

Japan International Cooperation Agency (JICA)  
Ministry of Food and Agriculture Mongolia (MFA)

## Mongolia

# The Study for Improvement Plan of Livestock Farming System in Rural Area

## Final Report

March, 2006

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**Mitsui Mineral Development Engineering Co., Ltd.**

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\* The Study Area is Dornogobi, Dundgobi and Umnugobi provinces of the Govi region.



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Exchange Rate (January, 2006)		
USD 1.00	=	Yen 119.07
Tg 1,000	=	Yen 97

## **PREFACE**

In response to a request from the Government of Mongolia, the Government of Japan decided to conduct a study for Improvement Plan of Livestock Farming System in Rural Area and entrusted to the study to the Japan International Cooperation Agency (JICA).

JICA selected and dispatched a study team headed by Mr.Takashi FUJITA of Pacific Consultants International, and consists of Mitsui Mineral Development Engineering Co., Ltd. between March, 2003 and January, 2006.

The team held discussions with the officials concerned of the Government of Mongolia and conducted field surveys at the study area. Upon returning to Japan, the team conducted further studies and prepared this final report.

I hope that this report will contribute to the promotion of this project and to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of Mongolia for their close cooperation extended to the study.

March 2006

Ariyuki Matsumoto,  
Vice President  
Japan International Cooperation Agency

Mr. Ariyuki MATSUMOTO  
Vice-President  
Japan International Cooperation Agency

## Transmittal Letter

Dear Sir,

We are pleased to formally submit herewith the Final Report of "The Study for Improvement Plan of Livestock Farming System in Rural Area" of Mongolia.

The report consists of a master plan for the development of the study area which has been prepared in consideration of the advice and recommendation of relevant ministries of the Government of Japan and JICA on the formulation of the development plan, as well as the discussions with the members of the Mongolian Counterpart Team on the Draft Report, and their comments on the Report.

The Study area consists of the three *Aimags* (provinces) of Dornogobi, Dundgobi, and Umnugobi, which are located in the Gobi / Steppe region of the southern part of Mongolia. In the Study area, pastoral livestock farming, relying on poor pasture vegetation and insufficient water resources, has been a traditional practice. However, the changing of the national policy from planned economy to market economy in 1990 has brought drastic changes to the environment surrounding livestock farming. This has made livestock farming even more vulnerable to changes of natural condition, due to that a large number of livestock died during 1999 to 2001, leading to the occurrence many poor households. One of the major reasons of such situation was that while un-used and low-used pasture expanding, many of the livestock were fed near the limited water sources, and thus, proper utilization of pasture has become an urgent issue. This master plan is formulated based on the feedback form Pilot Studies, which were executed for two years with actual construction of wells in three Soums in the southern part of Dornogobi Aimag. We are convinced that the "Pasture Utilization and Well Development" project proposed in this report will become a guide to Mongolia for promoting similar projects in the future.

In order to improve the livestock farming system in the rural areas, not only "Pasture Utilization and Well Development" but also "Livestock Products Improvement", "Herders Economy Stabilization" and "Human Resources Development" are necessary. In this report, the results of pilot projects comprising of such components were arranged, and projects are proposed in a form that local governments can immediately execute them. We are also convinced that local governments effectively utilize these proposals.

Taking this opportunity, we express our sincere gratitude to the officials of your agency, the Ministry of Foreign Affairs and the Ministry of Agriculture, Forestry and Fisheries of the Government of Japan for their valuable advices and recommendations for our study. We are also grateful to the officials of the Ministry of Food and Agriculture of Mongolia, the three Aimags of Dundgobi, Dornogobi, and Umnugobi, and the three Soums of Erdene, Ulaanbadrakh and Khuvs gul.

Sincerely yours

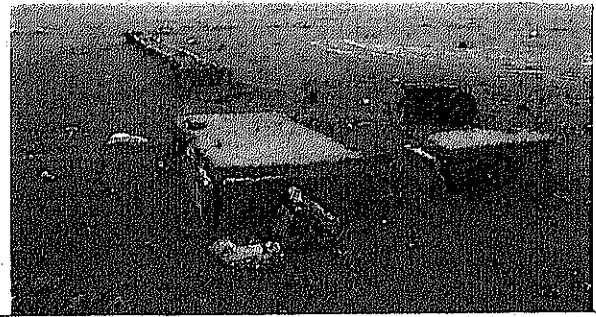
Takashi FUJITA  
Team Leader  
The Study for Improvement Plan of  
Livestock Farming System in Rural Area





DZUD DISEASE

*Dzud* occurred continuously in the period 1999 and 2000. About 20% of the total number of the livestock died during these years; in total 5.75 million heads died. The causes of death were hunger and frost.



BROKEN WELL

Shortage of wells occurred because broken wells were left without repairing or maintenance. Also, livestock concentrates on the existing well or large consuming area, and this leads to overgrazing.



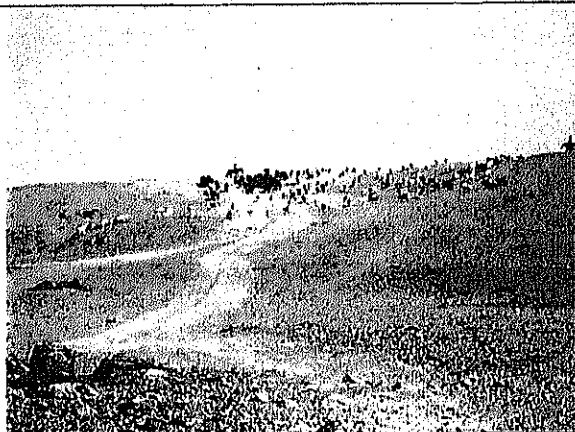
SITUATION OF WATERING TO DOMESTIC LIVESTOCK

*Dzud* Disaster occurred with summer drought and excess of snow in winter and with the factors complexly intertwined such as overgrazing, bad well maintenance, shortage of water resource, decreased function of fodder stock, etc.



LONG DISTANCE MIGRATION FOR SEARCHING FAVORABLE PASTURE LAND

The form of livestock farming of Gobi region is nomadic grazing. Livestock of the region consists of five kinds of animals: sheep, goat, cow, camel and horse. Livestock were privatized after the introduction of market economy and this sector absorbed many jobless people.



PASTURE LAND

Pastoral grazing is based on the pasture land and the existence of water resources is indispensable for it. Pasture land without water resource can not serve many uses. And Gobi region belongs to semi arid area, therefore, productivity of vegetation is low.



MINISTRY OF FOOD AND AGRICULTURE, MONGOLIA

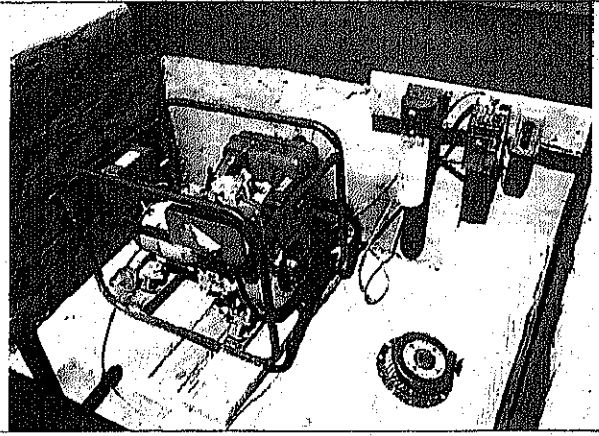
Ministry personnel: 85 persons, Annual Budget: about Tg 10.5 billion (2005, about US\$ 8.7 Million). This ministry is charged with livestock farming and food production which is an important basis for the country.





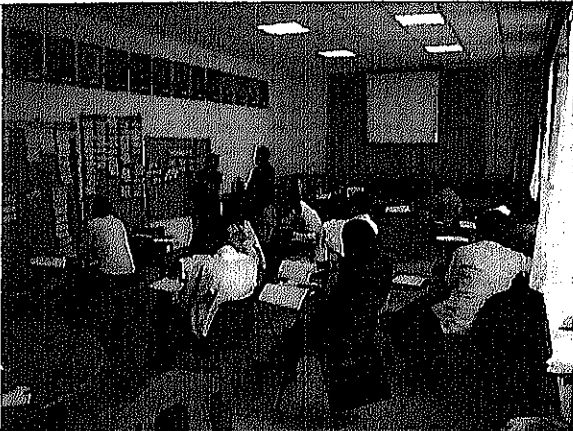
"PRODUCTION WELL" DEVELOPED BY THE PILOT PROJECT

5 wells were newly constructed and 12 wells were rehabilitated; totally, 17 wells were developed by the "Pasture Utilization and Well Development Project".  
(Photo: The well of *Butiin Khoolin, Erdene SOUM*)



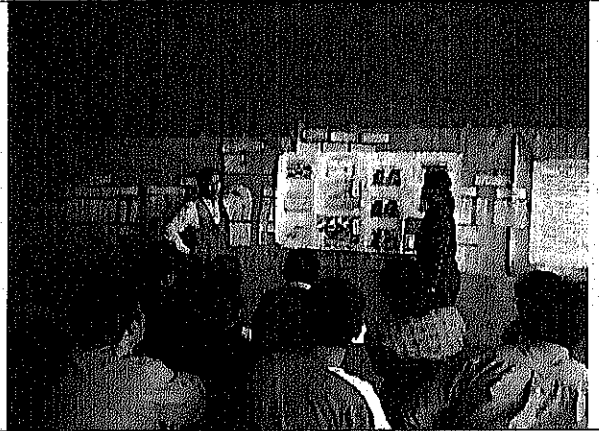
GENERATOR AND WATER PUMP

Generator (KAMA) and submersible motor pump (Grundfos) were equipped into the developed well. Herder group is responsible for the operation and maintenance of the well.



WORKSHOP HELD IN *DORNOGOBI AIMAG* (PROVINCE)

Participatory project planning by using PCM (Project Cycle Management) method was executed through this study. (August, 2003)



WORKSHOP HELD IN *SOUM* (DISTRICT) GOVERNMENT

PCM workshop was held in the *Soum* with *Soum* Government officers, residents and herders. (*Ulaanbadrakh Soum*: September, 2003)



INTRODUCTION OF SUPERIOR LIVESTOCK BY LIVESTOCK FUND PROJECT

Livestock Fund Project promoted a diffusion of superior livestock by providing loans with superior livestock. This project could be a remedy for the herders affected by *Dzud*.



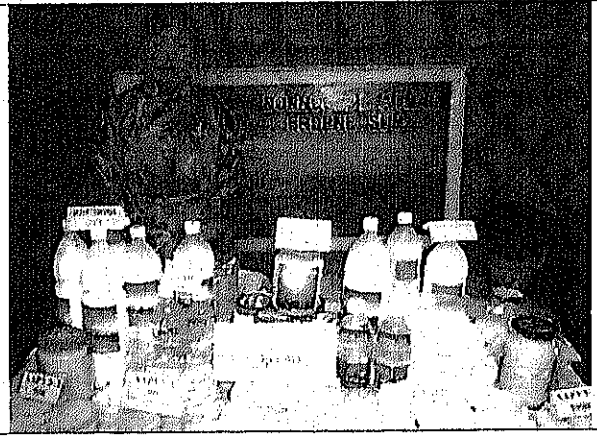
EQUIPMENT FOR THE TRADITIONAL WELL CONSTRUCTION

Traditional Well Development was promoted by the campaign project through providing a rental service of the equipment and the textbook for well construction.



WORKSHOP HELD WITH THE GROUP OF DAIRY PRODUCT SALES AND SHIPMENT PROJECT

The objective of the Dairy Products Sales and Shipments Project is to establish year-round shipment system and improve herder's income.



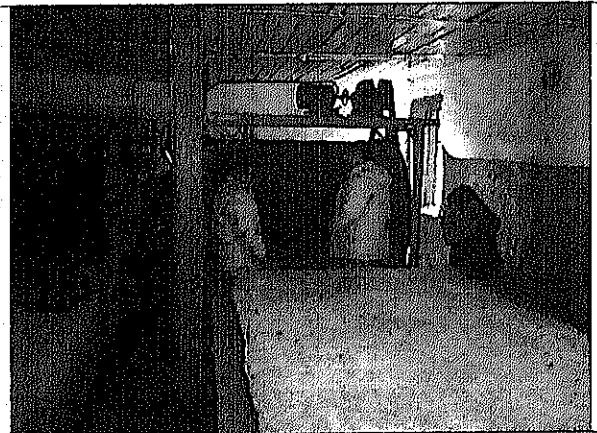
PRODUCTS OF THE GROUP (DAIRY PRODUCTS SHIPMENT AND SALES PROJECT)

*Botsargaa* (Processed sour camel milk), *Aaruul* (Cheese), *Shartos* (purified butter) and so on. Erdene Soum Government promotes a brand of camel milk. (Photo: Camel Festival in Dornogobi Prefecture, January, 2005)



SHOP OF THE WOOL PROCESSING AND PRODUCT SALES GROUP

Two groups of small felt products processing and one group of *Ger*-felt production, totally three groups, have started their activities in an effort to improve their cash income. Improvement of income is an overall goal of the Wool Processing and Sales Project.



