

4.7 Rural Infrastructure Improvement Plan

4.7.1 Road improvement

1) Road improvement plan

(1) Distribution road improvement plan

In the development plan of roads for marketing distribution, important road routes for linking areas of production, processing, and consumption of agricultural and livestock products will be planned. Decisions on development routes will take account of factors such as the arable and irrigation land area existing around the roads, facilities for processing agricultural and livestock products, and access to trunk national roads.

The following four national trunk roads will bear important roles for the development of agricultural and livestock farming in the Study Area:

- [1] Sukhbaatar - Darkhan - Ulaanbaatar
- [2] Sukhbaatar - Erdenet - Blugan
- [3] Hutag - Blugan - Bayanhangai - Ulaanbaatar
- [4] Ulaanbaatar - Lun - Arvaikheer

Important roads linking the above four routes to processing factories and production areas are to be as listed below (see Figure 4.7.1.1 in the Annex).

- [1] Shaamar - Zuunburen - Tsagaan nuur - Tsushig 108 km (wheat, irrigation areas)
- [2] Orkhon - Sant - Shaamar 144km (wheat, irrigation areas)
- [3] Hotog - Orkhontuul 71km (wheat)
- [4] Bayangol - Zuunharaa - Tsunhel - Batsumber - Ulb 150 km (irrigation areas, milk collection)
- [5] Bornuur - Jargalant - Ugtaaltsaidam 103 km (wheat, milk collection)
- [6] Bayanchandnani - Bayansogt 46 km (wheat, milk collection)
- [7] Teshug - Hutag 103 km (wheat, irrigation areas)
- [8] Selenge - Erdenet 63 km (wheat, irrigation areas)
- [9] Orkhon - Hushug ondor 44 km (irrigation areas)
- [10] Dashinchilen - Erdenesant 74 km (wheat)
- [11] Erdensan - Kharkhorin 65 km (wheat)
- [12] Kharkhorin - Hujilt - Arvaikheer 138 km (wheat, irrigation areas)

(2) Agricultural Road Improvement Plan

a) Target Areas

The agricultural roads to be improved and developed under this Plan shall be (from the viewpoint of economic efficiency) roads in Sums with a farmland area of 5,000 ha or more which basically connects farmlands with the trunk roads registered at the Ministry of Infrastructure Development.

b) Transport Route Plan

The routes of the agricultural roads covered in this Plan have been designed as shown in Figure 4.7.1.1, with a total length of 850 km including [1] 340 km for Selenge, [2] 290 km for Tov, [3] 160 km for Bulgan and [4] 60 km for Ovorhangai, in consideration of the distribution and size of housing complexes and economic efficiency in each area.

c) Design Traffic Volume

Vehicles which use agricultural roads mainly consist of trucks used to transport harvested agricultural products. These trucks are primarily used during the harvesting season, otherwise the traffic volume is very low. During the harvesting season, the estimated traffic volume temporarily increases to more than 10,000t/month.

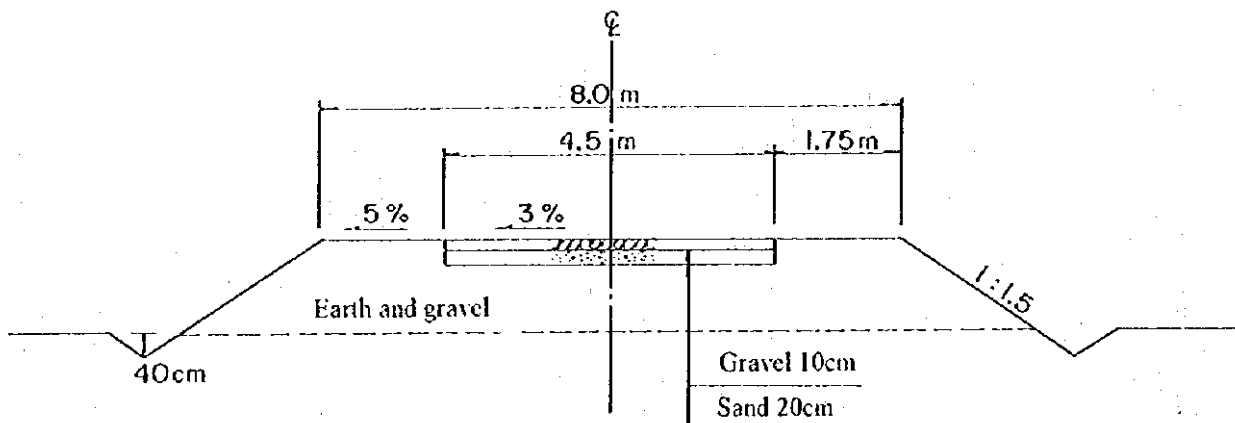
d) Road Structure

Road design specifications in Mongolia are based on those of the former Soviet Union. According to these specifications, the width of a road is determined based on traffic volume, that is, whether it is more or less than 10,000t/month. As the usage of vehicles in this area is concentrated during a certain periods of the year (harvesting season), the annual traffic volume is very low. Therefore, from the viewpoint of economic efficiency, the less than 10,000t/month type of road specifications had been selected for design traffic volume.

The basic concept used in the former Soviet classification of roads is also to be adopted in the Plan. The type of pavement that will be used under the Plan will consist of gravel pavement, as this is a local agricultural road. With regard to anti-frost damage measures, consideration of frost penetration depth in design (required replacement depth: more than 3m) would make the roads uneconomical. Mongolia's roads are usually designed with a bank structure using good quality earth materials (frost damage-resistant materials comprising a mixture of earth and gravel) which improve the drainage performance of the embankment and suppress the rise of ground-water. Further, since Mongolia is a dry

country with little rainfall, the moisture content of the soil is usually low, which means that there is less risk of frost damage. Based on these considerations, the standard cross-section shown in Figure 4.7.1.2 has been adopted for the designed roads.

Fig. 4.7.1.2 Standard Cross-Section of Designed Farm Road



(3) Agricultural Hamlets Road Improvement Plan

An agricultural hamlet road refers to a road that is used by inhabitants of a hamlet located in the capital of a Sum or a surrounding inhabited area or of another hamlet in an agricultural village area mainly as a daily service road.

An agricultural hamlet road must be designed with due consideration given to the hamlet's environment as well as the design requirements given below.

Further, the design work done for an agricultural hamlet road must be carried out for each of the hamlets individually, because the width of available land, slope, basin area, etc. differ according to the geography of the hamlet. Figure 4.7.1.3 (Annex) shows the standard cross-section of a designed agricultural hamlet road.

a) Road Design

[1] Pavement of roadways will consist of gravel pavement which is easy to manage and maintain.

[2] Roadside drainage gutters, etc. will consist of precast concrete so as to prevent erosion of the channels.

[3] Roads for cattle and horses will consist of earth road, and walkway for this type of road shall consist of a gravel-spread walkway. Roadside gutters shall consist of concrete gutters with cover.

[4] Vegetation/tree-planting work will be selected in consideration of the hamlet's landscape.

4.7.2 Rural Electrification Plan

(1) Rural Electrification Plan

Electricity will be introduced into agricultural villages under an introduction plan targeted for the year 2010 which is designed for the benefit of inhabitants of agricultural villages and nomads and which includes improvement and development of power generation and related facilities, in consideration of the increase in demand for electricity resulting from the increase in population and improvement/expansion of infrastructure facilities.

a) Expansion of CES Supply Area

The CES has drawn up an Electricity Supply Plan (Table 4.7.2.1) targeted for the year 2010. According to this plan, there is no room for supplying power to agricultural village areas in 1995, but surplus electricity will increase to 59,000 kW by the year 2000 and to 318,000 kW by 2010, which means that an expansion of the supply coverage area into agricultural village areas is possible in the future.

b) Expansion of Supply Coverage Area through Improvement and Enhancement of Power Generation Facilities of Sums, etc.

Table 4.7.2.2 shows Aimags (Sums) which have power generation facilities in the Study Area. These Aimags (Sums) also supply power to nearby Sums which do not have any power generation facilities. The CES is supplying power to Selenge, Darkhan-uul and Orkhon Aimags and the city of Ulaanbaatar, which are not included in this table. Other than these, although small-scale diesel power generation is being operated on former state-run farms etc., the power generation capacity of these facilities has decreased due to aging and deterioration, and the supply area is also limited to farms.

The Plan will be designed as a plan that includes the improvement and enhancement of these existing power generation facilities.

The electrification rate of the agricultural village areas within the Study Area is 64% for Tov Aimag, 53% for Bulgan Aimag and 61% for Ovorkhangai Aimag as of 1994, with a

total generation capacity of 4,930 kW. In order to bring this rate up to 100%, it is necessary to increase and enhance facilities so that a 39% (1,930 kW) increase in capacity, compared with the current level, can be achieved.

The CBS, which is supplying power to urban areas, has a facility expansion and improvement plan under which a 50% increase in power generation capacity would be sought by the target year 2010. However, under the Master Plan, it is proposed that in order to fill the gap in the level of capacity provided between urban areas and agricultural village areas to some degree, a 1,930 kW expansion in capacity be made by the year 2000 and a further 5,420 kW expansion through improvement and expansion of facilities including generators be made by the year 2010 (see Table 4.7.2.2).

c) Introduction of Portable Wind-Powered Power Generators, etc. through the Promotion of Domestic Production

Introduction of portable wind-powered power generators for nomads has been going on for four years now, through donations of facilities from Japanese volunteers and imports of Chinese products. The generators currently being used are capable of generating 200W, which is sufficient to use a 14-inch TV and a 20W fluorescent lamp. As these generators are simply-structured equipment, it is proposed that they be produced in state-run water-use machinery manufacturing companies and the like in Mongolia and their use promoted throughout the country, with assistance from other countries in the areas of assembly technique know-how and operating funds.

(2) Small-Scale Hydropower Generation Plan

In Mongolia, year-round operation of a hydropower generation system is not possible because the rivers freeze for a long time during the winter. Consequently, no major hydroelectric power plants have been constructed. In Kharkhorin, Ovorangei Aimag, there is a small-scale hydropower plant which is used as the power source for pumps that are operated during the irrigation period only, but this 30 year-old facility has by now deteriorated due to aging, and one of the two generators has broken down and is out of service. Rehabilitation of this small-scale hydro-electric power facility is to be planned in consideration of service life, improvement standards, and other criteria. Further, in a plan for providing newly small-scale hydroelectric power generation facilities, the justifiability of the facility including the installation conditions, demand for electricity during the generation period and utilization purposes also need to be considered.

4.7.3 Rural Infrastructure Development Implementation Programs and Projects

The main programs and projects required to implement the Rural Infrastructure Development Plan are outlined below.

(4.7.3.1)

Project Name	Rural Roads Administration/Maintenance Center Project	Beneficiary	Inhabitants of agricultural villages, nomads
Target	Road administrators at Aimag governments		
Purpose	To perform administration/maintenance of agricultural road and to improve/provide agricultural machinery of state-run farms, etc.		
Work Items	<ol style="list-style-type: none"> (1) Provision of hangars and repair/adjustment factories for administration machinery. (2) Introduction of administration machinery (bulldozers, back hoes, dump trucks, etc.). (3) Introduction of road patrol vehicles (jeep) and vehicles for the transportation of administration machinery (trailers). (4) Training/cultivation of operators and adjustment/repair technicians for administration machinery. 		

(4.7.3.2)

Project Name	Agricultural Hamlet Road Development Project	Beneficiary	Inhabitants of agricultural villages, nomads
Target	Road construction specialists and engineers Aimag governments and local authorities and local inhabitants.		
Purpose	To conduct road development in consideration of the living environment of agricultural hamlets.		
Work Items	<ol style="list-style-type: none"> (1) Ground formation for road construction in which distinction between roadway, walkway and cattle/horse road is made. (2) Construction of drainage facilities. (3) Planting of trees in consideration of the hamlet's landscape. (4) Training and cultivation of road construction specialists and engineers. 		

(4.7.3.3)

Project Name	Agricultural Villages Electric Power Supply Improvement Project	Beneficiary	Inhabitants of agricultural villages, nomads
Target	Electricians at Aimag/local governments, local inhabitants and nomads.		
Purpose	To lessen the gap in electricity supply between the agricultural village areas and urban areas in order to revitalize the agricultural village areas.		
Work Items	<ol style="list-style-type: none"> (1) Renewal of power generation facilities and installation of new generators. (2) Renewal and expansion of electricity supply facilities. (3) Training and cultivation of electricians. 		

(4.7.3.4)

Project Name	Portable Wind-Powered Generator Promotion Project	Beneficiary	Inhabitants of agricultural villages, nomads
Target	Private machine processing plants, electricians, inhabitants of agricultural villages, nomads.		
Purpose	Introduction of simplified power generation facilities to improve the standard of living of the inhabitants of agricultural villages and nomads.		
Work Items	(1) Promotion of low cost wind-powered generators assembly techniques, etc. (2) Financial support for realizing domestic production of wind-powered power generators. (3) Training and cultivation of electricians and mechanics.		

(4.7.3.5)

Project Name	Distribution Road Development Project	Beneficiary	Agricultural/livestock farming producers
Target	Road construction engineers of national and Aimag government levels and local inhabitants.		
Purpose	To develop road which connects the production areas of agricultural/livestock farming products with places that process and consume these products.		
Work Items	(1) Construction of roads which connect major production areas of agricultural/livestock farming products with major places for processing/consumption of these products. (2) The type of pavement will consist of gravel pavement.		

(4.7.3.6)

Project Name	Agricultural Road Development Project	Beneficiary	Agricultural/livestock farming producers
Target	Road construction engineers at Aimag/Sum governments and local inhabitants.		
Purpose	Development of roads for the accessing of farmland, transportation of products and management/maintenance of farmland.		
Work Items	(1) The routes necessary for the above services will be determined for sums with a farmland area of more than 5,000 ha and in which case roads will be constructed. (2) The type of pavement will consist of gravel pavement.		

4.8 Stage of Program/Project Implementation Plan

4.8.1 Implementation of Stages of Implementation Plan

Taking into consideration the funds and human resources required for agricultural and livestock development, the projects and programs formulated by Sectors, have been arranged in stages as outlined below in order to steadily achieve the targets.

As Table 2.5.2.5 shows, many donors have already provided or are now providing large amounts of aid to agriculture, and much of this aid may be implemented during the first stage of this plan. Consequently, it is essential that when implementing the projects and programs proposed by this plan, considerable care be taken to coordinate the work with these other aid projects already underway, or to take advantage of their effects.

A. Stage 1 (To begin between the first half of 1996 and 2000).

Along with being identified as the period during which the promotion of the establishment of basic conditions will be given priority in order to get economic management under the market economy system on track, urgent and immediately effective projects and programs will be arranged during this stage.

- [a] To improve and establish of conditions for government financial and administrative systems, the banking system, the distribution system, and other systems that form the base for implementing the measures.
- [b] To strengthen the system for experiments and research to develop new crops and establish new technology, and beginning the creation of a system for developing human resources.
- [c] To provide small and medium scale projects and programs that require urgent implementation, moreover that can be expected early effect.

B. Stage 2 (To begin between mid 2001 and 2005)

This is the period during which basic conditions have been established, more or less, and concrete development strategy directed toward the achievement of development targets will be promoted in earnest.

- [a] To implement large scale construction projects on agricultural infrastructure and projects and programs to improve distribution and processing related facilities.
- [b] To carry out projects and programs to develop human resources, restructure business organizations, strengthen support systems, etc.

[c] To arrange projects and programs that are rural development models for the reorganization of the rural economic system.

C. Stage 3 (To begin between late 2006 and 2010)

This is the period during which the effects of implementing development strategy become apparent, and the system for getting independent economic management on track is completed.

[a] To provide projects and programs to supplement, improve and renew agricultural and livestock businesses and the rural infrastructure.

[b] To arrange projects and programs to construct a system for technological innovation for the next generation.

4.8.2 Selection of the Priority Projects

Of the programs and projects to be implemented during Stage I of the Master Plan, those priority projects which will precedently implemented have been selected on the basis of the criteria given below. In defining the selection criteria and conducting the selection work, careful consultations with counterparts in the Mongolian government have been made.

1) Priority projects selection criteria

[1] **Emergency:** Project without which economic stagnation or decline and serious socio-economic effects are likely to occur, or those to be implemented urgently to execute new and important policies for promoting agriculture.

[2] **Precedence:** Fundamental projects requiring Research and Development investment which are essential for achieving medium- and long-term targets throughout the Study Area.

[3] **Model feature:** Projects designed to suit the general conditions of the Study Area, and which should bring extensive benefits to the area and its surroundings through strategic investments.

[4] **Public character:** Projects which involve public property and bring benefits or effects to the people in general, rather than particular persons.

[5] **Implementation management system and maintenance management:** Maintenance or a prospective maintenance system for adequate management and execution of the project and the results of development is established.

[6] **Duplication:** No duplication of assistance to the project.

2) Selection of the Priority Projects

The above selection criteria were used to select priority levels for each project as follows:

- 1: High Priority**
- 2: Medium Priority**
- 3: Low Priority**

Table 4.8.1.1 Table of Implementation Schedule of Programs/Projects by Stage

	Sector	Program/Project	Selection Item	Problems to Be Addressed
A+ Stage 1	Agricultural development	Irrigated Agriculture Technology Development Project	A②	Lack of accumulation of technology, lack of engineers
		Farmland Preservation Measures Model Demonstration Project	A②	Lack of accumulation of technology, lack of know-how
		Farmland Management Improvement Demonstration Model Project	A②	Lack of accumulation of technology, lack of engineers.
	Livestock farming development	RIAH Technology Development Project	A②	Lack of accumulation of technology, lack of engineers
		Milk Production Increasing Project	A③	Aging/deterioration of facilities and machinery/equipment
		Grassland Productivity Improvement Project	A②	Lack of accumulation of technology, lack of know-how
		Veterinary Research Institute Technology Development Project	A②	Lack of accumulation of technology, lack of engineers
		Herder's Water Supply Improvement Project	A③	Aging/deterioration of facilities, shortage of spare parts
	Distribution/processing	Milk Distribution and Processing Systems Enhancement Project	A③	Aging/deterioration of facilities and machinery/equipment
		Agricultural and Livestock Farming Food Products Processing Technology Research and Development Project	A②	Lack of accumulation of technology, lack of engineers
		Food Products Hygiene Technology Research and Development Project	A②	Lack of accumulation of technology
	Agriculture Promotion	Seed Multiplication and Provision Project	A②	Lack of accumulation of technology, shortage of seeds
		Agricultural Information System Improvement Project	A①	Insufficient agriculture/livestock farming promotion systems
		Agricultural/Livestock Farming Cooperatives Formation Project	A②	Inadequate agriculture/livestock farming promotion systems
		Agriculture/Livestock Farming Financing System	A①	Insufficient financing systems
		Agriculture/Livestock Farming Mutual Relief/Insurance System	A①	Insufficient administrative/financial systems
		Food Supply Stabilization System	A①	Insufficient administrative/financial systems
		Agricultural Research Cooperation Project	A②	Insufficient technology/know-how
Rural Infrastructure	Rural Roads Administration/Maintenance Center Project	A①	Insufficient means of transportation	
B+ Stage 2	Agricultural development	Balsumber Irrigation Facilities Rehabilitation Project	B③	Aging/deterioration of facilities
		Basic Irrigation Facilities Rehabilitation Project	B①	Aging/deterioration of facilities
		Khar Kherin Area Rehabilitation Project	B③	Aging/deterioration of facilities, shortage of spare parts
		Agricultural Weather Observation System Improvement Project	B②	Lack of accumulation of technology, lack of engineers
	Livestock farming development	Roughage Production Expansion Program	B②	Lack of accumulation of technology, shortage of seeds
		Intensive Livestock Farming Enterprises Development Program	B②	Shortage of human resources, lack of accumulation of technology
		Livestock Hygiene Control Systems Enhancement Program	B②	Aging/deterioration of machinery/equipment, lack of accumulation of technology
	Distribution/processing	Existing Flour Mill/Meat Factories Supporting Program	B①	Aging/deterioration of facilities
		Greens Wholesale Market Development Project	B①	Related industries are underdeveloped.
		Agricultural/Livestock Farming Products Distribution and Processing Supporting Program	B①	
	Agriculture promotion	Agricultural/Livestock Farming Technology Training and Promotion Project	B②	Lack of accumulation of technology, lack of engineers
		Agricultural/Livestock Farming Technology Promotion Systems Development Project	B②	Lack of engineers
	Rural infrastructure	Agricultural Hamlet Road Development Project	B③	Inadequate social infrastructure
		Distribution Road Development Project	B①	Insufficient means of transportation, inadequate social infrastructure
	C+ Stage 3	Agricultural development	Existing Irrigated Area Rehabilitation Project	C①
Hydrological Observation Systems Improvement Project			C②	Lack of accumulation of technology, lack of engineers
Livestock farming development		Livestock Improvement Systems Enhancement Program	C①	Insufficient promotion systems, lack of engineers
		Feeding Enterprises Promotion Project	C②	Aging/deterioration of facilities
Distribution/processing		Milk Products Processing Plants Supporting Program	C①	Aging/deterioration of facilities and machinery/equipment
		Country Area Agricultural/Livestock Farming Products Processing Plants Supporting Program	C①	Aging/deterioration of facilities and machinery/equipment
		Livestock Market Development Project	C①	Insufficient promotion systems
Rural infrastructure		Agricultural Village Electric Power Supply Improvement Project	C①	Inadequate social infrastructure
		Portable Wind-Powered Power Generator Promotion Project	C①	Inadequate social infrastructure
	Agricultural Road Development Project	C①	Insufficient means of transportation	

Table 4.8.2.1 Priority Projects Evaluation

Project/Program		Selection Criteria						
		①	②	③	④	⑤	⑥	⑦
Agricultural Development	Irrigated Agriculture Technology Dev. Project	3	3	2	3	3	3	17
	Farmland Preservation Model Demonstration Pro.	2	2	3	3	1	3	14
	Farm Management Improvement Demon. Model Pro.	2	3	2	3	2	2	14
Livestock Farming Development	RIAH Technology Development Project	3	3	3	3	3	3	17
	Milk Production Increasing Project	2	2	3	3	3	3	16
	Grassland Productivity Improvement Project	1	2	3	3	3	3	15
	Veterinary Research Institute Tech. Dev. Pro.	3	3	2	3	3	2	16
	Herder's Water Supply Improvement Project	3	3	3	3	3	3	18
Marketing Processing	Milk Distribution/Processing Systems Enhancement Project	3	2	2	3	2	3	15
	Agricultural/Livestock Farming Food Products Processing Technology Research and Dev. Pro.	2	3	2	3	2	3	15
	Food Products Hygiene Technology Research and Development project	2	3	2	3	2	3	15
Agriculture Promotion	Seed Multiplication and provision Project	3	3	3	3	3	3	18
	Agri. Information System Improvement Project	3	3	2	3	2	3	16
	Agri./Livestock Farming Cooperatives Formation Project	3	3	3	3	2	3	17
	Agri./Livestock Farming Financing System	3	3	3	3	2	3	17
	Agri./Livestock Farming Mutual Relief/Insurance System	3	3	3	3	2	3	17
	Food Supply Stabilization System	3	3	3	3	2	3	17
	Agricultural Research Cooperation Project	2	3	2	3	2	3	15
Rural Infrastructure	Rural Roads Administration, Maintenance Center Project	2	3	1	3	1	3	13

Notes ①:Emergency, ②:Precedence, ③:Model feature, ④Public character,
 ⑤:Implementation management system and maintenance management,
 ⑥:Duplication, ⑦:Total

Details of the 7 projects designated as priority projects in the above table are described separately in Chapter Six.

