

(3) Maintenance and administration costs

At present the Ministry of Public Works decides on the annual appropriation for maintenance and administration of earth roads in the Chaco region on the basis of US\$7,000 per 1 km of road.

However, this amount covers labour costs, fuel oil expenses and expenses for repair of machines and equipment, and does not cover depreciation. As for branch roads, this plan calls for about the same level of administration. For trunk roads, the maintenance and administration costs are estimated to be one third of the costs for earth roads, as trunk roads are planned to be paved and thus will require less inspections and repair. The maintenance and administration costs including depreciation for machines and equipment will be US\$1,100,00 a year. Table 9.3.4. shows details of the costs.

2) Irrigation facilities

Irrigation facilities are small-scale facilities designed to serve vegetable-growing farms in the Asuncion suburban zone. Water comes from wells. The irrigation water covers a zone of 90 ha and is available for 100 farms. The maintenance and administration of facilities will be taken care of by the local agricultural cooperative. The maintenance and administration costs will be about US\$10,000 a year, or US\$100 per farm. The details of the costs are shown in Table 9.3.5.

3) Drainage facilities

The drainage facilities are divided into a waterway on the level of paddies and a main drainage canal. The waterways on the level of paddies will be dealt with in farms' daily farming management and will not be taken up in this maintenance and administration plan. Since the main drainage canal serves a zone as one unit, it will be administered by the agricultural cooperative to be set up in each zone unit.

The main tasks of the maintenance and administration plan include mending defective parts in the drainage system and mowing at waterways and in incidental lots. Machines and equipment for such operations are not included in this plan, as farming equipment belonging to farms and machines owned by the agricultural cooperative can be used as appropriate depending on the situation. The maintenance and administration of the drainage facilities requires an inspection once a year or so. The annual costs are estimated to be half the costs for roads, or US\$350 per 1 km. Therefore a total of US\$22,000 will be required per year. Details of the costs are shown in Table 9.3.6.

## 9.4 PROJECT COSTS

Table 9.4.1. shows the total project costs for the Integrated Agricultural and Livestock Farming Development Plan. In estimating the total project costs, the following matters have been taken into account.

- 1) Although the base year of reckoning is the end of 1992, exactly the same construction costs in US dollars are shown as there have been no changes.
- 2) The total project costs are broken down into implementation design costs, project costs, an engineering service fee, a physical reserve fund, and a price reserve fund. Since agricultural and livestock product processing facilities, which the private sector deals with, closely relate to this integrated development plan, the cost for such facilities have been added and are included in the project costs. The fund requirements in the agricultural credit plan, which are indispensable for the implementation of this plan, will be shown separately from the total project costs.
- 3) 0.5 percent of the project costs are appropriated as implementation design costs.
- 4) The project costs include the following.
  - (1) Detailed design and implementation management costs The detailed design costs covers the expenses required for surveying, design, and preparation of tender-related documents. The implementation management cost covers the expenses required for the management of construction during the implementation period. In this plan, a total of 10% of the construction costs are appropriated for the detailed design and implementation management costs.
  - (2) Construction costs  
The construction costs are made up of direct construction costs and expenses. The direct construction costs cover the total of materials costs, machine costs, and labour costs. The expenses cover general administration expenses for construction firms and expenses required at construction sites. The expenses account for 30% of the direct construction costs.
  - (3) Lot costs  
The lot costs cover the expenses required to purchase lots for construction scheduled in this plan. Following the custom in Paraguay which calls for anyone who has the title to land to provide his land free when it is used for a construction lot for facilities that are

most likely to serve public interests such as roads, there is no appropriation for land costs. Land is to be provided free by landowners as a general rule.

(4) Operating costs

The operating costs for the research institute to be newly set up, the training centre for farmers as part of the agricultural support plan, the agricultural machinery joint-use organization and the seedling supply facility will be included in the project costs. The operating costs are scheduled for 15 years. In case any of the facilities earns income from selling bulls' semen or seedlings, such income is deducted when the annual operating costs are estimated.

(5) Maintenance and administration costs

The maintenance and administration expenses for roads, irrigation, and drainage facilities are counted in as maintenance and administration costs. The costs required to repair trunk roads include the saving in maintenance and administration costs resulting from the use of asphalt.

5) Engineering service fee

In implementing this integrated development project, an engineering service fee for overseas consultants is allowed for, and 15 percent of the project costs are appropriated for this fee.

6) Reserve fund

The reserve fund is divided into a physical reserve fund and a price reserve fund. 10 percent of the total of the implementation design costs, the project costs, and the engineering service fee is appropriated for the physical reserve fund, and 10 percent of the total of the implementation design costs, the project costs, the engineering service fee, and the physical reserve fund is appropriated for the price reserve fund.

7) Foreign currency

Table 9.4.2. shows the share of foreign currency in the project costs. The amount of foreign currency has been obtained by multiplying the foreign currency rate prepared on the basis of the Report on the Survey of the Plan for Increasing Production of Principle Grain in the Central Region of Departamento Itapua of Paraguay (ESTUDIO DEL PLAN MASTER O DEL PROYECTO DE LA PRODUCCION DE GRANOS PRINCIPALES EL ZONE CENTRAL DEL DEPARTAMENTO DE ITAPUA, JICA, 1988) by the amount of each item. Table 9.4.3 shows the foreign currency rate for each cost item in the project costs.

## 9.5 FINANCING PLAN

Table 9.5.1 shows financial requirements for each year which have been estimated on the basis of 9.2 Execution plan and 9.4 Project costs. In estimating the required funds, the following matters have been taken into account.

- 1) The execution year of each individual project and the development in each zone will be determined on the basis of 9.2 Execution plan.
- 2) Individual shares of costs for farmland development and irrigation and drainage projects, which are part of the infrastructure project, are classified and shown in Table 9.5.2. The project costs are divided into costs to be borne by the state and those to be shouldered by individual farms according to this table.
- 3) The amount of funds required for the "Fund for Integrated Agricultural and Livestock Farming Development in the Chaco Region" (tentative name) represents the cumulative total of loans and redemption money for each year of settlement of farms and the provision of marketing and processing facilities which have been estimated based on the fund income and expenditure plan for each type of farming shown in paragraph 2 of attachment 7.4.4 Agricultural credit plan and the fund income and expenditure plan for marketing and processing facilities included in attachment Financial evaluation (see Table 9.5.3). The funds are categorized according to the items covered by the funds and divided into land acquisition funds, funds for long-term loans used to finance individual shares of project costs and facilities and agricultural machinery, and funds for financing marketing and processing facilities. The appropriated amount of funds required for each year represents the fund shortage needed to offset the redemption money by loans for each category. Funds for short-term loans are excluded from the amount of required funds.
- 4) In estimating the amount of required funds for the Fund, the fund appropriation rate of the funds used to provide loans at an interest rate of 8% is set at 100% while the following fund appropriation rates set for each type of farming are applied to funds used to provide loans at an interest rate of 12% or short-term loans.