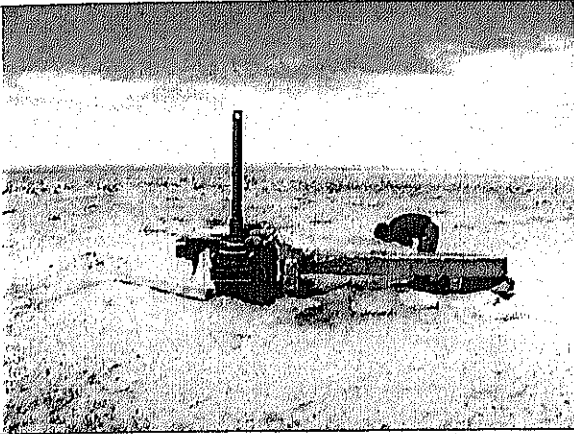
INSIDE OF GER-FELT FACTORY (DRUM AND TABLE FOR GER-FELT MAKING)

Each wool processing and sales group bore the initial investment. Then they started their activities. The demand for the *Ger* felt is high, and the products sold out.



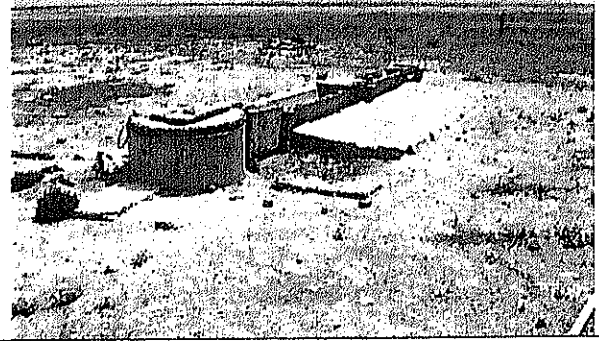
WORKSHOP HELD IN A GER (HERDER GROUP OF TALIIN TSAGAAN WELL / KHUVSGUL SOUM)

In Pasture Utilization and Well Development Project, herder groups themselves evaluated the results and problems of each activity on the basis of the Plan of Operation which was made by them. Also, they discussed the countermeasures. Herders wrote their opinions onto cards by themselves in Mongolian because they are literate.



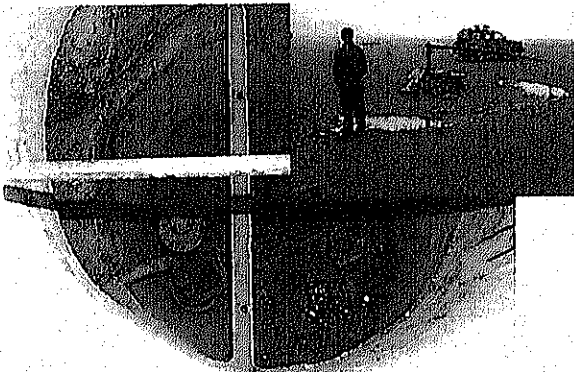
SHAFT WELL (DERELICT GROUND FACILITIES)

Concrete cylinder casing with a diameter of one meter is contained in the ground. It was constructed in the days of socialism and pumped by animal power. The depth of this well type varies from 2 to 30 m.



SHAFT WELL

Ground facilities of Shaft Well can not be procured now. Most shaft wells are used by removing the ground facilities and using them as traditional wells.



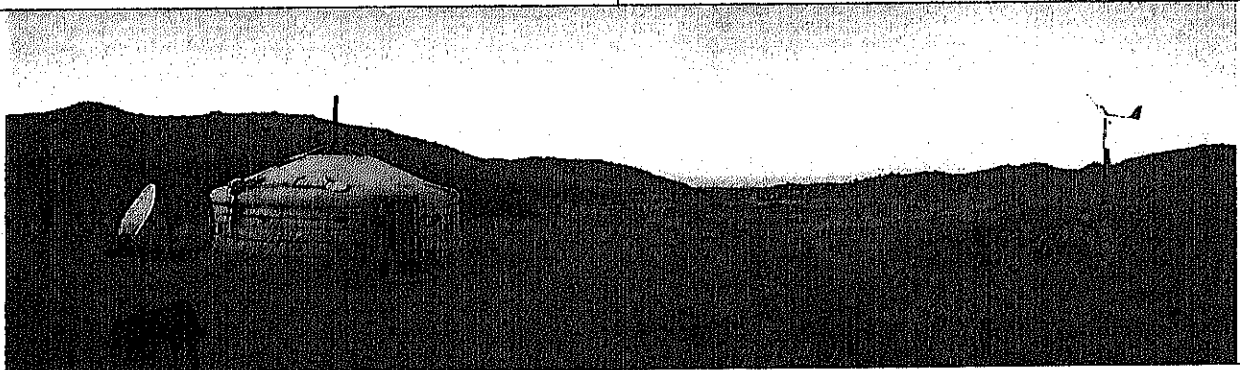
SHALLOW WELL

Rotary pump activated by livestock were installed the same as the Shaft Well. Substructure differs from the Shaft Well and the casing with a diameter of 168 mm is buried in the lower part of the concrete cylinder. The depth of this well type varies from 7 to 30 m.



TRADITIONAL WELL

The depth of Traditional Well varies from 4 to 8 m. Stone masonry exists inside of the well. The service life is said to be approximately 20 to 30 years and lot of wells are already at renewal time.



WINTER CAMP OF THE TALIIN TSAGAAN WELL GROUP (KHUVSGUL SOUM DECEMBER, 2004)

Generally, winter camp is set up near a water resource such as a Traditional Well, at the bottom of small hill to shelter against the cold wind of the severe winter. Electricity generated by wind or solar energy can be used in the Ger. The energy is used for the lighting, television, etc. Satellite TV dish can see at the left side of the photo.

# The Study for Improvement Plan of Livestock Farming System in Rural Area

## Summary of Final Report

### CHAPTER 1 INTRODUCTION

#### (BACKGROUND OF THE STUDY)

In Mongolia, the Agricultural sector employed 40% of the labor force and contributed 21% to GDP as of 2004. Approximately 80% of agricultural production came from the animal products sub-sector. In 2004, animal products accounted for about 5 % of all exports. The calamity of "Dzud" occurred continuously in the period 1999-2000 and totally 5.75 million heads were died from this calamity. As a consequence, agricultural output dropped by about 30%.

Under these circumstances, the Government of Mongolia made a request to the Government of Japan to extend its technical cooperation for the construction and rehabilitation of wells in order to improve the rural water supply in 7 provinces (*Aimags*) of Gobi and Steppe zone. Government of Japan, however, considered that the content of this request only for construction and rehabilitation of wells would not be adequate to mitigate the damage of *Dzud*. Therefore, Government of Japan proposed to modify to suit a comprehensive study plan that was initiated for the purpose of pasture management system, with consideration of pastoral livestock and the improvement of well management system.

#### (OBJECTIVES OF THE STUDY)

Government of Mongolia revised the request and following objectives were set. (1) To formulate comprehensive plan aiming at the establishment of a pasture management system incorporating the construction, rehabilitation and management of wells. (2) To enhance and strengthen the technical skill of counterparts and concerned personnel.

#### (METHOD OF THE STUDY)

Under the basic concept of "Effectiveness of the project is examined through the implementation of specific pilot study", this development study was carried out with the following three phases;

➤ Phase 1: Formulation of General Plan in the three *Aimags*

Formulation of the general plan aimed at three *Aimags* of *Dundgobi*, *Dornogobi*, and *Umnugobi* was carried out. And *Dornogobi Aimag* was selected for the detailed study area.

➤ Phase 2: Formulation of Detailed Plan for *Dornogobi Aimags*

Formulation of the detailed plan was carried out for *Dornogobi Aimag* and three *Soums* of *Erdene*, *Ulaanbadrakh* and *Khuvsgul* were selected as the Pilot Study areas. In addition, the Pilot Projects were identified and policy of implementing was planned.

➤ Phase3: Pilot Study in *Soums*

The Pilot Study has been carried out over about two years. Outcome of the Pilot Study gained through a sequence of these studies was fed back to the General Plan, and this report summarizes the results of these outcomes.

## CHAPTER 2 ACTUAL CONDITION OF STUDY AREA

### 2.1 GENERAL CONDITION

#### (GENERAL CONDITION OF THE STUDY AREA)

The superficies of the Study area is 349,000 km<sup>2</sup> and the population is about 150,000. The outline of the area is as follows:

- Low population density

The population density of Mongolia is extremely low. *Umnugobi* has the lowest density for a populated *Aimag* in Mongolia, with one family living in an area of 3.6 km on average.

- Extremely severe weather conditions

Because the temperature varies widely from 25°C or more in summer, to -20°C in winter, the annual mean temperature is about 0°C. The amount of rainfall in the Study area is 120 - 160 mm per year since it is relatively low as an inland area. 80 % of the annual rainfall occurs in summer.

### 2.2 NATURAL CONDITIONS

#### (TOPOGRAPHY)

Mongolia is entirely a mountainous country and the average elevation is 1,580 m. Nine big rivers are located in the northern part of Mongolia, but there is no rivers in the Study area. Concentration of springs around the Altai Mountains in *Umnugobi* seems to originate in considerably plentiful rainfall and melting snow.

#### (OUTLINE OF HYDROGEOLOGY)

In general, groundwater aquifers can be divided into two types: Granular Aquifer and Fissure Aquifer. Granular Aquifer type in the Study area are categorized in following three types; 1) Fluvial deposits, mountain basin deposits, fan deposits, 2) Weathered surface deposits on plains, 3) Cretaceous sandstone and conglomerate.

Total number of wells in three *Aimags* in 2000 is more than 10,000 and approximately 75% of them are the Traditional Well which was mainly dug into aquifer types 1) or 2). Aquifer type 3) is distributed mainly in the Study area and it provide also wide zone of flowing spring in *Dornogobi Aimag*.

#### (HYDROGEOLOGICAL FEATURES OF STUDY AREA)

The aquifer of Shallow Wells should be unconfined shallow aquifer that belongs mainly to the

Quaternary and the aquifer of deep wells should be confined deep aquifer that belongs to the Cretaceous or igneous rocks in variable geological ages.

#### **(INVESTIGATION OF WATER RESOURCES)**

Investigation of water resources in *Dornogobi Aimag* was carried out and the data to describe the geological and hydro-geological structure was obtained by electromagnetic method. 215 points were surveyed and on 159 points (74 %), the drilling depth to the aquifer was obtained. Range of the depth of 70 to 140 meter occupies 75% of total and the drilling depth below 60 meter occupies only 16%. This implies that drilling depth of the well should be deeper in the future.

#### **(GROUNDWATER QUALITY)**

TDS extracted from the database of the three *Aimags*, which is controlled by Institute of Geoecology shows more than about half of water resources are beyond 1000 mg/l (ppm), the standard of portable water. 127 groundwater samples were collected from the whole *Dornogobi Aimag*, including the wells constructed/rehabilitated in the Pilot Study. Groundwater quality was analyzed on 29 items.

As a result of the water quality analysis of shallow aquifer (92 samples), the ratio of Fluorine and Evaporated Residue are notably unfavorable 78.8% and 30.3% of samples were not satisfied the water quality standard. And arsenic was detected at three points. And the results of 35 samples of deep aquifer shows that the ratio of Hardness, Evaporated Residue, Chloride, Magnesium and Fluoride are also notably bad, 28.6%, 53.6%, 50.0%, 46.4% and 64.3% of samples were not satisfied the standard.

As above mentioned, groundwater quality of *Dornogobi Aimag* has many problems as drinking water for human being. Therefore, some kind of water purification is necessary to supply safe water in future. Reverse osmotic membrane method only can solve the problem at the present.

#### **(GROUNDWATER POTENTIAL EVALUATION - AVAILABLE GROUNDWATER VOLUME -)**

According to the macro water balance in Mongolia, 90% of total precipitation is lost by evapo-transpiration and the balance 10% is divided into surface water (6.3%) and groundwater (3.7%). 95% of the surface water flow out of the country and only 0.3% of total precipitation is retained in Mongolia. Meanwhile, groundwater's share in it is only 3.7%.

Total available groundwater volume is equivalent to 2.3% of the total precipitation in case of *Umnugobi*, 1.0% of *Dundgobi* and 1.3% of *Dornogobi*. Assuming that the average pasture capacity in Gobi Area is 3 ha/sheep/year and unit water demand is 5.0 liter/sheep/day and in consideration of water demand for herder family (25~50 liter/day/family), the groundwater volume seems to be sufficient. However, it is noteworthy that groundwater is not stored everywhere evenly and its potential is not so high in terms of quality and cost of exploitation.

