over desertification processes that constitute serious break points in a mostly sandy fragile desert landscape. Most forests and protected areas are still not being managed in sustainable way and exacerbate desertification processes (except around some large towns, notably Ashgabat where green belts have been established). Although the links between land degradation and livelihood have not been established empirically it is reported that these processes are causing out migration from degraded irrigation areas and are creating a class of livestock owners not able to escape from the degrading environment around many settlements.

4. The country has the financial means to make significant investments and is doing so with some very large projects, but seemingly lacks the data, experience and a consensus on how to modernise its agricultural infrastructure to improve water use efficiency, necessary to achieve its production objectives, or to supervise use of its fragile rangelands for livestock. Government has recognised the importance of harmonising economic development with the preservation of its natural resources and has adopted a National Environmental Action Plan approved by the President in 2002, which identifies most of the technical issues and problems. It has begun to implement this with a significant investment in an ambitious drainage program to reduce water logging to enable leaching of salinized land and has also invested to create some new water supplies from dams. Unfortunately much of the plan remains un resourced and it has to operate in a climate where the enabling environment of economic policies, legislative acts, administrative regulation, institutional arrangements, and land use rights are still evolving unevenly from those in place in Soviet times and do not provide adequate incentives for action by land and water users so that yields and water use efficiency is reportedly still dropping. Furthermore water quality and availability is subject to cross border impacts, possible changes in water supply from

the Amu Darya and climate change and there is not now a research capacity to react to these in a timely way.

5. Government has demonstrated an interest in solving these problems; it has ratified three of the Rio conventions, established a commission to coordinate activities to comply with these and donor activities to assist and has begun to invest to combat desertification under its National Action Plan, prepared to implement its responsibilities under the UN Convention to Combat Desertification. A review of this plan in 2004 indicated that it had not addressed the requirement to create a better enabling environment for action by land users. This National Program Framework has thus been developed to address these shortcomings, to provide a longer time horizon and the means to mainstream sustainable land management into the economy.

6. The vision and intended impact of the program is “Restoration, maintenance and enhancement of the productive functions of Turkmenistan’s land leading to improved economic and social well-being of those who depend on these resources while preserving the environmental functions of these lands in the spirit of UNCCD”. This is to be achieved by means of seven groups of activities or components including one to improve the capacity it’s national institutions to integrate Sustainable Land Management considerations into their operations and budgets and to improve the incentive environment for land and water users to manage their resources in a productive and sustainable way.

7. The visions of the six components of the program that have physical outcomes are:

- (i) Monitoring and information flow on SLM; a collaborative monitoring and reporting system responsive to its institutional stakeholders and land and water users providing appropriate and relevant information for land use planning, land, vegetation and water condition monitoring, land cadastre and land administration purposes making a significant contribution to mainstreaming SLM into the economy,
- (ii) Integrated sustainable management of irrigated lands; one or more pilot areas within main irrigation basins operating with a water use efficiency of 70% growing appropriate profitable crops managed by land and water users having long term use rights providing information and promotion for policy makers and other land and water users in other regions,
- (iii) Forestry and woodland areas; a developed system for local government and community based re-development and management of forestry areas and the sale of forest products and services including activities to develop a carbon market,
- (iv) Range and pasture areas; a developed sustainable system for pasture management and water point and energy system development and maintenance by collaborative and individual herders, with certified long term use rights and in harmony with settlement administrations, and
- (v) Targeted Research: research capacity to react to any changes in water quality and quantity and its availability due to climate changes, international agreements or borders impacts, and to research social issues of land degradation.

8. The program is organized in three phases over 10 years, the first two of which are budgeted to cost approximately \$30 million of which Government has agreed to meet almost 50% through its Agricultural fund and other national inputs.

I. INTRODUCTION

“Turkmen land is the land on which gold was scattered, if you serve such land, it will give back its gold abundantly to you”. Rukhnama p 240.

A. Rationale

9. Within the period 1991-1997 the economy of Turkmenistan and, therefore the GDP, fluctuated significantly due to changes in raw materials prices after the country became independent¹. Since 1997 the economy has stabilized, GDP has grown strongly and policies aimed at self sufficiency in basic food production and growth by adding value to agricultural and gas resources have been put in place. Government’s economic development strategy to 2010 features a step by step change to a market economy coupled with continued planned development of the principle crops of cotton and wheat to safeguard the availability of these commodities for these policies.

10. This process is proceeding differently in different agricultural industries giving mixed signals and difficulties for regulators and institutions responsible for monitoring resource use and land and water users alike. Privatization of livestock and granting leases for irrigation land happened rapidly, particularly for most food needs (including viticulture, vegetable and melon growing). While privatization or leasing of land to grow cotton and wheat is occurring, it is doing so at a much slower rate and control over the cropping practices and land and water management has been retained by Government and transferred to single commodity institutions. These cotton and wheat institutions (“Turkmengallaonumleri”, “Turkmenpagta”, Ministry of Textile and others) control input and output prices, but the Government provides subsidies for inputs, which partially off sets the losses due to the controlled output prices. Water and energy inputs are also kept very low as part of Government policy to keep living costs low.

11. Land and water users have responded to these incentives in several ways; livestock numbers have grown rapidly and unevenly causing significant and growing grazing pressure around settlements. Cotton and wheat producers have continued the former agronomy practices of the Soviet period but without the same level of agronomic support and yields dropping although the reason for this includes salinity and water logging. Horticulture is concentrated on family owned plots with increasing production going for sale where markets are within reach, or for family subsistence. Water use efficiency in all agriculture is still very low with high seepage and other losses leading to water logging and secondary salinity. Forestry resources are also reportedly still being cut indiscriminately for fuel wood, as has occurred for decades.

12. Turkmenistan’s ability to monitor the effects of these changes in land and water condition has declined markedly while the users of the information have also changed from a centralized system beginning in Moscow, to one that should operate from local levels, supported by relevant scientific institutes. The Ministry of Agriculture has retained the responsibility for land management and the Land Cadastre for agriculture and livestock but has little practical authority over cotton and wheat and therefore most agricultural land. It does not have the staff, equipment or approved regulatory procedures to undertake this under these changed ownership and control procedures. Water and Drainage management has remained under the control of the Ministry of Water Economy but its ability to do this effectively has significantly declined due to degraded infrastructure and lack of control and measurement facilities for this changed land use and control situation. The Ministry of Nature Protection retains the responsibility to monitor the

¹ “Neutral Independent Turkmenistan: 10 years of Turkmenbashi the Great Era”. Ashkhabad – 2001, page 139.

condition of the natural resources of desert pastures, soils, forests and rangelands for environmental protection but also no longer has the staff, equipment and regulatory procedures to undertake these duties adequately. Little information is being gathered on land, water, forests and pasture conditions and that which is, is not being analyzed or distributed to local levels of Government where it might be used.

13. Modern anthropogenic land degradation in Turkmenistan, in common with other CACs', had its origins in the former centrally planned agriculture of the Soviet period. Agriculture and livestock production was planned on scientific principles in large units. Implementation was marred by a poor mix of incentives and changing policies resulting in poor construction and management and consequent damage to the resource base of land and water quality, notably in the Aral Sea region. Present statistics and analysis of land degradation is based on the situation at the end of, and shortly after, this period.

14. More than 64% of all irrigated land was then assessed to be suffering from moderate or serious secondary salinity caused in the main by water logging from poor irrigation practice and deteriorated and insufficiently extended drainage infrastructure. Water quality itself is declining, particularly in the middle and lower Amudarya River. About 80% of Turkmenistan is sandy and very susceptible to erosion if disturbed. The principle causes of disturbance are over grazing and vehicle and industrial (technogenic) damage. Planning for livestock development in the Soviet period included the development of livestock watering facilities in strategic locations, which enabled some control to replace traditional practices although overgrazing was still a problem with moderate or serious damage in 54% of the area. Forests in mountains and in rangeland areas were supposed to be protected in the Soviet period although tree cutting for fuel supply has been a long-term cause of deforestation in most areas exacerbating desertification from overgrazing.

15. Since this time the situation is thought to have deteriorated further in all of these categories with degradation around settlements being perhaps the fastest under the influence of increases in livestock numbers and changes in grazing patterns following the distribution of livestock in the post Soviet period and the destruction of most water points. Then damage from exploration vehicles, pipelines and production facilities, then Secondary salinity. Some out migration to escape declining yields has been reported although reliable data do not exist. Water quality from increased salinity is also assumed to have worsened although pollution from inappropriate fertilizer and chemical use may have reduced with the reduction in input use. Land and soil quality is assumed to continue to deteriorate through inappropriate land treatment and cropping practices.

16. Turkmenistan has signed three of the so called Rio Conventions: Convention on Biodiversity, Convention to Combat Desertification, Framework Convention on Climate Change, as well as the Orhus convention on freedom of information flow and the Basle convention on hazardous wastes. It has established a State Commission to coordinate activities to comply with these conventions, Chaired by the Ministry for Nature Protection and has taken part in all of the steps establishing the Central Asian Initiative for Land Management to and including the preparation of this National Program Framework.

B. Overview of the National Action Plan

17. The National Action Program to combat desertification has been the main instrument to implement commitments under the UNCCD. The National Action Program to Combat Desertification in Turkmenistan (NAP/CD) was prepared in 1996 by the scientists of the Desert

Research Institute, with support from the United Nations Environment Program (UNEP). The NAP covers the country's physical environment, resources and socio-economic development plans. It describes human-induced desertification and specifies a strategy and plan of action including programs of high priority to combat desertification.

18. However, it is acknowledged to have weaknesses², specifically:

- (i) Its stand-alone nature;
- (ii) Its lack of attention to the enabling environment of incentives for land and water users;
- (iii) Absence of structured linkages between the NAP and the national, provincial, district and local levels of Government; and
- (iv) Limited interaction with NGOs or civil society organizations working through participatory approaches.

19. The NAP focused mainly on the conduct of further research or the field testing of outcomes of ongoing research in areas such as: investigation of desertification or degradation processes; combating of soils salinization; identifying progressive technologies for enrichment of rangelands; and stabilization and afforestation of moving sands. Implementation of the NAP has commenced with a self diagnostic capacity building program implemented by UNDP and some community based projects to combat desertification around settlements, these activities can be built on under CACILM.

20. Government has also reacted to the pressure of increased land and water degradation by preparing a National Environmental Action Plan (NEAP), approved by Presidential Decree in 2002. This is designed to ensure harmonious economic development without degrading the natural resource base. This document covers a wide range of natural resources including the major forms of land degradation using old data and includes a range of plans and measures designed to address these as policy guidelines. The plan is not yet well resourced and is operating only in a few areas and its actual plans and strategies are not detailed or comprehensive when compared with its objectives. The Ministries' of Nature Protection and Economy and Finance are responsible for coordinating the plan and assisting to attract finance from domestic and donor sources and securing budgetary support.

21. The plan has resulted in a significant investment into a large drainage collector, known as the Turkmen Lake, designed to draw irrigation drainage water away from the Amudaya River and the irrigation areas on the Mugrab and Tejen Rivers, and part of the drainage water from Uzbekistan, across Turkmenistan, to a depression in the north of the country. This is expected to significantly reduce water logging and enable leaching of saline land to recover it for agriculture, although its precise environmental impact is not yet known. Other investments have been made into new dams to provide more water for irrigation although the scope for this is limited due to climate.

22. It has also enacted new land and water codes to provide a basis for changed land and water use towards a market economy although these have not yet been fully converted into regulations, resourced and assigned to administrative positions.

² Turkmenistan: Issues and approaches to combat desertification, discussion draft Saigal S ADB/GM June 2003

23. It has participated in this CACILM process to prepare this National Program Framework to build on these previous activities and to provide a rationale to resource the NEAP in the near future.

C. CACILM Partnership

24. CACILM is a multi-country and donor partnership to support the development and implementation of national level programmatic frameworks for more comprehensive and integrated approaches to sustainable land management in the region and in each country. It is to be guided by National Program Frameworks (NPF) in each country such as this NPF for Turkmenistan. In 2001, the Global Mechanism (GM) initiated creation of the Strategic Partnership to carry out UNCCD in Central Asia putting together the efforts of GM, Asian Development Bank (ADB), Canadian International Development Agency (CIDA), German Agency for Technical Cooperation (GTZ/Germany), Switzerland Development Cooperation Agency (SDC), IFAD and ICARDA. In 2003, a Forum on Partnership Development was held in Tashkent that resulted in development of Tashkent Platform principles to carry out the UNCCD and establishing Working Groups for partnership development in each CAC.

25. As a result, the National Working Group (NWG) was established in Turkmenistan composed of representatives of different ministries and institutions, NGOs and international organizations. Since its establishment, NWG has been executing the functions of coordination at the national level to organize National Workshops and prepare this NPF. A CACILM coordination council has been established during the preparation of the NPF to provide a middle management means of coordinating the activities of different Ministries, scientific institutes and the private sector, including NGOs in the formulation of the NPF; it is intended that this council will be involved the coordination of the NPF during implementation.

26. Under the guidance of the NWG and with the active participation of the Coordination council, the CACILM NPF has been formulated to respond to perceived shortcomings in the NAP by developing plans for:

- (i) Information and monitoring systems for land administration of irrigated and desert landscapes;
- (ii) Demonstrating new incentives, institutional collaboration water saving and irrigation technologies to control soils salinization in pilot areas featuring participation of local communities/ NGOs;
- (iii) Larger scale investments to rationalize the use of rangelands and to redevelop livestock water resources with traditional and wind and solar powered modern facilities and improve the quality of fodder resources;
- (iv) Community and local Government based involvement in the management of reserves and protected areas; and
- (v) More focused research towards the productive use of deteriorating water and land resources that seem likely through one or more trends such as climate change and continued use of shared water resources; and in social research on the links between well being and land degradation.

27. The CACILM National Program Framework thus focuses and strengthens the NAP, links it to the policies established by Presidential decree in the NEAP and provides a means of financing those parts of NEAP relevant to land degradation that are not yet funded. It directs much more activity towards on ground investment; inter agency cooperation and the generation

of appropriate incentives and examples for people to act at local level to combat desertification and other land and water degradation.

II. SITUATIONAL ANALYSIS

A. Macroeconomic and Livelihood Situation

28. Within the period 1991-1997 the economy of Turkmenistan and so GDP, fluctuated significantly due to changes in raw materials export prices since independence³. The economy was structurally weak with primary agricultural production constituting 40% of the economy, focused on cotton. Industry constituted 17% of GDP while extractive sector formed about 80% inclusive of gas and oil.

29. By 1999-2004 policy and investment changes saw the share of industry increase to 31-33% and the ratio of the extractive sector to value added industry halved to 46% and the share of light and food industries increased to 30%). By 2004 ratio of agriculture in GDP was about 22% and services 40%.

30. Significant investments have been made in the textile industry to add value to raw cotton production and now some 35 % of raw cotton is processed into ready-made products compared to 3% during the Soviet period. These have been established in different regions of the country factories and within the period 1991-2004 the production of knitted fabric has increased to 4 times, and cotton yarn 10 times. Economic reforms between 1991-2004 has resulted in GDP per capita increasing 4.5 times to 6,900 US according to purchasing power parity.

31. Investments to achieve self sufficiency in food production, replacing importations during the Soviet period have been successful with wheat production in 2004 exceeding the 1991 figure by 13 times. There has been a significant investment in urban infrastructure with more than 28 thousand km of gas networks and 7 thousand km of electric systems installed towards gasification and electrification of city and village settlements. Other Government investment to provide basic services to the population and electricity gas, along with water and salt, are provided 'free of charge' for ordinary urban use under the national 2020 plan as part of the objective to increase standards of living to match economically developed nations as described in the UN Human Development Index (HDI). Turkmenistan was placed 86 on the HDI table in 2001 compared with 103 in 1995 according to World Bank (WB) estimates.

32. Per capita income varies according to the amount of industrial development compared to agriculture. In 2002 the highest Gross Regional Product (GRP) was Ahal province (20.6 %), the lowest Dashguz province (10.1 %) due to this influence as shown in Figure 1

33. The state policy of Turkmenistan is to further smooth the level of socio economic development of regions of the country, proceeding from natural, economic and labor capacity of each of them, as well as continuing the structural transformation of the economy consistent with both regional specialization and the need for integration. As a result serious income disparities do not appear, according to a WB survey in 2003, some 34% of the population was below \$4.30 per capita purchasing power parity (PPP) per day.

34. Cultivation of personal land plots, called Personal Subsistence Facilities (PSF) is significant in providing for basic living in rural areas and in understanding employment. 84.5 % of

³ "Neutral Independent Turkmenistan: 10 years of Turkmenbashi the Great Era". Ashkhabad – 2001, page 139.

those surveyed in 2003 under the ADB household survey were able-bodied, 6 % older and 9.5 % younger. 44 % of able-bodied people described PSF as their primary or secondary occupation, 28 % of those older described PSF as their primary occupation and those who are younger 23 %. PSF is largely a rural population activity with 5 times the level of urban involvement. The level varies between regions from 22 % in Ahal province up to 57 % in Lebap.

35. Women comprise of 56 % of all those engaged in PSF, 54% of the able-bodied age are women, 56% of the over age group are men and the under age group is split large families are more likely to be involved in PSF with the share of households consisting of 5 or more people comprises 66 % involved in PSF, households consisting of 4 people comprise 15 %, those consisting of 3 people 9 %, those consisting of 2 people 6 % and the ones of 1 person 5 %. Land is allocated according to family size and larger allocations are made to rural people and actual allocation is related to the potential land use.

36. Production from PSF is used both for personal consumption and for sale or barter, in both cases the income reduces expenditure on food and bartered items; cash income is 67 % of the average in urban areas, 7 % more than in rural areas. It fluctuates from 50 % in relation to an average indicator in Mary province, which is basically involved in plant growing, up to 160 % in Balkan province involved in cattle-breeding. Education is a factor in PSF employment with professional people receiving higher income, mostly in cash from their place of employment.

37. There are no good data linking land degradation and income. However some relevant observations can be made from developments since the break up of the Soviet Union, based on the proceedings of the First National Workshop:

- (i) The privatization of the national livestock resource has had the unfortunate side affect that animals have been moved closer to settlements where they can be protected by their owners, and the destruction of former water points away from the settlements. This has resulted in significant over grazing in near settlement areas and wind erosion of the denuded lands. This has had a disproportionate impact on people with smaller herds who cannot afford to pay the costs of transporting animals to better pasture. This in turn exacerbates the over grazing and land damage establishing a pernicious relationship between livelihood and land degradation.
- (ii) Secondary salinity and water logging are also very significant forms of land degradation; this has been occurring since before the breakup of the Soviet Union and is clearly linked to reductions in yield and so income to impacted farming enterprises. There are reports of out migration of farmers from degraded lands but no data to support this. As discussed above many large families with low cash income obtain food and goods for barter from private plots. There are no data linking these private plots to livelihood although Government grants such land to enable subsistence food production but it is suggested that inappropriate water use also occurs on these plots with further off site water logging and impacts on livelihood for reasons discussed below.

B. Trends in land degradation

(a) Areas vulnerable to land degradation

38. Practices that cause land degradation impact differently on different soil types. Only the seriozem/grey brown and some of the sandy soils and takyr⁴ like soils are suitable for agriculture. Takyr soils are often interspersed with solonchak⁵ areas which are almost entirely unproductive and in these areas the takyr type soils require land treatments before they can be used for agriculture.

39. The desert soils of Turkmenistan are often high in salts including carbonates, gypsum, sulphates and chlorides with sulphates and chlorides predominating along the Caspian coast and in formerly saturated paleo channels. Land degradation in desert soils occurs mostly through wind erosion in over grazed sandy areas.

40. Soils used for dry land agriculture are also subject to wind erosion, particularly in sandy and loess soils. They are also subject to water erosion in sloping areas during rainfall flood events, particularly where the soil has a significant salt content. The best land use in erosion prone areas is long cycle industrial crops such as vines and trees crops but many of these have been pulled out or cut down.

41. Soils used for irrigation are all subject to water logging depending on landform and drainage and this in turn causes secondary salinity. Clay and takyr soils are more likely to accumulate salt where leaching and drainage is not easily undertaken, but even sandy soils become water logged and salty where drainage does not occur. Practically the whole area under irrigated agriculture crops is irrigated by the passive flow from surface water sources. This is a wasteful form of irrigation, particularly in sandy soils, which impacts on water logging. There are small areas in the Kopetdag piedmont zone where groundwater for irrigation is lifted by pumps and where there is now an incentive to use less water.

42. Estimates of the extent of land degradation were last made in the early 1990's and were derived from space imagery well supported by ground observations (ground truthing) at permanent stations throughout the country and statistical processes. The desertification types and indicators for classification were developed at the National Institute of Deserts Flora and Fauna of Turkmenistan (NIDFFNPT) 6 and are set out in Table 1 below. Similar work was undertaken for each of the five Central Asian Republics in Turkmenistan.

43. These classifications have the advantage that they are commonly understood across the CACs and much previous data exists in each country under these headings. The disadvantage is that the indicators are not readily monitored in an automatic way; they are administrative classifications that require expert opinion to render them useful in different conditions of soil type and climate. It may be possible to calibrate these according to some objectively verifiable indicator, such as reflectance in remote sensed images and this may be useful for investigations into the rate of change but some more direct and internationally accepted indicators may be more useful in the future; this requires study.

⁴ Takyr and Takyr like soils are predominately clay soils with some loam. They usually include areas of hard clay pan, moderate to high salt(s) content. Some (Taykr like) soils are quite productive but where drainage is poor and salt(s) significant, they are considered mostly unsuitable for agriculture but useful for grazing.

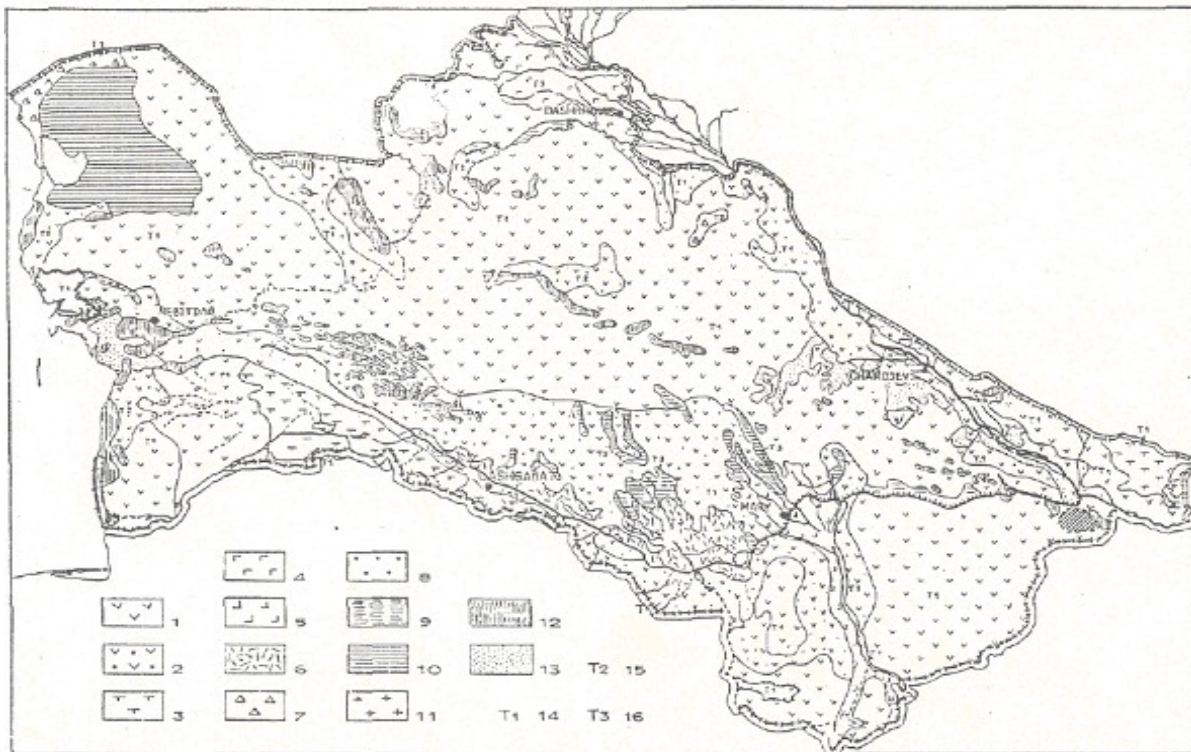
⁵ Solonchak soils have high to very high salt(s) content, usually with salt(s) apparent at the surface, they are quite unsuitable for agriculture and seldom produce much useful grazing, although sometimes quite moist after rain or along sea coasts, they are usually hard surfaces

⁶ Babayev A.G. Problems of Development of Deserts UN, 1995 – pp 340.