Large-scale livestock raising farms and marketing and processing facilities	50%
Medium-scale farms	70%
Small-scale farms	100%

Note: The fund appropriation rate refers to the percentage of farms which are assumed to actually borrow money to make up for shortage of their funds. The remaining percentage represents farms which are assumed to use their funds on hand and not to actually borrow money.

Table 9.4.1 Summary of Project Costs for Integrated Agricultural and Livestock Development Project at Lower Chaco

Items	Unit	Northern part Poço Colorado		Suburbs Asunción		Southern part Ca. Est. Sembrado - the Province		Eastern part of the Province		Livestock farming development		Applicable entire region		Total		
		Requirts Project	Project Results	Requirts Project	Project Results	Requirts Project	Project Results	Requirts Project	Project Results	Requirts Project	Project Results	Requirts Project	Project Results	Requirts Project	Project Results	Requirts Project
1. Implementation Costs		370	50	320	590											2,340
2. Project costs																
1) Research																
Chaco Livestock Experimental Station	place															( 6,990)
Operating costs for the above																1,610
Breeding stock farms	place															3,790
Support for agricultural and livestock farming	place															1,590
Traning centre for farmers	place															( 24,220)
Operating costs for the above																2,470
DEA regional administration office	place															2,940
DEA area diffusion office	place															710
Agricultural machinery joint-use organization	place															720
Operating costs for the above																13,850
SENASE seed and seedling supply facility	place															700
Operating costs for the above																1,610
3) Agricultural infrastructure improvement																1,220
Roads (trunk roads)	km.	79	16	97	8,810	211	19,370	298	26,480							701
Maintenance and administration costs for the above																5,000
Preparation of farmland (including branch roads)	ha.	25,400	2,200	26,200	15,610	38,100	25,510	85,200	46,550							177,100
Preparation of grassland	ha.	12,000	300	15,100	2,830	24,090	4,500	427,700	80,270							479,100
Drainage (including irrigation facilities)	ha.	15,700	2,200	4,200	6,300	20,500	31,200									63,900
Maintenance and administration costs for the above																42,600
4) Social infrastructure improvement																270
Preservation of farmland (afforestation and observation wells)	ha.	4,364	292	4,019	1,790	7,245	2,690									16,720
5) Marketing and processing facilities																
Clinics		80			110		270									( 62,050)
Educational facilities		500			310		1,200									460
Communication facilities		550			960		1,590									2,010
Electrification		8,940	630	12,990	12,990		15,260									3,100
Waterworks		1,430		960	1,910		4,300									37,820
Housing	houses	530	390	430	1,840	790	3,000	1,640	6,230							4,300
Marketing and processing facilities																14,360
Ginning plant	place	1		1	2,600	1	2,600									7,800
Joint facilities for grading and packing citrus fruit	place	1		1	1,100	2	2,200									4,400
Plant for milk and milk products	place															29,600
Meat processing plant	place															27,500
Joint collection and shipment facility for vegetable and fruit	lugar		1	1	6,600	4	26,400									1,300
Total project costs		74,960	10,060	62,720	138,610		160,970									511,300
3. Engineering service fees		11,240	1,510	9,560	20,790		24,150									76,700
4. Physical contingency		8,660	1,160	7,360	16,010		18,590									59,060
5. Price contingency		9,520	1,280	8,100	17,610		20,450									64,960
Grand total of project costs		104,750	14,060	89,660	193,710		224,960									714,570
Fund for Integrated Agricultural and Livestock Development at Chaco																
Land acquisition funds																5,820
Project investment funds																100,050
Farming investment funds																41,250
Funds for Marketing and Processing facilities																12,730
Total funds																159,850

Note : The costs for agricultural infrastructure projects include individual shares of costs for farmland development, preparation of grassland, and irrigation and drainage projects. These individual shares have also been appropriated as loan funds for the Fund for Integrated Agricultural and Livestock Development at Chaco.

Table 9.4.2 Summary of Project Costs for Integrated Agricultural and Livestock Development Project at Lower Chaco (Cost of foreign currency)

Items	Unit	Northern part Toro Colorado		Suburban Asuncion		Southern part of the Chaco to settlements		Eastern part of the Chaco to settlements		Livestock farming developments		Applicable entire region		Total
		Require- ments	270	Require- ments	40	Require- ments	240	Require- ments	510	Require- ments	590	Require- ments	230	
1. Implementation Costs														1,880
2. Project costs														( 3,580)
1) Research														720
Chaco Livestock Experimental Station	place											1	1	2,080
Operating costs for the above														780
2) Support for agricultural and livestock farming														( 18,810)
Breeding stock farms	place											1	1	1,180
Training centre for farmers	place													230
Operating costs for the above														240
DEA regional administration office	place													650
DEA area diffusion office	place													1,060
Agricultural machinery joint-use organization	place													1,010
Operating costs for the above														701
SENASA seed and seedling supply facility	place													47,360
Operating costs for the above														7,550
3) Agricultural infrastructure improvement														78,120
Agricultural infrastructure improvement	km.	79	5,250	16	1,150	97	6,600	211	14,480	298	19,840			177,100
Roads (trunk roads)			680		110		310		410	810				479,100
Maintenance and administration costs for the above														42,600
Preparation of farmland (including branch roads)	ha.	25,400	11,310	2,200	1,300	26,200	11,660	36,100	10,040	85,200	34,910			15,720
Preparation of grassland	ha.	12,000	1,690	300	50	15,100	2,120	24,000	3,380	427,700	60,200			67,440
Drainage (including irrigation facilities)	ha.	15,700	16,830	2,200	1,920	4,200	4,470	20,500	22,150					42,600
Maintenance and administration costs for the above			40		120		70		30					260
Preservation of farmland (afforestation and reforestation)	ha.	4,364	1,010	292	70	4,819	1,110	7,245	1,670		10			16,720
Preservation of farmland (afforestation and reforestation)	ha.													3,870
4) Social infrastructure improvement														( 40,400)
Clinics		40				60		140						240
Educational facilities		110				70		260						440
Communication facilities		550				980		1,590						3,100
Electrification		7,240				10,520		12,360						30,630
Waterworks		940				630		1,260						2,830
Housing	houses	530	440	300	380	430	360	790	660	1,640	1,370			3,790
5) Marketing and processing facilities														( 67,540)
Ginning plant	place	1	2,420			1	2,420	1	2,420					7,260
Joint facilities for grading and packing citrus fruit	place	1	960			1	960	2	1,910					3,830
Plant for milk and milk products	place					1	5,740	4	22,970					34,450
Meat processing plant	place													21,450
Joint collection and shipment facility for vegetable and fruit	lugar			1										550
Total project costs		55,350	11,240	11,240	1,510	9,560	9,560	104,790	104,790	117,370	48,600			380,300
3. Engineering service fees														76,700
4. Physical contingency														45,860
5. Price contingency														50,480
Grand total of project costs		80,910	9,340	9,340	70,320	70,320	70,320	152,570	152,570	171,590	70,520			555,250
Funds for Integrated Agricultural and Livestock Development at Chaco														0
Land acquisition funds														74,040
Project investment funds														30,530
Farming investment funds														12,730
Funds for Marketing and processing facilities														159,850
Total funds														159,850

Note : The amount of foreign currency has been obtained by multiplying the project costs shown in Table 9.4.1 by the foreign currency rate set for each cost item as shown in Table 9.4.3 in the volume of appendix.