## 2.3 SOCIAL AND ECONOMIC CONDITIONS

### (POPULATION AND EMPLOYMENT)

The portion of rural population in *Soums* ranges between 40.4% and 85.2% in *Dundgobi Aimag*, 29.1% and 81.0% in *Dornogobi Aimag*, and 65.1% and 85.7% in *Umnugobi Aimag*. The relatively high portion of urban population in *Dornogobi Aimag* is related to comparatively high development of infrastructure and service sectors associated with the Trans-Siberian railway that cuts longitudinally the *Aimag*.

Livestock farming is the dominant economic activity and the percentage of agricultural (livestock farming) population is about 80 % in *Dundgobi*, 45 % in *Dornogobi* and 70% in *Umnugobi*. In *Dornogobi Aimag*, population in transport, storage and communication sector attains 12.8% of the total employment. In addition, the share of mining and manufacturing activities is also high in *Dornogobi Aimag* (3.5% and 2.8% respectively) against 0.3% and 1% respectively in the both *Dundgobi* and *Umnugobi Aimags*. Relatively high percentage of 'Public administration, defense and compulsory social security' in *Dornogobi* and *Umnugobi Aimags* is largely due to the military and border guards presence in these *Aimags* because of the long border with China.

### (ECONOMIC ACTIVITY)

*Dundgobi* and *Umnugobi Aimags* are dominated by the agricultural or livestock sector with share of 45.3% to 53.4% in GDP. The share of the agricultural sector in *Dundgobi* and *Umnugobi Aimags* is around twice as much as the national average. In *Dornogobi Aimag*, industry sector is the largest sector in GDP and it attains 43.4 %.

As for GDP per capita in three *Aimags*, *Umnugobi* is the most labor productive *Aimag*; it varied between Tg 413,000 and Tg 484,000 in 1999-2001 against the national average of Tg 392,000 and Tg 478,000 for the same period. *Dundgobi Aimag*'s labor productivity was hit hardest by the *Dzud* declining from Tg 511,000 in 1999 to Tg 162,000 in 2000. A similar situation is shown in case of *Dornogobi Aimag* from 2000 to 2001.

### (LIVESTOCK FARMING)

Major challenges in livestock farming of three *Aimags* are shown as following;

- Low productivity.
- Low protection against natural calamities
- Livestock farming is managed by too small household economies scattered over enormous territory with poor infrastructure
- Certain difficulties with introducing some elements of modern society because of the mobile/nomadic nature of herder lifestyle.

A lack of fodder is one of the main reasons for mass animal losses during the *Dzud*. Because of ecological constraints, Gobi region has very limited potentials for fodder production. And the transportation cost will be high since the region is located far from the northern area where the fodder is produced. Therefore, it is difficult for herders in the area to purchase adequate fodder.



## **2.4 RURAL SOCIETY**

### **(LOCAL GOVERNMENT CAPACITIES)**

Because of low capacities of the *Soum* economy to generate revenues for local budget, the *Soums* are dependent on subsidies from *Aimags*. Dependency of local budgets on subsidies has serious implications for both efficiency and effectiveness of the delivery of social services to rural population. Since the market economic system has spread across Mongolia, the distribution and quality of social services has declined due to serious budget deficiencies. The rural population has suffered the most under this new situation.

### **(ECONOMIC SITUATION OF HERDERS)**

According to the balance model of a typical herder household with 5 members, the total sales revenue is Tg 666,400 for household with 100 heads and Tg 1,263,720 for household with 200 heads. Including the value of animals consumed for food, the figure increases to Tg 950,400 and 1,675,720.

The total expenditure is Tg 1,360,730 and Tg 1,617,950 for households with 100 and 200 heads. The biggest portion of expenditures goes to food and clothing, which is characteristic of any poor family. The revenues and expenditures are roughly equal for the family with 200 heads. However, revenues of the family with 100 heads fall Tg 410,330 (950,400-1,360,730) short of expenditures.

### **(HERDER COMMUNITIES)**

In Mongolia, 2 -10 households which cooperate in everyday herding activities; these are local neighborhood communities formed of *Khot Ailes* which use the same pastoral resources. The number of families within the *Khot Aile* in the Gobi region is lower than national average and not exceeds 2-3 families.

Mongolian herders depend on their livestock for subsistence mainly, obtaining much of their food from meat and dairy products; using wool, hair, and hides for domestic purposes; burning dung for fuel; selling or bartering livestock and livestock products for cash or goods; and using camels, horses and cattle for transportation and draft purposes.

Because of lack of transportation means, the small scaled herder families have poor capabilities to access better markets and organize seasonal migrations, thus are more vulnerable to natural calamities. Marketing capability and bargaining power of small herder households are weak because of lack of cooperative action. Especially barter trade is dominant for herder in the region and the level of raw material processing is low.

## **2.5 LIVESTOCK FARMING IN THE STUDY AREA**

### **(FEATURES OF LIVESTOCK FARMING IN THE STUDY AREA)**

#### **Pasture Grade and Carrying Capacity:**

According to the results of the Livestock Research Institute, carrying capacity in the Gobi



region is 33.9 (sheep unit/ha). It is the lowest than any others; 47.0 in the western, 69.7 in the central 89.4 in the eastern area. These carrying capacities are not fixed, and it is wide annual variation affected by the weather condition of the year.

Pastoral livestock farming became basic livestock farming style in such area where low and unstable carrying capacity. Pasture degradation by herd feeding could be avoided by seasonal migrating. Their migrating area is basically within *Soum* territory and they move to distance location cross *Soum* or *Aimag* boundaries in drought year.

#### **Number of Herder and Their Livestock:**

Livestock number is track to recovery after 2002. In 2004, *Dundgobi* has 1,781,000 heads (21% increased compare with 2002), *Dornogobi* has 1,019,000 heads (23% increased) and *Umnugobi* has 1,070 heads (18% increased). Number of herders household was increased rapidly from 1999 and it turned downward in 2001. Herders household number in 2002 is 8,040 in *Dundgobi*, 3,933 in *Dornogobi*, 6,842 in *Umnugobi*.

Density of livestock is extremely high in the north part of *Dundgobi*. The north part of *Dundgobi* belongs to the steppe pasture area and pasture yield in this area is high compared with other Gobi regions. Therefore, herders distribution was concentrated toward the area where the feeding condition is favorable.

#### **(VEGETATION AND CARRYING CAPACITY)**

##### **Present Condition of Pasture Use:**

Recently in Mongolia, degradation of the pasture has become a problem through regional overgrazing. "Overgrazing" is mainly presented as degradation in winter and spring camp.

##### Classification of Pasture Use:

The degree of pasture use depends on the crude density of herders. The pasture is classified into 5 types from the viewpoint of utilization as follows:

Unused:	Pasture which is far from <i>Soum</i> Center or lacks water supply facilities (water sources)
Low Used:	Ditto. But large livestock such as camel and horse can use. It is utilizable if there is deposited snow or puddle is available.
Appropriately Used:	Seasonal herding is appropriately conducted consist with plant production.
Highly Used:	Temporal burden on pasture is concentrated because of year-round stay in winter camp or decrease of plant yield due to drought.
Overused:	Devastated pasture due to constant high use such as the pasture around wells and crowded winter camps.

##### Year-round Use of Winter and Spring Camps and Degradation:

Water level in winter and spring camps is relatively high because they are located at the bottom of mountains, the valleys between hills, and the edge of basins where Traditional Wells can be dug. On the other hand, summer and fall camps are located in the plain, and thus there is a tendency not to supply stable water sources. Moreover, the installed Production

Wells in Socialist era became unusable and a part of the pasture around summer and autumn camps became low used or unused.

On the other hand, there is a problem that herders have begun inappropriate *Otor* (migration). There are social and economic reasons; however, the water supply ratio is one of the factors to prevent inappropriate *Otor* (migration) and herders falling into the vicious circle such as staying in winter and spring camps throughout the year and using the adjacent pasture. Accordingly, herders tend to overuse the pasture and exceed its carrying capacity.

#### Concentration of the Livestock Herds exceeding Water Supply Capacity of Traditional Wells:

It is said that the capacity of Traditional Wells can supply water only for 1-2 households which have less than 500 heads of livestock. But actually, pastures around the wells are overused. 5 to 6 households with more than 1,500 heads concentrate on the pastureland around a well. Furthermore, herders have to spend all day long for watering livestock because of the difficulty of continuous feed-water due to very limited yield of the wells. As a result of such long and inefficient feed-water, livestock herds stay a long time around the wells and this accelerates the devastation of the pasture.

#### **Vegetation and Carrying Capacity:**

##### General Condition of Vegetation:

In this study, carrying capacity is referred to the data of Livestock Institute, and the appropriate number of livestock referring to carrying capacity is calculated by multiplying 0.9 as safety ratio, considering for the annual fluctuation and tendency of drought.

**Dundgobi:** *Soums* in the northern part is classified in Steppe 60 % - 96 %. Southern part is classified in the Desert-Steppe (High) with ratios of 57% - 96%.

**Dornogobi:** Desert vegetation is distributed in the southwestern part. In the whole *Aimag*, vegetation is overwhelmingly classified in the division of Desert-Steppe (High or Low), and ranges 95% - 100%.

**Umnugobi:** Estimated productivity of pasture is the lowest among three *Aimags*. There is no area classified into Steppe and Desert-Steppe is dominance in this *Aimag*.

##### Carrying Capacity:

Three kilometers in radius is defined as stable water supplied pasture and buffer areas and carrying capacities are calculated by using GIS. Pasture use rate around the water source was examined by considering water supply efficiency and carrying capacity was estimated by using pasture use rate which was determined that 1.0 in case of Production (Shallow) Well, 0.9 in Shaft Well, 0.8 in Traditional Well and 0.7 in Spring.

**Dundgobi:** Carrying capacity is high (50.1 s.u. /km<sup>2</sup>) in the northern area and relatively low in the southern area (33.0 s.u. /km<sup>2</sup>). Pasture water supply rate in *Dundgobi* is outstandingly the highest among three *Aimags*, 60.2%. Carrying capacity in stable water supplied pasture reaches near 1.8 million in sheep units.

**Dornogobi:** Carrying capacity varied in the range of 29 - 35 (s.u. /km<sup>2</sup>) and there is no large dispersion. Carrying capacity in stable water supplied pasture is 1.293 million in sheep units.

**Umnugobi:** Average carrying capacity is 22.6 (s.u. /km<sup>2</sup>) and it is the lowest among three *Aimags*. Carrying capacity in stable water supplied pasture is 1.286 million in sheep units which is the lowest although the total area is the largest than others.

**Actual Condition of Unused and Low Used Pasture:**

Reasons for Forming Low Used and Unused Pastures:

Density of herder distribution makes overused of pasture and huge unused / low used pastures on the other hand. The concrete reasons for becoming unused / low used pastures are the following three factors. Mal-distribution of water sources is the most serious factor but it can be improved.

- Mal-distribution of water sources on the pasture
- Location far from central district such as *Soum* Center (Socio-economic factors)
- Low productivity of pasture vegetation

Supplying Water to Pasture by Traditionally Used Water Sources:

Water supply area of traditionally used water source, such as Traditional Wells, Ponds (Lakes) and Springs is dominated 60 % - 80 % of stable water supplied pasture,

**(WATER SUPPLY FACILITIES FOR LIVESTOCK)**

**Structure of Existing Well:**

The wells in the Study Area are categorized into four kinds - Production Well, Shallow Well, Shaft Well and Traditional Well. Specifications of each well type are described below.

	Well Depth (m)	Yield (l/sec)	Average Yield (l/sec)
Production Well	40-200	<1.0	2.87
Shallow Well	18-40	0.3-0.6	0.79
Shaft Well	6-18	0.2-0.4	0.45
Traditional Well	2-9		0.24

Production Well:

Production Well has a casing of 168 mm in diameter and is categorized into two kinds according to the type of the pump equipped, submersible motor pump or a lift pump.

Shallow Well and Shaft Well:

Although inner structure of Shallow Wells and Shaft Wells is different, rotary pumps actuated by livestock were installed at the both well. Internal structure of Shallow Well is tube well similar to Production Well and Shaft Well has the structure where concrete cylinders of one meter in diameter are built up at the bottom of the well.

Traditional Well:

In the Gobi region, Traditional Wells are constructed by digging approximately 7 - 8 m in

deep and stone lining. Traditional Well is operated and maintained by (individual) herder. However, it can not be privately owned and it is served as public goods.

### **Damage Levels and Rehabilitation Method of Water Supply Facilities:**

#### Production Well:

After well management was abandoned, engines, houses, water storage tanks in ground facilities remain destroyed or were disappeared by stolen and not to be reused. Lightly damaged wells are considered to have the following conditions.

- The column pipes remain as they were, after Russian's lift pumps were broken.
- The broken submergible pumps are still left on the wells.
- Wells have been covered firmly by welding.

The lightly damaged wells can be rehabilitated by dredging buried objects inside the wells, cleaning them by using the air lifting method, and later mounting submergible pumps to them. But in case of significantly damaged wells, it is required much time and cost to rehabilitate because objects dropped into the well cannot be identified. Therefore, it is less expensive to construct a new well since many uncertainties is raised.