Table 1: Criteria used in classifying desertification

Desertification type	Desertification status		
	Slight	Moderate	Severe
Degradation of the vegetative cover	Climax or slightly changed communities. Loss of productivity < 25%	Long-existing secondary communities. Loss of productivity by 25-50 %	Short-living secondary communities. Loss of productivity > 50%
Wind erosion Water erosion	Moving sands occupy <30% Sheet erosion, separate rills, washing off the top soil horizon < 5 cm	Moving sands occupy 30-70 % Sheet erosion. Formation of gullies, washing off the top soil horizon by 5-20 cm	Moving sands occupy >70 % Gully network. Washing off the top soil horizon > 20 cm
Technogenic	Technogenic sands occupy <10%. Length of roads per 100 km ² totals < 40 linear km.	Technogenic sands occupy 10-25%. Length of roads per 100 km ² totals 40-80 linear km.	Technogenic sands occupy > 25 %. Length of roads per 100 km ² totals > 80 linear km.
Waterlogging of rangelands	Depth of fresh ground waters is 5-10m. <i>Tamarix ramosissima</i> and <i>Alhagi persarum</i> cover < 30 %	Depth of fresh ground waters is 2-5 m. <i>Tamarix ramosissima</i> , <i>Alhagi persarum</i> and <i>Karenina cassia</i> cover 30-70%	Depth of fresh ground water is is < 2m. <i>Fragmites australis</i> covers 70-100 %.
Salinization of irrigated lands	Decrease in cotton yield totals <15%. Seasonal salt accumulation is 16-30 MT per hectare	Decrease in cotton yield totals 15-40%. Seasonal salt accumulation is 30-45 MT per hectare	Decrease in cotton yield totals >40% Seasonal salt accumulation is 45-90 MT per hectare

Figure 1: Desertification Map of Turkmenistan.



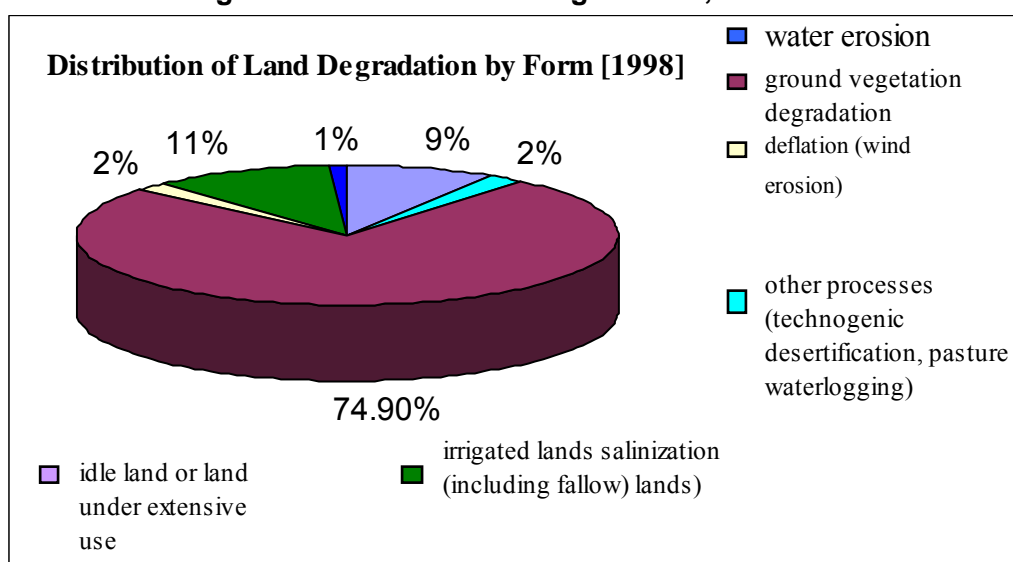
Source: National Institute of Deserts Flora and Fauna of Turkmenistan (incl. Table 1)

44. **Key to Figure 1:** 1 - Slight degradation of the vegetative cover; 2 - Moderate degradation of the vegetative cover combined with deflation; 3 - Degradation of the vegetative cover in mountains (70 %) and water erosion (30 %); 4 - Slight salinization of irrigated farm lands; 7 - Technogenic desertification; 8 - Wind erosion; 9 - Waterlogged of grazing lands; 10 - Shoal of the Gulf Kara Bogaz Gol; 11 - Undergrazing; 12 -Solonchak; 13 - Moving sand dunes of the natural origin; 14 - Low desertification rate (T1); 15 - Moderate desertification rate (T2); 16 - Severe desertification rate (T3).

45. The present rate of change in land and water condition is not known for the period since about 1991 (depending on indicator being examined) but is understood to have accelerated in all of these categories.

46. The NEAP, 2002, undertook a review of land degradation based on data published in 1998 but sourced from original data from the early 1990's and assessed there was about 446,000 km² of degraded land in the nation. The ratio of the different forms of degradation is illustrated in Figure 2 below. Although salinised irrigation land forms only about 3.5% of all useable land in the country it is the most important form of degradation ecologically and economically.

Figure 2: Forms of Land Degradation, % of area



Source: NEAP Figure 3.2.2 from Institute of Deserts, Flora and Fauna

These forms of land degradation are discussed in more detail in the following sections.

(b) Secondary salinization of lands

47. More than 68 % of irrigated lands in the country are classified as medium or high salinity. About 36 % of these lands also have underground water within 2 m of the surface exposing the land to secondary salinization from evapo-transpiration and water logging. This ecological problem is most significant in Dashoguz and Lebap provinces. The consequences are exacerbated by the highly mineralized irrigational water from the Amu Darya in Dashoguz province, in Turkmenistan's sector of the Aral Basin. Another significant problem is the increase in saline and polluted dust blowing from the shrinking Aral Sea in Dashoguz province. About 600 thousand ton of hard aerosols accumulate annually on the territory of this province and more than 70 % of this on agricultural crops in the irrigation zone.

48. Water logging and its consequent secondary salinity is largely due to the poor condition of the irrigation and drainage infrastructure. More than 90 % of irrigation and drainage network is constructed as unsealed earth channels. More than 40% of water moving through them is lost by infiltration. At the present time irrigation drainage water is dumped into the Karakum desert causing very significant areas of waterlogged ground and growing secondary salinity. According to Institute "Turkmensuwylmytaslama" about 698 thousand ha of pasturelands had been water logged by 1998. Government is addressing this issue with the construction of Turkmen Lake and associated drainage collectors and this is expected to solve this problem.

(c) Soil erosion due to wheel tracks – techno genic desertification

49. About 80 % of Turkmenistan is sandy and very susceptible to wind erosion if disturbed. Some 297 thousand ha has been assessed to have high level deflation (wind erosion), 214 thousand ha medium level and 253 thousand ha low level. This is mainly in the Central Karakum desert, in the southwest areas of oil and gas extraction, and along transport corridors and exploration roads. There are both natural and anthropogenic factors responsible for this erosion but technogenic causes are increasing in importance as exploration and exploitation of gas and oil increases, with associated roads, pipelines and railways. There are 39 deposits of gas and 18 of oil being currently developed in Turkmenistan. At present more than 400 geological structures regarded as prospective for gas, are being investigated. An average of 15 % of the grass covered area (or 300 ha) of each production facility becomes stripped during the process of drilling and around each derrick some 3.5 to 4 ha of the sand surface is damaged, and in cases of large oil and gas extracting sites, the average area of sand surface damaged is 600 ha. Additionally, the movement of heavy engineering machinery throughout the whole area of the field has a significant impact, and unchecked this grows naturally to form large areas of erosion.

50. The laws of Turkmenistan require people or institutions that damage the natural resource base to 'make good' but these laws are not being enforced well at present. It is not only the oil and gas sector that causes this damage. For example the canal track of Turkmenderya collector drain already has a motorway of some 200 kilometers that has been stripped of vegetation. Unchecked this disturbance has resulted in further erosion, in some places up to 300 m wide. Industrial development of sandy deserts increases with every passing year and the cities and settlements increase in number with the reclamation of the desert lands near the oases. Thus huge areas of open unfixed sand surfaces and sand ridges are appearing and require attention urgently.

(d) Pasture degradation due to uneven grazing

51. The major cause of pasture degradation is over grazing. The nature of this has changed since the distribution of state owned livestock to private citizens and the destruction of water points. Livestock have been concentrated around settlements for security resulting in overgrazing and land degradation in these places. Livestock numbers are reported to have increased significantly so that the pressure around settlements will have increased while some areas will have recovered. The problem now is more one of uneven grazing than over grazing in most areas.

(e) Soil erosion of irrigation lands on sub-mountain plains

52. Water erosion of soils on mountain slopes occurs on the Kopetdag, Large and Small Balkan ranges, on highlands of Karabil and Badhyz, and also on sloping foothill plains. Erosive activity from water flows can be seen on the plateau of Ustyurt and on the edges of Krasnowodsk plateau. The total area of land subject to such water erosion totals 690 thousand ha. All of the hillside areas of Balkan, Mary and Ahal provinces are subject to erosive processes.

52. The basic cause is in appropriate development or management of fragile lands. Some soils containing significant salts are highly erosive resulting in rill, sheet and gully erosion unless preventative measures are taken. Some land should not be planted with annual crops. This erosion caused by irrigation, is particularly serious in Ahal province where some 300 thousand ha was estimated to be affected by 1995. Ravine erosion is also significant with some 510 sq. kms. on irrigated lands being measured in the 1980's.

53. The formation of natural ravines is also exacerbated by anthropogenic factors such as mudflows caused in part by deforestation. The extent of natural ravines in Balkan province was 3025 kms, Mary 686 kms and Ahal 497 kms in 1995. The East and Western Kopetdag, Large and Small Balkans, and Central Kopetdag ranges are characterized by weak mudflow activities. The most powerful and frequent mudflows occur in the Western Kopetdag ranges through the broad ravines of Ajidere and Uzynsuw, in the East, through 9 big riverbeds.

(f) Degraded forestry lands

54. Although forests were not given a particular priority as a problem under NEAP, possibly due to the relatively small area involved, they are significant and potentially very significant as they can serve to protect land from wind and water erosion, provide fodder and fuel resources and in some places can be grown as 'biological drains' to use groundwater. Currently the total area dedicated to forestry is 9.9 million ha of which about 4.1 million ha had woods in 1995, about 6.5 million ha is held by farmers associations under long-term tenure and are used for livestock, which can be a competing use if accompanied by cutting.

55. Since the beginning of 1990's there has been a significant reduction in woods because of mass cutting, particularly of Juniper trees, Turkmen maple trees and others. This has more than halved the land area under juniper and reduced the area under tugai by 5.5 thousand ha. Fires on mountain slopes have resulted in degradation of land, vegetation, the number of water sources. Uncontrolled cutting of firewood has been a particularly serious problem over almost all of the forestlands used for livestock. Saxaul trees have been cut out of the vegetation mix over 6 million ha greatly increasing it's susceptibility to wind erosion.

56. Government has addressed this problem by banning the cutting of woods since 1991 and introduced a policy of providing free gas accompanied by a significant investment in gas reticulation to make this possible, providing favorable condition for natural renewal of forests.

57. **Conclusions and recommendations.** Land degradation from actions taken in the soviet period have not been addressed and are probably getting worse and the rate of change may be increasing for desertification around settlement areas and in secondary salinity although good data do not exist.

58. Better information is a key need as is the dissemination of useful data to concerned stakeholders.

C. Stakeholder Analysis

59. The mix of stakeholders in Sustainable Land Management (SLM) has changed since the dissolution of the Soviet Union, some have disappeared, while the responsibilities of others has changed, or are not being carried out, either because they have lost some duties or they are now ill equipped to carry out the tasks assigned to them. Others have the power to significantly influence land management practices, but no responsibility to protect the resource base. The analysis below is the current situation.

60. At the national decision-making level, are the Agricultural Council (AC), State Commission (SC) and three Ministries: Ministry of Nature Protection, Ministry of Agriculture, and Ministry of Water Management. Both, AC and SC, are the high decision making bodies in the field of nature protection. The SC has a recommendation-giving mandate only while the decisions made by AC are obligatory for all ministries and organization.

61. Ministry of Nature Protection is entrusted with the execution of Law "On Nature Protection". Nevertheless, the Ministry has no departments on land and water resources management which could help information flow from the Ministry of Agriculture and Ministry of Water management. As the Ministry of Nature Protection is entrusted with the execution of the National Environmental Action Plan, it is now the main Ministry involved in environmental strategy for the country and requires strengthening for this increased role.

62. Ministry of Agriculture has transferred its former responsibility of fulfillment of state order for wheat and cotton production, as well as the functions of agricultural services, to the newly established associations and state concerns. Therefore, the Ministry has retained and strengthened its policy role in agricultural sector which increases also due to the fact that the Land Resources Service functioning under the Ministry of Agriculture is responsible for execution of Law "On Land".

63. Ministry of Water Management is important for designing, maintenance and construction of irrigation and drainage canals, as well as for the organization of training workshop to introduce modern irrigation techniques and saline water use in agriculture. Soil and water monitoring as well as hydro-ameliorative units, should be the responsibility of this Ministry. Ministry of Water Management should undertake the new task of monitoring of water management on field.

64. National research institutions have accumulated rich experience in land and water protection techniques, although some of these have not found application by resource users. Despite the fact that many institutions are lacking methodological and technical capacity, most of the national research institutions carry out projects and programs jointly with the international agencies and therefore have some experience in executing activities which include the elements of policy impact, strengthening of institutional capacity and application of participatory approaches.

65. Private sector has been forming recently in the country. The growth in private lands indicates the agricultural organizations need to re-orient their services toward the needs of private land users. At the earlier stages, private sector could contribute into SLM by applying appropriate agricultural practices, optimizing the use of chemicals, use of water-saving techniques and rational use of pastures and forests.

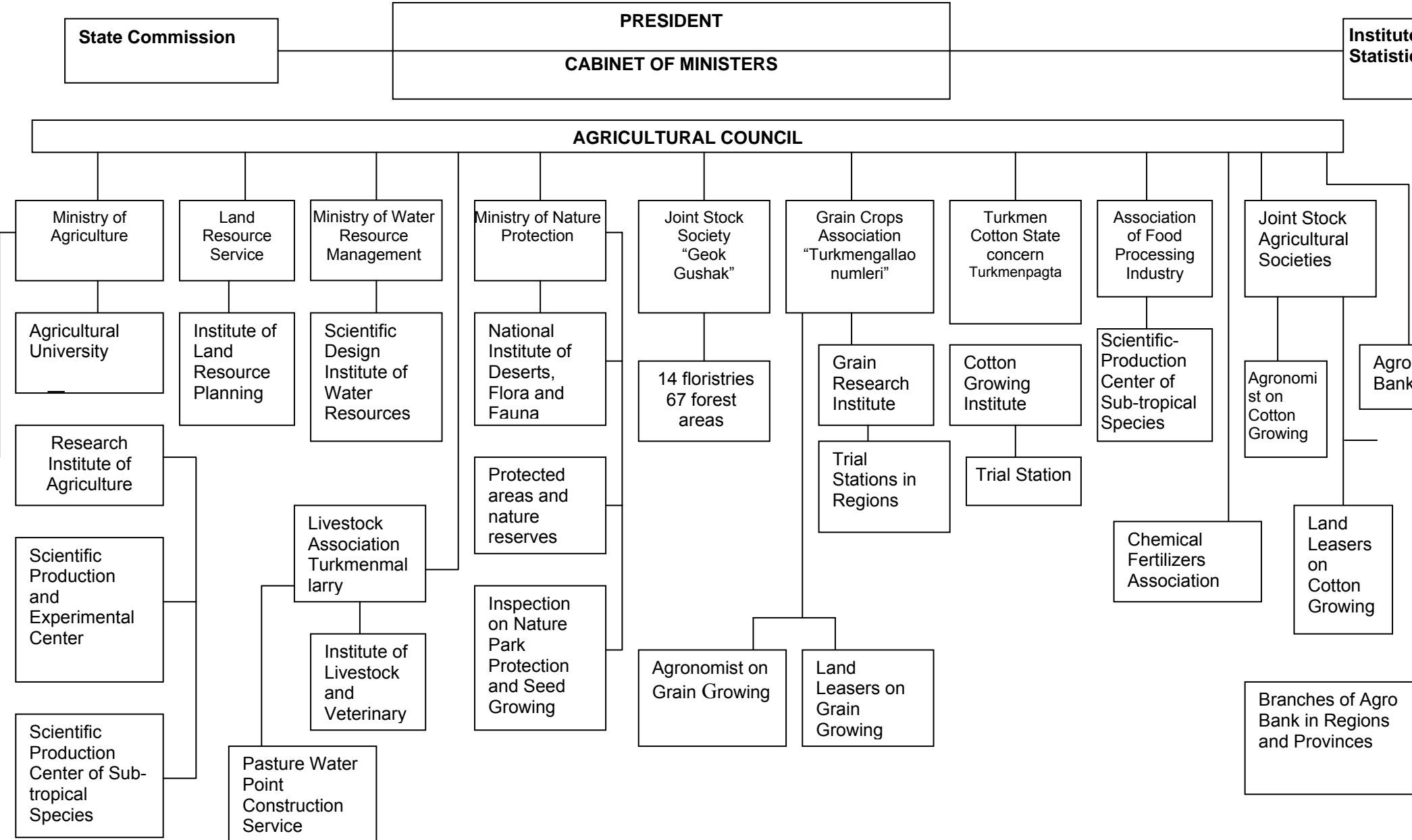
66. To support CACILM, civil society has a specific potential role of building the awareness and knowledge of stakeholders' (state, private sector, international agencies, etc) interest in SLM. In particular, civil organizations could assist in providing rural extension and consulting services in the fields of agriculture, marketing, accessing and dealing with credit. The role of civil society is expected, rather than committed and capacity building will be necessary for them to execute their roles as it is expected (human, technical, analytical, coordination, strategic).

67. Land and water users of course are the most important stakeholder to whom all other stakeholders relate in some form or another. Land and water users have grown in apparent

responsibility and interest but do not have the knowledge, means or incentive to act in the interests of SLM in many of their management decisions, notably in field cropping and water management in the field. Livestock owners have an incentive to preserve their livestock but less incentive to preserve pasture or water resources, which are state property and have common user rights. Agricultural associations have been recently established to integrate services for the private sector and farmers but it is not clear how these will operate. The role, responsibilities and potential use of different stakeholders who influence land and water users are depicted in Figure 2 stakeholders in SLM.

68. **Conclusions and recommendations.** The views, capabilities and roles of stakeholders in SLM are evolving and will continue to do so throughout the CACILM process. A practical means of reviewing these and mobilizing their potential to assist in mainstreaming SLM needs to be developed for success.

Figure 3: Stakeholders in SLM



D. Policy, Legal, Regulatory, and Institutional Barriers and Constraints

69. The main policies towards economic development described in the development program to 2010 and to 2020 contain clear development objectives for agriculture, livestock and light industry to add value agricultural production but do not clearly define where the resources, particularly water are to be obtained to support these. For example the 2010 plan anticipates a 10% per annum growth rate in Agricultural production between 2005 and 2010 and the 2020 plan anticipates a 17.7 times increase in agricultural production in the next ten years. It proposes this will occur as a result of yield increases, more land recovery but little additional water beside some relatively small dams. In fact crop yields are dropping, water use efficiency is reported to be still declining and international agreements may reduce supplies available from the Amu Darya. The Turkmen lake drainage project will increase the capacity of the large-scale collector systems and thus the capacity to leach saline land but cannot increase water supplies. There is no alternative but to invest to improve water use efficiency if these objectives are to be met. Funds are not now allocated for this nor is there any agreed strategy for investing to this end although small-scale demonstrations of some modern technologies have occurred.

70. A new land code policy towards leasing or giving land in 3 ha parcels to private farmers is being implemented but water control facilities do not permit farmers to take advantage this by altering farming practices, even if cropping pattern changes were permitted, which they are not in most areas. At the present time cropping patterns are in the main dictated by state orders for cotton and grain channeled through special purpose cotton and bread associations and not through rational land use planning and market demand. Markets are any case distorted by export restrictions, inflation and input price subsidies, particularly for water and energy and price controls for cotton and wheat. Government's policy is to make a step by step transition from this situation to a more recognizable market and encourages privatization but this process may take a significant period of the CACILM time span and in the meantime is a significant barrier to the development of a cost effective agricultural sector.

71. Similarly with livestock development, the plans call for substantial increases in livestock numbers and the repair of all livestock water points by 2005. In fact livestock numbers have increased ahead of plan but water repairs have not taken place and are not currently funded. There are also no developed regulations to cover pasture use and control in the event of over grazing.

72. Land zoning, land administration, the operation of the land cadastre and the monitoring of land, vegetation and water resources all requires information, some of which is being gathered by different agencies that have narrow responsibilities for the state sector and little requirement to collaborate with others or to share information or to provide information or supervision to the private sector. This issue of monitoring and land information processes is covered in a later section but constitutes a serious institutional constraint to the adoption of and mainstreaming of SLM.

73. **Conclusion and recommendations.** The policy, legal regulatory and institutional environment of SLM has evolved in some ways inconsistent with mainstreaming SLM and this needs to evolve further throughout the CACILM period but

the pace of change needs to be agreed and practical, while the expectations of land and water users to adopt SLM needs to be tempered by these realities.

E. Current Status of Monitoring and Research Programs

Monitoring

74. Monitoring resource condition to facilitate production planning and estimates was routine up until the end and for a few years after the breakup of the Soviet Union. This was focused since the 1960's around remote sensed monitoring interpreted through field observations at regional observation stations situated in different ecosystems and in reserves. This enabled data to be organized as ecological analogues. This work from Turkmenistan covered the whole of Central Asia providing a valuable resource for time series studies of various natural resources. The final results of this monitoring are maps desertification at various scales and scope, are held by the National Institute of Deserts, Flora and Fauna of the Ministry of Nature Protection up to 1985 to 1995.

75. More recent work has been undertaken to study the developing desertification processes on a coastal zone of the Caspian Sea on behalf of the Caspian Ecological Program (CEP) and this project has left a modern GIS equipped centre. Maps on desertification at the scale 1:1 000 000 for the period of 1982 to 1984, 1998 and 2000 (forecast) were made on the basis of automatic decoding of space pictures. This remote sensing work can be considered a linking system for a great deal of monitoring undertaken in the country.

76. There are various other monitoring activities that are more specialized; Table 3 below lists the various forms of monitoring now undertaken in the country.

Table 2: Information Monitoring Basis in Turkmenistan

The Ministries and Departments	Information Monitoring Basis
National committee on hydrometeorology under the Cabinet of Ministers of Turkmenistan	Monitoring of weather condition, hydrological model of surface waters and agrometeorological parameters at stations and posts.
The experimental Research and Production Centre of Ecological Monitoring of the National Institute of Deserts, Flora and Fauna of the Ministry of Nature Protection Turkmenistan	Regular background monitoring observation of the water pollution in lakes, rivers, large channels and reservoirs, also pollution of soil and the atmosphere.
Research Institute "Turkmenertaslama" at the Land Resources Service of MAT	Monitoring of lands on regular basis.
Hydrogeological Service of State Corporation « Turkmengeology »	Monitoring of the underground waters condition and their quality.
The Institute of "Turkmensuwlymytaslama" of the Ministry of a Water Resources of Turkmenistan	Monitoring of underground water levels and their chemical composition, also of hydrological and hydrochemical conditions of irrigational channels and collector-drainage systems.
Management of Caspieocontrol of the Ministry of Nature Protection of Turkmenistan	Monitoring of water environment pollution of the Caspian sea coastal zone.
Management of Flora and Fauna of the Ministry of Nature Protection of Turkmenistan.	Monitoring of biodiversity condition.

