

Assigned by Ministry of Agriculture, Forestry and Fisheries

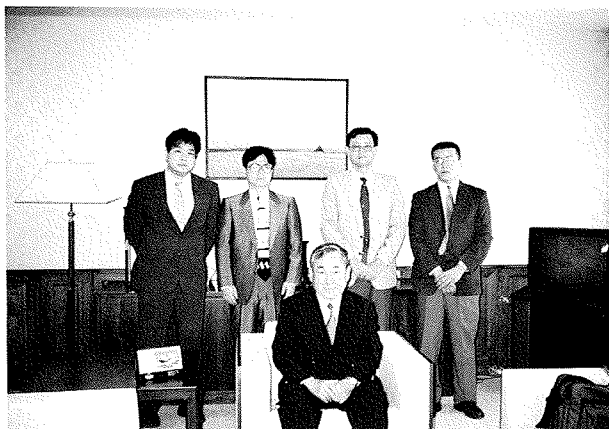
**Report on the Basic Survey on Agricultural
and Rural Development by
Progress Stage in Asian Countries**

—MONGOLIA—

**Focus on
Tov and Selenge Aimag**

MARCH 2000

**The Asian Population and Development
Association**



Center Shinji Kubota, Ambassador
 Rear, from right
 Seishi Yamazaki Survey Member
 Akihiko Ohno Survey Member
 Seiichi Fukui Survey Team Leader
 Osamu Kusumoto Survey Member



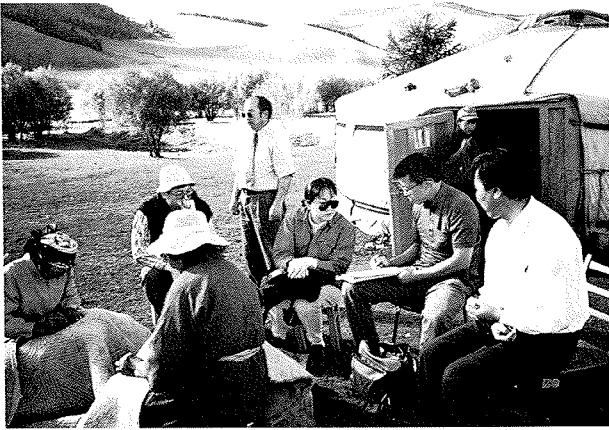
Center Kenji Matsumoto
 Resident Representative,
 Japan International Cooperation Agency
 (JICA)
 Left Hiroshi Komiyama Expert, JICA



Second from left Stev Bayambaa, State Secretary,
 Ministry of Agriculture and Industry



Left Yadam Balgansuren, Director General,
 Policy Coordination
 Division, Ministry of Agriculture and Industry



Hearing survey at a suburb of Ulaanbaatar



Large-scale wheat production farm at Selenge Aimag
(strip pattern)

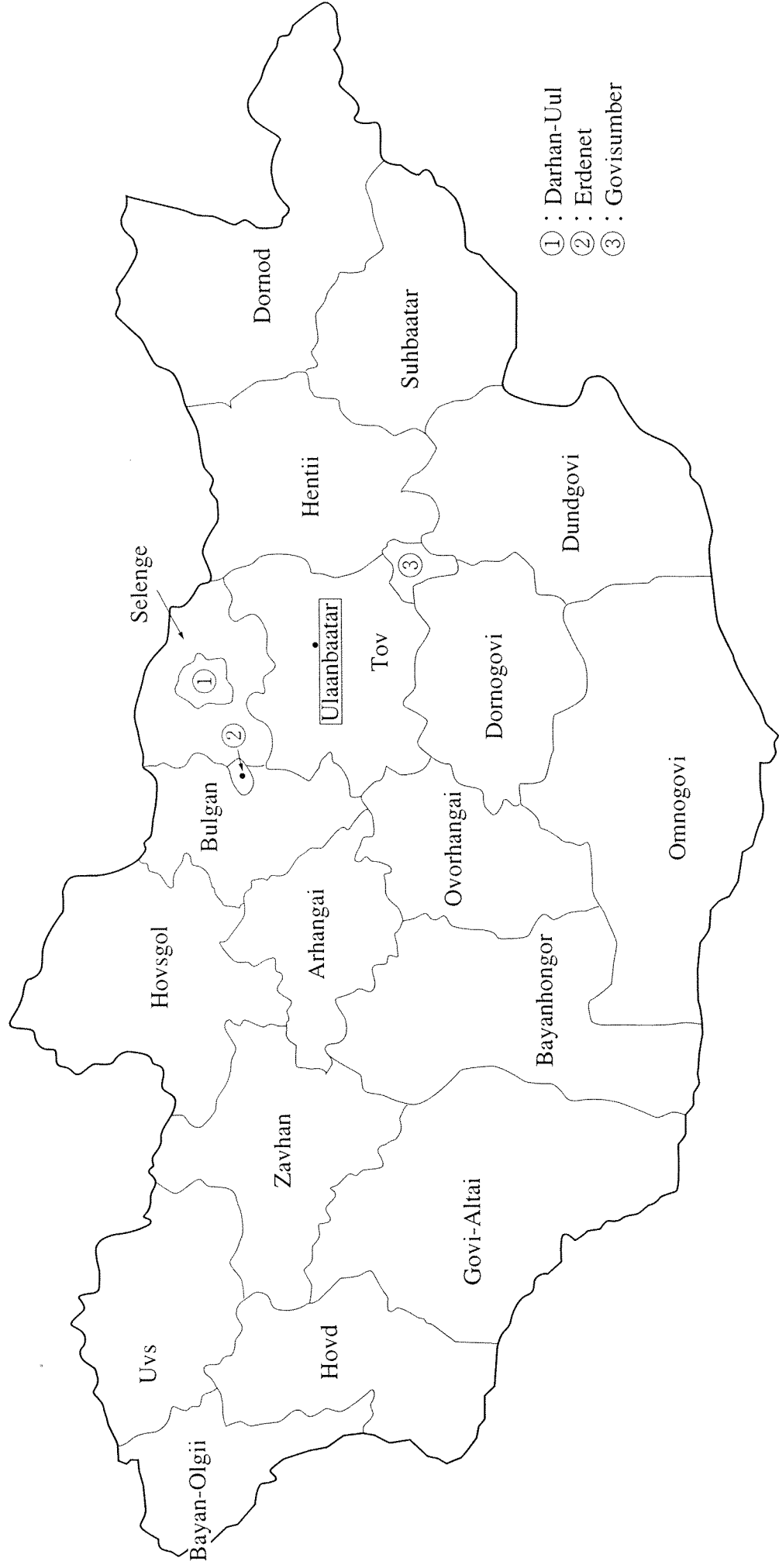


Vegetable production at Orhon



Training farm for *Green Revolution* at Ulaanbaatar

Administration Map of Mongolia



Foreword

This report presents the results of the “Basic Survey on Agricultural and Rural Development by Progress Stage in Asian Countries”, a project implemented in Mongolia by the Asian Population and Development Association (APDA) under the consignment from the Ministry of Agriculture, Forestry and Fishery in 1999. The survey and compilation of the results were mainly carried out by the member of survey committee of APDA (Chairperson: Dr. Shigeto Kawano, Professor Emeritus, the University of Tokyo).

The objective of this survey was as follows: “In extending assistance for agriculture and rural development to Asian countries, it is necessary to identify the areas in which agricultural and rural development assistance is to be offered, the form in which it is offered and the regions to which it is offered in accordance with stages of development in keeping with the country’s policy issues for overall promotion and improvement of rural areas while taking structural changes in population and employment into consideration, in an effort to form the foundation for offering effective and efficient assistance”.

For this purpose, survey will be conducted by selecting model and regions from Asian countries to study the form of agricultural and rural development according to structural changes in population and employment, thereby contributing to policy dialogue regarding agricultural and rural development. The field survey in Mongolia was conducted with the guidance and cooperation of: Mrs. Nyamosoryn Tuya, Minister of External Relations, Ministry of External Relations of Mongolia; Mr. S. Lambaa M.P., Chairperson of Standing Committee of Social Policy, The State Great Khural, Mr. Stev Byambaa, State Secretary of Ministry of Agriculture and Industry; and Mr. Shinji Kubota, Ambassador of Japan; Mr. Fumiaki Tominaga, Counsellor of the Embassy of Japan, and other cooperators.

In Japan, guidance regarding the content of the survey and assistance in arrangement of field survey were offered by the International Cooperation Planning Division, Economic Affairs Bureau, the Ministry of Agriculture, Forestry and Fisheries. And Mr. S. Khurelbaatar, Ambassador of Mongolia to Japan had done over all arrangement for field survey in Mongolia. I would like to take this opportunity to extend my deepest gratitude for their support.

I sincerely hope that this report will contribute to the advancement of the rural community and agricultural development programs in Mongolia and support effective assistance by the Japanese Government in this country.

Lastly, I would like to note that this report has been compiled under the sole responsibility of APDA and does not necessarily reflect the view or policies of the Ministry of Agriculture, Forestry and Fisheries or the Japanese Government.

March 2000

Dr. Taro Nakayama
Chairman,
The Asian Population and Development Association

Contents

Foreword	9
Chapter One : General Outline.....	13
1. Ecology	13
(1) Topography, climate, vegetation and their regionality.....	13
(2) Comparison with ecology of other Asian countries	17
2. Population	18
(1) Total population.....	18
(2) Population structure, labor population.....	20
(3) Urban/rural population ratio, literacy rate, school attendance rate.....	21
(4) Literacy rate, infant mortality rate, public health environment, family planning.....	23
(5) Estimation of future population.....	26
(6) Population carrying capacity of meadows.....	29
(7) Population structure and changes in diet.....	32
3. Economy	33
(1) Trends of general economy	33
Chapter Two : Overview of Agriculture and Livestock Farming	39
1. Present Condition of Agriculture	39
(1) Agriculture.....	39
(2) Livestock sector.....	41
(3) Crop sector.....	43
(4) Agro-Industry sector.....	45
2. Constraints	46
(1) Livestock husbandry.....	46
(2) Agro-industry.....	47
3. Policy	
(1) Government's strategic objective in agriculture.....	47
(2) Finance.....	48
(3) Crop production.....	49
(4) Livestock husbandry.....	50
(5) Agro industry	50

Chapter Three : Stock Farming and Agriculture in the Surveyed Region	51
1. Overview of Stock Farming and Survey Results	51
(1) Overview of Stock Farming.....	51
(2) Results of field study	55
2. Wheat	73
(1) Introduction	73
(2) Wheat Subsidies and Wheat Prices	77
(3) Wheat production	78
(4) Movement of privatization	82
(5) Some cases of wheat farms.....	83
(6) Farm management by farm size.....	89
(7) Land productivity needed for viable farm management.....	91
(8) Tariff and income tax policy related to wheat cropping.....	93
3. Vegetable Sector	99
(1) Trends of Vegetable Production in Mongolia and the Green Revolution.....	99
(2) Results of Field Survey.....	101
(3) Current Situation and Problems of Vegetable and Potato Distribution through Markets in Ullanbaatar	108
(4) Problems to Solve for Vegetable Sector Development	117
Chapter Four : Tasks Related to Agricultural and Rural Development in Mongolia	119
1. Tasks of stock farming.....	119
2. Tasks of wheat farming	121
3. Tasks of vegetable farming.....	122
4. Tasks of population/public health.....	123
Chapter Five : Survey Member and Itinerary.....	125

Chapter One

General Outline

1. Ecology

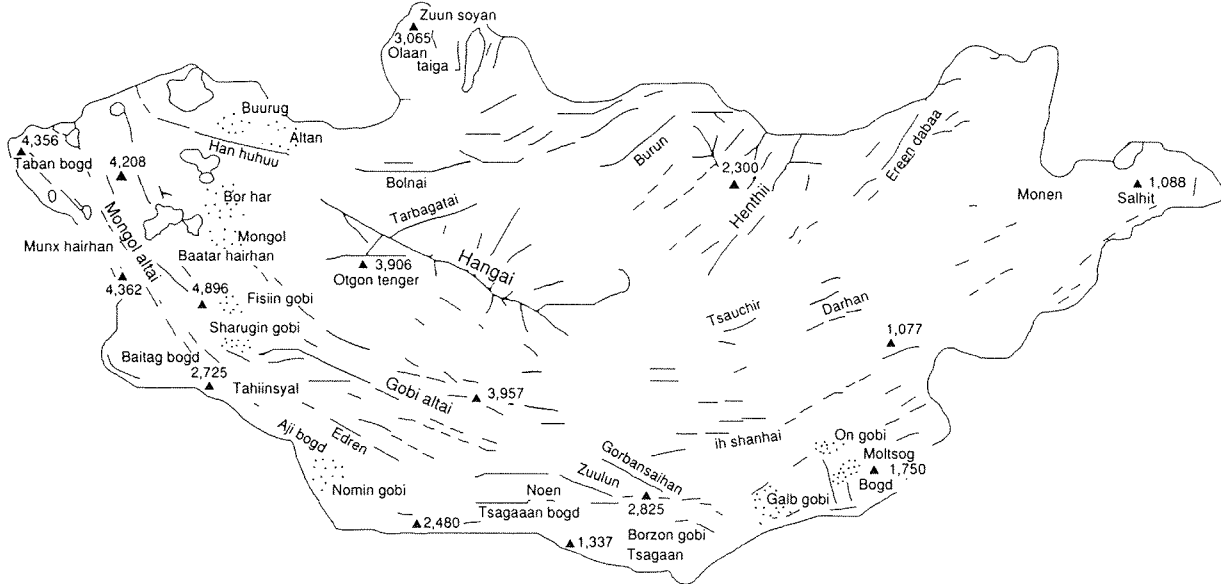
(1) Topography, climate, vegetation and their regionality

Mongolia is located in the highland region of inner Asian continent and has a vast area of 1,566,500 km² which is more than four times larger than the area of Japan. The country is located far from the tectonic activities of the Alps-Himalayan orogenic belt and the circum-pacific volcanic zone and therefore does not have the kind of fertile soil distributed in various places of Japan and Java Island of Indonesia which was formed by volcanic activities suited for cultivation. The lithosphere becomes strong and stable after entering its old age, and has little undulations on the whole by being subject only to weathering, erosion and build-up.

Several mountain ranges extend in numerous layers with their arcs facing the south direction. Lake Baikal, with its arc facing southeast direction, has a crescent shape as a result of such phenomena. The intervals of these mountain ranges become greater as they move south, and Mongolia has a topography that is higher on the north than on the south, and higher on the west than on the east (Figure 1-1).

The climate can be characterized as cold and dry. In the capital city of Ulaanbaatar, monthly average temperature rises to 16.9 degrees in July and drops to -21.8 degrees in January (Mongolian Statistical Yearbook 1998). In addition, precipitation is concentrated

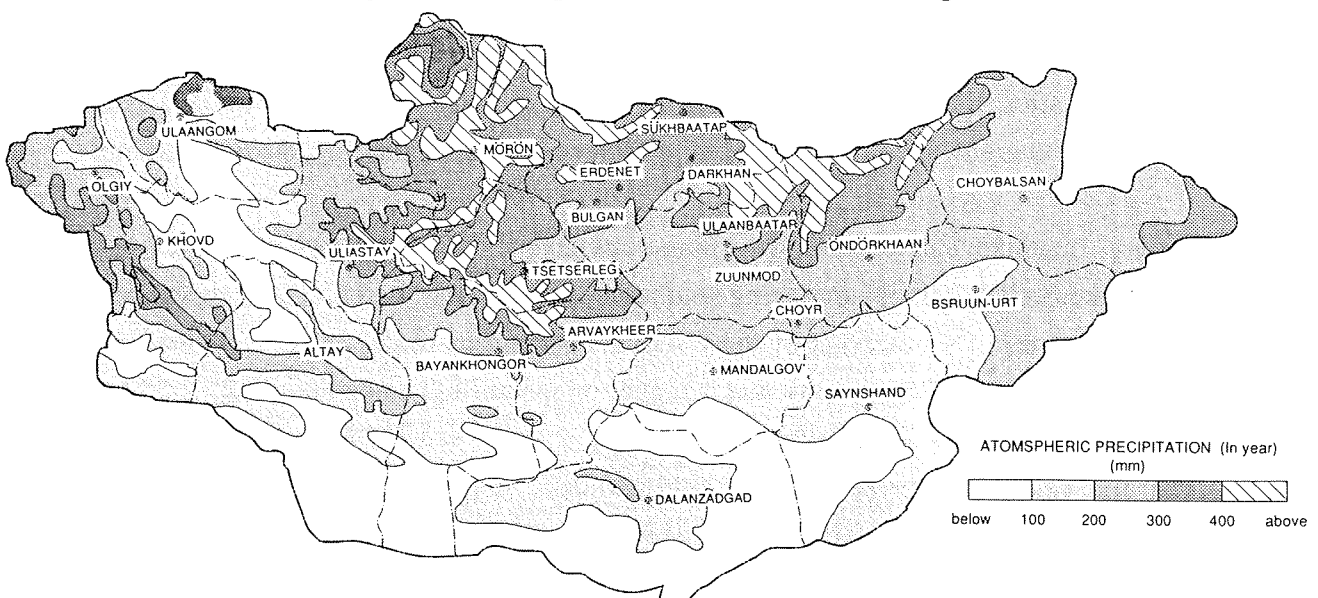
Figure 1-1 Mountains of Mongolia



Source: I. N. A. MARINOV "GEOLOGIYA MONGOLSKOI NARODNOI RESPUBLIKI" Moskow, 1973, p21

from June to August when scantily covered ground is fiercely heated to generate enormous convection. Meanwhile, the region from Mongolia to Siberia becomes dry after being cooled by radiation cooling that allows the land to cool the ground and gives rise to predominant downdraft. The cold air cannot escape to the south as its exit is blocked by the Tibetan Highlands and increases its coldness after gaining strength. Such seasonal differences are also one of the characteristics of the climate in Mongolia. Annual precipitation is less than 400 mm in most regions of the country. Precipitation increases in the north and differs from region to region, going down to less than 50 mm in the Gobi Desert region in the south (Figure 1-2).

Figure 1-2 Precipitation distribution of Mongolia



Source : Physical MAP of MONGOLIA, Cartography Enterprise of State Administration of Grodesy and Cartography of Mongolia, Ulaanbaatar, 1997.

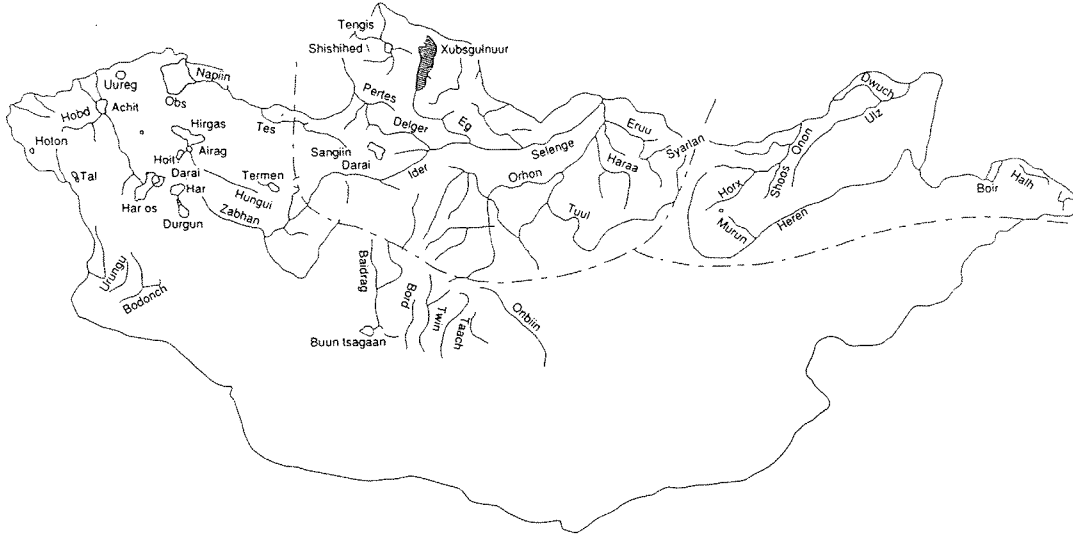
The mountain ranges that are particularly important when looking at the regionality of ecology in Mongolia are Hangai Mountains and Hentii Mountains that surround the mid-northern region in semi-circle. Many rivers have their sources in these mountains and flow north to irrigate their basins and collect precipitation at even greater areas before merging as Selenge River at Sukhbaatar near the border (Figure 1-3). This river runs from Lake Baikal through the lowlands of Siberia to the Arctic Ocean before closing the vast wheel of circulation. In addition, smaller circulation of abundant surface water leads to abundant rainfall in the summer and create a favorable condition of the meadows for livestock to graze. Thus, this semi-circle region is equipped with favorable condition as grazing land for livestock with its vast expanses of excellent meadows, which is a result of being more blessed with water than any other region of Mongolia. This region where Karakorum (Harhorin), the former capital of the Mongolian Empire, and the present capital of Ulaanbaatar, are both located, gave rise to development of nomadism since the old days. Productions of wheat and fodder crops were promoted during the socialist era and have reached the present condition after many twists and turns. The majority of such farms are located in here.

The moisture that the two mountain ranges bring to their inner regions translates into dryness at their outer regions. This can be clearly seen in the distribution of vegetation (Figure 1-4). Silvical meadows (Forest-steppe) exist in the region surrounded by the two mountain ranges while steppe (refers to prairies in terms of vegetation and is used to distinguish with general use of the term) and desert is connected via their halfway zones.

In addition, weather is relatively cool at high altitudes in the western region which consists of rows of high mountains with temperature dropping to as low as -70°C in the winter. Plains stretch out in the eastern region whereas altitude is low and precipitation is small in the south.

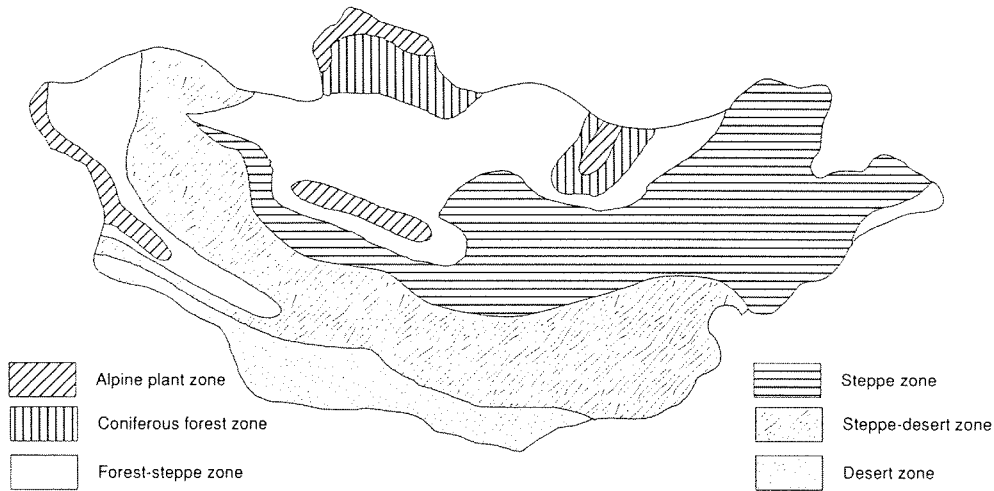
Rivers rarely merge. In the West, rivers flow into an inland lake. They are short in the south and do not reach the ocean as water disappears into the desert. The only rivers that reach the Pacific Ocean in the east are those in the northwest. Thus, the desert belt become narrower after silvical meadows appear again in the west and steppe stretches out in the east.

Figure 1-3 Rivers and lakes in Mongolia



Source: Prepared from *Great Map of the People's Republic of Mongolia*, Silk Road, 1978. Imaoka (1985) has been reproduced after slight revision.

Figure 1-4 Vegetation zones in Mongolia



Source : A. A. YUNATOV, "MONGOL ORNII GAZAR ZUI" Ulaanbaatar, 1969 p.283
 Reproduce from Imaoka (1985).

Mongolia has traditionally been divided into three main regions of Hangai, Heer-tal and Gobi. This distinction between Hangai, Heer-tal and Gobi often suggests cultural connotations, and making a clear distinction by drawing a line on a map may result in compromising accuracy. The above distinction can be replaced by that based on vegetation to silvical meadow, steppe and desert respectively. Alternatively, it is not wrong to roughly deem the northern part of the country as Hangai, the south as Gobi and the region in between as Heer-tal.

(2) Comparison with ecology of other Asian countries

The mechanism that created the ecology of Mongolia is distinguished from those in the tropical rainforest regions and tropical/temperate monsoon regions of East, Southeast and South Asia, and from the dry regions of Southwest Asia. The following two points will first be explained to describe these elements.

Firstly, the Asian Continent is located in the Northern Hemisphere and has a sea area extending near the equator. The equatorial tropical region is heated by the blazing sun. On the other hand, seawater temperature at western tropical region of the Pacific Ocean becomes higher than in any other part of the world because the ocean current flows from east to west near the equatorial Pacific and is heated in the process. Therefore, convection containing large amount of moisture becomes dominant throughout the year in tropical Asia, gathering clouds and increasing precipitation. Atmosphere descends in north and south of the equator to compensate for this atmospheric current and flows into the equatorial region. In addition, the inclination of the earth's rotational axis against the orbital surface changes the latitude that receives strong heating from season to season. Thus the subtropical climate having dry and rainy seasons is created between tropical climates in the north and south.

Secondly, there is the existence of long and massive mountain massif consisting of the Himalayan Mountains and the Tibetan Plateau that rises above 4,000 meters above sea level. This mass of mountains shall be referred to as the Tibetan Massif.

Air is thin on the Tibetan Massif that lies at relatively low latitude in the mid-troposphere. In summer, the ground with sparse vegetation cover absorbs the strong sunlight and rapidly heats the atmosphere above it to generate convection on a continuing basis. In the lower layer, moist air blows in from the south to compensate for this current. The Tibetan Massif is deeply involved in the formation of monsoon low pressure centered around northern India, creating one of the most pluvial regions in the world at its southern base.

There are many deep canyons at both ends of the Tibetan Massif. They are, for one, remnants of erosion of earth's surface by precipitation. These canyons created the sources for the Yellow River, the Yangtze River and the Mekong on the east side, and the Ganges and Indus on the west, all bringing far greater moisture and fertility than from precipitation alone to their basins as a result of the Tibetan Massif serving as waster tank and water pump for the lower subtropical and tropical regions.

Meanwhile, atmosphere ascends after being warmed and overflows from the upper layer of the troposphere in the form of strong air current. This descends down to Southwest Asia, Arabia and North Africa and becomes involved in drying of the region. In relatively low latitude regions of Asia, a contrast of moistness and dryness is observed between regions east of India (tropical rainforest, monsoon) and west of India. This is created by the positions of

land and sea and by the influence of the Tibetan Massif and the Pacific Ocean.

However, the aforementioned extensive and powerful circulation of atmosphere and water does not reach Mongolia as it is blocked by the distant Tibetan Massif itself in the southwest and by the Greater Khingan Range that brushes the western part of the country. Since there is no large river flowing in from outside, water and soil will flow out of Mongolia but will never flow into Mongolia.

Thus, the prevalence of meadows that are unsuitable for cultivation and suitable for nomadism in Mongolia, is more a result of her climate characterized by low precipitation and coolness than her high-latitude location in the heart of a vast continent.

2. Population

(1) Total population

According to the 1999 Mid-Year estimate, current total population of Mongolia is 2,413,033 and consists of 1,197,854 males and 1,215,179 females. The medium age in 1999 was 22.11 years, indicating that Mongolian population has high percentage of young population. In addition, the country's population increase rate is declining rapidly at a rate unprecedented in any part of the world.

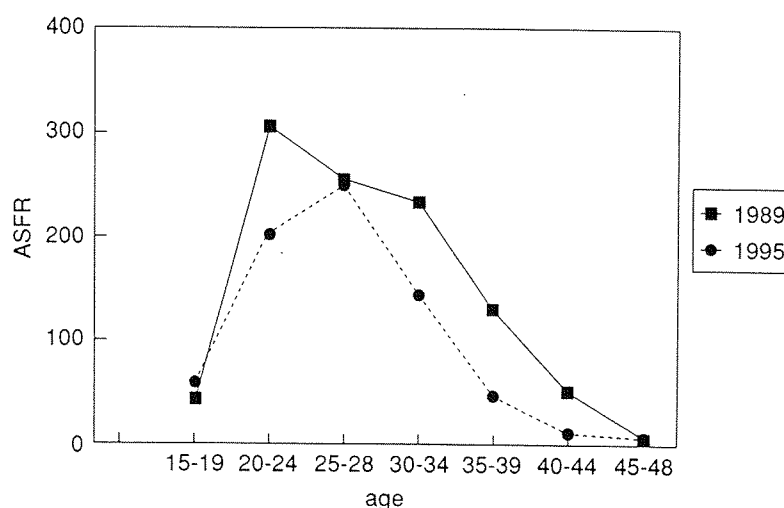
Table 1-1 Population changes and population increase rate in Mongolia

	1989	1990	1995	1996	1997	1998
Total population	2,095,600	2,149,300	2,317,500	2,353,300	2,387,000	2,420,500
Male	1,045,900	1,072,300	1,151,800	1,169,600	1,185,000	1,201,600
Female	1,049,700	1,077,000	1,165,700	1,183,700	1,202,000	1,218,900
Urban areas	1,193,600	1,225,100	1,202,800	1,226,300	1,252,300	1,236,600
Rural areas	902,000	924,200	1,114,700	1,127,000	1,134,700	1,183,900
Births	73,593		54,293	51,806	49,488	49,256
Deaths	17,000		16,794	17,550	16,980	15,799
No. of Natural increase	56,593		37,499	34,256	32,508	33,457
Increase rate(%)	2.70		1.62	1.46	1.36	1.38

Source: National Statistics Office, *Mongolian Statistics Yearbook 1998*, NSO 1999

While restraint of childbirth owing to economic difficulty since the economic transition is believed to be the greatest reason, child delivery age itself is also changing at a rapid rate as shown in the table.

Figure 1-5 Age specific fertility 1989-1995



Source: Mongolia National University, *Population Changes in Mongolia 1989-2030*, Mongolia National University 1999

To look at the total fertility rate (TFR), which refers to the number of children a woman gives life to in her lifetime under the present fertility rate, the number has nearly halved from 4.6 in 1989 to 2.3 in 1998. In particular, TFR has dropped from 4.3 to 2.7 in only 5 years from 1990 to 1995. The impact of economic factors on fertility is deeply related to the social development of that country. In many least developed countries, poverty has become the greatest obstacle to population control.

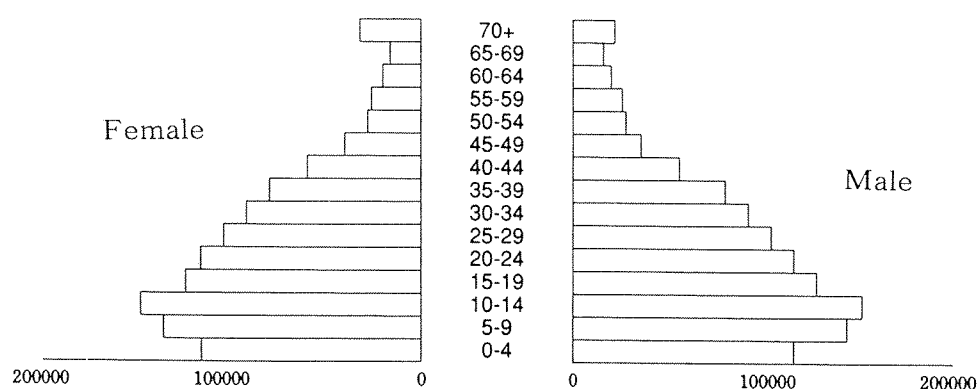
For economic difficulty to restrain birth, relative poverty, i.e. “the sense of being poor,” plays a greater role than actual poverty. Restraint of birth occurs as rational choice when one is unable to attain the standard of living he or she desires and means of contraception is available for that purpose, not when the desired or expected standard of living itself is low. Restraint of birth does not occur when such means are not available. Furthermore, lack of educational opportunities and coercion from tradition are often at work in these situations and even gives rise to fertility due to increase in economic earning opportunities that result from having children.

The premise in the case of rapid fertility decline that accompanied the economic transition in Mongolia is the existence of fully implemented social development and the foundation that allowed people to make rational choices according to their respective situation.

(2) Population structure, labor population

The population structure of Mongolia is very young and has a population pyramid shown below.

Figure 1-6: Population pyramid of Mongolia 1998



Source: National Statistics Office, *Mongolian Statistics Yearbook 1998*, NSO 1999

1) Dependent population and economically active age population

According to the mid-year estimation in 1998, economically active age population (15 through 64) was 1,460,271, which accounts for about 60% of total population. Dependent population index, obtained by dividing dependent population by economically active age population, was 65.2. Among them, young dependent population accounted for the overwhelming majority of 58.8 and aged dependent population amounted to only 6.4.

Table 1-2 Dependent population Index 1998

	Population		Index
Young population (0~14)	858,882	Young Population Dependency Ratio	58.8
Old population (65+)	93,880	Aged Population Dependency Ratio	6.4
Dependent population	952,761	Dependency Population Ratio	65.2
Economically Active Age Population	1,460,271		

Source: Calculated from National Statistics Office, *Mongolian Statistics Yearbook 1998*, NSO 1999

Although there are various factors of concern such as economic difficulties accompanying the system changeover, partial charge for school education and shortage of social services, Mongolia will be entering the demographic golden era in ten years from now

if restraint of population increase rate continues at the present rate and social development that has been realized up to now in Mongolia continues.