The Agri./Livestock Farming Financing System, Agri./Livestock Farming Mutual Relief/Insurance System, and Food Supply Stabilization System in the Agriculture Promotion project group received high scores as a result of the selection criteria evaluation, must be commenced soon, and probably should be recommended as priority projects. But these three systems were not designated as priority projects because such administrative, financial, and fund-raising problems are being dealt with as part of structural adjustment policies, mainly by the IMF, WB, and ADB.

4.9 Program and Project Implementation Management System

4.9.1 Implementation Schedule

The programs and projects to be undertaken during Stage 1 of the Master Plan must be implemented in a step by step manner, in accordance with the schedule given below. Implementation of other programs and projects to be undertaken during Stage 2 and Stage 3 will need to be adjusted in consideration of the status of the implementation and progress of the Stage 1 projects. (See Table 4.9.1.1.)

4.9.2 Management system for implementation of the M/P

In the case of COMECON-style aid, in which everything of equipment, technology, and even human resources was brought, the aid recipient was expected to be passive and submissive, simply waiting for commands from above.

However, the future development of Mongolia first of all requires a withdrawal from the COMECON system. Human resources particularly government officials, who are expected to be independent, active, positive and aggressive in conducting development projects, must be urgently developed in quality and quantity. The problems on the management system when implementing projects connected with the improvement and development of agriculture and livestock farming, as well as countermeasures for solving them, are as suggested below.

1) Recruit and development of human resources

- [1] In future various projects will be implemented in combination and in parallel, with the support of various aid donors. This will necessitate government officials who will be engaged in and responsible for the projects. There is at present an absolute shortage of administrative personnel in the Ministry of Food and Agriculture (71 officials). Even in their daily work they are at full capacity, and implementing new and intensive projects will not be conducted by the present officials. Therefore it is hoped that the measures described in [2], [3] and [4] mentioned below will be studied and implemented.
- [2] Many semi-government semi-private organizations exist under the umbrella of the Ministry of Food and Agriculture, while a considerable part of their budget is supplemented directly from the Ministry of Finance. Attempts would be made to reorganize these semi-government semi-private organizations, to recruit officials from them, and to develop officials' ability.

- [3] Various research institutes exist as subsidiary organizations under the jurisdiction of the National University of Agriculture. Outstanding personnel will be recruited from these research institutes and a separate organization in charge of supporting projects from overseas will be created within the the Ministry of Food and Agriculture. This organization will have a limited life of 10 or 15 years, i.e. the period during which assistance is continued.
- [4] As for irrigation-related engineers, the transfer of engineers from the Water Policy Research Institute of the Ministry of Nature and Environment will be considered. The main objective of the Water Policy Research Institute is to carry out research on water resources, water quality, and the correct distribution of water resources from the point of view of protecting the natural environment. Therefore it places emphasis on research and proposing policies connected with water. However, its current work includes proposing, planning, designing, and implementing projects that should be carried out by the Department of Crop, Machinery and Irrigation of the Ministry of Food and Agriculture. Therefore these engineers will be correctly allocated and assigned to the execution of irrigation projects.

2) Domestic budget support measures

When carrying out projects assisted by other countries and international agencies, Mongolia herself has to bear the costs of implementing the project, e.g. the salaries and travelling expenses of the Mongolian project leaders and site supervisors in charge of the project, jeep hire costs, or, when the equipment needs to be brought in from abroad for implementing the project, the costs of customs clearance and the costs needed for transporting this equipment domestically. A system should be arranged in Mongolia to ensure that these budget allocations are made.

3) Establishing a system of acceptance

In order to smoothly implement projects aided by foreign countries, the roles and burdens of the various accepting organizations (ministries and agencies) must be made clear. Further, in order to internally proceed with projects that the Ministry of Food and Agriculture accepts without delay, the roles, responsibilities, and burdens of each department within the ministry should be clarified. In addition, when the body responsible for carrying out projects is a subsidiary organization such as an Aimag or a Sum, clear rules should be established as to how the projects will be implemented.

4) Establishment of Project Implementation Structure

A base promotional organization (Projects Promotion Committee) for enabling smooth implementation of projects will be established by strengthening the steering committee organized to conduct this Master Plan survey. The Projects Promotion Committee, which in principle will meet twice a year (at the beginning and mid-point of the year) will actively participate in the promotion of projects and will be responsible for all aspects of each project including the status of progress of each project and project-related problems. Individual project implementation organizations for executing the actual work will be organized under this committee.

Fig. 4.9.2.1 Project Promotion Committee

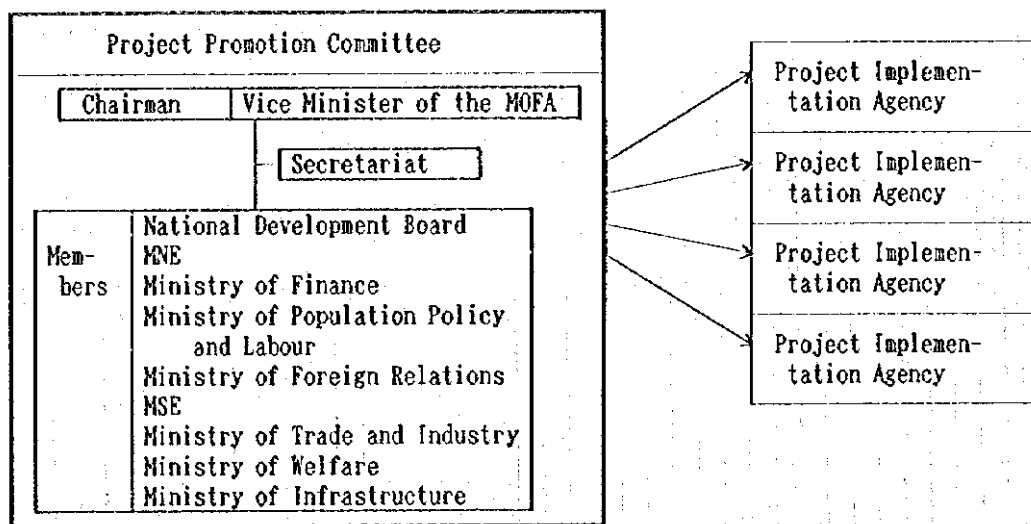


Table 4.9.1.1 Implementation Schedule

Project		1994:1995:1996:1997:1998:1999:2000:2001:2002:2003:2004:2005:2006:2007:2008:2009:2010											Component						
		(A)	(B)	(C)															
①Seed Multiplication and Provision Project	TA CA			←	→												2	○	○
②Irrigated agriculture Technology Development Project	CA TA			←	→												5	○	○
③RIAH Technology Development Project	TA CA			←	→												5	○	○
④Herder's Water Supply Improvement project	CA			←	→												2	○	○
⑤Milk Production Increasing Project	CA			←	→												2	○	○
⑥Agricultural Information System Improvement Project	CA			←	→												2	○	○
⑦Veterinary Research Institute Technology Develop. Pro.	TA			←	→												5	○	○
⑧Agricultural/Livestock Farming cooperatives Formation Program	TA			←	→												2	○	○
⑨Agricultural Research Cooperation Project	TA			←	→												5	○	○
⑩Milk Distribution/Processing Systems Enhancement Pro.	CA			←	→												2	○	○
⑪Agri./Livestock Farming Food Products Processing Tech. Research and Dev. Pro.	TA CA			←	→												3	○	○
⑫Food Products Hygiene Technology Research and Dev. Pro.	TA CA			←	→												3	○	○
⑬Grassland Productivity Improvement Project	TA			←	→												2	○	○
⑭Farmland Preservation Model Demonstration Project	TA			←	→												5	○	○
⑮Farm Management Improvement Demonstration Model Project	TA			←	→												3	○	○
⑯Rural Roads Management/Maintenance Center Project	CA			←	→												2	○	○
⑰Agriculture/Livestock Farming Financing System	CA TA		←	→													2		○
⑱Agri./Livestock Farming Mutual Relief/Insurance System	TA		←	→													2		○
⑲Food Supply Stabilization System	CA TA		←	→													2		○

Notes: CA; Capital Assistance, TA; Technical Assistance
 (A) shows approximate number of experts to be assigned. (B);Machinery/Equipment (C);Training overseas

CHAPTER 5 MAINTENANCE ORGANIZATION FOR EACH FACILITIES CATEGORY

5.1 Irrigation facilities

At present, the state owns a portion of more than 51% of the main irrigation facilities (e.g. dams, head works, pump facilities, trunk waterways) in the irrigated area of more than 500 hectares. In general there is considerable obsolescence and decline in the functions of these facilities, and this impedes irrigation. In order to efficiently maintain these facilities in future, the following measures should be adopted.

[1] The current system, whereby the state owns more than 51% of the main irrigation facilities that cover the irrigated area of more than 500 hectares, will be maintained. Further, the range of what exactly constitutes main irrigation facilities will be decided.

[2] Ministerial ordinances etc. will stipulate who will bear the costs, in what range and to what proportions, when these facilities need to be rehabilitated in future.

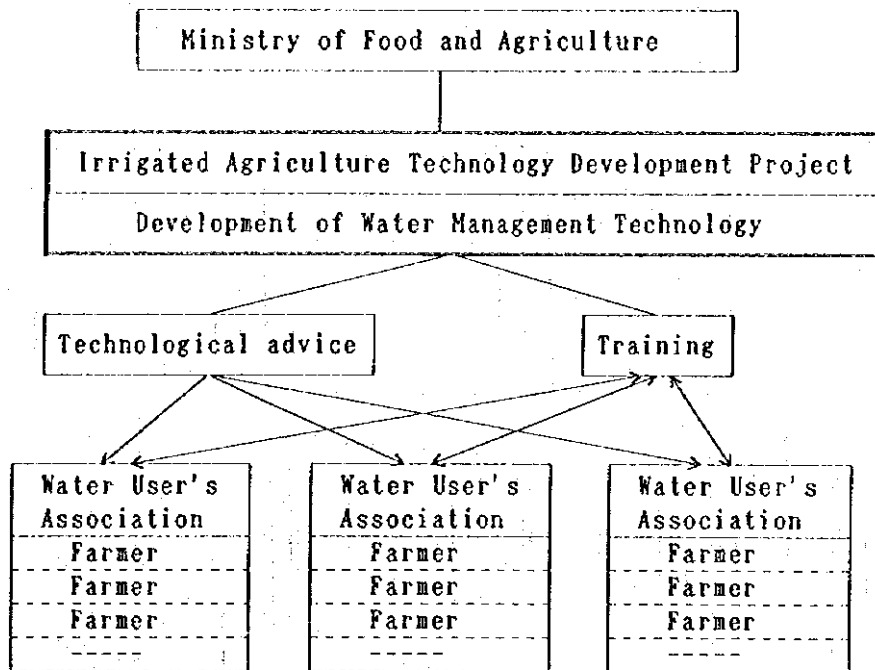
[3] Water users associations will be organized in each irrigation scheme, and these shall bear their own expenses for operating, maintaining, and managing irrigation facilities.

[4] Water charges levied from the members of the water users association will be included in the budget of the associations. The charges (unit water fee) and method of levying will be decided through agreement among the members of the associations.

[5] Suited to Mongolian guideline Management of irrigation facilities will be developed.

[6] Matters related to [3] and [4] above will be studied in the "Irrigated Agriculture Technology Development Project" recommended as a priority project, and guidelines will be formulated. Further, training and diffusion will be carried out to the members of the associations.

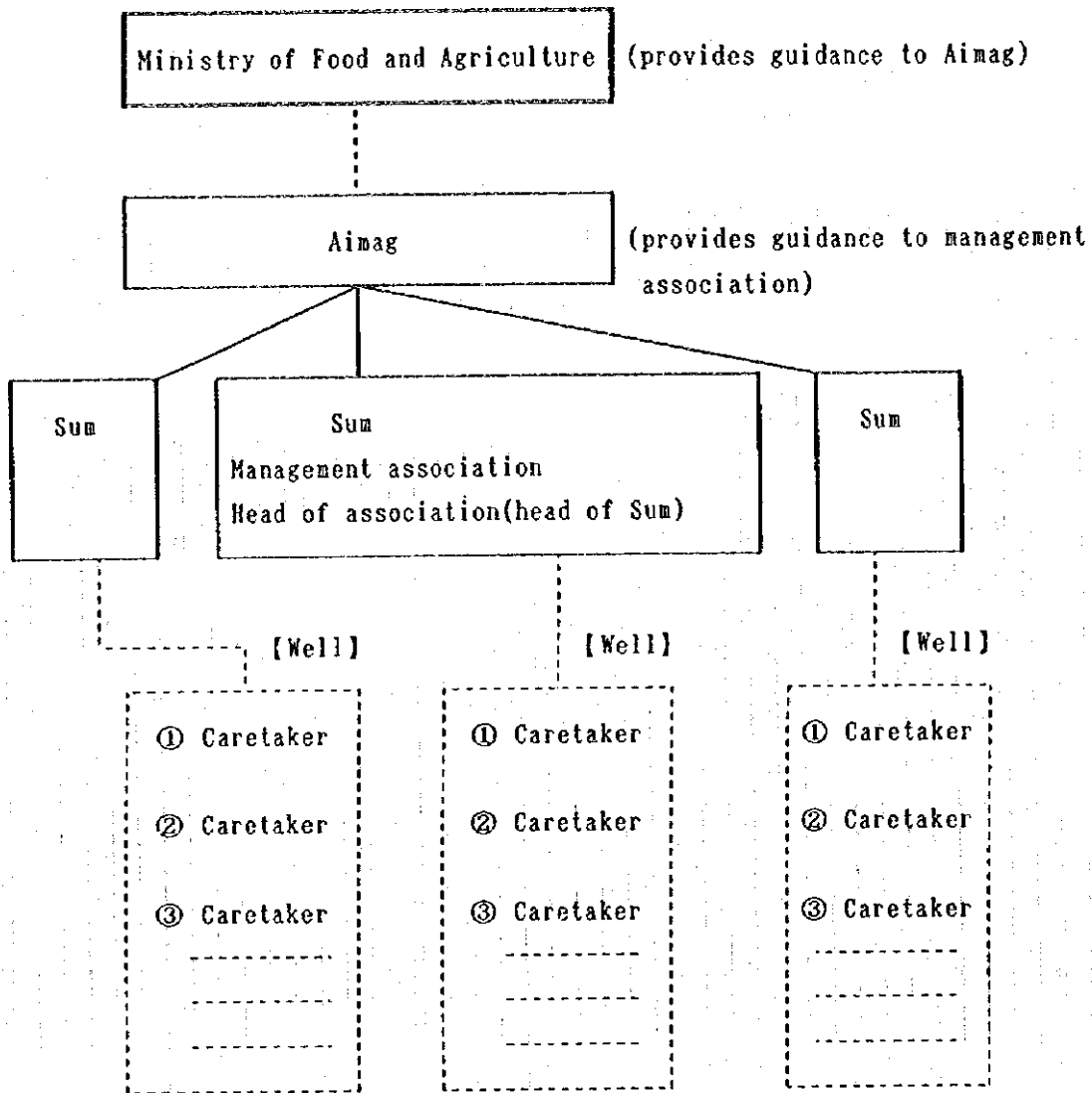
Figure 5.1.1 Irrigation Facilities Maintenance/Management System



5.2 Facilities to Supply Water in Nomadic Herding Regions

As shown in Figure 5.2.1, the maintenance and management of water-supply facilities for nomad areas will be conducted by a water-supply facility management association, which is to be organized in each Sum under the guidance of the MOFA and Aimag. The head of Sum is required to serve as the head of the association in his Sum, and the association will be established in the Sum government office. The head of each association is required to employ the following staff to run the association. The funds required for operating the association will be covered by dues collected from users of the facilities.

Figure 5.2.1 Association for Maintenance and Management of Water-supply Facilities in nomadic areas



[1] An assistant head of the association, accounting clerks, service engineers for machinery, drivers for a vehicle needed to transport fuels.

[2] Caretakers to be stationed at each well facility

Daily check, maintenance and operation of the pump will be done by the caretaker, but the service engineer will be required to perform important servicing when he patrols the facilities. Supplies and parts needed for minor repair or servicing will be

always kept at the association. Technical guidance for service engineers will be provided by short-term experts dispatched from overseas.

5.3 Rural Roads, Etc.

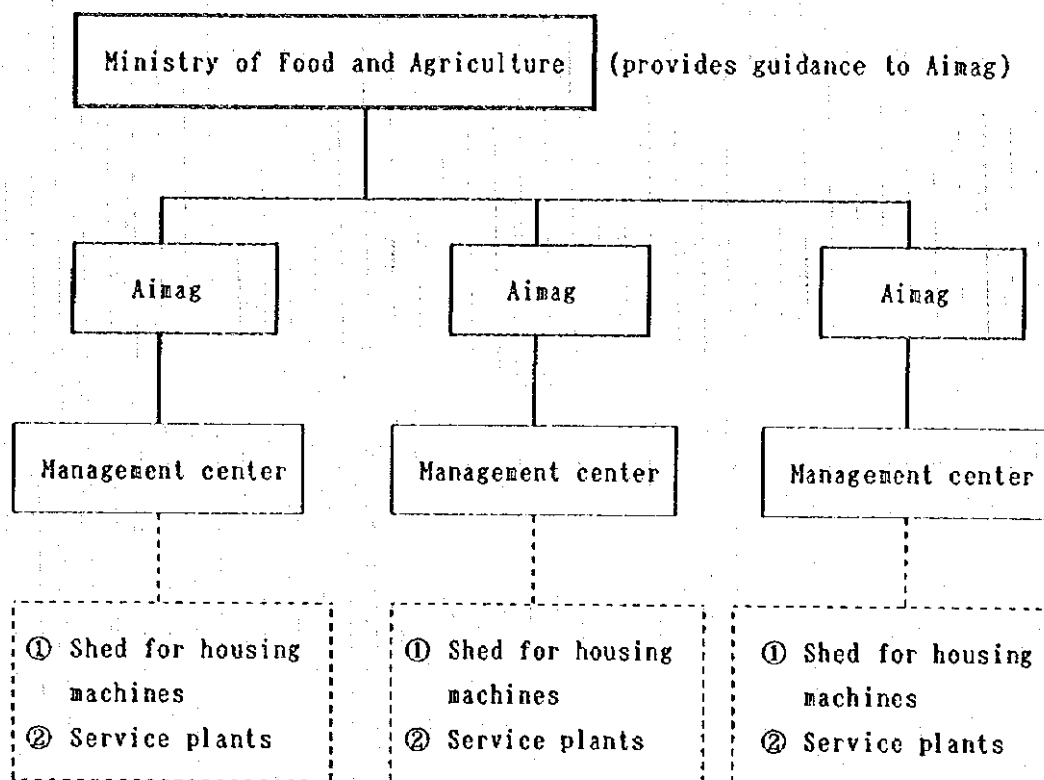
Program for improving system for maintenance and management of farm roads A farm road maintenance and management center will be established in several location in Selenge, Darkhan-uul, Tov, Bulgan, Orkhon and Ovorhangai Aimags, and Ulaanbaatar city to maintain and manage farm roads (see Figure 5.7.1)

The following facilities will be installed at each maintenance and management center.

- [1] Shed for housing machines used for maintenance and management
- [2] Service plant
- [3] Machines for maintenance and management
- [4] Road patrol vehicles and vehicles for transporting the machines.

Service plants will have capability of servicing agricultural machines.

Figure 5.3.1 Organizational chart of Farm Road Maintenance and Management Center



Chapter Six Priority Programs and Projects

6.1 Priority Programs and Projects

The following is an outline of seven priority projects that must be completed quickly in order to contribute to the development of agriculture and rural area in the Study Area by the year 2010.