#### Shallow Well:

Many Shallow Wells have been destroyed and they cannot be used by a hand drawing because their pumps, which are activated by livestock, were broken. As far as investigated in the field study, most of the destroyed wells have been buried and the cost will be lower to construct a new well than to rehabilitate the old ones in terms of their depths. However, wells where foreign matters have not been thrown into the casing tube can be rehabilitated by airlift dredging and cleaning of buried sand in the casing.

#### Shaft Well:

Special excavator was used to excavate the well of 1 meter in diameter to construct the Shaft Well, but this equipment is no longer in existence; therefore, only well rehabilitation shall be targeted. Animal powered pump is no longer made at present. Shaft Wells are currently used by hand-drawing, similarly to Traditional Wells. Pumping discharge is originally small because the depth is shallow, and screens are in an advanced state of clogging, it is considered difficult to secure a pumping discharge equal to a newly constructed well even if the Shaft Well is rehabilitated. Consequently, it is necessary to survey pumping capacities of wells and it is desirable to install pump only in case that required discharge can be secured.

#### Traditional Well:

Traditional Wells used to be constructed by excavation specialists in the era of socialist system; however, herders themselves have not really taken over the technology. In terms of the structure, since the inside of the well has been protected by building up stones, it is difficult to rehabilitate a section of it, and the time and the labor required for it is almost the same as new construction.

In case of excavating a well in the sandy soil of the Gobi region, it is desirable to excavate Traditional Wells in winter season when the soil is frozen in order to prevent collapse of the well during the excavation. However, these wells are constructed by herders when schools are in vacation with the objective of having manpower. In this case, since the groundwater level has risen, it is necessary to prepare drainage pump for prevention of collapse of wells during excavation. Even in the case that groundwater has been identified by excavation in summer rainfall (season), it will be difficult to use the well through the year because of water depletion in winter unless the well is excavated 2 – 3 m deeper than the depth where the groundwater was identified in consideration of lowering of the water level in winter.

### **Operation and Maintenance of Water Supply Facilities:**

#### Existing Condition of Operation and Maintenance for Well:

Operation and Maintenance (O & M) has been managed by herders in accordance with their customary rules. Hence, the well was abandoned when it was damaged seriously due to lack of repair budget from either herders or the government. The idea that responsibility of well O & M should be clear is common sense for Ministry of Food and Agriculture and for other donors. Thus, in order to maintain the sustainability of well use, recently a written agreement should be made between the *Soum* government and herders in case of new well construction and rehabilitation.

#### Traditional Well:

Traditional Well is the most popular among herders. Basically, a specific herder or herder group owns, operates and maintains it based on customary laws of ownership. They have no specific rules for operation and maintenance, but they deal with them case by case.

#### **Herder's Contribution and Well Use:**

A new joint decision was signed in 2006, June by Minister of Food and Agriculture, Minister of Natural Environmental and Minister of Finance. According to this decision, herder have to contribute a part of construction/rehabilitation cost of the engineering well. This contribution has to be paid before the construction works.

Herder's contribution was decided as follows: In the case of rehabilitation, it is more than 10% of construction expense. In the case of new well construction it is more than 5% construction expense. As for well use by the herders who pay their contribution, the rights will devolve to the herder after 3-party signing by the *Soum*, well contractor, and the herder.

#### **Costs of Water Supply:**

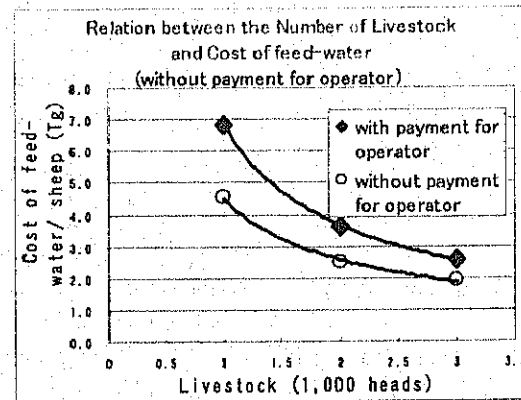
##### O & M Cost:

O & M cost consists of fixed cost for installed equipment and variable cost for operation. And it was estimated in case with and without employment of operator, with 1,000 heads, 2,000 head and 3,000 heads of herder management size.

Among these calculations, the relation between the herder size and cost of feed-water/ sheep in

case of SP5A-8 (about 40m in pump head) is shown in the figures on the right side.

The operation cost with the operator is about 1.5 times compared with that without the operator. Cooperation in the herders group is important to decrease the operation cost, for example, the other members taking care of the operator's livestock and rotating the post between members.



Moreover, the pump operation cost drastically increases in the case of about less than 2,000 heads. If a pump is installed, a few users would have much burden. This would be an obstacle for sustainable use of the pump unless the system that many herders can use it efficiently is introduced.

### Problems of Water Supply Facilities:

#### Seasonal Use of Water Source:

Since herders migrate several times a year, the period of well utilization at one feed-water point is short and the well unused period is long. A well managed by well manager and he always migrate with generator. A submersible pump is left in a well all of the time. While leaving the submersible pump in the well, it rusts within the pipe. This will speed up the abrasion inside the pump when reused.

#### Operation during Winter:

Temperature sometimes falls to as low as -40 degrees Celsius in winter. At that time, a water storage tank and piping freeze. Therefore, people come to take water directly to a feed water tank without passing through the water storage tank. Since the capacity of the feed water tank is small, people frequently operate and shuts down the pump. As a result, abrasion of the pump speeds up.

#### Well Maintenance by Aimag:

Well maintenance is responded by *Aimag*; however, it is carried out by consigned drilling company. In this maintenance work, well inventory lists are used. It is required a huge amount of work for well inventory making. If the well name agrees with the well registration, the well could be not really located at the point.

### (PROBLEM OF MARKET, TRANSPORTATION, AND LIVESTOCK PROCESSING)

In the Gobi region, most herders camps are located within 30 km or more from the *Soum* center. Because of low cash income, barter trade is dominant in marketing transactions between herders and traders. Trading capacity of small herders who are scattered over huge territory is low and herders are in a disadvantaged position.

### (ANIMAL SHELTER)

Animal shelter is an important livestock facility which provides protection against low winter

temperature and cold wind; especially in spring it protects pregnancy, livestock at birth period, and newborn babies. Most shelters were made in the socialist era and transferred to individual herders thus it has become personal properties now. They are made of stones, wood panels or faecal blocks (compressed faeces). The number of shelters per herder household is only 0.64 so 1 shelter is used by 2 to 3 households at present according to the result of the shelter inventory survey in *Dornogobi*.

### CHAPTER 3 DIRECTION OF DEVELOPMENT IN LIVESTOCK FARMING SYSTEM IMPROVEMENT PLAN

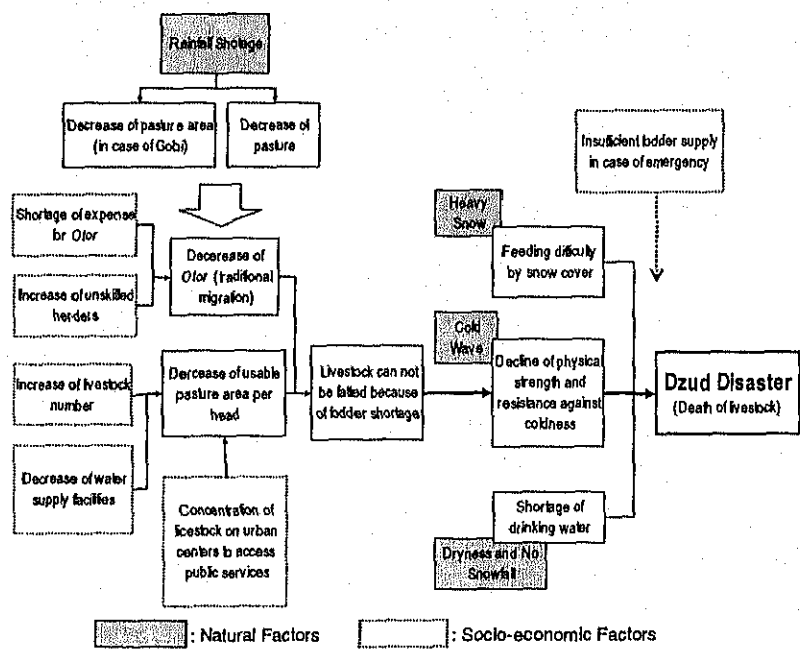
Causal connections of *Dzud*'s damage and constrains of the livestock farming in rural area were clarified. Based on these analyses, the direction of development was examined and the framework of the whole plan was formulated.

#### 3.1 MECHANISM OF DZUD DAMAGE OCCURRENCE AND ITS MEASURES

*Dzud*'s damage has continually been periodically repeated due to natural conditions such as drought and heavy snowfall. However, the reason why *Dzud* damage has increased since 1990s is due to various social changes which were brought about through collapse of *Negdel*, introduction of market economy, and privatization of livestock which were due to end of the planned economy.

More specifically, the risk of *Dzud* disaster increased because of following reasons such as; collapse of pasture use control and well management system, decrease in function of fodder stock system, increase of unskilled herders, conditions that prevent anything from be done if there is no cash and significant increase of cashmere goats that can bring cash easily. The most serious problem is that they

caused consequently decrease of usable pasture area per head and then livestock enter into sever winter without sufficient strength for wintering, and so more *Dzud* damage is liable to occur in comparison with the planned economy era.



### **(MEASURES AGAINST DZUD)**

Since cause of *Dzud* is extremely intricate and measures are also various, measures against *Dzud* contain various hard and soft factors, which indicates the necessity to approach such implementation systematically. Measures against *Dzud* that are shown in the figure are summarized below;

- Improvement of facilities: Improvement of water supply in pasture (well development). Improvement of shelter.
- Improvement of service system: Veterinarian service, Improvement of breed, improvement of fodder supply system
- Increase of employment opportunities: Promotion measures in the rural area to employ small scaled herders
- Securing cash income: Fostering entrepreneur ventures.

## **3.2 CONSTRAINTS ANALYSYS**

### **(CONSTRAINTS OF WATER RESOURCES AND PASTURE RESOURCES)**

Herders use various water resources such as groundwater use by deep wells and traditional wells which are indispensable, puddles in the summer and snow in the winter into their pastoral herding due to low rainfall in Gobi region. However, there are problems in that number of the wells are insufficient and the wells are broken and unused; consequently, "livestock concentrate on the limited wells", which causes the problem of overgrazing.

### **(CONSTRAINTS OF LIVESTOCK PRODUCTION)**

Most herders do not reach stable management scale to be able to increase the livestock number more than self-consumption. The fact that "grazing skills and knowledge of herders are not enough" especially among younger herders is pointed out. On the other hand, aspects related to livestock health and hygiene such as "veterinary service" or "epidemic prevention and pest control", and system to reduce management risk for disaster such as "livestock insurance system" or "feed stock", etc. are not developed.

### **(CONSTRAINTS ON CASH INCOME AND OPPORTUNITY)**

Income opportunity of herders is limited to two seasons cashmere sales in spring and meat sales in winter. It is necessary to establish a stable third income resource by diversifying management. But, herders have no knowledge or capital to start new business; moreover, access to market is unfavorable because market and social infrastructure is undeveloped and these factors are income constraints.

### **(CONSTRAINTS ON HUMAN RESOURCES AND ITS DEVELOPMENT)**

Local administration and herders do not have enough capability to solve emergent issues effectively and efficiently. This is the one of the problems of the rural livestock farming. This is a two sided question. One is the inadequate capability of both local administration and herders, and the other is the lack of cooperation between them to tackle the urgent problem.



### **3.3 DEVELOPMENT POTENTIAL**

#### **(WATER RESOURCES)**

According to the inventory survey carried out in 2003, a lot of well was classified into "currently unused wells". These unserviceable Engineering Wells can be a big potential for the development of water sources and pasture, because if they can be rehabilitated, its cost will be relatively modest than new well construction cost.

#### **(PASTURE RESOURCES)**

The reasons of establishment of unused / low use pasture are complexly intertwined with three factors as follows; i) Lack of stable water supplied areas, ii) Remoteness from densely populated areas such as *Soum* and *Aimag* center, and iii) Low productivity of vegetation in pasture. The second factor (i.e. remoteness) is very much like a socio-economic factor. The third factor (i.e. low productivity of pasture) is affected by natural elements. The first factor (i.e. lack of stable water supplied pasture) is concerned with both natural and socioeconomic factors. The first factor has the highest potential of development compared with the other two factors, since the first factor can be solved directly, when the other two factors are cleared.

#### **(POTENTIAL ON REVENUE OPPORTUNITY INCREASE)**

The livestock processing industry in rural area is limited and not fully developed. Its current potential is not high because there are lots of issues on promotion of livestock processing industry, such as: insufficient technology, lack of information, no electric power supply, small scale of the local market. However, if a small livestock processing factory is continuously operated, it can lead to create a new destination for raw livestock products and new income source for herders and the local residents. Especially, herder's needs to *Ger* felt making and dairy product processing is extremely high.