The Ministries and Departments	Information Monitoring Basis
National Institute of State Statistics and Information of Turkmenistan "Turkmenmillihasabat"	Standard of living of the population (socio - economic situation in Turkmenistan).

77. There are several existing Geographical Information Systems (GIS) installed in the country including, the National Institute of Deserts, Flora and Fauna of The Ministry of Nature Protection and the S A Niyazov Agricultural University who established one for the Farmers' Association leaseholders land resources for management purposes at the request of the Dashoguz province local authority to be managed under the Land Resources Services of the Ministry of Agriculture. It is proposed to extend this to other provinces in collaboration with the Ministry of Nature Protection with the support of USAID who have organized training courses to prepare specialists.

78. **Conclusion and recommendations concerning monitoring.** There is a significant amount of data and ongoing monitoring activities, however the system does not function precisely or in an integrated way and the information is held at various ministries and departments, they are not unified, and not analyzed or brought together in the form of reports, and the mechanisms of sharing these data and information are not developed.

79. There is a need for the concerned agencies to rethink their information needs and the uses to which data are to be put including how to link data for use in land management planning to the land cadastre and environmental monitoring.

80. **SLM research.** There are various former academic and research institutes had been working on aspects of SLM and environment protection; Table 4 provides a list including their direction below.

Table 3: Sustainable Land Management Research Programs

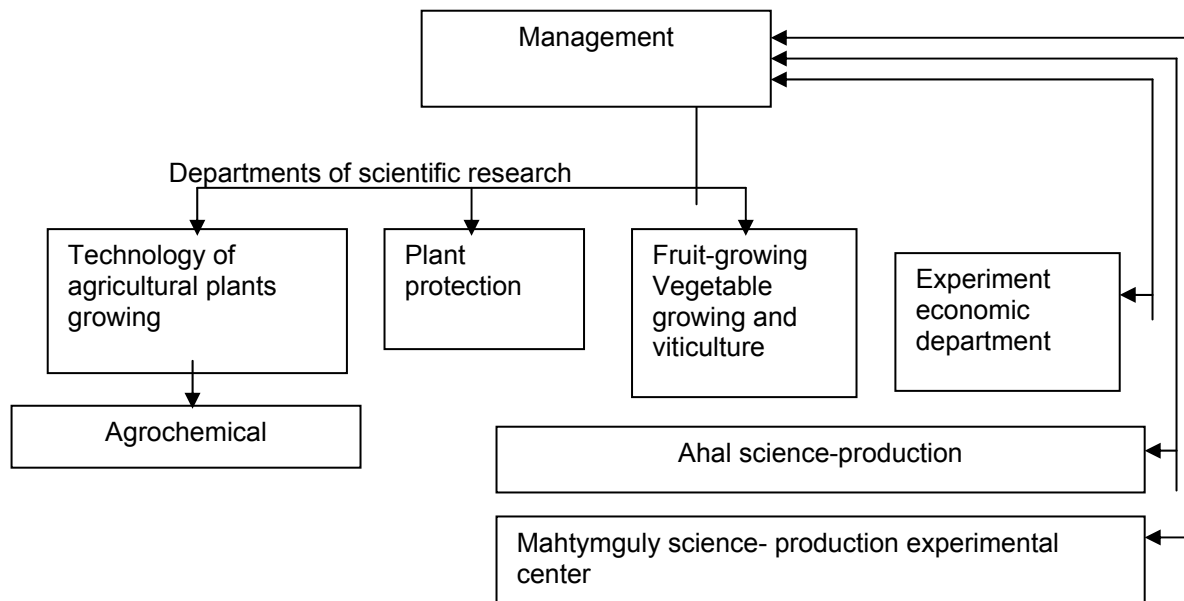
Institutes	Direction of Researches
Institute of Deserts at the Academy of Science of Turkmenistan	Elaboration of the assessment technique and mapping of desertification processes; development of methods of fixing of mobile sands and rehabilitation of degraded range lands; an estimation of salt balance in the zone of large irrigational systems and working out of methods of collector-drainage waters utilization for growing various agricultural plants; an assessment of hydrological and hydro chemical modes of the rivers, reservoirs, large irrigational channels and collectors etc.
Institute of Agriculture of the Ministry of Agriculture	Crop rotation, elaboration of optimum options of crop rotations; selection and seed-farming of medium-stapled cotton; elaboration of optimum methods of application of mineral fertilizers under various variants crop rotations; selection and seed-farming of high-yielding varieties of corn; selection and seed-farming of grain cultures; selection and propagation of fast-ripening Lucerne; elaboration of irrigation modes of agricultural plants, selection and introduction of a grapes, fruit trees and subtropical cultures; research in the field of plant protection etc.
Institute of Soil of the Ministry of Agriculture of Turkmenistan	Soil geography within the limits of oases, mapping and scientifically meaningful soil forecasting for agricultural development. Study of state of nutritious microelements of the soil. Study of land salinization under the influence irrigation and processes of soil salt performance in the zone of the Karakum River. Study of the mountain soil and soil zoning of areas favorable for development of agriculture. Study of erosion procedures of sub mountain

Institutes	Direction of Researches
	plain of the Kopetdag and elaboration of methods of combating these phenomena. Elaboration of methods of virgin lands agrotechnics etc.
Institute of Fine-Fiber Raw Cotton of the Ministry of Agriculture	Selection and seed-farming of fine-fiber raw cotton; selection and seed-farming of Lucerne.
Institute Animal Husbandry and Veterinary Science of Agriculture	Selection work and creation of new highly productive types; rational use of pastures and elaboration of various patterns of range land rotation; elaboration of methods of improvement of pastures; a qualitative assessment of pasture plants; preventive maintenance and combating illnesses of animals.
SRI of hydraulic Engineering and amelioration of MWR USSR:	Amelioration of irrigated lands; operation of water conservation systems; mechanization of water conservation works and hydro mechanization; hydraulics and river-bedding processes; thermal, water and salt balance of irrigated lands and elaboration of irrigation modes of agricultural plants.
Turkmen experimental station of All-Union institute of plant-growing	Selection, seed-farming and creation of subtropical genofund
Turkmen Forest station of Central Asian SRI Institute of Forestry	Introduction of forest cultures and elaboration of methods of creation of favorable forest protection strips.
Project Institute of Turkmengiprozem	Soil and salt shooting and their mapping
Project Institutes of Turkmengidrowodhoz Karakumgidrowodhoz	Soil prospecting work and projecting of irrigated lands and of hydro ameliorative systems.

81. A new structure of research institute activities linked to land resources management is given in Figure 4 below. Of these only the National Institute of Deserts, Flora and Fauna of the Ministry of Nature Protection is financed from the state budget, the rest are self-financing.

- (i) The National Institute of Deserts, Flora and Fauna.
- (ii) "«Turkmensuwlymtaslama" of the Ministry of Water Resources.
- (iii) Institute of a grain of the association of "Turkmengalla"
 - Lebap experimental station;
 - Mary experimental station;
 - Dashoguz experimental station.
- (iv) Institute of cotton growing of "Turkmenpagta" state concern,
 - Yoloten experimental base.
- (v) Etrek Research and Production Experimental Centre of Subtropical Cultures of "Food-Processing Association "

Figure 4: The Structure Sustainable Research in agriculture at S.A. Niyazov Agricultural University



82. Some new research institutes have been cooperating with international organizations to carry out joint research projects including participation of scientists from abroad including:

- (i) AWACAD and NIDFFMNPT Project "Assessment of agricultural capacity of traditional ways of water collection in the deserts of Central Asia "Inko-Kopernikus EU (1998-2001). The goal of the project was:
 - (a) assessment of the current state of clay lands in the Aral sea by means of remote methods;
 - (b) utilization of clay lands drain water for the agricultural development to elaborate "deposit - drain" model;
 - (c) Technical and economic evaluation of methods of surface drain water collection.
- (ii) Project of USAID and NIDFFMNPT "the integrated methods of cattle-breeding development and preservation of pastures in Central Asia " (1998-2003). The goal of the project was the study of the carbonic gas flow, biological efficiency and a number of other ecological characteristics of pastures.
- (iii) DARCA, Institute of animal husbandry and veterinary science of MA Turkmenistan and NIDFFMNPT (2001-2005) " Desertification and rehabilitation: modeling of market relations reforms impact on pastures in Central Asia " KAZ-CT-2000-10015 (2000-2003) The goal of the project was the study of pastures degradation in Turkmenistan and Kazakhstan under the impact of grazing and new market systems of livestock management.
- (iv) TACIS and Institute of cotton-growing "Assistance to cotton-growing sector of Turkmenistan " (2002-2004). The goal of the project was:
 - (a) perfection of cotton selection methods;

- (b) the current market situation, management of fiber quality;
 - (c) perfection of the methods of analysis of technological properties of raw cotton- fiber;
 - (d) delivery of laboratory equipment and office equipment;
 - (e) conducting of training courses for selectors and specialists in seed growing;
 - (f) realization of experiments on a mode.
- (v) USAID and NIDFFMNPT Project "Formation of artificial lenses of fresh waters and their sustainable operation in Karakum deserts" (2002-2005). The goal of the project was the creation of three-dimensional model of formation and operation of artificial lenses of fresh underground water.
- (vi) A number of other joint USAID and NIDFFMNPT projects regarding assessment and mapping of pastures degradation processes.

83. Some modifications of the curriculum of study is occurring in training of personnel in higher educational institutions in the field of environment protection to take into account the transition to a market economy with the practical side of education being put at the center of attention. Radical changes have taken place in terms of land resources management education.

84. **Conclusion and recommendations on SLM research.** It is considered that there are sufficient educated personnel within these institutions but their knowledge and experience is now dated and not so useful for an economy in transition to a market status. There is a need for exposure to education in a market economy and for scholarships for younger graduates to gain higher degrees in universities in market economies. It is also necessary to improve material and technical base of these establishments by providing them with modern equipment and technology devices and conducting applied research into the monitoring and rational use of natural resources within an ecosystem context.

85. It is also considered necessary to develop better means of disseminating the results of research and moving more research into the field to be undertaken with land and water users and to move to a situation where more research needs are identified by land and water users with researchers.

F. Current Land Management Practices

- **Agricultural and cropland management**

86. Private ownership prevails in agriculture in family plots. Dayhan (farmers) associations with a mixed pattern of ownership are the basic type of agricultural enterprises in 69 % of settlements. Long-term and short-term land leases for cultivation of wheat, raw cotton, rice and other crops, in that order. Private individual farms prevail in 21 % of settlements and 10 % enterprises and organizations own the land and direct the activities of employees.

87. At this time of transition to market relations, two systems of land resources management are used: state regulation and provision of economic incentives. In both cases, action at the local level is based on fulfillment of the state order. It is the state order at the local level that defines the volume of production and distribution of land and

water resources. The management of land and water resources is intended to be precisely supervised by state authority according to the laws in force for both farmers associations, and leaseholders. Although the activity of the leaseholders is based on self-financing, they also contribute to fulfill the state order.

88. Local level collaborative planning is undertaken at sessions called "Gengesh" on the rational use of land and water resources and the strategy for implementation, but the fulfillment of these plans and decisions is supervised by the representatives of the state. The availability and size of the areas and quotas of crops to be grown, mostly industrial grain and raw cotton, on lands of nongovernmental sectors, is made annually.

89. The following state departments and organizations are involved in various aspects of water resource management as follows:

- (i) The Ministry of Agriculture of Turkmenistan (MAT) is responsible for agricultural policy, coordinates the work of agricultural associations, is in charge of state order before the Government
- (ii) Ministry of a Water Resources of Turkmenistan is responsible for construction and operation of irrigational and collector-drainage systems, water supply at the point of its provision to primary water consumers and water users (up to an inter-economic level);
- (iii) The local administrations of settlements (hakimliks, archins) regulate issues related to land and water within the limits of their territories;
- (iv) Land users (farmers, leaseholders and others) within the limits of plots of land;
- (v) Ministry of Nature Protection is responsible for protection of land and water from pollution and exhaustion.

90. Watering and irrigational norms for every irrigated area are established and plans for water use for vegetation and non vegetation periods are made. At the local level, water use is supervised by local representatives of the MWE from province to district level called Mirab who are responsible for fair distribution and supply of water to water users in the fields. In actuality, planned water use is possible only where regulating and water measuring devices are installed and used. In most districts these are only available in large water supply points and between main watersheds. At the individual level these do not exist and water is not measured. Instead, watering, fertilizing and other agrotechnical measures are conducted by the landowners according to the agrotechnical regulations.

91. Similarly the management of fighting parasites is intended to be carried out by the association "«Turkmendokunhimiya". In reality these types of measures, as well as measures on planning, assessment, ecology management, management of information system, ecology researches and monitoring in regards to the state of irrigated fields, are not conducted at the landowners level.

- **Forest management**

92. Currently the total area of forestry fund of Turkmenistan comprises 9.9 million ha, including 4.1 million ha under forests. About 6.5 million ha out of the total area are under long-term lease by farmer (dayhan) associations and by livestock households who have

them under pastures. The joint-stock company of "Gok Gushak" was created to manage and control forestry and plant nurseries. It comprises 16 timber enterprises and more than 60 forest areas. In 1992 the Presidential decree "On planting of trees and gardens in Turkmenistan" was adopted and currently afforestation is a part of state policy of Turkmenistan. There is a Program of development of forest economy for the period of 2000 to 2005 and up to 2010.

93. Farmers associations, subsidiary facilities and the private land owners are intended to implement activities related to protection and rehabilitation of forestry for windbreaks on the plots of land they are given for tenure.

- **Pasture and rangeland management**

94. 41,500,000 ha or about 84 % of the total territory of the country are under range lands, and 50 % of these lands are degraded with 5 % having been transformed into moving sands. Pastures are owned by the state and distributed between livestock households for grazing both of private and leased cattle. Distribution of pastures between households depends on quality of pastures, availability of watering points, and size of the herd. Lands are not fenced, shepherds, based on long-term experience, know the boundaries of their pastures. The traditional patterns of grazing, rotation of winter, autumn and spring pastures, is still important.

95. Renting pasture lands for livestock grazing based on carrying capacity and availability of water needs is supposed to be occurring with the leaseholders being obliged to carry out measures aimed at their preservation and for the construction and reconstruction water sources and observance of pastures rotation. In reality this is not taking place, currently herders have long-term use of unlimited quantity of cattle from the state farms provided they 'manage them properly'. There are new grazing strategies emerging based on the use of stubbles and early grazing of crops, but these are hardly regulated. There is a need to develop new strategies for using of pastures based on traditional knowledge and modern technologies, in collaboration with the shepherds.

- **Protected areas**

96. Protected areas have been established to protect nature preserves, game reserves, and national, historic, natural and memorial parks, monuments of a nature, botanical and zoological gardens and natural areas used for recreational purposes. Local authorities are permitted to create other protected areas. There are 8 state reserves (Amuderya, Badhyz, Kopetdag, Kaplankyr, Kugitan, Repetek biosferic, Syunt-Hasardag, Hazar) and 13 game reserves, which are administered by the Ministry of Nature Protection of Turkmenistan. The total area of reserves is 1,975 thousand ha and game reserves 1,156 thousand ha, or more than 4 % and 2.6 % of the territory of the country respectively. There are also reserves of historic-cultural monuments, some 1,299 archeological sites throughout the whole country are known and 245 of them have been granted the status of "Monuments of state importance".

97. Seventeen of these have state status: 6 Garlyk (Karlyuk) caves; 5 geological sites; 2 paleontological and 3 botanical sites; 1 underground lake. Bone remains of an elephant, *Paleoloxodon turkmenikus*, are common in Turkmenistan. Their bone remains are found in many places of Turkmenistan and are more than 100 thousand years old.

98. Management of historic-cultural monuments is under the Ministry of Culture and the local departments of culture in local administrations of provinces and districts are responsible for protection of historic/cultural monuments, management of flora and fauna protection of the Ministry of Nature Protection of Turkmenistan and authorities at the provincial and local level.

99. Table 4 sets out a comparison of existing land, water and livestock management practices against desirable or recommended practice.

Table 4: The comparative analysis of existing practice against "good" practice

Use of lands	Existing practice	Desirable practice
Pastures	Insufficient introduction of rangelands rotation. Insufficient and irregular supply of water in most cases results in degradation of pastures.	Livestock have access to sources of water in all seasons of year according to rangelands rotation. They are knowledgeable and take part in restoration of degraded pasturelands as well as watering place sources, and also conduct regular monitoring of their use and protection.
Irrigation	The large losses of water from irrigational systems and irrigated fields as well as insufficient extent of collector-drainage systems, slow introduction crop rotation, uneven surface of fields, besides agro-technical measures, are not based on the operative information of monitoring services.	Application of modern methods of irrigation and management of production process in the system of soil – plant - atmosphere is conducted on the basis of data of monitoring and information systems. When planning the layout of the field surface, modern methods and equipment such as laser planning (which guarantees a qualitative layout) are used.
Forestry	In the majority of cases wind belts are not provided on irrigational lands, preventing the development of microclimate and resulting in underground waters rise.	Wind belt is established on field boundaries and along the irrigational channels. They play the role of a biological drainage and improving production process due to the improvement of the microclimate.

Source: Team processing

100. **Conclusions and recommendations.** There are few examples of 'good practice' for Turkmenistan to compare with and no examples of an integrated suite of practices in any of these subject areas, except a commercial example of trickle irrigation that can be used for demonstration and extension.

G. Lessons learned - Current and Recently Completed Projects

101. The nation has adopted a self-reliant approach to development and management of its economy; this has taken the form economic development plans with relatively simple objectives, often as large centrally planned activities although aimed at a gradual transition to a market economy. The first program has created a stable base for further economic reforms. Activities are now focused on the second program for the period till 2020. The strategic purpose of this program is for Turkmenistan to become a modern mid level state and it contains funding for the solution to two tasks:

- (i) Increasing volumes of production, and
- (ii) Export of raw material along with creating of a national processing industry.

102. The availability, of rich natural resources, land, water and agricultural farmlands are considered to be necessary factors for the achievement of these goals. The necessity to protect these resources from the harmful effects of human activity led to the development of the NEAP as the guiding policy and program to ensure compatibility between economic development and the environment.

103. The major project in this plan, in terms of cost, is the Turkmen Lake in the Karakum desert, intended to address the problems of land salinization, water resources pollution, rise of underground waters level and water logging of irrigated lands and deserted pastures. The project involves a combination of water economy, ameliorative, nature protection, socio economic measures and construction work. Work began in 2002 and is due for completion by 2010. At official exchange rates the total cost will exceed \$2 billion over 8 years (10173.2 Billion Manats at 5,000 Manats to the dollar).

104. The accomplishment of this enormous project is intended to solve the following environmental and economic problems:

- (i) All drainage water from irrigational lands will be collected into one single flow;
- (ii) About 4 thousand square km will be brought back into agricultural use from the deserted pastures lands now inundated with drainage water;
- (iii) The decrease in level of water by 1 m to 1.5 m in the Ozyornaya and Daryalyk collectors will restore the normal operation of drainage systems in that area.
- (iv) The salt balance of irrigated territories of Dashoguz province will be improved, the threat of destruction of the transport communications will decrease; and
- (v) Dumping of drainage water from irrigational lands of Lebap province in Amu Darya basin will cease.

105. The Construction of the "Dostluk" dam on the River Tejen (in collaboration with the Islamic Republic of Iran) is another large project of state importance. The capacity of this reservoir is 1250 million cubic m. The complex was constructed between 2002 and 2005 and is now being commissioned. It is intended to irrigate 25 thousand ha of lands in Turkmenistan, the same in IRI, and to provide a fresher drain for the River Tejen. Operation of this complex is intended to guarantee supply of water for reclamation of lands in the middle flow of the Tejen River delta meant for growing grain and cotton.

106. NEAP also envisages a number of major investment nature protection measures up to 2010. Among them are 10 large projects concerning protection of land resources many are not or partially resourced at present and might be joined with CACILM projects. A brief list is given below:

- (i) Reconstruction 843.6 thousand ha of lands available for irrigation between 2003 and 2010 at a cost of 12929.30 bln manats. The project covers irrigated lands in all provinces of the country. The purpose of the

- project is saving water for irrigation and reduction of filtration losses and the improvement irrigated soils.
- (ii) Construction or reconstruction of a collector-drainage network on 410.6 thousand ha of lands requiring partial reconstruction over 7 years at a cost of 2,035,0 bln. manats.
 - (iii) Cultivation of licorice (*Glycyrrhiza*) and other local kinds of plants as an experiment into the Phytoamelioration of salted soils over a thousand ha.
 - (iv) Planting of protective forestry plants over 360 ha in the zone of salt concentration producing dust aerosols from the bottom of dried up Aral, Dashoguz province
 - (v) Planting-gardening around the city of Ashgabat and provincial centers. The purpose of the project is the protection of territory against pernicious influence of hot winds, improvement of the microclimate and health of the population. The estimated cost over 8 years is 94,50 bln manats. The project is being carried out in a foothill zone of Central Kopetdag (Ahal province) with the participation of a number of the ministries and departments.
 - (vi) Reconstruction of interstate Daryalyk and Ozyornoye collectors, Dashoguz province. The purpose of the project is the prevention of the salinization processes and water logging of irrigation lands from drainage waters from territory of Khorezm province in Uzbekistan. Between 2002 to 2010 at an estimated cost of 111,80 bln. manats.
 - (vii) Fixing the desert sands in the area where Ashgabat - Dashoguz (553 kms) automobile and railway roads are constructed. The purpose of the project is the prevention of desertification processes along automobile and railway highways, protecting them from sandy drifts and blowing. The period is between 2002 to 2006 years at a cost of 126,30 bln. manats.
 - (viii) Nature protection measures in the areas of intensive industrial - transport development in Sarahs district of Ahal province. The purpose of the project is reduction of wind erosion, discontinuance of dune formation and the restoration of soil fertility. The period is 2002 to 2010 at a cost of 7.00 bln. manats.
 - (ix) Creation of water-salt monitoring system on irrigated lands. The purpose of the project is the organization of monitoring to optimize water-salt loads to prevent salinization and water logging of irrigated lands. The period is 2002 to 2010 and the estimated cost 15.60 bln.manats.
 - (x) Soil protection measures in mudflow endangered areas of the city of Ashgabat, Archabil, motorway Baharly -Balkanabad). The purpose of the project is the prevention of destructive influence of mudflows on the land, its economic and social damage. The period is 2002 to 2010 and the estimated cost 7.00 bln.manats.

107. There are a number of private sector projects that are experimenting with new techniques; 2 modern cattle-breeding complexes “, 1 factory for manufacturing juice and green-house facilities are constructed near the city of Ashgabat for all-the-year-round production of vegetables on drip irrigation over some 1,500 ha. The production cycle and cattle-breeding production, vegetables, berries; fruit etc processing processes also operate automatically. Essentially, these complexes are set up for demonstration purposes, and they also serve as an educational centre for training students and improvement of professional skill of the experts.

108. There are a number of international organizations cooperating in the achievement of national goals in the utilization and management of natural resources including; TACIS, USAID, GTZ, GTZ-CCD Project, FAO, CAP, IPGRI. These projects in the main had the objective of demonstrating and sometimes investigating new technologies in SLM together with concerned agencies and land and water users. Many were set up around participatory processes. Some, notably Winrock, GTZ, UNDP and ICARDA have experience over 6 and up to 10 years in a variety of locations and all are currently active.

109. There is a current ADB supported regional environmental monitoring project designed to develop environmental monitoring methods and capacity within the country and between countries including cooperation between Ministries. It has made a slow beginning in 2005 and is intended to be completed in 2006.