To perform a very simple estimation, Mongolia's dependent population index will drop to 39.6 in 2008 and give rise to a golden era that far surpasses the dependent population index of 44.9 that Japan attained in 1970 during the economic boom. While securing of employment opportunities and maintenance of social development for education and training are the prerequisites for proper utilization of this demographic golden era, a great opportunity will be emerging in terms of population structure in ten years from now. In other words, the measures that Mongolia will adopt in the next ten years will have conclusive significance on the country's future.

Table 1-3 Dependent population in 2008

	Population		Index
Young population (0~14)	589,772	Young Population Dependency Ratio	29.8
Old population (65+)	193,942	Aged Population Dependency Ratio	9.8
Dependent population	783,714	Dependency Population Ratio	39.6
Economically active age population	1,975,018		

Source: Calculated from National Statistics Office, *Mongolian Statistics Yearbook 1998*, NSO 1999

2) Population by industry

By industry, agriculture (including nomadism) had the largest population in 1998 by accounting for 48.7% of the entire population, an increase of 1.6 times from 33.0% in 1990.

Table 1-4 Population ratio by industry (%)

	Industry	Construction	Agriculture	Transportation/Communication	Provision (Distribution/commerce)	Others
1990	16.8	8.4	33.0	7.4	27.4	7.0
1998	12.1	3.4	48.7	4.1	22.5	9.2

Source: National Statistics Office, *Mongolian Statistics Yearbook 1998*, NSO 1999

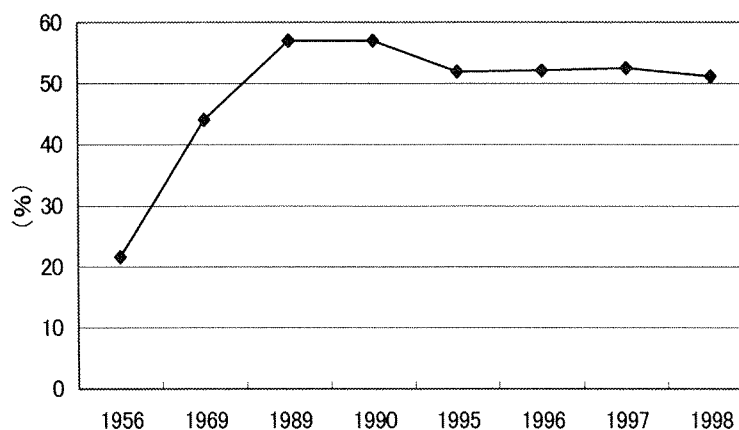
(3) Urban/rural population ratio, literacy rate, school attendance rate

Urban population increased to 1,236,600 in 1988, reaching a ratio of 51%. However, the aspects urbanization in Mongolia is quite different from that in other developing countries where urban population ratio continues to increase. Having continued to increase since 1956, urban population ratio started decreasing after peaking in 1989 and has been maintaining

more or less a constant level in terms of population scale and the increased portion has been absorbed by rural population. This is a result of a phenomenon in which the people that lost their jobs due to introduction of market economy went back to being nomads in search of their daily foods.

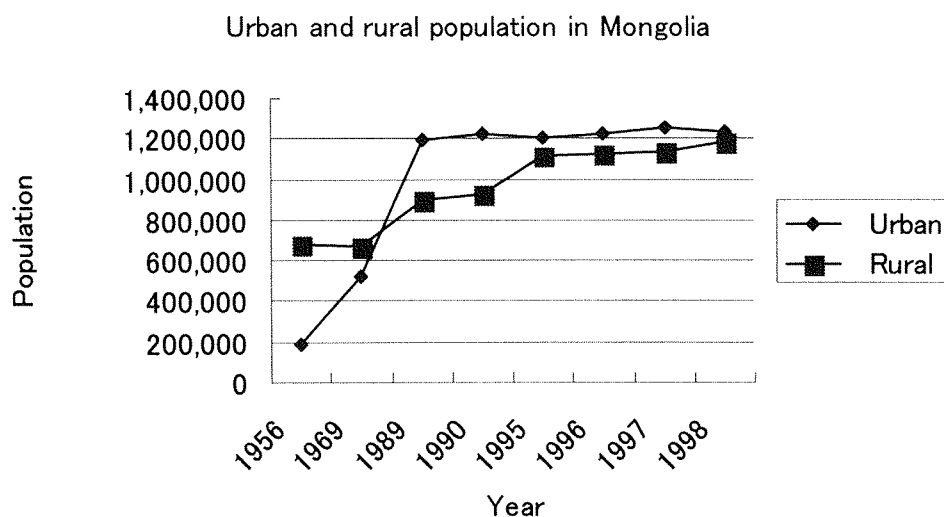
Figure 1-7 Rate of Urbanization in Mongolia

Year	Urbanization rate (%)
1956	21.6
1969	44.0
1989	57.0
1995	51.9
1996	52.1
1997	52.5
1998	51.2



Source: Calculated from National Statistics Office, *Mongolian Statistics Yearbook 1998*, NSO 1999

Figure 1-8 Changes in urban and rural population



Source: National Statistics Office, *Mongolian Statistics Yearbook 1998*, NSO 1999

(4) Literacy rate, infant mortality rate, public health environment, family planning

1) Literacy rate

Mongolia has a very high literacy rate with almost her entire population having the ability to read and write. In particular, literacy rate in urban areas such as Ulaanbaatar, Dalhanuru and Eldenet exceeds 99%.

Table 1-6 Literacy rate of population aged 15 years and above

	1996	
	Female	Male
Entire Mongolia	96.3	97.5
Aimag (Prefecture)	94.8	96.6
Soum (District)	99.0	99.1

Source: UNDP Mongolia, *Human Development Report MONGOLIA 1997*, UNDP

As shown in the table, infant mortality rate is high compared to literacy rate. Today's infant mortality rate serves as a barometer of the prevalence of medical technology. However, the difficulty of providing sufficient medical care in Mongolia where sparse population lives in the vast expanse of her land can easily be imagined.

Therefore, one can say that the vastness of land is making thorough diffusion of medical care difficult even in Mongolia where diseases including infectious diseases are relatively rare in natural state. A comparison with infant mortality rate of other countries with similar literacy rate shows that Tajikistan has a trend similar to that of Mongolia.

Table 1-7 Literacy rate and infant mortality rate of countries having literacy rate between 95% and 99%

Country	Literacy rate (%)	Infant mortality rate (per 1000 live birth)
Korea	97.0	10
Israel	95.0	8
Bulgaria	98.0	17
Greece	96.0	8
Spain	97.0	7
Cuba	96.0	9
Costa Rica	95.0	12
Argentina	96.0	22
Uruguay	97.5	18
Moldova	98.0	29
Tajikistan	98.5	57
Mongolia	96.9	51

Source: UNFPA, *The State of World Population 1999*, UNFPA 1999

2) Drinking water and access to medical institutions in case of emergency

Unlike the developing countries in the south, drinking water is rarely taken up as a public health issue in Mongolia where cold weather accounts for three-fourths of the year. As it is believed that temperature in winter drops far enough to kill infection-causing bacteria, people commonly use water from nearby springs and wells even in cities such as Ulaanbaatar. In addition, people drink water by boiling to prepare milk tea and we did not hear any stories about problems arising in this regard. Drinking water by source is as follows.

Table 1-8 Drinking water by source (%)

Water source	Urban areas	Rural areas	Total
Service water	46.5	0.6	23.0
Simple waterworks	2.1	0.5	1.3
Well	48.2	46.5	47.3
Fountain, mineral water	2.1	10.9	6.6
River, snow, rainwater	1.1	41.5	21.8

Source: National Statistics Office, *Reproductive Health Survey 1998*, NSO 1999

It can be said that transportation in emergency situations is the greatest problem in a sparsely populated country with vast land area such as Mongolia. Furthermore, serious shortage of medical supplies at medical facilities exists due to financial difficulty accompanying with economic transition, and shortage of medicine and medical appliances has also become a serious problem.

Table 1-9 Method of access to hospitals in case of emergency (%)

Means	Urban areas	Rural areas	Total
Telephone	85.6	4.2	43.9
Car, motorcycle	0.4	13.7	7.2
Horses, camels, cattle, yak	0.8	43.5	22.6
Walk	10.2	36.9	23.9
Others	3.0	1.7	2.3

Source: National Statistics Office, *Reproductive Health Survey 1998*, NSO 1999

While telephone is the most common method of access in cities, animals and walking are the overwhelming majority in rural areas where people often walk two or three hours to go to center of Soum (District) and Aimag (Prefecture). It is an obvious fact that the country is

confronted with problems in terms of the method for preparing the basic infrastructure in such vast expanse of land and for maintaining it in such harsh natural environment once it is prepared.

3) Family planning

As for practice of contraception, a national reproductive health survey was carried out in 1998 as part of national programs for implementing 1994 International Conference on Population and Development Plan of Action,. In this survey, 7,461 women were randomly selected from 6,003 households. The results of this survey would serve as the most reliable data until the results of the census scheduled in 2000 are published. The status of contraception practice according to this reproductive health survey is as follows.

Table 1-10 Contraceptive Method

Method	Female	Married women
Modern Method	56.4	73.9
(1) Pill	15.8	21.5
(2) IUD	41.1	55.7
(3) Injection	5.4	7.3
(4) Norplant implant	0.2	0.3
(5) Contraceptive films, jelly	2.0	2.6
(6) Condoms	22.7	29.2
(7) Female sterilization	1.8	2.4
(8) Male sterilization	0.0	0.0
Traditional methods	41.8	53.0

Source: National Statistics Office, *Reproductive Health Survey 1998*, NSO 1999

While it is natural for the practice rate of contraception to increase with higher final schooling, it is worthy of note that the increase is not attributable to increase in modern contraceptive methods but to increase in traditional contraceptive methods. Such traditional contraceptive methods include the so-called rhythm method.

Moreover, shortage of medical appliances and medicine following the changeover of economic system may have impact on family planning. While it is said that birth is being restrained due to economic difficulty, unintended pregnancy may increase in the future if shortage of family planning materials occurs. Some say that sharp decline of fertility in the last ten years was achieved by legal and illegal abortion. In this sense, it is similar to the demographic transition that took place in Japan after World War II, which means that Japan's

experience may be transferred to Mongolia. According to the 1998 statistics from the Ministry of Health and Social Welfare, one abortion occurs for every five childbirths. It is predicted that provision of family planning materials will become an important point in order to respond to the needs for prevention of undesired pregnancy.

Table 1-11 Contraceptive method by final education

	Contraception execution rate	Modern contraceptive methods	Traditional contraceptive methods
Primary school and below	45.7	41.9	3.0
Dropped out of secondary school	51.2	43.9	6.8
Graduated from secondary school	60.2	46.7	12.6
Above secondary school	66.7	46.7	18.5

Source: National Statistics Office, *Reproductive Health Survey 1998*, NSO 1999

Furthermore, Mongolia has traditionally had high infection rate of sexually transmitted diseases (STDs). Although there has been no reported cases of AIDS at present, it may spread like wildfire once AIDS infection starts. According to the reproductive health survey, information about AIDS is not sufficient and 98.4% of married persons responded that there is no change in their sexual behavior. Sufficient diffusion of information and measures is needed in the future for securing sound human resources.

(5) Estimation of future population

Several population estimations are available on Mongolia. There are four types of estimations: an estimation prepared through cooperation between UNDP and the government called MAP 21 (Mongolian Action Programme 21) and three types of estimations prepared by the Population Research/Education Center of the University of Mongolia (high, medium, low). The census was conducted in 1989 and estimation of population is based on the results of this census. However, the National Statistical Center conducted censuses in 1995, 1996 and 1997, and corrected the population estimate based on 1989 census results. The figures announced by the National Statistical Center was obtained in this manner.

It is difficult to compare these four types of population estimate with the values publicized by the National Statistical Center as the former does not necessarily reflect the latter. Therefore, the estimation of population obtained by using the values finalized by the National Statistical Center in 1989 as the basis and multiplying them with the increase rate from respective research bodies is shown in the next table.

However, as the estimation made by MAP 21 only included the estimated increase rates from 1997 onward, its values were therefore obtained by multiplying the corrected values

from 1997 National Statistical Center by estimated increase rate. For this reason, the estimated population figures shown here are different from those announced by the respective research institutions.

When the base figures are multiplied by these increase rates, it appears that the population increase predicted by MAP 21 will not occur.

None of the population increase estimates predict that population will reach 4 million by 2030. Mongolia's population is likely to remain in the range of 3.2 million to 3.4 million in 2030 even after considering the baby boom that would emerge around 2009 as a result of the largest population cohort reaching their reproductive age.

Table 1-12 Population Estimate of Mongolia

Year	NSO		Increase rate estimated by Population Institute of University of Mongolia						Increase rate estimated by MAP21	
	Statistical Yearbook	(%)	High level	(%)	Medium level	(%)	Low level	(%)		(%)
1989	2,017,400	2.70	2,017,400	2.48	2,017,400	2.48	2,017,400	2.48		
1990	2,103,300		2,067,432		2,067,432		2,067,432			
1991			2,118,704		2,118,704		2,118,704			
1992			2,171,248		2,171,248		2,171,248			
1993			2,225,095		2,225,095		2,225,095			
1994			2,271,377	2.08	2,271,377	2.08	2,271,377	2.08		
1995	2,312,800	1.62	2,318,621		2,318,621		2,318,621			
1996	2,347,100	1.46	2,366,849		2,366,849		2,366,849			
1997	2,379,600	1.36	2,416,079		2,416,079		2,416,079		2,379,600	
1998	2,413,000	1.38	2,466,333		2,466,333		2,466,333		2,448,846	2.91
1999			2,505,302	1.58	2,503,575	1.51	2,501,849	1.44	2,531,862	3.39
2000			2,544,885		2,541,379		2,537,875		2,592,880	2.41
2001			2,585,094		2,579,754		2,574,421		2,667,814	2.89
2002			2,625,939		2,618,708		2,611,492		2,744,914	2.89
2003			2,667,429		2,658,251		2,649,098		2,824,242	2.89
2004			2,704,506	1.39	2,691,213	1.24	2,677,973	1.09	2,918,854	3.35
2005			2,742,099		2,724,584		2,707,163		2,978,107	2.03
2006			2,780,214		2,758,369		2,736,671		3,051,071	2.45
2007			2,818,859		2,792,573		2,766,501		3,124,296	2.40
2008			2,858,041		2,827,201		2,796,656		3,198,030	2.36
2009			2,895,767	1.32	2,858,865	1.12	2,822,105	0.91	3,285,976	2.75
2010			2,933,991		2,890,884		2,847,786		3,367,139	2.47
2011			2,972,720		2,923,262		2,873,701		3,432,798	1.95
2012			3,011,960		2,956,003		2,899,852		3,488,410	1.62
2013			3,051,718		2,989,110		2,926,240		3,550,155	1.77
2014			3,089,864	1.25	3,020,496	1.05	2,950,236	0.82	3,613,347	1.78
2015			3,128,487		3,052,211		2,974,428		3,677,665	1.78
2016			3,167,594		3,084,259		2,998,818		3,725,107	1.29
2017			3,207,188		3,116,644		3,023,408		3,786,571	1.65
2018			3,247,278		3,149,369		3,048,200		3,854,351	1.79
2019			3,283,323	1.11	3,177,713	0.9	3,068,928	0.68	3,923,344	1.79
2020			3,319,768		3,206,312		3,089,797		3,993,964	1.80
2021			3,356,617		3,235,169		3,110,807			
2022			3,393,876		3,264,286		3,131,961			
2023			3,431,548		3,293,664		3,153,258			
2024			3,463,118	0.92	3,317,049	0.71	3,168,709	0.49		
2025			3,494,979		3,340,600		3,184,236			
2026			3,527,133		3,364,319		3,199,838			
2027			3,559,582		3,388,205		3,215,518			
2028			3,592,330		3,412,262		3,231,274			
2029			3,618,914	0.74	3,429,323	0.5	3,239,675	0.26		
2030			3,645,694		3,446,470		3,248,098			

Source: NSO, *Mongolian Statistics Yearbook 1998*, NSO
Mongolian National University, *Population Changes in Mongolia, 1989-2030*, Mongolian National University
Mongolian Action Programme, *Mongolian Action Programme 21* (Increase rate)

(6) Population carrying capacity of meadows

Mongolia has the lowest population density of all the countries in the world. Population density in the 1998 mid-year estimate was about 1.543 persons/km². A population of 2.41 million lives in an area four times as large as that of Japan (1,564,100 km²).

The combination of vast area and sparse population often leads to the notion that there is still a lot of room for people in Mongolia. Many leaders of Mongolia appear to think, though without any accurate basis, that 4 million is the appropriate level of population for the country. While the estimation by the University of Mongolia has projected the population of Mongolia in the year 2019 to be in the neighborhood of 2.90 to 3.17 million, “Mongolian Action Programme for the 21st Century (MAP 21)” edited by the Mongolian government estimates the country’s population in 2020 to reach 4.28 million.

However, the present population is extremely large from a historical viewpoint.

Table 1-13 Population of Mongolia, 1918-1998

Year	Population	Population increase rate (%)
1918	648,100	-
1930	727,400	1.01
1940	743,800	0.15
1950	772,400	0.38
1960	968,100	2.28
1970	1,265,400	2.78
1980	1,682,000	2.89
1990	2,149,300	2.48
1996	2,353,300	1.58
1998	2,413,030	

Source: National Statistics Office (NSO), *Population of Mongolia 1996*, NSO

This table shows that Mongolia’s population has more than tripled in 50 years from 770,000 in 1950.

1) Population pressure

Mongolia is a land of coldness and dryness. It is presumed that insect-borne infectious diseases such as malaria, which is a major cause of death in moderate and tropical climates, and other infectious diseases carried by water hardly existed due to these conditions of the natural environment. In the pre-modern days, high fertility inherent in human beings was offset by high infant mortality rate in the tropical regions. In this sense, one can say that

potential population pressure has always existed in Mongolia. As mentioned earlier, an attempt to estimate the level of historical population is made impossible by the fact that equestrian people do not leave any written record of their past, although it may be reasonable to hypothesize that increase in population pressure in the Mongolian Highlands triggered their southward advancement.

2) Natural environment and population carrying capacity of Mongolia

Mongolia is located at high latitude and high altitude. Ulaanbaatar, the capital city, is said to be located at an altitude of 1,297m. Mongolia Highlands is geologically very similar to Tibetan Highlands and the two form the watershed and the roof of the Eurasian Continent.

Owing to this cold natural environment, grain production was hardly ever practiced in Mongolia. Nomadism, the dominant form of sustenance in Mongolia, is a method in which people utilize the five main livestock varieties (cattle, horses, sheep, goats, camels) by having them collect the grass that grows under weak sunlight shining over the Mongolian Highlands. Being on the verge of cropping limit in terms of natural conditions, nomadism in Mongolia has certainly been the sustainable form of production that was compatible with the natural environment of the country as long as the scale of population remained small.

Historically speaking, nomadism has been the dominant form of subsistence and cropping was only practiced meagerly by a small number of Han Chinese. One can say that Mongolian people never culturally saw crop farming as their trade. In Mongolia, it has been believed that “vegetables are for sheep to eat, and wheat is the cause of constipation.” Thus, from a historical viewpoint, the scale of population in the Mongolian Highlands has been determined by the number of livestock that the land can sustain.

Unlike rice cropping, the number of animals that can be raised in certain area of pasture is determined automatically. In Mongolia, several estimations have been made as regards to the “carrying capacity of pasture” that indicates the number of livestock the pasture can support. The resulting capacity is expressed in the number of sheep that can be grazed. A Equivalent formula exists for other animals of the five main livestock varieties as shown below.

Table 1-14 Equivalent formula for the five main livestock varieties

Livestock	Sheep	Goat	Horses	Cattle	Camels
Equivalent rate	1	1	6	6	7

If nomadism was the basis of life, the carrying capacity of pasture translates directly into its population carrying capacity. According to President Ganbold of the National

Agricultural University of Mongolia, the pasture's carrying capacity estimated in the study that was conducted scientifically in considerable detail by the Soviet Union during the 1970s was 40 million sheep whereas the present official view is that it can hold 66 million sheep. It is said that considerable number of wells that are currently unusable must be repaired in addition to management of pasture to realize the 66 million figure.

This equivalent formula converting horses, cattle and camels into sheep is said to be more empirical than has been drawn strictly from the amount of grass consumed by each livestock variety. However, if we simply apply this formula and assume that 200 head of sheep can support one *ger* (portable dwelling for nomadic people) and that each household is comprised of five members, the carrying capacity of pastures in Mongolia can be estimated to range between 1 million and 1.65 million.

As mentioned earlier, grazing in pastures are different from rice cropping in the sense that input of labor does not lead much to increase in population carrying capacity. In this sense, population carrying capacity is quite limited and is poor in elasticity of carrying capacity in response to human effort.

Table 1-15 Livestock and population carrying capacity in Mongolia (changes in number of livestock)

Livestock industry (unit: 1,000 head)

	Item	1989		1995		1998	
		Real number	Sheep equivalent	Real number	Sheep equivalent	Real number	Sheep equivalent
1	Camels	558	3,908	367	2,571	356	2,495
2	Horses	2,200	13,198	2,648	15,890	3,052	18,314
3	Cattle	2,541	15,248	3,317	19,903	3,715	22,290
4	Sheep	14,265	14,265	13,719	13,719	14,682	14,682
5	Goats	4,959	4,959	8,521	8,521	11,014	11,014
	Total	24,524	51,578	28,572	60,603	32,820	68,795

Source: Calculated based on data from the Ministry of Agriculture and Industry

As can be seen from this table, the number of livestock in number of sheep based on the five livestock variety Equivalent formula has already reached 68.79 million head and has exceeded the official figure of 66 million. Moreover, repair of wells and management of pastures are not by any means sufficient. In addition, markets, hospitals and schools are limited to large cities such as Ulaanbaatar and Darkhan. Excessive concentration of nomads to large cities is therefore in progress, and is giving rise to devastation of suburban pastures caused by overpopulation of livestock. In addition, the percentage of nomads in the

population is increasing as people that had been hired by state enterprises are returning to nomadic life after the economic transition as a means of self-sustenance.

Table 1-16 Number of nomadic households and nomadic people

	1988	1990	1992	1994	1996	1998
Nomadic households	66,323	74,710	143,440	167,260	170,084	187,147
Nomadic population	127,557	147,508	30,076	377,148	395,355	414,433

Source: Data from the Ministry of Agriculture and Industry

These actual numbers show that each household is raising 367 head in sheep equivalent. Although the reality is not as simple because some non-farm households and companies own livestock in Mongolia, 1.65 million appears to be a reasonable limit when population carrying capacity of Mongolia is estimated on the basis of pastures. From this viewpoint, it is not necessarily proper from a long-term viewpoint to actively expand Mongolia's population.

(7) Population structure and changes in diet

When Japan decided to offer assistance for increasing food production, a question regarding the manner in which a crop farming based country like Japan could offer such assistance arose among educated people because of the difference in diet between Japan and Mongolia. It was a notion that questioned the significance of Japan offering cropping-related assistance to Mongolia where the aforementioned traditional concept of "vegetables are for sheep to eat, and wheat is the cause of constipation" is prevalent.

However, Mongolian diet is changing surely and rapidly. Mongolia has thoroughly implemented compulsory education for her people during the communist era but is also faced with a contradicting reality commonly found among countries in economic transition of having advanced social and human development and low GNP per capita resulting from backwardness of market economy. In this sense, thoroughness of education in Mongolia was more advanced compared to other communist countries in Asia such as Vietnam and China partly due to her small population. From the viewpoint of detachment between social and human development and economic development, Mongolian economy may be closer to economy in transition of the East European countries than that in the aforementioned Asian countries.

Education in Mongolia was carried out through boarding school system by gathering children at Aimag centers and Soum centers during the cold season from fall to spring. The Soviet system was naturally introduced and school meals were served at these schools. As negdel, the cooperatives that became the foundation for this system, spread across the country

about 40 years ago, all Mongolians that were in school age at that time received collective education and experienced school meals. Dishes using wheat and potato were served at these meals and gave Mongolian people the experience of eating vegetables at young age.

The food experienced in childhood plays a decisive role in the direction of dietary culture. Therefore, there are hardly any Mongolians that are reluctant about consuming vegetables (mostly potatoes) and wheat today. After *negdel* was dissolved, it has become difficult for many nomadic people to eat fresh vegetables because they are herding in areas far from the market, although it appears that cultural aversion is not at work as it did in the past.

This can also be explained from the aspect of population structure. Population of ages 49 years and below now accounts for 89.49% of the Mongolian population. Group education had been gradually practiced prior to complete diffusion of *negdel* and the young population structure of Mongolia suggests that more than 90% of Mongolians have experienced school meals and do not have resistance against grain and vegetable diet. In this sense, the Mongolian diet has changed enormously over the last 40 years.

3. Economy

(1) Trends of general economy (refer to Tables 1-19)

Mongolia had already been incorporated into the international political organization centered around the former Soviet Union before World War II and moved towards introduction of socialist-oriented planned economy after 1924. After the war, Mongolia depended on trade with COMECON (Communist Economic Conferences) countries and their assistance under the cooperation system headed by the former Soviet Union and East European countries, and worked towards economic development by imitating the former Soviet Union-oriented planned economic system.

Following the economic failure of the former Soviet Union, however, Mongolia was forced to re-examine her socialist-oriented planned economy and launched “*Shinechilel*” (Mongolian version of Perestroika) in 1985. In the correction process of distribution control system under planned control system and government procurement system in the production phase centering around state enterprises, state-operated farms and cooperatives (*negdel*), production and sales of agricultural and livestock products by private side business were approved in 1985 and independent profit system of state enterprises was introduced in 1986, contract production system and leasing system in 1987 and 1988, respectively. Furthermore, a law for the management autonomy of state farms and cooperatives was enacted in 1989.

After the national assembly decided to make a switchover to market economy system in 1990, the Mongolian government implemented the deregulation of state intervention along with another—from privatization of state enterprises and cooperatives, phasing-out of national procurement system and removal price control, affiliation with international organizations including IMF in 1991 to shifting of currency (tugrik) to floating currency exchange rate system in 1993.

In the meantime, aid from COMECON countries was discontinued following the collapse of the former Soviet Union and dissolution of COMECON in 1991, and export to former Soviet Union and East European countries dropped sharply owing to deterioration of economic condition in these countries. Moreover, economic slump of COMECON countries compelled a large number of engineers that had been supporting the technical aspects of production system in Mongolia to return to their home countries. This caused the shortage of imported materials and parts and skyrocketing of import prices. During this period, export of mineral products and cashmere products experienced a slump, and import decreased although the tugrik was further devaluated. As a result, production and export stagnated and deficit of current account balance expanded because Mongolia was dependent on import for the majority of her industrial necessary goods. Furthermore, fiscal deficit was not decreased despite the implementation of fiscal system reforms.

Steep rise in price of imports owing to liberalization of price control and devaluation of currency as well as increase in money supply to increase fiscal deficit gave rise to aggravation of inflation and expanded the deficit in current balance, bringing about a crisis in international balance of payments. Rising unemployment rate caused by administrative/financial reform, inflation and stagnation enforced the people to live in poverty and compelled the country to embark on the reconstruction of economy through structural adjustment loan from IMF and the World Bank.

Mongolia's macro economy stabilized following implementation of the structural adjustment policy, and the country's economy, which had experienced negative growth from 1991 to 1993, has recovered its production since 1994. Inflation has also settled down. However, the growth rate declined after the reform of financial and fiscal systems failed to expected results and shortage of energy supply occurred in 1996. This situation is still prevalent today.

To look at the trends of each sector after the switchover to market economy, the percentage of agricultural and live stock sector in GDP and labor force has increased considerably since 1991. However, the increase in percentage was only observed in livestock sector and the production of crop farming sector plummeted due to decline in production material import from COMECON countries and due to turmoil caused by privatization of

state-operated farms and cooperatives. The increase in percentage of livestock sector is believed to be largely attributable to the labor migration from the other sectors where the production and employment decreased and to privatization of livestock holding. Since 1996, however, agricultural and livestock sector industry's share in GDP has been declining while its share in workforce increases year after year, reaching nearly 50% in 1998.

The share held by industrial sector (textile, food processing, leather, footwear etc.) in GDP was greater than that of agricultural and livestock sector industry prior to the switchover to the market economy under COMECON's division of production system, but had been declining since 1991 owing to factors such as slump in domestic consumption, confusion in distribution of raw materials and shortage of energy supply. Recent years have seen increased production in industries such as food processing and textile, although signs of improvement have yet to be seen on the whole.

Service, construction, transportation and communication industries also lost their share immediately after the switchover to market economy but are moving towards recovery after 1996.

Changes in fundamental conditions of the economy during this period are as follows.

Trade balance was improved due to sharp reduction in import following the switchover to market economy. Export remains sluggish on the whole despite increase in export of textile, leather and lumber, while import has started increasing since 1994. Current balance has also been improving owing to expanding surplus in official unrequited transfers from the Western countries and improvement of trade balance. However, current balance deficit expanded after export floundered and import expanded in 1998.

No progress has been made in the improvement of government fiscal balance despite the implementation of cutback in fiscal spending and tax reform (e.g. increase of sales tax, import tariff, commodity tax and income tax, simplification of corporate income tax). This is attributable to the fact that government spending (for purposes such as raising public employee salary, pension payment and debt payment) increased at a faster rate than the increase in tax income. As a result, deficit in fiscal balance expanded and the aid-dependent nature of fiscal system that makes up for the deficit through foreign aid has not been improved after the system changeover.

Improvement of the financial system is also lagging behind and has not succeeded in returning people's surplus funds to investment for development. In particular, commercial banks that are indispensable for making the shift to market economy are experiencing serious shortage of staff equipped with language and computer operation skills that are needed for loan screening, bank management and international finance operations. In addition, unfamiliarity with the banking system among people has resulted in smallness of deposit. As

a result, the banks are confronted with problems such as inefficiency of banking operation, swelling of bad debt and low savings rate and are not fully playing the role of financial intermediary. However, increase in currency supply has been controlled relatively well within the range of 20 to 30%. Inflation rate is also kept below the 20% mark.

The exchange rate against the dollar plunged from 5.63 tugrig before the system shift (in 1990) to 412.72 tugrig in 1994 but has not depreciated more than 10 to 30% thereafter despite the large deficit of current balance, thanks mainly to influx of financial aid from overseas. Mongolia's cumulative debt has exceeded 50% of GDP but has maintained a rather safty level of debt-service ratio (about 10% of export amount) since 1995.

Note: Refer to Asian Development Bank Asian Development Outlook, 1998, Yasushi Yasuda "*Mongoru Keizai Nyumon*"
Nihon Hyoronsha, 1996, the Japan International Cooperation Agency, "*Mongoru Kunibetsu Enjo Kentoukai Hokokusho*", March 1997

Table 1-19

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998
GDP growth rate (%)		-9.2	-9.5	-3.0	2.3	6.3	2.4	4.0	3.5
Percentage of GDP by sector (%)									
Industry	35.6	30.2	32.0	30.9	30.5	28.8	20.6	24.1	24.1
Agriculture	15.2	14.1	30.2	35.1	36.9	36.7	36.8	33.5	32.8
Others	49.2	55.7	37.8	34.0	32.6	34.5	42.6	42.4	43.1

Trade balance (\$ million)		-140.0	-62.6	-8.7	-3.5	-22.0	-26.6	-16.8	-155.6
Export		346.5	355.8	365.8	367.0	451.0	424.3	451.5	316.8
Import		486.5	418.4	374.5	370.5	473.0	450.9	468.3	472.4
Current balance		-145.8	-90.7	-39.9	-40.3	-63.7	-101	-53	
Official unrequited transfers		41.6	38.5	71.0	77.6	67.7			

Debt-Service Ratio			10.5	10.6	16.3	12.0	11.5	9.0	9.8
Against export amount (%)									
Financial balance (100 billion Tg)		-0.24	-0.04	-0.68	-1.52	-1.15	-4.84	-6.51	-9.75
Revenue		0.65	1.19	5.48	8.61	13.63	16.29	22.25	22.73
Expenditure		0.89	1.24	6.17	10.13	14.77	21.13	28.76	32.48

Money supply (M2) (million Tg)	5633	9915	13052	42764	76777	102045	128395	170066	167250
Price increase rate (%)	0	40.4	154	268	87.6	56.8	3.2	20.5	6.0
Exchange rate against the dollar (Tg/dollar)	5.63	9.52	40.0	na	412.7	448.6	548.4	798.0	838.6

Source: ADB, *Key Indicators of Developing Asian and Pacific Countries*, 1997, National Statistical Office of Mongolia, *Mongolian Statistical Yearbook*, 1998, 1999

Chapter Two

Overview of Agriculture and Livestock Farming

1. Present Condition of Agriculture

(1) Agriculture

Agriculture has traditionally been the main sector of economy in Mongolia. It played and continues to play an essential role in providing food for the population and raw materials for the industry. The agriculture provides about a third of the GDP in Mongolia.

The economic transformation process began in 1990 and the withdrawal of support from the Council of Mutual Economic Assistance (COMECON) had a dramatic impact on the agricultural sector. After 1991, the share of agriculture in the state budget's total expenditure and total investment was sharply reduced.

The change and reconstruction are currently taking place toward privatization of state property, liberalization of prices, supporting of competition, maintenance of open external trade, reduction of state's participation in the economy, independent position of producers and consumers, and reconstruction of financial banking system. The major reforms introduced to agriculture by the Government included privatization of state farms and cooperatives, deregulation of prices of major agricultural products, and the liberalization of agricultural trade.