### **3.4 DIRECTION OF DEVELOPMENT**

#### **(ESTABLISHMENT OF WATER RESOURCE DEVELOPMENT PLAN CONSISTENT WITH PASTURE MANAGEMENT)**

Mal-distribution is observed in the present pasture use condition and it leads to pasture deterioration because of annual overuse around the limited water sources. Therefore, the well development plan should be implemented to improve pasture use ratio, to increase water supply efficiency for increase of carrying capacity, and to secure stable water resources in the unused and low use pasture.

#### **(COMPREHENSIVE APPROACH)**

Comprehensive set of countermeasures against *Dzud* disaster should be taken. Therefore, the plan consists of various projects. Local administration and herders should understand by themselves the reality surrounding the rural livestock farming. Also the plan aims to improve and have local people promote it by them.

### **(LIVESTOCK FARMING IMPROVEMENT PLAN FROM A POINT OF POVERTY ALLEVIATION AND NUMBER OF LIVESTOCK)**

The overwhelming majority of the poor in the rural area is small scaled herders who own less than 150 heads. In order to alleviate poverty in the rural area, it is indispensable for small scaled herders to increase the number of livestock. Since "a rapid increase in livestock number" was one of the factors of the *Dzud* disaster, it is necessary to execute well development and herding skill improvement in parallel with increment of livestock number.

### **(NECESSITY OF ORGANIZING HERDERS AND INCREASE OF OWNERSHIP)**

To expand production and to alleviate the poverty in the region, it is required for herders to collaborate and to cope with the difficulty that individual herders can not solve by themselves. It is effective to motivate in order to strengthen herder organization when new project starts. Moreover, it is necessary to take some measures to raise the sustainability. Thus, beneficiary contribution will be imposed in order to develop the ownership of their project.

### **(TOWARD QUALITY IMPROVEMENT OF LIVESTOCK)**

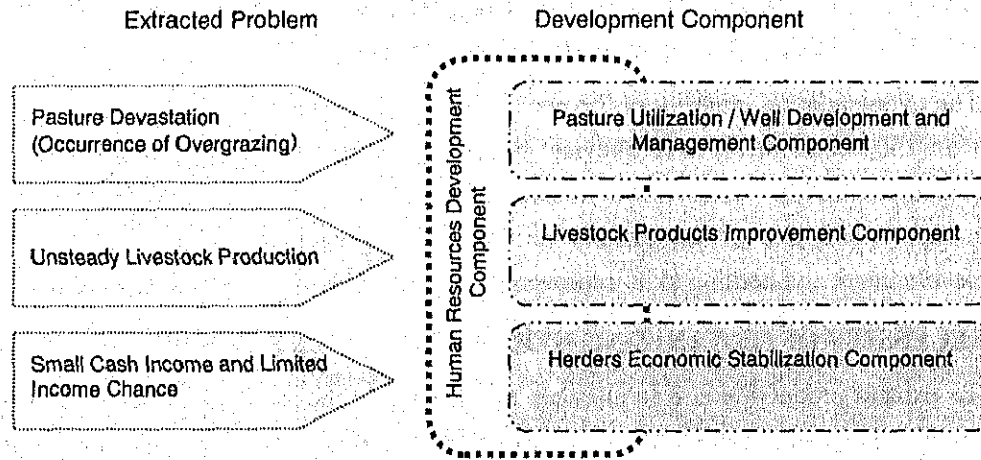
If the pasture condition is good and there is an intention to increase the number of livestock, it could drastically increase. Currently, there are many herders who intend to increase the number of livestock as a reaction to the loss of livestock due to the damage of *Dzud*. But herders should strive to obtain income through changing the viewpoint from increase of quantity to the quality improvement of livestock, and it can improve the productivity of rural livestock farming by raising the income per head.

### **(INHERITANCE OF TRADITIONAL HERDING AND ENVIRONMENTAL CONSERVATION)**

In Gobi region where pasture production is small, careless promotion of settlement could cause the deterioration of environment and the disruption of a herding system. In order to use pasture continuously, it is necessary to promote the seasonal *Otor* (migration), which has been carried out traditionally in the Gobi region.

## **3.5 DEVELOPMENT COMPONENT AND PROJECT (DEVELOPMENT FRAMEWORK)**

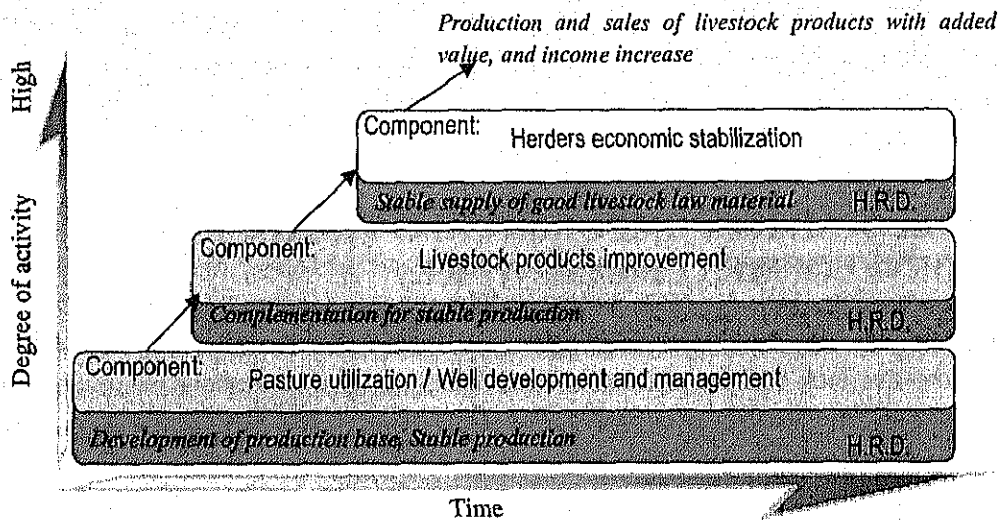
In consideration of the problem analysis and constraints and potential analysis, in order to improve the livestock farming system in rural area, based on the above-mentioned basic policy, it is necessary to build up the framework which consists of four components, as shown in below figure. Each component consists of project.



### 3.6 PRIORITY OF DEVELOPMENT COMPONENT

Among the four development components, the top priority one is “pasture utilization / well development and management component”. The effective utilization of pasture and water resources development are the foundation of herding in the region, and the fundamental basis for the stable livestock production.

“Livestock products improvement component” functions as complementary for stable growth of livestock farming and it is necessary for realization of sustainable development of livestock farming. Since “herders economic stabilization component” can not be realized without stable livestock production and raw material supply, it makes a secondary or higher component though it can expect a large impact.



Note: H.R.D.: Human Resource Development

Priority of the Four Development Component

## CHAPTER 4 PILOT STUDY

### (OBJECTIVE OF PILOT STUDY)

The Pilot Study was conducted with aim to strengthen the project viability, while examining the lessons to be obtained through the project implementation that will be executed by herders group organized through the Study.

### (SELECTION OF STUDY AREA)

*Dornogobi Aimag* was selected for the detailed study area among three *Aimags* of *Dundgobi*, *Dornogobi*, and *Umnugobi*, considering the fairness of the National Project and inputs' availability for the implementation.

### (SELECTION OF SOUM)

This study contains the aspect of countermeasure against the *Dzud* disaster; therefore, the extent of *Dzud* disaster damage was one of the key factor of the criteria for the selection of pilot *Soum*, although it was possible to choose an average *Soum*.

*Erdene*, *Ulaanbadrakh*, *Khuvsgul*, and *Khatanbulag Soum* located in the southern parts of *Dornogobi Aimag* are regarded as easily damaged by *Dzud*, and actually they had been damaged in the past, these four *Soums* were considered as the prioritized districts. Among them, *Khatanbulag* was excluded from viewpoint of effective study since it is so far from *Aimag* Center. Consequently three *Soums* excluding *Khatanbulag* were selected as candidates pilot *Soums*.

## 4.1 BASIC IMPLEMENTING POLICY OF PILOT STUDY

### (PARTICIPATORY APPROACH)

As for selection of the Pilot Project, the first priority is placed on the intention of herders who are the implementers and also the beneficiaries of the project. This is for the establishment of a more effective and sustainable project operation unit by improving the ownership of the project through adopting the participatory planning method such as organizing herders groups and drafting the proposals by herders themselves.

### (IMPLEMENTATION PROCESS OF PILOT PROJECT)

#### Implementation Process:

The Pilot Project starts from the process that *Soum* governments and the Study Team jointly select proposals presented by the herders themselves. First of all, Project Cycle Management Workshop (hereinafter called "PCM Workshop") was executed by the group to understand their own situation to draft a proposal. Then, each group drafted their proposal based on the problem analysis, through screening of *Soum* government and the Study Team. Finally the Pilot Projects were selected and started. The following figure shows the process until the start of the Pilot Project.

#### Holding of Workshop and Establishment of Herders / Residents Group:

Workshop was held in two steps: At first, PCM workshop was held and subsequently, workshop to make the "Plan of Operation" ("PO Workshop") that the group adopted. After the start of the pilot project, Monitoring and Evaluation (M & E) workshop was executed by the group.

"Confirming and understanding of the progress" and problem finding at early stage was implemented by executing periodic M & E. Based on this M & E, "changing tracks / adjustment" was done. Furthermore, based on the results of M & E "Recommendations" and "Lessons" was obtained by confirming whether the expected effects and outputs are achieved or not.

#### Selection of Proposal:

The Pilot Projects were selected based on the proposals presented from herders and residents, based on the selection criteria defined by the Study Team. In addition to these, site survey by the Study Team and simple interviews of activity record of the group were implemented. From the point of view of not only herder's desire but also livestock farming development in the future, the Pilot Projects were selected under the discussion between *Soum* governments and the Study Team.

## **4.2 FRAMEWORK OF SELECTED PILOT PROJECTS AND IMPROVEMENT LIVESTOCK FARMING SYSTEM IN RURAL AREAS AND THEIR RELATION**

### **(ESTABLISHMENT OF PILOT PROJECTS)**

As a result of screening, the projects shown below were selected.

Selected Pilot Projects and Its Purpose

Name of Project	Name of <i>Soums</i>	Implementer	Pilot Project Purpose
Pasture Utilization and Well Development	3 <i>Soums</i>	Herders group	Overgrazing is alleviated
Livestock Fund	<i>Erdene Soum</i>	<i>Erdene Soum</i> government	<i>Soum</i> government establishes Livestock Fund
Dairy Product Sale	<i>Erdene</i>	<i>Erdene Soum</i> government	Business situation of <i>Burdene</i> sanatorium is improved
Dairy Products Shipment and Sales	<i>Erdene</i>	Herders group	Shipment and Sales system of dairy Products throughout a year is established
Wool Processing and Products Sale	3 <i>Soums</i>	Residents group	Small-scale industry (wool processing) can be established easily by providing a concessional loan
Traditional Well Campaign	3 <i>Soums</i>	Each <i>Soum</i> government	<i>Soum</i> government has the capacity of promoting Traditional Well construction

Note: 3 *Soum* means *Erdene Soum*, *Ulanbadrakh Soum*, *Khuvsgul Soum* in *Dornogobi Aimag*.

### **(RELATION BETWEEN THE PILOT PROJECT AND DEVELOPMENT COMPONENT)**

End outcome of the project is "improvement of livestock farming System in rural area" focused on "mitigation of *Dzud* damage and resolving of overgrazing". The following table shows components corresponding to each Pilot Project.

Relation between the Pilot Project and the Development Component

Policy/End Outcome	Component of Development	Project	Related Pilot Project
Improvement of Livestock Farming System in Rural Area (Mitigation of Dzud damage and resolving of overgrazing)	Pasture Utilization / Well Development and Management	Pasture Utilization and Well Development	Pasture Utilization and Well Development Traditional Well Campaign
	Livestock Products Improvement	Veterinary Service Improvement	
		Superior Livestock Breeding	Livestock Fund
		Livestock Farming Technique Improvement	Livestock Fund
		Capacity Building for Risk Management	Livestock Fund
	Herders Economic Stabilization	Livestock Farming Improvement	Dairy Products Shipment and Sale Wool Processing and Products Sale
		Market and Distribution of Livestock Products Improvement	Dairy Products Shipment and Sale Dairy Products Sale
	Human Resources Development	-	Human Resources Development through each Pilot Project

“Veterinary Service Improvement” requires high expertise and is unsuitable to the issues that herders/residents tackle; thus, there was no proposal.

Since “Livestock Fund” and “Dairy Products” related project were designed and partially implemented by pulling elements from the superior components, so feedback limited and reflection to the plan is also limited. On the other hand, “Pasture Utilization and Well Development” is a cornerstone of the Plan for Improvement of Livestock Farming System in Rural Area; it combines the two Pilot Projects of “Pasture Utilization and Well Development” and “Traditional Well Campaign” so more detailed feedback can be expected to formulate a specific and detailed plan.

(Please refer to the sub-chapter 4.6 “CONTENTS OF PILOT PROJECT” of the Main Report, as the details of the Pilot Projects.)