110. There is also class of projects designed to support the Rio Conventions (some are also mentioned above). 29 project proposals were prepared for the second phase of the project between 2002 and 2004. Of these the notable projects include "Accelerated financing of measures on capacity increase in priority areas - phase 2" is being implemented by UNEP and GEF a regional project "Capacity build up for increasing the inventory quality of greenhouse gases" financed by GEF started in Turkmenistan and other countries in 2003. A TACIS project entitled "Technical assistance to Kazakhstan, Kyrgyzstan, Tadjikistan, Turkmenistan and Uzbekistan in regards to the implementation of their obligations performance on prevention of global climate change" has been under way since 2004. The purpose of the project is the rendering of technical assistance in creation of the national centre on climate change in Turkmenistan.

111. The convention on combating desertification was ratified by Turkmenistan in 1996. The major goal of the convention is the prevention of anthropogenesis desertification process and degraded lands productivity restoration. The National Action Plan was completed in 1996 and several projects begun with the assistance of GTZ, GEF, ADB and UNDP.

112. Of particular importance to the CACILM NPF has been the GTZ-CCD experience with the project "Combating degradation in three regions of Turkmenistan" starting with 1998 and ongoing. The general objective of the project is attraction of the local population in the activities on combating land degradation via development of self-assistance capacity of the local inhabitants and introduction of environmentally safe technologies.

113. Turkmenistan joined the convention on biodiversity in 1996. In accordance to one of the basic obligations of the Convention, the Ministry of Nature Protection of Turkmenistan prepared and published the first national review "State of biodiversity of Turkmenistan" in 2002 within the framework of joint project with UNDP/GEF and including a target long-term "Strategy and plan of action for preservation of biodiversity" to 2010.

114. There is a new UNDP supported project designed to facilitate the operation of the National Environmental Action Plan (NEAP) Centre and these Rio conventions. The centre is designed to coordinate the activities under the NEAP. It is to be staffed with

both international and national consultants and to begin operation in September 2005. The relationship of this project with CACILM is unknown; the project is also discussed below under coordination arrangements.

- **Lesson learned from ongoing and recently completed projects**

115. The NEAP program of works is the most important investment addressing SLM and the Turkmen lake drainage project is the largest single project that has this objective. There is reported to be little or no collaboration between this activity and international donors and reportedly insufficient attention to modern technology addressing water losses and water use efficiency. The Turkmen lake project only addresses drainage and all of the other NEAP programs discussed above address technical issues only. There is a lesson here and an opportunity to use this ongoing investment to address some of the wider issues related to cropping, the incentive environment and water use efficiency.

116. The projects executed in the various ministries and departments in partnership with donor organizations are demonstrating new methods of land and water management, but unfortunately these projects are executed on the basis of one ministry and department and have no inter-sectoral character. For this reason the results and positive experience of these projects in most cases have no wide circulation.

117. There is a recognized need to move from an administrative basis of water management to a market economy, but also a realization of the difficulties due to attitudes towards water, the inability to measure and control water easily at local and farm levels, and the difficulties recovering costs from low priced main products of cotton and wheat.

118. There is a recognition that changes in land management practices need to occur in tandem; for example it is insufficient to just change water use mechanisms without changing the incentive mix so that farmers will act. It is insufficient to just change land ownership without changing the ability of the farmer to make meaningful long-term decisions in land management. This means both education for the land and water users and the authority for him or her to decide on their own management practices. The scale and complexity of these needed changes to land management practices from both the institutional (including incentive) and biophysical standpoints mean it will be better to undertake a suite of changes in significant pilot areas rather than in a piecemeal way.

119. There is a significant need for training for natural resource users at a local level where the degradation occurs in the practice of agriculture and livestock production. It is the employees and workers of this sector of the national economy that are in biggest need of training and education. There is a clear need to link available international technical assistance to these major on-ground programs and to the needs for field training and education. The experience of most, if not all, of the above internationally funded projects, should be built on in this regard.

120. These training and education targets and can be summarized as:

- (i) The agricultural services sector; because the quality of land and water resources used in agriculture directly depends on the quality of services

rendered, such as, irrigation water supply, fertilizers supply, agricultural machinery, means for combating pests, etc. There needs to be better organizational links between various state structures, private input suppliers and land users to strengthen their capacity in modern extension methods for a market economy to improve the material-technical basis of agriculture. In particular this means training and education for input suppliers, who, under a market economy are the first point of call for farmers seeking information, and who have income from input sales with which to survive on.

- (ii) The land users; village inhabitants engaged in agriculture and animal husbandry at the local level. The majority of local inhabitants has no special agricultural education and rely only on their practical experience. With the distribution of land there are now many more land use decision makers increasing the need for this type of training and education. They require agro-technical training, including rational methods of irrigation, land reclamation, land treatment skills, knowledge of applying fertilizers, harvesting in crop fields. Such training would allow local land users to increase land productivity and to lessen negative impact of their activities on the environment. Explaining the mechanisms of interaction of natural environment components of land / water / plants to the farmers in an easy and understandable way is very important at this stage to prevent much damage.

121. The new Agricultural joint stock Companies discussed above are intended to address these training needs but it is too early to know if they can be successful and the need remains.

122. A very important need identified by all technical agencies, by many projects and programs is the need to overhaul land management procedures to facilitate SLM in a market economy. While there is wide agreement on this, there is evident disagreement about what type of change is needed and more importantly, who should undertake it. There is agreement on the following:

- (i) Monitoring capacity needs to be upgraded with new equipment and training;
- (ii) Better information is needed by many institutions and land managers, including farmers, although they do not all need the same information;
- (iii) It would be highly desirable to link monitoring so that land management, the land cadastre and environmental monitoring activities can use the same database for their different purposes.

123. Analysis of available water supplies in future under NEAP suggests much water will be marginal for agriculture and that the nation needs a capacity to develop genetic and technical means of utilizing this. Turkmenistan has many plants adapted to desert climates and there are some international examples of successful adaptation to saline water resources. There is a need to develop the national research and local level applied research capacity to deal with this situation. The knowledge of saline lands reclamation methods would hundreds of thousand hectares of saline lands of moderate degree, back into agricultural usage or, to use them as pastures for home livestock.

124. Another lesson from past projects is the need for better programs to strengthening farmers knowledge of legal issues connected to land tenure, such as the conclusion of land rent and conclusion of the contracts with service agricultural organizations.

125. The major lessons from the programs and projects designed to support adherence to the terms of the Rio Conventions is that they operate only in a peripheral way to main stream agriculture, only the GTZ CCD project really influences activities at local level and that is on an insufficient scale to make a difference.

H. Development Coordination Arrangements

126. Agriculture, including development activities, is under the control of the State Agriculture Council (AC), created to coordinate of the activity of the ministries and departments involved in agriculture. The President of Turkmenistan is the head of this Council and the Minister of Agriculture is the deputy head. In compliance with the Presidential Decree Number 438 dated 29 October 2004, agricultural joint-stock companies have been created to further improve the management of agriculture, improving industrial relations, increasing production of wheat, raw cotton and other agricultural products and the rational use of land and water resources. The companies are to be self funding and created at both provincial and district levels to coordinate the activities of all local organizations of the branch ministries, state concerns, joint-stock companies, banks and other organizations participating in management of the agricultural sector of economy. It is too early to know how these enterprises are to address the difficulties in coordination discussed above.

127. As mentioned above the President established a State Commission (SC) in 1999 to coordinate the performance of Turkmenistan's obligations under the UN conventions and programs on the environment. The executives of key official bodies were included and 8 working groups one covering each of the ratified conventions and programs. This commission operates in parallel to the Agricultural Council but more in a consultation and information flow sense than the Council.

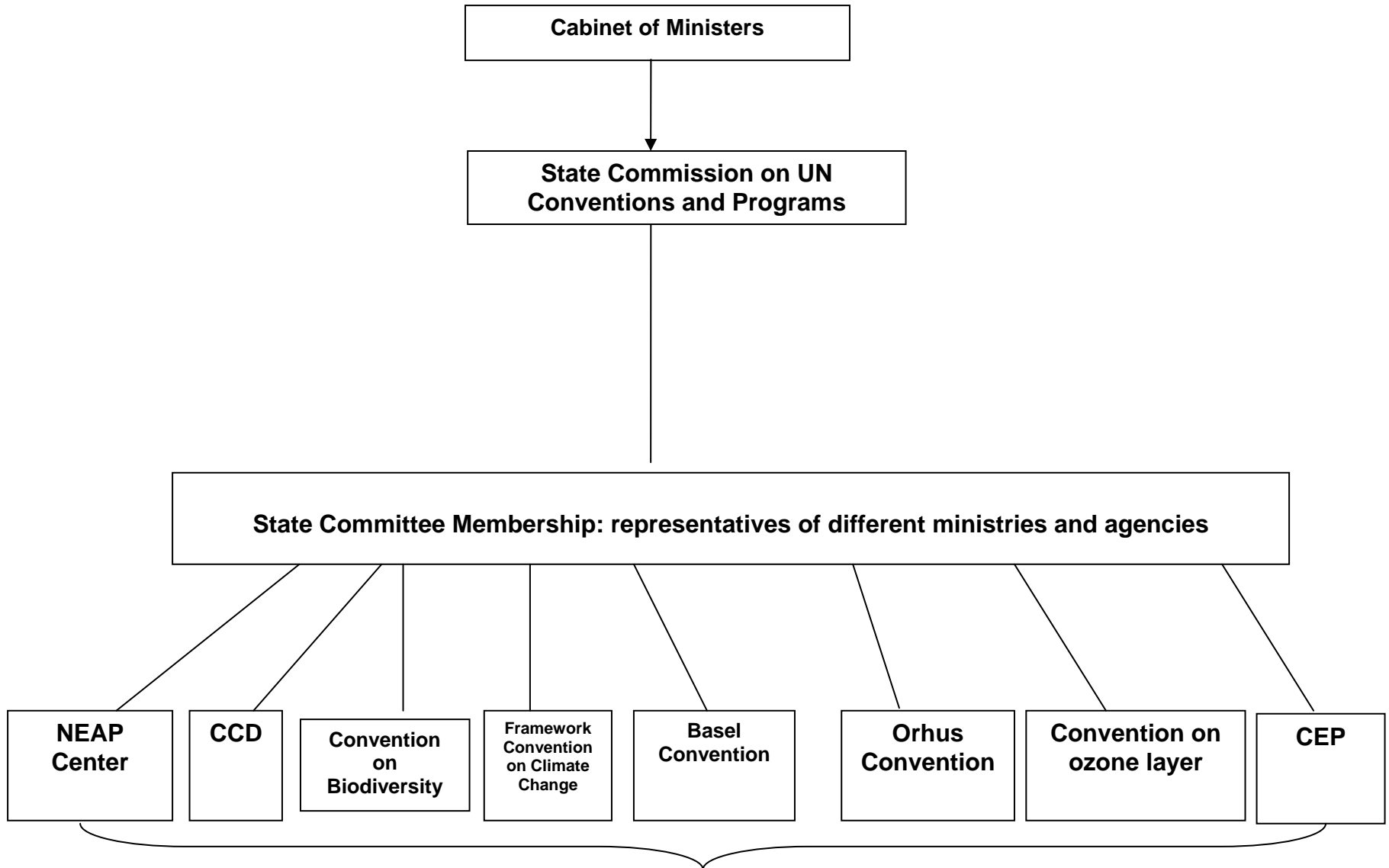
128. This Commission collaborated with UNDP to initiate a national program for environmental protection in 1998 and between then and 2000 worked to prepare procedures for environmental impact assessment and the development of legislation to enable this and on technical capacity building, this lead to the formulation of NEAP. As discussed above this state document defines the environmental strategy of the state in the context of the economic development plan to 2010 and 2020. An OECD project provided technical assistance to the implementation of NEAP in 2004 and this has recently led to the creation of a National Centre which was staffed late in 2005. The duties of this center are:

- (i) Coordination of the activities of the interested parties in NEAP implementation in Turkmenistan;
- (ii) Rendering of scientific assistance to help find solutions of ecological problems;
- (iii) Organization of regular interdepartmental work planning for implementation and monitoring and evaluation of NEAP in collaboration with the Ministry of Economy and Finance and the State Statistics center,

"Turkmenmillihasabat" and updating of NEAP activities when socio economic, ecological, conditions require this.

129. Thus the State Committee plays a coordinating role between donor organizations and ministries or other national partners of the projects and between donors.

Figure 5: Organization of the Commission to coordinate activities to comply with Conventions



III. PROBLEM ANALYSIS

A. Root causes of land degradation - formulating the problem

130. The preparation of the NEAP involved a significant participatory diagnostic process undertaken by a range of stakeholders at local, regional and national level including scientific specialists and land managers and they identified the following key land degradation problems:

- (i) Secondary salinization and water logging of irrigated agricultural lands;
- (ii) Land salinization, caused by the shrinking and drying up of the Aral sea;
- (iii) Erosion of irrigational land in mountainous and foothill areas;
- (iv) Degradation of pastures due to overgrazing around settlements;
- (v) Soil pollution due to agrochemicals, industrial and household waste.

131. The workshops then identified causal relationships between human activities and these problems as depicted in Figure 6 for soil erosion and Figure 7 for secondary salinity. The First National Workshop for this NPF also undertook some workshop activities, the results of these are shown in Figures 8 and 9. The exercises undertaken here were slightly different than with NEAP but they are fundamentally in agreement as far as they have gone in analyzing the problems. In the case of secondary salinity the key problems are degraded irrigation infrastructure and failure of farmers to follow the correct practices in soil and water management and in cropping patterns. The same pattern occurs with erosion the proximate causes of over grazing in settlement areas and vehicle damage etc are identified. Unfortunately the analysis does not identify why farmers and herders acted in this way or why they continue to do so. Only the group whose findings are depicted in Figure 9 discusses the incentive environment of the herders. This lack of attention to the enabling environment of farmers and herders has been noted as one of the weaknesses in the NAP that may have inhibited donor support of the NAP⁷.

132. The analyses in Section II D. E and F identify a range in influences on enabling environment including:

- (i) Capacity development of stakeholders at many levels;
- (ii) Better information upon which to base stakeholder decisions and land administration; and
- (iii) A range of policy, institutional and regulatory and economic issues that effect the incentive for land and water users to act towards SLM

133. The needs assessment that follows these problem trees will address this need and the preparatory phase to enable dialogue on these issues at the outset and through the CACILM implementation period.

⁷ Turkmenistan: Issues and approaches to combat desertification, discussion draft Saigal S ADB/GM June 2003