In the following 7 years, significant changes have taken place in the structure of Gross Domestic Product. One of the main indicators of agricultural production outcome is Agricultural Gross Product. Estimated at constant prices in 1993, its growth changes are shown in the following Table.

Table 1 Gross Agricultural Output, at constant prices of 1993

	1989	1990	1995	1996	1997	1998
Total	113510.9	109275.7	102790.1	104917.2	120532.1	119594.9
Livestock	79117.1	79334.2	87838.7	91135.3	105995.3	105316.7
Crops	34393.8	29941.5	14951.4	13781.9	14536.8	14278.2

(Thousand tons)

In 1997, the sector surpassed its previous peak level of production registered in 1989. In 1998, sector output at the constant prices of 1993 had increased by 5.4 per cent in comparison with 1989.

However, the share of agriculture in total GDP continued to decline to 32.8 percent in 1998 compared to 33.5 percent in 1997 and 36.8 percent in 1996.

During 1990-1993, value added in the agricultural sector contracted to 11 per cent. Since then, the sector has expanded steadily. In 1998, the output of livestock production constituted 87.6% of the total output of agriculture.

Table 2 Output of main agricultural products, thousand tons

	1989	1990	1995	1996	1997	1998
Meat Slaughter weight	239.6	248.9	211.7	259.9	240.5	245.8
Milk	319.3	315.7	369.6	369.8	418.6	438.1
Eggs, pieces	35.8	38.0	3.5	4.9	6.1	6.3
Cereals	839.1	718.3	261.4	220.1	240.4	194.4
Potato	155.5	131.1	52.0	46.0	54.6	65.2
Vegetables	59.5	41.7	27.3	23.8	34.0	45.7

In 1998, 194.9 thousand tons of wheat, 65.2 thousand tons of potato, 45.7 thousand tons of vegetables were harvested.

In 1998, the output of wheat declined 19 per cent owing to unfavorable weather conditions during the harvest, while the potato and vegetable harvest expanded almost 19 –34 per cent. Dairy production rose by 4.6 per cent.

(2) Livestock sector

Livestock sector in Mongolia accounts for 84.9% of gross agricultural output. Stock farming can be roughly divided into intensive livestock production system and extensive livestock production system. Intensive livestock production system can be likened to stock farming in Japan, i.e. raising varieties with specialized abilities in corrals by feeding large amount of fodder. Meanwhile, extensive livestock production system in this chapter refers to nomadism that manages native varieties by grazing them on natural meadows. Feeding of supplementary fodder has been performed since the old days but in limited quantities. As can be seen from the fact that natural meadows account for 98.9% of agricultural land in this country, nomadism—based on natural environment and the experience of nomadic people that had been accumulated over a long period of time—continues to be an important sector today, no less than it did during the traditional era and socialist era.

During the socialist era, the majority of livestock (sheep, goat, cattle, horse and camel) was owned socially by agriculture and stock raising cooperative (known as “negdel”) with limit set on number of privately-owned livestock. Total livestock population at the time of 25 million increased to 35 million after the introduction of market economy and removal of limit on private livestock ownership. At present, more than 95% of entire livestock is privately-owned, a number corresponding to 14 head per capita and 176 head per nomad. When this situation is seen in a straightforward manner, the socioeconomic reforms that were carried out successively around 1990 was successful in enabling nomadic people to achieve development in the livestock sector by urging them to independently increase the number of livestock they own, i.e. by making each and every nomad aware of their status as business entity. The fact that nomadic people started taking an essential position in the market economy by playing an important role of supplying animal products to the livelihood of cities and towns must also be noted. Moreover, there is a clear fact that workers that lost their jobs due to scale-down of industrial activities that had played the central role during the socialist era and privatization of government enterprises have been absorbed by nomadism. These facts indicate that nomadism became one of the driving forces behind socioeconomic recovery and offered a safety net for many people of Mongolia.

A look the realities of livestock industry, however, reveals the existence of a range of problems that may cause decline in both quality and quantity of products at the site of livestock production and its surrounding conditions. Among them, 8 points will be explained in the following.

The first problem is low productivity of livestock. Livestock raised in the nomadic regions of Mongolia are mainly native varieties. These animals are adapted to the severe continental climate of this country and have the advantage of being able to graze throughout

the year at very low cost, and the disadvantage of having low productivity.

The second problem is the existence of infectious disease and lack of means for coping with the resulting situation. The number of vaccinated animals in 1990 dropped to a third of the level attained in 1986 and shortage diagnosis and treatment materials and veterinarians cannot be negated.

The third problem is the reduction in number of usable wells that results in shortage of usable pastures. About half of 34,000 wells that currently exist are said to be in unusable condition. This problem can be divided into that of well maintenance and drying up of well water itself. In the case of the former, superannuation of motor-type wells that were built during the socialist era is becoming conspicuous in particular and their repair has become difficult due to shortage of materials. The ones that are usable are also becoming impractical under the situation in which gasoline prices are skyrocketing and its supply is unstable.

The fourth problem is the fact that proper mating ratio is not being maintained due to shortage of seed animals.

The fifth problem is the deterioration of natural meadows, which is the foundation of nomadism. Increasing number of nomads—whose norm was to manage livestock by moving between different quarters—have stopped migrating and started to settle in one place. This trend is particularly conspicuous in regions surrounding large cities such as Darkhan and Ulaanbaatar and is placing excessive load on pastures due to high concentration of animals.

The sixth problem is the unstable production volume and prices of animal products. Raw cashmere wool is the product that nomads have high expectations for as the source of income. Goats account for as much as 33% of all livestock as of December 1998. Moreover, Mongolia is the second largest producer of cashmere wool in the world after China, holding 21% share in the world market. To use cashmere as an example, a price fluctuation owing to the following international and domestic situation and fluctuations in production that could be inferred from such price fluctuations. The world cashmere market has gone through violent fluctuations in the past. In the recent years, ban on cashmere wool export in 1994 caused the price to soar from the lowest international price in history of US\$14 per kilogram in 1993 to US\$40 per kilogram in 1995. However, this ban was lifted in 1996 through pressure from financial institutions including the Asian Development Bank and was replaced by 30% export tariff in 1997. A motion to restart the export ban was submitted to the National Assembly and rejected in early 1999.

The seventh problem is the undeveloped nature of knowledge and skills regarding storage and processing of animal products and their marketing. To use the example of cashmere wool again, a large portion of raw wool produced in Mongolia is exported straight to China. The motion submitted to the National Assembly in early 1999 was supported by the

processors who feared that they might lose cashmere wool to processors in China. Needless to say, these facts reflect the difference in buying capacity of the two. On the other hand, as this is also caused by lack of a series of knowledge and skills such as selection, washing, processing and marketing of raw wool, it is certain that Mongolia is producing materials that can capture the world's high end market but has been unsuccessful in taking full advantage of their merits.

The eighth problem concerns the smallness of fodder production and supply. The same can be said about the intensive livestock production system and the extensive livestock production system. As shown in Table 3, the hay harvested in 1998 has been reduced by 499,000 tons compared to that in 1989 and fodder production has also declined by 68% during the same period.

Table 3 Gross hay harvest and laying –in of fodder

	1989	1995	1996	1997	1998
Gross hay harvest	1166.3	743.9	655.1	667.7	667.0
Used straw –total	99.0	33.3	21.9	16.3	15.9
Hand made fodder, in terms of fodder unit	25.6	10.4	9.1	11.3	20.3
Produced mixed fodder	169.7	13.8	4.8	4.4	3.2
Produced mineral	49.2	26.3	18.3	19.4	26.2
Fodder-total, in terms of fodder unit	1027.3	437.3	349.2	340.2	330.3

(3) Crop sector

Crop husbandry is a relatively new agricultural sector that started its development in our country in 1960. Main grains in crop production are cereals, potatoes, vegetables, and fodder. In 1989, more than 800 thousand hectares were cultivated. The wheat harvest was 840 thousand tons, producing 200 thousand tons of flour. The potato and vegetable harvest surpassed 100 thousand tons, leaving Mongolia self-sufficient in the production of these staples. This level of production was attained thanks largely to massive subsidies from the Soviet Union. With the abrupt elimination of these subsidies and the demise of the CMEA trading regime, crop production progressively declined until 1996-97.

Although grants are increasing thanks to the following year's international loan, they were distributed to other sectors and for solving problems accumulated in society.

The Government Action Plan aims to meet the domestic demand for flour, potatoes and vegetables by domestic industries and the "Green Revolution Program" has been implemented as the measure towards ensuring this target. Within the framework of "Green Revolution" national program, trade and supply organizations have imported and sold around 30 small-sized tractors and trailers. Domestically produced harrows and vegetable cultivation hand tools are also being produced. A joint Mongolian-Chinese venture has also started assembling small tractors and some basic agricultural machinery. Privatization of state-owned farms, which was completed in the first half of 1998, will also help in further increasing yields and attracting private investment.

Although the number of hectares sowed declined and the country experienced droughts and heat waves in 1998, Mongolian farmers are predicting greater yields over the previous year. Lack of seeds this year allowed only 279,500 of land to be sown—25,500 ha less than in 1998. In some areas crops withered from drought, and large swaths of land fell victim to the heat wave in late July.

The opposition party's resistance to private land ownership, including the cropping sector, is delaying the approval of the Land Ownership Law. Private ownership of cropland is necessary to attract private investment and management for crop farming, which accounts for only 1.5 percent of the total land area in the country. Private ownership of land, either through outright ownership or long-term transferable leases, is also a necessary condition for improving farmers' access to commercial credit. Under a project proposed by the World Bank, cadastral will provide the basis for the allocation and registration of privately owned croplands.

In 1998, 12.4 per cent of the total output of agriculture belongs to the crop production.

Yields for all major crops declined significantly as a result of significant decline of the cropped area. Furthermore, the level of imported machinery, seeds, fertilizers, and agrochemicals as well as higher fuel prices are having serious effect on mechanized agricultural operations while the level of interest rates and the responsiveness of marketing and procurement organizations are affecting financial input and the new pricing regime, respectively.

According to the following table, the yields of wheat and barley—which are the main agricultural crops—had declined by more than twofold in 1998 compared to 1989. On the other hand, yields of oats and fodder crop decreased by 70.7-73.8 per cent during the same period. In comparison with above-mentioned plants, decline in potato yield is less and remains at 34.6 per cent.

Table 4 Yields of staple agricultural crops, centers

	1989	1990	1995	1996	1997	1998
Cereals –total	12.5	11.0	7.3	6.6	7.6	6.3
Wheat	13.0	11.2	7.4	6.6	7.6	6.4
Barley	10.9	10.1	7.7	7.6	6.2	5.5
Oats	10.3	10.4	0.6	1.0	0.5	2.7
Potato	123.2	107.7	83.5	66.4	81.3	80.3
Fodder crops	103.4	114.5	44.7	50.8	58.3	30.3

(4) Agro-Industry sector

Agro-processing industry is an important sector for the economic development of the country. This sector consists of food, raw materials of animal origin and wood processing industries. They produce 32 per cent of Gross Domestic Production and 70 per cent of export goods.

Since agricultural production in Mongolia is highly seasonal, processing also tends to be seasonal. This has several consequences including: 1) procurement must occur in a narrow time span because harvesting is concentrated over a short period; 2) storage facilities tend to be larger, since plans have to stock raw material to extend the processing period; 3) large quantities of labor are only required seasonally, leading to problems of temporary unemployment or overmanning; and 4) capital needs are concentrated, as all processors tend to require credit at the same time.

Several factors contribute to the relatively high development potential of the sector, which seems to be the key for accelerating the development and growth of other areas of the economy, particularly those in the service sector. The key factors are: 1) agro-processing comprises a major element of industrial output in Mongolia; 2) considerable installed capacity already exist within the agro-industrial sector which, although not of the highest technological level, is generally capable of achieving the required technological level in the medium-term; and 3) changing production according to cost structure and market characteristics cause restructuring of the sector with declining importance of centralized facilities. Due to the potential of small-scale enterprise creation, agroprocessing consequently offers the greatest opportunities in Mongolia for private sector development and regional employment generation.

Lack of information is one of the obvious shortfalls which becomes apparent in the transition to a market economy and is related to number of areas including: 1) new technologies in processing, storage, packaging, and other activities related to the sector; 2)

possible suppliers of new and reconditioned used equipment; 3) market trends, prices and quantities for products; and 4) assessment of investments and other business opportunities.

2. Constraints

(1) Livestock husbandry:

Major changes are required in farming systems to improve profitability and reduce environmental degradation. While the privatization has been completed over the past four years and legislation changes that provide land use rights for 60 years remain to be enforced and widely implemented. The fact that land use rights have not been fully confirmed reduces the incentives for nomads to sustainable resource management and improve returns to their operations and thereby maximize the contribution to output and growth.

Access to capital for farm and nomad operations, traditionally the preserve of the state allocation mechanism, remains weak because of the chronic problems in the finance and banking sector at large and acts as a constraint to the performance of agricultural and livestock sectors.

Continued growth of the agricultural sector and its contribution to broader economic growth also depends on the performance of extensive livestock industry that accounts for around 70 per cent of the total sectional output. Constraints to the continued expansion of the extensive livestock sector such as pasture management and herd/flock management practices as well as inefficient distribution, lack of access to credit and inconsistent institutional support are turning into serious problems and will be tackled as a priority in the medium term.

The lack of proper supports to livestock husbandry and public sector's institutional structures remain as a further constraint to expansion of sector performance and contribution to economic growth. Although selected privatization such as the handing back of herds to individual families has occurred, considerable overlap of functions between private and public sector continues and remains as an impediment to expanded output and growth based on private sector investment.

The Government's own performance in provision of efficient and effective public sector support services remains as a constraint to achieving the fullest potential for the agricultural sector. This, in turn, is negatively affecting the transition to the market economy and the environment, both within the rural and urban communities.

(2) Agro-industry:

The major areas of constraints faced by all its subsectors are: 1) raw material supply and quality; 2) continued government support for large scale enterprises; 3) credit supply and delivery mechanisms; 4) seasonality of production; 5) access to market information; and 6) macroeconomic, financial and management factors.

3. Policy

(1) Government's strategic objective in agriculture

The Government's strategic objective in agriculture is to develop the sector as the source of income and employment for the rural population, by promoting input supply, food and other processing and manufacturing activities.

The Government's overall goals for the development of the sector in the medium-term (1999- 2004) comprise promoting growth and effectiveness of agricultural production, improving marketing efficiency, reducing regional disparities, ensuring food security and quality, and providing for socially and environmentally sustainable development. This include:

1. Improving livestock productivity and quality of raw materials
2. Rehabilitating crop production
3. Meeting food consumption needs
4. Expanding export- oriented agroprocessing industries
5. Supporting poverty alleviation and employment generation activities and
6. Ensuring soil productivity and the carrying capacity of pastures.

In support of these goals, a wide range of laws, resolutions and programs have been adopted in the last couple of years, and future measures are under discussion.

Over the medium term, the Government will build on existing reforms and focus on the remaining constraints to transformation to a market driven sector so as to improve the contribution of the agriculture and related industries to economic and social development.

The priority will be to improve the efficiency and timing of the transformation to a market driven sector and provide a consistent supporting role to facilitate emergence of competitive markets. This will be enhanced by introducing a new adjustment loan from international banks to provide the framework for further reform measures.

External assistance is needed to upgrade the quality of livestock herd and strengthen

extension services, rural markets, and pasture management.

The Government has undertaken a number of structural reform measures under the auspices of the ADB-financed Agricultural Sector Development Program but the task remains incomplete. Further reform measures are required in the medium term to focus on improving the incentives for nomads to manage the rangeland sustainably and to improve returns from improved quality output.

Government priorities will also be to reduce the structural constraints to the emergence of a market-driven agriculture by completing the privatization program and supporting the revitalization of the finance sector servicing agriculture and agro-processing. In view of the tight fiscal situation and the dominant role of the private sector, public expenditure in development projects for agriculture, particularly for maintaining existing cropping systems, will be minimized.

In addition, the Government plans to move forward with reforms to the legal and regulatory environment, including the improvement of land tenure legislation; strengthening sector institutions and private service delivery where feasible, including research and extension services, and continuing with the privatization of sector enterprises.

In order to fulfill the Government's above-mentioned goals, the roles of Ministry of Agriculture would be

- Promoting rural financing and small-scale projects
- Improving food procurement ability of farm households
- Diffusing of small-scale irrigation
- Improving road and transport network in rural areas
- Strengthening organization and personnel training
- Improving rural development

Achieving sustainable economic growth and social development depends fundamentally on improving the contribution from the agricultural sector and downstream industries to domestic production. To maximize that contribution, the agricultural and livestock sector needs to improve productivity and complete the transformation to a market based system and reduce the impact of structural constraints.

(2) Finance

The main cause behind crop production depression and unstable livestock production during the transition period is related to the not yet established state financial supporting system for those sectors. For further development of agriculture, state financial policy should be directed.

In the framework of budget, finance, loan policy in recent years-started works on identification current rule, laws to the foreign countries' sample. For example, renewed Law of Budget, Law of Foreign Investment, Law of Accountancy and other related to the finance now acting.

Besides this, in the framework of export and external trade it is important to carry out supportive policy of this sector. There is necessity of directing foreign countries' fund, technical assistance, and soft loans for construction and development of small and medium sized enterprises for processing livestock and crop's products.

(3) Crop production

There is necessity to implement on behalf of the government a definite program for crop husbandry recovery.

The action program of the Mongolian Government was aimed at providing its population with flour, vegetables and potatoes through domestic production. In accordance with this program, the following actions have subsequently been taken:

- Lay down legal basis for reforming land relations;
- Give priority to farms and cooperatives in crop industry and lay out favorable legal and financial environment for them;
- Apply mineral biobacterial fertilizers in cropping areas and protect/reproduce soil fertility;
- Direct the attention of farm managers to fight against weeds, diseases and rodents by improving plant protection methods through increased supply of domestic or imported herbicides;
- For the purpose of renewing plant seeds, produce elite seeds through a project order in research institutes, multiply seed at specialized seed farms through a state reserve order;
- Give priority to the import, test, selection and acclimatizing of high yield species, manage activities on obtaining selected sorts from countries with similar soil and climate conditions through foreign assistance projects programs and exchange of seeds;
- Introduce technical renewal in crop sector and support the initiative for mastering skills for domestic production of trailers and techniques of simple design and fast depreciating spare parts;
- Continue the policy on soft loans from international organizations and donor countries technical renovation.

Sustainable expansion of crop production in the future depends, in particular, on developing a land tenure regime that permits private ownership of cropland or the transferability of long-term leases, to provide incentives for private investment and financial

intermediation in agriculture. In addition, the seed production industry, which has virtually disintegrated, needs to be rehabilitated.

(4) Livestock husbandry:

Continuous growth of the agricultural sector and its contribution to overall economic growth relies on the performance of the livestock industry, which accounts for the majority of the sector's production. Meanwhile, future development of livestock industry depends principally on sustainable land management, including the rehabilitation of wells. Strengthening of veterinarian services and upgrading of the quality of the herd, especially of cashmere goats, also is needed. The pastures that are most productive and closer to cities are under heavy pressure due to expansion of livestock herd, excessive concentration of herds near urban centers, limited mobility of small nomads (many of whom are from female-headed households) and limited reach of transport and marketing infrastructure.

Land ownership continues to be a pressing issue both for cropping and grazing land requiring prompt solutions.

(5) Agro industry:

Important areas for government activity in the near and medium-term are: 1) facilitation of seasonal finance through strengthening of the financial sector; 2) divesting storage functions of the milling companies to allow new market entrants and increase competition; 3) encouraging research institutions to work closely with the industries they serve; and 4) supporting management training for existing managers and revision of school and university curricula to reflect new skills required in a market economy.

The following materials were attached in the following for reference purposes.

Reference 1: Strategy of the Mongolian Government by Sector and Proposed Projects 1999-2000 in the Seventh Conference of Nations Assisting Mongolia --Agricultural Sector—

Reference 2: Main Farm Products 1989-1998

Reference 3: Ministry of Agriculture, Mongolia, Implementation Plan for “Basic Policy of Socioeconomic Development in Mongolia for Fiscal 1999”

Reference 4: Cooperation of Third Countries and International Organizations for Mongolia

Reference 5: Present Condition of Cooperation by Japan in Agriculture and Forestry Sectors to Mongolia

The plans for mining sector was included in Reference 3 “Implementation Plan for “Basic Policy of Socioeconomic Development in Mongolia for Fiscal 1999” because Ministry of Agriculture is also in charge of mining in Mongolia.

Chapter Three

Stock Farming and Agriculture in the Surveyed Region

1. Overview of Stock Farming and Survey Results

(1) Overview of Stock Farming

The impact of *perestroika* that started in the latter half of the 1980s in Soviet Union also reached Mongolia and eventually gave rise to numerous reforms including adoption of the multi-partisan system, introduction of market economy and change in the country's name from the Mongolian People's Republic to Mongolia (Table 3-1).

Table 3-1 Process of Democratization

Year	Item
1986	Economic reform and " <i>if-tod</i> ", a Mongolian version of <i>glasnost</i> were launched
1987	Ban on private livestock was practically lifted.
1989	Demonstration demanding democracy held in Ulaanbaatar
1990	The Democratic Party of Mongolia, the first opposition party in Mongolia, was formed. The first free election under the multi-partisan system took place. Private Ownership Act was enacted.
1991	Introduction of market economy
1992	The new democratic constitution was adopted. The country's name was changed to Mongolia.

Prepared from *Modern History of Mongolia*, Masao Onuki, p.18-19, 1993

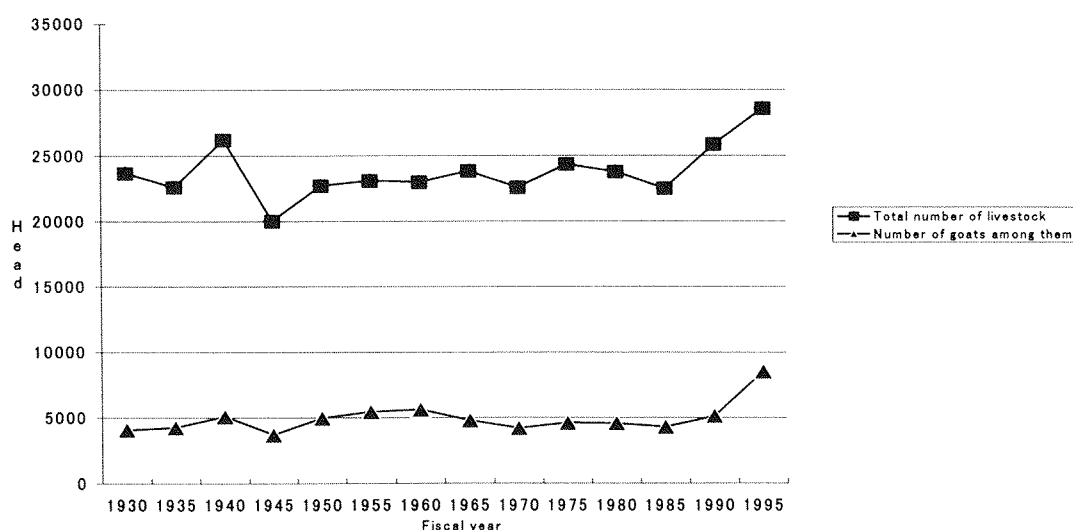
The reform of socioeconomic system that took place in and around 1990 transformed the very structure of livestock production (as exemplified by the extensive feeding of the five livestock varieties at each nomadic households which was practiced during Hot-Ail Community Era and exerted large influence on the management method of nomadic livestock.

In this section, the present situation of nomadism will be described with regard to number and composition of livestock raised by comparing with those during the Hot-Ail Community Era and the Socialist Era as required.

1) Number and composition of livestock raised

Changes in total number of livestock raised in the country are shown in Figure 3-1. Total number of livestock was less than 1 million around 1920 but rapidly increased during the 1920s and 1930s, allegedly as a result of expulsion of foreign capital and anti-feudal policy taken by the People's Government that came into existence in 1921. As the factors hindering the development of Hot-Ail Community were removed, the livestock population reached the 26 million mark in 1940. (This number was considered the highest in history until 10 years ago.) The number then dropped to 2 million in 1945 due to the effect of World War II but quickly recovered and remained around the 23 million mark. "Stagnation of nomadic industry" was pointed out with regard to the fact that no conspicuous increase in number of livestock was observed during this period of nearly 40 years. However, the likelihood of productivity in nomadic industry actually "stagnating" is small as such view was expressed by policymakers with the intent of establishing more effective management system. This can be inferred, for instance, from the aforementioned increase in population and export.

Fig. 3-1 Changes in Number of Livestock Raised (1930-1995)



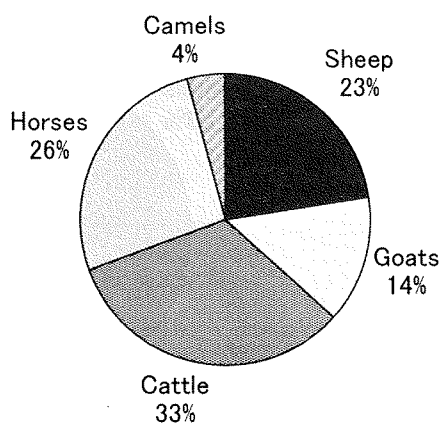
Source: Prepared from State Statistical Office of Mongolia (1996)

Total number of livestock continued to increase following the introduction of market economy and private ownership of livestock, reaching the record high of 28.6 million by the end of 1995. This increase was attributed largely to the increase in number of goats. As private ownership advanced, profit from sale of livestock products was returned directly to nomads. In addition, cashmere from goats among livestock products has become a major source of income for nomadic people as virgin wool harvested from 3 castrated males sells for price comparable to a monthly income of public servants. Increase in number of goats raised is the result of having kept them by minimizing their slaughter to harvest as much cashmere as possible. It is also the result of increase in number of households that slaughtered sheep for domestic consumption instead of goats.

It is not necessarily correct to grasp the percentage of each livestock variety in total number of livestock raised (composition of livestock raised) in real number since counting a sheep in the same manner as a cattle or a camel often results in wrong judgment. For this reason, a livestock unit for converting different varieties of livestock according to certain ratio has been adopted in Mongolia. It is referred to as “bod” in Mongolian and a unit corresponds to one sheep or goat. An example of livestock conversion ratio would be “sheep: goat: cattle: horse: camel = 1: 1: 6: 6: 7.” Conversion ratio of this sort does not strictly reflect the ratios of liveweight, wool output, milk output, and is used for solely for the purpose of convenience.

Livestock composition for the entire country calculated according to this livestock unit is shown in Figure 3-2. A point worthy of note in this table is that sheep, cattle and horses account for roughly one-third to one-fourth of the entire livestock.

Fig. 3-2 Composition of Livestock Raised in the Country



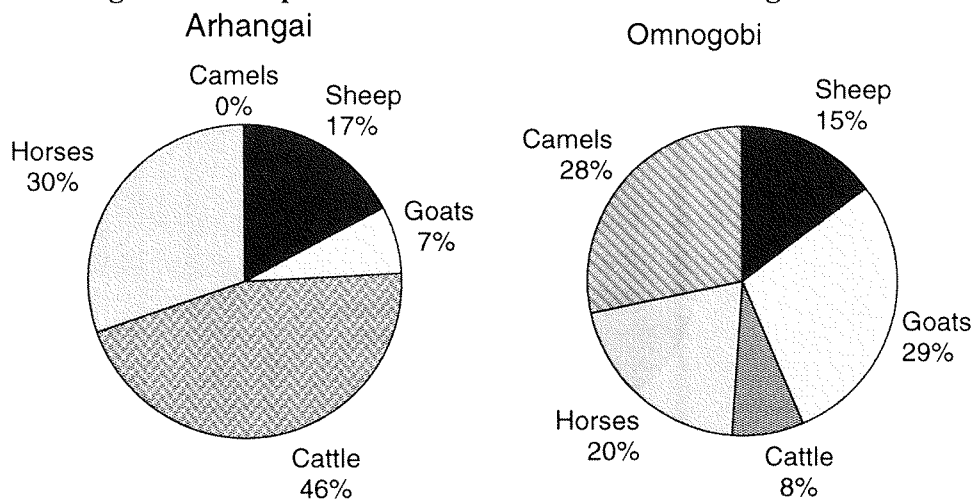
Note: Calculated from livestock unit (sheep: goat: cattle: horse: camel = 1: 1: 6: 6: 7).
 Source: Prepared from State Statistical Office of Mongolia (1996).

2) Regionality of livestock raising

While the five livestock varieties are distributed throughout the country, the manner of their distribution differs in accordance with the degree of access to the market and the geographical and social conditions of a location including characteristics of each livestock variety. It is natural for regions near large cities such as Ulaanbaatar and Darkhan to have better access to the market, it is worthy of note that these large cities are situated favorably in terms of topography and vegetation.

Figure 3-3 shows the livestock raising composition calculated according to livestock unit by taking up the region from Hangai to Arhangai Prefecture, and from Gobi to Umnugobi Prefecture as typical examples. Generally speaking, cattle and sheep are common in Hangai whereas camels and goats are dominant in Gobi. Populations of sheep and goats are particularly large in the western highlands and the country can be divided into four nomadic regions. In the western region, sheep comprise the main livestock and goats are mixed because of their strength in grazing at high altitudes and on steep slopes. Yak is also commonly raised in this region for their resistance to cold weather. Northern region is close to large consumption centers and is rich in feed resources. For this reason, it placed cows and dairy-beef cattle at the center of management and incorporated sheep management to become a productive cattle-sheep district. The eastern region is a stretch of vast prairie where sheep management is combined with horse management. The southern region of Gobi is suited for camels and goats because of their resistance to heat and dryness and their ability to endure extensive management. In contrast, cattle and sheep are not suited for this region.

Fig. 3-3 Composition of Livestock Raised in Hangai and Gobi



Note: Calculated from livestock unit (sheep: goat: cattle: horse: camel = 1: 1: 6: 6: 7).

Source: Prepared from State Statistical Office of Mongolia (1996).

(2) Results of field study

Matters of present concern for the nomadic industry in Mongolia are more or less as described in Chapter 2. One of the most important problems among them is the possibility and actuality of disturbance in the ecological environment (which is the base of nomadism) with city suburbs being affected more seriously than other areas. For this reason, we conducted a field survey to obtain basic information regarding the reality of nomadic industry and nomadic households in the suburbs. While much of meat consumed by urban residents and the majority of exported meat are processed at meat processing factories, their rate of operation has remained at a low level for quite some time. We therefore conducted a supplement study about the reality of meat processing factories.

The field study was conducted in the form of hearing study by visiting meat processing factories in Darkhan and 16 livestock-owning households that stay in Tuv Prefecture and Ulaanbaatar for the summer. All surveyed areas were located in Hangai regions with rich vegetation in city or suburbs.

1) Meat processing factories (Darkhan)

A meat processing factory established in 1974 by assistance from Hungary and currently possesses the second largest processing capacity in Mongolia. It slaughters and processes 300 large-sized livestock and 1,500 middle-sized livestock per day and has a capacity to freeze and refrigerate 100 tons of meat. Annual meat processing capacity was 3,200 tons around 1994 when freezing and refrigeration facility had superannuated but was increased up to 5,000 tons as a result of facility improvement carried out through grant aid from Japan in 1994-1995. However, only 1,400 tons of meat was processed in the previous year of the survey with rate of operation falling below 30%. In addition, cattle were the only livestock that was slaughtered and processed.

In the year prior to the survey, 550 tons out of 1,400 tons of processed meat was collected by “taabaar” in Mongolian. They visited nomadic households in May and June when the animals are lean, bought cattle at low price and carried them to the factory by August 15. The factory operated from July to December and the workers received an average salary of 50,000 tugrig per month during the months they had work and 20,000 tugrig per month during the months they did not have work. Aside from “taabaar”, livestock was also collected by other vendors that brought their livestock.

About 1,000 people worked at this factory in the 1980s, exporting 40,000 tons of meat to the Soviet Union every year. However, the socioeconomic reform that took place around 1990 had significant impact on this company that had just gone through the privatization process as it deteriorated its management, making it difficult to renew its facilities and leading

to cutback in number of its workers. The meat processing situation in 1994 can be inferred from the fact that factory had 520 workers at the time. The factory currently employs only 300 workers and the meat processing results are as described above—an indication that business scale continues to diminish despite grant aid from Japan.

One of the main reasons mentioned for reduction of business aside from infection was the lack of market. The only destination that this company is currently exporting is Irkutsk, a city connected directly with Darkhan by railroad. In Irkutsk, demand exists solely for beef and only in small quantities. Moreover, the payment for beef sold the year before allegedly has not been paid. In other words, it is a problem not only of a single company or nation but involves the vulnerability of economic base of a neighboring nation continues to exert strong influence on Mongolia.

2) Households owning livestock (Ulanbaatar, Tuv Prefecture)

(a) The results of hearing conducted on each household

Bornuur County, Tov Prefecture (Household #1)

Household #1

The quarters are located along the paved arterial road between Ulaanbaatar and Darkhan with a wheat fallow that is turning into wasteland nearby. This case is characterized by the fact that the household consists only of elderly couple and is therefore experiencing chronic shortage of labor and that it has the problem of successor. Number of livestock is not by any means large, although it is sufficient for the couple's cash income (they also receive 10,000-12,000 tugrig per month as pension) and reproduction of the herd.

Husband is 63 years old and wife is 62 years old. The couple has 7 children. The eldest son with university diploma has a car and is engaged in "naimaaa" (the so-called peddler—those engaged in this business is called "naimaachin"). Others are working as public servants, running a restaurant, and working in Eastern Europe. None of them live their parents. However, the couple live with 3 grandchildren under age 14 and looking after them.