## CHAPTER 10

### PROJECT ASSESSMENT





## CHAPTER 10 PROJECT EVALUATION

### 10.1 ENVIRONMENTAL IMPACT ASSESSMENT

#### 1) Environmental impact (forecast)

Several meetings were held with the Paraguayan government to discuss the environmental impact associated with development on the basis of the local scoping checklist, and both sides were virtually in agreement on estimates about the degree of environmental impact for each environmental element included in the checklist. Some estimates were supported by a long-term forecast, while some others need to be supplemented by future in-depth surveys and observation.

The results of the local scoping and measures to lessen environmental impact are shown in Table 10.1.1. When this integrated development plan is put into operation, the measures listed in the table must be taken properly in order to ease the impact on the environment. Of these measures to ease the impact on the environment, those that require special attention besides those already explained in 7.2.9 Environmental conservation measures are described below.

#### (1) Smooth transition for rights to planned lots and concern for indigenous people

When this integrated development plan is implemented, concern for the social environment, especially smooth coordination with large landowners for rights to planned lots (lots allotted for settlers, lots for public facilities) and thoughtful consideration for the indigenous people (including their customs of hunting and hunting) are indispensable conditions. Accordingly, necessary legal steps and smooth coordination efforts must be taken in Paraguay before the project is launched.

#### (2) Selection of settlers and proper conduct of training in farming, etc.

Settlement is planned as a government policy in this integrated development plan. For the purpose of not only ensuring the success of the project but also showing concern for the environment, it is extremely important for the Paraguayan government to carefully and comprehensively review the qualifications and requirements for settlers which are necessary for various agricultural and livestock farming operations created by this integrated development plan to take root and continue to exist in a stable manner. It should also provide farming support for settlers, including training in farming at an early stage, as well as education and training for the younger generation until their farming operations become stable. Abandonment of land due to failures in farming is likely to

result in the dilapidation of the land, which may trigger the destruction of natural environment, a possibility that cannot be denied.

- (3) Study of local diseases, and establishment of infectious disease prevention and hygiene systems for people and livestock

Since there are worries in connection with the settlement plan that endemic diseases (tuberculosis, schistosomiasis) may break out, the Paraguayan government is required to study the area covered by the development plan and its surrounding zones in advance, and to take measures to prevent infectious diseases as required. It should also pay special attention to the spread of infectious diseases, which may be caused by an increase in human and livestock traffic due to the development, and establish a hygiene system to protect people and livestock in the region.

A change in the surface environment such as vegetation brought about by the development of farmland may lead to an abnormal increase in pests and cause great damage. Therefore, past cases in the country as well as in the region must be studied beforehand, and infectious disease prevention measures must be put in place in Paraguay.

- (4) Environmental monitoring

Judging from the natural geographical conditions and the socio-economic conditions of the area covered by the development plan, and the scale, details, and period of this integrated development plan, environmental monitoring is deemed to be necessary for the implementation of this integrated development plan. In addition, the results and data obtained from such monitoring must be reflected in the project. Monitoring is to cover a survey of groundwater (level and quality) and the constituents of the soil in addition to an ecological survey of fauna and flora. It is also important to conduct an ecological survey of fauna and flora prior to the launch of the project.

- 2) Harmony between agricultural and livestock farming development and the environment  
Agricultural and livestock farming has progressed and grown thus far in keeping with the natural geographical and socio-economic environments of the region where it has originated, thanks to wise management and untiring efforts. This is also the principle that governs the successful establishment of land-intensive agricultural and livestock farming in the region. The study area has lagged behind in development as it has remained unused or only a small portion of the region has been utilized. In order to make clever use of the limited development potential and collectively establish agricultural and livestock farming operations in this region, the above principle has to be observed in a more positive form. To this end, the measures for preserving the environment discussed in 7.2.9 and the measures for easing

environmental impact reviewed in paragraph 1 of this chapter must be carried out after careful preparation. Only then can it be said that the basic condition needed to establish “sustainable operations in harmony with the environment”, which is the aim of this integrated development plan, will be in place.

Table 10.1.1 Name of Project: Study of Integrated Agricultural and Livestock Farming Development Project at Lower Chaco in Paraguay

Second Phase Local Survey/Environment Sector

Environmental impact associated with development and measures for reducing the impact on the environment

Environmental elements	Environmental impact	Measures for reducing the impact on the environment
<p>(1) Social environment</p> <p>(1) Residential lifestyles</p> <ol style="list-style-type: none"> <li>1. Systematic relocation</li> <li>2. Forced relocation</li> <li>3. Change in lifestyle</li> <li>4. Discord amongst inhabitants</li> <li>5. Indigenous people/minority races/nomads</li> </ol>	<p>A.... Settlers</p> <p>B.... Indigenous people</p> <p>B.... Settlers</p> <p>A.... Acquisition/allotment of lots for settlement</p> <p>B.... Living rights for some indigenous people (membership rights, etc.)</p>	<p>Development of social infrastructure, establishment of system for supporting livelihoods and production</p> <p>Confirmation of intentions of indigenous people</p> <p>Provision of thorough guidance for living</p> <p>Smooth acquisition of lots planned for development and proper evaluation and allotment of settlement lots</p> <p>Social and economic considerations and measures based on wishes of indigenous people</p>
<p>(2) Population problems</p> <ol style="list-style-type: none"> <li>1. Population increase</li> <li>2. Drastic changes in population structure</li> </ol>	<p>B.... Social systems and customs</p> <p>B.... Social systems and customs</p>	<p>Development of social and economic infrastructure and establishment of system for supporting lifestyles in consideration of growth in population</p> <p>Development of social and economic infrastructure and establishment of system for supporting lifestyles in consideration of growth in population</p>
<p>(3) Economic activity of inhabitants</p> <ol style="list-style-type: none"> <li>1. Transfer of base for economic activity</li> <li>2. Shift in economic activity and unemployment</li> <li>3. Increase in earnings differentials</li> </ol>	<p>A.... Transfer of rights to estates due to development</p> <p>B.... Indigenous people</p> <p>B.... Indigenous people</p>	<p>Smooth coordination with landowners concerned for transfer of rights and establishment of compensation measures</p> <p>Thoughtful consideration for indigenous people</p> <p>Thoughtful consideration for indigenous people</p>