Figure 6 : Scheme cause-effect linkages for wind and water erosion

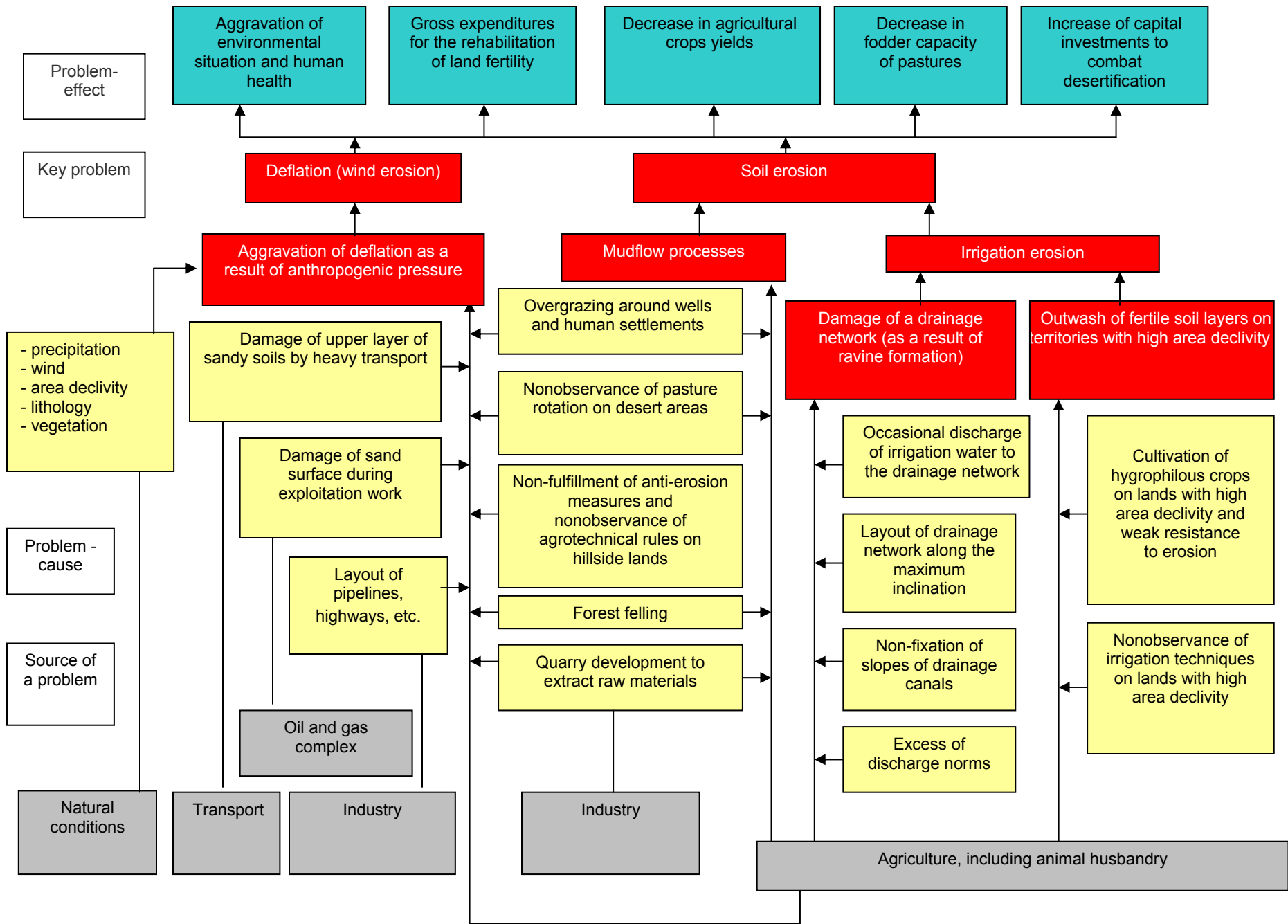


Figure 7: Cause-effect linkages for secondary soil salinization

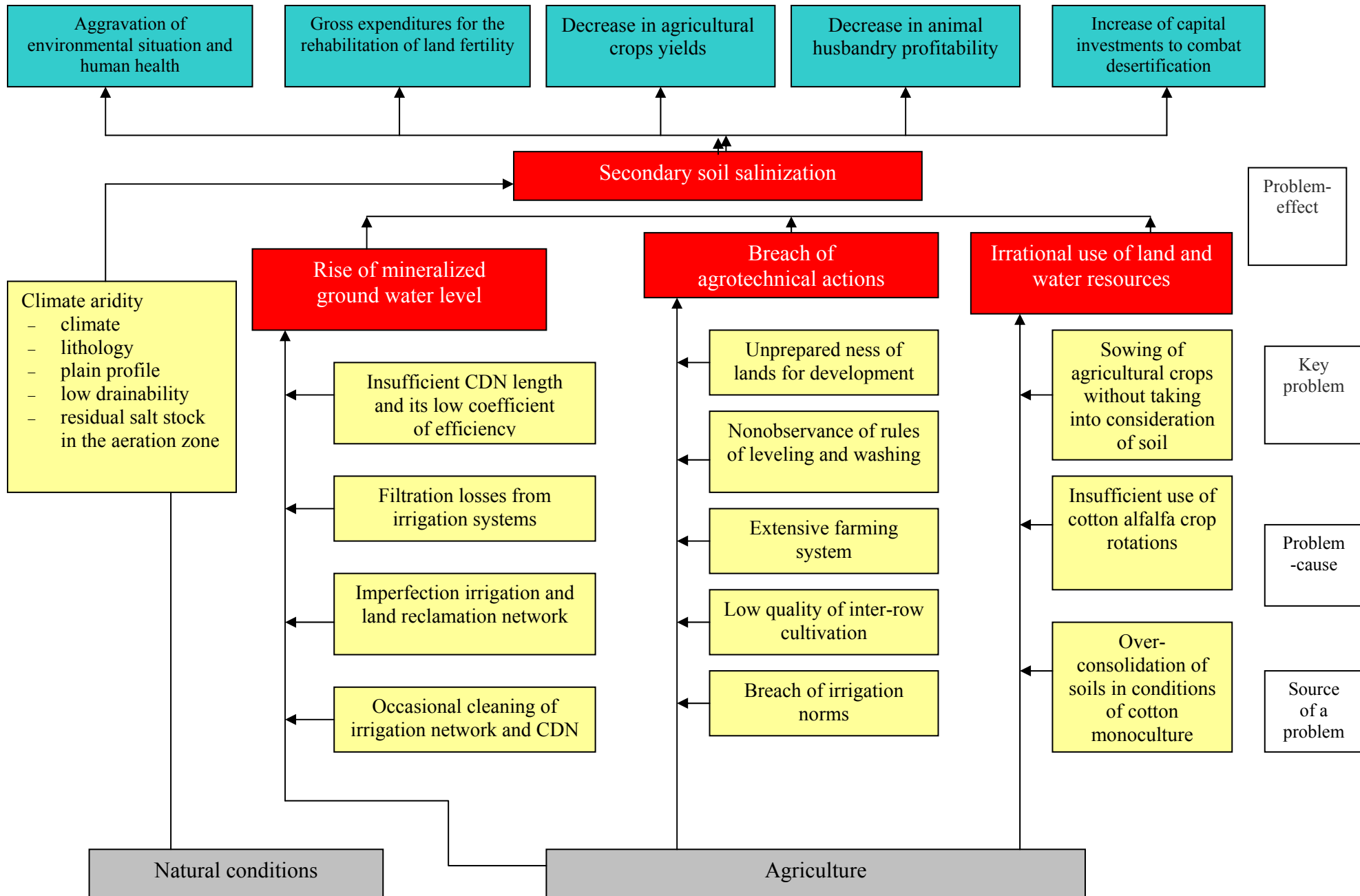


Figure 8: Secondary salinization of agricultural lands in irrigated area

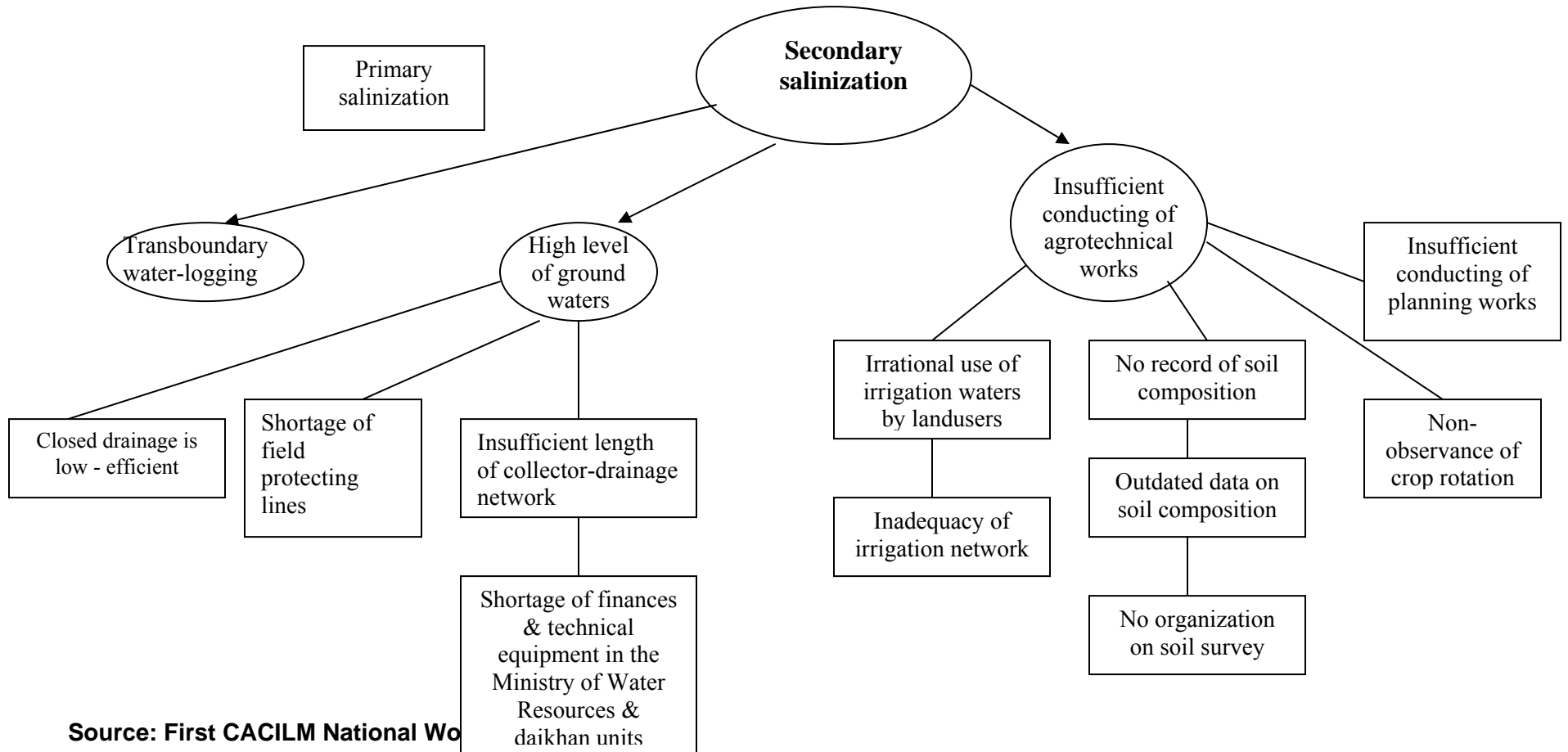
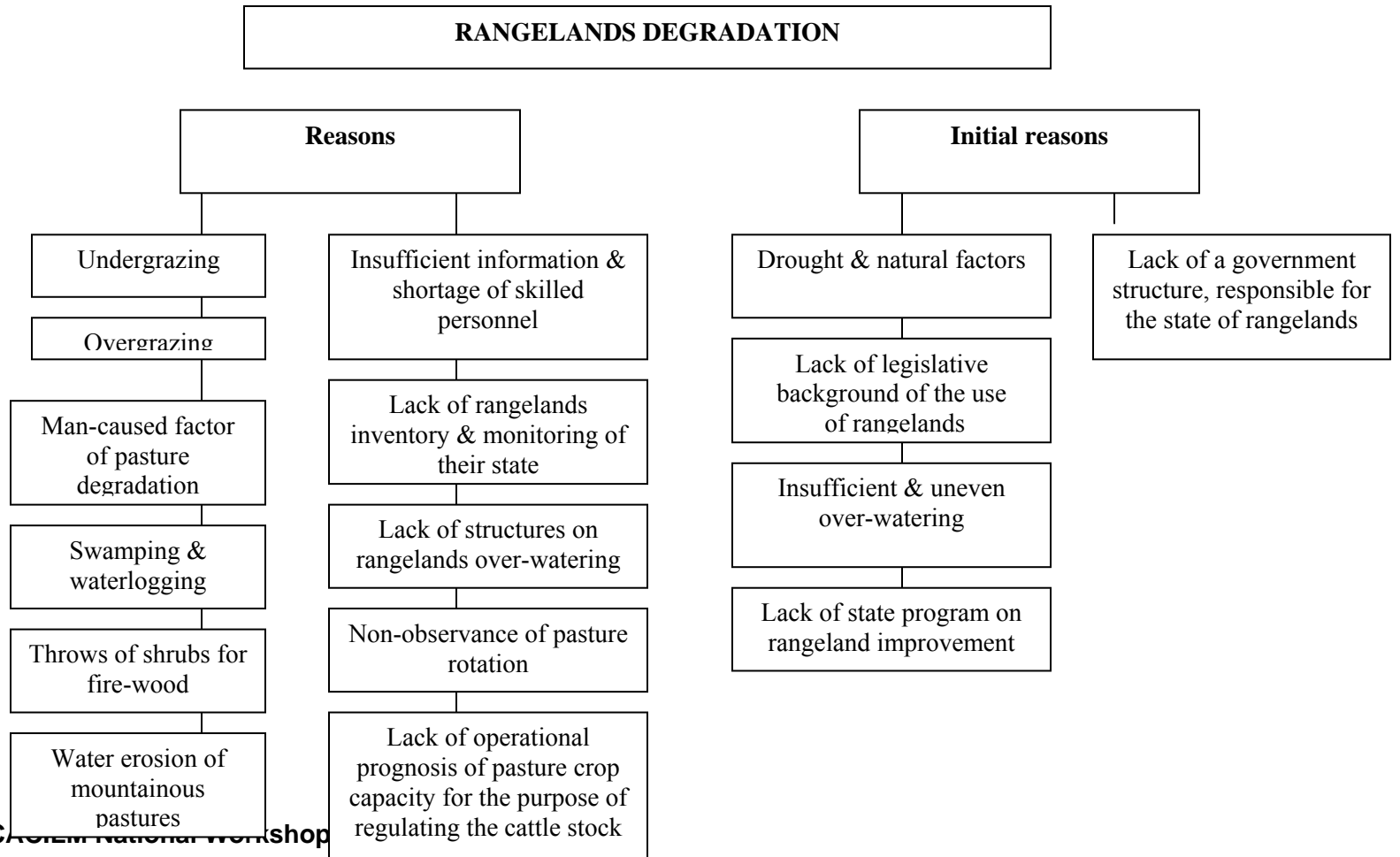


Figure 9: Rangelands degradation



Source: First Central National Workshop

B. Needs Assessment

134. There is a clear national consensus on the needs for improvements in land and water management based on; the Situation Analysis set out in the Section II and its associated workshops, and the National Environmental Action Plan (NEAP), also discussed above. NEAP sets out a strategy and a program to ensure compatibility between the national program for economic development to 2010 and beyond and the natural resource base upon which the economic development plan must rely. However as discussed above under 'Root Causes of Land Degradation' this analysis is not based on current information and does not go into the institutional, policy, regulatory and other incentives that provide the enabling environment for land and water users to combat land degradation, nor does it elaborate on needs for capacity development. The very significant effort that went into the development of NEAP was completed only in 2002 so that many of the proposed solutions have yet to be developed into actionable programs at the individual sector level and to appear in national budgets. This NPF addresses this need for resources and for additional activities to improve the enabling environment.

135. These are discussed below in the order of priority appearing in the NEAP.

- **Secondary salinity**

136. Secondary salinity is the most ecologically and economically damaging land degradation problem in the country, although small as a percentage of total area it strikes at the heart of the nation's most productive land. While the causes, impacts and broad solutions to secondary salinity are known and well described in different parts of section 3.2 of NEAP they are not yet being applied in a comprehensive way. Water losses in irrigation are the most important underlining cause of secondary salinity.

137. There is an additional reason to be concerned with water losses as the supply of water, mostly originating from the Amu Daya, is defined by international agreements and may be reduced due to reconsideration of water resources of the transboundary rivers. The NEAP provides for the development of new dams and reservoirs to augment these supplies but the potential for development cannot replace losses from this river supply. Unless addressed, this will represent a fundamental barrier to the planned doubling of irrigation area in the economic plan for the period to 2020 and its associated industrial raw material processing.

138. The major drainage initiative underway under the Turkmen Lake project will address the need for drainage of irrigation areas but this does not immediately address the need to improve water use efficiency. There are plans to rehabilitate degraded irrigation land but the technology to be used does not apparently take into account new developments in land treatment such as laser guided levelling, and land use rights are not yet flexible enough to enable better cropping practices to reduce further damage from water logging and salinity.

139. The ongoing process of change in land use rights is creating small farms that will require different irrigation water control mechanisms to enable individual farm

management and changes in cropping patterns to reduce water use and so water logging and secondary salinity. Lack of capacity to provide correctly timed water for these farmers are apparently resulting in further damaged land, out migration and reduction in livelihood but the linkages and data have not been established. There is a lack of capacity on the part of institutional stakeholders and farmers to develop and manage new irrigation and cropping methods and the enabling environment of pricing and other incentives is not conducive to farmers changing practices.

140. The needs are to:

- (i) Obtain better information on the evolving land degradation situation, which thought to be evolving in different ways with changes in land use patterns and land leasing patterns;
- (ii) Reconstruct irrigation, and drainage networks and to measure and better regulate water supply according to crop and smaller farm needs to reduce losses;
- (iii) Apply scientifically and practically approved agro-technical and reclamation methods for soil desalinization through laser guided levelling and leaching;
- (iv) Introduce more rotational cropping and improve the technology of cropping practices including water management from secondary canals to and on farm;
- (v) Introduce more rational use of low productive land including pioneering plants for saline land.

141. These needs are assessed as being due to:

- (i) An inappropriate division of responsibility for land water and crop procurement
- (ii) Lack of agreement among Government institutions on the best additional methods and incentives to address ongoing salinization;
- (iii) Lack of capacity to monitor land and water changes and to analyse and disseminate this information for a market economy;
- (iv) A lack of experience and capacity to implement changes in irrigation and drainage practice for the evolving market economy and smaller farm agricultural system;
- (v) A focus on cotton and wheat as mono crops to meet immediate cotton quota and food security demands;
- (vi) Lack of timely inputs of water, fertiliser, pesticides and technical advice;
- (vii) A lack of precise information on the hydro geological and soils situation governing each area where water is being used or drained to;
- (viii) A lack of financial resources available to farmers and water managers to introduce the range of needed solutions necessary for comprehensive solutions;
- (ix) A lack of Land Cadastre for Turkmenistan and regions; and
- (x) A lack of agricultural machinery which is financially affordable by the farmers;

- (xi) A lack of information on the social aspects of land degradation, in irrigated and other lands.

142. There is acceptance that these needs cannot be effectively addressed on a piece meal basis or demonstrated on a small scale if it is to influence policy. It is also accepted that addressing the issues in an integrated way will be institutionally difficult and that many incentives for changed cropping patterns will not be possible under present policies, except in limited areas as an experiment. It is accepted that some targeted research is needed to address information gaps. The solution that emerged from the situation analysis is to select pilot areas to implement the range of solutions required including the needed for targeted research and to address crop rotations and capacity development on a sufficient scale so that the benefits are clear.

- **Degradation of rangelands**

143. Rangelands degradation is the most serious ecological problem in the country based on an area basis as it threatens the majority of the land surface and once initiated on a significant scale will be economically very difficult, if not impossible to address. The causes of rangeland degradation over-grazing by livestock, fuel woodcutting and inappropriate disturbance by roads for exploration and industrial development are agreed and the solutions generally accepted. There is a perception that damage is increasing with increases in livestock numbers and the destruction of water points but data are not available and the systems for monitoring range condition are no longer operating. In order to reduce these pressures there is a need for the monitoring system to be rethought and re-established; for legislative instruments to create registrable use right titles to pasture and water and for capacity development and the institutional framework wherein the following needs can be filled:

- (i) Strengthening of land services departments which are responsible to fix pasture quotas on allotted areas based on fodder capacity of rangelands, livestock and watering; to register the documents on provision with pastures; to design the projects on pasture redistribution among districts (etraps); to keep pasture rotation; to control its improvement and watering;
- (ii) Re-establish monitoring of pastures to estimate of seasonal capacity of pastures to enable more informed supervision of grazing by authorities and to identify breakout points of degradation;
- (iii) To carry out the measures by land users on conservation and improvement of rangelands, on combating wind and water erosion, desertification, on constructing and re-constructing of water sources, keep rangeland rotation;
- (iv) Strengthening of the capacity to enforce rehabilitation by the institutions causing in appropriate roads and resulting damage, by the perpetuators.

144. These needs are assessed as being due to:

- (i) Lack of capacity on the part of most stakeholders to deal with pasture and water utilization in a market economy;
- (ii) Lack of consensus between etrap (district) mayor's offices, departments of land resources service and "Turkmenmallary" (livestock) Association on assigning of land plots to separate land users;
- (iii) The authority of the land surveyor in setting livestock grazing rights based on pasture capacity is not appointed legally by the Land Resources Service;
- (iv) There is not approved strategy on utilization, conservation and improvement of rangelands;
- (v) The expedition of "Turkmenertaslama" (soil research) responsible for monitoring of all the rangelands of Turkmenistan is not functioning properly;
- (vi) The wrong attitude by institutions exploiting minerals, oil and gas.

- **Wind erosion in areas of settlement and industrial development**

145. This issue overlaps with rangeland degradation but is considered separately as it includes consideration of other issues of concern to settlement residents. There have been some pilot projects to reduce shifting sand along roads and railways and around settlements that are beginning to show results so the causes, impacts and solutions to the problems of wind erosion are well known and accepted, but they are not being applied in a comprehensive way. There is also some water logging by sewage and other water some of these near settlement areas. The following needs remain to enable wide replication:

- (i) Systematic information on the evolving situation with regard to desertification so local authorities can influence policy and budget allocation;
- (ii) To plant many more shrubs on deflation risky areas adjacent to oases and other settled or industrial areas;
- (iii) To develop more rational ways to regulate use of pasture considering seasonality and water availability; and
- (iv) Revegetation of moving dunes and degraded pastures by sowing plants and controlling grazing in near settlement areas;
- (v) Wastewater treatment facilities to use wastewater for afforestation irrigation within rangeland areas.

146. These have been assessed as being due to a lack of:

- (i) Sufficient capacity to contribute to monitoring and national and regional planning to combat land degradation in their areas;
- (ii) Resources to replicate shrub and tree planting programs around settlements;
- (iii) Implementation of laws designed to ensure, mineral, oil and gas exploration and extraction enterprises take responsibility for their actions that cause erosion;

- (iv) Consensus on the best methods to enable herders to regulate their grazing across the landscape including the mechanisms to provide and manage new livestock water supplies;
- (v) An agreed system to allocate pasture use and development rights in township areas;
- (vi) A cost effective solution to controlling moving dunes and sowing plants in low populated areas.

- **Soil water erosion in irrigated foothills and plains**

147. Soil erosion in these areas is damaging not only on the lands eroded but also of the areas where the soil moves to and where ravines and mud flows occur. The causes, impacts and solutions to different erosion processes in hills and adjacent plains are understood and agreed but are not yet being implemented in a comprehensive way although the scale of damage in recent years has not been assessed systematically. There has been a demonstration of two new irrigation systems on a significant commercial scale and, as noted under wind erosion above, erosion control and rehabilitation of disturbed areas has been demonstrated in the present economic circumstances. The agreed range of needs is:

- (i) Better information on the evolving situation with regards to land degradation in these areas;
- (ii) Provide economic or other incentives to implement erosion control measures or change crops in erosion prone areas;
- (iii) Introduce advanced irrigation methods on inclined lands;
- (iv) To enable changes in cropping from annual to industrial long cycle crops or forestry in particularly fragile areas;
- (v) Rehabilitate disturbed industrial, mineral and other lands; and
- (vi) Introduce new methods and technologies of land cultivation.

148. These have been assessed to be due to:

- (i) Lack of sufficient means to contribute to regional and national monitoring for budget and planning purposes;
- (ii) Lack of consensus on appropriate incentives;
- (iii) A lack of experience of advanced irrigation methods available and relevant to the broad mass of farmers;
- (iv) Inability of most farmers to obtain secure and timely access to water and other needed inputs;
- (v) Lack of implementation of laws designed to ensure industrial, mining, oil and gas enterprises take responsibility for their environmental impacts; and
- (vi) Weak extension and activities to address conservation of natural resources;
- (vii) Weak control and ability to control water use and lack of appropriate incentives and penalties.

- **Forests and reserves**

149. Degradation of forests is similarly a problem not only to the forests and its land surface but also to areas impacted by the reduction in ecosystem services provided by the forests. In the case of degradation of forests on sandy area a break point disturbance in one area can quickly spread to others. In the case of forests in mountains the changed water and mud flow impacts strongly on downstream areas. The most important area of deforestation is generally understood to be that occurring among desert shrubs and trees and this has been covered above, in addition to this there is deforestation in mountainous areas. The policy towards these areas has been to forbid felling except for fire management and to enable natural regeneration. This has been combined with actual replanting of some forests where this also serves the purpose of preserving rare species of flora and fauna.

150. The remaining needs have been assessed as a means to contribute to monitoring and planning, the development of a cost effective method of managing such forests and reserves and to replicate planting on a wider scale.

- **Enabling environment**

151. Although not specifically mentioned under NEAP this needs assessment has identified a requirement to develop the enabling environment to facilitate action to combat land degradation and this has not been addressed previously except in connection with production, and then not very effectively. This includes the development or reapplication of existing incentives for farmers in financial and non-financial areas including land use rights access to credit and information. These incentives are discussed to the context of each subject area identified under NEAP. The creation of a better enabling environment includes needs best provided as specific projects as discussed below.

- **Monitoring and land information**

152. This analysis has identified a need to rethink information needs for a market economy and to install new monitoring equipment for new information purposes and to develop new systems for information dissemination.

- **Targeted research**

153. This needs assessment analysis has also identified a need for targeted research to enable the country to adapt to reduced water resources and reduced water quality. Another need is for targeted research into the social aspects and linkages between land degradation and livelihoods.

- **Dialogue and capacity development**

154. The needs assessment above indicates a need for a dialogue phase and a program of capacity development to develop stakeholder skills for the evolving market economy and changing land use rights.

C. Priorities

155. The NEAP provides a priority of SLM problems to be solved as follows:

- (i) Secondary salinity (to which needs to be added, efficient use of water as water wastage is a significant cause of water logging, which in turn creates secondary salinity). This is in consideration of its importance in economic and ecological terms to the population, the majority of which depend on agriculture for its livelihood;
- (ii) Rangeland condition. This is consideration of the percentage of the nation's area taken up by rangelands and woodlands and the impact in terms of ecological damage if these fragile, mainly sandy areas were to be disturbed by anthropological activities and these disturbances;
- (iii) Wind erosion in settlement and industrial areas. This is in consideration of the rapid changes in land condition and the environment in which people live in rural areas since the transition to a market economy began, particular the changes that have resulted in the destruction of water points and intensification of grazing in settlement areas;
- (iv) Soil water erosion in foothills and plains. This is recognition of both the off site impacts of this erosion in terms of ravines and mudflows and the loss in productivity of these warmer and wetter areas due to unchecked erosion;
- (v) Forests and protected areas. This too is in recognition of the off site impacts of reduced forests, more rapid and erosive water runoff and mudflows and the loss of timber resources and bio diversity.

156. Both the first and the second national workshops undertaken as part of the preparation of this program and the analysis above have concluded that there are some important enabling conditions to be provided before these problems can be addressed successfully.

157. This leads to the conclusion that the first priority is to create a better enabling environment and that this involves a period of dialogue between institutional stakeholders to;

- (i) Discuss and agree on mechanisms for cooperation,
- (ii) Initiate a strategic reassessment of monitoring and information needs for a market economy,
- (iii) Discuss and agree on policy, legislative, and institutional changes that can be addressed to provide better incentives for action by land and water users in conformity with the 'step by step' process towards a market economy that can be addressed in the first phase of the program,
- (iv) Agree on and present budgets for approval for activities in more detail, and
- (v) Agree on a program of targeted research.

158. This will enable the Program to address the NEAP priorities and secure budget support for projects designed to combat land degradation as intended by NEAP.

159. It will often be necessary to also precede projects under the Program with periods of dialogue or preparation to further develop the enabling environment in each sector. These activities will continue through out the Program consistent with the 'step by step' strategy laid down in the 2010 and 2020 economic development plans and to ensure harmony between economic development and natural resource protection as intended in NEAP.

IV. NATIONAL PROGRAM

A. Vision

160. The overall vision for CACILM is the same in essence as the vision for NEAP, which seeks to harmonize economic development with the preservation of the natural resource base on which economic development depends. CACILM seeks a change in community and institutional attitudes and approach to land and water management to one that seeks to preserve land and water resources to sustain livelihoods in this and future generations.

161. The vision for each physical component of the National Program is:

- (i) Monitoring and information flow on SLM; a collaborative monitoring and reporting system responsive to its institutional stakeholders and land and water users providing appropriate and relevant information for land use planning, land, vegetation and water condition monitoring, land cadastre and land administration purposes making a significant contribution to mainstreaming SLM into the economy,
- (ii) Integrated sustainable management of irrigated lands; one or more pilot areas within main irrigation basins operating with a water use efficiency of 70% growing appropriate profitable crops managed by land and water users having long term use rights providing information and promotion for policy makers and other land and water users in other regions,
- (iii) Forestry and woodland areas; a developed system for local government and community based re-development and management of forestry areas and the sale of forest products and services including activities to develop a carbon market,
- (iv) Range and pasture areas; a developed sustainable system for pasture management and water point and energy system development and maintenance by collaborative and individual herders, with certified long term use rights and in harmony with settlement administrations,
- (v) Targeted Research: research capacity to react to any changes in water quality and quantity and its availability due to climate changes, international agreements or borders impacts, and to research social issues of land degradation

162. The over all vision is expressed as the expected impact in the Design and Monitoring Framework discussed in the next section while the visions for each physical activity are expressed as expected outcomes together with the design logic to complete a tabular summary of the national Program Framework, which appears as Appendix Two.

B. Overview of the Design and Monitoring Framework

163. The overall goal of CACILM⁸ program is to “help restore, sustain and enhance the productive functions of Turkmenistan’s land and water resources so as to improve economic and social well-being, and reduce livelihood of those who depend on these resources while preserving the environmental functions of these lands in the spirit of UNCCD. The program seeks to bring resources to bear to implement the NEAP strategic objective to harmonize economic development with natural resource preservation and capitalize on the land and other reforms to encourage private and other investments in the maintenance and improvement of land assets. In environmental terms, the program seeks to mitigate the causes of land degradation and its negative impacts on the functional integrity of principal ecosystems through the promotion of SLM at different administrative levels.

164. The expected outcomes of the Program are of three broad kinds: (1) Improved capacity of Turkmenistan’s national institutions to integrate SLM considerations into their operations and budgets and improved ability to promote and implement investments in SLM, (2) development and demonstration of systems to manage different land and water systems in a more sustainable and beneficial way, including sloping lands, main irrigations systems, rangelands, settlement areas, logistic corridors and forest and reserve areas, and (3) Widening of the support to SLM in Tajikistan to include service providers and civil society.

165. The program’s overall goal will be pursued through seven groups of activities or components designed to respond to the analysis presented in parts II and III of the NPF namely 1) Capacity Building including monitoring and information flow, 2) Sustainable Agriculture including in upland and main irrigation areas, 3) Sustainable Forest and Woodland management, 4) Sustainable Rangeland Management including community based schemes to address land degradation in settlement and logistic corridor areas, 5) Targeted Research, 6) Sustainable Management of protected areas, and 7) National Program Coordination and Management.

166. The intended outcome of these groups of activities and their success is to be judged by verifiable performance indicators subject to certain stated assumptions and risks as summarized in the Project Design and Monitoring Framework table in Appendix 2. These indicators will need to be developed in more detail for each project and verifying would make use of existing sources of verification and reporting by other donors.

⁸ The term Program and CACILM are used interchangeably in this section, although strictly speaking the program is a product of CACILM.

167. Achieving the desired overall impact of the program assumes that the 'step by step' transition to a market economy proceeds as planned in the 2010 and 2020 programs and is subject to the risk that land management policies do not revert to former command economy processes so that land and water users can assume greater responsibility for their actions as they wish and are competent to do so. This assumption will need to be tested periodically as different projects are designed to take the process of mainstreaming SLM a step further and this will require evidence of legislative and other instruments of change to be provided.