They became nomads in 1992, the most obvious motivation being their qualification for pension. The number of livestock had increased between 1992 and the time of survey from 40 sheep, 5-6 goats, 10 cattle and 10 horses to 100 sheep, 40 goats, 30 cattle and 20 horses.

Nevertheless, much change had occurred in number of livestock compared to 1 year before the survey. Firstly, they had "zod" (snow damage) the previous winter. Snow started falling around October and reached the depth on one's knee, repeating the process of

melting and freezing several times thereafter. Animals could not feed themselves and 20 cattle starved to death. One of the reasons that exacerbated the damage was not having been able to carry the grass they had harvested in the pasture due to snowfall, even though they had purchased 320,000 tugrig's worth of hay and bran (hay 600 tugrig/25kg × 200, bran 2,000 tugrig/30kg × 100—purchased price of hay and bran differs depending on time and region) as supplementary feed. They slaughtered 6 sheep and 1 cattle in December for domestic consumption. After entering this year, they have been slaughtering 1 to 2 sheep every month since June and plan to continue this until November. On the other hand, young including 65 lambs and 7 calves were born.

They sold 40 sheep and 16 horses this year. As for sheep and goats, their children took them to Ulaanbaatar and sold them for a total of 800,000 tugrig. The market price in Ulaanbaatar was 30,000 tugrig/head for ram, 17,000 tugrig/head for ewe. This year's selling price was not by any means high. The couple were happy about the outcome, saying they would use that money to buy a car for their children. The horses were sold to a nomad acquaintance. The couple sold 16 horses (comprised of 14 horses and 2 foals) for 1,200,000 tugrig. This household sold only sheep and horses this year, although they had clearly different business strategy for sheep and horses, i.e. to maintain the number of sheep and reduce the number of horses.

The uniqueness of this household lies in the fact that they had scheduled the lambing for both their sheep and goats from mid-March to early-April and that they had completed milking of their goats at the same time as milking of their sheep in early July around the time of "Naadaam". Management of this household is constantly confronted with the issue of labor shortage and the two points mentioned above were part of their effort to reduce their workload. In fact, they had sold a large number of horses for the same reason.

They do not have a successor at this point. The couple can raise livestock on their own and make a living for the time being, it is clear that they will not be able to eventually. When asked whether they are thinking about up their nomadic life for a lack of successor, they responded, "We want to have someone raise the animals. Since the eldest son is more interested in nomadism than any of his brothers and sisters, he will probably take over." Since male primogeniture has traditionally been practiced in the nomadic community of Mongolia, a modern inheritance not conforming to custom was observed in this case.

Zuunmod County, Tov Prefecture (Household #2)

Household #2

This case is characterized by the fact that, although their management scale is similar to that of Household #1, they are holding back on sales of their livestock, and that the couple

that started raising livestock very recently are in their forties and are in the prime of their life. In addition, their damage from “zod” was limited even though, like Household #1, they moved long distances and had purchased far less supplementary feed.

This couple of 48 year old husband and 42 year old wife have 3 sons with the 19 year old being the eldest. The eldest son has been helping with nomadism after graduating from 8th grade. The couple was married in 1980. Husband was a negdel driver and wife was still a student at a commercial college. After marriage, husband continued to work as a driver and wife was working at a “zakha” (market) in the central district of the prefecture.

The two entered nomadic life very recently in 1997. Husband was born in a nomadic household and grew up helping the family since childhood, while wife grew up in central district of a county and therefore had hardly any experience of doing work related to nomadism. Starting from 20 sheep, 20 goats, 4 cattle and 10 horses, they had increased their stock to 100 sheep, 40 goats, 10 cattle and 40 horses in only 2 years’ time when the survey was conducted. As 25 sheep, 10 goats, 4 cattle and 6 horses were born that year, the number of newborn young was comparable to that of total stock they owned in 1997.

The household had slaughtered 3 to 4 head each of sheep and goats, 2 cattle and 1 horse in November of previous year and has been slaughtering 1 to 2 sheep every month from July to October of the surveyed year for domestic consumption.

The status of their livestock and livestock product sales is as follows. First, they sold a total of 10 head of sheep and goats to a “naimaachin” that came to visit and at zakha by going to Ulaanbaatar for a total of 150,000 tugrig. They also sold 50 kg of raw sheep wool at 50 tugrig/kg to a naimaachin and 10 kg of virgin cashmere at 1,200 tugrig/kg at a zakha, earning a total of about 300,000 tugrig. Considering the condition of such slaughter and sales as well as the number of young born during the surveyed year, it appears that this household is moving in the direction of gradually increasing the number of their stock.

Their winter quarters are located in the land where husband was born. They explain that it is convenient in many ways to have the feel of the place. They arrive at their winter quarters in November and leave in end of March when the snow melts. Their summer quarters are located near the center of the county and they stay at 3 quarters when traveling between summer and winter quarters by relying on the knowledge obtained from nomadic parents. They use both well water and water from creek at the summer quarters but use river water and snow at other quarters where well is not available. They travel a long distance of 250 km a year, using a truck as means of transportation for the entire travel.

They purchase about one-tenth of supplementary feed compared to Household #1 for both hay and bran. They also do not harvest hay. Nevertheless, they did not experience as large a damage as Household #1 from zod the previous year except for a miscarriage of a

horse.

The condition of pasture appears to be poor around their summer quarters. The explanation given to us was that many other households move their quarters to a nearby town in the summer and swarming the entire area with livestock. However, they have not even heard of confrontations occurring over grazing land.

The couple are expecting their eldest son who is working as nomad after graduating from 8th grade to become their successor and hoping the other two sons to become independent in other occupations.

Ulaanbaatar (Households #3 through #5)

A district where the influence from existence of old perm nearby could be felt. Perm is a group that belonged to negdel organization, a group that was collecting large number of dairy cows in one place for milking and processing of dairy products, during the socialist era. Many of the cows that were released are currently owned and managed by nomads. We selected and visited 3 households from about 10 households that were clustered together among the gers that were lined along a mountain stream for the survey.

Household #3

The couple is almost done with child rearing and is about to let the next generation take over. They are similar to Household #1 in the sense that they are trying to cut down on their workload and raise livestock with limited labor by reducing the number of animals they have to manage on a daily basis. The difference between the two is that this household is entrusting the management of their livestock instead of attempting to sell them to reduce labor and that it has source of cash income aside from nomadism.

Husband is 58 years old and wife is 53 years old. The couple has 7 children aged 19 to 36 and only their third son (their sixth child) live with them to attend school. All other children graduated from national university or college and 3 of them have become nomads. Wife is a pensioner and receives 1,200 tugrig per month. The couple also takes advantage of their former career and sells tree seeds, earning about 100,000 tugrig per year.

The couple married in 1962. The two had worked at local forestry office for more than 10 year and were engaged in forest management such as clearing the undergrowth. They became nomads in 1993. They had received a part of livestock owned by their parents at the time of their marriage and had been keeping a small number of stock. In 1993, they owned 80 sheep, 10 goats, 30 cattle and 20 horses. Their present stock is more or less the same as 6 years ago except for reduction in number of horses to 6.

However, this household only manages cattle and horses. Cattle are mainly used for

dairy. Breeding cattle are divided into two groups and mated at different periods of the year to enable year-round milking. Horses are raised for riding and loading. Management of sheep and goats has been assigned to a nomad daughter. They do not sell sheep, goats, raw sheep wool and raw cashmere wool themselves and entrusts all of this work to their daughters. They slaughter 1 sheep every month from June to September and have dressed carcass after slaughter and disjoints delivered in winter. The household moves only twice a year, i.e. they simply go back and forth between summer and winter quarters that are located only 4 to 5 km apart from one another at the upstream and downstream of the same mountain stream. They say the quantity of pasture is sufficient. For this reason, the amount of work at this household is markedly less compared to other households. They have 8 breeding cows they use for milking, and their main work consists of year-round milking and dairy product processing and selling milk and dairy products in Ulaanbaatar. They also harvest 5 truckloads of hay for domestic use and only purchased bran as supplementary feed.

The third son living with the household is currently 21 years old and is expected to marry in the not-too-far future. The couple will be preparing 50 sheep, 2 breeding cows, 5 breeding horses, 5 castrated horses as bride price.

Household #4

A household on home relief owning only 9 head of livestock. It is special in the sense that it does not own sheep or goat. They purchase meat at Ulaanbaatar for consumption as they are unable to slaughter their domestic stock.

The couple is both 40 years old and has 6 children from the 21-year-old eldest son down who live with them except for the second son working at a factory in Ulaanbaatar.

They married in 1980. Husband was a tractor driver and wife was working in service sector related to railroad. The couple lived in Ulaanbaatar for several years. However, wife started to work in a perm after husband had become nearly bedridden from an accident in 1987. Perm was privatized in 1992 and the couple entered nomadic life.

In 1987, the couple only owned 2 horses aside from a cattle they purchased from the perm. Their stock has not increased much since then as they only own 8 cattle and 1 horse. Two castrated horses died of starvation during the zod that occurred in the spring of this year after eating up all the supplementary feed they had prepared.

As breeding cows are not included in the 8 cattle they own, they use the breeding cows owned by a neighbor household. Breeding cows for 2 newborn calves are lactating and the couple are earning cash income by selling their milk and yogurt ("tarak" in Mongolian) by visiting apartments in Ulaanbaatar. They go to the city 3 times a week in summer when milking volume is large and sell 10 liters each of milk and yogurt at 250 tugrik/liter. Since

milking volume per breeding cow is estimated at 10 liters/day, this household is selling about half of the milk they produce. Their monthly turnover can be estimated at 60,000 tugrig. This income concentrated in the summer, when combined with the pension they receive throughout the year, should be sufficient for purchasing foodstuff such as meat and grains.

The household always migrates with a distant relative that sets up its ger next to theirs and uses a cattle-drawn cart to carry their load. Their summer and winter quarters are only several kilometers apart. Like Household #3, they go back and forth between upstream and downstream of a mountain stream. We were told that availability of pasture is limited, one of the reasons being the increase in number of nomad households in the area. Quite a few unfamiliar people have come from Ulaanbaatar as nomads. Some came from western Mongolia such as Uvs Prefecture and Hovd Prefecture. Another reason is the existence upstream of grazing area for musk deer which is a protected animal. Access to this area and grazing there is restricted.

The livelihood-related problem of this household was an economic one. For instance, they must give 30 kg of meat to their children living in dormitories every year. They do not have enough money to buy them new clothes. In addition, there is another problem unique to this area of milk collection system not being established even though there are many households raising breeding cows.

Household #5

A household of elderly couple from Uvs Prefecture. Their 8 children starting from a 42-year-old eldest daughter live in Ulaanbaatar or its suburbs and therefore do not live with them. It was a household that seemed to have created a small community based on kindred and geographical connection, as exemplified by their 31 year old third son moving in from Uvs Prefecture the year before and setting up a new home as a nomad nearby.

This household owns a total of 100 head of sheep and goats combined, 10 cattle and 30 horses. The couple's main income consists of their pension (37,000 tugrig per month) and 90,000 tugrig (9,000 tugrig/kg × 10 kg) from sales of cashmere wool. From this income they had purchased hay and bran as supplementary feed for 220,000 tugrig (which corresponds to about half year's worth of their pension) in the previous year, although they lost 20 cattle from starvation due to zod. They do not sell their livestock and use all of them for domestic consumption. As for the volume of domestic consumption, they slaughter 10 sheep and 1 cattle in winter and 4 to 5 sheep every month in summer when their children take vacation and visit the couple with their families.

This household also migrates along a mountain stream between summer and winter quarters that are only 5 km apart. Migration is always accompanied by households of their

children, relatives and acquaintances from the same province. Although shortage of places for grazing and migration does not exist at the moment, they feel that it may surface if the number of settlers increases in the future.

The household owns less than 150 livestock but did not give an impression of living in poverty as it was a household of elderly couple that lived in a community comprised of relatives and people from the same geographic area. However, they would have to pay 240,000 to 400,000 tugrik a year in tuition if they are to send their youngest child to college. Their income is sufficient to maintain their daily life but expenditures for education would create an extremely large burden.

What they had to say about their migration was as follows. First, the couple moved in 1972 for the purpose of improving the educational environment for their children. Although they did not have any concrete occupation in mind, they wanted their children to find jobs that would involve travels abroad by going to “good schools” and by receiving “good education.” In the case of the third son that came last year, there were economic problems such as not being able to sell his livestock in local areas in addition to the issue of education. These facts seem to give a glimpse of problems similar to those being experienced by many countries other than Mongolia that originate from the gap between urban and rural regions.

Altanbolak County, Tov Prefecture (Households #6 through #10)

Located approximately 60 km south of Ulaanbaatar. The area is somewhat drier compared to the suburbs of Ulaanbaatar and vegetation is sparse. Well and well water are occasionally causing problems as the people of this area seldom use river water and are often dependent on well water and spring water.

Household #6

A household mainly consisting of elderly couple. This household and Household #7, the next household we visited, were adjoining each other. Four households of relatives and acquaintances had set up their summer quarters there. These summer quarters were located several kilometers from the center of the county. We were able to gather basic information about this area, including life connected with the county center and Ulaanbaatar as well as condition of pasture and well use.

Husband is 78 years old and wife is 68 years old. They are nomads since before the negdel era. The two have 6 children between them and live with their fifth child who works in the country center, their sixth child who is looking for a job and a 15-year-old grandchild going to school. They own about 100 head of livestock, sheep, cattle and horses combined, which is not by any means many. However, they are able to maintain their management

scale as the total number of livestock sold or slaughtered is smaller than the number of newborn livestock. As for livestock products, they sold 2 to 5 liters of milk and dairy products at the county center for 100 tugrig/liter. They also sold 20 kg of sheep wool and 5 head of sheep at a zakha in Ulaanbaatar for 100 tugrig/kg and 20,000 tugrig/head, respectively. On the other hand, they spent 110,000 tugrig to purchase supplementary feed and harvest their own hay.

They migrate a distance of 30 km a year, an average distance among people living in the area. They have abundant water at their winter quarters where they access to Tuul River, while the well water they use at their summer quarters is not sufficient. The household usually migrates with the other 3 households. They gave shortage for place of migration and pasture and gave increase in settlement from western Mongolia and shortage of wells as the reason. Settlers naturally seek water. As a result, pastures close to rivers and wells are devastated as they become crowded with livestock. They explained that there are times when have to wait a long time at the well before they could let their livestock drink water and that there is sometimes not enough water at the well. There are also water pumps that were installed during the negdel era that are not used because of machine trouble or lack of funds to pay for the gasoline. To improve this situation, it is necessary to restrict settlement from western Mongolia or divert such settlement to unused land while digging new wells and realizing their proper management.

Household #7

This household adjoins Household #6 and is comprised of an unmarried woman and 2 children. Their living standard appears to be reasonably high as they own relatively large number of livestock, although some shortage of labor exists.

The woman is 32 years old and her children are ages 9 and 7. They own a total of more than 200 head of livestock, consisting of 110 to 120 sheep, 38 goats, 30 cattle and 40 horses. Livestock slaughtered for domestic consumption included 10 head of sheep and goats combined, 1 cattle and 1 horse. They did not sell any livestock. Considering the number of family members and situation of slaughter and sales, this household owns enough livestock to live on and can increase the number of their stock year after year. Their problem is shortage of labor, particularly in spring when lambs and kids are born. They also end their goat milking by the end of July.

They did not sell their livestock because it is difficult to go to Ulaanbaatar and they did not particularly need extra cash. They sell their raw wool from sheep and goats to naimaachin for a total of 140,000 tugrig. They did not sell any milk or dairy products. The woman's brothers living in Ulaanbaatar visit here occasionally to exchange grains and

vegetable with dairy products and meat. They had spent about 10,000 tugrig on supplementary feed.

The household migrates 3 times a year between its winter, spring and summer quarters for a total of about 20 km. They use well water in winter and summer quarters and experience water shortage in summer. Like Household #6, they gave shortage of pasture, wells and well water as the problem and thought these problems were caused by the same reasons mentioned by Household #6. They also felt that amount of grass also declined. Specifically, grass has become shorter compared to 10 years ago and the trend has become particularly conspicuous in the last 3 years.

Household #8

A household owning a large number of livestock, exceeding 600 head in total. They travel long distance with the household of husband's brother (Household #9).

Husband is 33 years old and wife is 29 years old. The couple became independent from their nomadic parents and became nomads themselves when they married in 1991. They have 3 children with the eldest being 8 years old. The household owns a large number of livestock including 500 sheep, 70 goats, 22 cattle and 28 horses. They finish milking goats and sheep by the end of July because they have sufficient labor and have enough cows they can milk as well. They do not sell their milk, dairy products or livestock. The household's main income comes from selling 100 kg of raw sheep wool for 12,000 tugrig to naimaachin and 20 kg of raw cashmere wool for 240,000 tugrig.

They have summer quarters on the bank of Tuul River and use the water from the river. They also have winter and spring quarters and their annual migration is done with the household of husband's brother under the initiative of this household. While the move from winter quarters to spring quarters requires a truck as they have to travel a distance of 90 km, a cattle-drawn cart is sufficient for the move from spring quarters to summer quarters as the two are only 1 km apart.

Household #9

A household of a young couple traveling with Household #8. Owns a relatively large number of livestock and is selling milk and dairy products at the county center. We also asked them questions about the settlers.

This couple of 25 year old husband and 24 year old wife just married the year before. They started last year with their combined bride price consisting of 100 sheep, 70-80 goats, 20 cattle and 30 horses and their total number exceeded 300 after 50, 20, 7 and 5 head of young were born this year, respectively. While labor is probably in short supply, the amount

of work appears to be reduced significantly through cooperation with Household #8.

They slaughter about 10 sheep and 1 cattle in a year. They do not slaughter goats because raw cashmere wool sells for high price and were more attracted to raising goats than sheep. They do not sell their livestock. In addition to selling 150 kg of raw sheep wool to naimaachin for 15,000 tugrig and 135 kg of raw cashmere wool at a zakha in Ulaanbaatar for about 170,000 tugrig. They have sold a total of 100 liters of milk at the county center before the survey was conducted.

Their response to condition of pasture and impact of settlement was as follows. Condition of pasture has definitely deteriorated compared to 10 years ago. However, desertification is not taking place and there is still land for migration. Nevertheless, settlements from western Mongolia such as Uvs Prefecture is increasing. They are causing a bit of a problem by grazing near the winter quarters of other households in late autumn.

Household #10

The family has a disabled member and only owns 10 goats. The household is making ends meet by receiving public assistance and helping the work of other households.

The householder is a 48-year-old woman who lives with her elder brother, 18 year old son and 6 year old daughter. Her brother and daughter have disability. The woman was working in perm from the age of 10 until around 1990. She gave birth to a child from each of her 2 marriages but divorced and was bereaved of her respective husbands. She is not in good terms with any of her relatives and cannot rely on her deceased husband's living in center of the county. She is on welfare and receives 20,000 tugrig per month including the amount her bother receives. In addition, she is receiving supply of flour, candles, matches and used clothes from the county. They also need to live in the quarters of other nomadic household so that they could receive shares of milk, dairy products and meat or be invited for a meal in return for helping the shores of that household such as grazing and milking. Recently, the eldest son helped another household's work and received clothes and 2 pregnant ewes. This household only owns 10 she-goats and no seed goat, they have to graze their stock among the herds of other households.

Suburbs of Ulaanbaatar, Toy Prefecture (Households #11 through #16)

Household #11

Household #11 and Household #12 adjoin each other and set up their summer quarters along a highway stretching from Ulaanbaatar. The city can be seen far in the distance. The two households only leave Ulaanbaatar for 3 months in summer and live in gers.

The couple of Household #11 are well-educated and earning high income from other

jobs. They are not nomads and, as the informant mentioned, the reasons they own livestock was to lead a healthy life on one hand and manage their assets on the other. They are engaged in livestock management, milking and dairy product processing only during the 3 summer months.

The couple is both 40 years old. Husband has an experience of studying in Moscow and currently works as a prosecutor and wife is a member of the Science Academy. Grandmother who became the informant is receiving pension. They have a high combined income of more than 100,000 tugrig per month. The couple have 3 children and their eldest daughter is studying abroad.

The household started raising livestock 3 years ago. One of the reasons was the desire of grandmother to let her grandchildren lead a healthy life. She says that life in a city is unhealthy and that one can become healthy by raising animals in the country and eating dairy products. They started with 1 cattle and 6 horses. The number has currently increased to 3 cattle and 40 horses.

This household is managing livestock for only 3 months from around June 10 to around September 10. Therefore, milking of cattle and horses is limited to this period. In other months of the year (i.e. while they are staying in Ulaanbaatar), they entrust management of their livestock to 6 young nomads after preparing the supplementary feed for cattle. The content of assignment has been documented in the form of a contract. According to this contract, the nomads receive 1 out of 10 ponies born as remuneration, and are free to milk cattle and consume or sell the milk and dairy products. The nomads also receive 20,000 tugrig per month of compensation.

The 6 young nomads are also put in charge of managing livestock owned by households other than Household #11. In particular, they are looking after as many as 700 horses. Because horses have the behavior of eating grass by the root, it is not desirable to graze them at one place over a long period of time. For this reason, the young nomads are continuing the hard labor of grazing and managing livestock by continuing to move even in the winter. On the other hand, entrusted cattle and horses in poor health are managed by their families at their winter quarters. While the negdel system has collapsed, the method of managing large number of certain entrusted species survived the termination or was created anew by imitating the old method and continues to exist as a result.

Household #12

This household is similar to Household #11 in the sense that they live in Ulaanbaatar except in summer but differs in these sense that they manage their livestock throughout the year. For this household, milking cattle to obtain milk and dairy products that they sell is

more important than domestic consumption. The household was performing unique management for this purpose.

Sixty year old husband and 49 year old wife have 6 children between them, of whom 2 daughters going to college and a ninth-grader son live in the same house. The couple first owned livestock in 1990 and started managing their livestock by going to suburbs in summer in 1994. As of December 1998, they owned 8 cattle and 2 horses. Four calves had also been born at the time of the survey.

The couple's basic income from their combined pension amounts to 33,000 tugrig per month. They also have income from selling milk and dairy products. In addition, they sold 2 breeding cows for 360,000 tugrig they year before the survey to pay for their daughters' tuition.

This household milks their cow year-round and was using the following management techniques to prevent their milking volume from dropping in winter and spring. Firstly, as for mating, this household does not have a seed bull and therefore has to let their cows graze with those from other households for mating. In the surveyed year, all of their 4 breeding cows were impregnated by mating with seed bulls belonging to Household #11. They time their mating by counting backward so that calves will be born between winter and spring. In fact, all of the 4 calves born that year were born as planned between December of the previous year and April of this year. The second technique concerns supply of supplementary feed. They purchase a truckload of vegetables such as potatoes, turnips, carrots, onions and cabbages that have become unsuitable for human consumption in addition to hay and bran, paying as much as 500,000 tugrig in total. Moreover, they slaughter their bulls as soon as they become 2 years old in order to feed as much supplementary feed as possible to breeding cows. It is through these efforts that this household is able to maintain the same milking volume as summer of 8 liters per head during the cold season while realizing production of milk and tarak that can be sold at 400 tugrig per liter as opposed to summer prices of 250-300 tugrig.

Household #13

Households #13 through #16 set up their summer quarters at a health resort located about 30 km from Ulaanbaatar and about 5 km from the prefectural center. Households #13 and #14 were setting their summer quarters along the highway connecting Ulaanbaatar and the health resort along with 8 other households. A mixture of nomads and households from the prefectural center live in this area.

Household # 13 is comprised of 60 year old husband and 58 year old wife who have 6 children. Only their 23 year old last child and the third son live with them. None of their

children are engaged in nomadism. Husband is usually participating in corporate management as vice president and has an income of 50,000 tugrig per month from the job. His wife mainly takes care of the animals.

They owned less than 100 head of livestock, namely 36 sheep, 40 goats and 14 cattle, at the time of the survey. However, they were making a little profit from the sales of dairy products and the production was sufficient for domestic consumption. Therefore, the ideal number of livestock they would like to keep was not too different from what they currently had.

They migrate with an acquaintance household throughout the year. Winter quarters are located near the prefectural center and the household travels over a distance of approximately 20 km a year.

Household #14

A household living in the prefectural center that goes out to the suburbs only during summer and autumn. Despite the high expectations they have on nomadism as means of livelihood, they have little leeway in this regard as they do not own enough number of animals. They cooperate with other households in management of livestock at their summer quarters.

Husband is 58 years old and wife is 56 years old. Among their 3 children, the second son and the child of eldest daughter live with them. They own livestock since 1990 when wife started receiving pension. The number of stock increased from 10 sheep and 2 cows to 52 sheep, 21 goats, 16 cattle and 1 horse between now and then. They wanted to have a total of 150 to 200 head, which is an enough number for selling and slaughtering, but have been unsuccessful in increasing the number. To substantiate this, 12 lambs and 1 kid were born on the surveyed year in contrast to about 15 sheep and 2 goats that were slaughtered for domestic consumption. Consequently, the number of sheep and goats decreased that year even though they did not sell any livestock.

This household passes the winter at the prefectural center and travels to their summer quarters 3 km away with other households, returning to the center in autumn. Since they share the grazing work with 3 other households, one household only needs to be in charge of grazing once every 4 days in average.

They say that the condition of pasture may have slightly deteriorated compared to 5 years ago. The reasons they gave included large number of settlers from Ulaanbaatar, Uvs Prefecture and Arhangai Prefecture, and increase in number of households keeping large number of horses. There is a traditional grazing method in Mongolia of grazing animals in the order of cattle, sheep/goat, and horses for feeding by taking into account the fact that latter

animals have tendency of eating grass closer to the root. Hoofs worn by horses also exert pressure on the pasture. Grazing of large number of horses is problematic for these reasons.

Household #15

Moved from western part of Tov Prefecture 9 years ago. This household owns a large number of livestock that they also slaughter and sell in considerable numbers. Presumably a characteristic of being a suburban tourist resort.

The 59-year-old husband and 58-year-old wife were already nomads when they married in 1960. The couple has 9 children, 4 of which live with them to help with work and go to school. After the state-owned livestock was distributed in the early 1990s, the family owned 500 sheep, 100 goats, 80 cattle, 100 horses and 5 camels by the time they moved to the present location. They currently own 180 sheep, 100 goats, 80 cattle and 270 horses, which means that they reduced the number of sheep and increased the number of horses over the period of nearly 10 years. Ideal number of livestock, they say, is twice as many as the present count for sheep and goats and the same number as they currently own for larger animals.

Considerable number of young were born on the year of the survey (80 sheep, 35 goats, 13 cattle and 68 horses). On the other hand, they slaughtered more than sheep and goats combined, about 20 cattle and more than 10 horses. The number of slaughter and sales appears to have increased as they had to raise money to cover the tuition for a daughter attending national university, host tourists as well as acquaintances and relatives visiting them from Ulaanbaatar, and offer assistance to households of their children.

The household travels over a total distance of more than 300 km between winter quarters, spring quarters and summer/autumn quarters with 2 households of their brothers. They use truck for long distance travel. They are using spring water at their winter quarters and are not experiencing any problem in terms of quality and quantity. They are using river water at their summer quarters.

They claim that the condition of pasture has slightly deteriorated as a result of large number of people and livestock coming closer to Ulaanbaatar. The situation is same around the winter quarters 150 km away as the number of nomadic household in the vicinity increased from 10 to 70 between 9 years ago and today. The problem of pasture shortage is therefore occurring at the same time.

Household #16

A household that moved from Ovorhangai Prefecture to Tuv Prefecture 10 years ago. Husband is 47 years old and wife is 36 years old. The couple has 4 children, starting from

age 13, all attending school in the prefectural center. The couple was a nomad in charge of horses in particular during the negdel era and was looking after more than 500 horses at the time. They still own a large number of horses, counting 97 in contrast to 83 sheep, 27 goats and 27 cattle as of December last year.

The household incurred enormous damage from zod that occurred from the winter of 1998 to the spring of this year as 20 sheep, 4 goats, more than 10 cattle and 42 horses died of starvation. There were also considerable number of miscarriages. They hardly sold any livestock for this reason. However, they slaughtered nearly 30 sheep in summer and autumn alone for domestic consumption and entertaining guests. They slaughtered many livestock for relatives and acquaintances visiting them from Ulaanbaatar in particular.

This household lives in a fenced house in prefectural center from late autumn to spring. For this reason, they were paying 400,000 tugrig to purchase supplementary feed for sheep and goats. They also have relatively large number of horses and has selected the method of entrusting the management of cattle and horses to another nomadic household during the cold season. The household to which they entrusted their livestock last year were taking care of a total of 1,500 horses and 800 sheep and goats combined, an obviously more animals than they can handle. They thought this was one of the reasons that exacerbated the damage from zod and will ask a different household to care for their animals this autumn. They will add rice and commodities in addition to cash to compensate for the work.

They say that pasture condition is not bad this year but has worsened over the 5 year period. The reason they gave was the influx to Ulaanbaatar and prefectural center of nomads that used to migrate in search of areas with abundant water and grass during the negdel period. They also added concentration of people and animals from Ulaanbaatar and other regions during the Naadaam as the reason.

(b) Compilation of Household Survey Results

The results of questionnaire survey compiled on a household basis are reinterpreted in the following by using keywords to outline the nomadism in the suburbs for the purpose of sorting out their problems.

Resettlement

There were surveyed households that had set up its summer quarters at the surveyed area after resettlement. While it seemed true that many households have resettled from western Mongolia as have been generally said, the existence of households that resettled from Arhangai and other prefectures suggested that people have been coming to Ulaanbaatar and other cities and their suburbs from around the country since 1990. Living in rural areas

certainly has its demerits. Prices go up as distance from Ulaanbaatar increases as infrastructure is undeveloped and gasoline prices continue to rise. When one tries to sell livestock and livestock products, the market is small and prices are low. Opportunities for education are also limited. Therefore, it was natural that resettlement increased before and after the introduction of market economy despite the existence of some risks.

Increase in number of households raising livestock

In addition to natural increase and resettlement, a considerable number of households started raising livestock around 1990. There are 2 main reasons for this. One is the increase in number of nomadic household that resulted from households that lived in Ulaanbaatar and prefectural/county centers and engaged in other occupations became nomads when they started receiving pension and lost their jobs, for instance. In this sense, it is proper to say that nomadism provided safety net to the people of Mongolia during the social and economic transition period. The other concerns households raising livestock that basically live in Ulaanbaatar and prefectural /county centers. Their migration is extremely limited and included a case such as Household #11 that does not quite qualify as nomadic household.

Scale of livestock raised and standard of living

The gap in livestock ownership status expanded between households after privatization of state organizations and introduction of market economy. Surveyed households included those owning more than 500 head of livestock to those such as Household #10 that owned only several animals. Household #10 had to purchase meat even though they were nomads and had to also work as livestock management helper at other households to make a living. In addition, many of the households that owned few livestock mentioned that their lives have become more difficult in the last 10 years. It appears that distinction between “winners” and “losers” has become conspicuous in Mongolia as well. Under the present standard, households owning less than 150 head of the five livestock varieties combined tend to be regarded as poor. This standard is truer in rural areas.

However, the survey included cases that owned less than 150 head but did not qualify as living in poverty. The first example is a household of an elderly couple that were receiving pension. There was also a similar example of household with members having jobs in cities and towns. The second example is a household such as Household #12 that owns dairy cows and making profit by selling milk and dairy products throughout the year.

Livestock management similar to negdel method

Nomads specializing in managing livestock of other households and companies are being born. These cases were also observed in Households #11 and #12 and are identical to the system that existed during the negdel era in the sense that they manage same animal variety in large numbers. This method is excellent in increasing the efficiency of management. However, since each livestock variety has variety of grass they prefer for feeding, the negdel method is likely to exhaust certain grass variety and runs a risk of devastating the grassland.

It may be necessary to reintroduce the Otor that was practiced during the negdel era into the system to avoid this risk.

Condition of grassland and availability of grazing land

Questions and their responses about the condition of grassland and availability of grazing land tend to be subjective. If we were to venture a conclusion from these responses, grasslands have become impoverished compared to 5 to 10 years ago. The amount of grazing land has diminished and conflict between nomads may occur in the future.

However, it is logically clear that increase in number of nomadic households and households raising livestock in addition to number of livestock as well as emergence of households raising livestock in large scale (particularly households managing large number of single animal variety) will increase the risk of grassland devastation in the suburbs and shortage of grazing land and places of migration.

Management of wells

Well management was a very serious issue that influenced those mentioned above. There were cases in the surveyed region that had access to water from rivers such as Tuul River in which problems over water were unlikely to occur both in terms of quality and quantity. However, there were problems of deteriorating water quality and decline in water volume that originated from high concentration of nomadic households and their livestock in addition to the problems related to maintenance of wells when they encamped on land where river water was not available.

Supplementary feed and zod, form of migration

Many households had spent more than 100,000 tugrig to purchase hay and bran in addition to harvesting hay on their own. There was even a household that spent nearly 500,000 tugrig on such supplementary feed. These facts suggest that each household is preparing as much as they possibly can to stock up on supplementary feed to feed their

animals during the cold season.

However, there were households that did not have sufficient supplementary feed to prevent their livestock from starving to death during the severe zod that started the year before the survey was conducted. This appears to be a clear indication of delay in relief activities by the government that had existed during the socialist period. On the other hand, there were households that prepared very little hay but were hardly affected by zod as they were able to migrate long distance to areas with little snow and good grassland condition. This fact calls for a need to recover the mobility of nomadic households.

Incidentally, none of the surveyed households processed feed on their own even though there were grass varieties of lily and chrysanthemum families at the grassland that were suited as materials for homemade processed feed.