Environmental elements	Environmental impact	Measures for reducing the impact on the environment
<p>(4) Systems and customs</p> <ol style="list-style-type: none"> <li>1. Readjustment of rights to water and fishing</li> <li>2. Change in social structure including establishment of organizations</li> <li>3. Reform of existing systems and customs</li> </ol>	<p>D.... Study is required (indigenous people's customs of hunting and fishing)</p> <p>B.... Formation of new villages by settlers</p> <p>B.... Formation of new villages by settlers</p>	<p>Support for autonomous and collective activities of settlers</p> <p>Support for autonomous and collective activities of settlers</p>
<ol style="list-style-type: none"> <li>2. Preservation of health and hygiene</li> <li>1. Increase in amount of agricultural chemicals used</li> <li>2. Occurrence of endemic diseases</li> <li>3. Spread of infectious diseases</li> <li>4. Accumulation of residual toxicity and agricultural chemicals</li> <li>5. Increase in amount of residual toxicity and excrement</li> </ol>	<p>B.... Effect on people and livestock</p> <p>B.... Study is required in connection with settlement plan</p> <p>B.... Increase in human and livestock traffic</p> <p>D.... Special attention is required in the long run</p> <p>D.... Special attention is required in the long run</p>	<p>Diffusion of and instruction in techniques for prevention of damage from disease and pests</p> <p>Establishment of disease-prevention and hygiene system</p> <p>Establishment of disease-prevention and hygiene system</p> <p>Guidance for selection of agricultural chemicals</p> <p>Guidance for disposal methods in consideration of safety, health, and environment</p>
<ol style="list-style-type: none"> <li>3. Historical sites, cultural heritage, and scenery</li> <li>1. Damage and destruction of historical sites and cultural heritage</li> <li>2. Loss of valuable scenic sights</li> <li>3. Underground deposits of resources</li> </ol>	<p>D....</p> <p>D....</p> <p>D.... Archaeological deposits</p>	<p>To be excluded from development plan</p> <p>To be excluded from development plan</p> <p>Preservation measures are required if such deposits have been found (Cultural Properties Law ...Law No. 946)</p>

Environmental elements	Environmental impact	Measures for reducing the impact on the environment
<p>II Natural environment</p> <p>4. Areas where valuable wildlife and ecological systems exist</p> <p>1. Changes in vegetation</p> <p>2. Valuable species and fauna and flora indigenous to the region</p> <p>3. Variety of species of wildlife</p> <p>4. Penetration and propagation of harmful animals</p> <p>5. Extinction of wetlands and peaty soil</p> <p>6. Extinction of tropical forest wild land</p>	<p>B.... Shift in land utilization</p> <p>B.... Ecological study is required</p> <p>B.... Shift in land utilization</p> <p>B.... Spread of infectious diseases among live stock, abnormal increase in harmful animals</p> <p>D.... Observation is required</p>	<p>Preservation of fixed size of forests, natural grasslands, and wetlands in accordance with Forest Resources Law</p> <p>To be excluded from development plan as environment preservation zones.</p> <p>Periodical study of ecology</p> <p>Preservation of fixed size of forests, natural grasslands, and wetlands in accordance with Forest Resources Law</p> <p>Establishment of measures for preservation of livestock health, establishment of harmful animal control system</p> <p>Preservation to be considered through land use planning</p> <p>Preservation to be considered through land use planning, periodical study of ecology</p>
<p>5. Soil and land</p> <p>(1) Soil</p> <p>1. Soil erosion</p> <p>2. Salinization of soil</p> <p>3. Deterioration of soil fertility</p> <p>4. Soil contamination</p>	<p>B.... Wind erosion</p> <p>B.... Deterioration of productivity of land</p> <p>B.... Deterioration of productivity of land</p> <p>D.... Special attention is required in the long run</p>	<p>Provision of shelterbelts</p> <p>To be considered in drainage plan, periodical observation of groundwater level and salt (simple observation holes, farm management)</p> <p>Diffusion of and instruction in safe usage of agricultural chemicals</p>
<p>(2) Land</p> <p>1. Dilapidation of land (including desertification)</p> <p>2. Dilapidation of hinterland, woodland, grassland</p>	<p>D... Special attention required</p> <p>D</p>	<p>Application of Forest Resources Law, implementation of measures for preserving environment</p> <p>Application of Forest Resources Law, provision of shelter belt (conservation forest)</p>

Environmental elements	Environmental impact	Measures for reducing the impact on the environment
6. Hydrology, quality of water (1) Hydrology 1. Change of flow condition of surface water. 2. Change of flow condition and level of groundwater 3. Occurrence of submergence and flooding 4. Accumulation of earth and sand 5. Lowering of riverbed	C.... Minor effect B.... Periodical observation required D.... Minor effect D.... Special attention required C	Periodical fixed-point observation
(2) Quality of water and water temperature 1. Water pollution and deterioration of quality 2. Eutrophication 3. Penetration of salt water 4. Change in water temperatures	D.... Minor effect (observation required) D.... ditto (ditto) D.... ditto (ditto) D.... ditto (ditto)	Periodical fixed-point observation
(3) Atmosphere 1. Air pollution	C	

Notes: 1. The symbols used in the environmental impact column represent the degree of environmental impact.

A: Seriously affected

B: Deemed to be seriously affected

C: Not seriously affected

D: Unknown or deemed not to be seriously affected

2. Expected effects are shown in the environmental impact column.

## 10.2 FINANCIAL EVALUATION

### 1) Purpose of financial evaluation

The purpose of financial evaluation is to clarify the year-to-year financial conditions of a business entity which makes project investments with a view to earning private profits, and to analyze the propriety of the project investment on the basis of figures obtained from such financial conditions through a certain calculation process. The specific purpose of financial evaluation in this report is to evaluate the financial status of farms in a settlement which are the beneficiaries of this integrated agricultural and livestock farming development plan as well as the financial condition of each of the business entities which operate marketing and processing facilities, to contribute to production through handling and processing agricultural and livestock products, and to prove that this agricultural and livestock farming development plan will bring profits to business entities which will participate in the project. This is a very important factor that encourages business entities to participate voluntarily and cannot be made light of if this integrated development plan, which is built on sustainable development, is to be materialized.