C. Program Areas

1. Capacity Building

1a. Enabling Environment – Mainstreaming Sustainable Land Management

168. This program area responds to the finding that the present incentive environment of farmers and herders is evidently not resulting in needed changes in land, water, pasture forests and reserve management to reverse long standing land degradation problems or to meet planned production increases. Government has developed a strategy to harmonize economic development with natural resource preservation through its NEAP but this mostly addresses physical needs such as drainage and water supply without specifically addressing the need to develop the capacity of stakeholders to change present management practices to enable these twin objectives to be met. There are a number of aspects of capacity building that the analysis in Section II suggests require attention:

- (i) The stakeholder analysis concluded that the views capabilities and roles of stakeholders in SLM have evolved since the 1990's but not always in ways conducive to SLM; some have lost some duties and are now ill equipped to carry out those they have retained, such as the Ministries of Agriculture with regard to land administration, Water Economy with regard to water management in secondary canals and on modern small farms and Nature Protection with regard to nature protection. Some have responsibilities to maximize production but little duty to preserve the resource base, such as the new Research Institute "Cotton-Growing" of the Agricultural JS Company of Turkmenistan and Research Institute "Grain" of the "Turkmengalla" Association. The emerging private sector similarly has the apparent interest to maximize production in a sustainable way but not the knowledge or authority to make production management decisions for cotton and wheat and has no effective administrative system within which to relate in utilizing pasture;
- (ii) The policy, legal, regulatory and institutional analysis concluded that some policies do not take into consideration the existing limitations in water supply and yield trends in setting production objectives, setting up a similar situation that existed in the 1960's and 1970's and as a result

underestimating the importance of some needed changes to reduce land degradation. The economic development plans stress the importance of a 'step by step' approach to market reforms that will enable land and water users to learn more cost effective production techniques. This step-by-step process will require careful management to facilitate learning for SLM. There are new laws, such as the land and water codes, that will facilitate SLM but have yet to be developed into regulations and relevant institutions strengthened to administer them. Furthermore many stakeholders do not yet understand their rights and responsibilities under these laws.

169. The program area will include a preparatory phase for dialogue between institutional stakeholders to decide on the pace of change for different policy, legislative and institutional areas necessary and consistent with the 'step by step' approach desired by Government in its transition to a market economy. This will be a central task of the Program and will gradually merge into Program Coordination to maintain focus.

170. The focus of this program area throughout the CACILM period will be to:

- (i) To promote SLM as a budget area in national programs;
- (ii) To incorporate awareness of SLM laws into training and education on each relevant project funded under this NPF;
- (iii) To undertake specific awareness building activities through the media, national and local;
- (iv) To provide specific assistance to educate service and input suppliers on the obligations and responsibilities of their clients so they are able to assist in communicating these;
- (v) To facilitate SPA partner donors to prepare projects for inclusion in CACILM and in monitoring and supervising their activities.

171. It would also monitor the implementation of some laws on SLM, particularly where laws cannot be enforced as intended, this will involve many aspects of the NPF but particularly relates to:

- (i) Laws governing the use of rangelands for livestock, which have not been developed into regulations, particularly covering certification of rights to use pastures and water;
- (ii) The laws that do exist to protect natural resources but are not being enforced as there is no effective monitoring to support decision making;
- (iii) The development of administrative mechanisms to govern control of water facilities and grazing by herder groups or individuals;
- (iv) Laws governing the ownership and use of land for agriculture, which under conditions of procurement orders and quotas for cotton and wheat, do not operate as intended by giving incentive signals for appropriate land management and cropping;
- (v) Laws governing the rational use and non wasteful use of available irrigation water, particularly where the control and measurement facilities

do not exist at the farm level (most areas) and where water is not priced to encourage efficient use;

- (vi) Laws governing the ownership control and management of livestock water supplies;
- (vii) Laws governing the policing of land use to discourage bad practice, particularly where there is lack of information about land and water condition from monitoring to form a basis for the decisions and where laws are enforced in appropriately to influence cropping choices.

172. The NPF would promote activities to:

- (i) Greatly improve the monitoring system including its analysis and dissemination of information to both land users and land regulators (see below);
- (ii) Develop regulations to govern the implementation and enforcement of laws related to land and water resource use in irrigation and livestock production at the operational level, and test these in pilot areas;
- (iii) Gradually introduce more market pricing, initially in pilot areas to demonstrate the benefits in terms of SLM and productivity;
- (iv) Provide water control and measuring devices to the farm gate, initially in pilot areas to demonstrate the benefits and so justify the cost;
- (v) Improve the equipment and training available to enable more transparency and accountability of land regulation and land cadastre services at provincial and local levels,
- (vi) To replan and assess land and water administration and land and water management with respect to effective operation in a market economy, including at what level of government the services are provided (in conjunction with the strategic reassessment of monitoring and information flow, discussed in the next section);
- (vii) Consider changing boundaries of water administration from the present administrative boundaries to irrigation basin boundaries to enable more rational management;
- (viii) Enhance arrangements for cooperation between institutions responsible for elements of resource monitoring in order to provide a more integrated solution at the local level, (in conjunction with the strategic reassessment of monitoring and information flow, discussed in the next section).

173. It would also promote the development of financial incentives for SLM in each of the relevant program areas as follows:

174. The Government now provides incentives for land rehabilitation for productive agriculture of the main crops of Cotton and Wheat and it is proposed that these be extended to cover SLM; such as Government subsidies on the cost of land and water delivery infrastructure and education and training. These incentives would help off set the risk of adopting new techniques in SLM.

175. It would implement and make use of small grants schemes wherever possible to provide incentives to partially offset the cost of in-kind inputs that produce substantial public benefits in settlement areas and in rangelands and in forests and protected areas.

176. It would promote the granting of long-term use rights for farmers and other resource use rights where they should substantial commitment to SLM so they will have the freedom to make their own decisions on their use and to market products at their true value. It is understood that this will be introduced gradually and in pilot areas to demonstrate the benefits to justify replication.

177. The intended outcome is for “key institutional stakeholders to be collaborating in the interests of sustainable land management in the long term as evidenced by budgeted expenditure, official recognition of the NPF in official reports and development plans”.

1b. Integration into Land Use Planning and Management Systems

178. This program area responds to the finding that most stakeholders in SLM are ill equipped in terms of reliable information to make needed planning, management and resource use decisions, that existing information is extrapolated from data gathered up to around the time of the break up of the Soviet Union when the pressures on land and water users was different.

179. The analysis in Section II E. concluded “there is a significant amount of data and ongoing monitoring activities, however the system does not function precisely or in an integrated way and the information is held at various ministries and departments, they are not unified, and not analyzed or brought together in the form of reports, and the mechanisms of sharing these data and information are not developed.

180. There is a need for the concerned agencies to rethink their information needs and the uses to which data are to be put including how to link data for use in land management planning to the land cadastre and environmental monitoring”.

181. The program area plans a two-phase project to develop a capacity to monitor and disseminate information necessary for effective decision-making by stakeholders to enable effective action and reaction towards SLM:

- (i) an initial dialogue and strategic reassessment phase to enable stakeholders to consider new information needs, their respective capabilities and needs and the forms of cooperation required for a good information management for SLM, and
- (ii) a second phase to invest in new equipment, training education etc to equip the necessary stakeholders from national through to local levels, including land and water users with access to appropriate information for their part in SLM.

182. This program area would provide:

- (i) A strategic analysis of the nation's land and water information needs;
- (ii) A data base for the land cadastre;
- (iii) A data base for land and water management and monitoring for nature and resource protection;
- (iv) A system of reporting to satisfy the different needs of institutional and private land users and managers at central, provincial and local levels;
- (v) An agreed set of data to share with neighbouring countries.

183. This program would require the active interest and participation of all institutions with relevant information needs and land and water management legal obligations.

184. The intended outcome is "appropriate monitoring and information flow between key institutional stakeholders and from these to local authorities and communities for effective land use administration".

2. Integrated Sustainable Management of Irrigated Land

185. This program area responds to the finding that land degradation, particularly secondary salinity in the main irrigation areas is apparently increasing while crop yields and water use efficiency is declining. If these trends continue the nation will not be able to meet its production objectives on which its economic development plans are based. The trends are occurring against a background where land users and other stakeholders have to find new ways to manage land in smaller plots for a market economy but with water systems established for large units and a high level of technical and other inputs. The analysis of the root causes of the problem and experience on other projects indicates that there are a great number of interlinking problems facing farmers seeking profitable SLM, from the enabling environment that can only change on a step by step basis, to many technical issues and difficulties obtaining markets for more appropriate crop choices and that little consensus exists on the best path forward. Under the present transition phase to a market economy full pricing of water and other inputs and outputs that might bring about change more organically cannot be undertaken in the first phase of this program.

186. The analysis in Section II concluded, "there are few examples of 'good (SLM) practice' for Turkmenistan to compare with and no examples of an integrated suite of practices in any of these subject areas, except a commercial example of trickle irrigation, that can be used for demonstration and extension".

187. The program area would address the needed suite of interventions in one or more pilot areas including items across the spectrum of modern irrigated agriculture such as:

- (i) Different systems to map and repair leaking canals;
- (ii) Establishment of some pressurised water delivery systems;

- (iii) Water measuring and control devices, (including onto farm and in a nearby unchanged situation as a control);
- (iv) Field soil and water monitoring devices (with a control as above) as a research activity;
- (v) Investigating carbon sequestration resulting from improvements in organic matter, as a research activity, to set a possible base line for sequestered carbon sales in the future;
- (vi) Different modern land treatment technologies including laser guided levelling for flood and furrow irrigation (with a control as above);
- (vii) Different trickle, floppy and subsoil irrigation technologies (including with potential suppliers⁹);
- (viii) Facilities and advice to enable farmers to participate in different crops and crop rotations;
- (ix) Facilities and advice to enable different modules for water user associations or similar to participate in water management from secondary canals to on farm to be trailed;
- (x) Develop regulations to enable granting of long term land use rights over land being used correctly and on which farmers have invested significant effort (according to the new Land Law the leaseholders received high crop yields during last 5-10 years can be given up to 3 ha to private ownership by the Decree of the President of Turkmenistan).

188. This program would require a combination of institutions and local government for implementation and would prepare detailed scientific research and promotional reports to facilitate influencing policy makers and replication in other areas.

189. The option of continuing to address these needs on a piecemeal individual institutional basis is not considered viable except for limited training purposes.

190. The intended outcome of this program area in main irrigation areas in the long term is “more sustainable and profitable land management in main irrigation areas, undertaken by farmers with long term use rights”.

3. Sustainable Forest and Woodland Management

191. This program area responds to the finding that deforestation has been a long-term problem that has not found a solution yet although Government action to supply gas to towns and cities is reducing further pressure. Government is also supporting commercial efforts to establish green belts around some cities as a matter of policy. Experience with other projects, notably GTZ, indicates some community interest in this area

⁹ As Turkmenistan has a comparative advantage in the cost of plastics suitable for irrigation equipment there is the potential for a mainstream irrigation supply company to join this activity to develop a market that might extend to other Central Asian countries lacking this advantage and where similar problems exist.

192. Attention to combating degradation in forests and reserves is important as these areas provide important environmental services, including smooth delivery of water from runoff, bio diversity and reduced erosion from slopes. They also provide good products such as timber.

193. Agriculture in sloping areas has become subject to erosion, mud slides and the development of ravines partly caused by changes in land use away from long cycle industrial crops towards food crops late in the Soviet period and that this is continuing. This is producing significant off site impacts of mudslides, dust and floods.

194. The program area would strengthen and replicate experience from past projects to build check dams for mudflows in strategic areas, to facilitate changes in plants grown from short cycle to long cycle crops or forests to stabilise sodic and other fragile soils, and to monitor the results closely to enable wider replication as market pricing becomes more common through this program period.

195. This program area would address degradation in forest areas would involve these processes:

- (i) Promotion and making contact with institutions and communities interested in reforestation, perhaps including by response to tenders where the demand is significant;
- (ii) A planning process to identify key participants including commercial entities such as the "Green Belt" company, design works, to sequence activities and gain agreement for participation in monitoring for adaptive management;
- (iii) Making arrangements for the provision of predictable long term rights to use resources protected by the people undertaking the work;
- (iv) Investigating and setting the base line to introduce sequestered carbon sales to offset the cost of tree planting;
- (v) Investigating and promotion of other forest product processing and marketing to assist in making reforestation a sustainable activity for communities.
- (vi) Constructing of dams against mudflows in the main areas;
- (vii) Planting of perennial crops and forests to strengthen fragile soils;
- (viii) Monitoring of the results achieved for further replication when market pricing is common during the program implementation.

196. The program area will require the active interest and participation of provincial and local authorities and communities in each area; it will also require technical support from relevant scientific institutions and access to a source of funding for technical and operational inputs.

4. Sustainable pastureland management

197. This program area responds to the finding that pasture utilization is now mostly unregulated and with rapidly increasing numbers is causing increasing degradation

around settlements and that the destruction of water points is inhibiting a more rational use of pasture lands.

198. Combating rangeland degradation of potential break points from anthropological causes where fuel wood cutting, road damage and over grazing is occurring, is a strategically important investment because of the very wide areas that might be impacted if the break out points are not addressed. There are two aspects to be addressed:

- (i) The monitoring of rangelands to identify weaknesses and break out points and then activities to rehabilitate important areas (discussed above); and
- (ii) Activities to address weak areas before problems occur by re-establishing effective grazing control, and developing new systems for rangeland management and energy supply in a market economy.

199. Developing new methods to manage rangelands for a market economy requires applied research with herders, particularly around the issue of the provision, control and maintenance of water for livestock and the provision of alternative energy sources, including solar, wind (in some areas) and gas. There are some spontaneous efforts to re-establish limited traditional grazing systems, including using traditional water harvesting and storage systems and these would be reinforced. There are also a few successful programs to re-establish or create new water supplies and manage them in a market economy in other countries that might be used as examples. The process under this program area would include:

- (i) Promotion and contact with herders interested in working on this problem in return for new water supplies and secure resource use rights;
- (ii) Participatory planning to identify groups, leaders, and office bearers for associations to own and manage new water supplies and energy resources;
- (iii) Monitoring the results of these activities to refine procedures before wide replication;
- (iv) A program to enforce restitution and better care by perpetrators of damage from in-appropriate road development and exploration.

200. The fundamental difference between this program area and the following one involving settlements is an institutional one; rangeland rehabilitation involves the provincial authorities supported by the Institute for Deserts, Flora and Fauna. It also involves perpetrators of road damage while the following settlement program involves township authorities, although the two will interface in many locations where the damage is occurring in settlement areas but the root cause, lack of water and a consensus on pasture use rights, is occurring in rangeland areas.

201. The option of addressing these needs, as a program directed and managed by Government institutions is not considered as being suitable as without active participation and ownership on the part of herders and perpetrators of damage the activities to combat the damage are unlikely to be sustainable.

202. The intended outcome of this program area is “a more sustainable system of rangeland use recognized and monitored by Government and operated by herder groups or individuals”.

5. Targeted research

This program area responds to the finding that some research capacity needs to be restored to address problems directly related to the declining resource base, particularly involving water, pastures and social and institutional issues. As noted above applied research enters into several other program areas, notably sustainable agriculture, sustainable pasture management and forestry. The two programs areas below require a particular focus and will only be connected to other program areas in a peripheral way.

5a. Research targeted towards uses of saline water

203. This program area responds to the finding that the nation requires a capacity to respond to ongoing and potential changes in water quality and quantity. The changes to be planned for include:

- (i) Changes in fresh water availability due to international agreements;
- (ii) Changes in drainage flows from neighbouring countries and in the main stream of the Amu Daya;
- (iii) The water available at different points along the Turkmen lake collector; and
- (iv) Climate change.

204. These changes may not all occur but the potential risk to the economy is such that the precautionary principle needs to be applied. The alternative of relying on scientific advances internationally to provide new techniques to solve land and water degradation issues in Turkmenistan is considered insufficient due the need for innovation geared to the specific circumstances of the country. Reliance on international research would also result in the loss of the leading edge research capacity of the NIDFF, which had an international clientele, particularly from neighbouring Central Asian Countries. However activities under this program area would actively seek collaboration with relevant international research centres, such as ICARDA in the International Center for Bio-saline Agriculture (ICBA)

205. The activities under this program area would include agronomic, aquaculture and other research activities to investigate valuable water uses at increasing levels of salinity and other contaminants. The activities are expected to include a combination of laboratory and pilot test sites in the pilot areas discussed under sustainable agriculture above, and particularly along the Turkmen drainage Canal.

206. The outcome of the program area will be “a developed capacity to investigate and develop plant based and other economic activity to utilize changed water quantity and quality.”

5b. Research to investigate the links between land degradation and livelihood

207. This program area responds to the finding that there is insufficient understanding of the social aspects of land degradation and a capacity to investigate this is required to better inform policy and development planning.

208. The program area would mainly involve the National Statistics Institute and would include field surveys in program and non-program areas and would be included in program evaluation activities.

209. The intended outcome of the program area would be “a better understanding of the social factors involved in land degradation.”

D. Proposed Investment and Technical Assistance Projects

1. Overview of Program

210. The program is designed to be an interlinking series of projects responding to the needs, identified in Section II and analyzed in Section III, to mainstream SLM into the national consciousness and Government and private activities involving the use of natural resources. Government is already making substantial investments pursuant to its NEAP and this program is to resource parts of that plan not now being resourced and augmenting others considered not to be adequately covering the needs.

211. The program devotes significant investment in creating a better enabling environment for land and other resource users to act themselves towards SLM as this has been identified as a significant impediment to this type of action in the past. This type of investment will remain an important area as the country takes its step-by-step path towards a market economy during the life of the Program.

212. The program addresses the perceived needs in each of the important technical areas of Agriculture, Rangelands, Forests and Special Reserve areas and pays particular attention to the involvement of relevant stakeholders at all levels, particularly communities and land pasture and water users as these are the primary target for this intended change in national consciousness towards SLM. It also includes a targeted research program to enable the nation to respond to expected changes in its environment.

213. Program planning and implementation is designed to be an iterative learning process so that early projects prepare the ground for latter activities and inform the design of these later activities. It is also designed to facilitate collaboration between donors and to reduce the transaction costs and time for the nation to attract and administer much donor assistance in this general area of SLM.

214. As can be seen from the investment table following, the Government has agreed to make a substantial commitment to this Program as further evidence of its commitment to SLM and the relevant conventions it is a signatory to, including particularly the UNCCD.

2. Investment Table

215. The following table sets out the initial investment plan covering Phases One and Two.

Table 5 Turkmenistan Sustainable Land Management Investment Program

2	Project	Cost Estimate	Financing \$US, 000			IA	Notes
			Gov't	Donor	GEF		
1. Capacity Building - Strengthening the Enabling Environment (Dialogue stage) - Integration into Land Use Planning and Management	Capacity Building and On-the-Ground Investments for Integrated and Sustainable Land Management	2,000	TDB	1,000	1,000	UNDP, GTZ/CCD, NIDFF	To overcome the existing inconsistencies and disconnect between the policy framework for Land Management and actual needs for land users by initiating participatory dialogue with involvement of the key line ministries, local government and local land users.
2. Monitoring and information flow system on SLM	Establishment of National Monitoring System of land resources of Turkmenistan for long term planning and sustainable management	4,425	1,845	535	2,045	MNP, M of Agr. MWE, Min. of Economy and Finance, Turkmenmillihasabat (Statistics), Mapping Ass., Turkmenmallyary Ass. (Livestock), NRC ICSD	Development and operation of permanent National Monitoring System of land resources of Turkmenistan and establishment of GIS "Land Degradation in Turkmenistan" for better information in order to develop sustainable land management and capacity building of involved agencies
3. Integrated Sustainable Irrigated Land Management	Participatory reclamation of degraded lands	3,015	1,130	375	1,510	MWE, Turkmensuwlyymta slama (Water	Prevention of land degradation and improvement of

2	Project	Cost Estimate	Financing \$US, 000			IA	Notes
	located in the Seepage area of great water channels and reservoirs of Turkmenistan					Design Inst.), M of Ag, JS Com. "Goek Gushak", Training Center, Ass. Turkmenmally (Livestock), GTZ/CCD, UNDP	environment land condition in seepage areas of great water channels and reservoirs, use improvement, water saving, land and pasture areas restoration, improvement of livelihood.
	Improvement of the effectiveness of land and water use.	9,050	3,390	1,125	4,535	MWE Turkmenmally (Water Design Inst.), M of Ag, JS Com. "Goek Gushak", Training Center, Ass. Turkmenmally (Livestock), GTZ/CCD, UNDP Project	Efficient use and improvement of land and water use, conservation and improvement of soil productivity, increasing crop capacity and better living and working conditions
4. Sustainable Forest and Woodland Management	Community based restoration of forests of Central Kopet-Dag.	1,535	245	245	1,045	JC Com. "Goek Gushak", NIDFF, Kopet-Dag reserve Inspection on Forests, TurkmenHydromet (Hydro Meteorology Service), Ass. Turkmenmally (Livestock)	Livelihood improvement via rehabilitation of degraded lands and sustainable development of mountain forests and rangelands

2	Project	Cost Estimate	Financing \$US, 000			IA	Notes
						GTZ/CCD, UNDP	
5. Sustainable Pastureland Management	Development of model for restoration and sustainable development of rangelands by the example of Rukhabat Etrap (District)	7,015	1,370	1,750	3,895	M of Ag, MNP (NIDFF), GTZ/CCD, UNDP, Ass. Turkmenmallyary (Livestock), Turkmenhydromet (Hydro Meteorology Service), RPC "Tebigy Kuwwat"	Reducing areas of degraded lands and seek sustainable management of rangelands on the base of pasture fodder capacity, better water supply and vegetation of pasture areas
6. Targeted Research	Use of saline water in agriculture	2,085	720	320	1,045	Turkmensuwlyymta slama (Water Design Inst.), Institute of Agriculture, NIDFF, GTZ/CCD,	Water quality and quantity will decline, Targeted research is needed to adapt
	Identification of population groups subject to negative impact of land degradation.	215	95		120	Turkmenmillihasabat (Statistics), Min of Agr.	Establish links both way between livelihood and land degradations to inform policy
7. National Program Coordination and Management	CACILM Secretariat and NCC Capacity Building	610	50	180	380	MNP	Set up CACILM Secretariat and national partnership, training, partner dialogue and study tour to other CACs

3. Phases and Schedule

Figure 10: Program Schedule

(An Excel chart will come in here in A3)

4. Phase One Activities

216. Phase one activities will focus on setting up the NPF, institutionally and administratively and in preparing the ground for each program area through dialogue or strategic or design studies as follows:

- (i) Capacity building to prepare the institutional, policy, legislative and collaborative setting for the whole Program;
- (ii) Capacity building to prepare the ground for the development of a collaborative monitoring and information system that will facilitate mainstreaming of SLM into areas of Government including; land use planning, environmental monitoring, land administration, the operation of the Land Cadastre and economic planning;
- (iii) To select pilot areas for activities directed at sustainable agricultural practices and to arrange for to the necessary collaboration for integrated pilot program activities;
- (iv) To select initial areas and prepare plans to develop community based forestry management systems, including he calling of tenders for interested participants and the attraction of possible commercial partners;
- (v) To select pilot areas for activities to develop mechanisms for sustainable pasture management including water and to facilitate selection of initial participants, drafting agreements and certificates for water and pasture use rights;
- (vi) To select initial areas and participants, possibly through tender, for activities to combat land degradation in settlement areas and logistical corridors, including negotiations to induce investment from institutions causing degradation;
- (vii) To design and initiate the targeted research program, negotiating for partners and selecting pilot areas;

E. Implementation Arrangements

1. Organization Structure

217. The Ministry of Nature Protection has provided a small secretariat under the authority of the national Working Group for the preparation of the NPF. During the preparation phase a national consultation council was established to facilitate the involvement of senior and middle management of concerned ministries and other stakeholders including NGO's in NPF preparation. This council is intended to become a permanent part of the organisation of the NPF during its 10-year implementation period.

218. The Working Group will be restructured based on administrative provisions suitable for this purpose and renamed, the National Coordinating Council (NCC); NCC's creation will be expected to receive the Government's endorsement. The NCCs main functions will be to

- (i) Coordinate the overall implementation of projects and activities mandated by the National Programming Framework;
- (ii) Supervise implementation of the activities that are direct responsibility of NCC;
- (iii) Monitor performance of all project and activities and report to the CACILM Steering Committee (see below); and
- (iv) Review and endorse proposals for consideration by the CACILM Steering Committee (see below)

219. A representative of the Strategic Partnership will continue to be a member of NCC. A technical review panel (TRP) will be created to advise the NCC on matters relating to prioritization and selection of projects for funding under CACILM. The TRP will deliberate quarterly and consist of two national specialists and a representative of the donors nominated for a fixed period.