2. Wheat

(1) Introduction

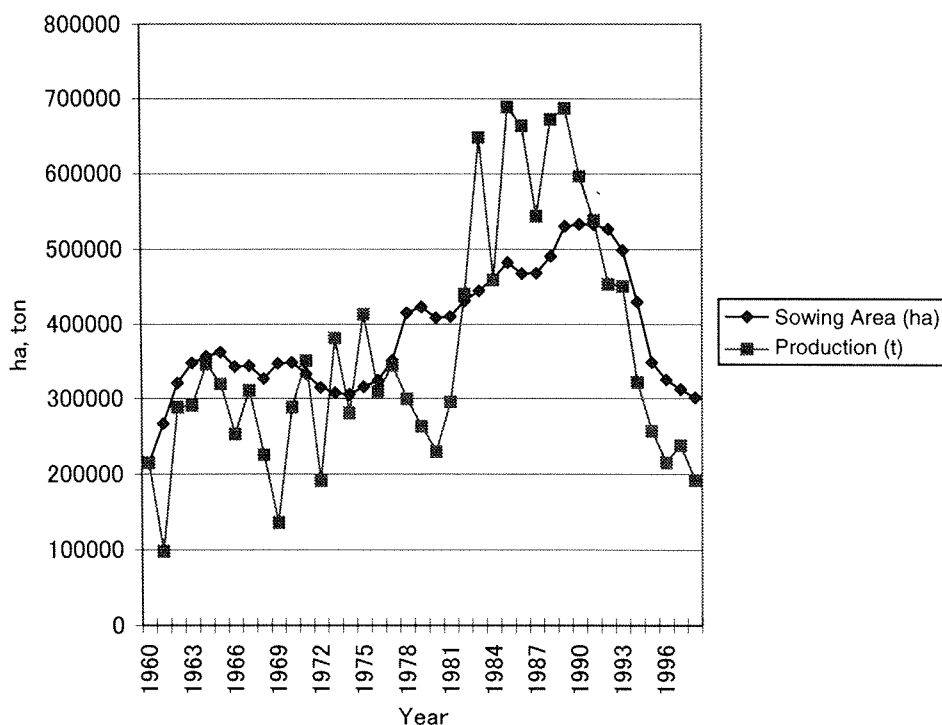
As nomadic life is the first image that comes to mind when one thinks of Mongolia, livestock raising accounts for 87.6% of gross agricultural products with cropping merely accounting for the remaining 12.4%. In terms of farmland, cropped land (mostly wheat) only accounts for 1% whereas land for pastoral activities takes up more than 80% of the country (Mongolian Statistical Yearbook 1998).

History of crop agriculture in Mongolia only started with the full-scale introduction of cropping by the Virgin Lands Program, which was launched in 1959/60 under the assistance of the Council for Mutual Economic Assistance (CMEA) with the goal of converting pastoral land into cultivated land on a massive scale. The clearing program was mainly implemented in the basins of Selenge River and Orhon River in the north where wheat crop relying on rainwater was attempted. At the backdrop of assistance from CMEA and government subsidy, wheat cultivation in Mongolia increased from 200,000 ha in 1960 to 530,000 ha in 1990 with production reaching nearly 700,000 tons by the latter half of 1980s (Figure 3-4). The country also attained full self-sufficiency during the same period and experienced wheat export at one point. However, wheat production rapidly declined when liberalization began in the 1990s as assistance was cut off due to collapse of the Soviet Union and financial difficulty of the Mongolian government. This forced the country to import wheat in the last several years.

What must be noted here is the fact that, as can be seen in Figure 3-5, average wheat productivity has dropped considerably from 1.2 ton per hectare in the 1980s (peaking at 1.43

ton in 1985) to way below the 1 ton per hectare mark after entering the 1990s. Land productivity would not decline if reduction in planted area were occurring at inferior land. It can be said that the decline in land productivity signifies overall decline in wheat cultivation due to a structural problems.

Fig. 3-4 Changes in wheat sowing area and production



Source: State Statistical Office of Mongolia, *Agriculture in Mongolia 1971-1995, A Statistical Profile* Ulaanbaatar, 1996.

Fig. 3-5 Changes in land productivity of wheat

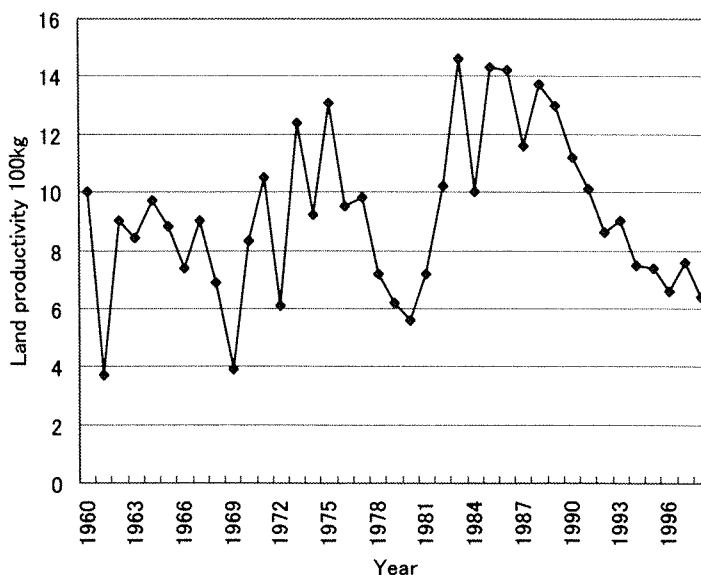


Table 3-2 Import of Main Goods Related to Agriculture

	1989	1990	1995	1996	1997	1998
Phosphatic fertilizers	15.0	9.1	-	-	-	-
Nitrogenous fertilizers	21.0	19.9	8.7	6.1	8.5	12.0
Tractors	624	390	109	89	50	49
Diesel	320.5	364.3	113.2	120.4	128.2	132.2
Wheat	2.3	-	0.0	0.0	17.3	37.9
Flour	Na	Na	32.8	97.8	69.1	40.3

Note: Figures for tractors are number of tractors, others are 1,000t.

Source: National Statistical Office of Mongolia, 1999. *Mongolian Statistical Yearbook, 1998*.

A wide range of factors exists in the background. For instance, Mongolia used to import chemical fertilizers from the former Soviet Union at prices below international prices but has to buy them now at international prices. The volume of imported agriculture-related input plunged (Table 3-2). In addition, the difficulty in obtaining diesel fuel and tractors (including spare parts) makes timely cultivation difficult. For instance, Table 3-3 shows the number of large farming machinery and their years of use. The table shows that the majority of machinery have been used for more than 10 years and, combined with the difficulty in importing their parts, it has become an obstacle to performing proper farm work. For these reasons, the self-sufficiency rate of wheat in Mongolia has now dropped to about 50% according to the Ministry of Agriculture, Mongolia. Since Mongolia has to import for almost all of its inputs such as machinery and chemical fertilizers, devaluation of tugrig is also a prime cause behind the scale-down of wheat cultivation.

Table 3-3 Number of Large Farming Tools by Years of Service

	Prefecture	Tractors				Trucks				Grain Harvesters			
		Years of Service											
		Total	1~5	5~10	10~	Total	1~5	5~10	10~	Total	1~5	5~10	10~
1	Tov	724	81	260	383	192	25	78	89	264	27	92	145
2	Bulgan	396	41	108	247	50	5	24	21	163	11	55	97
3	Ovorhangai	98	4	21	73	12			12	42		8	34
4	Hovsgol	69	3	10	56	70			7	28		9	19
5	Selenge	1011	266	352	393	45	3	26	16	263	54	63	146
6	Uvs	139		39	100	17		7	10	76		14	62
7	Zavhan	32			32					22			22
8	Govi-Altai	32			32	1			1	6			6
9	Bayanhongor	35			35					2			2
10	Hovd	262	13	95	154	858	30	281	547	4			4
11	Orhon	13		3	10	6		3	4	7			7
12	Dalhan-Uul	96	12	12	72	12		3	8	47	1	5	26
13	Suhbaatar	49		5	44	12			12	23		3	20
14	Dornod	123	12	4	107	9		3	6	43	3	2	38
15	Dundgovi	2			2					1			1
16	Ulaanbaatar	126	31	41	54	30	8	16	6				
	TOTAL	3303	475	962	1866	1263	71	444	747	1038	97	256	655

Source: Ministry of Agriculture and Industry, Mongolia

Mongolian National Health Organization has set the annual required consumption of wheat per adult unit at 105 kg. After wheat is harvested, 180 kg per hectare is put aside for seeds and about 7% is used for fodder and alcohol brewing (according to the 1997 results). Considering the fact that land productivity in the recent years has been about 0.7 ton per hectare, 67% of wheat production would be used for flour production. As flour milling rate ranges from 70 to 75%, 47 to 50% of flour production is believed to have come from domestic wheat. Since population of Mongolia in terms of adult units is 2,182,000, the required flour (for eating purposes only) would amount to 229,000 tons ($105 \text{ kg} \times 218.2$). Judging from the fact that current wheat production is about 200,000 tons, around 100,000 tons of flour is coming from domestic production. In other words, self-sufficiency rate is approximately 50% (this figure is almost equal to that announced by the Mongolian Ministry of Agriculture) and the country has to import flour.

Considering the imbalance of payments in recent years, recovery of self-sufficiency in wheat would be an important task in agricultural administration of Mongolia provided that such recovery becomes possible without relying on excessive protectionist policy. In

particular, whether the current flour import from China would be guaranteed in the future remains questionable because China herself is dependent on imported wheat. Revival of domestic wheat production is therefore an important task from the viewpoint of food security as well.

Moreover, as is clear from the above discussion, the following understanding about the limiting factors of cultivation farming in Mongolia would be indispensable. In the majority of Asian countries, shortage of farmland due to high population density has become a serious limiting factor. In Mongolia, however, shortage of land per se is not a serious problem as can be seen from the fact that cultivated area under food grains accounts for about 1% of agricultural land area and area under wheat is decreasing. Rather, setting aside the issue of natural environment, shortage of modern inputs is a greater limiting factor to wheat production in Mongolia.

(2) Wheat Subsidies and Wheat Prices

Prior to liberalization, price of wheat was fixed at 450 tugrig per ton and flour mills were buying wheat from farms by taking out loans from the government (at interest rate of 1% a month).

Table 3-4 Farm-gate Prices of Wheat (tugrig/ton)

	-1985	1985-91	1992	1995	1996	1997	1998
Edible wheat	450	660	1,100	90,000	130,000	110,000	80,000
Fodder wheat	370	450	900	75,000	95,000	55,000	45,000

Source: Prepared from materials presented by the State University of Agriculture, Ulaanbaatar.

After the liberalization, wheat price soared as the wheat price that had been controlled by the Ministry of Agriculture shifted to market price in 1995. However, farm-gate prices of wheat declined in 1997 and 1998 owing to commencement of wheat import from China and arrival of wheat from overseas as part of food aid. Japan and U.S. offered 24,000 tons and 21,200 tons of wheat to Mongolia in 1997 and 1998, respectively (refer to Table 3-5 for aid from Japan). According to the official in charge at the Ministry of Agriculture, however, the prices were going to be raised to 10,000 tugrig per ton in 1999 because these prices were too low for domestic producers.

Furthermore, financial constraints for wheat mills to purchase wheat have been serious due to discontinuation of financial assistance from the government and a still-immature banking system. This has also created problems in marketing of wheat as the mills are unable to purchase wheat from farms and some large farms have started building their own

mills. While we were not able to study any flourmills in this survey, they need to be examined from the viewpoint of production efficiency and taxation.

Table 3-5 Agricultural assistance from Japan

KR food assistance (KR1)			
May 23, 1991	Wheat produced in China	4,478 tons	2 million yen
May 28, 1992	Wheat produced in China	4,625 tons	2 million yen
June 10, 1993	Wheat produced in China	7,279 tons	3 million yen
Sep. 13, 1994	Wheat produced in China	8,545 tons	3 million yen
Sep. 15, 1995	Wheat produced in China	5,263 tons	2.5 million yen
Dec. 22, 1997	Wheat produced in Kazakhstan	4,478 tons	5 million yen
May 11, 1999	Rice	4,478 tons	3.3 million yen

KR2		
May 28, 1992	Fertilizers, farm machinery	1.5 million yen
May 17, 1993	Fertilizers, farm machinery	1.5 million yen
Sep. 13, 1994	Farm machinery	1.5 million yen
July 18, 1995	Farm machinery	1.5 million yen
Feb. 25, 1997	Farm machinery	1.5 million yen
May 13, 1998	Farm machinery	1.5 million yen
Feb. 12, 1999	Farm machinery	1.5 million yen
July 10, 1999	Farm machinery	1.5 million yen

(3) Wheat production

Wheat cropping is concentrated in the northern prefectures of Mongolia such as Selenge, Darkhan-Uul, Arhangai and Bulgan where annual precipitation is relatively high ranging from 250-350 mm, and in the central Tov Prefecture. In 1995, these top 5 prefectures produced 74.30% of entire wheat production in Mongolia. A look at planted area, land productivity and production of wheat in these 5 prefectures reveals overall scale-down of wheat production that has been indicated earlier (Figures 3-6, 3-7, 3-8).

Wheat production in Mongolia is taking place on marginal land in every sense of the term. Considering the fact that annual precipitation ranges from 250 to 350 mm and only 3% of cultivated area is irrigated, soil moisture would be the most serious limiting factor in terms of natural environment. The number of cultivation has to be limited and weeding will have to be performed carefully so as to maintain moisture in the soil. Needless to say, the

Fig. 3-6 Changes in wheat sowing area at major prefectures

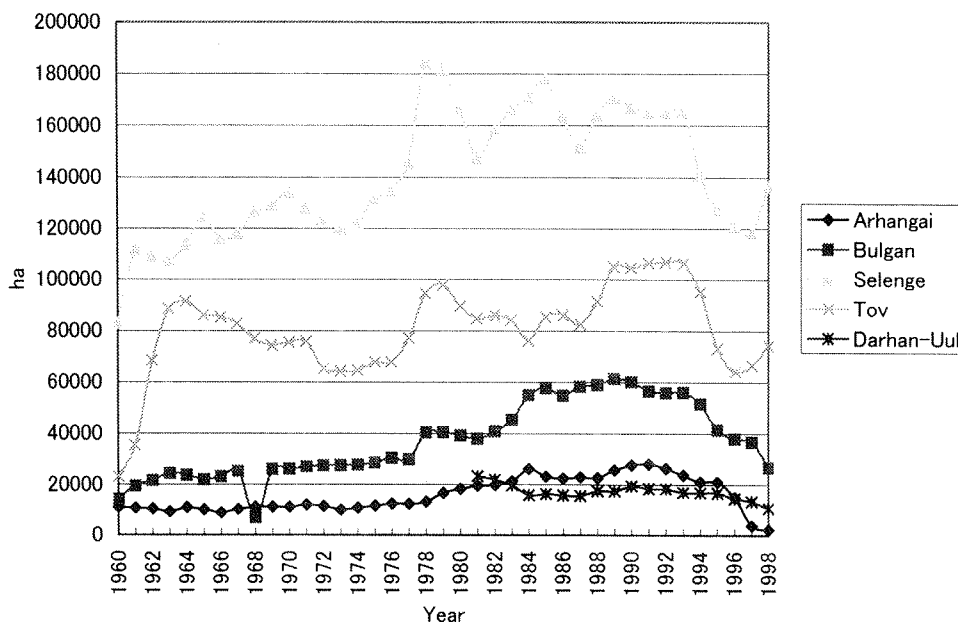
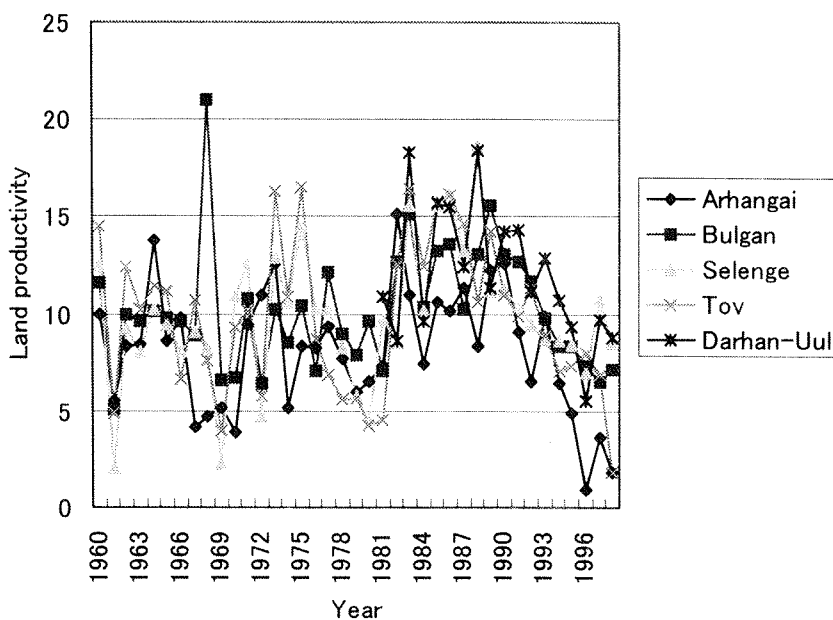


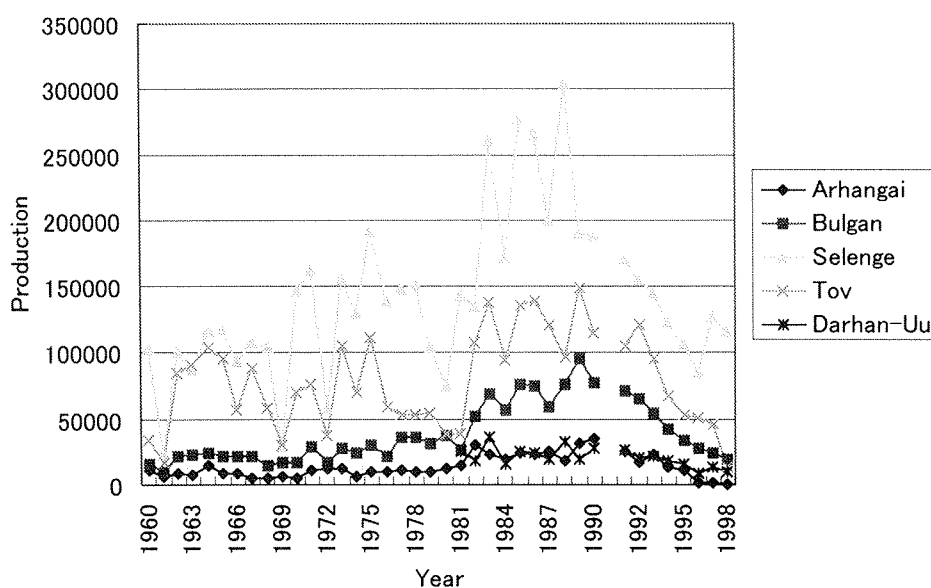
Fig. 3-7 Changes in land productivity for wheat at major prefectures



former prevents evaporation and the latter prevents transpiration. In addition, limiting the number of cultivation will also prevent wind erosion of farmland.

The cold climate of this region also slows down the decomposition of organic matter such as straws, which means that recurring cropping of wheat will instantly deprive fertility from the land. For this reason, wheat/fallow rotation in alternate years is being practiced.

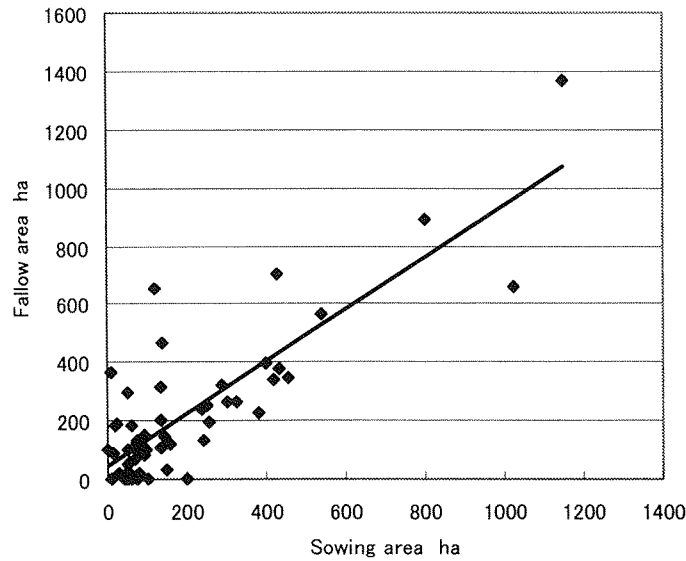
Fig. 3-8 Changes in wheat productivity by major prefectures



This method will make it possible to retain soil moisture from the rainfall concentrated in the latter half of summer until the seeding season of the following year. The long time required for soil recovery in the cold region due to slow speed of decomposition for organic matter is another reason for practicing crop rotation. It has also been pointed out that fixation of nitrogen is difficult in this region due to lack of root nodule bacteria, which, in turn, destroys composition of soil (also affecting the balance of microorganisms in the soil) and increases the occurrence of soil erosion due to strong wind. Since farmland is extremely vulnerable in the environment of Mongolia, recovery of land whose soil fertility has been lowered by excessive cultivation is considered as an important policy theme.

Wheat fields consist of alternating planted fields and fallow fields that are 20 to 30 meter-wide (striped planting). In addition, the striped pattern is formed perpendicular to direction of the wind to prevent soil erosion. Figure 3-9 plots the planted area and fallow area for 58 farm households in Saihan district of Selenge Prefecture. The figure shows that crop rotation is performed almost every other year. Moreover, frost-free period in this region lasts for about 100 to 120 days. This means that planting will have to take time limitation into consideration. Figure 3-10 shows the relationship between seeding period and land productivity (ton/ha) for 2 wheat varieties. It shows that planting will have to wait until the latter half of May, although concern of frost damage will increase if it is delayed too long. Generally speaking, seeding will have to be performed between May 7 and 22 in the northern Mongolia. Planting after this period is said to seriously increase the likelihood of

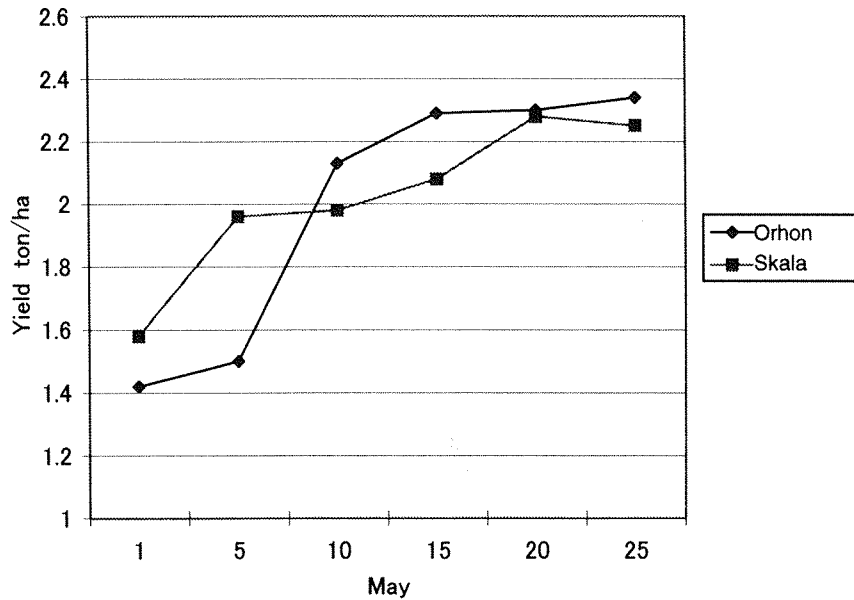
Fig. 3-9 Sowing area and fallow area



frost damage. For instance, snowfall prior to harvest in 1998 has resulted in 19% decline in wheat production from the previous year.

Under these circumstances, introduction of large farm machinery was indispensable for the purpose of using early-maturing spring wheat and completing land preparation, seeding and harvest work in a short period of time. Adoption of huge state-operated farms relying on large farm machinery was inevitable in Mongolia where history of cropping did not exist

Fig. 3-10 What sowing season and land productivity



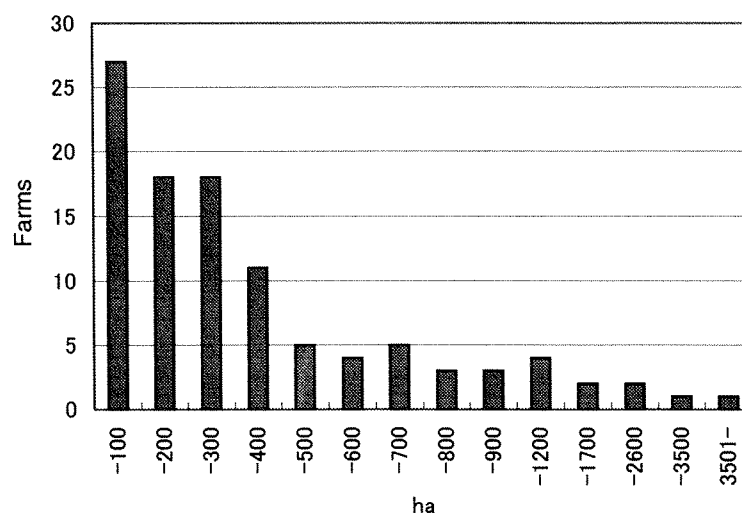
in the first place. In this manner, wheat production is performed mainly based on huge state-operated farms (the Negdel system is observed in forest steppe regions).

(4) Movement of privatization

State-operated farms and the Negdel were privatized for wheat crop in the process of economic liberalization in 1991, and state-operated farms were gradually divided into small farms. However, the land was leased to wheat farmers as the ownership of the land remained with the government. The Land Act was enacted in November 1994 and approved 60-year land lease and 40-year extension of land up to 18,000 ha. In June 1998, Article 100 of the Government Ordinance set the minimum term for land at 15 years. The authority for leasing land lies with soum chiefs. Rent is set between 0.02% and 0.03% of the appraised value of the land and corresponds to extremely low amount of 300 to 400 tugrig per hectare.

Figure 3-11 shows the size distribution of operational land holdings of 102 farms (average management scale is 484.84 ha) in Saihan district and Khongar district of Selenge Prefecture. There exist many farms with less than 100 ha while the largest farm has an area of 10,684 ha. The undermentioned farm in Orhon district manages 20,500 ha of wheat field, which corresponds to 89.13% of the entire wheat, planted area in the district (23,000 ha). Thus, operational land holdings range widely from small farms of less than 100 ha (almost all small farms are run by individuals) to large-scale farms exceeding 10,000 ha (run by companies). Based on the recognition that the size of operational holdings has become too small in the process of privatization, the Mongolian government set out a policy in 1991 that it is proper to “organize joint stock companies having cultivated land of 3,000 ha or more.” The reality, however, is that many small farms of several hundred ha are emerging.

Figure 3-11



It can be seen as a problem that originated from privatization using the coupon method. The problems associated with small land holdings are to be discussed later.

(5) Some cases of wheat farms

Hearing was attempted on 6 farms in Selenge Prefecture in this survey. The results will be described in the following.

1) Farm A (a large-scale farm in Orhon District)

Orhon District has a population of 6,000 and cultivated area of wheat is 23,000 ha, of which Farm A accounts for 20,500 ha. In addition, half of approximately 600 persons engaging in paid labor in this district work for Farm A. This region is located at altitudes between 800 and 1,000 meters and has an annual precipitation of 271 to 278 mm.

There was originally a state-operated farm (established 1943) in this district that was raising sheep. It started wheat production as part of the Virgin Lands program that was carried out around 1960. This state-operated farm was gradually privatized from 1992 and was completely privatized in April 1998.

The farm is divided into 7 production groups (brigades) with large farm machineries including tractors and combines allocated to each. However, many of them are superannuated and require large costs for their spare parts.

Each brigade consists of brigade chief (monthly salary 35,000 tugrig), cooking and laundry in charge (monthly salary 26,000-37,000 tugrig), 9 to 12 drivers (monthly salary 30,000 tugrig) and 15 to 17 staff working as security and accounting clerks for recording the working hours of employees. Salary accounts for about 20% of sales, although the percentage went down to 11% last year as land productivity dropped to 0.82 ton/ha due to snow damage in September. This year, land productivity will remain at about 0.8 ton/ha due to drought (the figure was 0.98 ton/ha years ago).

Table 3-6 Production Groups at Farm A (Brigades)

	Size of land (ha)	Cropped area	Fallow	Cropped area per tractor	Cropped Area per combine
1	3004	1790	1214	429	256
2	2750	1502	1248	344	188
3	3019	1502	1517	377	300
4	3217	1737	1480	402	290
5	3206	2039	1167	356	291
6	2523	1120	1403	504	280
7	2409	1236	1173	602	236
Total	20128	10926	9202	530	260

Table 3-7 Large Machinery at Farm A

	H.P.	Units	Years of service				Service life
			5 years or less	5-10 years	11-15 years	16 years or more	
Tractor T-150	150	11				11	16
Tractor DT-75	100	38	8	10	14	6	14
Tractor MTZ-80	80	14		2	9	3	16
Combine CK-5		42	6	5	16	15	10

Note: Data on service life from World Bank, *Mongolia: Prospects for Wheat Production*, 1995.

While we were not able to conduct a hearing on details of cost structure, let us take a look at the main production costs. Land preparation is performed 3 times a year and costs 9,000 to 12,000 tugrig in diesel and parts. Seeding costs 15,000 tugrig/ha and weeding costs 6,800 tugrig/ha. The management says land productivity of about 0.6 ton/ha is the break-even point.

2) Farm B (a large-scale farm in Khongor District)

Khongor District has a population of 5,700 and an area of 271,000 ha. We conducted a hearing at 2 farms (both joint-stock companies) in this district.

Farm B in Khongor District cultivates 10,600 ha of field. It practices wheat/fallow rotation in alternate years and seeded at 5,100 ha in the year of the survey (1999). It owns 12 tractors made in Russia (350 horsepower), 4 tractors made in Ukraine (150 horsepower) and 2 tractors made in Japan (100 horsepower) as well as 6 tractors with less than 100 horsepower and 25 combines.

Fifty out of 140 farm employees are tractor and combine drivers. The body that controls the organization consists of a mechanical engineer, an agricultural expert, 2 accountants, 2 logistic management in charge, 4 mechanics and a wheat storage in charge and work under the president and vice-president. President and vice-president receive a fixed salary of 41,000 tugrig/month. Fixed salary is paid only during the period when farm work is performed from March 15 to Dec. 25, and 80% of the profit is distributed during the remaining 3 months. In the event no profit is made due to poor crop, the company pays the money in advance and has it reimbursed the following year.

Table 3-8 Production Cost/Profit Structure of Farm B (per hectare)

Expenditures		
Seeds	180 × 80 tons	= 14,400 tugrig/ha
Land preparation	5,000 tugrig/ha × 3	= 15,000 tugrig/ha
Seeding	5,000 tugrig/ha	
Weeding	5,100 tugrig/ha	
Harvesting	3,000 tugrig/ha	
Rent	386 × 2 tugrig/ha	
Brigade members: 5 persons (excluding driver)*		
	40,000 tugrig/person/month	40,000 × 9 × 5 = 1,800,000 tugrig
	1,800,000 tugrig/1,300 ha	= 1,400 tugrig/ha
	Total Expenditures	44,772 tugrig/ha
Income		
Land productivity	1.2ton/ha	
Farm gate price	85,000 tugrig/ton	
	Income	102,000 tugrig/ha
Gross profit 57,228 tugrig/ha		
* Note: Driver's salary is included in land preparation, seeding, weeding and harvesting cost.		

The farm is cultivated by 4 production groups (brigades) with each production group including 12 to 13 drivers who are paid according to the amount of work allocated to them. Their salary corresponds to the amount remaining after subtracting the cost of diesel and parts as well as depreciation of machinery (i.e. rental charge) from the income. Although fixed wages had been paid to drivers in the past, this form of contract was introduced after the farm experienced theft of diesel and parts as well as an abuse of machinery.

The cost structure of this farm is shown in Table 3-8. Break-even point with respect to land productivity is 0.52 ton/ha although that would not generate enough income to pay the bonus for the 3-month off-season. Land productivity of 0.55 ton/ha would be required to guarantee the same amount of salary paid during the busy farming season. In addition, even better land productivity would be necessary to renew the machinery. The farm managers referred to the financial difficulty in renewing machinery as a serious problem.

3) Farm C (a medium-scale farm in Khongor District)

A 8,000 hectare-operated farm in this district was privatized and became 51% state-owned and 49% private-owned in the spring of 1999. The informant had purchased 20% of the farm's stock in 1997 at the securities market for 7 million tugrig but ended up owning 40% of the private share after half of the farm was privatized. Management area is 4,000 ha. Since the 4,000 hectare farm is managed by 4 production groups, average seeding area for

each production group is 500 ha.

The informant is in charge of one of the production groups. Its management situation is as follows. The group has a 300-horsepower tractor, a 80-horsepower tractor and 2 combines. Production cost per 1,000 ha ranges from 25 million to 27 million tugrig (consisting of 10 million tugrig for parts, 5-6 million tugrig for salary, 8 million tugrig for diesel) and yield is 1.2 ton/ha. Cost per hectare amounts to 40,000 to 41,000 tugrig which means that the cost-profit structure is about the same as the aforementioned Farm A. Cost of spare parts that could not be confirmed at the farm was identified from the hearing conducted at this farm—it accounted for as much as 38% of total expenditures. It shows that superannuation of machinery is pushing up the production costs of farm management.

4) Farm D (a medium-scale farm)

Farm D in Selenge Prefecture is a medium-scale farm with landholding of 1,680 ha and had 829 ha of cropped area on the survey year. The farm owns 8 tractors and 4 combines and purchased 2 tractors and 2 combines through assistance from Japan (tractor cost 11.2 million tugrig and combine cost 19.6 million tugrig).

