

## APPENDIX 3

### SOCIO-ECONOMIC ANALYSES FOR FOUR FOCUS AREAS IN THE PRC<sup>1</sup>

#### 1. Socio-economic Baseline for Four Focus Areas for Demonstration Projects

The four focus areas lie along a line that stretches from east to west within Inner Mongolia Autonomous Region. The total area is 812,600 km<sup>2</sup> with a population of 5,133,600 which accounts for 21.6% of Inner Mongolia's total (Table A3.1). These areas belong to typical agro-pastoral transitional zones. Agricultural production is operating under difficulty and drought-prone climatic conditions, which can easily result in severe land degradation.

**Table A3.1 Basic Data of the Four Focus Areas in the PRC, 2002**

Items	Hulunbir	Xilingol	Ordos	Alashan	Sub-total	(%)
Total Population (10000 persons)	267.65	93.31	134.42	17.98	513.36	21.6
Total Area (10000 km <sup>2</sup> )	25.30	20.26	8.68	27.04	81.26	69.0

Note: % refers to proportion to total province.

Source: Inner Mongolia Yearbook, 2003

Inner Mongolia Autonomous Region as a whole is one of most under-developed western region in the PRC. The four selected demonstration areas all have depressed economy aside from Ordos that possesses several strong enterprise groups. Inner Mongolia ranks low in economic status. Although the counties/banners of four sites account for 69% of whole autonomous region, they just yield 29% GDP of Inner Mongolia Autonomous Region of 2002. Primary industry still contributes a high proportion of the GDP compared the to average for the PRC. as whole. For instance, the primary industry of Hulunbir account for 24% of the GDP of 2002, Xilingol account for 28%, comparing to 15% for the PRC. Detailed information is presented in Table A3.2. This indicates that agricultural productivity of four focus areas is very low and agricultural production is based on extensive cultivation of marginal cropland. Therefore land abuses and land degradation are unavoidable.

**Table A3.2 GDP Indicators for Three Sectors within the Project Areas, 2002**

Monetary Unit: RMB 100 million

	GDP	Primary Industry		Secondary Industry		Tertiary Industry	
		Value	%	Value	%	Value	%
Hulunbir	190.3	45.11	23.7	54.79	28.8	90.45	47.5
Xilingol	81.91	23.15	28.3	32.48	39.7	26.27	32.1
Ordos	204.77	28.11	13.7	119.34	58.3	57.31	28.0
Alashan	29.56	4.19	14.2	13.36	45.2	12.02	40.7
China	104,790.60	16,117.30	15.4	53,540.70	51.1	35,132.60	33.5

Source: Inner Mongolia Yearbook, 2003 Note: % refers to proportion to GDP

<sup>1</sup> Prepared by Dr He Kaili

Farming and animal husbandry contributes most to the agricultural economy. For instance, the farming proportion of Hulunbir reached 63.4% in 2002 and animal husbandry proportion of Xilingol reached 66.3%, over half of total commercial value of agriculture (Table A3.3). Therefore, large areas of cultivated land and large herds of livestock were needed to support this high proportion value of farming and animal husbandry.

**Table A3.3 Commercial Value of Agriculture (by sector), 2002**

Monetary Unit: RMB 10000

	Total	Farming		Forestry		Animal husbandry		Fishery	
	Value	Value	%	Value	%	Value	%	Value	%
Hulunbir	812,392.9	514,672.0	63.4	36,046.9	4.4	244,877.8	30.1	16,796.2	2.1
Xilingol	339,740.2	104,983.1	30.9	8,851.8	2.6	225,405.3	66.3	500.0	0.1
Ordos	432,581.6	207,527.7	48.0	29,679.3	6.9	191,246.9	44.2	4,127.7	1.0
Alashan	65,161.9	33,443.0	51.3	3,834.5	5.9	27,350.8	42.0	533.6	0.8