### 4.3 REVIEW OF THE FEEDBACK OBTAINED FROM PILOT PROJECTS

To confirm the ability of the improvement plan of Livestock Farming System in Rural Area and to prepare more effective policy and plan, 6 Pilot Projects were carried out. The obtained knowledge through implementation of these Pilots Projects are summarized here.

#### Important Feedback Topics from the Pilot Project

1. Planning in terms of the sustainability of activity or project
  - 1-1. Organizing herders/residents into groups is effective.
  - 1-2. Beneficiary contribution and establishment of Fund is effective.
  - 1-3. Caution about excessive inputs.
2. Cautions regarding rule making
  - 2-1. “Effective rules” exists such as “Livestock Fund Management Rules” and
  - 2-2. Ineffective rules such as “pasture management rules in Gobi region”
3. Capacity development of beneficiary and administration (especially Soum government)
  - 3-1. Capacity development of administration
  - 3-2. Capacity development of beneficiary (herder or resident)
  - 3-3. Building the relations of trust between herder and administration. (Establishment of monitoring system by Soum government)

## **(PLANNING IN TERMS OF THE SUSTAINABILITY OF ACTIVITY OR PROJECT)**

### **Organizing herders/residents into groups is effective:**

It was confirmed by the Pilot Project that the herder group can be organized and continue their group activities even in Gobi region. It was proven by organizing herder groups that they have potential power to think, decide and solve problems, which are difficult to handle by individual herders or residents. Moreover, the effectiveness of organizing herders/residents to achieve project purposes and outputs was confirmed.

### **Beneficiary contribution and establishment of Fund is effective:**

The beneficiary contribution was introduced to increase sustainability of activities and to enhance the ownership in the group. People understood the aim of introduction of the beneficiary contribution and accomplished full responsibility even when the contribution became a heavy burden to them. The payback was carried out even if it was not scheduled; thus, its effectiveness was confirmed. Therefore, the principal of beneficiary contribution is applied in the Plan.

### **Caution about excessive inputs:**

Related with the beneficiary contribution, it may happen that the participant cannot finish making its contribution for all inputs after the beginning of the project. Therefore, the initial input by the project has to be minimized, and it is better to carry out the next necessary input by the group according to own willingness after their activities become stable and they get enough experience.

## **(CAUTIONS REGARDING RULE MAKING)**

### **Effective Rules:**

The management rules for Livestock Fund and *Soum* Well Fund were operated effectively. Proper and effective fund management is important since willingness to contribute to the fund is greatly reduced when the fund is not managed properly. Therefore, clear decision making and operation under the certain rules are essentials to establish appropriate fund management.

### **Ineffective Rules - Pasture Management Rule in Gobi Region:**

The herders continue their traditional way of pasture use in the region by migrating for good pasture, paying attention to the pasture won't be degraded. The provision of codified pasture utilization rules around the well was tried but it did not succeed. Because herders could not feel the necessity and effectiveness of codified rules, they were not feasibility.

## **(CAPACITY DEVELOPMENT OF BENEFICIARY AND ADMINISTRATION, ESPECIALLY *Soum* GOVERNMENT)**

### **Capacity Development of Administration:**

Improvement plan of Livestock Farming System in rural area covers various fields. Capacity development of administration is necessary to correspond to its implementation. Particularly, it is necessary to be acquired the skills to organization and methods for promoting the participatory development.

### **Capacity Development of Beneficiary (Herder or Resident):**

The sustainability of project activities are not secured only organizing herders/residents, even though all project activities are carried out by the organized groups. Necessary skills have to be learned by beneficiaries to ensure the sustainability of the project implementation by them. Therefore, capacity development and learning skills of beneficiaries is essential.

### **Building the Relations of Trust between Herder and Administration. (Establishment of Monitoring System by *Soum* government):**

During project implementation, the administration has to monitor the activity in each group and to provide the necessary advice and support. And monitoring by administration will make Project management smoother because the chances of discussions with herders are increased and mutual understanding becomes deeper through the monitoring activities.

## **CHAPTER 5 LIVESTOCK FARMING SYSTEM IMPROVEMENT PLAN**

### **5.1 PASTURE UTILIZATION / WELL DEVELOPMENT AND MANAGEMENT**

#### **(BASIC CONCEPTS IN PLAN FORMULATION)**

##### **Utilization of GIS Data:**

In this project, a plan is formulated based on an understanding of the whole areas condition, which is gained by overlapping wells distribution and pasture carrying capacity by using GIS.

Basic data for well development is based on the well database that was prepared by UNDP in 1991, and the pasture carrying capacity was based on "Evaluation of carrying capacity, ecology and its value in Mongolia", (Livestock Research Institute, 2000, Tserendash et.al)".

##### **Setting Stable Water Supply Pasture:**

As an indicator for pasture utilization or well improvement, setting water supply rate is important work. Consequently, within 5 km from water resource was set as the stable water supply pasture (5km Zone) that can be utilized with a well. In addition, from the viewpoint of pasture utilization by livestock, this stable water supply pasture was divided into stable water supply pasture (3 km Zone) that is utilized by smaller livestock, and stable water supply pasture (3-5 km Zone) that is utilized by larger livestock.

##### **Relation between Carrying Capacity used for Plan and Stable Water Supply Pasture:**

Within the stable water supply pasture (5 km Zone), the nearer to the center of the water resource, the more excessive concentration of pasture utilization. Although it is expedient to assume that larger livestock utilizes (3-5 km Zone), actually (3 km Zone) is also utilized. In the planning, it is necessary to calculate carrying capacity in consideration of such actual utilization and actual carrying capacity of (3-5 km Zone) was set to be 60% in the plan.



### Setting Pasture Utilization Ratio due to Difference of Water Supply Efficiency:

Water supply efficiency depends on well's capacity, livestock number around the well, and pasture productivity; corresponding to this result, pasture utilization ratio changes.

### Treatment of Nature Preserve in Planning:

Generally use of livestock farming in the nature preserve is forbidden, but actually, use is continuing. Therefore, it is assumed that present use condition continues but there will not be promotion to do so accompanying new development.

## 5.1.1 PASTURE USE AND MANAGEMENT

### (Basic Policy of Pasture Use and Management)

The most important matter from the viewpoint of pasture use and management is to correct the imbalance of these two resources. It is the basic idea in this plan to facilitate seasonal migration due to the restriction of low vegetative productivities in the Gobi region.

It is important to maintain and stabilize the level of carrying capacity for sustainable development of pastoral livestock system. The two measures to stabilize or to raise the carrying capacity are as follows:

- i) To stabilize pasture use by water supply development for unused / low used pasture (Well development).
- ii) To upgrade herder skill for appropriate seasonal migration and efficient way of feed-water (Water-feed management / Pasture management).

### (To Establish Pasture Monitoring)

Pasture monitoring activities will mainly be conducted by *Soum* government. It will be principally composed of two aspects of pasture management: production and utilization.

### Monitoring in Pasture Production:

*Soum* government conducts pasture diagnosis by simplified pasture measurement as an appropriate technology through team work together with herders. *Soum* government agricultural officer will calculate the results of pasture measurement collected from herders and deliver back carrying-capacity information to herders.

Pasture Measurement through Team Play between Herders and <i>Soum</i> Government	
Purpose	Offering carrying capacity information for winter/spring camp
Target	Mainly to herders
When to measure	August – September (every year)
When is the information delivery	October – November (every year)
Accuracy & Specialty	Relatively in lower level, training acquired
Sites to measure	Many (30 points planned)
Location	Widely distributed in <i>Soum</i> area

### Monitoring in Pasture Utilization:

*Soum* government identifies facts of herder seasonal migration and combination of water sources through monitoring and makes use of monitoring information for appropriate pasture use according to carrying capacity.

### Guideline for Appropriate Size of Livestock Number and Utilization Balance:

Appropriate level (3 km Zone) of livestock number considering environmental aspects as follows;

Area		Yield (kg/ha)	Livestock number (s.u./km <sup>2</sup> )	Appropriate livestock number per well (s.u.)
Dundgobi	North	285.6	50.1	1,416
	South	155.1	33.0	933
Dornogobi	Northeast	150.7	32.1	906
	Southwest	147.1	31.3	885
Umnugobi	North	122.2	26.0	735
	South	89.8	19.1	540

From the viewpoints of livestock and pasture management, it is recommended to lead livestock to (3-5 km Zone), which is considered edge of 5 km in radius more actively and consciously as grazing policy. Besides, it will also be an effective way to make maximum use of (3-5 km Zone) by increasing number of big livestock and improving livestock constitution balance in accordance with natural conditions of the Gobi.

#### Significance of Establishing Pasture Monitoring System:

Increasing water supply capacity implies the danger to cause overuse of pasture. But it is possible to alleviate it by improving water supplying and livestock management techniques. In this way, it is requested to take a balance of hard and soft development techniques.

#### Need for Pasture Management Plan in Accordance with Well Development:

Respective activities for <Environmental development plan for winter/spring camp> and <Low use and unused pasture development plan> are summarized as follows:

	Environmental development of winter/spring camp	Development of low use and unused pasture
Output	<ul style="list-style-type: none"> <li>Improving watering capacity</li> <li>Improvement of watering techniques</li> <li>Development of facilities in winter/spring camp</li> </ul>	<ul style="list-style-type: none"> <li>Expansion of seasonal migration pasture</li> <li>Improving watering capacity</li> <li>Improvement of watering techniques</li> </ul>
Activities	<ul style="list-style-type: none"> <li>Rehabilitation of Traditional Well</li> <li>Rehabilitation and construction of Production Well etc.</li> <li>Development of facilities in winter/spring camp</li> <li>Introduction of scheduling of watering time and rotational use of well use</li> <li>Organization of herders group</li> </ul>	<ul style="list-style-type: none"> <li>Rehabilitation and construction of Production Wells, etc.</li> <li>Improvement of watering facilities</li> <li>Organization of herder groups</li> </ul>

#### Plan for Environmental Development of Winter/Spring Camp:

Activity items of herder groups, regional government, central government and donors are respectively summarized below.

Activity items	Activities for herders group	Activities for <i>Soum</i> government and <i>Aimag</i> government	Activities for government and donors
Rehabilitation of Traditional Well	Supplying labor for rehabilitation of Traditional Well or Shaft Well		Supplying materials and trucks for rehabilitation of Traditional and Shaft Well
Rehabilitation and construction of Production Well etc.	Formulating herders group Operating & Maintenance	Organizing herders group	Rehabilitation and construction of Production Well etc.
Introduction of scheduling of watering time and rotational use of well use	Introduction and operation of well use rules (scheduling for watering)	Managing of well use rules by herders	Instruction of well use rules by herders
Development of facilities in winter/spring camp	Rehabilitation of winter shelter Rehabilitation & construction of storage for fodder		

### Plan for Developing Low Use and Unused Pasture:

Activity items of herders group, regional government, central government or donors are respectively summarized as follows.

Activity items	Activities for herders group	Activities for <i>Soum</i> government and <i>Aimags</i> government	Activities for government and donors
- Rehabilitation and construction of Production Wells, etc. - Improvement of watering facilities	- Supplying labor for rehabilitation & construction of Production Well - To attend seminars	- To design water tank, etc. - To give seminars	- To develop well - To instruct to design of water tank, etc.
- To organize herders group	- Organized operating and maintenance of wells by herders group	- To manage and coordinate herders group	- To instruct herders group

## 5.1.2 IMPLEMENTATION OF WELL DEVELOPMENT

### (PURPOSE OF WELL DEVELOPMENT)

Well development in the area aims to achieve "improvement of water supply efficiency in using pasture" and "Expansion of usable pasture area in unused or low use pasture"; thus, the precondition for proper pasture utilization will be maintained.

### (BASIC POLICY)

#### To Carry Out the Well Development Based on Herders Requests:

The herders' willingness to use wells is essential to achieve its sustainable operation and maintenance in pasture. Hence, well development will be carried out based on the request of herders. On the other hand, *Soum* government has to consider balance of wells in their territory in executing development plans by risk management.

#### Introduction of Well Development Process combined with Pasture Management:

Through well development, herders will be pulled into the pasture management system in the region. The necessary cooperation of herders on pasture management will be herder's obligation and included in the well use contract.

#### Building up the Operation and Maintenance System by Herders Has to Be Developed Concurrently with Well Construction Works:

Herder well maintenance activities should be started from the beginning of well utilization. Therefore, the formulation of well operation and maintenance has to be carried out concurrently with execution of well construction works.

#### Effective Use of Existing Unusable Wells:

Rehabilitation will be carried out as a priority since it is inexpensive than new well construction. Moreover, when the well cannot be rehabilitated, a new well will be constructed next to the existing well based on its characteristics, since its success rate is better than construction in a new place.

#### Development of New Wells:

Concurrently with the rehabilitation of existing wells, it is better to make new wells with high

potential of water resources based on water resources investigation to use pasture without existing wells.