Members include the president (60,000 tugrig), 2 vice presidents (50,000 tugrig), 1 director (50,000 tugrig), 6 truck drivers (40,000 tugrig), 6 tractor/combine drivers (40,000 tugrig), 4 agricultural experts (50,000 tugrig from November to April), 2 cooks (30,000 tugrig), 4 mechanics (35,000 tugrig) and 12 work assistants (20,000 tugrig). Figures inside parentheses are monthly salaries of each member.

Other production costs include 97,500 tugrig/ha for 4 land preparations (including salary, parts cost), 9,756 tugrig/ha for seeding, 7,317 tugrig/ha for chemical fertilizers, 3,659 tugrig/ha for herbicides and 9,756 tugrig/ha for harvesting. Adding these costs to labor cost of 13,951 tugrig/ha, production cost per unit area would amount to 142,000 tugrig/ha. Land productivity of 2.3 tons/ha would generate an income of 187,000 tugrig/ha and gross profit of 45,000.

The management has mentioned frequent land preparation of fallow land, renewal of machinery, use of chemical fertilizers and use of high-quality seeds as the reasons for land productivity being higher compared to other farms. Management efforts including the use of chemical fertilizers are improving land productivity. However, the fact that gross yield per unit area is less than Farm B which does not use chemical fertilizers and has land productivity of only 1.2 ton suggests that economy of scale is at work.

5) Farm E (a small-scale farm)

Table 3-9 Production Cost/Profit Structure of Farm E (per hectare)

Expenditures		
Seeds	180 kg = 14,400 tugrig/ha	
Land preparation:	3 times Diesel for 22,000 tugrig/ha (including cost of seeding and spare parts)	
Weeding	Not performed	
Harvesting	17,000 tugrig/ha	
Rent	386 × 2 tugrig/ha	
4 drivers: Working at fixed wage of 30,000 tugrig/month. Amount increased by 40% during land preparation and harvesting season.		
Total therefore is 1,540,000 tugrig/ha		
Accountant:	30,000 × 12 = 360,000 tugrig	3,600 tugrig/ha
President's salary =	30,000 × 12 = 360,000 tugrig	3,600 tugrig/ha
Expenditures 56,964 tugrig/ha		
Income		
Land productivity	0.9 ton/ha	
Spot-sale prices	85,000 tugrig/ton	
Income 76,500 tugrig/ha		
Gross profit 19,536 tugrig/ha		

The farm was established in 1997 and registered in November 1998. It is a small-scale farm with landholding of 200 ha and cropped area of 100 ha. In addition to the manager, its personnel include an accountant and 4 drivers. The president used to work as vice-president at a state enterprise. He purchased stocks at the time of privatization by collecting coupons and received allotment of farm machinery with those stocks. Farm machinery includes a 200 horsepower tractor and a 120 horsepower tractor made in Russia in 1988 and 1989, respectively (that cost 2 million tugrig and 1.2 million tugrig, respectively), a combine that was made in Russia in 1979 and cost 5 million tugrig, and a 4 ton truck that cost 1.1 million tugrig. The farm has not taken out any loan from the bank.

Its cost-profit structure per hectare is shown in Table 3-9. According to this table, gross profit would be 19,500 tugrig/ha (The manager admits that gross profit was 20,000 tugrig/ha). Since 7.5% of this amount is paid as tax, net profit would amount to 18,500 million tugrig/ha. Thirty percent of this amount is paid as bonus to the employees and the manager receives the rest as income. Under this cost-profit structure, break-even point of land productivity would be 0.67 ton/ha (The manager has indicated that break-even point is 0.6 ton/ha).

6) Farm F (a small-scale farm)

Farm F that is established in 1997 is a small farm with management area of 474 ha. On the year of the survey, wheat was planted on 238 ha and the remaining 236 ha was left fallow.

The president used to work as a tractor driver at a state-operated farm. Vice-president is his spouse and currently works at a kindergarten. Employees include a supervisor, 3 drivers, a cook and a security guard. Salary is paid monthly. Supervisor and driver receive 40,000 tugrig (18,000 tugrig for 3 months of slack season). Cook is hired during busy season only and receives 25,000 tugrig per month and security guard received 20,000 tugrig per month. Two temporary workers are hired during the busy months for 25,000 tugrig per month.

Farm machinery includes 2 100-horsepower tractors (made in Russia in 1987 and cost 4 million tugrig), an 80 horsepower tractor (made in Russia in 1986 and cost 2.2 million tugrig), 12 combines (1.4 million tugrig), and a 5 ton truck (2 million tugrig).

The structure of cost-profit per hectare is shown in Table 3-10. The farm has a gross profit of about 7.8 million tugrig from which 7.5% is paid for corporate tax. Another 2.2 million tugrig is paid from the remaining amount to 6 employees. A combine driver, for instance, receives 600,000 tugrig. According to the above calculations, land productivity of at least 0.82 ton/ha is needed to make gross profit positive.

Land productivity was 2 ton/ha in the previous year but dropped to 1.2 ton/ha in the year of the survey due to drought. Although land productivity of 2 ton/ha is quite high compared to the average in Mongolia, the manager made the following comment regarding this topic. "In land preparation, we look at the varieties of weeds and determine whether we have to cut their roots or not to kill them. Then we set the blade of the weeding machine as well as the depth of land preparation for weeding and its timing. Also we send our seeds to the prefectural laboratory in the winter for selection. Productivity would increase if you love the land in this manner."

Table 3-10 Production Cost/Profit Structure of Farm F (per hectare)

Expenditures		
Seeds	180 kg = 14,400 tugrig/ha	
Land preparation	12,510 tugrig/ha	
Details	3 times	Diesel for 4,800 tugrig/ha
	Lubrication	756 tugrig/ha
	Parts expenditures	756 tugrig/ha
Seeding	2,857 tugrig/ha	
Chemical fertilizer	none	
Herbicides	400 liters (1,500 tugrig/liter), therefore 2,521 tugrig/ha	
Insecticides	420 tugrig/ha	
Rent	386 × 2 tugrig/ha	
Harvesting	5,000 tugrig/ha	
Details	Diesel (including lubricants)	2,601 tugrig/ha
	Parts	1,050 tugrig/ha
	Truck gasoline	924 tugurug/ha etc.
Labor	10,802 tugrig/ha	
Expenditures	69,280 tugrig/ha	
Income		
Land productivity	1.2 ton/ha	
Spot-sale prices	85,000 tugrig/ton	
Income	102,200 tugrig/ha	
Gross profit	32,720 tugrig/ha	

We have examined 6 cases of wheat farms. While it is not possible to say much based on limited data, the following 2 points can be confirmed. Firstly, profit per unit area varies considerably owing to large variance of both production cost and land productivity. Please refer to Appendix for details. Secondly, a fact exists that even large-size farms are dividing themselves into 500 to 1,000 ha of management areas for their production groups to cultivate. In other words, about 1,000 ha of cropped area is considered to be a technically appropriate scale for farming work.

(6) Farm management by farm size

Let us take a look at the condition of management by farm size from the data on 38 farms by the Agricultural University of Mongolia (using figures from fiscal 1996). Areas covered by this data include cropped area, fallow area, amount of production, land productivity, variable and fixed cost and gross profit. As is clear from the relationship between cropped area and fallow land (Figure 3-12), alternate year crop rotation is performed. For this reason, this section will take a bird's eye view of data in terms of cropped area rather

than landholding.

Let us begin by obtaining the Cobb-Douglas production function shown below. Figures inside parentheses are t-values.

$$\ln(\text{land productivity}) = -13.32 + 1.00 \ln(\text{variable cost/ha}) + 0.25 \ln(\text{fixed cost/ha})$$

$$\begin{matrix} & (-3.31) & (2.51) & (0.90) \end{matrix}$$

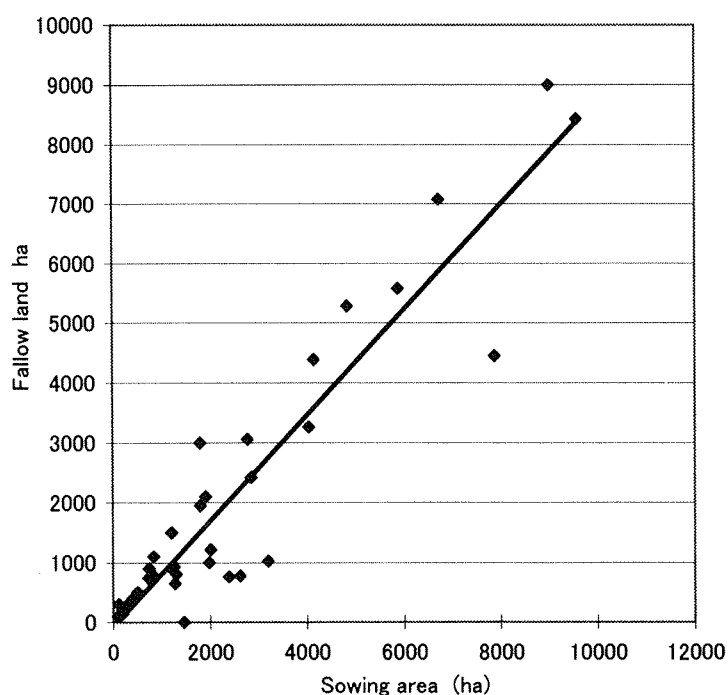
$$R^2 = 0.22 \quad F = 4.90 \quad (P < 0.14\%)$$

While the coefficient for variable cost was recognized as significant at 1.7%, there is no significant relationship for the fixed cost.

Long-term average cost curve is shown in Figure 3-13. This figure indicates that cost per unit production of wheat rapidly increases at farms with planted area of 1,000 ha or less. Therefore, one can conclude that farms larger than 2,000 ha (i.e. larger than 1,000 ha in cropped area) are most efficient under the present circumstances. This fact suggests the validity of the policy that attempted to create farms greater than 3,000 ha.

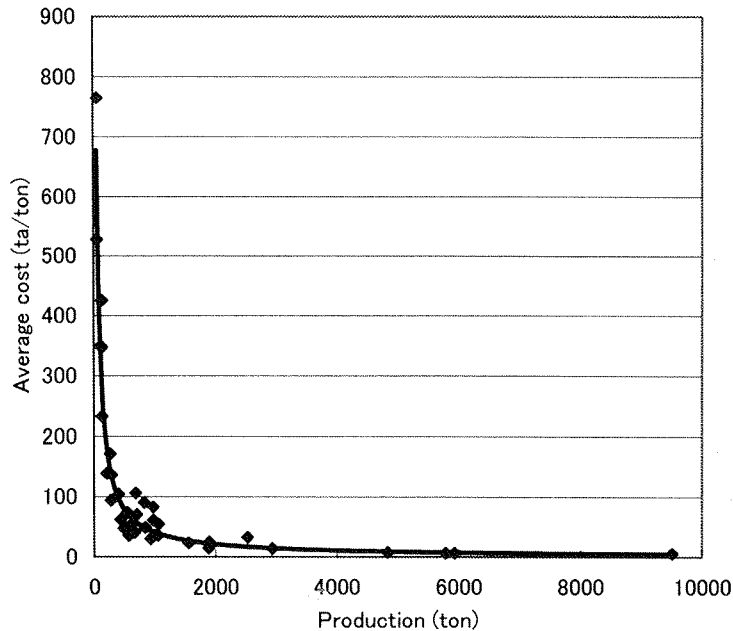
However, many large-scale farms may emerge unless some policy measures are taken because long-term average cost curve continues to decline. While this is not much of a problem from the viewpoint of economic efficiency, it requires attention as it may distort income distribution

Fig. 3-12 Sowing area and fallow land



As mentioned earlier, however, the main cause behind the decline in long-term average cost curve at farms with management scale of 1,000 ha in cropped area has not been extracted. Investigation of such cause is considered important in predicting the future form of wheat production in Mongolia. A detailed study is therefore desired.

Fig. 3-13 Long-term average cost curve



(7) Land productivity needed for viable farm management

Let us now discuss the level of land productivity needed for viable farm management. A strong correlation expressed by the following equation exists between land productivity and gross profit per unit area (Figure 3-14) or net profit (Figure 3-15).

$$\begin{aligned} \text{Gross profit} &= - 21720.03^{***} + 77510.55^{***} \text{ Land productivity} \\ &\quad (- 5.79) \quad (15.55) \quad R^2 = 0.87 \\ \text{Net profit} &= - 27340.21^{***} + 69657.04^{***} \text{ Land productivity} \\ &\quad (- 7.42) \quad (14.23) \quad R^2 = 0.85 \end{aligned}$$

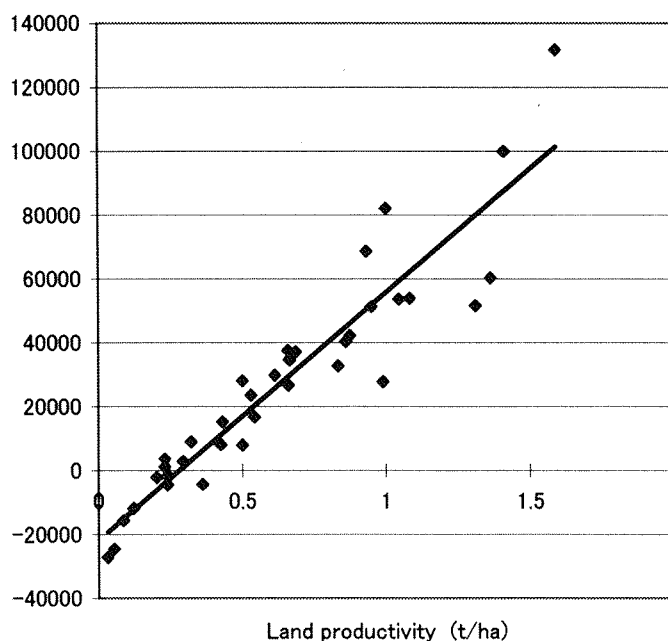
Land productivity needed for positive gross profit and net profit calculated using these equations are 0.28 ton/ha and 0.39 ton/ha, respectively. According to a study conducted by the World Bank in 1994, 1.16 ton/ha is necessary (the figure goes up to 1.4 ton/ha when fluctuations of input prices and production risk are taken into consideration).¹ Meanwhile, a

¹ World Bank, Agricultural Operation Division, China and Mongolia Department, *Mongolia: Prospects for Wheat Production*, 1995

study conducted by the Asian Development Bank in 1996 has concluded that viable land productivity is 0.6 ton/ha, which is closer to our calculation. The figure, however, is raised to 1.2 ton/ha when renewal of machinery is taken into consideration.² The large gap in break-even point land productivity between studies by the World Bank and the Asia Development Bank is attributable to the considerable change that has taken place in farm-gate prices of wheat. When the World Bank conducted its study in 1994, wheat price was controlled at 58,000 tugrig/ton. However, wheat prices soared after the controlled prices were lifted in 1995 and reached 130,000 tugrig/ton in 1996. This fact is believed to be the main reason behind the large gap that exists between the estimated land productivity for viable management in these studies.

Farm gate price of wheat at the time of our study was 85,000 tugrig/ton (80,000 tugrig/ton when mills arrange the transportation). Wheat prices have seen considerable fluctuations in the last several years due to influx of wheat through foreign aid. In particular, wheat prices fell 15 to 20% from the previous year in 1999. Calculation of land productivity for viable farm management must be calculated by taking these circumstances into consideration. In our study, the break-even point land productivity was 0.6 to 0.7 ton/ha which is lower than the figure from the Asian Development Bank study conducted in 1996.

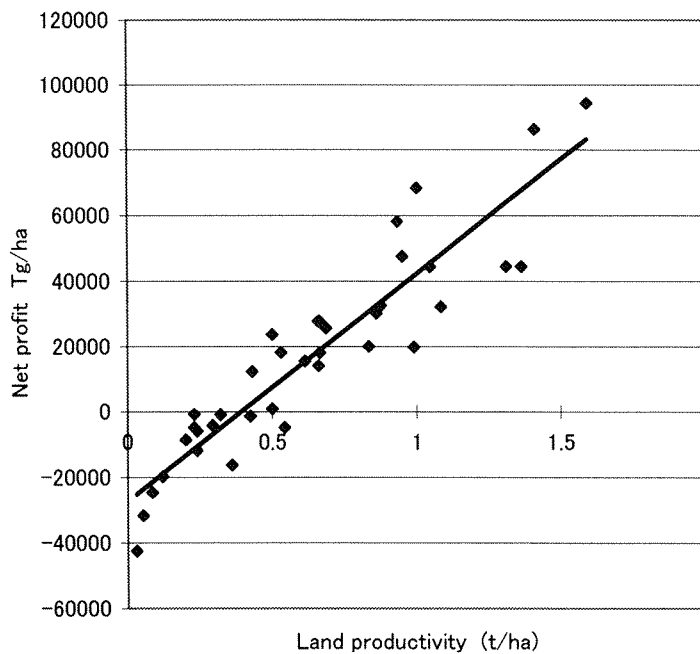
Fig. 3-14 Land productivity and gross profit per unit area



² Asian Development Bank, *Policy Analysis and Recommendations for the Wheat and Flour Sector*, Ulaanbataar, 1997

The fact that wheat prices in fiscal 1996 was approximately 1.625 times higher than those in fiscal 1998 is believed to be caused behind this difference.

Fig. 3-15 Land productivity and net profit per unit area



(8) Tariff and income tax policy related to wheat cropping

The influx of inexpensive wheat from China since economic liberalization is another element that is hurting wheat production in Mongolia. For this reason, Mongolia imposes a 5% import tariff on wheat and imposes a 15% seasonal tariff additionaly from September 1 to April 1 when domestic wheat is harvested. According to the official in charge at the Ministry of Agriculture, import tariff higher than this level may trigger inflation and an import tariff of 15 to 20% would enable domestic wheat to remain competitive. Sales tax of 13% is also imposed on imported wheat. In the case of domestic wheat, 13% sales tax is collected at the mill.

Farm households pay 15% farm tax on income up to 100 million tugrig and 40% farm tax on portions of their income exceeding this amount. Tax office determines the amount of tax by harvesting a 1m² area to estimate the yield and by having farm households submit an accounting report every 3 months. This tax system has the effect of subdividing large-scale management. Incidentally, 50% of income tax is currently deducted to promote agriculture.

Conclusion

Wheat production of Mongolia was forced to scale-down in the process of economic liberalization. At the same time, wheat import is increasing and is generating concern from the viewpoint of trade balance deficit and food security. Needless to say, protecting uncompetitive industry makes national economy inefficient. However, one can conclude that wheat production in Mongolia has sufficient potential of survival when one looks at the fact that break-even point of land productivity is as low as 0.6 ton/ha despite low protective tariff of 15% and influx of wheat by foreign aid that decreases market prices of wheat.

Wheat farms in different forms of management with wide-range of farm size and managerial ability are coexisting in the process of commercialization and privatization. It signifies that wheat production is in transient stages in which it is searching of equilibrium in many ways, and therefore it is necessary to converge into a point of equilibrium that would increase productivity. Assistance for wheat production would have to keep in mind the fact that numerous forms of inefficiencies still exist and policies that would promote prolong the life of inefficient farms should be avoided.

Fostering farms having between 2,000 and 3,000 ha of farm size that would be ideal from the viewpoint of social welfare and production efficiency. It is also necessary to grasp the devastation of farmland as a serious problem and research for this purpose would become an important subject of assistance. In addition, superannuation of large farm machinery would advance in the future and their spare parts cost would push up the production cost even further. This is another potential area where assistance can be considered.

Supplement

Judging from the study of farms, there exist considerable dispersion in cost, yield and profit per ha among different farm size. Let us first review the data from the Agricultural University of Mongolia by focusing on the relationship with farm size (cropped area). The relationship between variable/fixed cost, total cost and land productivity per ha is shown in Figures 3-19.

Cost per ha by farm size varies widely among farms smaller than 3,000 ha whereas dispersion is relatively small among those exceeding 4,000 ha. Such relationship is manifested in the relationship between farm size and land productivity. In other words, land productivity is between 0.6 and 1.0 ton/ha in large farms while farms smaller than 3,000 ha have land productivity ranging from nearly zero to 1.5 ton/ha but have the same level of land

Fig. 3-16 Sowing area and variable cost per unit area

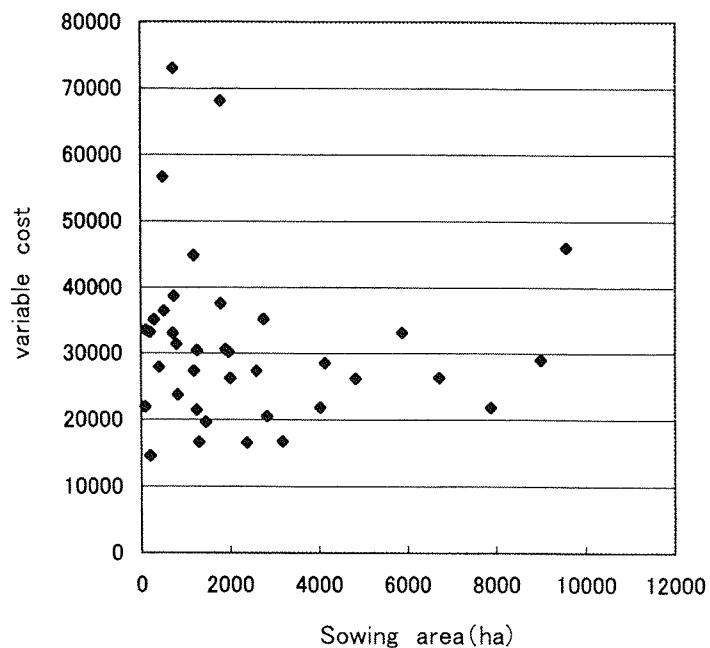
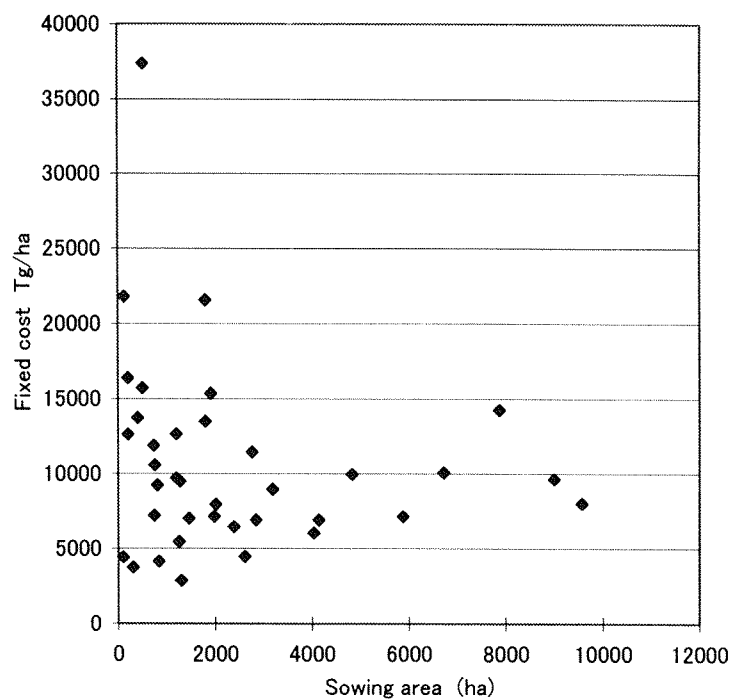


Fig. 3-17 Sowing area and fixed cost per unit area



productivity as large farm in average. This is also almost equal to land product for wheat of 6.6 ton/ha in 1996. The same can be said about gross profit (Figure 3-20) and net profit (Figure 3-21) per ha. References to adequate farm size cannot be made from these data. Two hypotheses can be presented to explain these facts.

Fig. 3-18 Sowing area and total cost per unit area

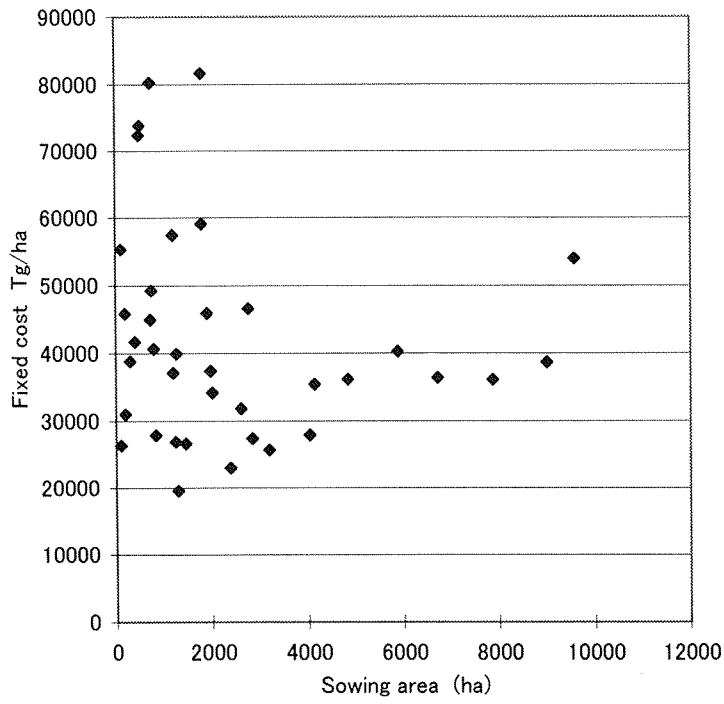


Fig. 3-19 Sowing area and land productivity

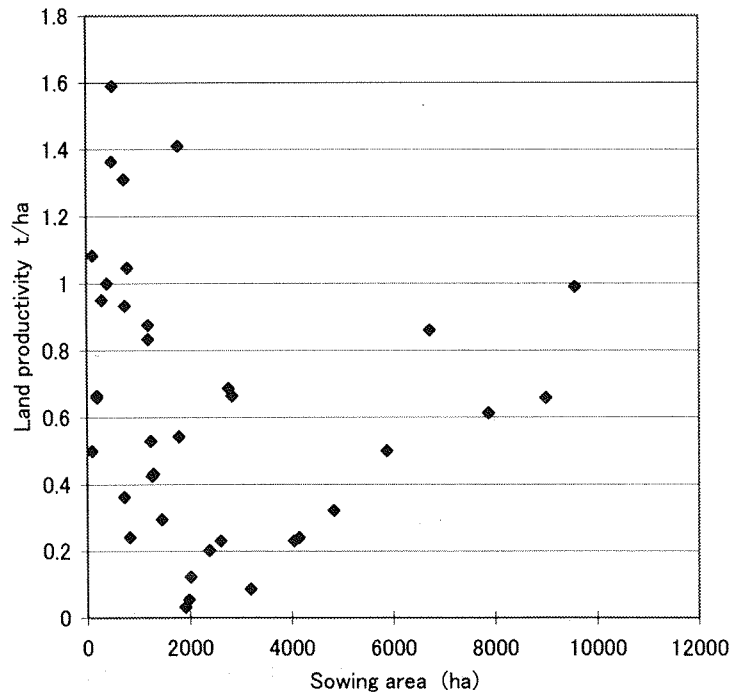


Fig. 3-20 Sowing area and gross profit per unit area

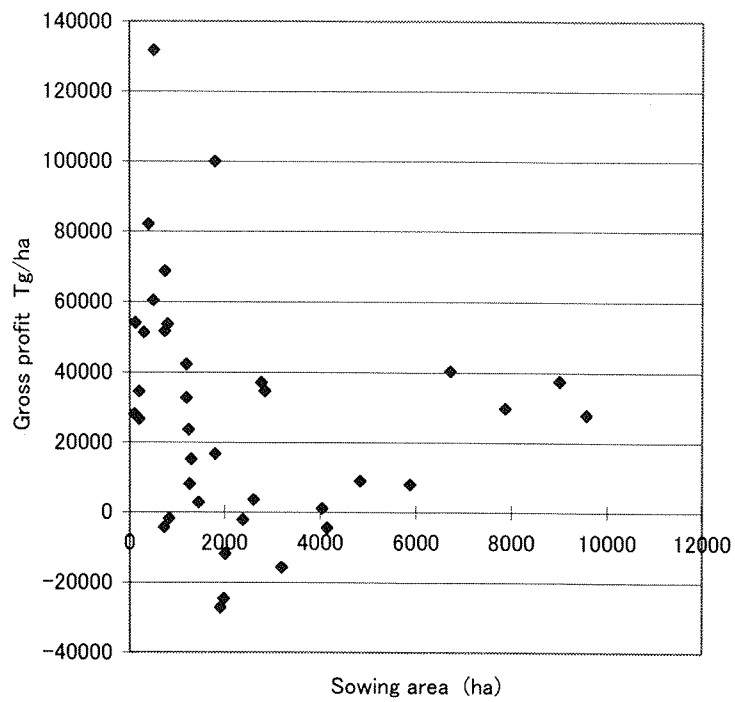
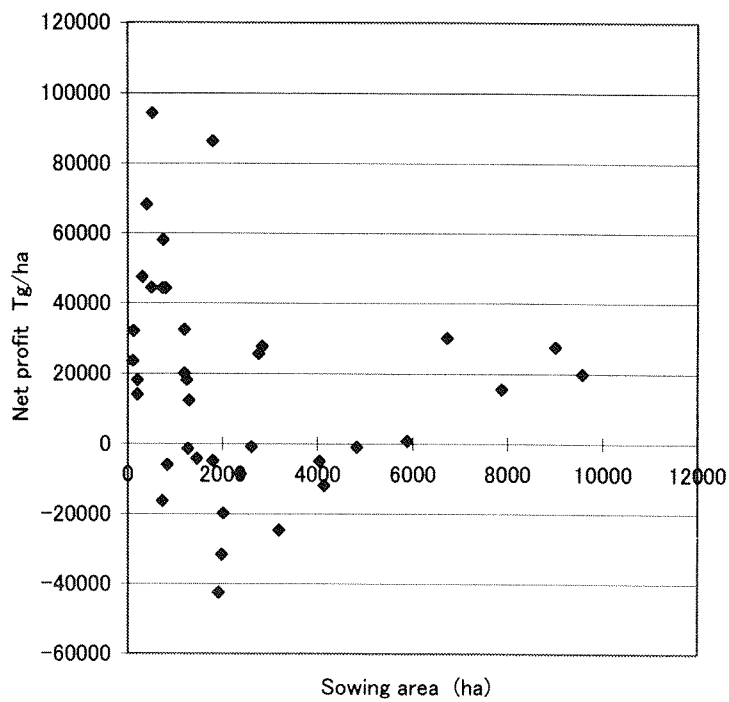


Fig. 3-21 Sowing area and net profit per unit area



Risk dispersion hypothesis

Wheat cropping in Mongolia is exposed to various risks including its climate and dependence on rainwater. The degree of exposure to risk would differ even within the same region if seeds are sown at different periods while damage from hail is limited to certain regions. These idiosyncratic shocks affect smaller farms more seriously while such shocks would be leveled out at larger farms through dispersion of fields. For instance, the largest farm among the aforementioned 30 farms in Khongar District disperses 10,684 ha of its landholding into 57 plots. In addition, as indicated earlier, retention of soil moisture is important in wheat cropping. For this purpose, it is necessary for the cropped area to be located on the north slope (which means it gets little sun) of topography consisting of undulating hills. However, not all farmlands are located on the north slope and this fact is also related to land productivity and vulnerability to risks from natural environments.

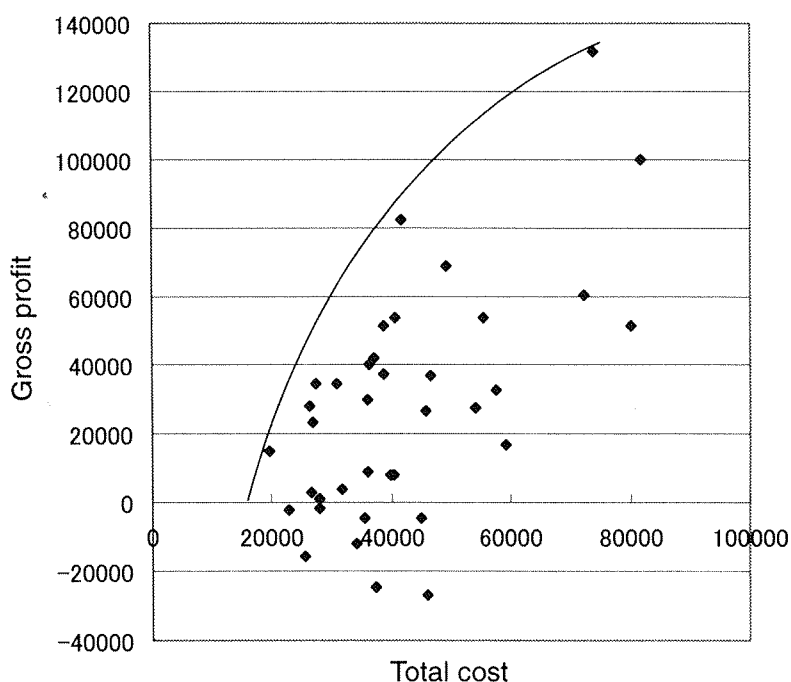
Management capacity hypothesis

Differences in management capacity exist among farmers since privatization is only a recent phenomenon. As each individual was engaged in specialized farm work in their state-operated farm days, it appears that there was a shortage of managerial ability for the overall process of farm work when state-operated farms were divided and privatized. However, there is more to the present situation in Mongolia. As mentioned earlier, superannuation of farm machinery is advancing with supply of spare parts running short. Under these circumstances, farms having only limited number of farm machinery (generally small-scale farms) may experience difficulty performing proper farm work due to breakdown of machinery.