### 2) Evaluation target entities and evaluation method

Financial evaluation will be carried out for the following business entities which are expected to earn private profits through this integrated development plan. Financial evaluation is not to be conducted on entities in the public service sector such as research institutes or agricultural support organizations.

- 1) Farm operation for each type of farming excluding farms operated by indigenous people
- 2) Marketing and processing facilities

In making a financial analysis, the following matters are taken into consideration.

### 1) Operation of farms

Prices are all evaluated on the basis of market prices. The financial analysis is to be made on the basis of the business income and expenditure plan for each type of farming. Since depreciation costs are counted as reinvestment costs for each year that requires such reinvestment, they are to be excluded from the expenditure at the time of calculation.

Since the financial evaluation is made on the basis of total owner's equity, interest expense is to be excluded from the expenditure items. The amount of money required for project investment is all assumed to be invested in the first farming year. As for the



project investment, individual shares are to be included and subsidies from the state are not counted.

As for the items that require reinvestment such as buildings, facilities, machinery, and seedlings, reinvestment is to be made for each year that is in need of such reinvestment. In addition, as to the items that have residual value in the final accounting year, such residual value is counted as negative investment costs.

Since livestock is counted on the basis of self-breeding within each operation, reinvestment is not to be made except for investment from outside. As for improved grassland, reinvestment is not to be made since seed costs, feed costs, etc. are included in the operating costs as replacement costs.

Income from agricultural and livestock farming minus operating costs for agricultural and livestock farming and household expenses is regarded as disposable income. Net profit is the disposable income minus project investment expenses. The financial internal rate of return (FIRR), which is calculated on the basis of changes in the above net profit over 30 years, serves as the criterion for evaluation.

## 2) Marketing and processing facilities

Income is to be obtained by multiplying ex-factory prices estimated from market prices or international prices by output. For expenditure items, material purchase costs are to be obtained by multiplying a farm's loco price by purchased quantity. Labour costs are to be estimated from the planned number of employees. Operating costs are to be obtained by adding up material purchase costs, labour costs, and other expenditure. For matters not covered here, the rules provided in 1) Operation of farms apply.

## 3) Results of evaluation

### (1) Operation of farms

An analysis of financial status over a period of 30 years after the launch of the project has been made on the basis of the business income and expenditure plan for each type of farming as well as the investment plan. The results of the analysis are shown in Tables 10.2.1-10.2.11. The FIRR for each type of farming obtained from the analysis is shown below. Compared with an estimated interest rate of 12% (shown in US\$), which is a standard rate for the agricultural and livestock farming sector in Paraguay, every FIRR exceeds the rate. Judging from this, the plan can be regarded as valid.

- (i) Integrated beef cattle operation from breeding to fattening (large-scale)
  - 13.6% (Table 10.2.1)
- (ii) Multiple operation: dairy farming, cotton, and peanuts (medium-scale)
  - 18.6% (Table 10.2.2)
- (iii) Multiple operation: dairy farming and oil crops (medium-scale)
  - 15.6% (Table 10.2.3)
- (iv) Multiple operation: dairy farming and industrial crops (medium-scale)
  - 17.1% (Table 10.2.4)
- (v) Operation dedicated to dairy farming (medium-scale)
  - 20.4% (Table 10.2.5)
- (vi) Multiple operation: dairy farming, fruit trees, and sheep (small-scale)
  - 14.7% (Table 10.2.6)
- (vii) Multiple operation: dairy farming, fruit trees, and goats (small-scale)
  - 15.0% (Table 10.2.7)
- (viii) Multiple operation: field crops and fruit trees (small-scale)
  - 20.3% (Table 10.2.8)
- (ix) Multiple operation: dairy farming and fruit trees (small-scale)
  - 13.4% (Table 10.2.9)
- (x) Dairy farming, fruit trees and sheep (small-scale, part-time initially)
  - 14.0% (Table 10.2.10)
- (xi) Dairy farming, fruit trees and goats (small-scale, part-time initially)
  - 14.4% (Table 10.2.11)

(2) Marketing and processing facilities

An analysis of the financial status over a period of 30 years after the launch of the project has been made on the basis of the construction plan for each type of marketing and processing facilities. The results of the analysis are shown in Tables 10.2.12-10.2.16. The FIRR for each type of facilities, as shown below, is higher than 12%. Judging from this, the plan can be regarded as valid.

- (i) Ginning plant 17.5% (Table 10.2.12)
- (ii) Milk and milk product plant 15.6% (Table 10.2.13)
- (iii) Meat processing plant 14.5% (Table 10.2.14)
- (iv) Joint facilities for shipment of citrus fruit 17.8% (Table 10.2.15)
- (v) Joint facilities for shipment of fruit and vegetables 14.3% (Table 10.2.16)

### 10.3 ECONOMIC EVALUATION

#### 1) Purpose and method of economic evaluation

The purpose of economic evaluation is to judge the propriety of the project investment from a national point of view. Benefits and costs which arise from all kinds of project investment in connection with agricultural and livestock farming covered by this integrated development plan are to be estimated first. Then, the economic internal rate of return (EIRR) is obtained from year-to-year changes in net profit and verify the propriety of the project investment from a national point of view. In obtaining the EIRR, the following matters have been taken into account.

Prices are to be evaluated on the basis of economic prices which are determined by taking account of production costs or opportunity costs, and not of market prices.

All products that are produced through this integrated development plan are to be counted as benefits. Prices are to be evaluated on the basis of loco prices which are determined by deducting transportation costs from border prices. In the road plan, the saving effect in maintenance and administration expenses is to be considered as a benefit since some existing roads are planned for repair and surfacing for the collection of products. In addition to such a benefit, the effects of preventing damage to products, running time, and expense reduction effects can be considered as benefits. But since these effects are reflected in selling prices and are thus already materialized, they are not to be counted. Production is to be stepped up gradually according to the execution plan.

In this integrated development plan, all expenses for investment in connection with agricultural and livestock production are to be regarded as costs. However, in the case of the rural infrastructure plan, which is aimed at improving the living conditions for farmers, it is difficult to gauge benefits numerically. Accordingly, this plan is to be excluded from cost estimation.

Project investment costs are to be distributed annually according to the execution plan. Maintenance and administration expenses for roads, irrigation, and drainage are to be counted as costs. Operating expenses for research institutes are also to be counted as costs. However, for those that are expected to earn sales proceeds and fees, these earnings are to be deducted when their operating costs are estimated. Operating costs are not to be estimated for existing institutions.

Of the operating costs, fodder costs, fertilizer costs, and fuel costs associated with physical input are to be counted as costs. But transfer items such as rental charges, taxes, public imposts, etc. are to be excluded. Labour costs are to be regarded as equivalent to a transfer item and excluded from costs in consideration of the employment of local inhabitants. Depreciation charges and interest expenses are also excluded from costs.