1. Seed Multiplication and Provision Project
(1) Details: Financial Assistance ([1] Provision of seed propagation nurseries, [2] Improvement of laboratory facilities [3] Construction of facilities, [4] Introduction of equipment, machinery, etc.) Technical Assistance ([1] Dispatch of experts, [2] Overseas training of trainees)
(2) Implementing Organization: Plant Science and Agricultural Research Institute (PSARI)
(3) Responsible Ministry: MOFA and MSE
(4) Beneficiaries: Plant Science and Agricultural Research Institute and Cultivators.
(5) Approximate Project Costs: U.S. \$12,800,000
(6) Project Evaluation: FIRR = 11%, EIRR = 13%
2. Irrigated Agriculture Technology Development Project
(1) Details: Financial Assistance ([1] Construction of a technology center, [2] Development of a trial field, [3] Introduction of machinery, etc.) Technical Assistance ([1] Dispatch of experts, [2] Overseas training of trainees)
(2) Implementing Organization: Crops, Machinery and Irrigation Department
(3) Responsible Ministry: MOFA and MSE
(4) Beneficiaries: Cultivators practicing irrigated agriculture (About 1,000 households in the Study Area)
(5) Approximate Project Costs: U.S. \$2,100,000
(6) Project Evaluation: FIRR = 13%, EIRR 16%
3. RIAH Technology Development Project
(1) Details: Financial Assistance ([1] Provision of barns [2] Provision of testing and processing facilities, [3] Introduction of Machinery, etc.) Technical Assistance ([1] Dispatch of experts, [2] Overseas training of trainees)
(2) Implementing Organization: Research Institute of Animal Husbandry (RIAH)
(3) Responsible Ministries: MOFA and MSE
(4) Beneficiaries: RIAH, university students specializing in animal husbandry, animal husbandry specialists, farmers practicing intensive livestock raising.
(5) Approximate Project Costs: U.S. \$5,100,000
(6) Project Evaluation: FIRR = 3%, EIRR = 25%
4. Herder's Water Supply Improvement Project
(1) Details: Financial Assistance ([1] Water resource survey, [2] Construction and improvement of wells, [3] Construction of water supply facilities, [4] Introduction of machinery, etc., [5] Reorganization of maintenance associations) Technical Assistance ([1] Short-term dispatch of experts, [2] Overseas training of trainees)
(2) Implementing Organization: Ovornhangai Aimag
(3) Responsible Ministry: MOFA
(4) Beneficiaries: Nomadic herdsmen in Tugrug Sum, Guchin-us Sum, and Bogd Sum
(5) Approximate Project Costs: U.S. \$17,100,000
(6) Project Evaluation: EIRR = 5%
5. Milk Production Increasing Project
(1) Details: Financial Assistance ([1] Provision of central dairy farms, [2] Provision of milk collection and shipping facilities, [3] Establishment of a milk producers association) Technical Assistance ([1] Dispatch of experts, [2] Overseas training of trainees)
(2) Implementing Organization: Milk Producers Association
(3) Responsible Ministry: MOFA
(4) Beneficiaries: Dairy farms which will be members of the milk producers association
(5) Approximate Project Costs: U.S. \$12,500,000
(6) Project Evaluation: FIRR = (12%), EIRR = 8%
6. Agricultural Information System Improvement Project
(1) Details: Financial Assistance ([1] Wireless communication facilities, [2] introduction of machinery, etc.) Technical Assistance ([1] Dispatch of experts, [2] Overseas training of trainees)
(2) Implementing Organization: MOFA, Six Aimags and one city
(3) Responsible Ministry: MOFA
(4) Beneficiaries: Corporate farms and nomads
(5) Approximate Project Costs: U.S. \$1,200,000
7. Veterinary Research Institute Technology Development Project
(1) Details: Financial Assistance ([1] Improvement of institution, [2] introduction of machinery, etc.) Technical Assistance ([1] Short term dispatch of experts, [2] Overseas training of trainees)
(2) Implementing Organization: Veterinary Research Institute
(3) Responsible Ministries: MOFA and MSE
(4) Beneficiaries: Veterinary Research Institute, university students specializing in animal veterinary, animal veterinary specialists, and stock farmers

Note: None of these projects will harm the environment.

6.1.1 Seed Multiplication and Provision Project

1) Background

The switch to a market economy in Mongolia has been followed by an abrupt decline in the level of service provided by organizations that produce and supply seeds to wheat and vegetable producers. This means that the country's farmers are now highly dependent on imported seeds and seedlings. These problems have created a shortage of seeds, thereby pushing up seed prices and making it difficult for farmers to obtain the seeds they require. The deterioration of plant varieties caused by the continuous use of seeds produced on their own farms has contributed to declining yields and an increase in idle land. This has been a major cause of the decline in agricultural production in Mongolia.

2) Objectives and Effects

In order to improve the functioning of the research institute that exercises overall control over the improvement, propagation, and distribution of seeds and seedlings for the entire country, seed and seedling production control facilities need to be expanded and upgraded and their control and distribution functions enhanced. A seed supply system will be established by propagating and exercising appropriate control of wheat and vegetable seeds by nurturing superior high quality seeds. In addition the quantities supplied and their prices need to be stabilized through improvements to seed production technology so as to quickly restore the productivity of crop farming as well as to conserve foreign currency by reducing the amount of imported seeds.

3) Positioning in the Master Plan

Seeds are the basic material required for the cultivation of crops, and good quality seeds are essential for good agricultural productivity. This plan to increase superior seed production and provide a stable supply of seeds has been positioned as a priority issue in the Master Plan.

4) Details of the Project

Financial assistance for the following activities.

[1] The development of seed propagation nurseries: Rehabilitation of irrigation facilities (wheat seed production nurseries: 200 hectares, vegetable seed production nurseries: 45 hectares, water intake equipment, channels, pumps, etc.)

[2] Reinforcement of laboratory equipment.

[3] Buildings: Hothouses, isolation chambers, seed storage facilities, seed selection facilities, offices (including the Seed and Seedling Control Center), etc.

[4] Machinery: Seed selector, agricultural machinery, operating equipment, transportation carts, etc.

[5] Others: Engineering services

In order to increase the effectiveness of the financial assistance to be provided under this Plan, the following assistance will be arranged to enhance research capabilities.

[1] Dispatching of experts (long-term and short-term)

[2] Overseas training of researchers.

5) Project Implementation Organization

(1) Implementation Body

The key organization will be Plant Science and Agricultural Research Institute (PSARI).

The Seed and Seedling Control Center (tentative name) will be established within the PSARI to implement the project.

(2) Responsible Ministry

MOFA , MSE

6) Beneficiaries

(1) Direct Beneficiaries

Plant Science and Agriculture Research Institute

(2) Indirect Beneficiaries

[1] Crop farmers: 30,000 households

[2] Seed production farmers: 25 farms(13,000 ha)

[3] Flour mills & bakeries: Stable procurement of raw materials

[4] Consumers of flour and flour products: cheap and stable consumption of high quality products (3,000,000 people)

7) Implementation Schedule

(1) Basic Design: 1996

(2) Facilities and Equipment (Financial Assistance: 1997 to 1998 (2 years)

(3) Technical Assistance: From 1997 to 2001(5 years)

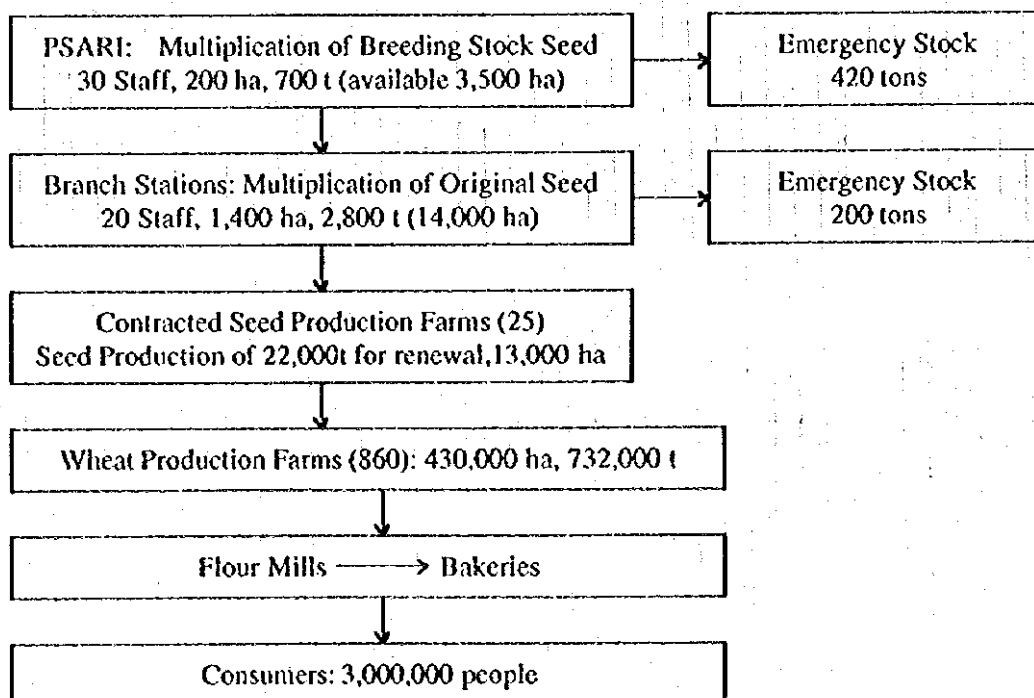
8) Project Cost

Project costs will include construction costs, engineering service costs, material preparation costs, and price preparation costs. The approximate costs are estimated at approximately U.S. \$12.8 million (approx. Tg 5.9 billion) as shown in Table 6.1.1.1.

Table 6.1.1.1 Seed Multiplication Improvement Project Costs

Items	Local Currency	Foreign Currency	Total	Remarks
Construction Costs				
Building/Facilities (1000Tg) (US\$)	2,085,100 4,532,800	706,200 1,535,200	2,791,300 6,068,000	①
Farmland/Irrigation (1000Tg) (US\$)	308,000 669,500	701,700 1,52,5500	1,009,700 2,195,000	②
Equipment/Machinery (1000Tg) (US\$)		479,000	479,000 1,041,300	③
Total Construction Costs (1000Tg) (US\$)	2,393,100 5,202,300	1,041,300	4,280,000 9,304,300	④=①+②+③
Engineering Service (1000Tg) (US\$)		1,886,900 4,102,000	594,100 1,291,500	⑤=(①+②)× 15% +③× 5%
Physical Contingency (1000Tg) (US\$)	239,300 52,020	248,100 539,400	487,400 1,059,600	⑥=(④+⑤) × 10%
Price Contingency (1000Tg) (US\$)	263,200 572,200	272,900 593,300	536,100 1,165,500	⑦=(④+⑤+⑥) × 10%
Total Project Costs (1000Tg) (US\$)	2,895,600 6,294,700	3,002,000 6,526,200	5,897,600 12,820,900	⑧=④+⑤+⑥+⑦

[Reference] Example of Wheat Seed Multiplication Beneficiaries



9) Project Evaluation

(1) Financial Analysis

The financial analysis calculated and assessed the Financial Internal Rate of Return (FIRR) based on market prices for the PSARI and the seed propagation nurseries which are to be established through this project.

Income from the project will be treated as income from the sale of products, and will be appropriated as income beginning in the second year of the project. Funds invested in the project will be treated as public investment and deducted from investment expenses, but the depreciation costs of facilities and machinery will be treated as renewed reserves, and appropriated from the first year of the project as annual investment costs. Project costs, personnel expenses, testing machinery, as well as education and training equipment replenishment expenses will be appropriated from the first year of the project as materials input costs for seed production and as operating costs for the seed propagation department.

As the table indicates, the result of the calculation yields an FIRR of 11%, and the seed propagation department alone will obtain net profits of approximately U.S. \$26,000 per year after the plan has been fully implemented.

(2) Economic Analysis

An economic analysis was carried out in which the Economic Internal Rate of Return (EIRR) was calculated and assessed based on economic prices in order to evaluate the effectiveness of the project investment. Economic prices was calculated using a conversion coefficient for the domestic currency portion and the labor force.

Project profits include the net profits earned by the seed propagation department and the ripple effects of implementing the project. The ripple effects will be felt in every farming household cultivating vegetables, wheat, and white potatoes in the central region. It is estimated that five years after the project commences, improved seeds will begin to result in increased yields. It is also estimated that the increase in profits generated by the ripple effect will result in an increase of 20% in the gap between present income and the projected profitability of the cultivation of vegetables, wheat, and white potatoes. The increase in profits produced by this project in the year 2010 is forecast to amount to a total of U.S. \$2.6 million: U.S. \$1.7 million for wheat, U.S. \$700,000 for vegetables, and U.S. \$200,000 for white potatoes.

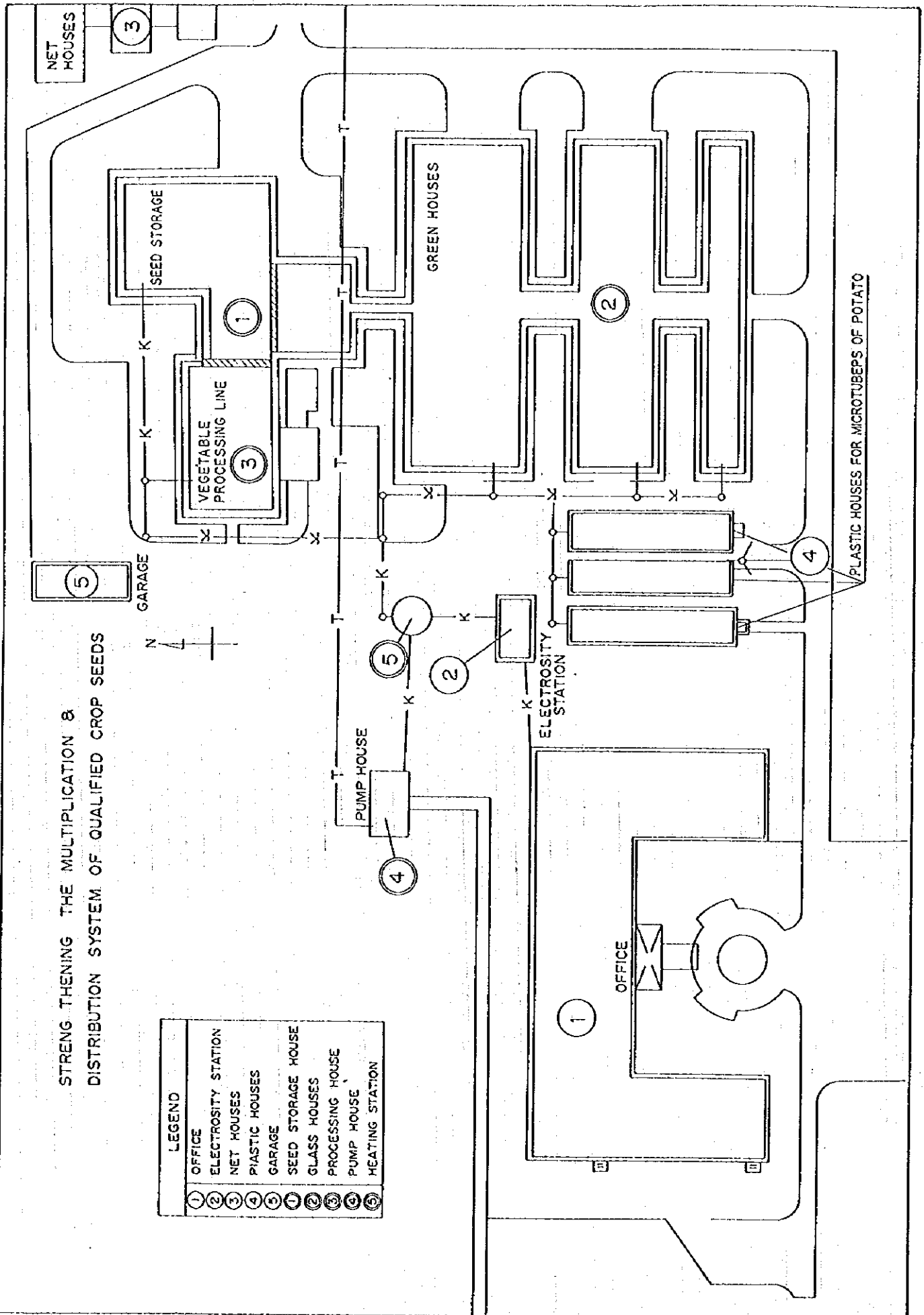
The results of the calculations are presented in Table 6.1.1.2 of the Annex as an EIRR of 13%, demonstrating that this project is highly feasible.

Seed Multiplication and Improvement Project

Improvement/Facility		Quantity	Description, Etc.
Buildings	Wheat Storage Barns	1	Brick
	Seedling Storage	2	Root crops storage: 240 m ² , Original seed storage: 340 m ²
	Greenhouses	9	Glass greenhouse: 450 m ² , Vinyl greenhouse: 400 m ² , Net greenhouse: 340 m ²
	Seed Selection and Work Shop Buildings	1	Seed storage case, 2 sets of selectors, 1 set of sterilization equipment and packing.
	Offices	1	100 m ²
Land to be Developed	Testing and Research Nurseries	1	Trunk water channel (3.2km), etc.
	Sprinkler Irrigation Facility	1	2 pumping stations (4 sets of pumps), piping (1,620 meters), sprinkler system.
Machinery	Tractors	1	Including attachments
	Harvesters	1	
	Control Machinery	5	2 small tractors (12HP), 2 sprayers, and 1 fork lift.
	Vehicles	3	Land cruiser, and one 2-ton truck and one 4-ton truck.
Testing and Research Equipment	Testing Equipment	1 set	Clean bench, culturing unit, ultracentrifuge, spectrophotometer, etc.
	Educational and Training Equipment	1 set	Personal computers, video equipment, etc.
	Laboratory Office Equipment	1 set	Desks, chairs, lockers, etc.

STRENGTHENING THE MULTIPLICATION & DISTRIBUTION SYSTEM OF QUALIFIED CROP SEEDS

LEGEND	
①	OFFICE
②	ELECTROSTATION
③	NET HOUSES
④	PLASTIC HOUSES
⑤	GARAGE
①	SEED STORAGE HOUSE
②	GLASS HOUSES
③	PROCESSING HOUSE
④	PUMP HOUSE
⑤	HEATING STATION



PDM (Seed Multiplication Technology Development Project)

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
<p>(Ultimate Goals) Increase the productivity of the crop growers and provide for a stable supply of food.</p>	<p>Effects after a specified period of time has elapsed once assistance has been provided. 1) Changes in seed and seedling production. 2) Changes in new varieties introduced and the number of varieties maintained.</p>	<p>Post-project assessments by dispatching survey teams</p>	<p>1) No change in MOFA policies. 2) The supply of production materials and testing equipment and materials is stable. 3) The tastes of the domestic consumers do not change. 4) A stable market economy is maintained.</p>
<p>(Project Goals) 1) Development of technology breeding new varieties. 2) Development of seed preservation and breeder's stock seed multiplication technology. 3) Development of cultivation management technology. 4) Training of breeding development technicians. 5) Training of cultivation seed multiplication farmers.</p>	<p>Effects after a specified period of time has elapsed once assistance has been provided. 1) Preparation of manuals on breeding and multiplication technology 2) Changes in improved varieties. 3) Preparation of manuals on cultivation management technology. 4) Changes in breeding development technicians. 5) Changes in planned area of seed multiplication farmers.</p>	<p>Post-project assessments by dispatching survey teams</p>	<p>1) No change in MOFA policies. 2) Sufficient financial support is provided to the project by the government. 3) The research staff does not change, and it is possible to obtain a stable supply of workers at the site.</p>
<p>(Effects of the Project) 1) Breeding technology is established, and manuals are prepared. 2) Seed preservation and breeder's stock seed multiplication technology are established. 3) Cultivation technology for new crops is established and manuals are prepared. 4) The number of breeder development technicians increases. 5) The number of seed multiplication farmers increases and cultivation technology is adopted by farmer.</p>	<p>1) Details of breeding technology. 2) Details of seed preservation and multiplication technology. 3) Details of cultivation control technology. 4) Number of specialists and engineers trained.</p>	<p>1) Final report on the project. 2) Post-project assessments by Post-project assessments by dispatching survey teams</p>	<p>1) No change in MOFA policies. 2) Sufficient financial support is provided to the project by the government. 3) The research staff does not change, and it is possible to obtain a stable supply of workers at the site.</p>
<p>(Project Activities) 1) Development of breeding technology. (1) Field testing and research at the center. (2) Trials and data collecting and analysis in the test field. (3) Preparation of manuals. 2) Preservation of seeds and breeder's stock seed multiplication technology development. (1) Testing and research at the storage facilities. (2) Testing and research on biotechnology and multiplication technology. 3) Development of crop cultivation technology. (1) Testing and research at open and protected fields. (2) Testing of the practical application of developed technology and the collecting of data. (3) Preparation of manuals. 4) Training of breeding specialists and engineers. (1) Training of specialists and engineers.</p>	<p>(Inputs) Donor Countries 1) Rehabilitation of PSARI 2) Introduction of agricultural machinery and testing equipment 3) Provision of the test field 4) Long-term dispatch of experts (in breeding, soil etc.) 5) Acceptance of counterparts agronomy Mongolia 1) Provision of a project manager and counterpart personnel 2) Provision of land required for project (center, test field) 3) Implementation of part of the related construction work 4) Establishment of the Project Promotion Committee</p>	<p>1) A suitable project manager and counterpart personnel are provided. 2) The Mongolian government introduces supporting budgetary measures. 3) The needed input materials can be obtained. 4) Production and distribution systems are strengthened.</p>	<p>(Prerequisite Conditions) 1) The Government of Mongolia provides funds and personnel required for the project. 2) Land is provided for test fields in the PSARI. 3) The Project PROMOTION Committee carries out necessary coordination work.</p>

6.1.2 Irrigated Agriculture Technology Development Project

1) Background

Recently, with the increasing diversification of diet, particularly among city dwellers, there has been a noted increase in the consumption of vegetables and fruits rather than the traditional diet of meat. Also, a national policy has been adopted to improve the rate of self-sufficiency in sugar and vegetable oil, which presently depend entirely on imports, and the cultivation and expansion of sugar beet and oil crops are urgently required. However, with an average precipitation of about 200 mm, irrigation is indispensable for such crop cultivation. Conventional irrigation using large machines has been designed mainly for wheat, barley, and feed crops, but irrigation technology for the desired crops have not yet been developed, and irrigation and cultivation technology adopted to Mongolian weather and soil condition must be established urgently. It is also urgently necessary to disseminate the developed irrigation and cultivation technology to the individual farmers through training national and Aimag officials.