#### **Effective Distribution of Wells:**

In the rehabilitation / new construction plan of engineering wells, distribution of them is to be decided to broaden their stable water supply pasture (3 km Zone). Concretely, it is set as an index of well distribution, which the wells in future have to be 6 km away from existing wells.

#### **Selection of Target Well from Economic Viewpoint:**

The wells with small yield have to be operated longer to obtain enough water. Due to that, such wells have no economic effect considering operation and running cost. In the Study, 0.6l/s is set as regulation yield for well rehabilitation so that wells with less than 0.6 l/s are excluded as rehabilitation candidates. New construction will be started from the site where water depth is expected to be shallow by water resources exploration. In this selection, water quality and well yield in the existing wells also should be considered.

#### **(IMPLEMENTATION SYSTEM)**

The implementation of well development should follow "General rules concerning rehabilitation/ new construction, the financing, possession and utilization of the engineering wells and the water source" issued in July, 2005.

For well development, the local government such as *Soum* government and agriculture agency in *Aimag* government should gather requests from herder groups. The well development work is to be carried out by state budget or other donor's project. According to the General rule, 2 years is needed after the selection of wells from herder's request to hand over the well.

#### **(MASTER PLAN OF WELL DEVELOPMENT)**

##### **Target:**

Target development level of Master Plan should be decided considering pasture condition of each *Aimag*. The development level in each pasture class is set to be 90% in Steppe and Desert-Steppe area, and limited to 70% in Desert.

##### **Present Status of Pasture Utilization and Carrying Capacity:**

The area and carrying capacity in stable water supply pasture (3 km Zone) and stable water supply pasture (5 km Zone) are calculated for present well distribution.

##### **Development Area (Area will be Stable Water Supplied by the Plan):**

"The development area" is assumed that the part of remainder by which the stable water supply pastures (3 km Zone) calculated is excluded from the whole developed area set as target goal. Number of well is calculated as the one to use the development area.

##### **Number of Wells in Master Plan:**

Based on the overlapping of stable water supply pasture by each well in exiting condition, average increased area of stable water supply pasture per well is used in the calculation. The total number of water sources, present number of water sources and required number of wells,

is 3,681 in *Dundgobi*, 3,261 in *Dornogobi*, 4,728 in *Umnugobi*, 8,261 in 3 *Aimags* when it consider with stable water supply pasture 3 km Zone. It will take a long period to complete improvement of all these wells.

#### (FIRST WELL DEVELOPMENT PLAN)

Considering the pasture condition of the 3 *Aimags* of the Pilot Study, Master planon the well improvement is formulated to effectively utilize carrying capacity in the region. The first step of implementation should be rehabilitation or alternative new construction of existing wells and new construction based on the existing results of geophysical exploration. The First Well Development Plan is settled based on such information.

#### New Construction and Rehabilitation Feasibility by Well Type:

Well Type	Basic Policy
Production Well	Rehabilitation has the priority for new construction. New wells will be constructed on the unused-low used pasture when necessary or near the same location when the existing well cannot be rehabilitated.
Shallow Well	Only the wells with high feasibility are to be rehabilitated. New wells will be constructed on the unused-low used pasture when necessary, or near the same location when the existing well cannot be rehabilitated or is abandoned Shaft Well.
Shaft Well	These will be rehabilitated through installing a power pump for improvement of water supply to pastures and promotion of the well utilization. It cannot be newly constructed. Thus abandoned Shaft well will be replaced as Traditional well when its water level is shallow and as Shallow Well when it is deep but has high yield capacity.
Traditional Well	These will be constructed or rehabilitated by herders to maintain the present distribution. The administration will support it.

#### Total Number of Wells by Well Type in the First Well Development Plan:

Well Type		<i>Dornogobi</i>	<i>Dundgobi</i>	<i>Umnugobi</i>
New Construction	Production Well	144	93	114
	Shallow Well	132	263	260
	Traditional Well	323	543	435
Rehabilitation	Production Well	66	117	103
	Shallow Well	26	52	71
	Shaft Wells(with Pump)	219	201	93
	Traditional Well	300	375	350
Total		1,210	1,444	1,426

#### Stable Water Supply Pasture & Carrying Capacity by First Well Development Plan:

		Area(km <sup>2</sup> )			Carrying Capacity (1000 s.u.)		
		<i>Dundgobi</i>	<i>Dornogobi</i>	<i>Dundgobi</i>	<i>Dornogobi</i>	<i>Dundgobi</i>	<i>Dornogobi</i>
Master Plan		67,007	90,758	129,185	2,629	2,824	2,724
Present Condition	Stable water supply pasture (5km Zone)	62,858	78,688	106,771	2,148	1,810	1,780
	After First Well Development Plan	50,080	51,492	71,660	1,946	1,459	1,489
	Stable water supply pasture (3km Zone)	66,805	85,310	116,084	2,299	2,045	2,024
	Stable water supply pasture (5km Zone)						
Share of After First Well Development Plan	3 km Zone	75%	57%	55%	74%	52%	55%
	5 km Zone	100%	94%	90%	87%	72%	74%
No. of water source		4,017	2,972	4,307			
Stable water supply pasture and carrying capacity for 1 water source	3km Zone	12	17	17	0.484	0.491	0.346
	5km Zone	17	29	27	0.572	0.688	0.470

Share of stable water supply pasture (5 km Zone) is 100% in *Dundgobi*, 94% in *Dornogobi* and 90% in *Umnugobi*. Thus the target is almost achieved. However, in carrying capacity, the share of stable water supply pasture (5 km Zone) becomes only 87% in *Dundgobi*, 72% in *Dornogobi* and 74% in *Umnugobi*. And so, well development can contribute to increase of water supply.

The comparison is carried out between target in Master Plan and livestock number (converted into sheep unit) in present (2004) and before *Dzud* damage (1999). In *Dundgobi*, the present number is the same as Master Plan, but 1999's data exceeded it. Hence, the Master Plan's goal means only that the number of present livestock can be bred stably, and that it cannot reach the number in 1999. Therefore, the other kinds of development activities such as improvement of livestock quality should be considered in *Dundgobi*.

### Calculation of Construction Cost:

#### Standard Specification

As for examination of the specification of the Engineering well, 2.5 tons of water is needed for 500 livestock animals and it takes about 40 minutes to supply it when pump capacity is 1.0l/s. Thus this pump capacity can be set as standard specification. Moreover, standard capacity of the water storage tank is 2.5 tons so that 1 herd can be fed water.

However, it is necessary to examine the strategy for reducing waste time for livestock waiting around the well such as the installation of one more feed water tanks or large storage tank, etc. for the large scaled herder group who requires high water supplying capacity.

In the plan, the intention of each herder group as user should be used to make well facilities specification, because cost sharing is required of the herders. Thus, the specification of each well should be decided according to their request and by confirming their willingness to pay for the increased rehabilitation cost.

#### Estimation of Unit Construction Cost

The unit construction cost is calculated based on the experience in Pilot Study.

Kind of Work		Total Cost	Construction Cost	Assumed Depth	Equipment Cost	Assumed Depth
New Construction	Production Wells	12,720	11,160	H=100m	1,560	W.L.=40m
	Shallow Wells	9,130	7,900	H=20m	1,230	W.L.=20m
	Traditional Wells	200	200			
Rehabilitation	Production Wells	7,280	5,720	H=100m	1,560	W.L.=40m
	Shallow Wells	5,840	4,610	H=20m	1,230	W.L.=20m
	Traditional Wells	3,580	2,500	-	1,080	-
	Production Wells	200	200			

Note 1) The construction cost for Production Wells and Shallow Wells requires 10% additional from the average construction cost in pilot study, and USD 2,000 for pump house and USD 500 for both tanks are also included.

Note 2) In the cost of Traditional Well, it is assumed that it will be made by herders.

#### Estimation of Total Construction Cost:

Total cost of First Well Development Plan is USD 5,569,000 in *Dundgobi*, USD 4,518,000 in *Dornogobi*, and USD 5,409,000 in *Umnugobi*.

### **5.1.3 WELL OPERATION AND MAINTENANCE**

The following activities are required to get the operation and maintenance system to secure the sustainability of the constructed wells.

#### **(For General Activities to Heighten Herder's Ownership through Well Construction Process)**

The following activities are required to increase ownership. The *Soum* government will carry out these activities to organize herder group. Therefore, it is necessary to develop a procedure to organize the group and *Soum* government's capacity.

- To organize the herder group
- Introduction of well use contract
- To establish Herder's Well Fund

#### **(Establishment of *Soum* Well Fund)**

At present the *Soum* government gives the herders well use rights and delegates its operation and maintenance to them. However, the budget for supporting herder's well operation and maintenance is not usually prepared by the *Soum* government or *Aimag* government. "*Soum* Well Fund" is established in each *Soum* so that *Soum* government has the capacity to cope with such situations.

This fund is established by herder's contribution; herders pay money tacked on small amount for contribution to the well construction to each *Soum*, and then *Soum* government utilize this small amount of money for the Fund. At first the Fund is used for buying spare-parts for improved wells or loan to repair the equipment in the beginning. The *Soum* Well Fund has to report their activities to the public once a year to maintain transparency and to continue the activity of the fund.

#### **(Establishing Well Maintenance System)**

The herder group has to solve any trouble when it happens on their well. Each herder group has to take full responsibility to maintain the operation and maintenance of wells in the future. Thus, a supporting system has to be established in which *Soum* government and *Aimag* government give support for operation and maintenance activities.

Especially, many generators had troubles in the Pilot Study and the following matters are necessary activities to establish for the well management system as experienced in the Study. The following activities are necessary for the well operation and maintenance.

- Execution of Operation and Maintenance Training for Herders
- Training to Promote *Soum*'s Engineer in Charge of Well Equipment Management
- Stock and Procurement of Spare Parts in *Soum*
- Contract with Local Well Construction Company to Support Well Maintenance

## 5.2 LIVESTOCK PRODUCTS IMPROVEMENT COMPONENT

This component is designed to insure that the livestock farming in rural area sustainably develops through measures and projects necessary for improvement of livestock products productivity and its stabilization.

### (VETERINARY SERVICE IMPROVEMENT PROJECT)

After shifting to market economy, veterinary service management is not steady and runs into a situation that number of veterinaries and medicines decrease and technique level is lacking. Through improving such situation and keeping livestock's health, stable livestock products are made possible.

**Target Group and Implementing Organization:** Veterinary association and herder's group/ *Soum* and *Aimag* government

**Project Purpose:** Livestock health in rural area is maintained.

**Outputs:**

- Quality of Veterinary Service in Rural Area is Increased
- Cooperation System between Herders and Veterinaries is Established.(Organizing Herders Group)
- Livestock Medicine is Stably Supplied in Rural Area.
- Herders Provide Elementary Knowledge on Livestock Health

**Inputs:**

Veterinary training, training for herders, livestock medicine, *Soum* veterinary equipment

### (SUPERIOR LIVESTOCK BREEDING PROJECT)

Superior livestock are not introduced and breeding among closely related livestock is increased and then livestock quality is devastating. This project aims to make a shift from quantity production to quality one, and increase its productivity.

**Target Group and Implementing Organization:** herders/ *Soum* and *Aimag* government

**Project Purpose:** Superior livestock number is increased.

**Outputs:**

- Extension System of Superior Livestock Variety is Improved.
- Technique and Knowledge on Livestock Breeding is Increased.
- Herder's Technique and Knowledge on Breeding is Increased.

**Inputs:**

Superior livestock varieties that become resource livestock fund, soft loan, training of veterinary, and training of herders, cost for livestock fair.

### (LIVESTOCK FARMING TECHNIQUE IMPROVEMENT PROJECT)

After *Negdel's* disorganization, lot of unskilled herders increased. Under such circumstances it is required to train herders about basic herding technique and thereby increase production technique.



**Target Group and Implementing Organization:** herders/ *Soum* and *Aimag* government

**Project Purpose:** Herder's herding technique is increased.

**Outputs:**

- Herder's Number with Unskilled Herding Technique is Reduced. (Implementation of Inter-Herders Training)
- Basic Livestock Production Technique is Increased.
- Basic Knowledge on Livestock Farming Management is acquired.

**Inputs:**

Herders who accept herding technique training, training cost, cost for text of basic livestock production technique and training cost, cost for text of livestock farming management and training cost

**(CAPACITY BUILDING FOR RISK MANAGEMENT PROJECT)**

In order to improve livestock farming system in rural area and promote the whole industry, it is necessary to reduce various risks and to contribute to stable livestock production.

**Target group:** *Soum* government, *Aimag* government

**Project Purpose:** Livestock farming system that is strong enough to cope with disaster in rural area, and coping with infectious disease is established.

**Outputs:**

- Feed Stockpiling System is Improved.
- Livestock Shelter is Improved.
- Herders Join in Livestock Insurance System.
- Weather Forecasting and Warning System is Arranged.
- Public System for Epidemic Prevention and Quarantine is Improved.
- Number of Livestock Theft Cases is Decreased.