220. A National Secretariat (NS), successors to the present Working Group Secretariat, will support the NCC in the overall implementation of projects and activities mandated by the National Programming Framework. Its responsibilities will include:

- (i) Monitoring performance of all project and activities undertaken;
- (ii) Annual reporting to the CACILM Steering Committee on NPF implementation;
- (iii) Providing secretarial and logistical support to NNC meeting and workshops;
- (iv) Supervision of specific activities that are the direct responsibility of the NNC, and
- (v) Provide guidance and assistance in the preparation of the project proposals.

221. The National Secretariat will be strengthened to be able to operate in English, effectively liaise with local partners, have the technical ability to screen projects for compliance with CACILM eligibility and be familiar with donors' project management requirements.

222. The Program's implementing agencies are those government agencies, international organizations, and civil society organizations that will actually implement specific elements of the Program. These CACILM Implementing Agencies will be responsible also for reporting on project performance to the National Coordinating Council.

223. The national level implementation structure will be meshed into a multi country implementation and coordination structure because CACILM is a multi-country partnership in which implementation in each country benefits by sharing of insights with partners, because in addition to the national content there may be some multi-country components (described later on), and because allocation of GEF funds under CACILM is predicated on a multi-country partnership.

224. The multi-country mechanism chosen parallels the national implementation structure and consists of the CACILM Steering Committee (CSC) and the CACILM Secretariat (CS).

225. The CACILM Steering Committee will comprise (i) representatives of the governments of Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan; (ii) GEF Implementing Agencies (World Bank, UNDP, and UNEP); (iii) GEF Executing Agencies (ADB, FAO, and IFAD); (iv) bilateral agencies acting as CACILM implementing agencies or participating in projects or activities through co-financing; and (v) other international organization participating in CACILM project and activities. The CSC will be responsible for:

- (i) Overall direction of the CACILM Multi-Country Partnership Framework;
- (ii) Approval and endorsement of proposals for submission to GEF;
- (iii) Oversight of those multi-country project and activities that the direct responsibility of the Steering Committee;
- (iv) Monitoring performance of the multi-country projects and activities undertaken the Multi-Country Partnership Framework; and
- (v) Reporting to GEF on all project and activities undertaken CMPF

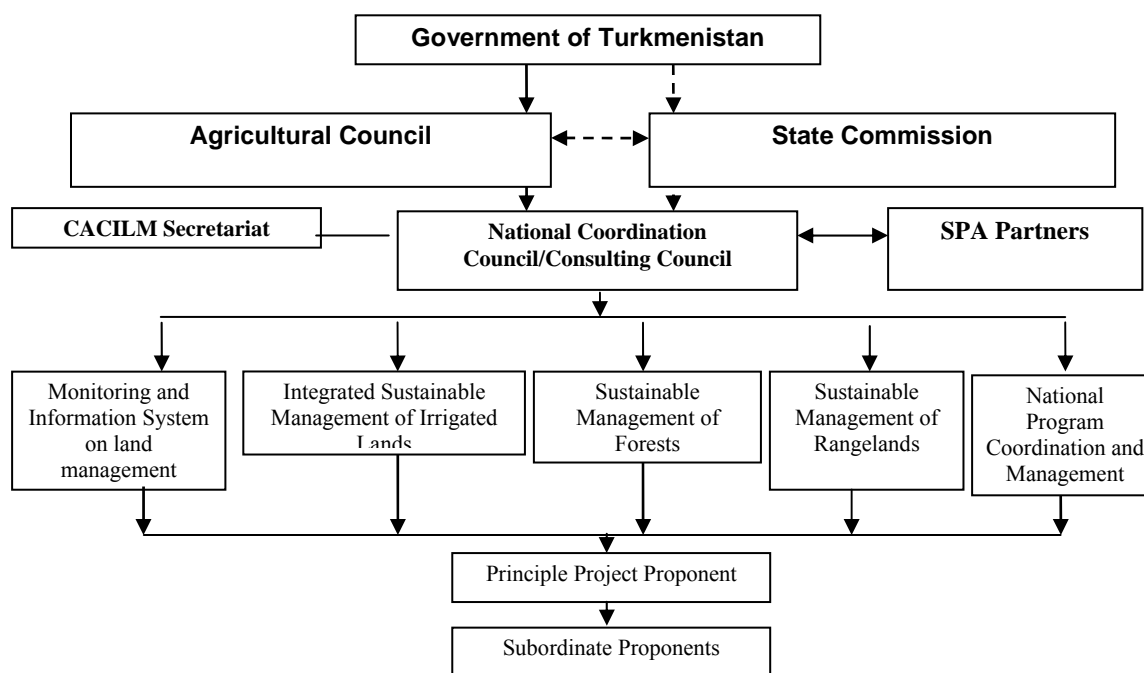
226. The CACILM Secretariats will support the CACILM Steering Committee in the overall implementation of projects and activities mandated by CACILM Multi-Country Partnership Framework, including:

- (i) Monitoring performance of all project and activities undertaken;
- (ii) Annual reporting to the CACILM Steering Committee on CMPF implementation;
- (iii) Providing secretarial and logistical support to CMPF meeting and workshops;
- (iv) Supervision of specific activities that are the direct responsibility of the CACILM Steering Committee, and
- (v) Provide guidance and assistance in the preparation of the project proposals.

227. Like the National Steering Committee, the CSC and CS will be able to draw on a three-person GEF technical review team (TRT) from within the Multi Task Force members, such nominations rotating every year. TRT will not include any representative of the five CA countries to avoid any suspicion of partisanship in determining access to GEF resources.

228. **Coordination Mechanisms.** Each NPF project will provide an institutional framework to operate for projects requiring cooperation between agencies, public and private, and between levels from national through to local levels. This framework would provide flexibility to enable specific projects to have coordination mechanisms to suit their particular circumstances. This program coordination would have the general shape depicted in the Figure 11.

Figure 11: Proposed Organization for CACILM



2. Roles and responsibilities of National Partners

a. Roles and Responsibilities of each Stakeholder

229. CACILM's principle government partners are the Ministries of Nature Protection, Agriculture and Water Economy.

230. The CACILM secretariat will be responsible to Government and to the CSC for the coordination of the NPF, including its M&E, donor and participants liaison and for maintaining files of reports submitted and projects designed or evaluated.

231. In addition to this there are a large number of potential stakeholder partners as set out in Figure 3 in Section II. As any of them become partners in CACILM they would take up one of these roles and responsibilities:

- (i) As a principle proponent of particular projects having responsibility for the particular project and for ensuring that it conforms with CACILM guidelines, including during implementation and for M&E;
- (ii) As an associate to a principle proponent having responsibility to the principle proponent to ensure compliance with CACILM procedures as outlined above;
- (iii) As a Institutional stakeholder with some authority or responsibility for the resource or the activity being undertaken, project proponents must gain assent from such institutions if their responsibility or commitment of resources anticipated for the project is more than normal or publicly available;
- (iv) As a participant expected to provide in-kind inputs, for example in a community based activity, project proponents must show written evidence of assent by a recognised representative of the participant community in these cases and this should include agreement to participate in M&E, including for adaptive management purposes;

3. Proposal Submission and Approval Process

232. The projects included into the national CACILM Program will need to comply with the following criteria, developed by the Multi-Country Task Force (Table 6).

Table 6 Criteria for Inclusion of Projects in the CACILM Program

No.	Proposed projects must be consistent with or attain:	Comments
1	Definitions and provisions of the UNCCD	All projects should demonstrate consistency with and contributions to UNCCD implementation
2	Provisions of the relevant NAP(s) and/or SRAP	All projects should demonstrate consistency with and contributions to NAP and/or SRAP implementation
3	Principles laid out in the 2003 Tashkent Platform	Shows relevance to agreed directions, including participatory principles and links to NCCs
4	Provisions of the SPA Memorandum of Understanding	Shows partner coordination and demonstrated adherence to partnership principles
5	Approval of the UNCCD National Focal Point after consultation with the CCD Working Group	Required for GEF funding and shows engagement with CCD Working Group
6	Key provisions of the CACILM	Required for any GEF funding and also

No.	Proposed projects must be consistent with or attain:	Comments
	Concept Note as agreed by the Task Force members	shows consistency with agreed directions
7	Provisions of GEF OP-15	Required for GEF funding
8	Provisions of Draft GEF CPP Framework	Required for GEF funding
9	Approval of the GEF Operational Focal Point	Required <i>only</i> for GEF funding
10	Agreement of the partner agency	May require other governmental approvals as well
11	Commitment by Government of financial contribution	Applies to government investment projects, with at least in-kind contributions required for technical assistance projects

233. The investment projects listed in Table 5 have been included in the Program as they satisfy the selection criteria *prima facie*. A formal check of compliance of each proposed investment with the selection criteria will be completed by March 2006.

234. Each project has or would have a principle national proponent, normally the party with the largest attested contribution in financial terms. Programs may involve projects with different principle proponents.

235. It is proposed that any relevant agency, Government department, NGO or the private sector may make proposals for CACILM support. The responsibility for proposal preparation and submission to the CACILM secretariat would rest with the proposing party. Following and if appraisal is successful and funding granted, the responsibility for inception would also be with the proponent.

236. Proponents must be able to provide evidence that they have the necessary expertise and capability to support the project as intended, and where gaps exist, to able to show that the proposed project of proposal will provide inputs to address the gaps.

237. The Proposing party (the proponent) would submit proposals to the National CACILM Secretariat, together with evidence of support from associated parties or donors. The format of proposals shall be as provided by the Secretariat. Projects would be screened by the secretariat for consistency with the CACILM format guidelines, including the criteria of GEF and interested donors. Dialogue may be entered into but the final decision of what projects are submitted to CACILM for funding will be that of the Focal Point.

238. Projects meeting the CACILM guidelines would be selected for submission to the Working Group based on their priority. Approval for submission to CACILM would be required only from the Focal Point following consultation with the Working Group.

239. In the case of small grants activities under the on ground investments, discussed below, the CACILM Secretariat would call for tenders from interested parties and these would need to pass the same tests.

240. Project proposals will include details and evidence of all commitments of financial and, where relevant, in kind support of participants, including other donors, Government agencies, Institutes, NGO's Local Government, community groups or the private sector.

241. The CACILM Secretariat would provide oversight of CACILM funded projects and programs and would facilitate participating donor oversight where relevant and contained in project agreements. The responsibility for monitoring project and program activities will rest with the sponsoring agency, the details of which would be specified in Project operating documents and noted in contracts. Copies of Monitoring reports would be lodged with the CACILM secretariat.

242. Selection of projects for submission to CACILM for funding would be undertaken by the CACILM Secretariat based on the proposals being consistent with this National Program and meeting the above criteria as decided by the CACILM Secretariat. In addition to these criteria the CACILM Secretariat would also apply the order of priority agreed in this National Program, namely:

- (i) Projects or activities intended to build national capacity to create an enabling environment for mainstreaming SLM into the national consciousness and national and private programs and activities involving the use of natural resources;
- (ii) Projects or activities leading to the development of sustainable agricultural practices, a reduction in secondary salinity and water logging and an improvement in yields and water use efficiency;
- (iii) Projects or activities leading to the development of new sustainable systems to utilize pasture and water and to combat land degradation in settlement areas and along transport corridors;
- (iv) Projects or activities to develop community based systems to develop and manage forests and reserves; and
- (v) Projects or activities to support target research.

4. Monitoring and Evaluation System

243. Monitoring and evaluation (M&E) under CACILM would have these elements and operate at several levels:

- (i) M&E of the relevant agreed indicators of land and water degradation for the national purposes related to land planning and environmental protection;
- (ii) M&E of particular project activities as part of an adaptive management strategy of CACILM funded activities;
- (iii) Impact monitoring to suit GEF and particular donor requirements and guidelines utilising the Design and Monitoring Framework.

244. At the Program level, the M&E will be supported by the development of a Land Degradation and Sustainable Land Management Information System (LDSLMIS) directed towards monitoring the performance indicators in the NPF Logical Framework (see Appendix B)

but with a wider applicability as a tool of long-term monitoring SLM in the country. The System will include:

- (i) Acquisition of economic, social, and environmental data and information;
- (ii) Procedures, protocols and guidelines for data acquisition including all necessary survey instruments, sampling methods, analytical methods, and reporting formats;
- (iii) Computer databases and analytical programs, including geographic information systems, for storing and analyzing data and information;
- (iv) Computer based systems, including geographic information systems, for presenting results and generating reports on the results of the Program monitoring; and
- (v) Systems for managing monitoring field teams in the collection and reporting of all necessary economic, social, and environmental data and information

245. Development of LDSLMIS will be supported under the Project Coordination and Monitoring component of the Program. At the level of individual projects, M&E will be supported by Project Performance Monitoring System (PPMS). The PPMS system will consist of:

- (i) Provisions for monitoring the achievement of land degradation and sustainable land management objectives of the Project in question;
- (ii) Mechanisms for monitoring compliance with environmental and social safeguards that may be stipulated in SPA Members co-financing agreements;
- (iii) Monitoring of project implementation including work plan progress, and tracking of all project inputs activities; and
- (iv) Project financial monitoring including annual disbursements, contracts awarded and annual audited financial statement.

246. Under most projects it will be necessary to design and develop (i) guidelines for data acquisition including all necessary survey instruments, sampling methods, analytical methods, and reporting formats; (ii) Computer databases and analytical programs, including geographic information systems, for storing and analysing data and information; (iii) Procedures and formats for reporting on the project monitoring; (iv) Computer based systems, including geographic information systems, for presenting results and generating reports on results of the project monitoring; (v) training courses on all aspects of the PPMS; and (vi) systems of reporting on the Project's effectiveness and the effectiveness of Project implementation.

247. M&E design, in particular the compatibility of each investment proposal's M&E design with existing UNCCD, GEF (in projects to be co-financed by GEF) and other donor's monitoring systems will be one of investment proposals' prioritization criteria. Another will be the degree to which the each proposal is structured in a logical framework fashion that facilitates M&E.

248. Besides agencies implementing and co-financing the project in question, M&Es reports will be submitted to the NCC through the NS for centralized use to facilitate Program-wide M&E. A bi-annual review of all M&E reports for all five CACILM countries will be conducted by an evaluation specialist engaged by a donor agency not represented in the Strategic Partnership.

249. It is also intended to provide for an adaptive management capacity to operate in association with national M&E as described above. The purpose of this system is to facilitate institutional learning for planning and replanning and to provide stakeholders with a forum where they can bring up concerns, claims or issues about the performance of other stakeholder

participants important for the achievement of project plans. These adaptive monitoring meetings would take place according to a schedule agreed in the project plan (at least yearly) and be minuted with the minutes available for monitoring. The working document for meetings would be the annual operational plan beginning with the initial project document, which would be discussed and agreed in these meetings with amendments based on the meeting for review in the next meeting.

5. Mechanisms for Stakeholder Participation

250. All projects submitted for CACILM funding would provide an analysis of stakeholders and evidence that representatives of all relevant stakeholder groups have been involved in project preparation and agreed to provide their input. It also should show evidence that such stakeholders have agreed to participate in M&E, including adaptive management M&E as discussed above and as specified in the Project documents.

Mechanisms for regional and donor or other external stakeholder participation would involve:

- (i) Multi-Country Partnership (Task Force) where donors and representatives of NCC/NS Formulation periodically to chart directions and assess progress
- (ii) Donor Coordination Meetings that each year bring the donors and the Government together for the purpose of formulating the Public Investment Program. The Donor Coordination Meetings are not specific to the Program. Nevertheless one of the objectives of CACILM is to make SLM as a distinct category of PIP attracting donor funds;
- (iii) National Coordination Council that allows key national stakeholders, representatives of civil society and a representative of the donor Strategic Partnership to confer on a variety of matters described earlier on in this document;
- (iv) Regular government-donor and civil society-donor dialogues that serve to inform the parties about future possibilities in developing SLM activities, and learning from existing experience;
- (v) Other types of consultation, e.g. those between the members of CGIAR (whether members of the Strategic Partnership or not) and local institutions active in SLM applied research, workshops with SLM as one of the themes, or deliberations of thematic working groups with relevance for SLM (e.g. Working Group on Land Reform).
- (vi) The participation of civil society is ensured through the representation of NGOs on the NCC. In view of civil society's diversity, however, separate attention is needed. The National Secretariat assisted by national consultants will prepare for approval by the NCC a special folder for NGOs describing (1) the CACILM Program and its individual components, (2) the for NGO involvement, and (3) a simple description of the ways in which to participate in CACILM.

6. Communication Plan and Information Dissemination Strategy

251. Plan for providing stakeholders information about routine land and water management issues and practices that they require to manage their land and water in accordance with national sustainable resource use strategies and objectives

252. The design of the proposed national environmental and land management monitoring system would specify that all participants who contribute data for land and water monitoring

would be provided with copies of synthesised reports for monitoring purposes. Furthermore that all synthesised reports would be made available publicly electronically on Web based information management systems. Information would also be collated and synthesised on GIS platforms for land and water use planning and land cadastre purposes and this too would be made publicly available. Particular attention would be made to providing water use and quality information to water users and range condition information to range users.

253. National and sectoral public awareness programme for the dissemination of sustainable land and water management information and requirements

254. The principle means of creating national public awareness of sustainable land management will be through the awareness and participation program of CACILM. This program operates as a small grants scheme enabling people, communities and other proponents to undertake small or medium sized activities to address land degradation and related environmental issues including in relevant areas; dune stabilisation, wind breaks, bio drainage, livestock water points and activities to even out grazing pressure.

255. Tenders would be let by the CACILM Secretariat for these activities and project budgets would include 10% to fund supervision of these activities by the Secretariat. The activities would need to comply with CACILM guidelines.

256. The activities under this program would be published and feature links with community service groups, schools etc. Funds would be provided for national and international media liaison and local dissemination of the results.

257. Communication about the program would be through a Communication Plan and Information Dissemination Strategy (CPIDS) which will be formulated by the NCC by the end of 2006 to serve national purposes. CPIDS will spell out (i) the mechanisms of communicating Program-related information within the country, and the target audience; (ii) the role and responsibilities of NCC/NS in implementing CPIDS; (iii) selection of information to be placed in the public domain; (iv) mechanisms of communicating Program-related information to regional partners and further; (v) the budget of information-related activities.

258. At the multi-country level, CACILM web site (www.adb.org/projects/CACILM) will be the principal communication tool for CACILM-related development. The website will contain not only administrative matters but serve as a forum for the exchange of ideas on sustainable and improved land and water management practices.

Inventory of Current and Recently Completed Projects and Programs

Project name	Location	Funding	Funding Agency
Combating to Land Degradation in three pilot regions	Three pilot regions: desert, irrigation oasis and mountain regions		GTZ CCD
Management of Water and Soil resources in Irrigated Schemes	2 Pilot irrigation areas		FAO
Estimate of the ecological; impact of Afghan crisis on the water quality of the Amu Darya	Amu Darya		UNDP
Support to Private Agriculture in Dashoguz Region/Gerogly District	Gerogly District of Dashoguz province		GTZ
Pilot Project in the Meat and Milk Sectors	National		TACIS
Support to Farmers' Associations including Rural Credit	National		TACIS
Pilot Project on Improvement of Livestock (cattle and sheep)	National		TACIS
Integrated Support to Agriculture and the Food Industry	National		TACIS
Consolidation of Voluntary Farmers Associations in Turkmenistan	National		TACIS
Joint Research on Sustainable Agriculture Development in Central Asia and Caucuses	Regional		ICARDA/ USDA
"Farmer to Farmer" Program	National		Winrock
Initiatives to develop civil society	National		USAID
Regional Monitoring program	Regional		ADB

Program Logical Framework

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
Impact Land degradation arrested, allowing for improved livelihood	Land Degradation stabilized Standard of Living of communities most affected by Land Degradation is improved	National Reports on land degradation Monitoring and Evaluation systems established under CACILM	Assumptions <ul style="list-style-type: none"> The step by step transition to a market economy proceeds as planned Risks <ul style="list-style-type: none"> Government policies towards land use management revert to command approaches
NPF Outcomes 1. Key Institutional stakeholders collaborating to harmonize economic development with natural resource preservation related to SLM.	SLM recognized as a budget category in relevant ministries NPF recognized by Government as the framework for combating land degradation	Budgeted expenditure for SLM in relevant ministries Collaborative reports on SLM activities	Assumptions <ul style="list-style-type: none"> Institutional stakeholders are prepared to address SLM issues in a collaborative way Risks <ul style="list-style-type: none">
2. Appropriate monitoring and information flow between keys institutional stakeholders and from these to local authorities and communities, effective land use administration.	Relevant integrated reports on natural resource condition are produced for land administrators, land use planners and land users, available and used nationally regionally and locally	Land and water condition reports, land cadastre records, land zoning and land use maps in hands of relevant users	Assumptions <ul style="list-style-type: none"> Institutional stakeholders are prepared to share information with one another and land users Risks <ul style="list-style-type: none">
3. More sustainable and profitable land management in main irrigation areas, undertaken by farmers with long-term use rights.	70% water use efficiency, reduced, drainage flows, salinity damage and improved, profitable cropping patterns in pilot areas being demonstrated to Government and other irrigation; soil and water use is efficiently improved.	Land and water use monitoring reports, local Government and Water user association reports, cropping gross margin analysis reports, soil and water quality reports. Numbers of field days or other promotion or media reports.	Assumptions <ul style="list-style-type: none"> Present commodity companies agree to cropping pattern changes in pilot areas Farmers agree to participate Risks <ul style="list-style-type: none"> Agricultural fund does not provide matching finance
4. Collaborative re-development and management of forestlands.	New forest areas developed and managed in a collaborative way.	Land and vegetation monitoring reports, carbon or other forest product income reports.	Assumptions <ul style="list-style-type: none"> Local Government and communities are interested in collaborating with the 'Green Belt' or other investors in forest and other development and management Risks <ul style="list-style-type: none"> Acceptable income opportunities and income sharing mechanisms can be developed to sustain the activities
5. A more sustainable system of rangeland use recognized and monitored by Government and operated by herder groups or individuals.	Reduced overgrazing, new water point development and pasture and water use funded and managed through agreements between herders and certified by	Rangeland condition reports, Rangeland water use certificates, Local Government cost recovery reports. Herder group agreements.	Assumptions <ul style="list-style-type: none"> Herders are interested in adaptive research activities with scientific institutes. Risks <ul style="list-style-type: none">

	Government		
6a. A developed capacity to investigate and develop plant based and other economic activity to utilize changed water quantity and quality	Selected plants and other productions systems suitable for use by land users	Technical reports, reports of uptake of new technology	Assumptions <ul style="list-style-type: none"> New plant and other production possibilities can be found
6b. A better understanding of the social factors involved in land degradation	Socio economic indicators or livelihood according to land and water condition and industry or other factor related to SLM	Publishes reports, presence in official statistics reports, use by other projects.	Assumptions <ul style="list-style-type: none"> Government agrees to open investigations and reporting in this subject. Risks <ul style="list-style-type: none">
7. National Coordination and Management	A smooth implementation of CACILM leading to effective mainstreaming of SLM into Government and land and water users normal practice	Project reports, Donor evaluation reports, post evaluation and responsive monitoring reports.	Assumptions <ul style="list-style-type: none"> Participant stakeholders find the arrangements responsive to their needs Risks <ul style="list-style-type: none"> Some participants elect to by pass the arrangements
Activities: Program Area and Projects:			Inputs: (\$) (Phases 1 and 2)
1. Capacity Building – Strengthening the Enabling Environment and Integration into Land Use Planning and Management 1) Strengthening of land users for Sustainable Land Management through <u>capacity building</u> at different levels, particularly at local level 2) <u>On-the-ground investment</u> in three selected areas in order to create pilot cases for improved land use practices which later on can be used for extension to other areas 3) <u>Targeted research</u> as support to improving the knowledge basis for SLM -			<ul style="list-style-type: none"> SPA Members Government TBD Other Donors (GEF) \$ 1 mln. Beneficiaries Private sector Others
2. National Monitoring System on SLM - to study the information needs; - to prepare a strategic plan for establishment and implementation of a new system, - to undertake dialogue and negotiation for the proposed system; - to provide equipment; - conducting of different training programs; - providing service to the interested agencies.			<ul style="list-style-type: none"> SPA Members Government \$1,845 Other Donors (GEF) \$2,045 Beneficiaries (in kind) Private sector (possible irrigation equipment co)
3. Integrated Sustainable Management of Irrigated Lands 1. Participatory reclamation of degraded lands located in the seepage area of great water channels and reservoirs of Turkmenistan - to define the area of land and pastures water-logged by filtration lakes and floods as well as areas along big reservoirs; monitoring of zones of reservoirs and channels to identify the areas where leakage, water-logging and salinization occur; - to study and define land pasture degradation process (salinization, water-logging, deflation, flooding and others) as a result of formation of filtration lakes and floods along channels; - to define and research dynamics of water deterioration in filtration lakes and its negative impact to environment and livelihood; - to study dynamics of secondary salinity and salt accumulation in the water-logged areas; - to develop effective methods of land and pastures conservation (biological drainage and others) as well as to build up opportunities to improve productivity of semi-arid agriculture; - to carry out activities on covering of channels beds using local stuff, mud fill, trees planting and others in order to reduce filtration wastes and avoid water-logging; - to plant trees and bushes along the periphery of filtration lakes in order to reduce the			<ul style="list-style-type: none"> SPA Members Government \$1,130 Other Donors (GEF) \$1,510 Beneficiaries (in kind) Private sector (possible irrigation equipment co)