2) Objectives and effects

A five-year project will be conducted to install an Irrigation Technology Development Centre in the Gachuurt area along the River Tuul in the suburbs of Ulaanbaatar. This project will mainly consist of (1) collection and analysis of necessary basic data for the development of irrigation technology, (2) development of optimum irrigation and cultivation technology for Mongolia, and (3) domestic dissemination of the developed technology. The project aims at improving the rate of self-sufficiency in farm products, particularly vegetables, sugar and vegetable oils, and thus helping improvement of the international balance of payments.

3) Positioning in the Master Plan

The Master Plan places emphasis on the expansion of the production of vegetables which are in high demand among the population and the expansion of production of vegetable oils and sugar which the country currently must import in large quantities, by strengthening the production infrastructure and by developing new cultivation technologies.

4) Details of the Project

(1) Details of the Project

Financial and technological assistance will be provided for the following projects.

[1] Provision of Facilities: Construction of a technology center (main building, trainee dormitory, garage, storage building, machinery repair shop), provision of a trial garden.

[2] Introduction of Machinery, etc.: Tractors and other farm equipment, testing and research equipment, educational and training equipment, vehicles.

[3] Dispatching of Experts: Cultivation (cultivation, soil, fertilizers), irrigation (irrigation, irrigation facility design), etc.

[4] Overseas Training of Research Personnel:

(2) Relationship with Other Aid

The FAO/ADB is planning an irrigation system rehabilitation project, but its principal goal is the improvement of existing irrigation facilities whose functions have deteriorated. The FAO/ADB plan is not directly related to this project.

5) Project Implementation Organization

(1) Implementing Body

Crop, Machinery and Irrigation Department

(2) Responsible Ministry

MOFA

6) Beneficiaries

(1) Direct Beneficiaries

[1] MOFA (Irrigation Techniques Development Center): 100 technical staff

[2] 270 Local government technical instructors

[3] 1,000 Farm instruction managers and technicians

(2) Indirect Beneficiaries

[1] Irrigated vegetable farms: 10,000 Farmers, 25,000 ha

[2] Consumers of fresh food products in major urban areas; 1,590,000 people

7) Implementation Schedule

(1) Basic Design: 1996

(2) Facilities and Equipment (Financial Assistance): 1997 to 1998 (2 years)

(3) Technical Assistance: 1998 to 2002 (5 years)

8) Project Cost

The estimated project cost is approximately U.S. \$2.1 million (approx. Tg 950 million) as shown in Table 6.1.2.1.

Table 6.1.2.1 Irrigation Agriculture Technology Development Project Costs

Items		Local Currency	Foreign Currency	Total	Remarks
Construction Costs					
Building/Facilities	(1000Tg)	278,800	94,400	373,200	①
	(US\$)	606,000	205,300	811,300	
Farmland/Irrigation	(1000Tg)	23,100	52,800	75,900	②
	(US\$)	50,300	114,700	165,000	
Pumping System	(1000Tg)	15,700	22,500	38,200	③
	(US\$)	34,100	48,900	83,000	
Equipment/Machinery	(1000Tg)	-	212,400	212,400	④
	(US\$)	-	461,800	461,800	
Total Construction Costs	(1000Tg)	317,600	382,100	699,700	⑤=①+②+③+④
	(US\$)	690,400	830,700	1,521,100	
Engineering Service	(1000Tg)	-	83,700	83,700	⑥=(①+②+③) ×15%+④× 5%
	(US\$)	-	182,000	182,000	
Physical Contingency	(1000Tg)	31,700	46,600	78,300	⑦=(⑤+⑥) ×10%
	(US\$)	69,000	101,300	170,300	
Price Contingency	(1000Tg)	34,900	51,300	82,600	⑧=(⑤+⑥+⑦) ×10%
	(US\$)	75,900	111,400	187,300	
Total Project Costs	(1000Tg)	374,200	563,700	947,900	⑨=⑤+⑥+⑦+⑧
	(US\$)	835,300	1,225,400	2,060,700	

9) Project Assessment

(1) Financial Analysis

A financial analysis was performed in the same way as it was in the case of the Seed Multiplication and Provision Project because the project is to be publicly financed.

The results of the calculations reveal an FIRR of 13%, and the net profit when the project is completed will be approximately U.S. \$7,500.

(2) Economic Analysis

Profits from the project will include the net profits earned by the Irrigation Technology Center and those produced by the ripple effects resulting from the

implementation of the project. The ripple effects will extend to all farming households cultivating wheat and potatoes on irrigated fields in the central region and those cultivating vegetables in the same region. The increase in yields resulting from the wide acceptance and use of irrigation technology is projected to appear five years after commencement of the project. It is also estimated that the increase in profits generated by the ripple effect will result in a 20% increase in the gap between present income and the projected profitability of the cultivation of vegetables as well as irrigated wheat and white potatoes. The increase in profits produced by this project in the year 2010 is forecast to amount to a total of U.S. \$1.2 million: U.S. \$700,000 for vegetables, U.S. \$400,000 for white potatoes and U.S. \$80,000 for wheat.

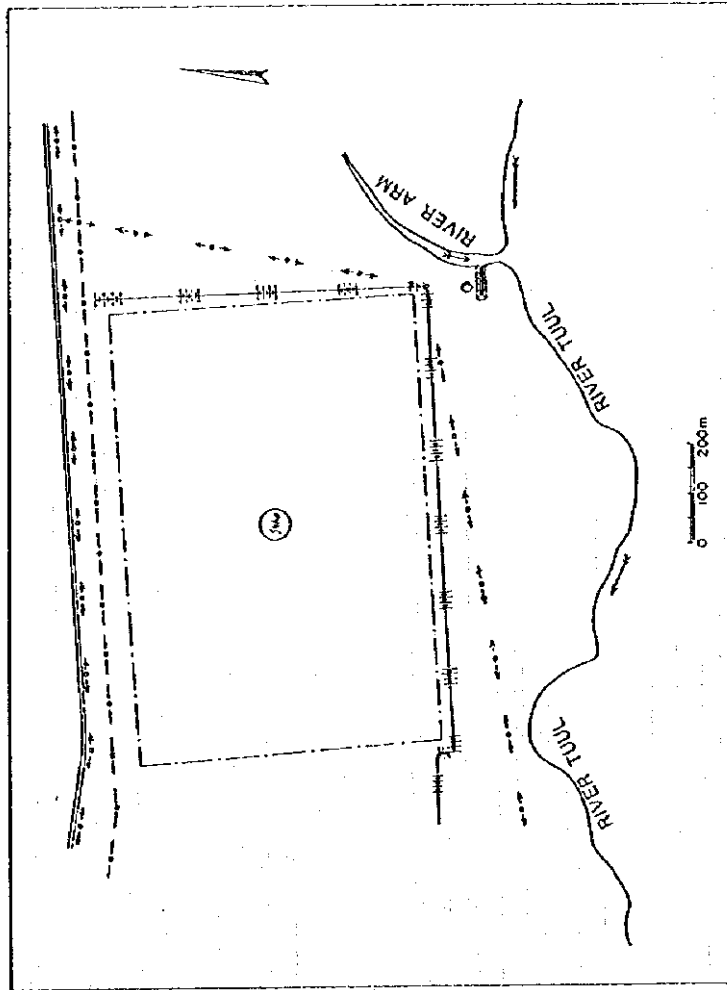
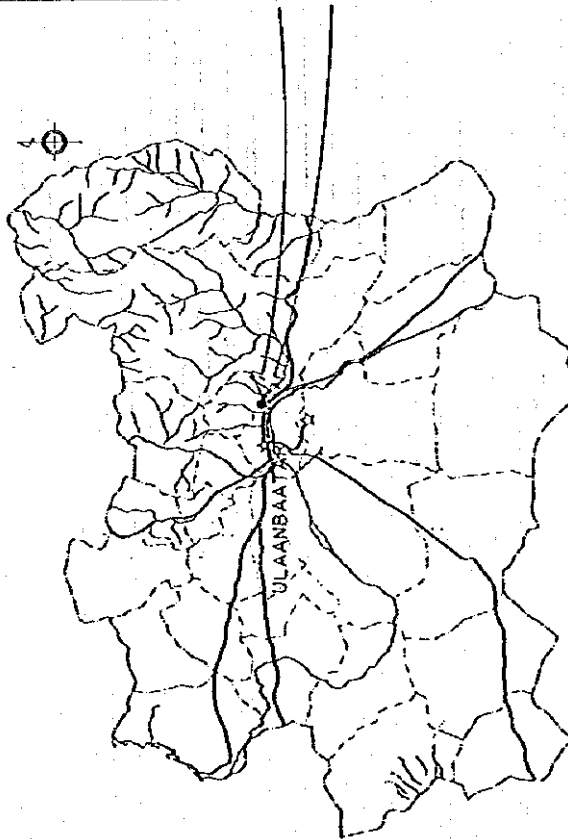
The results of the calculations are presented in Table 6.1.2.2 of the Annex as an EIRR of 16%, demonstrating that this project is highly feasible.

Irrigated Agriculture Technology Development Project

Improvement/Facility		Quantity	Description, Etc.
Buildings	Main Building	1	Three stories (laboratory, training rooms, offices), boiler room 10 rooms for trainees, shower room, dining room Storage and repair of agricultural machinery
	Trainees Dormitory	1	
	Repair Shop	1	
	Garage	1	
	Warehouse	1	
Farmland	Experimental Farmland	1 set	Water intake system and trunk pipeline
	Farmland of Project Center	1 set	Water channel (L = 650 m), sprinkler system
Pumping Facilities	Pumping facilities for the project center	1 set	Shed, pump
Machinery	Agricultural Machinery	1 set	Tractors, trucks, etc.
	Vehicles	2	Jeep type vehicles
	Tools	1 set	Welder, high-speed cutter, sander and drill, etc.
Testing Equipment	Soil quality testing devices	1 set	
	Civil engineering material testing devices	1 set	
Education and Training Equipment		1 set	Video cameras, television sets, OHP, and slide viewers
Office equipment		1 set	Personal computers, office equipment, copiers, etc.

LOCATION MAP OF IRRIGATED AGRICULTURE TECHNOLOGY DEVELOPMENT PROJECT

T O V



LEGEND

- Boundary of irrigated agriculture technology development project
- == Asphalt road
- Power line
- Telephone line
- |||| Flood protection bank (Existing)
- Pump station (Plan)

PDM (Irrigated Agriculture Technology Development Project)

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
<p>(Ultimate Goals)</p> <p>Increase of vegetable productivity and stable provision of vegetables</p> <p>(Project Goals)</p> <ol style="list-style-type: none"> 1) Development of vegetable cultivation technology. 2) Training of agricultural improvement dissemination personnel. 3) Development of irrigation project implementation technology, irrigation facilities maintenance technology, and water management technology. 4) Training of irrigation engineers. 	<p>Effects after a specified period of time has elapsed once assistance has been provided.</p> <p>Changes in vegetable production.</p> <p>Effects after a specified period of time has elapsed once assistance has been provided.</p> <ol style="list-style-type: none"> 1) Preparation of manuals on vegetable cultivation technology. 2) Changes in the number of agricultural improvement dissemination personnel. 3) Preparation of manuals on irrigation project implementation technology. 4) Changes in the number of irrigation engineers. 	<p>Post-project assessments obtained by dispatching survey teams</p> <p>Post-project assessments obtained by dispatching survey teams</p>	<ol style="list-style-type: none"> 1) No change in MOFA policies. 2) The supply of production materials is stable. 3) A stable market economy is maintained. 1) No change in MOFA policies. 2) The government provides sufficient financial support to the project. 3) Counterpart personnel do not change.
<p>(Fruits of the Project)</p> <ol style="list-style-type: none"> 1) Vegetable cultivation technology is established, and manuals are prepared. 2) The number of agricultural improvement dissemination personnel increases. 3) Irrigation project implementation technology, irrigation facilities maintenance technology, and water management technology are established, and manuals are prepared. 4) The number of irrigation engineers increases. <p>(Project Activities)</p> <ol style="list-style-type: none"> 1) Development of vegetable cultivation technology (1) Testing and research at a field in the Center. (2) Testing and data gathering and analysis of the data at a trial field. (3) Preparation of manuals 2) Training of agricultural improvement dissemination personnel. (1) Preparation of a dissemination personnel training plan. (2) Training of dissemination personnel. 3) Development of irrigation project implementation technology, etc. (1) Gathering and analysis of data. (2) Preparation of manuals. (3) Application of the developed technology in a trial field. 4) Training of irrigation engineers (1) Training of engineers. 	<ol style="list-style-type: none"> 1) Details of vegetable cultivation technology. 2) Details of irrigation project implementation technology. 3) Training result. 	<ol style="list-style-type: none"> 1) Final report on the project. 2) Post-project assessments obtained by dispatching survey teams. 	<ol style="list-style-type: none"> 1) No change in MOFA policies. 2) The government provides sufficient financial support to the project. 3) Counterpart personnel do not change.
<p>(Inputs)</p> <p>Donor Countries</p> <ol style="list-style-type: none"> 1) Construction of the Irrigated Agriculture Technology Improvement Center 2) Provision of agricultural machinery and testing equipment 3) Construction of the trial field 4) Long-term dispatch of experts (in cultivation, soil, irrigation, irrigation facilities, etc.) 5) Acceptance of trainees from counterpart organizations <p>Mongolia</p> <ol style="list-style-type: none"> 1) Provision of a project manager and counterpart personnel 2) Provision of project land (center, trial field) 3) Implementation of part of the related construction work 4) Establishment of the Project Promotion Committee 	<p>Effects after a specified period of time has elapsed once assistance has been provided.</p> <p>Changes in vegetable production.</p> <p>Effects after a specified period of time has elapsed once assistance has been provided.</p> <ol style="list-style-type: none"> 1) Preparation of manuals on vegetable cultivation technology. 2) Changes in the number of agricultural improvement dissemination personnel. 3) Preparation of manuals on irrigation project implementation technology. 4) Changes in the number of irrigation engineers. 	<p>Post-project assessments obtained by dispatching survey teams</p> <p>Post-project assessments obtained by dispatching survey teams</p>	<ol style="list-style-type: none"> 1) A suitable project manager and counterpart personnel are provided. 2) The Mongolian government introduces supporting budgetary measures. 3) The needed input materials can be obtained. 4) Related construction work is correctly implemented. <p>(Prerequisite Conditions)</p> <ol style="list-style-type: none"> 1) The Government of Mongolia provides funds and personnel required for the project. 2) Land is provided for the project center. 3) The Project Promotion Committee carries out necessary coordination work.

6.1.3 RIAH Technology Development Project

1) Background

The transition to a market economy in Mongolia has affected various sectors of the animal husbandry industry in differing ways. The privatization of the ownership of animals went relatively smoothly in the traditional nomadic herding sector, but the profitability of many of the large dairy farms, pig farms, and poultry farms fell, forcing them to curtail their operations. One reason for this has been a shortage of both accumulated technology and specialists in this field, a result of the short history of this type of intensive animal husbandry in Mongolia. Furthermore, the RIAH which is a center of animal husbandry technology development, does not have the testing and research facilities needed to develop intensive animal husbandry technology and train experts.

However, the provision of a stable supply of milk, eggs, and other animal products to city residents is an important task for the livestock industry sector, and it will be necessary to promote intensive animal husbandry to fulfill this task provide this service. For these reasons, there is an urgent need for both the establishment of technological systems suited to the natural conditions of Mongolia for the use of dairy, pig and poultry companies and farms specializing in fattening beef cattle, and for measures to train experts in these technologies.

2) Objectives and Effects

Testing and research facilities to support the development of dairy farms, pig and poultry raising, and beef cattle fattening technology will be provided at the farm operated by the RIAH. In addition, technological systems needed for intensive animal husbandry adapted to the natural conditions characteristic of Mongolia will be established, and experts in this field will be trained by providing specialized technical education to students of the National University of Agriculture as well as to college staff members responsible for technical guidance and the dissemination of new technology.

This project is an effective blending of financial assistance with the improvements at the farm facilities at the RIAH and technological assistance needed to establish animal husbandry technology and help train experts in the field. The project also aims to make a significant contribution to the development of intensive animal husbandry in Mongolia.

3) Positioning in the Master Plan

The Master Plan places top priority on the provision of a stable supply of livestock products by expanding dairy farming and other forms of intensive animal husbandry and the development of technology and training of experts to support this expansion, as well as provides measures to achieve these objectives. The most important and urgent of these measures is the improvement of the testing and research capabilities of the RIAH, the organization which plays a leading role in this field in Mongolia.

4) Details of the Project

(1) Details of the Project

Financial and technological assistance will be provided for the following projects.

[1] Provision of Facilities: Facilities for a herd of 20 head of dairy cows, a herd of 30 sows, an egg farm with 1,500 laying hens, and fattening facilities for 50 head of beef cattle, plus facilities for testing and processing livestock products.

[2] Introduction of Machinery, etc.: Testing and research equipment, educational and training equipment, livestock product testing and processing machinery, farm equipment, vehicles, and breeding livestock.

[3] Dispatch of Experts: Animal feeding and management (dairy and beef cattle, pigs, poultry), feed production, livestock product processing, etc.

[4] Overseas Training of Trainees

(2) Relationship with Other Aid

The FAO is carrying out a domestic animal genetic resource preservation project at the AI center with technical assistance from the RIAH. The FAO project, intended to improve frozen semen production technology and preserve the genetic resources of the native breeds of livestock raised in Mongolia, is not directly related to this project under the Master Plan.

5) Project Implementation Organization

(1) Implementing Body

RIAH

The present staff of the RIAH includes 186 persons: 82 research personnel, 15 instructors, along with technicians and office staff. It has plenty of researchers and instructors and is well organized, so it will have no problem implementing the

technical assistance side of the project. The government will have to provide priority funding for the project once technical assistance commences.

(2) Responsible Ministry

MOFA, MSE

6) Beneficiaries

(1) Direct Beneficiaries

RIAH

(2) Indirect Beneficiaries

Students of the National University of Agriculture : 1,000 people

Animal husbandry specialists employed by MOFA, aimags and sums : 2,100 people

Farms involved in intensive animal husbandry : 7,500 households

Consumers in major urban areas : 1,590,000 people

7) Implementation Schedule

(1) Basic Design: 1996

(2) Facilities and Equipment (Financial Assistance): 1997 to 1998 (2 years)

(3) Technical Assistance: 1998 to 2002 (5 years)

8) Project Cost

The approximate project cost is U.S. \$5.1 million (approx. Tg 2.3 billion) as shown in Table 6.1.3.1.

Table 6.1.3.1 RIAH Technology Development Project Costs

Items		Local Currency	Foreign Currency	Total	Remarks
Construction Costs					
Building/Facilities	(1000Tg)	433,400	146,800	580,200	①
	(US\$)	942,100	319,100	1,261,200	
Equipment/Machinery	(1000Tg)	-	1,209,600	1,209,600	②
	(US\$)	-	2,629,600	2,629,600	
Total Construction Costs	(1000Tg)	433,400	1,356,400	1,789,800	③=①+②
	(US\$)	942,100	2,948,700	3,890,800	
Engineering Service	(1000Tg)	-	147,500	147,500	④=①×15% +②×5%
	(US\$)	-	320,700	320,700	
Physical Contingency	(1000Tg)	43,300	150,400	193,700	⑤=(③+④) ×10%
	(US\$)	942,00	326,900	421,100	
Price Contingency	(1000Tg)	47,70	165,400	213,100	⑥=(③+④+⑤) ×10%
	(US\$)	103,600	359,600	463,200	
Total Project Costs	(1000Tg)	524,400	1,819,700	2,344,100	⑦=③+④+⑤+⑥
	(US\$)	1,139,900	3,955,900	5,095,800	

9) Project Assessment

(1) Financial Analysis

The trial calculation of the financial profitability treats it as a publicly financed project. As shown on the table, the results of the calculation indicate a low FIRR of 3%, but a total of U.S. \$5,800 in profits can be earned when the project is completed, and the farm at the RIAH will be sufficiently profitable.