Source: Inner Mongolia Yearbook, 2003

The statistical data also show that the cultivated land area and animal heads increased greatly over the past 20 years. For example, there are 647,600 ha of cultivated land in Hulunbir of 1990, but in 2002 it was 1,220,800 ha (1.87 times greater than in 1990). In Xilingol, animal number is just 4,498.400 heads in 1978, but there were 9,598,000 heads in 2002 and three sectors (2.13 times higher than in 1978), meanwhile, the number of sheep and goats increased nearly 300% since 1978. The continuous increase of cultivated land and number of animals no doubt contributed to overgrazing and land degradation. Over the past ten years, although net income of farmers and herdsmen in the four focus areas has enhanced greatly, most of them still live a hard life. Average net income of these people is just close to or lower than the level of whole country (Table A3.4). For instance, although the average annual growth rate of the net income of Xilingol reached 6%, net income per capita was only 1,940 yuan in 2002, a lot lower than 2,476 yuan/capita for the whole country. The poverty population can be found mostly in this area. In 2002, there were 74,348 people, or 8% of the total population, who live under the state-defined absolute poverty line of RMB 625 in Xilingol. In addition to the absolute poor, approximately 292,894 people classified as low-income population accounts for 31% of the total population of Xilingol (Table A3.5).

**Table A3.4: Net Income Profile in Four Focus Areas**

Monetary Unit: Yuan

	1990	1995	1999	2001	2002	%
Hulunbir	715.00	1468.00	2037.00	1934.53	2278.04	9
Xilingol	861.00	1536.00	2383.00	1867.68	1940.32	6
Ordos	600.00	1251.00	2371.00	2257.59	2469.92	11
Alashan	921.00	1504.00	2284.00	2514.05	2664.00	9
PRC	686.31	1577.74	2210.34	2366.40	2475.63	10

Source: Inner Mongolia yearbook, 2003; China Yearbook, 2003

Note: Net income refers to that of farmers and herdsmen

Note: % refers to average annual growth rate of net income from 1990-2002

**Table A3.5: Poverty Profile of Four Focus Areas , 2002**

	Poverty population under state-defined poverty standards (in 10,000 persons)		
	Absolute poor with average net income < 625 yuan	Low-income with average net income = 625-865 yuan	Total population with average net income < 865 yuan
Xilingol	7.4348	10.9273	18.3621

Above all, the project area is the source region locating at the under-developed western part of the PRC. Rural people live under difficult natural conditions that make them vulnerable to recurring drought. The depressed economy makes it difficult for local government to find a lot of money to solve the eco-environment problem. However, local authorities have already been aware of the importance of environment and economy sustainable development, and try their best to eradicate the harmful impacts brought by desertification. The key question is how to adopt a coordinated, integrated and balanced approach to realize socio-economy sustainable development.

## 2. Socio-economic Analyses About the Causes of DSS Occurrence

Generally speaking, there are two factors about the causes of DSS occurrence: one is change of nature (natural causes), the other is human activities (socio-economic causes). These two factors interweave and make the frequency and intensity of DSS become more much and strong. The later is the direct cause of DSS occurrence in recent years. Our selected focus areas show the same reasons for their present status as DSS source areas.

### 2.1 Demography Factors

Local people are not only the custodians of resources but also the destroyers. Rapid growth of population in project areas has been exerting enormous pressure on the carrying capacity of grassland and leading to the grassland degradation. Table A3.6, shows that the number of people in four focus areas has quadrupled since the age of 1950s. Annual average growth rate reached 4%, compared to 2% for the PRC as a whole.

With the rapid growth of population over the past 20 years, the demand for cultivated land increases continuously (Table A3. 7). For instance, from 1950-2002, the arable land area of Hulunbir has increased from 1,472,000 hectares to 12,080,000 ha (a 7-fold increase). This increase was achieved by converting grassland mostly, at the expense of the ecological environment. Instead, the arable land of per capita declined a little with the great volume of population. It is said that 70% of the expansion of the area of cultivated land in the western part of the PRC in the period 1995-2000 came through reclamation of grassland. Furthermore, most of the reclaimed area was abandoned after 2-3 years, and eventually become degraded land<sup>2</sup>. Grassland conversion and denudation went hand in hand.