Figure 3-22 shows the relationship between total amounts of cost per ha and gross profit per ha. In view of the production frontier shown in the diagram, farms below this frontier would be labeled as being under X -inefficiency.

If risk diffusion hypothesis is adopted, large-scale management would be a desirable measure against risks. On the other hand, adoption of management capacity hypothesis would give rise to a need to foster a group of farm households that are realizing high land productivity at relatively small-scaled farms.

Figure 3-22 Total cost per area and gross profit



3. Vegetable Sector

(1) Trends of Vegetable Production in Mongolia (Table 3-11) and the Green Revolution

Under the central planned economy system, vegetable and potato were produced at state-owned farms and cooperative using technology imported from Eastern Europe and former Soviet Union. The production cost inevitably became high as the country was dependent on import for almost all inputs including machinery, fuel, seeds and fertilizers. Vegetables produced by state-owned farms and cooperatives were mainly sold at state and cooperative-owned shops and markets at controlled prices under the state procurement system.

After going through contract production system and lease system, these systems were changed into a market economy system which did not rely on state assistance after the transition period started in 1991 through privatization of state-owned farms and cooperatives (Negdel) and through abolition of the state procurement system. Many of them were divided and reorganized into private corporations or were transformed into private cooperatives called Khorshoo.

After privatization, production of vegetables and potato declined because the official assistance to state-operated farms and cooperatives was suspended, import of production inputs was stopped and distribution system was in disorder. Such declining trend in production continued for 3 to 4 years after the transition period started but vegetable and potato production started recovering from around 1995. Although vegetable and potato production continued to increase thereafter partly due to rapid increase in production at home-gardens in Ulaanbaatar, it has not recovered to the level attained prior to the transition period (Table 3-11). Under these circumstances, the Green revolution National Program was launched in 1997.

Table 3-11 Trends of vegetables and potato production in Mongolia

Year	1986-1990 average	1990-1995 average	1996	1997	1998
Vegetables					
Planted area (ha)	3953	2802.6	3189	4269	5064.3
Production (ton)	50336	22493	23818	34024	42042
Yield (ton/ha)	12.7	8	7.5	8	8.3
Potato					
Planted area (ha)	12302	8344.8	6933	6717	7772.2
Production (ton)	134010	68396	46022	54610	63420
Yield (ton/ha)	10.9	8.2	6.6	8.1	8.2

Source: Byambadori, J. and Turmandakh, T., *Baseline Study on Vegetable Marketing in Ulanbaatar*, UNDP, December 1998, pp.1-3

National Program for Green Revolution (1997-2004) was adopted by the Mongolian Congress in September 1997 to deal simultaneously with the two aforementioned problems of a) decline in vegetable and potato production, and b) increase in unemployment and pensioners due to the serious depression of the former Soviet Union and Eastern Europe, emergence of market economy and privatization of state-operated farms and cooperatives.

National Program for Green Revolution was designed based on the fact that current consumption (as of 1996) of vegetables, potatoes and fruits is much smaller than nutrition standard; that Mongolian's diet is heavily biased to meat and wheat; and that the country is highly dependent on import of vegetables and potato as domestic production of these commodities is limited to 10-40% (in the case of vegetables and potato) of national consumption. It aimed to increase the production of vegetables, potatoes and fruits by encouraging small farm households in urban areas to solve the problem of small consumption and insufficient production of vegetables and potato. It also attempted to decrease wheat import by changing people's dietary habit and reducing wheat consumption, which is already believed to have reached the saturation point and to assist poor households by creating income through development of such family farming in urban areas.

Important measures to implement the program include provision of irrigation, supply of seeds and seedlings, production and import of farm equipment, supply of fertilizers and agricultural chemicals, construction of heating facilities and education/extension. National Council for Green Revolution was established to implement the program by cooperating with the government and local administrative bodies. To promote this program, "agro-parks" were constructed in various districts and used as the base for offering technical guidance on vegetable production, storage and processing and supplying necessary materials to residents while offering micro credit as well as importing and domestically producing production materials for families starting vegetable production.

According to the plan, more than 10%(or 35,000 households) of urban residents will start their farming business in the first phase (from August 1997 to October 1998). The number of household starting their home-garden is expected to increase to more than 20%(or 70,000 households) in the second phase (from August 1998 to October 2000) and to more than 50% of 350,000 urban households in the final phase(from November 2000 to October 2004).

(2) Results of Field Survey

As mentioned earlier, production of vegetables and potato has not even recovered to the level achieved prior to the period of transition economy and production per capita still remains at 36% and 78% of the highest levels in 1980s for potatoes and vegetables, respectively. Moreover, since even the highest level of per capita vegetable consumption, 20kg, is one-seventh of per capita vegetable consumption level in Japan (138kg) or one-ninth of the level in Korea (186kg), the potential vegetable demand is expected to be considerably high.

In this section, we describe the current situation of domestic vegetable and potato supply, and elucidate the difficulties with improvement of production and distribution systems to meet the potential demand in the future, based on the field survey.

1) Current Situation and Problems of Vegetable and Potato Production

Most of the vegetables and potato currently grown in Mongolia are being produced by using the capital-intensive technologies from the era of central planned economy. The companies which were reformed from former state-operated farms or the privatized cooperatives undertake production. The field survey was conducted in Selenge Province, Darkhan-Ul and Ulaanbaatar of the central region which is major vegetable and potato producing area¹⁾. In this survey, we classified the types of vegetable farms into the following four typical management forms from the viewpoint of technology and marketing; i) corporate

enterprise in remote area, ii) family farm in remote area, iii) corporate enterprise in suburban area and iv) family farm in suburban area.

Table 3-12 Vegetable production by region (1998) (unit: tons)

Aimags & City	Potato		Vegetables	
	1989	1998	1989	1998
Selenge	46843.5	8305.0	11898.0	9186.7
Tov	51420.4	12735.6	15976.3	9646.9
Darhan-UI	7471.5	3698.1	3534.3	4952.0
Ulaanbaatar	2216.6	11094.6	4010.3	8284.7
Subtotal for 4 districts	107952	35833.3	35418.9	32070.3
	(69.4)	(55.0)	(59.6)	(70.2)
National total	155531.4	65152.4	59473.6	45656.3
	(100)	(100)	(100)	(100)

Source: National Statistical Office of Mongolia, *Mongolian Statistical Yearbook, 1998*, Ulaanbaatar, 1999.

Note: Figures inside parentheses refer to percentage.

i) Corporate enterprise (Bayangol District, Selenge Province)

A large scale corporate enterprise is located 130 km northwest of Ulaanbaatar and used to be part of a state-operated farm that was privatized and divided into 3 farms. Type of business enterprise is located liability company and the president was used to work in the former state-operated farm as a brigade chief. The company owns 40 hectares of farmland, 2 tractors, a combine for potato, a weeding machine, 2 irrigation facilities (river irrigation), a greenhouse (0.3 hectare) and 500 sheep. It also owns a warehouse equipped with anti-cold facility in Ulaanbaatar.

Vegetables and potato are cultivated in greenhouse as well as open field. While most of farming operation has been mechanized except for cabbage²⁾, machine and irrigation facility which has not yet been renewed, have poor efficiency.

In this company, 18 employees (e.g. agricultural machinery operators, drivers, cooks, vegetable farmers, herders, transportation laborers) are working under the president. Salary is paid on a monthly basis except for vegetable farmers and bonus is paid depending on work achievements. For the vegetable farmers, the company offers the production inputs other than family labor to the farmers for a charge, and consigns farm management to farmers. The farmers receive 70% of net profit, which is obtained by subtracting servicing cost of machinery and irrigation facilities, cost of fertilizers and pesticides purchased from company, rent (land tax to be born by company), cost of transportation to the market (carried by the company truck) and tax (7.5% income tax) from gross profit, as their income. The company is

in charge of selling the vegetables but have many problems including as a result of not being able to accurately forecast market prices.

Land productivity per hectare in 1998 was 25 tons for cabbage, 8 tons for carrots, 10 tons for turnip and 9 tons for potato, exceeding the national average of 20 tons, 7 tons, 8 tons and 8.2 tons, respectively. In addition, production cost is not necessarily high because of low depreciation cost owing to use of old machine and facility (Table 3-13). However, the company's profitability is extremely low due to the lack of market information attributable to the remote location (Table 3-14).

The renewal of the existing old machine and facility is raised as the greatest challenge.

Table 3-13 Production cost of main vegetables (1998)

Variety	Production cost (Tg/kg)	Yield (ton/ha)
Cabbage	23.5	20
Turnip	24.4	8
Carrot	52.3	7
Potato	62.5	8.2

Source: Byambadorj and Tutmandakh [op. cit.], p.9, Table 12.

Table 3-14 Profitability by type of farm management (1998)

Type of management	Farm Size (ha)	Profitability (Tg/Kg)
Corporate enterprise (Bayangol District, Selenge Province)	40	291,667 *
Family farm in remote areas	1	441,480
Corporate enterprise in suburban area (Ulaanbaatar)	3	31,040,000
Family farm in suburban area (Ulaanbaatar)		
a)	1.2	4,040,000
b)	0.06	8,833,333
c)	1	1,850,000

Source: Interview survey conducted by the author.

Note: Includes the income received by farmer.

ii) Family farm in remote area (Orhon District, Darkhan-Ul)

An irrigation system irrigating 300 hectares of farm land was constructed during 1970s' in Orhon district, located 190 km northwest of Ulaanbaatar (7 hours by train). Another 100 hectares of irrigation capacity was added thereafter. This irrigation system continues to be managed by a joint-stock company that owns 51% of the share after the privatization. In this

region, small pumps, chemical fertilizers and agricultural chemicals are offered free of charge to farm households since 1998 through the FAO project. A case of typical vegetable farm of which farm size is one hectare, is described as below.

The only machine that this farm household uses is irrigation pump. All other work is performed by using family labor. Crop they grow include cabbage, cucumber, carrot, turnip, tomato and potato. All cultivation is performed in open field, using chemical fertilizers and agricultural chemicals offered free of charge by FAO.

Production in 1998 amounted to 15 tons in total, 1.2 million tugrig in gross profit. Cash expenditure included cost of seeds (100,000 tugrig), diesel oil for pumps (50,000 tugrig), water use charge (20,700 tugrig), rent (property tax 780 tugrig), railroad transportation cost to Ulaanbaatar (200,000 tugrig) and income tax (7.5%), the sum of which accounted for more than 38% of gross profit. After deducing income tax and payment for chemical fertilizers (120,000 tugrig) from cash expenditure, management expenses amount to about 41% of gross profit (32.8 tugrig/ton), which is almost the same as corporate enterprise in remote area (Table 3-14). Assuming that imputed family labor cost is 9.7 tugrig/kg, production cost per unit weight is 42.5 tugrig, which is higher than the average level. Meanwhile, selling price of 80 tugrig/kg is equal to the average level in the peak season, from August to October (Figure 3-24). This is higher compared to the price obtained by the company mentioned above.

Thus, despite the efforts to reduce labor cost through the use of family labor, management cost has not been cut down because the transportation cost is expensive due to long distance from market area and purchased current input are costly. In addition, they cannot get high price because under the open field cultivation they have to harvest and ship their products in the peak season. Such high cost and low price inevitably lower net income per unit area (Table 3-14). Possible solutions include the reduction of purchased current input use, as well as obtaining high price by adjusting shipping timing and increasing value added by processing vegetables.

iii) Corporate enterprise in suburban area (Ulaanbaatar)

This is a case of joint-stock company established in 1992. This company was a part of the state-operated farm that was established 40 years ago and was divided into two private companies during transition period. The president of this company used to work as an engineer during the state-operated farm period. He and his family hold all the share of this company.

This farm adjoins a steam power plant in Ulaanbaatar and uses hot water supplied from the power plant for greenhouse cultivation of vegetables. Farm size is 6 hectares, including 3 hectares of greenhouse where cucumber and tomato are planted and 3 hectares of open field

where cabbage and turnip are planted.

The greenhouse was built in 1972 through assistance from Bulgaria and has never been renewed to date. Farm machinery includes 3 tractors, a shovel car and 4 trucks which has already been renewed. Irrigation water is pumped up from deep well and is scattered by manual labor.

The company is comprised of the president, 7 executive staff members responsible for marketing, account, engineering and agricultural technology, 74 farm laborers and security guards³⁾. The wages for all the staff are paid in the form of monthly salary with additional bonus attached to profit. The farm laborers have to meet their assigned norm in terms of production per area. If production exceeds this norm, farm laborers can receive 50% of the surplus in kind as bonus.

As for marketing, executive employees in charge of marketing sell 36% of total production and sales of the rest are consigned to 42 outside dealers. The marketing staff of this company usually make contract with restaurants and hotels to sell the products. The dealers are the commission agents who are engaged in trading at markets and receive 5% of selling price as commission. The commission is raised to 8% if all their assignments are sold out.

Greenhouse farming can be carried on from March to November. Almost all the farming operations of greenhouse farming are made by hand. Manure from cows and birds are applied as fertilizers as well as small amount of chemical fertilizers. Pest damage is slight and only small quantities of agricultural chemicals are used for pest control. They do not use herbicide for weeding but use manual weeding. All the seeds are imported from Russia partially because this company is entrusted with import of seeds from Russia.

In 1998, this company could attain high prices of cucumber and tomato, 800 tugrik/kg and 700 tugrik/kg respectively because he could sell them in lean season owing to greenhouse cultivation and he used the highest quality seeds (Table 3-15). On the other hand, greenhouse heating cost (cost of purchasing hot water from the steam power plant), which accounts for 70% of all expenses, is exerting pressure on the operating cost by boosting the cost per unit weight as high as 474 tugrik/kg for cucumber and 670 tugrik/kg for tomato. Despite such high cost incurred by greenhouse cultivation, profitability per land area is very high because the company can sell for high prices that more than make up for it (Table 3-14). Open field cultivation of cabbage and turnip resulted in loss in 1998 due to use of Chinese seeds and to bad harvest (20 tons decline in yield from normal year). The total profit of this company, however, was very high.

Cutting down heating cost and renewing glass and plumbing of greenhouse are the points raised as existing problems.

Table 3-15 Vegetable prices by market
(November 22, 1998, December 13, 1998) (unit: tugrig/kg)

Name of Market	Potato		Cabbage		Turnip		Carrot		Onion	
	WP	RP	WP	RP	WP	RP	WP	RP	WP	RP
Bars	100	120	180	200	60	100	120	200	120	150
	120	150	180	200	60	100	150	250	140	160
Kharkhorin	110	140	120	200	40	100	120	250	160	250
	120	200	120	200	50	100	150	250	160	250
Bayanzurkh		150		200		100		200		200
		200		200		100		250		200
Selbe		200		300		200		350		500
		250		300		200		350		500
Urlan		200		300		300		350		500
		250		300		300		350		500
Bumburgur		180		250		150		250		250
		200		250		150		300		250
Khuchitshonkhor	100	130	160	200	50	100	100	300	150	200
	120	180	160	200	60	100	130	300	150	200
Taiz		200		250		150		350		500
		250		250		150		350		500
Mercury		300		350		400		500		700
		350		350		400		500		700
Dalai eej		250		350		300		450		600
		300		350		300		450		600

Source: Byambadorj and Tutmandakh [op. cit.], p.5, Tables 7 and 8.

Note: Upper column indicates November 22 prices and lower column indicates December 13 prices.

iv) Family farm in suburban area (Ulaanbaatar)

In Ulaanbaatar, the number of part-time vegetable farmers rapidly increased after the transition period started. In many of these cases, vegetables are grown in family compound surrounded by board fence, relying mainly on family labor. Wedge scribe 3 types of suburban vegetable family farm based on the case study.

a) Medium-scale farm using small scale machine and greenhouse

In this case, 9 households organized a new cooperative, "khorshoo" and are cultivating 1.5 hectares of farmland. Regarding vegetable cultivation in 0.7 hectare, however, each household cultivates their farmland independently and potatoes the only crop that is being grown collectively. In addition, Household A, which plays the central role among the 9 households, owns the right to cultivate to 0.6 hectare of vegetable field and 0.6 hectare of potato field. Therefore, it is a private farm managed by this household and the term "cooperative" is nominal if nothing else. The head of Household A is a pensioner. He is working as a company adviser so his wife is mainly engaged in farming. They grow cabbage, carrot, turnip, tomato, cucumber, mung bean and potato by using a small tractor made in China and by drawing water from river and well. The tractor and irrigation pump are owned

by khorshoo. They grow their cabbage (0.2 hectare) and turnip(0.15 hectare) in the greenhouse and other crops in open field.

Most of the farming operations are made by labor except for land preparation and harvest of potato. They hire laborers for operation of tractor and weeding, and use family labor for other operations. And they do not use chemicals but use manure from their own cattle. Therefore, their cash expenditure other than taxes consist of hired labor wages, seeds and cost of fuel for tractors and pumps. Management cost after subtracting taxes and including depreciation of machinery was kept surprisingly low at 4.4 tugrig/kg.

In addition, net profit per area was very high (Table 3-14) due to the higher land productivity (cabbage 35 tons/ha, carrot 40 tons/ha, turnip 53 tons/ha, potato 20 tons/ha) and high selling prices (as shown in Figure 3-24) owing to greenhouse cultivation and suburban location(cabbage 200 tugrig/kg, carrot 250 tugrig/kg, turnip 120 tugrig/kg, potato 200 tugrig/kg).

b) Home-garden farming

This type of vegetable production has rapidly increased in the recent years. Household B has a 600 m² vegetable garden where about 20 varieties of vegetables including broccoli and salad lettuce which is rarely planted in Mongolia in addition to cabbage and carrot) are grown. Household head is engaged in non-agricultural job while wife is growing vegetables. They purchased a greenhouse in 1998 to grow tomato and cucumber.

Vegetables are cultivated in open field and greenhouse. Since almost all work including land preparation and weeding is done by family labor, agricultural chemicals are not used and seeds are self-supplied, cash expenditure, which is needed for only for barnyard manure and construction of greenhouse, is extremely small. Meanwhile, they can easily adjust the timing of shipments owing to proximity to the market and greenhouse cultivation. They also own a kiosk (small shop) where can sell their vegetables directly. All these merits enabled this farm to achieve a high profit of 600,000 to 700,000 tugrig per year in sales as well as the highest net profit per area among all suburban family farms we interviewed (Table 3-14).

c) Medium-scale farm using family labor

This family comprised of 3 households and 15 members had already started growing vegetables at their garden in 1974. The family head who manages this farm, retired and is living on his pension. But his 5 children, who have other jobs, help him to grow 56 varieties of vegetables and flowers on 0.5 hectare of land, and to grow potato on another 0.5 hectare of land.

They have a small greenhouse but almost all vegetables and flowers are cultivated in open field. Water is drawn from irrigation canal and well by pump. All work including land preparation, fertilizer application, weeding, watering and harvesting is done by family labor. Barnyard manure obtained free of charge from agricultural university is applied as fertilizer. They do not use agricultural chemicals, perform weeding manually and usually use self-supplied seeds. Therefore, the power bill for running the irrigation pump is their only cash expenditure and their management expenses are surprisingly low.

This family sold at least 2 million tugrig of vegetables, potato and flowers after providing for themselves in 1998. Assuming that the portion consumed by the family was equal to 560,000 tugrig, their gross profit can be estimated as no less than 2.56 million tugrig and the family would still have 2.4 million tugrig left in net profit after subtracting management expenses.

(3) Current Situation and Problems of Vegetable and Potato Distribution through Markets in Ulaanbaatar

Current situation and problems of vegetable and potato distribution is discussed focusing on the large scale markets in Ulaanbaatar as below.

1) Government Intervention, Distribution Channel and Price fluctuation under Market Economy System

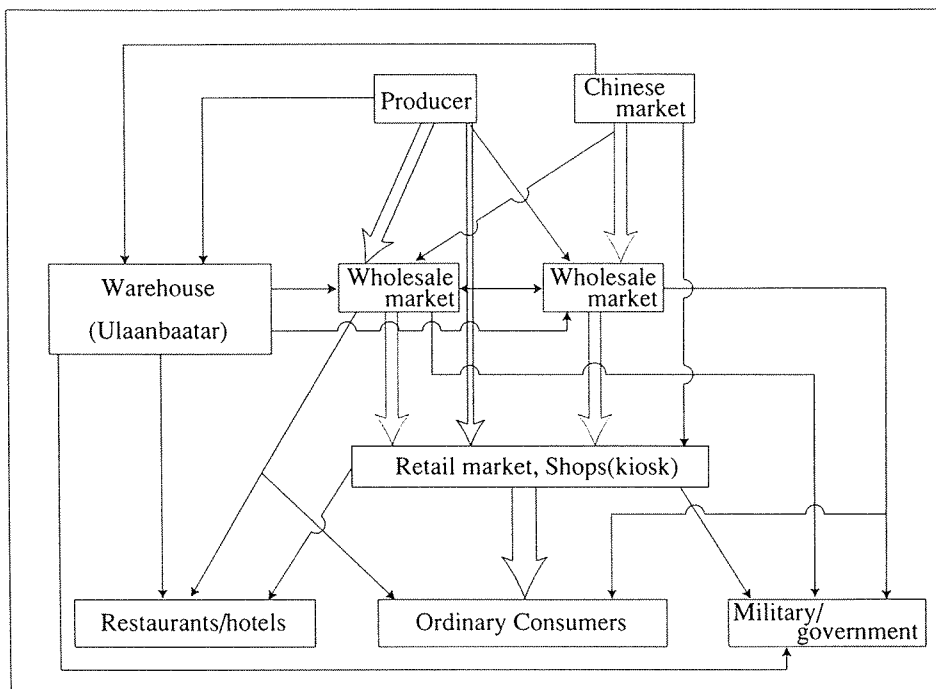
Large scale markets permitting free trade did not exist in Mongolia until the government procurement system was abolished and market economy system was introduced in 1991. There are 10 large-scale markets in Ulaanbaatar that are playing important roles in distribution of vegetables and potato under the market economy. All of these markets are run by newly established private companies under government assistance since 1992.

Government intervention in the market is limited to minimum and includes low-rate import tariff, licensing system for retailers and vegetable quarantine system. Low-rate tariff of 5% has been imposed on imports since July 1, 1999, and 15% seasonal tariff is added from September to March. The licensing system requires the traders doing business in the retail markets to obtain a business license from the district while the quarantine system requires the vegetables traded in city limits to receive quality inspection at quarantine stations located at each district. This rule is applied strictly to vegetables produced in China but it appears that the same is not necessarily true for domestic vegetables.

Figure 3-23 is a conceptual diagram of distribution channel for vegetables and potato. In Mongolia, market is not clearly divided by law into retail and wholesale as is done in Japan. Among the 10 markets mentioned above, markets in Khuchitshonkhor and Bars played the role of wholesale market in the sense that products shipped from producing area are sold there

first. The other 8 markets specialize in retail. Vegetables and potato shipped to Ulaanbaatar from remote producing areas in Mongolia and the market in Ereen, China, are transported to these wholesale markets and sold to big lot demanders such as retailers from the other 8 markets, restaurants, hotels, military and government agencies, or are brought to warehouses owned by private brokers and vegetable producing companies and shipped to the market in winter when supply of vegetable declined. A part of vegetables and potato shipped from suburban area are sold at small shops called "kiosk".

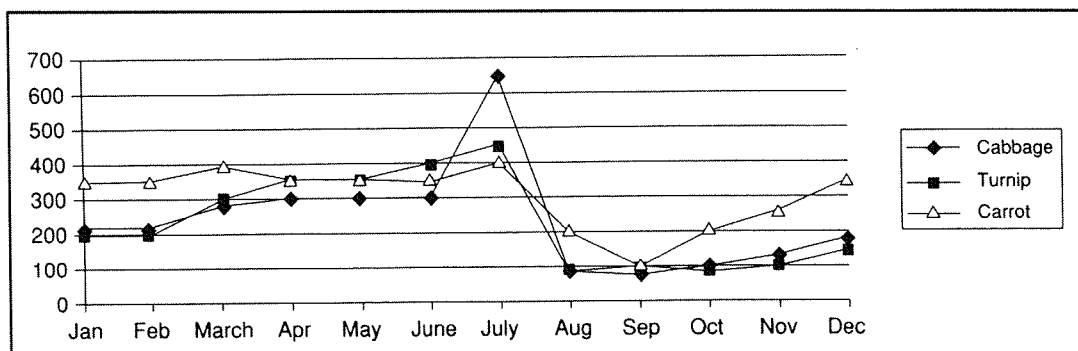
Fig. 3-23



Source: Interview survey

Figure 3-24 shows the seasonal fluctuations of vegetable prices. According to this figure, the peak season when the vegetable prices lower, lasts from August to November after that supply of vegetables declines from December to July in the next year and the prices rise up. Shipments from domestic vegetable producing areas increase between August and November and the amount of Chinese vegetables increase during the pre-harvest months when prices are high.

Fig. 3-24 Seasonal fluctuations of vegetable wholesale prices in Ulaanbaatar (unit: tugrig/kg)



Source: Byambadorj and Turmandakh [1998], p.4, Fig.1.

2) Characteristics of large scale markets

Current situation of 5 large markets will be described as below based on the results of interview with market managers.

i) Khurkhorin market

This market is a general retail market that sells commodities in addition to food and was built in 1994. The vegetable section used to be an open-air market but moved to an indoor market specializing in vegetables, potatoes and fruits that was built by a company different from the one running the market.

Trading started there in July 1999. Seventy traders have obtained business license for this market from the district. 30 of those traders are vegetable growing farmers. The market is operated according to the contract signed between these traders and the company managing the indoor market regarding the fee (60,000 tugrig/month) and the rules for using the market (prohibition of damaging the facility, hygienic considerations and prohibition of subletting etc.). The company provides services such as electricity and water supply, cleaning and monitors the quality of products handled by the traders.

Between 60 and 70% of vegetables and potato traded in this market are produced in China and are mostly passed through Bars market. Almost all fruits come from China but in limited quantities. Chinese vegetables mainly arrive from November to June. They do not arrive in September and October when Mongolian vegetables are in peak season and prices are low. Since this market mainly carries Chinese vegetables that are priced lower than Mongolian vegetables, market prices are lower than the other markets. Therefore, the low-income consumers purchase vegetables in this market more commonly.

**Table 3-16 Prices of vegetables produced in Mongolia and China
(August 25, 1999, interviewed in Khukhorin market)**

Variety	Price (Tg/kg)	
	Mongolian	(Chinese)
Cabbage	200-250	60-80
Carrot	180-200	110-120
Potato	150-180	100-120

Source: Interview survey

ii) Mercury market

This market is also a general retail market of daily necessities but has different characteristics from Khurkorin market in the sense that its customers mainly consist of high-income groups and foreigners. All items are sold in the indoor market that was built in February 1996. The market is run by a private company and has a total of 290 traders doing business there. Among them are 46 retailers selling vegetables and potato. While contract signed between the company and these traders regarding the market fee(58,000 tugrig/ month, deposit 29,000 tugrig), services and quality inspection provided by the company and ways of transaction are almost similar to those at Khurkhorin market, the company encourages the traders to get high quality and wide variety of vegetables intended for high income consumers. For the purpose of meeting these requirements, the suburban farmer-retailers grow a wide variety of vegetables and some of the retailers travel as far as Russia and Beijing to obtain vegetables that are not available in Mongolia.

iii) Dalai eej market

An indoor general retail market adjoining Mercury market. The layout of the building is same as Mercury market but is intended for middle-income groups that are positioned between Mercury and Khurkhorin customers. The market was established in December 1993 and its ownership was transferred to a private limited liability company in 1998. It has a total of 170 retailers of which 22 are selling vegetables and potato (7-8 of them are farm households). The contract regarding market fee (30,000 tugrig/month, deposit 50,000 tugrig) and other matters are similar to those at Mercury market. Vegetables sold are mainly produced in Mongolia in autumn and winter but are replaced by Chinese counterparts during the lean season from spring to summer. Quality is inferior to Mercury but is superior to other markets.

iv) Khuchitshonkhor market

Opened in 1992 by a private limited-liability company as the first fresh food market in Mongolia. Vegetables, potatoes and meats are traded in a 7,000m² lot. It is one of the largest markets in Mongolia. Meats are traded inside a building and vegetables are traded at an

unpaved open-air market, which is divided into a roofed area where retailers do business, an unroofed stall area where suburban farm households and assemblers sell their vegetables and an open air area where producers and assemblers that carried vegetables from remote vegetable producing regions sell the loaded vegetables on their trucks.

Since anyone can freely participate in market transaction, this market has visitors in succession. About 100 vegetable traders and 150-170 meat traders are said to be doing business at any point in time. Since a public rule clearly distinguishing wholesale market from retail market has not been established in Mongolia, traders can engage in both wholesale and retail business. In the case of this market, however, bulk trading is common because its large parking space enable arrival of large shipments from remote producing areas in trucks. For this reason, ordinary consumers purchasing small quantities are rarely seen here, and direct dealings between shippers(including producers, assemblers from vegetable producing areas, large brokers that own anti-cold storage facilities in Ulaanbaatar) and buyers (such as retailers and bulk users) are often observed⁴⁾. In this sense, it is closer to the image of wholesale market, although the number of professional wholesalers that specialize in brokering between shippers and retailers is still limited with only a handful of brokers selling the vegetables they store in the their own warehouse outside the market during the lean season.

The company managing the market offers the same services as other markets and collects market fee and parking fee. It makes a contract with store holders. However, the contract is verbal and, although it is an arrangement concerning market fee, it does not provide strict rules regarding sanitation and profit of subletting space as done in other markets. One can say that neither rules nor public regulations exist except for inspection of vegetables produced in China and transactions in this market are left to the free activities of traders.

The amount to be paid to the market when the goods are brought in by vehicle for sale includes 600 tugrig/hour for parking and 2000 tugrig/day for market fee. If a shop is rented, 3% of gross revenue will have to be paid as market fee. The amount of sales is monitored by the employees of limited liability company that collect the fee.

v) Bars market

The current limited liability company purchased and privatized in 1995 a site that used to be a state-operated trading center. It adjoins the Ulaanbaatar station where the quarantine station for vegetables from China is located. Eighty-percent of vegetables from China is purchased at Ereen and transported to Zamyn-Uud on the Mongolian site where they are relocated on railroad for transport to Ulaanbaatar. Vegetables shipped to Ulaanbaatar are

checked at this quarantine station and sent without being taken out from the freight car to Bars market where they are sorted according to destinations within Ulaanbaatar. For these reasons, most vegetables traded at this market come from China and are intended for bulk trading.

Bars market is a general market where non-food commodities are also traded. Indoor market is currently under construction and vegetables and potato are traded at an open-air market. About 80 traders are doing their business by using containers as stores and vegetables and potato are traded at 17 stalls. There are also assemblers that receive goods directly from cargo. Majority of business is wholesale but some traders also are doing retail business.

Rules related to market trading are same as those at Khuchitshonkhor market. Market fee is fixed at 2,000 tugrig/day for stalls and 1,000 tugrig per vehicle for parking fee.

As described above, although it is necessary to follow minimum public rules, transactions are left to the free activities of traders and neither rules nor public regulations exist. The company is under government supervision but does not intervene with price formation and individual transaction. Instead, their activities are limited to collection of parking fee, cleaning of market, provision of water/electricity/security service, collection of market fee and cancellation of contract with parties violating the market rules.

Putting the above mentioned fact findings together, we can say that each market is trying to coexist with others through commodity differentiation. Khuchitshonkhor market has high percentage of vegetables produced in Mongolia whereas Bars market specializes in vegetables from China. Each retail market is also making a marketing strategy such as quality differentiation to correspond with his customers' needs. And each company has established the traders that are licensed to do business in the market are limited to those that have signed an agreement with the company regarding these rules and market fee.

3) Marketing practices and distribution efficiency

Lastly, let us take a look at the realities of shipping and marketing practices and their influence on efficiency of distribution based on the interview with traders.

Payment is usually done in cash and methods such as sales or purchase on credit, advance payments, and sales on consignment have not been reported.

Transportation of vegetables and potato is done by truck or railroad when shipped from remote areas and by various means of transportation including light trucks and passenger cars when shipped from suburban producing areas. Form of packaging differs depending on kinds of vegetable but is generally simple. Cabbages shipped from remote areas are piled up on truck beds while potatoes, cucumbers and turnips are carried in jute bags. Tomatoes are shipped in wooden boxes while more fragile vegetables such as green

onion etc. are carried in various ways including packing in travel bags. Classification and assortment are usually performed at retail stage.

Trading is done on direct negotiation between buyers and sellers so that continuous customer relationship between them is needed to reduce transaction cost arising from negotiation. As mentioned earlier, however, it is hard for traders in the markets to disregard the behaviors of their competitors. Therefore, information on market price plays an important role in determining the price in direct negotiation. Producers and assemblers in remote areas collect information on market price by making telephone inquiries to the market, while retailers, wholesalers, suburban farmers and suburban assemblers obtain this information on their own at the market and by exchanging information with others in the same trade. Both sellers and buyers calculate the basic prices based on market price information obtained in this manner and adjust actual prices using these prices as the standard by direct negotiations and depending on sales. In addition, the trader can search the other customers if they can not reach agreement with their regular customers. Therefore, market price is determined competitively, taking account of volume and quality, thus transaction is considered very rational one. Retail markets are also believed to be competitive but are different in the sense that retail prices are more rigid compared to wholesale prices. This fact can be understood if we assume that markets are in a state of monopolistic competition and each retailer in the market is facing a kinked demand curve because: a) companies running the retail market are trying to differentiate their commodities with others through unique assortments; and b) a market structure in which other retailers would follow price lowering by a retailer but the same is not true for price raising exists. Market price determined in this manner would not vary widely among vegetables of same variety and same quality in the same market. However, price gap between markets is relatively large because quality and unit trade volume, which affect price determination, vary with market (Table 3-17).