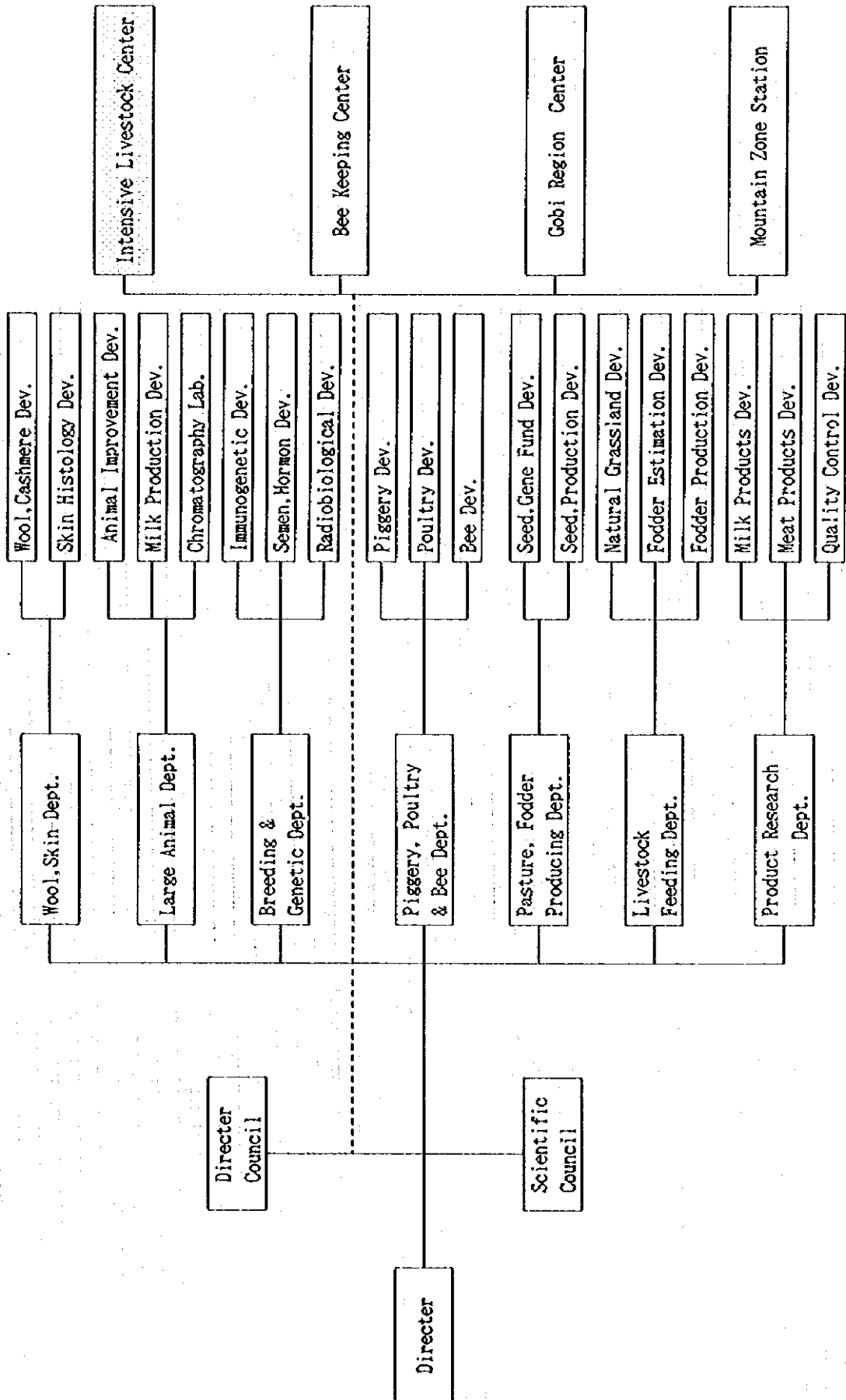
(2) Economic analysis

Profits from the project will include the net profits earned by the farm provided at RIAH and those produced by the ripple effects from the implementation of the project. The increased profitability generated by the ripple effect, in this case the effects of the widespread application of the technology developed by the project, has been forecast to equal 10% of the total profits earned from the production of milk, pork, eggs, and fattened beef cattle in the Study Area. The increase in profits produced by this project is forecast to amount to a total of U.S. \$3 million: \$1.5 million for dairy products, \$800,000 for pork, \$400,000 for beef cattle, and \$300,000 for poultry. The results of the calculations are presented in Table 6.1.3.2 of the Annex as an EIRR of 25%, demonstrating that this project is highly feasible.

RIAR Improvements/Facilities

Improvement/ Facility	Quantity	Description
Buildings		
Farrowing barn	1	486m ² Farrowing/weaning pen, pregnant sow pen, feed storage, boiler room
Fattening barn	1	506m ² Repairs of roof, floor, etc. of existing barn
Hen barn	1	486m ² Chick pen, feed storage, hatchery, egg storage room
Hatching barn	1	488m ² Repairs of existing barn, chick pen, feed storage, etc.
Cow barn	1	375m ² Rearing, calving pen, feed blending room, milk room, etc.
Bunker silo	1	168m ³ Poured on site concrete
Office	1	420m ² Two story, office, computer and document room, private rooms, etc.
Machine store house	1	200m ² Includes parts storage
Compost yard	1	162m ² Includes compost storage
Urine tank	3	210m ³ Poured on site concrete
Fattening barn	1	457m ² Repairs of roof, exterior walls, etc. of existing barn
Paddock	1	Construction of a galvanized fence
Attached facility	1	Water pipes, electric wiring, etc.
Processing facility	1	Insulation of walls and ceilings, reconstruction of partitions
Facilities		
Pumps	1	Deep well pump etc.
Machinery		
Machinery	1	Tractor, harvester, mower, and other fodder production machinery
Jeep	2	4WD
Repair equipment	1	Welder, high-speed cutter, sander-drill, etc.
Equipment		
Pig-raising	1	Pig pen fencing, heaters, feeders, sterilization equipment, etc.
Chicken-raising	1	Cages, heaters, feeders, incubators, etc.
Cow-raising	1	Milking machine, bulk cooler, excreta handling machine
Feed-producing	1	Feed blender, grain grinder, etc.
Testing Equipment		
Testing	1	AI equipment, egg measurement set, etc.
Processing	1	Meat and milk processing equipment
Training Equipment		
Training	1	Video camera equipment, TV set OHP, etc.
Office Equipment		
Office Equipment	1	Copiers, PC, and other office equipment

Organization of Research Institute of Animal Husbandry (RIAH) Plan



Outline of RIAH (Budget and Personnel)

1) Changes of Budget (1992-1995) (Unit : Million Tg)

Section	1992	1993	1994	1995
Min. of Science & Education	168.0	198.0	205.0	215.0
National University of Agriculture	128.0	130.0	156.0	168.3
Animal Husbandry	9.2	9.8	11.5	15.6

Source: RIAH

2) Personnel Organization of National University of Agriculture (1995)

Institution	Total	of which			
		Teachers	Researchers	Technicians	Supports & Others
Animal Husbandry	186	15	82	4	85
Veterinary Science	131	31	50	3	47
Ag. Engineering	71	19	19	10	23
Ag. Economy	75	33	15	2	25
Agronomy & Gen. Education	163	21	-50	10	82
Total	626	119	216	29	262

Source: National University of Agriculture

Target for Education and Training by RIAH

1) Students of National University of Agriculture (1994/95)

Course	I	II	III	IV	V	Total
Animal Husbandry	90	69	35	32	37	263
Veterinary Science	92	28	18	21	13	172
Agronomy	40	28	24	10	15	117
Ag. Engineering	57	40	23	29	17	166
Ag. Economy	127	128	60	-	-	315
Total	406	293	160	92	82	1,033

Source: National University of Agriculture

2) Number of Livestock experts (1994)

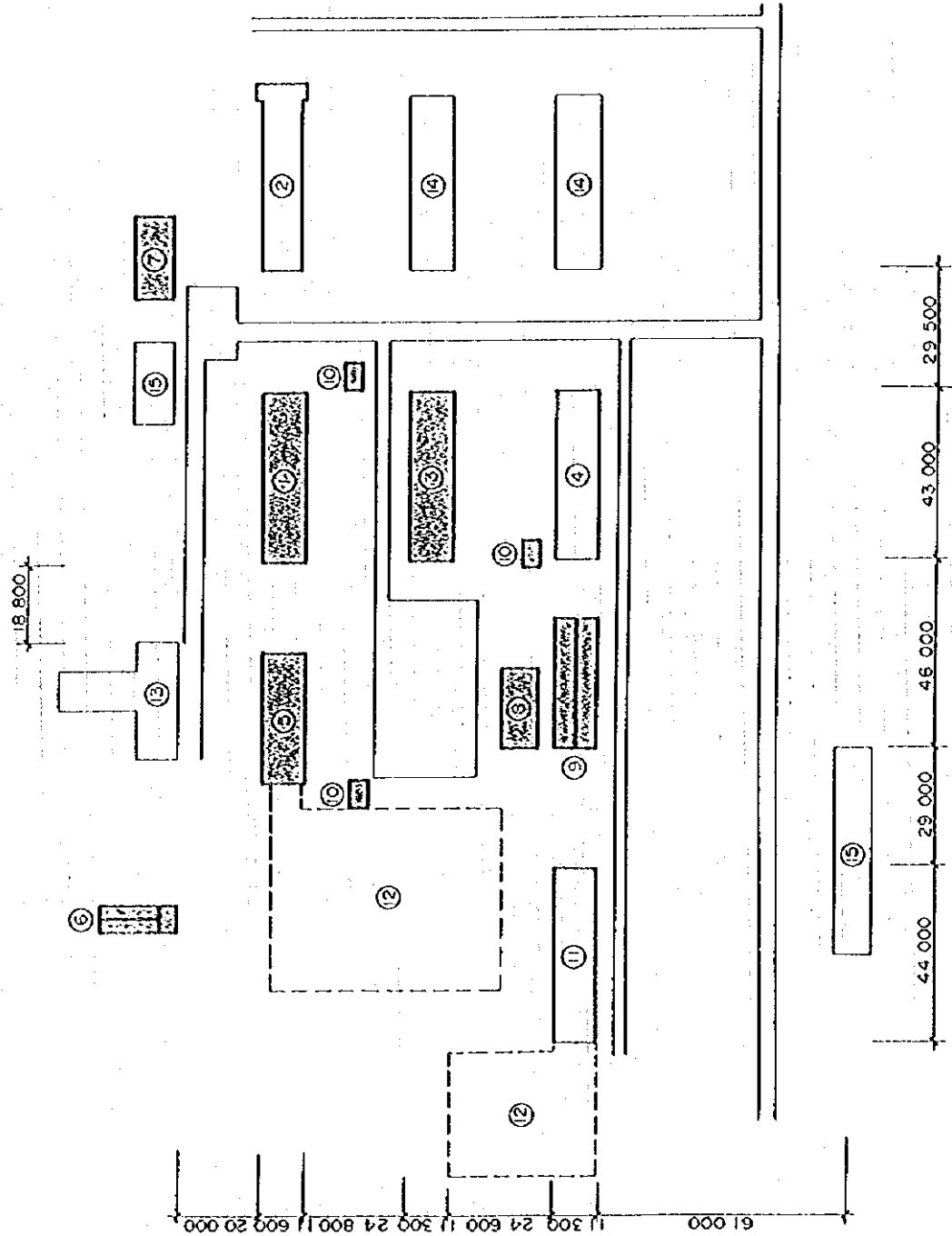
Section	Zootechnician	Veterinarian	Total
National Total	379	1,715	2,094
of Which Study Area	136	482	618

Source: MOFA

Outline of Farming by sector

Section	Dairy	Pig	Poultry	Cattle Fattening	Remarks
Livestock	Cow	20 head	Hen	Fattening	50 head
	Calf	14 "	Hatching		
Livestock	Heifer	16 "	Chick		
	Total	50 "	Total	Total	50 "
Fodder	Forage	14ha		N.grassland	83ha
	A.grassland	14ha			A: Artificial N: Natural
	N.grassland	65ha			
Facility	Cow barn	375m ²	Hen barn	Fattening barn	457m ²
	Bunker silo	168m ²	Hatching barn	Paddock	1
	Compost yard	162m ²			
	Paddock	1			
Main Products	Milk	60 t	Egg	Fattening cattle	95 head
		4 heads	Chick		
Farm business (1,000Tg)					
	Gross income	8,310	19,808	7,100	
Expenditures			16,837	6,600	
	Profit	1,649	2,971	500	
Main roles	①Fodder production tech	①Feeding tech	①Feeding tech	①Feeding tech	①Farm management tech
	②Feeding tech	②Reproduction tech	②Feed processing tech	②Fattening tech	②Products processing tech
	③Compost tech	③Fattening tech	③Chick supply		③Education and training of livestock tech.
	④Heifer supply	④Gilt supply			

RIAH Technology Development Project Layout Plan



No.	Name
1	Pigsty for 30 sows
2	Pig-fattening compartment
3	Hen-coop with 1500 hens
4	Hen-coop with 500 hens
5	20 cow housing
6	Silo trench
7	Office
8	Machine storehouse
9	Fertiliser preparing compartment
10	Liquid collector well
11	Cattle fattening shed
12	Paddock
13	Processing unit
14	Training facility
15	Storehouse

PDM (RIAH Technology Development Project)

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
<p>(Ultimate Goals) Expand production in the animal husbandry area in order to provide the people with a stable supply of good quality animal husbandry products by reducing losses caused by animal communicable diseases.</p>	<p>Effects after a specified period of time has elapsed since the assistance has been provided</p> <ol style="list-style-type: none"> Increase in the number of head of livestock diagnosed as suffering from animal communicable diseases. Decline in losses of livestock caused by communicable diseases. 	<p>Post-project assessments obtained by despatching survey teams</p>	<ol style="list-style-type: none"> No change in MOFA policies. Financial conditions do not deteriorate The people's food tastes do not change The market economy is stable.
<p>(Project Goals) 1) Improvement of animal communicable disease diagnosis technology. 2) Development of animal communicable disease prevention technology. 3) Improvement of the technology used by RIAH researchers.</p>	<p>Effects after a specified period of time has elapsed once assistance has been provided.</p> <ol style="list-style-type: none"> Preparation of manuals on animal communicable disease diagnosis technology. Preparation of manuals on animal communicable disease prevention technology. Successful research and technological development in the animal communicable disease field. 	<p>Post-project assessments obtained by despatching survey teams.</p>	<ol style="list-style-type: none"> Policies of the MOFA do not change. The government provides sufficient financial support to the project. A stable research staff is employed, with few researchers changing jobs.
<p>(Effects of the Project) 1) Improvement of the research and technological development related facilities at the RIAH. 2) Establishment of animal communicable disease diagnosis and prevention technology and the preparation of manuals of this technology. 3) Establishment of animal communicable disease diagnosis and prevention technology and the preparation of manuals of this technology.</p>	<ol style="list-style-type: none"> Details of machinery improved or provided. Details of the animal communicable disease diagnosis technology established. Details of the animal communicable disease prevention technology established. Papers on research and technology development published by researchers. 	<ol style="list-style-type: none"> Final report on the project. Post-project assessments obtained by despatching survey teams. 	<ol style="list-style-type: none"> Policies of the MOFA do not change. The government provides sufficient financial support to the project. A stable research staff is employed, with few researchers changing jobs.
<p>(Project Activities) 1) Preparation of Research and Development Plans Preparation of plans for research and development on animal communicable disease diagnosis and prevention technology. 2) Research and Development of Animal Communicable Disease Diagnosis Technology (1) Testing and research at the RIAH (2) Collection and analysis of data. (3) Preparation of manuals. 3) Research and Development on Animal Communicable Disease Prevention Technology (1) Testing and research at the RIAH. (2) Preparation of manuals.</p>	<p>(Inputs) Donor Countries 1) Contribution of machinery and materials (machinery used for research and technological development) 2) Dispatch of experts (microbiology, pathology, immunology, animal experimentation, etc.) 3) Acceptance of trainees from counterpart organizations.</p> <p>Mongolia 1) Appointment of a project manager and selection of a counterpart. 2) Provision of project facilities and land. 3) Establishment of the Project Promotion Committee</p>		<ol style="list-style-type: none"> Suitable researchers are employed. The Mongolian side enacts the needed budget measures. The necessary research materials can be acquired. A complete animal husbandry hygiene management system is established <p>(Prerequisite Conditions) 1) The Government of Mongolia provides funds and personnel required for the project. 2) The RIAH is provided with the facilities and land it needs for its research and technological development work. 3) The Project Promotion Committee carries out the necessary coordination work.</p>

6.1.4 Herders' Water Supply Improvement Project

1) Background

The water used by the nomadic herders and their livestock in nomadic herding regions includes ground water, river water, and spring water. Not only is rainfall light, but there are few trees to retain the water resources. Therefore the result is that little water flows on the surface so that the use of ground water is widespread. The southern part of Ovorhangai Aimag is particularly dry, with less than 150 mm of precipitation every year and few rivers that can be used as a source of water. The nomads in this area are forced to rely on ground water for both themselves and for their livestock. The wells in this region, which were dug in the early 1970s, have deteriorated, passing the stage where they should be reconstructed, and the machinery at the well-sites frequently breaks down. However, those machinery have been left without maintenance because of the insufficient budget allotted for rehabilitation. As a result, the people and their livestock in this area have been suffering from a shortage of drinking water.

2) Objectives and Effects

In parts of Ovorhangai Aimag suffering from a lack of water resources (Fugrug Sum, Guchin-us Sum, and Bogd Sum), [1] the problem will be clarified with a survey conducted of ground water resources, [2] wells (shallow wells, deep wells) will be installed based on the number of nomadic households and the number of animals cared for by the nomadic population in each area, and [3] a well management system will be set up so wells will be correctly maintained.

These steps will permit the selection of appropriate sites for water supply facilities and guarantee a stable supply of water for the daily use of the nomadic herding households. This, in turn, will permit orderly nomadic herding activities, maintain the size of livestock herds, prevent deterioration of the grasslands by excessive grazing, and help to preserve the natural environment.

3) Positioning in the Master Plan

The Master Plan calls for the appropriate distribution of wells throughout the region in order to use the grasslands efficiently and to improve the lives of the nomadic herders and their families, as well as to meet demands for the early improvement of deteriorated facilities in the southern part of Ovorhangai Aimag where water resources are particularly poor.

4) Details of the Project

(1) Details of the Project

Financial assistance will be provided for the following activities.

- [1] Water Resource Survey: Collection and analysis of existing data, a test drilling survey, the introduction of a mobile survey-use boring machine along with geophysical prospecting equipment.
- [2] Rehabilitation of the Well Equipment: Drilling deep wells, installing deep well pumps, construction of sheds, and installation of wind-powered pumps.
- [3] Digging new Shallow Wells: Digging wells and installing hand-operated pumps.
- [4] Installation of Water Supply Equipment
- [5] Reorganization of Maintenance Associations: Introduction of control vehicles and provision of equipment to be used to repair facilities.
- [6] Short-term Dispatching of Experts: well facility repair and maintenance
- [7] Overseas Training of Trainees

(2) Relationship with Other Aid

An F/S survey financed by Japanese government to rehabilitate wells in Gobi Altai Aimag outside of the Study Area has been begun in response to request from MOFA. This project, one planned to benefit city residents living mainly in the Aimag capital of Gobi Altai Aimag, is quite different from the water facility improvement project directed at nomads in nomadic herding regions. Thus, the two projects do not overlap.

5) Project Implementation Organization

(1) Implementing Body

Ovorhangai Aimag

At this point, there are no organizations. Therefore, by the time the project gets underway, well facility maintenance associations will need to be established in Tugrug Sum, Guchin-us Sum, and Bogd Sum in Ovorhangai Aimag, under the guidance and supervision of the Crop, Machinery and Irrigation Department of the MOFA.

(2) Responsible Ministry

MOFA

6) Beneficiaries

(1) Direct Beneficiaries

2,000 nomadic herding households which have joined the well facility maintenance associations in Tugrug Sum, Guchin-us Sum, and Bogd Sum in Overhangai Aimag.

7) Implementation Schedule

(1) Basic Design: 1996

(2) Project Implementation: 1997 to 1998 (2 years)

8) Project Cost

The approximate project cost is U.S. \$17.1 million (approx. Tg 7.9 billion) as shown in Table 6.1.4.1.

Table 6.1.4.1 Herder's Water Supply Improvement Project Costs

Items	Local Currency	Foreign Currency	Total	Remarks
Construction Costs				
Water Resource Survey (1000Tg)	184,900	1,370,800	1,555,700	①
(US\$)	402,000	2,980,000	3,382,000	
Building/Facilities (1000Tg)	1,645,400	2,358,000	4,003,400	②
(US\$)	3,576,900	5,126,100	8,703,000	
Equipment/Machinery (1000Tg)	-	110,400	110,400	③
(US\$)	-	240,000	240,000	
Total Construction Costs (1000Tg)	1,830,300	3,839,200	5,669,500	④=①+②+③
(US\$)	3,978,900	8,346,100	12,325,000	
Engineering Service (1000Tg)	-	839,400	839,400	⑤=(①+②)×15%
(US\$)	-	1,824,700	1,824,700	+③×5%
Physical Contingency (1000Tg)	183,000	467,900	650,900	⑥=(④+⑤)
(US\$)	397,900	1,017,100	1,415,000	×10%
Price Contingency (1000Tg)	201,300	514,700	716,000	⑦=(④+⑤+⑥)
(US\$)	437,700	1,118,800	1,556,500	×10%
Total Project Costs (1000Tg)	2,214,600	5,661,200	7,875,800	⑧=③+④+⑤+⑥
(US\$)	4,814,500	1,2306,700	17,121,200	

9) Project Assessment

(1) Financial Analysis

The annual maintenance cost of the water supply facilities will total of U.S. \$184,000: U.S. \$44,000 for labor, and about U.S. \$140,000 for fuel. There will be an average of thirteen or fourteen nomadic families using each well, which means that a total of about 2,000 households will use the 151 wells to be provided by the project. When the maintenance cost is divided among these households, the cost to each household comes to about U.S \$90 per year (approx. Tg 41,400 per year). Adding the yearly depreciation expense of about U.S. \$530,000 for the facilities and machinery increases the burden to about U.S. \$350 per year (approx. Tg 161,00 per year). Since this far exceeds the financial resources of the nomadic people, the government must take steps to help cover the cost of maintaining the wells.