<sup>2</sup> There were several episodes of major land reclamation, notably during the Great Leap Forward and in the 1970s

**Table A3.6 Population Profile for Four Focus areas**

Unit: 10000 persons

	Hulunbir		Xilingol		Ordos		Alashan	
	Total	Rural residents	Total	Rural residents	Total	Rural residents	Total	Rural residents
1950	30.86	17.80	21.58	17.88	42.77	41.94	--	--
1960	119.95	48.32	50.34	31.93	66.11	61.20	--	--
1970	135.49	56.05	59.14	45.05	84.16	77.75	--	--
1980	225.48	103.75	76.40	51.83	103.46	91.07	13.97	7.55
1990	257.54	110.24	88.91	57.98	120.4	98.40	16.05	7.24
1997	271.87	111.06	91.98	58.18	126.58	94.52	17.05	7.08
2002	267.65	100.59	93.31		134.42		17.98	
Growth-rate (%)	4	3	3	2	2	2	--	--

Source: Inner Mongolia Yearbook, 2003 Note: rural residents include farmers and herdsman

**Table A3.7 Cultivated Land Profile for Four Focus areas**

Unit: 10000 hectares, mu/person

	Hulunbir		Xilingol		Ordos		Alashan	
	Arable land <sup>1</sup>	Per capita <sup>2</sup>	Arable land	Per capita	Arable land	Per capita	Arable land	Per capita
1950	14.72	7.15	16.30	11.33	64.67	22.68		
1960	30.21	3.78	30.71	9.15	66.83	15.16		
1970	30.61	3.39	21.67	5.50	45.95	8.19		
1980	60.57	4.03	25.41	4.99	24.40	3.54	1.05	1.13
1990	64.76	3.77	19.74	3.33	22.64	2.82	1.12	1.05
1997	133.10	7.34	30.60	4.99	37.10	4.40	1.60	1.41
2002	120.8	6.77	20.00	3.22	41.50	4.63	2.33	1.94

Notes: 1 = Arable land x 10,000 ha 2 = Mu per capita

Source: Inner Mongolia Yearbook, 1991,1998,2003; Prosperity of Inner Mongolia (1947-1999)

At the same time, population growth promotes the increase of livestock (Table 2.8). Rapid growth of livestock contributes to the grassland desertification. For example, in Xilingol, the largest grassland of the PRC the degraded grassland area increased from 1.44 billion Mu in 1985 to 1.92 billion Mu by 1999 with the sheep and goats increasing from 5,073,700 to 10,527,000. In Hulunbir, the degraded grassland area increased from 5,577,000 ha in 1994 to 8,763,000 ha in 1999 with sheep and goats increasing from 1,962,671 to 2,781,488, (6% annual average growth rate. In the early stages of national establishment the ratio of livestock to land was 11.1 ha/sheep but by 1980 this had narrowed to only 2.7 hectares (25% of 11.1/ha). In other words, the stocking rate per ha of grassland increased from 0.09 head/hectare to 0.37 head/hectare in this period (a 3-fold increase).

**Table A3.8 Sheep and Goats Profile for Xilingol and Hulunbuir**

Unit: Heads

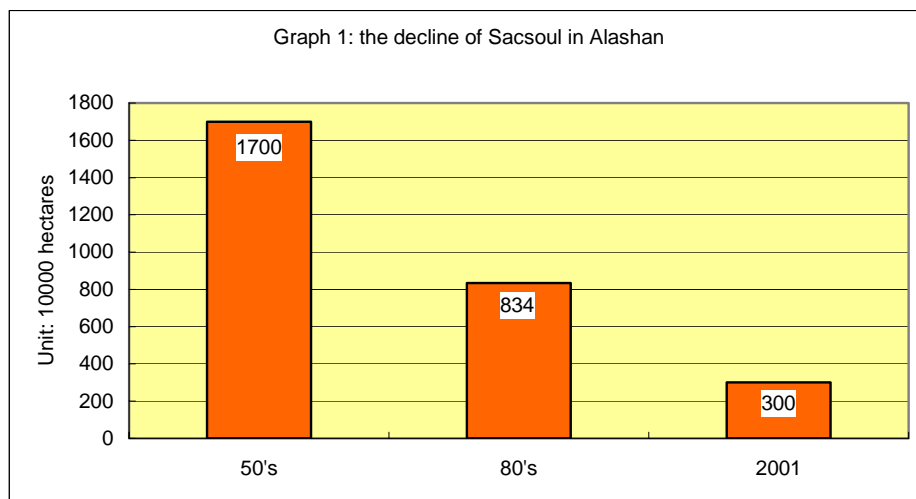
	1978	1985	1990	1994	1999	2002	%
Xilingol	3476100	5073700	6816800	7542000	10527000	8994000	5
Hulunbuir			1570197	1962671	2781488	3873400	6

Note: % refers to average growth rate from 1985 to 1999 for Xilingol and from 1994 to 1999 for Hulunbuir.