Table 3-17 Price difference between large markets

Variety	Potato		Cabbage		Turnip		Carrot		Onion	
	WP	RP	WP	RP	WP	RP	WP	RP	WP	RP
Minimum price (Tg/kg)	100	120	120	200	40	100	100	200	120	150
Maximum price (Tg/kg)	110	150	120	200	50	100	130	250	140	160
	110	300	180	350	60	400	120	500	160	700
Average price (Tg/kg)	120	350	180	350	60	400	150	500	160	700
	103	187	153	260	50	170	113	320	143	415
	120	233	153	260	57	170	143	335	150	416

Source: Table 5.

Note: Upper column indicates November 22 prices and lower column indicates December 13 prices.

Ratio of purchasing/selling prices, percentage of producers' net receipts, distribution margin rate at each stage, barriers against entry and conveyance of market information will be discussed as below.

Table 3-18 shows the ratio of purchasing price to selling price. According to this table, the ratio is 0.6-0.8 for wholesale market and 0.5-0.64 for retail market. Compared to other Asian countries the former is about the same and the latter is lower. Table 3-19 and Table 3-20 show the ratios of farm-gate price to retail price and the ratios of gross margin to selling price at each stage in Mongolia and other Asian countries. Comparing Mongolia with other Asian countries, the ratio of farm-gate price and the ratio of wholesaler or assembler margin in Mongolia are higher while the ratio of retailer's margin in Mongolia is lower.

Table 3-18 Buying and selling prices of vegetables (August 27, 1999)

(unit: tugrig/kg)		
Vegetable price	Buying price	Selling price
Wholesale market		
Cabbage	50(67.5)	80(100)
Cucumber	140(77.8)	180(100)
Turnip	200(66.7)	300(100)
Onion	180(72-90)	200-250(100)
Carrot	80(61.5)	130(100)
Retail market		
Potato	186(61.6)	302(100)
Cabbage	150(50)	300(100)
Cucumber	150(60)	250(100)
Turnip	280(63.6)	440(100)
Onion	250(50)	500(100)
Carrot	240(57.1)	420(100)
Tomato	150(60)	250(100)

Source: Interview survey conducted by the author.

Table 3-19 The gross marketing margin rate in Ulaanbaatar (December 1998)

Vegetable variety	Cabbage	Turnip	Carrot	Potato
Ratio of gross margin to selling price	0.4	0.24	0.375	0.4
(Wholesaler/assembler)	0.4	0.4	0.4	0.5
Ratio of gross margin to selling price (Retailer)	0.33	0.6	0.375	0.2

Source: Calculated by the author based on Byambadorj and Tutmandakh [1998], p.9, Table 11.

Table 3-20 Market margin rate by stage in Asian countries

Vegetable variety	Thailand	Philippines	Laos	Korea
Ratio of farm-gate price to retail price ¹⁾	0.48	0.31	0.45	0.39
Ratio of assembler's gross margin to selling price ²⁾	n.a.	0.26	n.a.	0.33
Ratio of wholesale's gross margin to selling price ²⁾	0.18	0.19	0.26 (0.46) ³⁾	0.30
Ratio of retailer's gross margin to selling price ²⁾	0.20	0.26	0.26	0.34

Source: Fukui, Seiichi; "Ajia ni okeru keizai hatten to oroshiurishijo sisutemu no kindaikani tsuite", *Economic Bulletin*, Osaka Gakuin Daigaku, vol. 13, No. 1, 2, Table 5

Note 1: Average values from 12 varieties of vegetables for Thailand, 3 varieties for Philippines, 8 varieties for Laos and 7 varieties for Korea.

Note 2: Margin rate refers to percentage of gross margin in selling price at each stage.

Note 3: Figures inside parentheses refer to margin rate of wholesales for vegetables produced in remote areas.

Possible entry barriers include "absolute cost advantages" and "minimum requirements of capital"⁵⁾. Entry into retail business being regulated by the somewhat strict implementation of license system for retailers and the need for companies running the market to obtain business license and relatively high retail margin ratio despite not very high shipping cost are examples of the former type of entry barrier. Existence of customer relationship could also become an entry barrier of this sort, although we were not able to find any evidence that this is hindering the efficiency of distribution. In addition, requirement of certain amount of cash to pay the market fee, parking fee, deposit and day-today transaction can be regarded as an example of the latter type of entry barrier, although this would not pose much of a problem since the volume of transaction and the required capital amount in Mongolia are currently small.

Meanwhile, market information is presumably transmitted promptly and accurately because, as mentioned earlier, retailers, brokers, suburban farmers and suburban assemblers are eagerly collecting market information on a daily basis. In contrast, producers and assemblers in remote areas are collecting market information by telephone but are confronted with time lag because wholesale market prices change from day to day and transportation takes time. Large-volume shipments also affect market prices one way or another. Therefore, they are at disadvantage in terms of collecting real-time information compared to vegetable traders in Ulaanbaatar and suburban farmers.

Based on the above considerations, the structure of vegetable market in Ulaanbaatar is "competitive" on the whole, although the existence of entry restrictions at the retail market, the difficulties with access to market information for producers and assemblers in remote

areas and the lack of professional marketing intermediaries such as assemblers at producing areas and wholesalers at urban markets, remain as tasks for the future.

However, distribution of vegetables was far more efficient than expected considering the fact that the country has just started treading the path of the market economy.

(4) Problems to Solve for Vegetable Sector Development

To develop vegetable sector, the following problems should be solved.

Regarding the aspect of production, firstly, there is an issue of how to improve the inefficient large-scale farm management by corporate enterprise in remote areas. As mentioned earlier, this type of farm still rely on large-scale mechanical technology that has been used since the planned economy era and cannot help submitting to low productivity under the climatic condition in Mongolia not suitable for vegetable production. In the case of companies included in the interview survey, production cost per weight unit was not necessarily lower than the national average even though depreciation expenses were low owing to superannuation of machinery and facilities of which share normally accounts for large percentage of expense items. Thus, corporate enterprise vegetable production in remote areas is inefficient and conversion of vegetable to wheat, for instance, should be considered. At the same time, suburban family farms need to be fostered because their production and distribution systems are the more efficient and they can respond to price fluctuations more flexibly by using family labor intensively, with consideration for the issue of overproduction. Production of vegetables other than potato, cabbage, carrot, turnip, cucumber and tomato should also be encouraged when fostering suburban family farming to address the diversification of vegetable consumption that would accompany economic development and urbanization.

In the aspects of distribution, many problems exist because the market economy has just started on its way. The following three points should be remarked.

Firstly, the reality is that producers are experiencing difficulty dealing with the market as they have to perform their own marketing. This is because the country has only recently shifted its system to market economy and there are not enough number of local merchants specializing in marketing intermediaries. This has become one of the reasons behind low profitability of remote producers.

Secondly, supply of vegetables and potato to Ulaanbaatar increased thanks to the effect of "Green Revolution" program in 1998, although it resulted in steep falling of prices during the peak season and forced a large number of producers to incur loss. In Mongolia, vegetable production is expected to increase but is still at low level and market is small. For this reason,

it is necessary to promote the program by taking into consideration the increase in vegetable demand and the development of market economy, instead of resorting to radical reform.

Thirdly, shipments from remote producers whose costs (e.g. production and transportation) are higher, account for high percentage of items sold at markets in Ulaanbaatar and have a great influence on the development of the wholesale prices. In addition, entry barrier at retail markets is inflating retail margin and making retail price comparatively high, as mentioned earlier. Thus, the possibility that inefficiency in production and distribution is raising vegetable prices and restraining the increase in consumption cannot be negated.

Chapter Four

Tasks Related to Agricultural and Rural Development in Mongolia

This chapter will analyze the results of field study based on the results of stock farming, agriculture and population analysis described in the first three chapters by dividing them into: 1. Tasks of stock farming; 2. Tasks of wheat farming; 3. Tasks of vegetable production; and 4. Tasks of population/public health.

1. Tasks of stock farming

Priority tasks of development assistance for the stock farming sector include maintenance and additional installation of wells and diffusion of water purifiers. Since the number of livestock raised has been increasing nationwide after the system changeover, livestock production can easily reach its limit provided that the area of pasture remains at the present level. Reclaiming unused land by repairing superannuated wells that were built during the socialist era and digging new wells is an effective way to break through this limit. Since approving ownership of wells does not seem to be compatible with the realities of this country in which stock-raising households migrate from season to season, wells should ideally be owned and managed by national, prefectural and county governments. Water quality of a well also affects people's health when it is drunk over a long period of time.

Therefore, developing inexpensive water purifiers that are easy to use and do not consume much electricity and making them available to each household is important particularly in regions where water quality is poor.

Then there are problems originating from expanding disparity in wealth that became conspicuous over the last 10 years. Households owning less than 150 head of livestock are sometimes classified poor households. As described in Chapter 3, this classification is not necessarily correct. However, there are more than a few households that do not own enough livestock, i.e. live capital, to continue its reproduction. It is necessary to offer not only home relief but also support for the sake of independence to these households. In concrete terms, this translates into loan of livestock by the government, i.e. creating a system similar to that which existed during the *negdel* era in the sense that the government consigns the so-called poor households to manage the livestock it owns in return for certain amount of produce. Japan should be able to cooperate when the Mongolian government buys the livestock it is renting from the private sector.

In terms of livestock management, lack of households that processed supplementary feed among those studied would be a problem. In the Hangai region where the study was conducted, herbaceous plants of grass family that are tall and convenient for cutting grow naturally in abundance. For this reason, households tend to not go beyond preparing their own hay. However, a wide variety of wild grasses with varying nutritional values exist in the pasture. Therefore, efforts shall be made towards research and organization for making stock-raising households aware of nutritional values of wild grass and repeatedly educating them about their use as supplementary feed for winter.

Since livestock industry is the most principal form of livelihood and industry in this country, there are a variety of tasks other than those described above. However, the tasks in distribution and animal product processing should not be given priority when offering assistance. This is because many projects are already in progress in these areas in addition to the existence of areas that are largely influenced by the social and economic situation of neighboring Russia and China as well as problems that need to be solved in connection with infrastructure improvement for the entire country. Moreover, solving these problems should require considerable amount of time and excellent individuals and companies would be solving them on their own in the meantime.

Lastly, a point must be made with regard to sustainable use of pasture utilization although it does not lead directly to development assistance. At present, greater concentration of livestock occurring in areas that are closer to suburbs is posing the risk of devastation of pastures. To solve this problem, it is necessary to encourage frequent long-distance migration similar to that practiced during the *negdel* days in addition to limiting resettlement while

incorporating this as system in one form or another. As seen in the examples in Chapter 3, long distance migration will reduce supply of supplementary feed while coping with zod. In addition, as seen in the example of consigned management of horses, managing large number of same variety without migration tends to give rise to impoverishment of meadows. Although negdel seems to have been forgotten with the system changeover, now is the time to reassess its value.

2. Tasks of wheat farming

Statistics show that wheat cropping in Mongolia is going through declining phase. While export of wheat was possible in the past, self-sufficiency rate of wheat has now dropped to 50%. This can be seen as wheat cropping that prospered during the socialist era supported by massive subsidies searching for new balance now that these subsidies have been abolished.

Incidentally, under the present situation in which constant deficit in current balance continues, recovery of self-sufficiency in wheat production should be one of the important tasks of agricultural administration in Mongolia provided that it can be realized without excessive protectionist policy. In preparing the strategy for recovering the wheat crop in Mongolia, it is necessary to consider the fact that, unlike many other Asian countries where land is the scarce resource, the scarce resource in Mongolia is farm machinery. As is clear from the data, wheat cropping in Mongolia is an industry with gradually decreasing average cost over a long-term in which average cost decreases for large management farms. Therefore, a situation where large farms would dominate wheat production may occur unless there are some political interventions. Although this may be technically efficient, it is not necessarily desirable in terms of social welfare. It would be necessary to foster farm households of this scale in view of the fact that long-term average cost ceases considerably to decrease after management scale of 2,000 to 3,000 hectares.

While main assistance that Japan may offer for recovery of wheat cropping in Mongolia would be in the form of farm machinery, there will be a need for a strategy taking socially appropriate scale into consideration rather than fostering farms of technically appropriate scale.

3. Tasks of vegetable farming

As indicated in Chapter 3, we should place top priority on the development assistance on the production improvement of vegetable sector. These policies include assistance to foster small-scale family farms, immediate improvement and expansion of research extension system and technical guidance related to cultivation method and storage suitable for production in cold regions.

Some programs implemented in Agro-Parks for “Green Revolution” aiming for diffusion of home gardens, such as dissemination of vegetable cultivation technology and assistance to small scale farms, are said to be effective in increasing small scale vegetable farms, provided that they are performed in a proper manner. Funds needed for this purpose are said to be 2.75 billion tugrig (a little more than 200 million yen), about 10 million yen per prefecture. Using Japan’s “Grassroots Aid” funds for the operation of Agro-Park in Ulaanbaatar may be considered suitable.

While supply of seeds is indispensable for expanding vegetable and potato production, Mongolia is dependent on import because domestic production of high-quality seeds is unable to meet the demand due to shortage of personnel and facilities. Increase in imported seeds may give rise to pests that were unconceivable in the past and spoil the advantage of Mongolia’s vegetable production of having few pests. On the other hand, absolute shortage of facilities and personnel currently does exist for production of high-quality seeds affected by pest. Damage by pest may expand if high-quality seeds are produced and distributed under these circumstances. This implies that Mongolia will have to depend on imported high-quality seeds. To overcome such dilemma, assistance shall be used for accelerating improvement and expansion of research facilities and researchers as well as equipping the epidemic prevention system for imported seeds rather than immediately increasing the production of high-quality seeds (Note by Expert Kurami of JICA).

In Mongolia, the frost-free period of 105 to 110 days is very short and the amount of precipitation is very small. Therefore, promotion of cold-resistant and frost-resistant greenhouse cultivation and improvement of irrigation facilities are essential requirements, and it is important to supply these facilities and materials such as greenhouse covering materials at lowest possible cost. According to Expert Kurami, it is possible to grow most vegetables even when frost-free period is short through the use of primitive greenhouses, tunnels and mulch cultivation. Display of cultivation methods and guidance at Agro-Park are expected to contribute to technological dissemination of this type.

Moreover, storage and processing of vegetables would become important measures in making up for short cultivation period. However, large state-operated processing plant that

was privatized after the system changeover is not currently operating. Equipment of storage and processing facilities is also a high-priority task. As some producers in remote areas attempt to improve the added value of their products by storage and processing to overcome the disadvantage of their location, extending credit to construction of storage and processing facilities that can be shared by several small families is also worth considering.

Meanwhile, many problems must also be solved in the areas of distribution. However, vegetable markets in Ulaanbaatar are brisk and vegetable trading appears to be carried out smoothly even though market economy system has been just introduced. If the number of large-scale producers in remote areas with low profitability is reduced and the number of suburban family farms with high profitability increases, it would depress the wholesale price while increase of vegetable sales at small shops like “kiosk” would force down the marketing margin in large retail markets. The number of traders specializing in brokerage of vegetable distribution will undoubtedly increase. In this sense, the market transition process that started from zero may advance relatively smoothly.

On the other hand, imported technology and materials introduced from the former Soviet Union and Eastern Europe prior to transition economy has been used in Vegetable production. Such production system is still being maintained even today when market economy has advanced even though it is not necessarily suited for the country and is inefficient, and has become a negative asset for vegetable production in Mongolia.

Therefore, official development assistance for the vegetable sector would be more effective if it is concentrated in assistance for establishing small-scale, suburban vegetable production system that relies on resources within Mongolia and more suited to geographic and natural environment of the country instead of assistance for improving the distribution system.

4. Tasks of population/public health

From the viewpoint of population size, Mongolia with her population of 2.4 million is the countries with smallest population density in the world. However, it is also true that population carrying capacity of pastures in Mongolia is very limited (although no accurate estimation has been made) and the fact that the present population has already exceeded the carrying capacity of pastures in Mongolia must be noted. Needless to say, extensive nomadism is not the only means that is supporting the population. However, it is true that increase in population will become a large burden on her environment in view of the

vulnerability of natural ecosystem of Mongolia such as high altitude, high latitude and limited precipitation.

At present, under the economic transition has triggered one of the most rapid demographic transition in the world. As Mongolia has the experience of having restrained the potential population pressure for various reasons, this population increase is expected to stop once the conditions are met and stabilize over a very short term.

The condition needed for this to happen is the availability of family planning measures to people who need it when they need it. As pointed out in the reproductive health survey, Mongolia has high infection rate of sexually transmitted diseases because of her cultural background and concern over epidemic of HIV/AIDS exists unless such sexual behavior is changed. It goes without saying that the purpose of solving population problems lies in fostering healthy future generations and realizing sustainable society by seeking improvement of quality of life and welfare through social and economic development. Population control must never take place through prevalence of disease and spreading of vulnerable and unhealthy condition. In this sense, it will be necessary to expand and popularize information, education and communication activities to enlighten the public on population issues while politically promoting supply of family planning commodities. Transferring the experience of Japan may be an effective cooperation in this field due to existence of numerous similarities including existence of very little cultural constraints.

As indicated by the analysis in Chapter 1, Mongolia will enter a demographic golden era in another decade or so if her demographic transition continues as it is. Mongolia will have a tremendous bill to pay in the future if she fails to take this opportunity. Nevertheless, concern exists over decline in overall standard of education due to drop in school attendance rate since the economic transition

It goes without saying that existence of large number of poorly educated and trained laborers that can only perform simple labor will not lead to development of a country amidst a globalization of economy. In this sense, it would be an important policy task for Mongolia, which is in the midst of economic transition to support human resource development by way of policy to utilize the assets from the country's past.

Chapter Five

Survey Member and Itinerary

1. Committee in Japan

Sigeto Kawano	Emeritus Professor, The University of Tokyo. Board of Directors, the Asian Population and Development Association (APDA)
Yonosuke Hara	Director, The Institute of Oriental Culture, the University of Tokyo.
Masatake Matsubara	Director, Professor, The Japan Center for Area Studies, National Museum of Ethnolgy
Seiichi Fukui	Professor, Osaka Gakuin University
Akihiko Ohono	Professor, Aoyama Gakuin University
Seisi Yamazaki	JSPS Research Fellow Graduate School of Asian and African Area Studies, Kyoto University
Hirose Tsuguo	Executive Director/ Secretary General, APDA
Osamu Kusumoto	Senior Researcher, APDA
Chiharu Hoshiai	Manager, International Affairs, APDA
Yuko Kato	Deputy Manager, International Affairs, APDA

2. Survey Member

Preliminary Survey (from 24 July to 31 July)

Osamu Kusumoto Team Member (see above)

Main Survey (from 14 August to 28 August)

- 1) Seiichi Fukui Team Leader (see above)
- 2) Akihiko Ohono Team Member (see above)
- 3) Seisi Yamazaki Team Member (see above)
- 4) Osamu Kusumoto Team Member (see above)

3. Cooperators

(1) The Embassy of Japan and JICA

Shinji Kubota Ambassador
Fumiaki Tominaga Counselor
Hiroshi Fujimoto Third Secretary
Kenji Matumoto Resident Representative,
Japan International Cooperation Agency (JICA)
Keizo Egawa Assistant Resident Representative
Japan International Cooperation Agency (JICA)
Hiroshi Komiyama Expert, Japan International Cooperation Agency (JICA)

(2) The Embassy of Mongolia in Japan

S.Khurelbaatar Ambassador
Rentsendoo Jigjid Counselor

(3) Government of Mongolia and other Institutions

Dogsomyn Ganbold, Deputy Speaker, The State Great Khural (National Parliament)

Sambuu Lambaa, Chairman, Standing Committee on Social Policy, The State Great Khural (National Parliament)

L.Bold, Chairman IPU Asia and the Pacific, The State Great Khural (National Parliament)

S. Oyun, Member of The State Great Khural, The State Great Khural (National Parliament)

S. Tumur-Ochir, Member of The State Great Khural, The State Great Khural (National Parliament)

Dambajav Ganbold, Officer, Inter-Parliamentary Relation Department, The State Great Khural (National Parliament)

Zevsegiin Ulziysaikhan, Officer, Standing Committee on Security and Foreign Policy, The State Great Khural (National Parliament)

Setev Byambaa, State Secretary, Ministry of Agriculture and Industry

Yadam Balgansuren, Director General, Policy Coordination Division, Ministry of Agriculture and Industry

Dovdoniin Buuveibaatar, Chairman, Administration Department, Ministry of Agriculture and Industry

G.Davaadorji, Senior Officer, Programme and Project Implementation Division, Ministry of Agriculture and Industry

Zagdyn Yadam, Officer of Food and Agriculture Division, Strategic Planning and Policy Department, Ministry of Agriculture and Industry

Choimpog Puntsagsuren, Officer of Programme and Project Implementation Coordination Division, Sectorial Coordination Department, Ministry of Agriculture and Industry

I.Hanimhan, Chief of External Relations and Cooperation Division, State Administration Department, Ministry of Agriculture and Industry

D. Boldbaatal, Director, Foreign Trade and Economic Cooperation Department, Ministry of External Relations

Lodoidambyn Nasanbuyan, Officer, Foreign Trade and Economic Cooperation Department, Ministry of External Relations

Ts. Gantsog, President, National University of Mongolia

Davaasuren Chultemjamts, Chairperson, The National Statistic Office

Khanaeva Djerem, The National Statistic Office

Moseva Amagoe, The National Statistic Office

Durgersurengiin Tsedevsuren, Chairman, Local (Khural) Assembly Orkhon Sum, Darkhan-Uul Province

Sahiya Lhagva, Vice-Director, Darhan-Uul Aimag

Altangerel, Village Chief, Khongr Sum

Tsedeasuren, Village chief, Shurn Gol Sum, Selenge Province

Dorngji, Village Chief, Orhon Sum, Selenge Province

Davaasambuu Ganbold, President, Mongolian State University of Agriculture

Chukuunbat, Vice-President for Education, Mongolian State University of Agriculture

Norovyn Altansukh, Vice President for Research & Cooperation, Mongolian State University of Agriculture

Agipar Bakey, Dean, Faculty of Agricultural Economics, Mongolian State University of Agriculture

Begz Dorji, Dean Faculty of Agro-biology, Mongolian State University of Agriculture

D. Tsermaa, Vice-Director PSARI, Plant Science and Agricultural Research Institute, Mongolian State University of Agriculture

Byamba Purev, Senior Lecturer, Faculty of Agricultural Economy, Mongolian State University of Agriculture

Ts. Baldandorj, Head, Water resources and use division, Institute of Geo-ecology

G.Dolgorsuren, Hydraulic Engineer, Water resource and use division, Institute of Geo-ecology

D. Ulziibayar, Researcher, Institute of Geo-ecology

Douglas Gardner, Resident Representative, United Nations Development Programme (UNDP)

B.Batkhuuyag, Programme Assistant, United Nations Development Programme (UNDP)

Kenta Goto, Associate Expert Governance and Economic Transition, United Nations Development Programme (UNDP)

Linda Demers, Country Representative, United Nations Fund for Population (UNFPA)

Bayarmaa Batchuluun, National Programme Officer, United Nations Population Fund (UNFPA)

Albert M. Marckwardt, Chief Technical Advisor to the National Statistic Office, United Nations

N. Saruul, United Nations Information Shop Assistant, United Nations Development Programme (UNDP)

A. Khuchit, Consultant on Agricultural Issues, Mongolian ALT Corporation

B.Jiyandorji, President, Mongolian Green Movement

Ts. Maidar, Coordinator, National Green Revolution Programme

Natsagiin Tserendorj, General Manager, Inter Consul Co. Ltd

U. Ulzinyam, Interpreter, Chairwoman Mongolia Japan Economic Development Center

Zorig Saranchimeg, Interpreter

B. Uyanga, Interpreter, Interpreter

L. Damdinbayar, Interpreter

Gantumur Luvsannyam, Interpreter

Preliminary Survey Itinerary

— from 24th July to 31st July —

24th July (Sat)

- 8:55 Depart from Haneda (JD203) 10:00 Arrive at Itami
- 10:30 move from Itami to Kansai International Airport (KIX)
12:00 arrive at KIX
- 14:10 Depart from KIX (OM904) 17:25 Arrive at Ulaanbaatar
- Discuss about survey program with Ms. Lodoidambyn Nasanbuyan, Ministry of External Relations

25th July (Sun)

- Visit to Ger of nomadic people in Undur dov district. Briefing on Nomadic.

26th July (Mon.)

- Visit to Ministry of External Relations. Discuss about survey schedule.
- Visit to Ministry of Agriculture and Industry. Explain the survey purpose to Mr. Stev Bayambaa Sate Secretary and briefing on Nomadic culture, livestock farming, crop production and vegetable production.
- Visit to UNFPA Mongolia. Briefing on Population programme in Mongolia from Ms. Linda Demers, resident representative
- Visit to JICA Office. Briefing on Japanese ODA Assistance from Mr. Keizo Egawa, Assistant resident Representative and Mr. Hiroshi Komiyama, JICA Expert
- Visit to the Embassy of Japan, Briefing on economic cooperation from Mr. Fumiaki Tominaga, Counselor

27th July (Tue.)

- Visit to Ministry of External Relations. Briefing on Mongolian and Japanese Relationship.
- Visit to Population Teaching and Education Center, The National University of Mongolia. Material Collection.

28th July (Wed.)

- Visit to National Statistic Office (NSO). Briefing on Agricultural Statistics and Population Statistics from Dr. Davaasuren Chultemjamts, Chairperson of NSO.
- Visit to UNDP Mongolia. Briefing on International Cooperation to the field of Agriculture and livestock farming from B. Batkhuyag UNDP Program Assistant

29th July (Thu)

- Visit to Great Khural of Mongolia. Pay courtesy to Mr. S. Lambaa, Chairman, Standing Committee on Social Policy, The State Great Khural (National Parliament)
- Visit to Mongolian State University of Agriculture. Briefing on conditions and constraints of Mongolian Agriculture from Davaasambuu Ganbold, President of Mongolian State University of Agriculture.

30th July (Fri)

- Visit to Ministry of Agriculture and Industry. Report of Preliminary survey and discuss about objective of main survey and its schedule coordination.
- Visit to suburb of Darhan. To see the Wheat production.

31st July (Sat)

07:45	Depart from Ulaanbaatar by MO(903)	12:55	Arrive at KIX
14:45	Depart from KIX by (JL 114)	16:00	Arrive at Haneda

Main Survey Itinerary

— from 14th August to 28th August —

14th August (Sat)

- 9:00 Depart from Haneda (JD203) 11:00 Arrive at Itami (Ohno, Kusumoto)
- 10:30 move from Itami to Kansai International Airport (KIX)
12:00 arrive at KIX
- 14:10 Depart from KIX (OM904) 17:25 Arrive at Ulaanbaatar
(Fukui, Ohno, Yamazaki, Kusumoto)

15th August (Sun)

- Discuss about survey program with Ms. Lodoidambyn Nasanbuyan, Ministry of External Relations

16th August (Mon)

- Visit to the Embassy of Japan, Pay courtesy to H.E. Ambassador Shinji Kubota. Discuss about survey program.
- Visit to JICA Office. Briefing on Japanese ODA Assistance from Mr. Kenji Matumoto, Resident Representative and Mr. Hiroshi Komiyama, JICA Expert
- Visit to Ministry of External Relations. Discuss about survey schedule.
- Visit to Ministry of Agriculture and Industry. Discuss about survey program with Mr. G. Davaadorji, Senior Officer.

17th August (Tue)

- Visit to Ministry of Agriculture and Industry. Discuss about survey program with Mr. Yadam Balbansuren, Director General Policy Coordination Division.
- Visit to UNDP Mongolia. Briefing on Multi-National assistance from Mr. Douglas Gardner, Resident Representative
- Visit to UNFPA Mongolia. Briefing on Population program in Mongolia from Ms. Linda Demers, Resident Representative

18th August (Wed)

- Visit to Mongolian State University of Agriculture. Discuss about survey contents in the field of Agricultural economy, Livestock farming, Wheat production and Vegetable production.
- Visit to National Statistical center. Material Collection.
- Discuss about potentiality of Mongolian Agriculture with Mr. A. Khuchit, President of NONHERARTH Co-operative.

19th August (Thu)

- Move from Ulaanbaatar to Darhan Area.
- Visit to Wheat and Vegetable Farm (Medium Size) at Bayangol, conduct Interview Survey
- Visit to Wheat Farm at Khongor (Large Size), conduct Interview Survey
- Move from Khongor to Darhan (Stay at Darhan)

20th August (Fri)

- Visit to PSARI(Plant Science and Agricultural Research Institute). Briefing on Wheat production, Variety of seed, and etc. from Ms D. Tsermaa, Vice Director of PSARI
- Visit to Syaryngol farm.(Vegetable Cultivation medium size) , conduct Interview Survey
- Move from Syaryngol to Darhan (Stay at Darhan)

21st August (Sat)

- Visit to Nomgon District, conduct Interview Survey at medium and small size farm
- Visit to Orkhondarai, conduct Interview Survey at large size farm
- Move from Orkhondarai to Darhan (Stay at Darhan)

22nd August (Sun)

- Move from Darhan to Ulaanbaatar

23rd August (Mon)

- Visit to Ministry of External Relations. Discuss about survey schedule in Ulaanbaatar
- Visit to training farm of Green Revolution
- Visit to Ger suburb of Ulaanbaatar. Conduct Interview Survey.

24th August(Tue)

- Visit to Geo-ecology Institute. Discuss about carrying capacity of Mongolian grass land
- Interview Survey
 - Visit to Vegetable market (Fukui, Gantumor)
 - Visit to Ger (Ohono, Yamazaki, Kusumoto, Ulzinyam)

25th August (Wed)

- Interview Survey
 - Visit to Vegetable market (Fukui, Gantumor)
 - Visit to Ger (Ohono, Yamazaki, Kusumoto, Ulzinyam)

26th August (thu)

- Interview Survey
 - Visit to Vegetable market (Fukui, Gantumor)
 - Visit to Ger (Ohono, Yamazaki, Kusumoto, Ulzinyam)

27th August (Fri)

- Visit to Ministry of Agriculture and Industry. Report the survey result
- Visit to Ministry of External Relations. Report the survey result.
- Visit to The embassy of Japan. Report the survey result

28th August (Sat)

- 07:45 Depart from Ulaanbaatar (MO903) 12:55 Arrive at KIX
(Fukui, Ohono, Yamazaki, Kuusmoto)
- 14:45 Depart from KIX by (JL114) 16:00 Arrive at Haneda
(Ohono, Kusumoto)

Collected Materials

- 1) Asian Development Bank, Policy Analysis and Recommendations for the Wheat and Flour Sector, Ulaanbataar, 1997.
- 2) Enkhsetseg Byambaa and Bolormaa Tsogtsaikhan, Population Change in Mongolia 1989-2030 prospects and Implications, Mongolian National University 1999
- 3) Interpress, The Mongolian Action Programme for the 21st Century, Interpress 1998
- 4) National Statistic Office of Mongolia, Agriculture in Mongolia 1971-1995, National Statistic Office of Mongolia, 1996
- 5) National Statistic Office of Mongolia, Mongolian Statistical Yearbook 1998, National Statistic Office of Mongolia 1996
- 6) National Statistic Office of Mongolia, Statistical Bulletin 1996 October, National Statistic office of Mongolia 1996
- 7) National Statistic Office of Mongolia, Statistical Bulletin 1997 December, National Statistic office of Mongolia, 1997
- 8) National Statistic Office of Mongolia, Statistical Bulletin 1998 December, National Statistic office of Mongolia, 1998
- 9) National Statistic Office of Mongolia, Statistical Bulletin 1999 July, National Statistic office of Mongolia, 1999
- 10) National Statistic Office of Mongolia, Statistical Bulletin 1999 April, National Statistic office of Mongolia, 1999
- 11) National Statistic Office of Mongolia, Statistical Bulletin 1999 February, National Statistic office of Mongolia, 1999
- 12) National Statistic Office of Mongolia, Women and Man in Mongolia, National Statistic office of Mongolia, 1999
- 13) National Statistic Office of Mongolia and United Nations Population Fund, Mongolia Reproductive Health Survey 1998 National Report, National Statistic office of Mongolia, 1999
- 14) National Statistic Office of Mongolia and United Nations Population Fund, Situation Analysis of Mongolia's Reproductive Health Services 9-27 March 1998, National Statistic office of Mongolia, 1999
- 15) Population Teaching and Research Center, Mongolia Demographic Survey 1994 Main Report, Mongolian National University, 1996
- 16) Population Teaching and Research Center, Second Demographic Survey 1996 Main Report, Mongolian National University, 1996
- 17) The Great Peoples Hural of the Mongolian People's Republic, The Constitution of Mongolia, The Great Peoples Hural, 1992
- 18) UNDP Mongolia, The Guide UNDP in Mongolia, UNDP Mongolia, 1999

- 19) UNDP Mongolia, Human Development Report MONGOLIA 1997, UNDP Mongolia, 1999
- 20) World Bank, Agricultural Operation Division, China and Mongolia Department, Mongolia: Prospects for Wheat Production, The World Bank, 1995.
- 21) Kokusai kyouryoku jigyouudan (JICA), "Chuubu chiiki Noubokugyou Nouson Sougoukaihatukeikaku Chosa Saishuu Houhokusho, Nouyouchi Seibi Kodan 1996 (Japanese)
- 22) Kokusai kyouryoku jigyouudan (JICA), "Mongoru kunibetu kentoukai houkokusho", JICA 1997 (Japanese)