(2) Economic Analysis

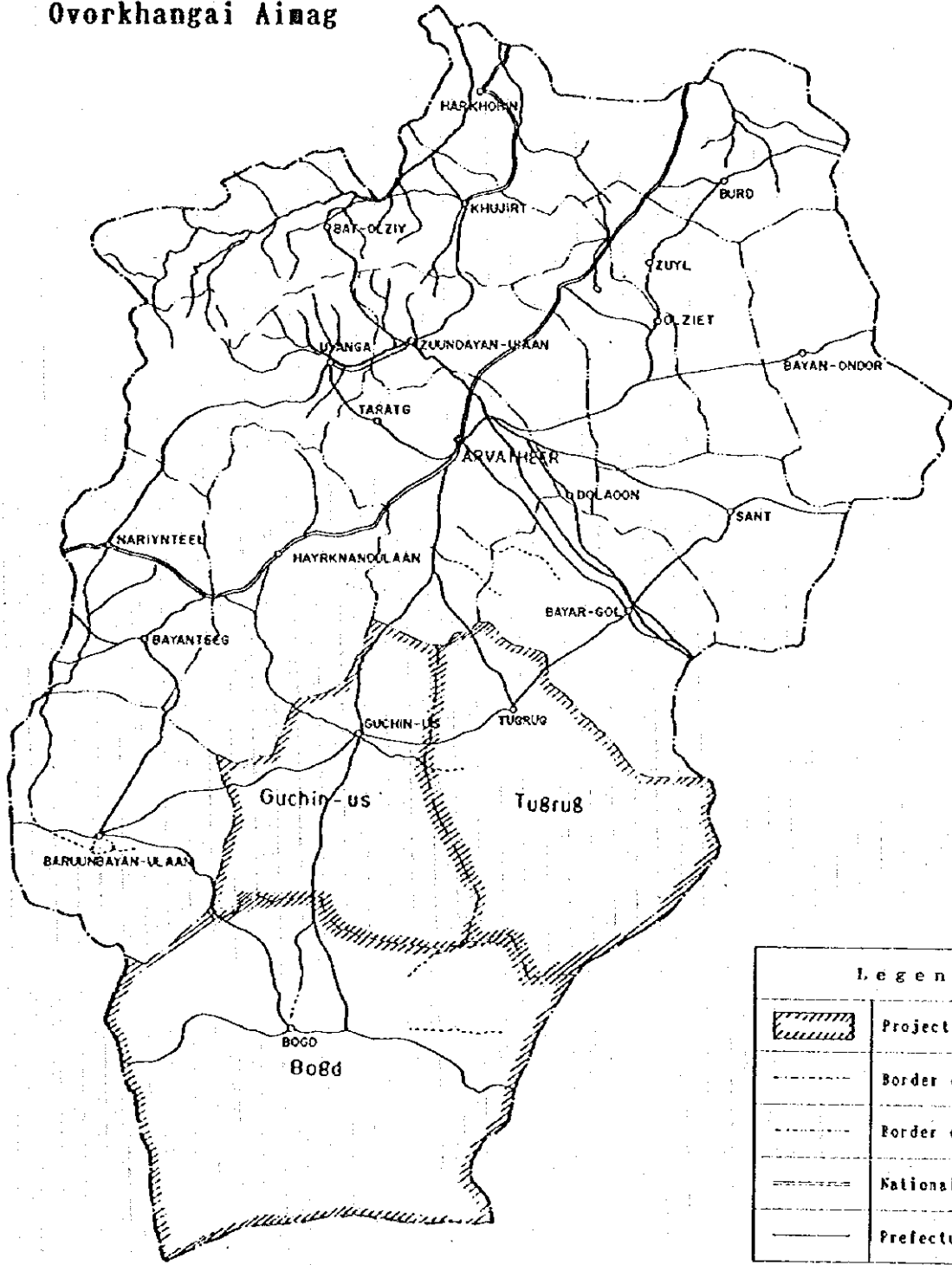
The EIRR was calculated as 5%, treating the profits from the production of the animals which will use the wells as from profits the project and considering the expenses to consist of the project costs and the well maintenance costs (labor and fuel costs). Although the internal revenue received is low, the implementation of the project will enable nomadic herding households to raise roughly 420,000 animals in terms of numbers of sheep, and use a total of 485,000 hectares of grassland as grazing land. In the Study Area where there is a shortage of grassland resources, this project will have a significant economic impact by allowing the effective use of more grassland.

Herder's Water Supply Improvement Project
Improvements, Facilities

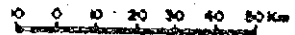
Improvements, Facilities	Quantity Etc.	Description Etc.
(1) Water Resource Study ① Gathering and Analysis of Existing Datas of Existing Data ② Test Boring survey ③ Test Boring survey ④ Mobile Boring Machine ⑤ Fuel for the above ⑥ Geophysical Exploration Equipment	1 Set 50 Location 100 Location 1 Set 1 Set 1 Set	Computer processing, etc. H=100m H=30m Spare car, spare parts, etc. Including accessories and spare parts
(2) Improvement of Facilities ① Deep Well Pumps ② Pump sheds ③ Well drilling	45 Set 45 Location 45 Location	H=100m Rotary boring
④ Wind-powered pump ⑤ Well drilling ⑥ Improvement of well surroundings ⑦ Well facilities	6 Set 6 Location 6 Location 6 Location	H=100m Rotary boring
(3) Provision of Shallow Wells ① Hand pumps ② Well drilling ③ Improvement of well surroundings	100 Set 100 Location 100 Location	H=30m Percussion boring
(4) Water Supply Facilities	151 Location	Concrete precast products
(5) Maintenance Association ① Buildings ② Office Equipment ③ Management vehicles ④ Repair tools	3 Location 3 Set 3 Set	Existing county buildings will be borrowed (office and conference hall) Desks, chairs, lockers, and other office equipment Small trucks, pickup trucks Tools, welders, etc.

Herder's Water Supply Improvement Project Location Map

Ovorkhangai Aimag



Legend	
	Project area
	Border of Aimag
	Border of Sum
	National road
	Prefectural road



PDM (Herder's Water Supply Improvement Project)

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
<p>(Ultimate Goals) While taking care not to disrupt the grassland ecology, appropriately locate water supply facilities in order to permit the sustained and effective use of the grasslands.</p> <p>(Project Goals) 1) Water resource survey 2) Improvement of well facilities 3) Encouragement of maintenance associations for the well facilities 4) Training of geological specialists and engineers</p>	<p>Effects after a specified period of time has elapsed once assistance has been provided. 1) Operating condition of the wells. 2) Changes in the number of domestic animals.</p> <p>Effects after a specified period of time has elapsed once assistance has been provided. 1) Preparation of manuals on water resource survey methods. 2) Changes in the number of construction technologists specializing in well facilities. 3) Changes in the activities of well maintenance associations. 4) Changes in the number of geological technicians.</p>	<p>Post-project assessments obtained by dispatching survey teams</p> <p>Post-project assessments obtained by dispatching survey teams</p>	<p>1) No change in MOFA policies. 2) An orderly system of nomadic herding is maintained. 3) A stable market economy is maintained.</p> <p>1) No change in MOFA policies. 2) The government provides sufficient financial support to the project. 3) Counterpart personnel do not change.</p>
<p>(Effects of the Project) 1) The amount of water resources available is estimated so the well location plan can be established. 2) A stable supply of water can be provided. 3) Orderly well utilization is maintained. 4) The number of geological technicians increases.</p> <p>(Project Activities) 1) Water resource survey (1) Gathering and analysis of existing data. (2) Test boring. (3) Preparation of study manuals. 2) Construction of well facilities (1) Training of experts in well construction technology. 3) Encouragement of the establishment of well facility maintenance associations (1) Training of well facility maintenance personnel and of facility and machinery repair technicians 4) Training of geological specialists and engineers (1) Training of geological specialists and engineers</p>	<p>1) Details of the summary of the water resources survey. 2) Operating state of the well facilities provided. 3) Details of the activities of the maintenance associations. 4) Training implemented.</p> <p>(Inputs) Donor Countries 1) Implementation of the water resource survey. 2) Provision of test drilling equipment and geological exploration machinery for the water resources survey. 3) Construction of well facilities. 4) Provision of maintenance vehicles. 5) Long-term dispatch of experts (geology, facility and machinery repair). 6) Acceptance of trainees from counterpart organizations</p> <p>Mongolia 1) Provision of a project manager and counterpart personnel 2) Provision of a project office 3) Establishment of the Project Promotion Committee</p>	<p>1) Final report on the project. 2) Post-project assessments obtained by dispatching survey teams</p>	<p>1) No change in MOFA policies. 2) The government provides sufficient financial support to the project. 3) Counterpart personnel do not change.</p> <p>1) A suitable project manager and counterpart personnel are provided. 2) The Mongolian government introduces supporting budgetary measures. 3) The needed input materials can be obtained.</p> <p>(Prerequisite Conditions) 1) The Government of Mongolia provides funds and personnel required for the project. 2) A project office is provided. 3) The Project Promotion Committee carries out necessary coordination work.</p>

6.1.5 Milk Production Increasing Project

1) Background

Large mechanized dairy farms have been established around the capital city of Ulaanbaatar in order to provide its residents with milk, but many of these dairy farms have been forced to either shut down or to curtail their operations because of the deterioration of their equipment and facilities and the chaotic conditions in the farm management environment following the rapid transition to a market economy. The consequences of this have been a rapid decline in the amount of milk collected by milk product processing plants preventing them from supplying milk and milk products to city residents, thereby causing serious malnutrition among old people, children, and hospital patients.

To resolve these problems, steps must be taken at once to restore milk production on the dairy farms to former levels and to establish a system to provide dairy product processing plants with a stable supply of milk.

2) Objectives and Effects

The productive functions of dairy farms supplying milk to Ulaanbaatar's milk processing plants will be upgraded and a system capable of hygienically collecting milk produced by nomadic herders will be provided in order to assure a stable supply of milk and milk products to urban residents. At the same time, a Milk Producers Association will be established to organize the joint purchasing of production materials and shipping of products and to disseminate knowledge of farm management technology in order to contribute to the stabilization of dairy farming.

The implementation of the Milk Production Increasing Project will make a significant contribution to the effectiveness of the Ulaanbaatar Milk Processing Facility Improvement Project completed with assistance from Japan at the same time as it increases the operating rates at these dairy product plants.

3) Positioning in the Master Plan

The stabilization of supplies of animal husbandry product through the development of dairy farm production and other forms of intensive animal husbandry is one of the priority projects in the Master Plan. The dairy farm sector must be stabilized as quickly as possible by expanding milk production and by reorganizing and improving large dairy farms.

4) Project Details

(1) Details of the Project

Financial support for the following activities.

[1] Provision of Core Dairy Farms: Improvement of facilities at fifteen dairy farms (installation of milker and heating equipment, provision of compost production facilities, and the introduction of roughage production machinery and artificial insemination (AI) equipment, etc.)

[2] Provision of Milk Collection and Shipping Facilities: Construction of cooler stations at five locations

[3] Establishment of a Milk Producers Association

[4] Long-term dispatching of Experts (Facility repair and association organization)

[5] Overseas Training of Trainees

(2) Relationship with Other Aid

[1] Relationship With Financial Aid From Japan

While the main purpose of the Ulaanbaatar Milk Processing Facility Improvement Project that was implemented by Japanese assistance consists of improvement of refrigeration and freezing equipment at milk processing plants, this project will improve the production system that supplies milk to these plants. Consequently, the two projects complement each other and are, therefore, expected to be extremely effective.

[2] Relationship With the DANIDA Project

The dairy farming reorganization project now being implemented by DANIDA is a financial assistance project intended to nurture dairy farms with between 10 and 20 head of dairy cows as a way to revive those farms that have already gone bankrupt. This project, which is intended to support farms that are still in operation so that they will play a central role in future dairy product production, does not overlap with the DANIDA project.

5) Implementation Organization Project

(1) Implementing Organizations

The Milk Producers Association

At this time, the organization does not exist, so by the time the project starts, a producers association will need to be established under the guidance and supervision of the Livestock Department of MOFA.

(2) Responsible Ministry

MOFA

6) Beneficiaries

(1) Direct Beneficiaries

Fifteen dairy farms which will be members of the Milk Producers Association
(Employees: 1,002, Shareholders: 6,265)

(2) Indirect Beneficiaries

Primarily residents of Ulaanbaatar and other cities : 1,590,000 people

7) Implementation Schedule

(1) Basic Design: 1996

(2) Project Implementation: 1997 - 1998 (2 years)

8) Project Cost

The approximate cost of the project is U.S. \$12.5 million (approx. Tg 5.7 billion), as shown in Table 6.1.5.1.

Table 6.1.5.1 Milk Production Increasing Project Costs

Items	Local Currency	Foreign Currency	Total	Remarks
Construction Costs				
Dairy Producers Association (1000Tg)	63,800	21,600	85,400	①'
Building/Facilities (US\$)	138,600	46,900	185,500	
Equipment/Machinery (1000Tg)	-	793,700	793,700	②'
(US\$)	-	1,725,500	1,725,500	
Subtotal (1000Tg)	63,700	815,300	879,100	③' = ①' + ②'
(US\$)	138,600	1,772,400	1,911,000	
Main Dairy Farm Building/Facilities (1000Tg)	900,300	304,900	1,205,200	①''
(US\$)	1,957,200	662,900	2,620,100	
Equipment/Machinery (1000Tg)	-	2,311,300	2,311,300	②''
(US\$)	-	5,024,600	5,024,600	
Subtotal (1000Tg)	900,300	2,616,300	3,516,500	③'' = ①'' + ②''
(US\$)	1,957,200	5,687,500	7,644,700	
Total Construction Costs (1000Tg)	964,000	3,431,600	4,395,600	③ = ③' + ③''
(US\$)	2,095,800	7,459,500	9,555,700	
Engineering Service (1000Tg)	-	348,800	348,800	④ = ① × 15%
(US\$)	-	758,300	758,300	+ ② × 5%
Physical Contingency (1000Tg)	96,400	378,000	474,400	⑤ = (③ + ④)
(US\$)	209,600	821,800	1,031,400	× 10%
Price Contingency (1000Tg)	106,000	415,900	521,900	⑥ = (③ + ④ + ⑤)
(US\$)	230,500	904,000	1,134,500	× 10%
Total Project Costs (1000Tg)	1,166,400	4,574,300	5,740,700	⑦ = ③ + ④ + ⑤ + ⑥
(US\$)	2,535,900	9,944,000	12,479,900	

9) Project Assessment

(I) Financial Analysis

The financial analysis obtained the FIRR for all 15 dairy farms included in the project. Income from the project is assumed to consist of income from sales of products, and is proportional to the increase in the number of heads of cattle on these farms. Project investment for this project will begin by the second year of the project, and depreciation expenses for the facilities, machinery, etc. will be appropriated from the fifth year as investment expenses. As a result of the calculations, the FIRR is, as shown on the table, -6%, and if the farms bear the full cost of the project, it will be difficult for them to continue operations. As the separate trial calculation shows, the appropriate share of the burden for the producers to bear is about 25% of the project cost (FIRR = 12%). This means that they will be able to continue operating by

bearing the investment costs in later years with financing at an annual interest rate of 12%, even without putting in any funds themselves. In this case, it will be essential for either the government or an overseas aid provider to supply funds to cover the remaining expenses.

(2) Economic Analysis

Profits from the project consist of the difference between production profits earned by the farms if the project is implemented and if it is not implemented. If the project is not implemented, total productivity will likely fall by about 5% per year, considering the present tendency for production to decline. The profits from production were found by deducting the cost of production inputs from sales income. The results of this calculation, shown in Table 6.1.5.2 of the Annex, indicate an EIRR of 7.9%, a figure which falls somewhat below the 8% which is the standard index for agricultural investment in developing countries.

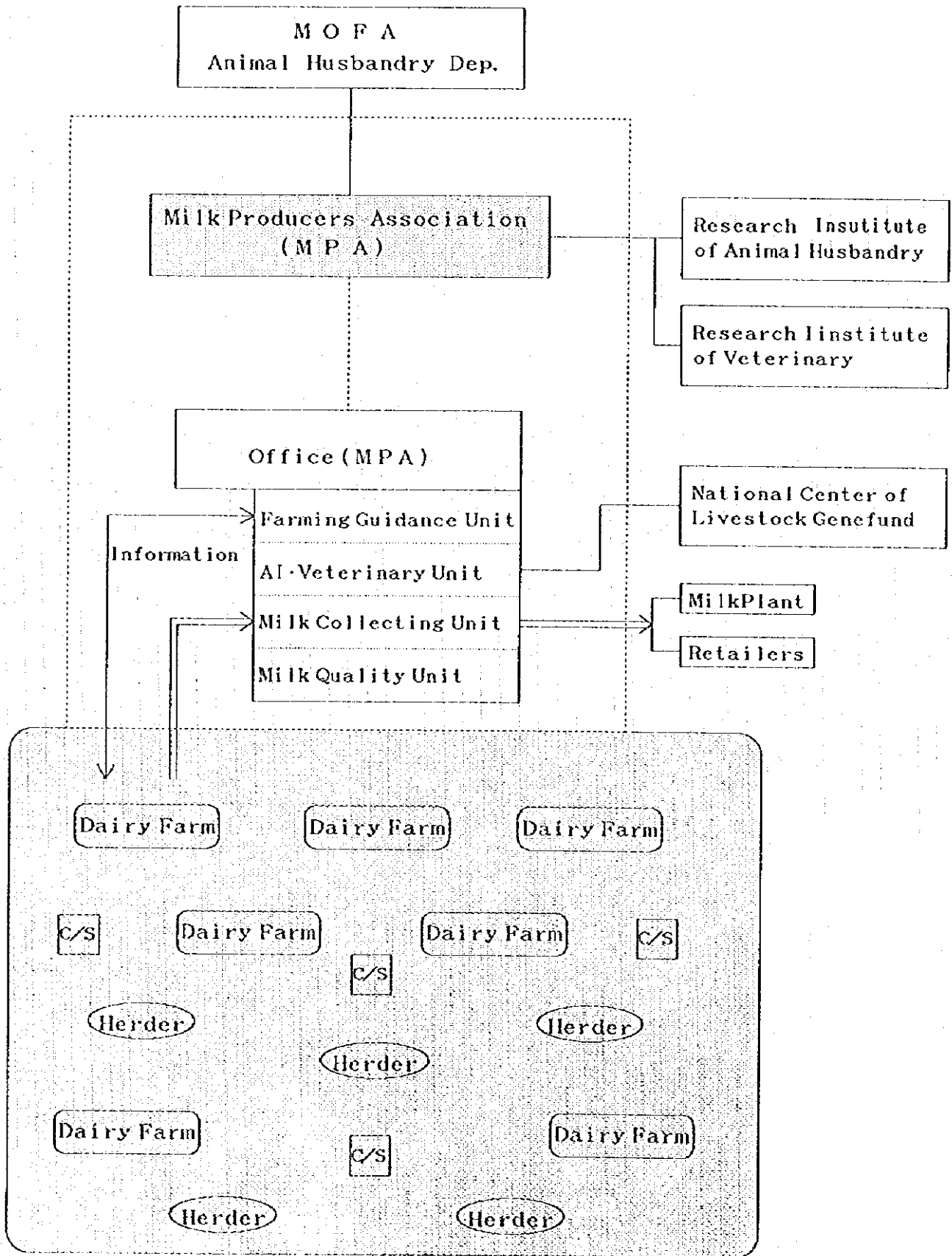
1. Improvements/Facilities of the Milk Producers Association

Improvements/Facilities		Quantity	Description
Buildings	Association office	1	420m ² Existing facilities (interior, electric, water supply are done)
	Cooler Station	5	301m ² Milk storage, office, electric generating room
Equipment	Milk Inspection	1	Milk fat separator, heater, alcohol test, hydrometer etc.
	Radio	1	Key station (FT-80C)
	AI	3	Liquid nitrogen container, AI kits
	Milk tank	5	Two 2000L tank, 1 generator, 1 scales at each station
Vehicles	Milk truck	5	6,000L
	Cars	2	Jeeps (with mobile radio equipment)
Office		1	Copier, PC, desks, lockers, other office equipment

2. Improvements/Facilities of the Core Dairy Farms

Improvements/Facilities		Quantity	Description
Buildings	Insulation work	15 farms	Insulation work of the external walls and ceilings (Cow barn and calf barn)
	Compost yard	15 "	New construction
Equipments	Milking machine	12 "	New bucket type milker
	Bulk Cooler	12 "	New bulk cooler
Machinery	Fodder production	15 "	Tractor, harvester, mower, etc.
	AI equipment	15 "	Liquid nitrogen container, AI kits