<p>area of water-logging along reservoirs and big channels;</p> <ul style="list-style-type: none"> - to engage, train and consult the local people and technicians on methodology to combat water wasting, prevention and conservation against negative impact resulted by formation of filtration lakes and floods. <p>2. Improvement of the effectiveness of land and water use.</p> <ul style="list-style-type: none"> - Enabling environment for project implementation (management structure, responsibilities of parties, power delegation and etc.); - Development of efficient water- and resource-saving technology on minimizing of pre-sowing tillage aimed to improve fertility of soil; - Development and introduction of technology on fertilizing ameliorants application in cotton and wheat areas enabling high yields of crops and improvement of soil fertility; - Diversification of crops (cotton and wheat complex) in the soil which is subject to salinization; - Development of technology on biotechnical drainage combating to salinization and water-logging of irrigated land; - Development of technology on double-sided regulating of water and salt regime of irrigated lands of Lebap Velayat (province); - Improvement of soil and ameliorative conditions of saline land of Dashoguz Velayat (province) of Turkmenistan; - Capacity building of water and land use by means of establishment of pilot regions introducing a number of required solutions on irrigation water use; 	<ul style="list-style-type: none"> • SPA Members • Government \$3,390 • Other Donors (GEF) \$4,535 • Beneficiaries (in kind) • Private sector (possible irrigation equipment co)
<p>4. Sustainable Forest and Woodland Management</p> <ul style="list-style-type: none"> - monitoring and survey of rangelands and forests on the mountain areas of Baharly and Geok-Tepe districts, - development technology for combating soil water erosion and mudflows, - development of techniques to rehabilitate forests in the mountain area, - to develop methods of improvement of the degraded mountain rangelands, - establishment of nurseries for various trees in the mountain area - to develop technology on restoration of pistachio-trees at the foothills of Central Kopet-Dag - cultivating poplar as timber 	<ul style="list-style-type: none"> • SPA Members • Government \$245 • Other Donors (GEF) \$1,045 • Beneficiaries (in kind) • Private sector (possible Green Belt Co) • Others
<p>5. Sustainable Pastureland Management</p> <ul style="list-style-type: none"> - to carry out a comprehensive pastures inventory with certifications of water sources enabling to get necessary information for sustainable planning development of the cattle breeding, - development of principles and redistributions of pastures territory, - development of methods of rational use and restoration of pastures, - organization of territory with pasture rotation introduction on seasons of year on land users of the whole region, - to develop pilot area based on renewable energy sources (WES), - establishment of pilot area, based on a gathering and accumulation in atmospheric precipitation, - training of agreement between cattle breeders, interested in redistribution, reconstruction, rational using of pastures and new technologies of energy and water supplying. 	<ul style="list-style-type: none"> • SPA Members • Government \$1,370 • Other Donors (GEF) \$3,895 • Beneficiaries (in kind)
<p>6a. Targeted Research into new uses for degraded water resources</p> <ul style="list-style-type: none"> - Technical assistance into productive systems for saline water - Study tours, scholarships, staff exchange - Research equipment 	<ul style="list-style-type: none"> • Government \$720 • Other Donors (GEF) \$1,045 • Beneficiaries (In kind)
<p>6b. Targeted Research into the social aspects of land degradation</p> <ul style="list-style-type: none"> - Technical assistance into social research, - Transport, travel etc 	<ul style="list-style-type: none"> • Government \$95 • Other Donors (GEF) \$120
<p>7. National Program Coordination and Management.</p> <ul style="list-style-type: none"> - Technical assistance into program management, M&E and accounting - Study tours other CACs, CACILM secretariat and donor headquarters 	<ul style="list-style-type: none"> • SPA Members • Government \$50 • Other Donors (GEF) \$380

CACILM – Central Asian Countries Initiative for Land Management

Project Concept Papers for Phase One Funding

NPF Program Area: Capacity Building – Strengthening the Enabling Environment and Integration into Land Use Planning and management

Capacity Building and On-the-Ground Investments for Integrated and Sustainable Land Management

1. Rationale

The environmental problems of Turkmenistan are to a great extent the consequence of the past command-and-control policy and of putting heavy emphasis on intensive exploitation of natural resources without paying attention to environmental implications. The environmental key problem is wide spread deterioration of soil and water resources due to inappropriate agricultural practices.

Degradation of vegetation due to overgrazing and fuel collection, wind and water erosion due to degraded vegetation, and salinization of irrigated lands due to inappropriate agricultural practices threaten more than 70% of the land resources.

Lack of coherence between environmental plans and programmes, insufficient public awareness for the necessity of SLM, weak cooperation between the environmental stakeholders, an incoherent implementation of existing laws and insufficient agricultural extension services limit the active participation of land users in land use planning and management aiming at sustainability of agricultural production.

The project “Capacity Building and On-the-Ground Investments for Integrated and Sustainable Land Management” will concentrate on creating the necessary conditions for an efficient participation of the key stakeholders in improved land management schemes in selected pilot areas.

Impact: The project will create an enabling environment for integration of SLM principles into the sectoral and nation-wide development policies and strategies. At the national level harmonizing the legislation to duly reflect SLM principles in relation to land use planning and management will be addressed by the project.

At the local level, capacity building for participatory land use planning and management in three agro-ecological zones in order to overcome the existing disconnection between the decision-making process and the needs of the land users (farmers) will be the most important component of the project. Particularly the standard of organization of land users in the three pilot regions will be improved so that they can be actively involved in land use planning. This will contribute to increased livelihood standards in the three selected pilot areas through improved management of existing land resources.

Outcome: In terms of sustainable land management (SLM) the expected outcome of the project is an increased number of land users who utilize the results of technical and scientific support for improved land management, and the acceptance and active support of land use plans by local stakeholders including local administration.

In terms of improvement of livelihood of land users in the project area the expected outcome of the project is an increase of the capacity of land users for sustainable land management. Land users will use their improved capacity for active participation in land use planning. Their improved practical and theoretical knowledge concerning management of land resources will lead to a higher and more stable income of farmers and rural population in the project area.

Project Components

- 1) Strengthening of land users for Sustainable Land Management through capacity building at different levels, particularly at local level
- 2) On-the-ground investment in three selected areas in order to create pilot cases for improved land use practices which later on can be used for extension to other areas
- 3) Targeted research as support to improving the knowledge basis for SLM

2. Institutional arrangements

Executing Agency: The UNDP Country Office will be the Executing Agency of the Project and acts in this Project as Implementing Agency of the Global Environment Facility (GEF). The UNDP Country office will provide specific implementation support services to this nationally executed project in line with the Guidelines for Operational Support Services of UNDP and in accordance with the corresponding approved budget.

Project Management Arrangements: UNDP as the project-executing agency will install a Project management unit which will implement the project in very close cooperation with the ongoing GTZ/CCD project and other possible co-financers.

3. Financial Arrangements, cost estimate and Schedule

Total estimated budget of the implementation of Project components and Monitoring and Evaluation will be 2,104,000 USD.

4. Monitoring and Evaluation Framework

The Project would set up the M&E process for CACILM, including and adaptive management process.

NPF Program Area: Monitoring and Information flow system on SLM

Establishment of National Monitoring System of land resources of Turkmenistan for long term planning and sustainable management

1. Rationale

This program area responds to the finding that most stakeholders in SLM are ill equipped in terms of reliable information to make needed planning, management and resource use decisions, that existing information is extrapolated from data gathered up to around the time of the break up of the Soviet Union when the pressures on land and water users was different.

Impact: The system developed is operating to provide with appropriate information and awareness on SLM of the population. The results achieved enable to improve land resources and livelihood; they could also be used for reforms and marketing of land.

Outcome: the project to establish the National Monitoring System of land resources for an appropriate monitoring and information flow between keys institutional stakeholders and for local authorities and communities, effective land use administration.

2. Project components

A component to study the information needs;
 a component to prepare a strategic plan for establishment and implementation of a new system,
 A component to undertake dialogue and negotiation for the proposed system;
 A component to provide equipment;
 A component focused on the training programs;
 A component on providing service.

3. Institutional Arrangements

Executing Agency: The Ministry of Nature Protection, Ministry of Agriculture, Ministry of Water Economy, Ministry of Economy and Finances, Hydrometeorology, Statistics Institute, Livestock Association, Mapping Institute, SIC ICSD

Project Management Arrangements: The Ministries operating through the Consultation Council and with the assistance of national and International technical assistance.

4. Financial Arrangements, cost estimate and Schedule

The project would be financed by an International Grant with in kind input by Government. The grant component would total \$2, 045,000. The Government Contribution in-kind would be \$1,845,000

5. Monitoring and Evaluation Framework

The implementation will be reviewed through regular project reviews of the donor

NPF Program: Integrated sustainable management of Irrigated Land

1. Rationale

This program area responds to the finding that land degradation, particularly secondary salinity in the main irrigation areas is apparently increasing while crop yields and water use efficiency is declining. If these trends continue the nation will not be able to meet its production objectives on which its economic development plans are based. The trends are occurring against a background where land users and other stakeholders have to find new ways to manage land in smaller plots for a market economy but with water systems established for large units and a high level of technical and other inputs. The analysis of the root causes of the problem and experience on other projects indicates that there are a great number of interlinking problems facing farmers seeking profitable SLM, from the enabling environment that can only change on a step by step basis, to many technical issues and difficulties obtaining markets for more appropriate crop choices and that little consensus exists on the best path forward.

Participatory reclamation of degraded lands located in the seepage area of great water channels and reservoirs of Turkmenistan

1. Brief introduction

Building and using of the large-scale channels and reservoirs has led to creation of filtration lakes and floods along watercourses and reservoirs. Due to infiltration water through riverbeds and dams great land areas for agricultural use or other important purposes are flood and waterlogged. So, such degradation process as deflation, salinization and waterlogging of land, changes in condition of rangelands, other changes of local, climate, environment, sanitary types occur. Formation of lakes and floods is caused by anthropogenic activity of constructing companies, organizations which use and serve channels and reservoirs, local agricultural organizations, local communities (herders, farmers and other people). These changes affects economic and social life of people living in oasis and areas closed to the desert involved on farming and livestock-breeding as well as people living in desert areas for which main activity and source of revenue are cattle-breeding and semi-dry farming.

Impact: Reduced secondary salinity, water losses and water logging in main irrigation areas, improved yields and income for land users and local communities.

Outcome: A demonstration of more sustainable land and water management in main irrigation areas by land and water users with long-term rights to land and water, suitable for policy makers and other main irrigation area users.

2. Project components

A component to define the area of land and pastures water-logged by filtration lakes and floods as well as areas along big reservoirs; monitoring of zones of reservoirs and channels to identify the areas where leakage, water-logging and salinization occur;

A component to study and define land pasture degradation process (salinization, water-logging, deflation, flooding and others) as a result of formation of filtration lakes and floods along channels;

A component to define and research dynamics of water deterioration in filtration lakes and its negative impact to environment and livelihood;

A component to study dynamics of secondary salinity and salt accumulation in the waterlogged areas;

A component to develop effective methods of land and pastures conservation (biological drainage and others) as well as to build up opportunities to improve productivity of semi-arid agriculture;

A component to carry out activities on covering of channels beds using local stuff, mud fill, trees planting and others in order to reduce filtration wastes and avoid water-logging;

A component to plant trees and bushes along the periphery of filtration lakes in order to reduce the area of waterlogging along reservoirs and big channels;

A component to engage, train and consult the local people and technicians on methodology to combat water wasting, prevention and conservation against negative impact resulted by formation of filtration lakes and floods.

3 Institutional Arrangements

Executing Agency: Scientific Design Institute of Water Resources, GTZ/CCD, Ministry of Agriculture, Ministry of Nature Protection, Livestock Association, JSC «Gek Gushak-Green Belt», Turkmen Agricultural University

Project Management Arrangements: The partners coordinated and facilitated by the CACILM Coordination Council with the assistance of national and International technical assistance.

4. Financial Arrangements, cost estimate and Schedule

The project would be financed by an International Grant with in kind input by Government. The grant component would total \$1,510,000. The Government Contribution in-kind and cash contribution would be \$ 1,130,000. There would also be in kind contribution of beneficiaries and the private sector un-quantified.

5. Monitoring and Evaluation Framework

The implementation will be reviewed through regular project reviews of the donors

Project 2. Improvement of the effectiveness of land and water use.

1. Brief description

Common to all Central Asia countries intensive developing of new lands in Turkmenistan during last 10-15 years disadvantages in irrigation and long cotton monoculture have resulted lack of water resources, deterioration of water in undercurrent of Amu-Darya river and worsening of environment in the area of Aral Sea and its drying. all the mentioned above has a negative impact on fertility of irrigated land and crop productivity.

At the same time population growth in the region requires permanent increasing agricultural production, which is possible strengthening irrigated agriculture and improvement of efficiency of use of limited water resources.

Impact: Soil fertility of irrigated land is preserved and improved, water and land resources are used efficiently

Outcome: Agricultural capacity building, improvement of ameliorative conditions of land, efficient use of water and land resources.

2. Project components

A component on enabling environment for project implementation (management structure, responsibilities of parties, power delegation and etc.);

A component on development of efficient water- and resource-saving technology on minimizing of pre-sowing tillage aimed to improve fertility of soil;

A component on development and introduction of technology on fertilizing ameliorants application in cotton and wheat areas enabling high yields of crops and improvement of soil fertility;

A component on diversification of crops (cotton and wheat complex) in the soil which is subject to salinization;

A component on development of technology on biotechnical drainage combating to salinization and water-logging of irrigated land;

A component on development of technology on double-sided regulating of water and salt regime of irrigated lands of Lebap Velayat (province);

A component on improvement of soil and ameliorative conditions of saline land of Dashoguz Velayat (province) of Turkmenistan;

A component on capacity building of water and land use by means of establishment of pilot regions introducing a number of required solutions on irrigation water use;

3. Institutional Arrangements

Executing Agency: Scientific Design Institute of Water Resources, GTZ/CCD, Ministry of Agriculture, Ministry of Nature Protection, Turkmen Agricultural University, JSC «Gek Gushak-Green Belt»

Project Management Arrangements: The partners coordinated and facilitated by the CACILM Coordination Council with the assistance of national and International technical assistance.

4. Financial Arrangements, cost estimate and Schedule

The project would be financed by an International Grant with in kind input by Government. The grant component would total \$4,535,000. The Government Contribution in-kind and cash contribution would be \$ 3,390,000. There would also be in kind contribution of beneficiaries and the private sector un-quantified.

5. Monitoring and Evaluation Framework

The implementation will be reviewed through regular project reviews of the donors

NPF Program Area: Sustainable Forest and Woodland Management

Project: Community based restoration of Central Kopet-Dag

1. Rationale

This project responds to the finding that deforestation has been a long-term problem that has not found a solution yet although Government action to supply gas to towns and cities is reducing further pressure. Government is also supporting commercial efforts to establish green belts around some cities as a matter of policy. Experience with other projects, notably GTZ, indicates some community interest in this area. Attention to combating degradation in forests and reserves is important as these areas provide important environmental services, including smooth delivery of water from runoff, bio diversity and reduced erosion from slopes. They also provide good products such as timber.

Impact: water erosion of the degraded land is arrested, soil moisture in the mountain area is increased, bioproductivity of the forest and range lands is improved, environment for sustainable development and management of the forests and range lands is created based on introducing of the new technology and legislation on restoration and efficient use of the forests and rangelands aimed to improve livelihood.

Outcome: community based system is developed to be the basis for restoration, conservation and sustainable development of the rangeland vegetation and forests in the mountain area involving local authorities at different levels.

2. Project components

A component on monitoring and survey of rangelands and forests on the mountain areas of Baharly and Geok-Tepe districts,

A component on development technology for combating soil water erosion and mudflows,

A component on development of techniques to rehabilitate forests in the mountain area,

A component to develop methods of improvement of the degraded mountain rangelands

A component on establishment of nurseries for various trees in the mountain area

A component to develop technology on restoration of pistachio-trees at the foothills of Central Kopet-Dag

A component on cultivating poplar as timber

3. Institutional Arrangements

Executing Agency: Forest Inspection, Kopet-Dag Reserve, JSC «Gek Gushak-Green Belt»

Project Management Arrangements: The Inspection for Forests and partners possibly including the “Green Belt” company. Coordinated and facilitated by the NPF CACILM Secretariat with the assistance of national and international technical assistance.

4. Financial Arrangements, cost estimate and Schedule

The project would be financed by an International Grant with in kind input by Government. The grant component would total \$1,045,000 over 1+ years. The Government Contribution in-kind and cash contribution would be \$ 245 000. There would also be in kind contribution of beneficiaries and the private sector un-quantified. Possible donor partners includes GTZ and UNDP.

5. Monitoring and Evaluation Framework

The implementation will be reviewed through regular project reviews of the donors

NPF program: Sustainable Pasture Land Management

Project: Development of model for restoration and sustainable development of rangelands by the example of Rukhabat Etrap

1. Rationale

This program area responds to the finding that pasture utilization is now mostly unregulated and with rapidly increasing numbers is causing increasing degradation around settlements and that the destruction of water points is inhibiting a more rational use of pasture lands. Combating rangeland degradation of potential break points from anthropological causes where fuel wood cutting, road damage and over grazing is occurring, is a strategically important investment because of the very wide areas that might be impacted if the break out points are not addressed.

Impact: Land degradation is arrested, fodder capacity of rangelands is increased, water is supplied, establishment of sustainable rangeland management, legal base on rangeland utilization is developed and livelihood, therefore, is improved.

Outcome: Sustainable rangeland management will be set up: integrated research and re-distribution of pasture will be conducted, technologies on improvement and rehabilitation of rangelands using pasture rotation are applied, water resources are identified, equal water supply for rangelands is used. As a result the level of livelihood is improved.

2. Project components

A component to realization of comprehensive pastures inventory with certifications of water sources enabling to get necessary information for sustainable planning development of the cattle breeding,

A component on development of principles and redistributions of pastures territory,

A component on development of methods of rational use and restoration of pastures,

A component on organization of territory with pasture rotation introduction on seasons of year on land users of the whole region,

a component to develop pilot area based on renewable energy sources (WES),

a component on establishment of pilot area, based on a gathering and accumulation in atmospheric precipitation,

a component on training of agreement between cattle breeders, interested in redistribution, reconstruction, rational using of pastures and new technologies of energy and water supplying.

3. Institutional Arrangements

Executing Agency: Ministry of Agriculture, Ministry of Nature Protection, GTZ/CCD, UNDP, Ministry of Transportation, Association «Tebigy Kuwwat», JSC «Gek Gushak-Green Belt», Hydrometeorology, Livestock Association

Project Management Arrangements: The Ministry of Agriculture and partners possibly including a NGO coordinated and facilitated by the CACILM NCC and Secretariat with the assistance of national and international technical assistance.

4. Financial Arrangements, cost estimate and Schedule

The project (both phases) would be financed by an International Grant with in kind input by Government. The grant component would total \$ 3,895,000 over 1+ years. The Government Contribution in-kind and cash contribution would be \$1,370,000. There would also be in kind contribution of beneficiaries and the private sector un-quantified. Possible donor partners includes GTZ.

5. Monitoring and Evaluation Framework

The implementation will be reviewed through regular project reviews of the donors

NPF Program Area: Targeted research

This program area responds to the finding that some research capacity needs to be restored to address problems directly related to the declining resource base, particularly involving water, pastures and social and institutional issues. As noted above applied research enters into several other program areas, notably sustainable pasture management and forestry. The two

projects areas below require a particular focus and will only be connected to other program areas in a peripheral way.

Project 1: Use of saline water in agriculture

1. Rationale

This sub project responds to the finding that the nation requires a capacity to respond to ongoing and potential changes in water quality and quantity. The changes to be planned for include:

- Changes in fresh water availability due to international agreements;
- Changes in drainage flows from neighboring countries and in the main stream of the Amu Daya;
- The water available at different points along the Turkmen lake collector; and
- Climate change.

These changes may not all occur but the potential risk to the economy is such that the precautionary principle needs to be applied. The alternative of relying on scientific advances internationally to provide new techniques to solve land and water degradation issues in Turkmenistan is considered insufficient due the need for innovation geared to the specific circumstances of the country. Reliance on international research would also result in the loss of the leading edge research capacity of the NIDFF, which had an international clientele, particularly from neighboring Central Asian Countries. However activities under this program area would actively seek collaboration with relevant international research centers, such as ICARDA and the International Center for Bio-saline Agriculture (ICBA)

Impact: Sustainable and profitable uses of now degrading resources.

Outcome: A developed capacity to investigate and develop plant based and other economic activity to utilize changed water quantity and quality.”

2. Project components

Components by specialist Scientific Institutes to investigate agronomic, aquaculture and other research activities for valuable water uses at increasing levels of salinity and other contaminants.

Components to test findings in the pilot areas particularly along the Turkmen drainage Canal.

A component to publish and promote findings to policy makers, land and water users and other regions having declining water quality and quantity

3. Institutional Arrangements

Executing Agency: National Institute of Deserts, Flora and Fauna, Scientific Design Institute of Water Resources, Research Institute of Agriculture

Project Management Arrangements: Partners coordinated and facilitated by the NPF CACILM Secretariat with the assistance of national and international technical assistance. However activities under this program area would actively seek collaboration with relevant international

research centers, such as ICARDA and the International Center for Bio-saline Agriculture (ICBA)

4. Financial Arrangements, cost estimate and Schedule

The project would be financed by an International Grant with in kind input by Government. The grant component would total \$1,045,000. The Government Contribution in-kind and cash contribution would be \$ 720 000. There would also be in kind contribution of beneficiaries. Possible donor partners include ICARDA.

5. Monitoring and Evaluation Framework

The implementation will be reviewed through regular project reviews of the donors

Project 2: Identification of population groups subject to negative impact of land degradation

1. Rationale

This project responds to the finding that there is insufficient understanding of the social aspects of land degradation and a capacity to investigate this is required to better inform policy and development planning.

Impact: SLM addressing the population most affected by land degradation

Outcome: A better understanding of the social factors involved in land degradation.”

2. Project components

There would be only one component, a survey and reporting component.

3. Institutional Arrangements

Executing Agency: The Institute of Statistics, Ministry of Agriculture

Project Management Arrangements: The Institute of Statistics and Ministry of Agriculture coordinated and facilitated by the CACILM NCC and Secretariat with the assistance of national and international technical assistance.

4. Financial Arrangements, cost estimate and Schedule

The project would be financed by an International Grant with in kind input by Government. The grant component would total \$380,000. The Government Contribution in-kind and cash contribution would be \$95,000.

5. Monitoring and Evaluation Framework

The implementation will be reviewed through regular project reviews of the donors