Source: Inner Mongolia yearbook, 2003

## 2.2 Livelihood Factors

Farmers and herdsman live in the economically backward area where transportation and other infrastructure is poorly developed. It is difficult for them to connect with outsiders for trade and commerce. Goods they need couldn't reach there because of high cost or bad roads. The fuel for daily life is the commodity in shortest supply. To cook their food, they cannot help but cut shrubs growing over the sandland. This has serious implications for sand fixation. Sacsoul (*Haloxylon* spp) is one of the most wonderful shrubs protecting sandland in Alashan. But by 2001 just 3,000,000 ha in 2001, less than 18% of the 17,000,000 ha of in the 1950s last century (graph 1). It is said each rural household consumes 10,000 kg of firewood each year (equal to fifty Mu of 40 year-old Sacsoul).



In addition, local people also cut wild forest on the Helan Mountain for fuel. Two-third of tree cover was destroyed and soil erosion was a big problem. The Alashan deserts are expanding to the southeast at a rate of 1000 km<sup>2</sup> every year. One-fourth of herdsman have become ecological refugees.

### 2.3 Household Structure Factors

There is economic development and conditions are changing. But it will not be sustainable unless the two factors (environment and economy) change at nearly the same pace. Considering the four focus areas, it could be concluded that attention to the environmental factors has lagged behind. (Table A3.9).

Taking Xilingol as example, the structure of GDP has changed between 1978 to 2002 with the contribution of primary industry declining but the structure for demography changed little from 1978 to 2002. This indicates that large numbers of surplus agricultural labors have been remained in rural areas. There being no adequate off-farm employment opportunities they could just live on farming and animal husbandry and develop extensive production through over-cropping and overgrazing. This is the evidence seen from the severe desertification and land degradation.

**Table A3.9 Structure for Demography and GDP**

Unit: %

	Structure for GDP			Structure for Demography		
	Primary	Secondary	Tertiary	Primary	Secondary	Tertiary
<b>Hulunbir</b>						
1978						
2002	23.7	28.8	47.5	43.7	23.5	32.7
<b>Xilingol</b>						
1978						
2002	28.3	39.7	32.1	15.8	19.9	64.3
<b>Ordos</b>						
1978						
2002	13.7	58.3	28.0	61.0	15.5	23.5
<b>Alashan</b>						
1978						
2002	14.2	45.2	40.7	42.7	20.4	36.9

Source: Inner Mongolia yearbook, 2003

All in all, the demography element is at the center of the DSS problem. How to deal with the great number of surplus farmers and herdsman is the key element for our DSS protection and control.

### 3. Polices and Institutions Adopted by State and Local Authorities and their Impacts on Local Economy

Protection and control of DSS occurrence is not only a technological point, but is also concerned with administrative and policy decisions made by state and local authorities. In the four focus areas, agricultural and animal husbandry policies often conflict or negate one another or are too narrowly-focused. This is a root cause of land degradation and desertification, which leads in turn to the enormous damage cost of DSS.

### 3.1 Food Self-sufficiency Policies Result in Over-cropping

Taking Xilingol league as an example, over the past fifty years, there were four times great reclamations in this area under the national policy of “ Food self-sufficiency”. The first of these started in the 1950s at the early stage of establishment of the PRC. At this time, a big immigration occurred in this area. For the sake of livelihood, local governments encouraged land reclamations and subsidized the cultivators, bringing about enormous growth in the area of cultivated land. Cultivated land had increased 640 thousand Mu within one year of 1952 in Xilingol league, an increase of 124% over the previous year. The second was in the period of 1958-1961 (“the Great Leap Forward”). To achieve high agricultural production, large areas of grassland was converted into cropland. The cultivated land increased 2,160,000 Mu in 1960, ( a 157% increase over the previous year. The third time occurred in 1966-1976 (period of “Cultural Revolution”). Under the direction of the government herdsmen must eat food produced by themselves, so an additional 800,000 Mu of grassland changed into cultivated land at this time. After the reforming and opening to the world of the PRC, the fourth period of large-scale reclamation occurred in this area. Large areas of grassland became industrial land to support the growing need for economic development..