General Idea of Milk Producers Association

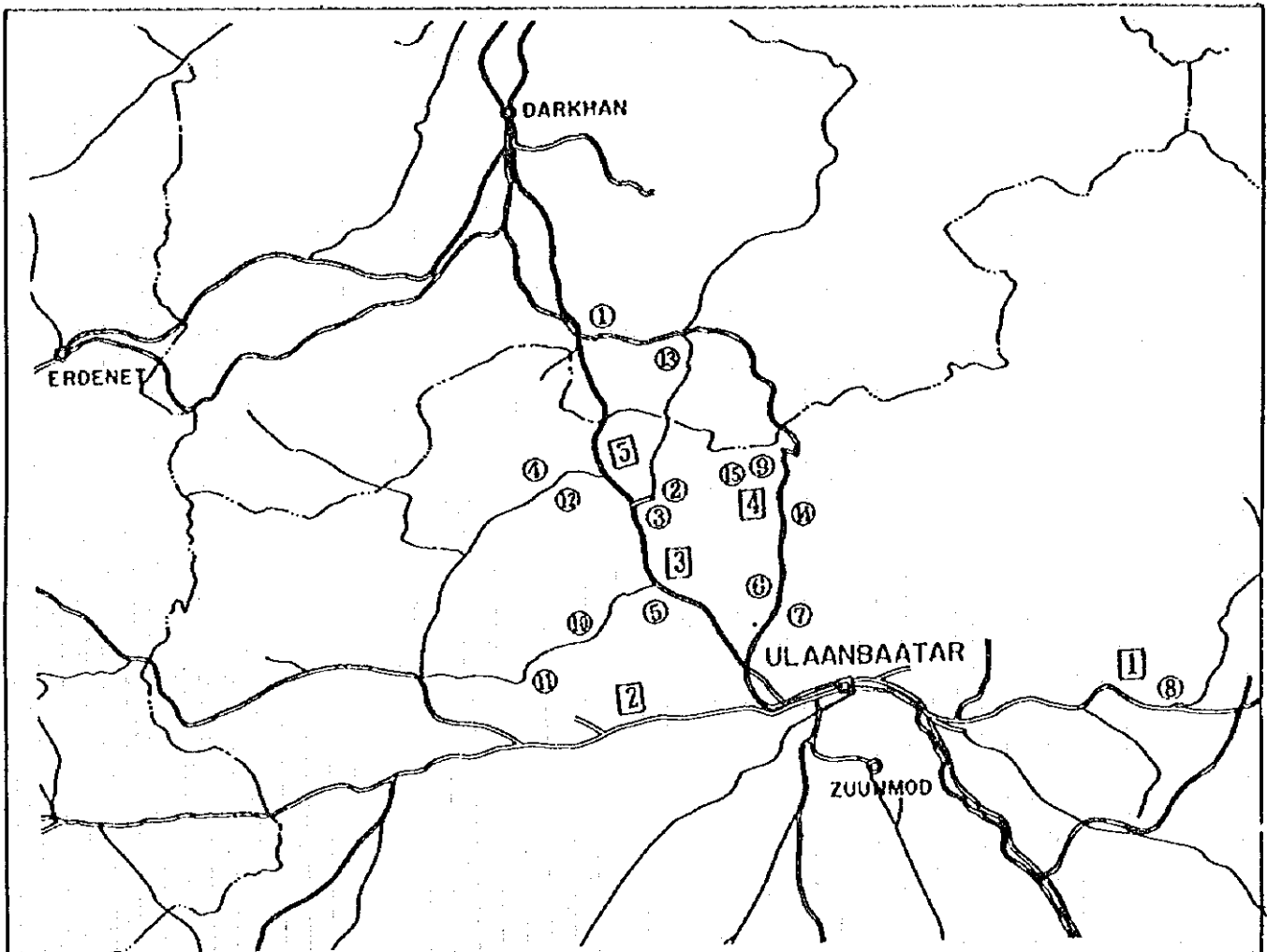


Outline of Selected Dairy Farms for the Priority Project

Aimags	Sum	Farm Name	Heads of Cow			Actual Data in 1989				Now Condition (1995.7)		Farming Type	
			Capacity	1995.7	2000 plan	2010 plan	Hds. Cow	Hds. Total	Milk Pro.	Milk/Cow	Employee		Stockholder
Selenge (2)	Bayangol	Shine Zam ①	800	450	600	800	614	1,635	1,632.9	2,474	95	257	Private
	Mandal	Bilunt ②	800	128	200	800	718	1,442	1,447.1	2,157	46	262	"
Tov (11)	Bornuur	Shar Khooloi ③	800	405	600	800	740	1,198	2,803.4	3,594	84	976	"
	Bornuur	Davaanbulag ④	400	300	400	400	449	717	1,595.9	3,773	38	409	"
	Jargalant	Artsat ⑤	800	280	400	800	848	1,807	1,765.6	2,228	77	633	"
	Jargalant	Bayanbulag ⑥	400	150	200	400	387	696	888.8	2,291	84	347	51%State-owned
	Bayanchandmani	Tsagaan Erdene ⑦	400	140	200	400	380	792	1,031.0	2,720	34	284	Private
	Bayandelger	Tsatsral ⑧	400	350	400	400	353	754	689.0	2,057	85	(377)	100%State-owned
	Batsumber	Erdenetolgoi ⑨	400	120	200	400	396	570	1,292.9	2,892	74	414	Private
	Batsumber	Bayanbadrah ⑩	400	110	200	400	-	-	-	-	72	643	"
	Batsumber	Bayantolgoi ⑪	400	150	200	400	371	530	1,365.1	3,289	46	256	"
	Bayantsogt	Khairkhan ⑫	400	210	200	400	416	723	1,266.0	3,014	30	418	"
	Bayantsogt	Orgil ⑬	400	190	200	400	403	721	1,074.4	2,944	80	118	"
Ulaanbaatar (2)	Partizan	Delgerekh ⑭	800	430	600	800	818	1,666	2,379.1	3,250	132	(773)	100%State-owned
	Partizan	Dul ⑮	400	140	200	400	383	721	1,107.4	3,059	25	98	Private
Total (15)			8,000	3,555	4,800	8,000	7,276	13,972	20,338.6	2,795	1,002	6,265	

Source: MOFA

Milk Production Increasing Project Location Map

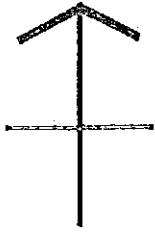


Selected Dairy Farm

Farm Name	Heads of Cow & Breed		Farm Name	Heads of Cow & Breed	
	Capacity	Breed		Capacity	Breed
① Shine Zam	800	Simmental	⑨ Erdenetolgoi	400	Alatau
② Shar Khooloi	800	Holstein	⑩ Khairkhan	400	Simmental
③ Davaanbulag	400	Holstein	⑪ Orgil	400	Simmental
④ Artsat	800	Holstein	⑫ Bayanbulag	400	Holstein
⑤ Tsagaan Erdene	400	Holstein	⑬ Bilut	800	Steppe Red
⑥ Delgerekh	800	Holstein	⑭ Bayanbadrah	400	Alatau
⑦ Dul	400	Holstein	⑮ Bayantolgoi	400	Alatau
⑧ Tsatsral	400	Simmental			

① ~ ⑮	Dairy Farm
[1] ~ [5]	Cooler Station

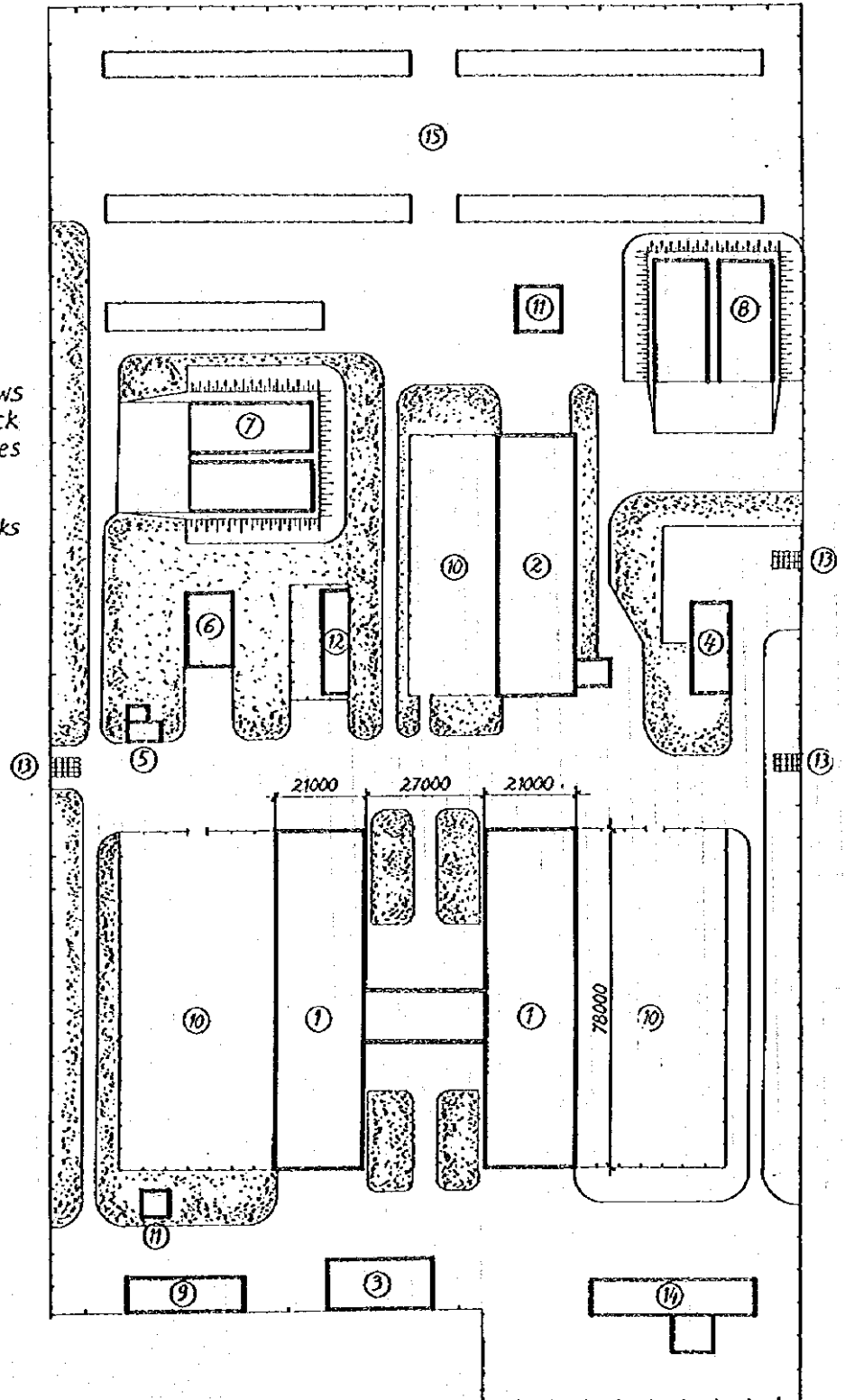
General plan of milk farm for 400 cows.



Name of object

1. Construction for 200 cows together with milk block
2. Building for young calves
3. Service an supply
4. Veterinary service
5. Scale for weighing trucks with freight.
6. Hay storing
7. Silo trench
8. Silo trench
9. Garage for tractors
10. Sqaire for sunny days
11. Bathing
12. House for bulls
13. Sanitation sqaire
14. Steem heating stove
15. Hay sqaire

M1: 1000



PDM (Milk Production Improvement Project)

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
<p>(Ultimate Goals)</p> <p>Provide a stable supply of milk and milk products to the residents of Ulaanbaatar.</p>	<p>Effects after a specified period of time has elapsed once assistance has been provided.</p> <p>Changes in the volume of production of the dairy product plants.</p>	<p>Post-project assessments obtained by dispatching survey teams</p>	<p>1) No change in MOFA policies.</p> <p>2) The dairy product plants can continue to operate.</p> <p>3) A stable supply of production materials is provided.</p> <p>4) Low interest loans are obtained by the dairy product plants and the dairy farms.</p> <p>5) A stable market economy is maintained.</p>
<p>(Project Goals)</p> <p>1) The volume of milk produced by dairy farms near Ulaanbaatar rises and they operate profitably.</p> <p>2) A system for hygienically obtaining milk from nomadic herders is established.</p> <p>3) The Milk Producers Association is established and active.</p>	<p>Effects after a specified period of time has elapsed once assistance has been provided.</p> <p>1) Volume of milk produced and financial condition of the dairy farms.</p> <p>2) Milk is supplied by nomadic herders</p> <p>3) State of activities of the Milk Producers Association</p>	<p>Post-project assessments obtained by dispatching survey teams</p>	<p>1) The milk product plants continue to operate.</p> <p>2) Low interest loans are obtained by the dairy product plants and the dairy farms.</p> <p>3) Management guidance is performed by specialists and engineers.</p> <p>4) A stable supply of production materials is provided.</p> <p>5) Roads needed for milk collection are provided.</p>
<p>(Effects of the Project)</p> <p>1) The resistance to cold weather of barns on dairy farms improves.</p> <p>2) The functioning of the machinery and equipment improves.</p> <p>3) Animal waste is effectively used as fertilizer.</p> <p>4) A stable supply of milk is provided to milk product plants.</p> <p>5) High quality milk cattle are raised.</p> <p>6) A Milk Producers Association is established.</p>	<p>1) Details of the improved barns.</p> <p>2) Details of the machinery and equipment provided.</p> <p>3) Details of the compost-yard installed and distribution of fertilizer.</p> <p>4) Milk is collected by milk product plants.</p> <p>5) Details of the AI equipment installed and its successful use.</p> <p>6) Activities of the Milk Producers Association</p>	<p>1) Final report on the project.</p> <p>2) Post-project assessments obtained by dispatching survey teams</p>	<p>1) The milk product plants continue to operate.</p> <p>2) Low interest loans are obtained by the dairy product plants and the dairy farms.</p> <p>3) Management guidance is performed by specialists and engineers.</p> <p>4) A stable supply of production materials is provided.</p> <p>5) Frozen semen of high quality milk cattle is supplied.</p> <p>6) Roads needed for milk collection are provided.</p>
<p>(Project Activities)</p> <p>1) Improvement of 15 core farms.</p> <p>2) Work to improve the resistance of the barns to cold weather.</p> <p>3) Construction of new compost-yard.</p> <p>4) Improvement of machinery and equipment.</p> <p>5) Introduction of agricultural machinery for feed production.</p> <p>6) Introduction of artificial insemination (AI) equipment for livestock.</p> <p>7) Improvement of milk collection and shipping facilities</p> <p>8) Construction of cooler stations.</p> <p>9) Introduction of milk trucks.</p> <p>10) Establishment of the Milk Producers Association.</p> <p>11) Establishment of the association</p> <p>12) Form reserves of operating funds.</p> <p>13) Technical guidance for association members</p>	<p>(Input)</p> <p>Donor Countries</p> <p>1) Improvement of 15 dairy farms.</p> <p>2) Improvement of milk collection and shipping facilities.</p> <p>3) Introduction of agricultural machinery for feed production purposes.</p> <p>4) Long-term dispatch of experts (facility repair, association organization).</p> <p>5) Acceptance of trainees from counterpart organizations.</p> <p>Mongolia</p> <p>1) Provision of a project manager and counterpart personnel.</p> <p>2) Provision of a project office.</p> <p>3) Low interest loans for dairy farms from "an agriculture and livestock fund".</p> <p>4) Execution of part of the related construction work.</p> <p>5) Establishment of the Project Promotion Committee</p>	<p>1) A suitable project manager and counterpart personnel are provided.</p> <p>2) The Mongolian government introduces supporting budgetary measures.</p> <p>3) The needed input materials can be obtained.</p> <p>4) The related construction work is performed when needed.</p> <p>(Prerequisite Conditions)</p> <p>1) The Government of Mongolia provides funds and personnel required for the project.</p> <p>2) The dairy farms participate in the project.</p> <p>3) The Project Promotion Committee carries out necessary coordination work.</p>	<p>1) A suitable project manager and counterpart personnel are provided.</p> <p>2) The Mongolian government introduces supporting budgetary measures.</p> <p>3) The needed input materials can be obtained.</p> <p>4) The related construction work is performed when needed.</p> <p>(Prerequisite Conditions)</p> <p>1) The Government of Mongolia provides funds and personnel required for the project.</p> <p>2) The dairy farms participate in the project.</p> <p>3) The Project Promotion Committee carries out necessary coordination work.</p>

6.1.6 Agriculture Information System Improvement Project

1) Background

In Mongolian agriculture, the group production system by means of state farms and negdels collapsed, and the nation made a rapid shift to the privatization and market economy system. This resulted in a chaotic situation of the system for exchanging information among traditional nomads, corporate farms and Sums, Aimags and the Ministry of Food and Agriculture as well as the system for providing various necessary information.

Particularly, nomads face great difficulty not only in their productive activities but also in their daily life, including a lack of information and system for communications in emergencies because of their farming style, i.e. traditional livestock production through nomadic herding. Furthermore individualization among nomads has proceeded because privatization of livestock and market economy has been spread. It is keenly required to collect precise information and the prompt administration measures for promoting planned land use and for gathering and distributing livestock products. For this reason, a new information transmission system among nomads, corporate farms, Bags, Sums, Aimags and MOFA should be urgently developed.

2) Objectives and effects

In a nomadic region, a system for providing information from Aimags or Sums to nomads by means of radio waves, as well as a system for collecting and conveying information between Aimags or Sums and the Ministry of Food and Agriculture must be established to contribute to stabilization of livestock farming suitable for the market economy system and improvement of living environment.

Through implementation of this project, various types of information, including market prices, agricultural weather, situation of outbreak of diseases caused by harmful insects or cattle diseases, new techniques, and information on living will be conveyed in a timely manner from Sums or Aimags.

The establishment of data collection structures which center Bags as nucleuses within each Sum and the development of a system for transmitting information between Sums/Aimags and MOFA will enable those concerned to properly grasp information on agriculture and livestock farming, and will be very helpful in making proper decision on policy, and providing prompt support and guidance.

3) Positioning in the Master Plan

The master plan calls for the improvement of agriculture related information collection and dissemination systems and more effective use of these system as one component of the Agriculture Technology Promotion System Improvement Plan.

4) Details of the Project

As a pilot project, a radio communication network centered on Bags in Haatagundor Sum (4 towns [Bags]) and in Bulgan Aimag and Bogd Sum (5 Bags) in Overhangai Aimag will be provided in order to construct a new information reception structure. And as a model project, radio receivers will be provided to nomadic herders to provide them with the information they need. Facsimile machines will be introduced in Aimag and Sum administrative offices to speed up the receipt of information. At the same time, a data base system will be established at the MOFA, and modems will be provided so that information can be transmitted to the Aimags. The following materials and equipment will be provided as part of this project.

(1) Materials and Equipment to be Provided

Radio Communication Equipment

Bogd Sum (As mobile stations, 5 Bags x 2 units, and as a base station, 1 unit at the Sum administrative office)

Haatagundor Sum (As mobile stations, 4 Bags x 2 units, and as a base station, 1 unit at the Sum administrative office)

Vehicles for use as mobile stations

Bogd Sum (4-wheel vehicles, 5 Bags x 2)

Haatagundor Sum (4-wheel vehicles, 4 Bags x 2)

Long-wave radios for the nomadic herders

Bogd Sum (200 households x 1 unit)

Haatagundor Sum (200 households x 1 unit)

Facsimile Terminals

Simple type (75 Sum x 1 unit)

Dedicated type (6 Aimags x 1 unit + 1 city x 1 unit + MOFA x 1 unit)

Personal Computers

Equipped with CPUP5 + 500MB hard drive

(6 Aimags x 1 unit + 1 city x 1 Unit)

Equipped with CPUP5 + 1GB hard drive (MOFA x 1 Unit)

(2) Dispatch of Experts (data base operation, radio communications network creation, training of officials concerned)

(3) Overseas Training of Trainees (To study systems in preparation for the establishment and operation of the data base)

5) Project Implementation Organization

(1) Implementing Body

MOFA, Selenge, Darkhan-uul, Tov, Bulgan, Orkhon, and Ovorhangai Aimags, and Ulaanbaatar City

(2) Responsible Ministry

MOFA

6) Beneficiaries

Nomads and corporate farms in the Study Area : 87,700 households

7) Implementation Schedule

(1) Basic Design: 1997

(2) Project Implementation: 1998 to 1999 (2 years)

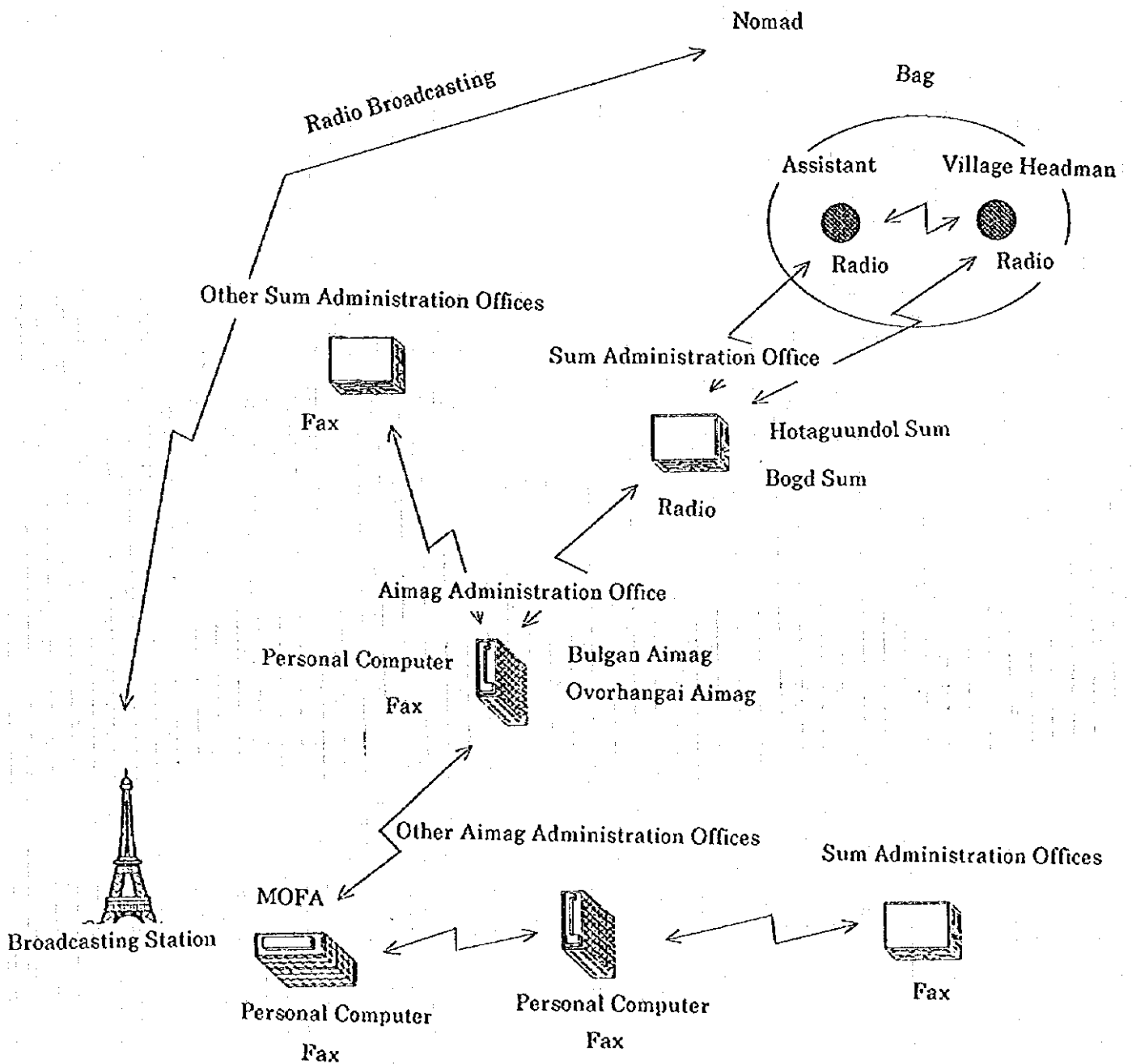
8) Project Cost

The approximate project cost is U.S. \$1.2 million (approx. 570 million Tg) as shown in Table 6.1.6.1.