As in the case of the financial analysis, the internal rate of return is to be obtained from year-to-year changes in net profit. But the increase in net profit expected to be caused by the implementation of the project over net profit expected to be materialized without such implementation is to be assessed.

For this reason, the present output is to be deducted from net profit at the time of estimation, on the assumption that output in the future will remain at the same level as the present output.

A period of 20 years after the completion of all the projects is to be included in the estimation of costs.

Engineering service fees are to be included in costs, but reserve funds are not to be included.

A sensitivity analysis, which takes account of changes in project costs and production is to be made at the same time.

## 2) Evaluation results

Table 10.3.1 shows the results of economic analysis of the entire plan for integrated development. EIRR is 16% and thus higher than the capital opportunity costs of 12% in Paraguay. Judging from this, the feasibility of this plan is deemed to be high. When EIRR is estimated on the basis of the following conditions used in the sensitivity analysis, it is as follows.

Case 1: When there is a 20% increase in costs - 13.0% (Table 10.3.2)

Case 2: When there is a 20% decline in earnings - 9.0% (Table 10.3.3)

To study which condition has the greater effect on EIRR, Sensitivity Indication (SI) is to be estimated. It can be calculated as follows.  $SI = \{ \text{Rate of change of sensitivity analysis result (EIRR) to the original result (EIRR) of economic evaluation (\%)} \} \div \{ \text{Change in rate of the condition used to obtain the sensitivity analysis result to the original condition used in economic evaluation (\%)} \}$

The SI for each case will then be as follows.

	EIRR (%)	SI
Case 1:	13.0	$(16.0-13.0)/(16.0)/0.2 = 0.94$
Case 2:	9.0	$(16.0- 9.0)/(16.0)/0.2 = 2.19$

As shown above, case 2 has a larger value of SI, indicating that economic efficiency is more affected by a decline in earnings than by an increase in project investment. This makes us realize once again the importance of research projects aimed at improving farming technology in farms and securing planned output.

Cuadro 10.3.1.(4) Summary of economic analysis						
Year	Production benefits	Production costs	Project costs + operating costs	Engineering service fee	Loss of current net benefits	Net benefits
	①	②	③	④	⑤	①-②-③ -④-⑤
	1,000US\$	1,000US\$	1,000US\$	1,000US\$	1,000US\$	1,000US\$
1			1,275			-1,275
2			1,875	123		-1,998
3			5,046	846		-5,892
4			5,046	846		-5,892
5			5,283	882		-6,165
6	18,359	6,944	26,114	4,929	13,930	-33,558
7	19,685	8,069	30,159	5,780	14,479	-38,803
8	31,481	9,874	22,613	3,938	15,688	-20,632
9	36,542	11,728	30,216	4,356	15,742	-25,500
10	48,499	13,795	27,989	3,341	15,795	-12,422
11	55,088	15,350	32,991	3,572	15,795	-12,620
12	64,660	17,517	42,476	4,870	16,119	-16,321
13	77,017	20,343	43,406	4,612	16,442	-7,786
14	95,179	23,450	46,486	4,206	16,766	4,270
15	109,363	26,722	65,844	7,337	17,090	-7,629
16	133,786	30,978	70,742	7,143	17,464	7,459
17	155,247	35,619	71,975	6,546	17,838	23,269
18	190,959	40,598	79,430	6,475	18,212	46,244
19	219,902	45,386	76,343	4,578	18,586	75,008
20	251,085	50,279	74,466	2,620	18,960	104,760
21	270,242	51,777	71,015		18,960	128,489
22	284,567	52,559	75,072		18,960	137,975
23	291,564	53,030	77,404		18,960	142,170
24	313,905	53,272	78,034		18,960	163,638
25	312,880	53,287	78,278		18,960	162,354
26	314,084	53,294	78,278		18,960	163,551
27	313,143	53,301	78,278		18,960	162,604
28	316,273	53,305	78,278		18,960	165,729
29	313,230	53,308	78,278		18,960	162,683
30	316,332	53,310	78,278		18,960	165,784
31	311,179	53,309	78,278		18,960	160,632
32	316,261	53,301	78,278		18,960	165,721
33	313,045	53,287	78,278		18,960	162,520
34	315,928	53,267	78,278		18,960	165,423
35	312,683	53,249	78,278		18,960	162,196
36	312,683	53,249	78,278		18,960	162,196
37	312,683	53,249	78,278		18,960	162,196
38	312,683	53,249	78,278		18,960	162,196
39	312,683	53,249	78,278		18,960	162,196
40	312,683	53,249	78,278		18,960	162,196

EIRR

16.0%

## 10.4 EFFECTS OF THE DEVELOPMENT PROJECT

### 1) Increase in agricultural production

Table 10.4.1 shows a comparison between agricultural and livestock farming output, planted acreage, and the number of livestock targetted in this integrated development plan in the region covered by the plan, by those in Departamento Presidente Hayes where the region is located, and by those in Paraguay as a whole. When this is viewed in terms of 1) agricultural products for export and 2) self-sufficiency in the national food supply and the resultant surplus of agricultural and livestock products to be exported, these products show the following increases over the Departamento and the country as a whole at the planned output peak.

### 1) Agricultural products for export

Peanuts 7.4-fold increase compared with the Departamento

71% increase compared with the country as a whole

Cotton 6.8-fold increase compared with the Departamento

7% increase compared with country as a whole

Oil crops 180-fold increase compared with the Departamento

2.4-fold increase compared with the country as a whole (castor beans and sunflowers are compared)

### 2) Self-sufficiency in the national food supply and resultant surplus of agricultural and livestock products

Citrus fruit 14-fold increase compared with the Departamento

38% increase compared with the country as a whole

Tropical fruit 4.1-fold increase compared with the Departamento

13% increase compared with the country as a whole

Vegetables 1.3-fold increase compared with the Departamento

1% increase compared with the Departamento

Cattle 1.2-fold increase compared with the Departamento

26% increase compared with the country as a whole

Sheep and goats 1.2-fold increase compared with the Departamento

50% increase compared with the country as a whole

Milk 1.1-fold increase compared with the country as a whole

The total export value of these agricultural and livestock products is estimated to be US\$110 million, as shown in Table 10.4.2. This represents 25% of the export value of agricultural and livestock products in 1992 (US\$110 million), and 17% of the total export value in the

same year (US\$657 million). When viewed in terms of the amount of added value, i.e. the planned output value of agricultural and livestock products less production costs, the added value amounts to US\$675 million at the output peak. This represents 12.5% of US\$1,477 million for GDP in the agricultural and livestock farming sector in 1991.

2) Expansion of employment opportunities

In this plan, employment opportunities are expected to be expanded by 1) agricultural and livestock farms, 2) agricultural and livestock product processing plants, and 3) research institutes and supporting organizations for agriculture. Table 10.4.3 shows the estimated number of workers expected to be employed by them. A summary is shown below.