This policy of food self-sufficiency gave birth to serious land abuse in the agro-pastoral belt of northern PRC. This policy resulted in large areas of grassland degradation with a shortage of grassland custodians in this agro-pastoral area. For instance, analysis of satellite imagery shows that 2,350,000 Mu, out of a total of 4,470,000 Mu cultivated land in Xilingol of 1999 (satellite picture) had become desertified.

### 3.2 “Animal Heads” Policy Leading to Overgrazing

Animal husbandry policies based simply on “animal heads” have led to overgrazing. Taking the number of animals as the only statistical attribute and planning indicator is an easy guideline for local government. Furthermore, the achievement of local officials was always mainly judged by their success in increasing of “animal heads”, and not judged by net income of herdsmen or ecological status of the grassland. Although 《Grassland Law, 1998 revised 2002》 stipulates that the number of animal must be determined by production capacity of grassland, the fact that the livestock husbandry tax was based on the number of animal weakened the power of law. Rarely did local officials ban grazing or seek to curb the growth in herd size. Therefore, the local government just only concentrates their minds and energy on the animal husbandry tax and did not take carrying capacity of grassland into account. So the number of animals has exceeded carrying capacity of grassland for a long time.

### 3.3 Incomplete Property Right Reforms Bringing about ‘Tragedy of the Commons’

After reforming and opening to outside world, the pasturing area was also reformed. The institution of property rights to grassland and livestock was enshrined in law. Grassland and livestock both were contracted to herdsmen on the basis of household structure. This was

called “double contracts of livestock and grassland” which is propitious to mobilizing enthusiasm of herdsman to managing grassland and enhancing its production efficiency. But the actual fact is that livestock has been contracted with herdsman in the middle of 80’s and grassland had not been contracted with herdsman until 1997~1999. The formalization of grassland contract lagging behind livestock led to enormous increases of animal number within ten years from 1989-1999. Being short of owner of grassland, there is no somebody to administer it, and became an example of the “Tragedy of the commons”. This failure to formalize property right reforms resulted in pillaging of grassland.

### **3.4 Absence of a Mechanism for the Supervision and Management of Grassland**

Grassland station under the control of the Bureau of Animal Husbandry is the sole agency managing grasslands. Due to the small outlay for grassland construction and administration and the policy referring to “animal heads”, the station paid little attention to grassland management and supervision. Furthermore the Grassland Law is difficult to implement, so the power of grassland station is weakened.

What is more, some herdsman with large area of grassland and quite a few livestock rent more grassland after contracts are in place. Lessor and leaseholder both ignore the grassland condition. Overgrazing is unavoidable and contracting policies haven’t achieved a lot.

### **3.5 Overlapping and Fragmented Institutional Mandates**

Government agencies such as agriculture, forestry and animal husbandry each functions in a different area. The Agricultural agency plays an important role in husbandry and grassland and the forestry agency mainly is responsible afforestation and desertification control. The dividing of government function endows each agency with a different set of powers. They function within their mandate without any communication and coordination with others. This means that policies often bring about the fragmentation of institutional mandates. For example, in the recent backbone project of returning farmland to forest and grassland (Green for Grain), the forestry agency is responsible for the use of the money, the quota of returning area and the standard of subsidy quite independent of the other government agencies. The forestry agency does not manage the grassland so Grassland management was neglected in this backbone project. There are many examples like this that undermine the national effort to prevent and control DSS.

To sum up, institutional factors are often the root causes of DSS occurrence. Many institutional and policy barriers that have been found to exist in the agro-pastoral zone that have contributed to land degradation and desertification. For the sake of long-term sustainable development, it will be indispensable to take the policy-making into consideration.