Table 6.1.6.1 Agricultural Information System Development project Costs

Items	Local Currency	Foreign Currency	Total	Remarks
Construction Costs				
Equipment/Machinery	(1000Tg) -	446,200	446,200	①
	(US\$) -	970,000	970,000	
Engineering Service	(1000Tg) -	22,300	22,300	②=①× 5%
	(US\$) -	48,500	48,500	
Physical Contingency	(1000Tg) -	46,800	46,800	③=(①+②)
	(US\$) -	10,180	10,180	× 10%
Price Contingency	(1000Tg) -	51,500	51,500	④=(①+②+③)
	(US\$) -	112,000	112,000	× 10%
Total Project Costs	(1000Tg) -	566,800	566,800	⑤=①+②+③+④
	(US\$) -	1,232,300	1,232,300	

Schematic Diagram of the Agriculture Information System



PDM (Agriculture Information System Improvement Project)

Narrative Summary	Verifiable indicators	Means of Verification	Important Assumptions
<p>(Ultimate Goals) By providing a new and improved information transmission system to link nomads, farm company, bags which serve them, sum, and aimag offices, and the MOFA, gather reliable information and implement administrative policies without delay.</p>	<p>Effects after a specified period of time has elapsed once assistance has been provided. Obtain all necessary agricultural statistical documents.</p>	<p>Post-project assessments obtained by overseas offices.</p>	<p>No change in MOFA policies</p>
<p>(Project Goals) Provide radios to be used by sum and aimag authorities to provide information to the people of the nomadic herding regions, and at the same time, establish an information transmission system linking the aimag offices, county offices, and the MOFA, and in these ways, guarantee the stable farm management required in a free market system and improve the people's living conditions.</p>	<p>Effects after a specified period of time has elapsed once assistance has been provided. Obtain all necessary agricultural statistical documents.</p>	<p>Post-project assessments obtained by overseas offices.</p>	<p>No change in MOFA policies</p>
<p>(Effects of the Project) Information about market prices, the weather outlook, pests, outbreaks of animal diseases, new technology, and so on will, along with information about matters related to the daily life of the people, be transmitted periodically from the aimag and sum offices.</p>	<p>Amount of agriculture-related information publicly announced.</p>	<p>Post-project assessments obtained by overseas offices.</p>	<p>No change in MOFA policies</p>
<p>(Project Activities) Information is transmitted between sum offices and bags with communication equipment. Information is transmitted between sum offices and aimag offices by fax. Information is transmitted between aimag offices and the MOFA by fax and personal computer communications. Information is transmitted to nomads from the MOFA by radio.</p>	<p>(Inputs) Donor Countries Introduction of communication equipment, motor vehicles, facsimile terminals, and personal computers. Acceptance of trainees from counterpart organizations. Mongolia Provision of a project manager and counterpart personnel Provision of a project office Establishment of the Project Promotion Committee</p>	<p>A suitable project manager and counterpart personnel are provided. The Mongolian government introduces supporting budgetary measures. The Government of Mongolia provides funds and personnel required for the project. The Project Promotion Committee carries out necessary coordination work.</p>	<p>No change in MOFA policies</p>

6.1.7 Veterinary Research Institute Technology Development Project

1) Background

The Veterinary Research Institute of the National University of Agriculture, which is Mongolia's only institution involved in educational and research activities concerning veterinary science, had formerly conducted training and research on diagnosis and treatment technology with financial support from the former Soviet Union and other Eastern European nations. Since losing the support of the former Soviet Union, research personnel of the Institute have continued performing diagnosis work using classical methods studied in the past. While useful, it appears that they are now confronted with many diseases that cannot be adequately studied due to a lack of diagnosis technology. It has been pointed out that as a consequence of this backwardness in diagnosis technology and a recent decline in the level of the animal husbandry hygiene services provided by RIAH, there is a danger of serious animal diseases spreading, which could adversely affect programs for increasing the amount and quality of livestock products in Mongolia.

2) Objectives and Effects

In order to improve the fundamental research functions of the Veterinary Research Institute so that it will be better able to diagnose and prevent the spread of infectious animal diseases, it will be necessary to replace and improve deteriorating equipment, and new diagnosis and treatment technology will be established and transferred to researchers. Specialized technical training by Mongolian researchers will be given to students at the National University of Agriculture and persons engaged in animal husbandry hygiene services in order to provide a supply of trained specialists, enhance the animal husbandry hygiene management system, and minimize production losses attributable to livestock diseases. These measures are also expected to contribute to a boost in farm household incomes and increased animal husbandry production.

3) Positioning in the Master Plan

Animal husbandry constitutes the most important element of Mongolian agriculture, and is an essential factor in achieving the Master Plan's goal of a stable food supply. Hygiene management of livestock plays a particularly important role in guaranteeing a stable production of animal products as well as to improving the quality of such

products. Given the current low levels of diagnosis and treatment technology used to fight infectious animal diseases as well as livestock product hygiene management, immediate action must be taken in order to strengthen the functions of the Veterinary Research Institute, which conducts research into and development of the basic technologies that are the key to the resolution of these problems.

4) Detailed Content of the Project

(1) Detailed Content of the Project

Technological assistance in the following areas

[1] Introduction of equipment, etc.: Equipment for testing and research, equipment for education and training, equipment for developing infectious disease diagnosis and prevention technology.

[2] Dispatch of experts: Diagnosis and prevention of infectious diseases among livestock (pathology, epidemiology, applied immunology, study of pathogenic microorganisms, laboratory animals, cell biology, etc.)

[3] Overseas training of researchers

(2) Relationship with Other Aid

The EU is implementing a project to enhance animal husbandry hygiene services designed to improve the infectious animal disease prevention system and to provide a supply of chemicals. The purpose of the project is to improve the veterinary division and regional animal husbandry hygiene services of the MOFA. The IAEA is also undertaking an animal infectious disease project intended to improve animal infectious disease diagnosis and prevention technology, though the project primarily consists of providing funding to the Veterinary Research Institute. Although there are distinctions that need to be made between the content of these assistance programs, there is no overlap between these programs and the project being provided under the Master Plan, which aims at supporting basic research on animal infectious diseases together with the development and transfer of diagnosis and prevention technology.

5) Organization Implementing the Project

(1) Implementing Body: Veterinary Research Institute

Established in 1966 and integrated with the National University of Agriculture since 1992, the Veterinary Research Institute is now the only institution in Mongolia that provides education in the field of veterinary sciences. The Institute conducts

surveys of animal diseases, and engages in research and development work concerning animal disease diagnosis and prevention measures, in addition to hygiene management of products derived from animal husbandry.

(2) Responsible Ministries

MOFA, MSE

6) Beneficiaries

(1) Direct beneficiaries

Veterinary Research Institute

(2) Indirect beneficiaries

Students of the National University of Agriculture : 1,000 people

Technical specialists involved in animal husbandry hygiene services : 1,700 people

Livestock farmers : 307,500 households

7) Implementation schedule

Technological cooperation 1997 to 2001 (5 years)

PDM (Veterinary Research Institute Technology Development Project)

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
<p>(Ultimate Goals) Expand production in the animal husbandry area in order to provide the people with a stable supply of good quality livestock products by reducing losses caused by animal infectious diseases.</p>	<p>Effects after a specified period of time has elapsed since the assistance has been provided 1) Increase in the number of head of livestock diagnosed as suffering from animal infectious diseases. 2) Decline in losses of livestock caused by infectious diseases.</p>	<p>Post-project assessments obtained by dispatching survey teams.</p>	<p>1) No change in MOFA policies. 2) Financial conditions do not deteriorate. 3) The people's food tastes do not change. 4) The market economy is stable</p>
<p>(Project Goals) 1) Improvement of animal infectious disease diagnosis technology. 2) Development of animal infectious disease prevention technology. 3) Improvement of the technology used by Veterinary Research Institute researchers</p>	<p>Effects after a specified period of time has elapsed once assistance has been provided. 1) Preparation of manuals on animal infectious disease diagnosis technology. 2) Preparation of manual infectious disease prevention technology. 3) Successful research and technological development in the animal infectious disease field.</p>	<p>Post-project assessments obtained by dispatching survey teams.</p>	<p>1) Policies of the MOFA do not change. 2) The government provides sufficient financial support to the project. 3) A stable research staff is employed, with few researchers changing jobs.</p>
<p>(Effects of the Project) 1) Improvement of the research and technological development related equipments at the Veterinary Research Institute. 2) Establishment of animal infectious disease diagnosis and prevention technology and the preparation of manuals of this technology. 3) Improvement of the capability of the researchers at the Veterinary Research Institute.</p>	<p>1) Details of machinery improved or provided. 2) Details of the animal infectious disease diagnosis technology established. 3) Details of the animal infectious disease prevention technology established. 4) Papers on research and technology development published by researchers.</p>	<p>1) Final report on the project. 2) Post-project assessments obtained by dispatching survey teams.</p>	<p>1) Policies of the MOFA do not change. 2) The government provides sufficient financial support to the project. 3) A stable research staff is employed, with few researchers changing jobs.</p>
<p>(Project Activities) 1) Preparation of Research and Development Plans Preparation of plans for research and development on animal infectious disease diagnosis and prevention technology 2) Research and Development of Animal Infectious Disease Diagnosis Technology (1) Testing and research at the Veterinary Research Institute. (2) Collection and analysis of data. (3) Preparation of manuals. 3) Research and Development on Animal Infectious Disease Prevention Technology (1) Testing and research at the Veterinary Research Institute. (2) Preparation of manuals.</p>	<p>(Inputs) Donor Countries 1) Contribution of equipments and materials (for research and technological development) 2) Dispatch of experts (microbiology, pathology, immunology, laboratory animal, etc.) 3) Acceptance of trainees from counterpart organizations.</p> <p>Mongolia 1) Appointment of a project manager and a counterpart personnel. 2) Provision of project facilities and land. 3) Establishment of the Project Promotion Committee</p>	<p>1) Suitable researchers are employed. 2) The Mongolian side enacts the needed budget measures. 3) The necessary research materials can be acquired. 4) A complete animal husbandry hygiene management system is established.</p>	<p>(Prerequisite Conditions) 1) The Government of Mongolia provides funds and personnel required for the project. 2) The Institute is provided with the facilities and land it needs for its research and technological development work. 3) The project Promotion Committee carries out the necessary coordination work.</p>

6.2 Environmental Impact Assessment

1) Assessment Method

In 1994, the Ministry of Nature and the Environment (MNE), the ministry responsible for environmental impact assessments, enacted environmental impact assessment guidelines covering screening methods, standards to be applied during assessments, and assessment implementation procedures. Discussions concerning assessment methods with MNE officials at the time of the initial environmental impact assessment revealed that the Mongolian guidelines and those followed by JICA were almost identical, so it was decided that the final environmental impact assessment will be conducted in accordance with JICA guidelines.

2) The Initial Environmental Impact Assessment

The initial environmental impact assessment included a project description (PD), a site description (SD), and screening of the six priority projects.

(Assessment Results)

(1) All six of the projects can be implemented without any direct or indirect impact on the social or natural environment (Table 6.2.2). As a reference, Table 6.2.1 presents the Environmental Impact of Development and Impact Mitigation Measures for the entire Master Plan.

(2) It was pointed out that there is a danger of domestic animal waste at dairy farms close to the city contaminating the nearby environment if existing conditions remain as they are. The priority project, Milk Production Increasing Project, includes plans for improving facilities so that this danger will be eliminated, and the ripple effects of these plans are expected to be felt in other regions.

(3) In order to preserve the natural environment when conducting an agricultural development project, it is essential to preserve the soil on the cultivated fields and to prevent the deterioration of grasslands. The Model Verification Project for Farmland Preservation Measures and the Grassland Productivity Improvement Program proposed as part of the Master Plan will contribute to this. Further, it is hoped that these two projects will begin soon after the commencement of the six priority projects.

Future Measures

Officials of the MNE and Aimags involved have exchanged views on these matters based on the initial environmental impact assessment, but the priority projects

incorporate specific measures to protect the environment, and all agreed that their implementation will have neither a direct nor indirect impact on the environment and that there is little need for an environmental impact assessment. Consequently, in order to prepare for the conduct of an environmental impact assessment by the Mongolian side, information concerning the priority projects will be provided to the MNE.

Table 6.2.1 The Environmental Impact of Development and Impact Mitigation

Elements Farming the Environment	Environmental Impact	Environmental Impact Mitigation Measures
<p>I Social Environment</p>		
<p>1. Social Life</p>		
<p>(1) Daily Life of the People</p>	<p>D D C...Nomads(loss of social security because of privatization D C...Nomads</p>	<p>Provide guidance in all areas of daily life</p> <p>Consider all social and economic issues and provide measures based on respect for the aspirations of the nomads</p>
<p>2. Systematic movement of the population</p>		
<p>3. Non-spontaneous movement of the population</p>		
<p>4. Changes in life styles</p>		
<p>5. Conflict among the people</p>		
<p>6. Aboriginal groups, minority groups, nomads</p>		
<p>(2) Population Problems</p>	<p>B...Movement of people into the cities D...Social systems and customs, more young people</p>	<p>Provide the socio-economic infrastructure in the regions to deal with the population increase Youth employment measures to deal with the population increase</p>
<p>1. Population increase</p>		
<p>2. Rapid change in the composition of the population</p>		
<p>(3) Economic activities of the People</p>	<p>B...Breakup of land use rights through privatization B...Regional farm households B...Regional farm households</p>	<p>Diversification of crops and establishments of a crop rotation system Stimulation of regional economies to increase employment opportunities Stimulation of regional economies</p>
<p>1. Transformation of the foundations of economic activities</p>		
<p>2. Changes and loss in economic activities</p>		
<p>3. Widening gaps in incomes</p>		
<p>(4) Institution and Custom</p>	<p>D...Study necessary C...Nomads overworked C...Nomads overworked</p>	<p>Support for self-government and cooperative activities at the town level Support for self-government and cooperative activities at the town level</p>
<p>1. Reconfirmation of water and fishing rights</p>		
<p>2. Changes in social structures by new organizations etc.</p>		
<p>3. Reform of existing systems and practices</p>		
<p>2. Health and Hygiene</p>	<p>C...Effects on people and animals C...Study necessary C...Increase in movement of people and animals D B...Effects on surface water of excrement produced by intensive animal husbandry</p>	<p>Strengthening animal disease prevention systems Installation of fertilizer production facilities</p>
<p>1. Increase in the volume of agricultural chemicals used</p>		
<p>2. Outbreak of endemic disease</p>		
<p>3. Transmission of communicable disease</p>		
<p>4. Accumulation of residual toxic substances, agricultural chemicals, etc.</p>		
<p>5. Increase in residual toxic substances and excrement</p>		
<p>3. Historical Remains, Cultural Properties, Scenic Beauty</p>	<p>C C D</p>	<p>Exemption from development plans Exemption from development plans Preservation measures needed when discovered</p>
<p>1. Damage and destruction of historical remains and cultural properties</p>		
<p>2. Loss of precious scenery</p>		
<p>3. Buried resources</p>		

(continue)

Elements Farming the Environment	Environmental Impact	Environmental Impact Mitigation Measures
II Natural Environment		
4. Regions With Valuable Plants and Ecosystems 1. Changes in vegetation 2. Valuable varieties and unique plant and animal varieties 3. Diversity of living organisms 4. Intrusion and multiplication of harmful living organisms 5. Disappearance of wet lands and peat bogs 6. Disappearance of tropical forest and wild lands	C...Observation necessary C...Ecological study necessary C C C...Observation necessary	Preservation of forests and wet lands of prescribed size, restriction on the increase in the number of domestic animals Exempted as natural environment conservation areas or national parks Exempted as natural environment conservation areas or national parks
5. Soil and Land (1) Soil 1. Soil erosion 2. Soil becomes saline 3. Decline in the fertility of soil 4. Soil contamination	B...Wind Erosion C...Decline in the productivity of the soil C	Implementation of measures to prevent soil erosion and the planting of windbreak groves of trees as part of farm operation Regional improvement by establishing a crop rotation system
(2) Land 1. Destruction of the land (including desertification) 2. Destruction of surrounding land, forests, grasslands	C...Observation necessary C	Conducting soil conservation programs
6. Water Content, Water Quality (1) Water Content 1. Changes in surface water flow 2. Changes in flow and level of ground water 3. Occurrence of floods or floods 4. Sedimentation of soil 5. River bed subsidence	C...Slight effect B...Periodic observation necessary C...Slight effect C C	Periodic inspections and observation Appropriate locations for wells
(2) Water Quality, Temperature 1. Contamination and decline of water quality 2. Eutrophication 3. Penetration of salt water 4. Changes in water temperature	C...Slight effect D D D	Periodic inspections and observations
(3) Atmosphere 1. Atmospheric pollution	C	

(注) 1. Codes in the environmental impact column express the degree of the impact on the environment.
 A: Serious impact. B: Assumed serious impact. C: No serious impact. D: Unclear or assumed to be no serious impact.
 2. The items in the environmental impact column are forecast effects.

Table 6.2.2

Results of the Initial Environmental Examination

C A T E G O R Y	I S O C I A L E N V I R O N M E N T					
	1. Social Life (1) Daily Life of the People 1. Systematic movement of the population 2. Non-spontaneous movement of the population 3. Changes in life styles 4. Conflict among the people 5. Aboriginal groups, minority groups, nomads	(2) Population Problems 1. Population increase 2. Rapid change in the composition of the population	(3) Economic Activities of the People 1. Transformation of the foundations of economic activities 2. Changes and loss in economic activities 3. Widening gaps in incomes	(4) Systems and Practices 1. Reconfirmation of water and fishing rights 2. Changes in social structures by new organizations etc 3. Reform of existing systems and practices	2. Health and Hygiene 1. Increase in the volume of agricultural chemicals used 2. Outbreak of endemic disease 3. Transmission of communicable disease 4. Accumulation of residual toxic substances and agricultural chemicals 5. Increase in residual toxic substances and excrement	3. Historical Remains, Cultural Properties, Scenic Beauty 1. Damage and destruction of historical remains and cultural properties 2. Loss of precious scenery 3. Buried resources
1. Irrigated Agriculture Technology Development Project	D	D	D	D	D	D
2. Seed Propagation Project	D	D	D	D	D	D
3. Animal Husbandry Laboratory Technology Development Project	D	D	D	D	D	D
4. Nomadic Herding Region Water Supply Facility Improvement Project	D	D	D	D	D	D
5. Milk Production Improvement Project	D	D	D	D	C	D
6. Agriculture Information Dissemination System Improvement Project	D	D	D	D	D	D

(continue)

C a t e g o r y	N a t u r a l E n v i r o n m e n t						Overall	Remarks
	4. Regions With Valuable Plants and Ecosystems 1. Changes in vegetation 2. Valuable varieties and unique animals and plant varieties 3. Diversity of living organisms 4. Intrusion and multiplication of harmful living organisms 5. Disappearance of wet lands and peat bogs 6. Disappearance of tropical forest and wild lands	5. Soil and Land (1) Soil 1. Soil erosion 2. Soil becomes saline 3. Soil contamination	(2) Land 1. Destruction of the land (including desertification) 2. Destruction of surrounding land, forests, grasslands	6. Water Content, Water Quality (1) Water Content 1. Contamination or decline in surface water flow 2. Changes in flow and level of ground water 3. Occurrence of floods and floods 4. Sedimentation of soil 5. River bed subsidence	(2) Water Quality, Water Temperature 1. Contamination and decline of water quality 2. Eutrophication 3. Penetration of salt water 4. Changes in water temperature	(3) Atmosphere 1. Atmospheric pollution		
1. Irrigated Agriculture Technology Development Project	D	D	D	D	D	D	D (No Serious effect)	
2. Seed Propagation Project	D	D	D	D	D	D	D (No Serious effect)	
3. Animal Husbandry Laboratory Technology Development Project	D	D	D	D	D	D	D (No Serious effect)	
4. Nomadic Herding Region Water Supply Facility Improvement Project	D	D	D	D	D	D	D (No Serious effect)	
5. Milk Production Improvement Project	D	D	D	D	D	D	D (No Serious effect)	Newly constructed compost-ban
6. Agriculture Information Dissemination System Improvement Project	D	D	D	D	D	D	D (No Serious effect)	

(EE) 1. Code in the environmental impact column express the degree of the impact on the environment.

A : Serious impact, B : Assumed serious impact, C : No serious impact, D : Unclear or assumed to be no serious impact.

2. The items in the environmental impact column are forecast effects.