1) Employment at agricultural and livestock farms

full-time employees 1,210 persons

part-time employees 966,850 man-days (3,223 man-years)

2) Employment at agricultural and livestock product processing plants

full-time employees 1,496 persons

part-time employees 153,600 man-days (512 man-years)

3) Employment at research institutes and agricultural supporting organizations (newly employed)

full-time employees 64 persons

part-time employees 15,600 man-days (52 man-years)

In total some 6,500 employment opportunities are to be created by the three sectors.

In addition, the implementation of social infrastructure projects including the establishment of hospitals and schools, and various construction work during the implementation of the project expect to create employment for a considerable number of people. Thus, this project is assumed to have great economic effects in terms of the creation of employment.

3) Contribution to small and landless farmers

Agricultural problems concerning small and landless farmers have arisen from the appearance of unemployed people mainly in the eastern region and the loss of balance in the supply of land which is to be allocated. These surplus workers have flowed into cities in search of places to live, causing new social and economic problems. The plan takes account of such circumstances and contributes to the government's measures to support small and landless farmers as it calls for people including such surplus workers to settle in the planned region as farmers.



The plan provides technical and financial support for small farmers who are short of funds and technical ability and those with no land, allocates land to farmers with no land, puts idle labour to effective use through farming, thus allowing it to participate in production and ensuring a living for it. Thus, absorbing any number of small and landless farmers into this settlement plan will be of considerable help in easing the most significant agricultural problem Paraguay faces, and will provide a clue for the solution of the problems concerning small and landless farmers.

It is also believed that it will slightly reduce the number of unemployed workers in rural areas flowing into cities, including potential unemployed workers and groups of young workers who are likely to lose their jobs, and to help prevent cities from producing run-down zones.

4) Progress of regional development through assurance of a stable way of living for rural inhabitants

(1) Improved life environment

This Master Plan has set forth a rural improvement plan whose basic policy is to reduce the gap between cities and rural areas by providing facilities that improve the living environment and allowing farmers to enjoy a stable life in rural areas. In this connection, the plan has adopted an upgraded version of standard cities in the eastern region of Paraguay applied to the establishment of facilities for a better living environment such as public health, medical, and educational facilities.

According to the Agricultural and Livestock Farming Census taken in 1991, the population structure for farms in Departamento Presidente Hayes showed a very small proportion of children below 10 (15.2% except for the Mennonite settlements) as compared with the nationwide average of 29.8%. The reason for this is presumably a high rate of infant mortality which results from the inadequate provision of public health and medical facilities, in addition to the harsh natural conditions in the Chaco region. This plan is aimed at reducing the rate of infant mortality by expanding public health and medical facilities. As a result, the proper population structure and family structure will be established and thus the groundwork will be laid for the nation to secure the farming population and successors. In the educational aspect, the plan also aims for a higher ratio of students who go on to secondary school than the national average in Paraguay. This will improve the level of knowledge on which agricultural techniques of would-be farming operators will be built on.

Provision of roads and communication facilities and the supply of electricity to rural

areas will shorten the time and distance due to improved means of transportation, communication, and acquisition of information, and thus are expected to widen and promote the production and activity zone.

Such improvements in the foundation for the living environment will create a stable living environment in rural areas and promote the permanent settlement of farmers.

(2) Ensuring steady incomes

Farming is an operation basically made up of capital and labour which mainly requires farming family members. Behind such an operation is the living of farmers. Therefore, they have to secure their living expenses from what remains after all expenses and loan payments are deducted from all earnings obtained through agricultural and livestock farming. The farming plan laid out in this Master Plan aims for a higher level of agricultural income than the present level as a result of a study of the present status of each type of farming which was made on Japanese farms in a settlement, and farms in the suburbs of Asuncion as well as a study of indigenous people made on the basis of the "preference survey" which was carried out in this study.

The plan has also determined the living expenses for medium-scale farming entities which form the nucleus of farms in the zone on the basis of the living expenses of middle-class farms in the eastern region and the assumed income per salaried worker household in cities. The living expenses for other farming entities are determined on the basis of the above living expenses, which serve as the standard, and on the business scale and income of each farm. Would-be farming operators are divided into a group with technology and capital, a group which has technology to produce agricultural products for export, and a group which has technology to meet the demand on the domestic market. These groups correspond to large-scale, medium-scale, and small-scale farming entities respectively. An indigenous group corresponds to a small-scale farming entity. Of these, large- and medium-scale farming entities will be able to achieve the set income target in five to six years, whereas the small-scale farming entities will only be able to achieve their target 15 years after the start of farming. This is because small-scale farming entities, which have no start-up capital and lack technology, will have to start farming in a settlement economically from zero or even from a deficit, and thus will be completely dependent on loans for farming.

In either case, plans to support such conditions and allow each type of farming to advance without falling behind has taken the form of measures for supporting agriculture technically and financially. Backed up by such measures, farming will be established

and farmers will be able to make a living by earning the initially targetted income and continue to produce agricultural products. Both the planned income target and living expenses have been set higher than the present level. Thus, the plan aims for an increase in income and a higher level of living for farmers. On the whole, they will be able to accumulate wealth in five to fifteen years and to live a stable life through independent farming.

As described above, to have farmers settle down in a newly established settlement and operate agricultural and livestock farming will mean developing new villages in the Chaco region. This will bring progress in regional development and at the same time open up a way to remove the burden of population growth in the eastern part. This will also pave the way for the development of the Chaco region which has been lagging behind, and will lead to the implementation of a balanced development of the national land based on national planning.