**Inputs:**

Procurement cost for feed stockpiling, cost for shelter construction and rehabilitation, weather forecast and warning network improvement cost, and livestock retting pool rehabilitation /construction cost

**5.3 HERDERS ECONOMIC STABILIZATION COMPONENT**

After shifting to market economy, herder's chance to pay cash increased. However, herders don't get income corresponding to it, and income chance is limited too. So it is required to create new income source.

**(LIVESTOCK FARMING IMPROVEMENT PROJECT)**

Added value of livestock products is increased through promotion of small-scale livestock products processing business in rural area. The project provides income chance and entrepreneurial chance, and aims to increase herders' and residents' livelihood in rural area.

**Target Group and Implementing Organization:** herders/ *Soum* and *Aimag* government

**Project Purpose:** Herders and residents start small-scale livestock products processing business.

**Outputs:**

- Local Residents and Herders acquire Livestock Products Processing Technique.
- Local Residents and Herders acquire Economical Knowledge and Management Ability.
- Financing System to Start Small-scale Livestock Products Processing Business is improved.

**Inputs:**

Fund necessary for finance, Experts of processing technique, Specialist of management and economy, Study tour (training of advanced cases), and other training cost

**(MARKET AND DISTRIBUTION OF LIVESTOCK PRODUCTS IMPROVEMENT PROJECT)**

Training that is necessary for producers to ship directly livestock products and livestock processing goods to market is implemented and human resource development is also implemented.

**Implementing organization:** *Soum* government, *Aimag* government

**Project Purpose:** Local livestock products market is growing.

**Outputs:**

- Market is Prepared (Development of Local Sales Base, Market/Base Development)
- Herders and Residents acquire Knowledge on Market (Organizing Herders, Cooperative Shipping, Cooperative Business)
- Market Related Infrastructure is Improved (Roads, Electricity, Communication, Railway, etc.)
- Market Information can be Utilized.

**Inputs:**

Economy guidance specialist, each processing specialist, training places, social infrastructure improvement

## **5.4 HUMAN RESOURCES DEVELOPMENT COMPONENT**

This component is essential to develop fully effect and results of which intents was brought from three components of “Pasture utilization / Well development and management”, “Livestock products improvement”, and “Herders economic stabilization”.

**Target Group:** herders, residents, *Soum* government officials *Aimag* government officials

**Project Purpose:** Capacity of livestock farming in rural area related person is increased.

**Outputs:**

- Administration becomes to Support Organizing Herders and Residents for Project Implementation on Livestock Farming Project in Rural Areas.
- Herders/Residents become to be able to Play Systematically.
- Administrative Officers acquire Technique and Knowledge necessary for the Livestock Farming System Improvement in Rural Area.

- Herders/Residents acquire Technique and Knowledge necessary for the Livestock Farming System Improvement in Rural Area.

**Inputs:**

Cost for human resources training necessary for the livestock farming system improvement plan in rural area, text creation cost, plan formulation training cost targeted for herders/residents

## **5.5 ACTION PLAN OF PROJECT**

### **(CONTENTS OF THE PROJECT AND PRIORITY)**

“Pasture utilization / Well development and management” is top priority and basic in the livestock farming system improvement projects. The others of “Livestock products improvement”, “Herders economic stabilization” and “Human Resource Development” are complementary, and they are extremely effective for the livestock farming in rural area. Synergic effect of projects can be expected if these projects are promoted in parallel as much as possible.

### **(UNDERSTANDING OF ACCURACY OF THE PROJECT)**

#### **Well Development Project:**

For the basic information related the Wells in the well development project, there are differences between the three *Soums* of the Pilot Study, *Dornogobi Aimag* targeted for the detailed plan and the other *Aimags*. Therefore, if the well development plan is implemented outside of the Pilot Study Area, it is necessary to check well information (on well data and rehabilitation provability).

#### **Small-scale Projects:**

Content of the project is changeable according to the regional characteristics and implementer's intent. However, the project is able to be structured according to “Chapter 4, Pilot Study”.

### **(PREPARATION OF WELL IMPLEMENTATION PROJECT)**

In order to implement the well implementation project, it is necessary to start organizing herder groups according to the Process of Well Construction issued by the Country. For this purpose, the *Aimag* government has to inform the *Aimag* policy of the well development to each *Soum*, and after that each *Soum* has to prepare a *Soum* well development plan and announce it to herders; then herders who want well development have to organize herder groups and start saving money for the well construction contribution.

### **(NECESSITY OF STEP-BY-STEP IMPLEMENTATION OF THE PROJECT)**

#### **Required Days for the Works :**

The project plan shows that about 100 wells per *Soum* on average and the number of engineering wells affects working schedule of the project. The actual number of wells to be implemented is calculated as 80% of planned number of engineering wells, since it seems that it is difficult to organize herders groups on 100% of the planned wells.

In the Gobi region, drilling rig (excavator) can work only 7 months from April to October. Based on the normal capacity of drilling rigs, total working period is calculated for each *Aimags* as follows; 28.3 years for *Dundgobi*, 21.5 years for *Dornogobi*, and 27.7 years for *Umnugobi*.

If it is assumed that contractors can provide 2 to 3 drilling machines and the total working period is set as 5 years, 2 to 3 contractors might work in each *Aimag*.

#### **Step-by-Step Implementation of the Works:**

Average number of engineering wells in the project is about 30 to 40 per *Soum*. Since it is very difficult for the *Soum* government to manage implementation of 40 wells per year, it is assumed that the well implementation in a *Soum* will take 2 to 3 years in actuality. There are 14 or 15 *Soums* in each *Aimag*, so 3 to 4 *Soums* will be set per work package. The work of whole *Aimag* will be completed within about 5 years.

If the works in 3 *Aimags* start at the same time, there are considerations that scale of the works might be too large and it might become difficult to manage the project. Moreover, the projects have to be implemented through trials because the new system of the beneficiary's contribution in construction cost is involved in it. Thus, the total works should be divided into some stages. It is judged realistic that the well development works should start from *Dornogobi Aimag* which was the detailed plan area.

#### **(IMPLEMENTING SCHEDULE (PROJECT CYCLE))**

Implementation schedule of the works is needed to plan in consideration with the climate condition in the Gobi region. Since workable period is limited there, the work shall maximally utilize this period, and works of bidding and contract shall be implemented in winter. Implementation period is roughly set to 5 years.

#### **(FLOW OF "WELL IMPROVEMENT PROJECT" AND ROLE SHARING)**

There is the role sharing of herders, the local administration and the nation/ donors in flow from launch of well development project to starting well use, so they shall carry on due to it.

For the three Pilot Study *Soums*, since exchange of opinions between the Study Team and *Soums* has been frequently done, the *Soums* understand the contents and objectives of the project. On the other hand, other *Soums* have only limited information. Therefore, it is necessary to explain the contents of the project and implementation method for each *Soum* in the beginning of project.

The project intends to promote well development by bottom-up approach, so the actual process before starting construction work is very important. Because there are required assumptions of wells construction, that herders organize their own group for well use by their responsibility and determine own roles sharing, they need to establish well operation and maintenance funding and pay their contribution.

It is difficult to start the survey and construction work in all *Soum* at the same time because of

the vast area. It is important to keep fairness of the projects in an *Aimag*, thus all *Soums* in an *Aimag* are divided into 3 blocks, and it is better to complete all works in 2 to 3 routines, not to finish the working in one block then shift to the next block.

#### **(WORKFLOW AND ROLE SHARING OF SMALL-SCALE PROJECTS)**

It is also important for the projects other than well development to be executed based on their own roles as herders, local governments, and the nation/donors. It is important to select projects in consideration of herders technical level and economic sustainability.

## **CHAPTER 6 CONCLUSIONS AND RECOMMENDATIONS**

### **(NECESSITY OF EARLY REALIZATION OF WELL DEVELOPMENT)**

In the Gobi region where there is no choice but to seek groundwater as water resources, wells are the foundation of human and livestock survival. To feed livestock stably, it is necessary to implement anticipatory pasture management and well development with involvement of public agencies.

Pasture utilization and well development project was formulated on the basis of pasture and groundwater potential to realize unused/low used pasture development and efficient well utilization. It is necessary for Mongolian Government to promote it to the authorities concerned.

### **(IMPORTANCE OF WELL OPERATION AND MAINTENANCE (O&M))**

Water pump and generator can easily breakdown and in case, it is impossible to repair them in the *Soum*, broken equipments should be sent to Ulaanbaatar where the manufacturing enterprise or distributor is located in. Therefore, a lot of time and trouble would be consumed for repair since Gobi region is located in a remote area. Thus, concerned parties should recognize that well O & M is extremely important. Even though there is always a possibility that the related persons can easily perform well construction, well construction and well operation and maintenance should be considered as a unit.

### **(PASTURE MANAGEMENT & WELL DEVELOPMENT IN GOBI REGION)**

Pasture condition changes widely year by year in Gobi region. Hence, it can not be said that the pasture will be used stably around the developed well, or that it is highly possible to migrate with a livestock a long distance from the well. Therefore, in addition to one well which is used exclusively by one group, it is required to use any other wells which belong to others without difficulty in an emergency case. For that reason, a system to use plural wells in extensive area effectively is required. Only *Soum* Government can take responsibility for the adjustment of well emergency use.

### **(PASTURE PRIVATIZATION IN GOBI REGION)**

The pasture condition in Gobi region changes easily according to slight change of weather condition. Actually, pasture use that exceeds the *Soum* boundaries happens frequently. Thus, it

is impossible that herder complies with pasture utilization rule in such region, if the pasture privatized rule is adopted.

#### **(NECESSITY OF WELL DEVELOPMENT PLAN MANAGED BY SOUM)**

Since the herder group seeks new wells within the current grazing zone, it is possible that well development does not always contribute to unused / low used pasture development that the *Soum* wants. As for the wells that are necessary for measures against drought and *Dzud*, in cases where the herder group does not want to develop them, it should be considered that the *Soum* plans to develop these wells under its control.

The number of such wells should be restricted to two or three in consideration of the *Soum's* ability to manage them, and contribution to the well construction might be paid from the *Soum* Well Fund under the agreement with the investors of the fund; alternatively, the government might pay this contribution. Use of these wells would be done under a general rule that the users pay the Operation and Maintenance cost.

#### **(PUBLIC INFORMATION ON HERDERS CONTRIBUTION TO WELL CONSTRUCTION COST)**

Although government regulations demand that users contribute some portion of the construction cost prior to the well construction, the number of herder groups that can readily afford such a cost is limited. Therefore, the local government that wants well construction should actively recruit herder groups who want to use a well and the herder groups should also promptly start saving money for such construction. The *Soum* government will be able to apply the request of well construction to the organization once they save the required money.

Government should announce the new efforts for well development. Also it is desirable for the government to promote organization of well users group and funding the construction service fee as a nationwide movement.

#### **(NECESSITY OF ESTABLISHING O & M SYSTEM)**

Herders are not familiar with operating engineering wells, consequently problems will arise. Since it would be best if such problems could be solved on site, it is necessary to build establishment of well operation and maintenance into the well development plan.

In the operation and maintenance system, the *Soum* government should play the main role. To cope with easier repair, the *Soum* government needs to train a suitable person, and always stock spare parts necessary for repair. When repair cannot be handled in the *Soum*, it will be requested to the well company in the *Aimag*. It is recommended that the government and the *Aimag* shall carry out establishing such a system systematically and together.

### **(NECESSITY OF “ESTABLISHMENT OF SOUM WELL FUND” - TOWARD SUSTAINABLE WELLS & M -)**

In consideration of the *Soum*'s role to carry out the above mentioned measures, the fact that the *Soum* government has no such budget is a big problem. To solve this problem, herders need to pay some amount added to their normal contribution at the well construction stage. By using the remainder of the money after paying the contribution accompanied with well construction to the government, it is recommended that the *Soum* government establish a “*Soum* Well Fund”.

*Soum* Well Fund shall be used for well development in the whole *Soum*, including follow up of the wells invested in by the herders. With more financial backing, the *Soum* could promote well development more effectively.

### **(ENHANCEMENT OF ADMINISTRATIVE CAPABILITIES)**

Small-scale livestock farming projects implemented in the Pilot Study could all be carried out at the cost spent for one or two well developments. Such projects would payback the cost to the *Soum*; therefore, actual expenditure would be smaller.

If there is a lack of capabilities in the local administration, any project success would be unsure. The *Soum*'s administration capabilities should be enhanced through the project planning, and they would become activated through implementation of the project. Success of one project will make the *Soum* look forward to further development. Although the contents of small-scale businesses are various, it is considered that a lot of projects can be managed by *Soum* Government level. Therefore, the Central Government should consider activating the rural area (*Soums*) through implementation of these projects.

### **(UPDATING AND EXPANDING OF GIS DATABASE)**

The GIS database for pastures and water sources in 3 *Aimags* of Gobi region was prepared in the Study. In this database, wells data has to be updated every year since facilities condition, users, and utilization also change. It is desirable that each *Soum* will arrange this data and that Agriculture Agency of *Aimag* government integrates all data. It is also necessary to prepare same kind of GIS database in other *Aimags* and to promote plan preparation with them.