## CHAPTER 11

# CONCLUSIONS AND RECOMMENDATIONS



## CHAPTER 11 CONCLUSIONS AND RECOMMENDATIONS

### 11.1 CONCLUSIONS

- 1) The purpose of this study is to develop an Integrated Agricultural and Livestock Farming Development Project (Master Plan) at Lower Chaco in Paraguay (73,000 km<sup>2</sup>). The Master Plan for agricultural and livestock farming development in the region developed through this study paves the way for agricultural and livestock farming development in the entire Chaco region located in the western part of Paraguay.
- 2) Sustainable development is a prerequisite condition for this Master Plan as it takes account of the ecological conditions in the region. Based on this principle, the Master Plan is laid out as a plan for development in the sector of agricultural and livestock farming with the goal of contributing to 1) self-sufficiency in the national food supply, 2) an increase in the export of agricultural and livestock products, 3) an increase in employment opportunities, 4) measures for supporting small and landless farmers, and 5) the assurance of a stable living in rural areas with the aim of optimizing resources in the region including land, water, and people.
- 3) The target region consists of lakes and swamps which are always filled with water, wetlands, forests, and grasslands. Part of it belongs to the semi-arid zone and is ecologically fragile. Thus, the development of this region requires the closest attention.
- 4) The local inhabitants consist of those involved in livestock farms, settlers in the Mennonite settlements, farmers in domestic settlements, other farmers, and indigenous people. The region is a sparsely populated zone with a population of 53,300 and a population density of 0.73 per km<sup>2</sup>. Farming operators required by this plan will be chosen mainly from these residents, and will be recruited from other parts of the country in the event of a shortage of such operators. They will be divided into five groups; 1) those who have both production technology and management skill as well as capital, 2) those who have technology to produce agricultural products for export and some start-up capital, 3) those who possess sufficient technology to produce agricultural products for the domestic market, 4) those who do not possess sufficient technology to produce agricultural products for the domestic market, and 5) indigenous people.
- 5) In the land use plan the region is divided into three areas in consideration of its ecological characteristics: 1) areas excluded from the development plan in consideration of environment, 2) areas covered by the agricultural development plan, and 3) areas covered by the livestock

development plan.

- 6) The area covered by the agricultural development plan accounts for 4.6% of the total area of the region, and is subdivided into four zones: the Asuncion suburban zone, the northern part of Pozo Colorado, the eastern part of the Mennonite settlements, and the southern part of the Mennonite settlements. The area of each zone and the number of settlers in each zone are 9,000 ha/390 households, 76,000 ha/630 households, 185,000 ha/1,360 households, and 68,000 ha/640 households, respectively. In each zone, the foundations for the subsistence of residents and agricultural and livestock farming will be laid to form settlements, whereafter the development of villages will be materialized. Then farming will be started by the above-mentioned five groups of farming operators.
- 7) The area covered by the livestock farming development plan accounts for 36.4% of the total area of the region. Livestock farming development is the pillar of this Integrated Agricultural and Livestock Farming Development Plan in this region as livestock farming accounts for the largest portion of the production value. Although the development plan calls for an increase in productivity through improvements to livestock and grassland, it also places emphasis on an increase in productivity of the present livestock through improvement of facilities in consideration of the impact the development will have on ecological systems.
- 8) Farming is divided into 15 types to accommodate the above-mentioned five types of farming entity, which are different from one another in the qualifications and the environmental condition of agriculture, and basically in line with the strategy for the diversification of farm products. Combined operation of farming and dairy farming is adopted as a basic type for farming which focusses on agriculture in order to spread potential risks in the financial balance for farming.
- 9) The improvement of infrastructure for the subsistence of residents in settlements includes water supply, clinics, schools, electrification, communication facilities, and housing.
- 10) The improvement of infrastructure for production includes 701 km of trunk roads, 1,060 km of branch roads, preparation of 177,100 ha of farmland, preparation of 479,100 ha of grassland, 100 ha of irrigation areas, and 42,600 ha of drainage areas.
- 11) In order for farms to sell agricultural and livestock products as merchandise and to earn income from such sales, they must add value to their products. To this end, collective grading, packing, and shipping facilities, milk and dairy product plants, ginning plants, and meat processing facilities are to be provided as marketing and processing facilities.



- 12) It is usually difficult to actually organize agricultural and livestock farming operated by farmers including small and landless farmers. Therefore, agricultural support and agricultural credit plans have been worked out as measures to support such farmers. The agricultural support plan calls for the provision of one training centre for farmers, one DEA local administration office, four DEA diffusion offices, one facility for supplying SENASE seeds, and one association for the collective use of agricultural machinery. The establishment of the Fund for Integrated Agricultural and Livestock Farming Development in the Chaco region (provisional name) is proposed in the agricultural credit plan.
- 13) This region has natural conditions that are different from those in the eastern region as well as being unique. Thus, the development of new techniques are required for agricultural and livestock farming in this region. For this reason, the Central Chaco Agricultural Testing Station has recently been established for agriculture. For livestock farming, existing livestock testing stations are to be improved, and stock breeding farms are to be provided.
- 14) Since sustainable development is a prerequisite for this Master Plan, various measures for the preservation of the environment and farmland are naturally included in the plan. In addition, many measures which reflect concern for the environment are incorporated in various parts of the individual sector plans.
- 15) The zones to be developed first are the Asuncion suburban zone and the northern part of Pozo Colorado in the region covered by the agricultural development plan. The southern part of the Mennonite settlements and the eastern part of the Mennonite settlements are to be developed in that order. In particular, the development plan is to be launched in the Asuncion suburban zone as soon as various requirements have been met, because agriculture in the zone is developing a tendency towards innovation and its agriculture and socio-economic environment can be regarded as an extension of the eastern region. In the area covered by the livestock farming development, the development plan is to be launched in the order of the first priority zone, the second priority zone, and the third priority zone. Priority projects are basically those regarding testing and research, study, training and agricultural support which are indispensable for all the zones concerned, and the development projects in the above-mentioned priority zones, which are to be carried out in parallel with the priority projects.
- 16) This integrated development project is to be carried out over a period of 20 years. The implementation design is to be made in the first two years. The top priority projects are the above-mentioned projects concerning testing and research, study and training, and agricultural support. These are the foundation of the agricultural and livestock farming plan and the core of the development plan, and shore up the plan as such as well as projects for

providing various facilities in the priority development zones. The former projects are to be carried out from the second to fifth years while the latter projects are to be implemented from the third to sixth years. The projects for consolidating the production infrastructure are to be implemented one after another according to the established priorities over a period of 15 years from the sixth to the twentieth year. The implementation period is two years for the Asuncion suburban zone, five years each for the northern part of Pozo Colorado and the southern part of the Mennonite settlements, and six years for the eastern part of the Mennonite settlements. Settlement is to start two years after the launch of the projects for consolidating the production infrastructure. Projects for the development of social infrastructure are to be launched two years before the start of settlement.

- 17) This integrated development project is to be implemented under a system supported by the Paraguay Chaco Integrated Development Commission, which serves as its central organization.
- 18) The total project costs required by this Master Plan are \$715 million.
- 19) The results of economic assessment of the entire Master Plan show an economic internal rate of return (EIRR) of 16%, which far exceeds the state's capital opportunity costs of 12%. Thus, the feasibility of the plan is deemed to be high.
- 20) This Master Plan specifies five targets as a framework for the plans, and each plan is designed as a means of achieving the targets. The effects expected to be brought about by this Master Plan in connection with its targets are as follows. 1) Self-sufficiency in the national food supply - production of food for the domestic market such as vegetables, fruit, milk and meats is increased. 2) Expansion of agricultural products for export - production of cotton, peanuts, oil crops is increased while the diversification of agricultural products is promoted through the cultivation of new farm products including jojoba and macadamia nuts. 3) Creation and expansion of employment opportunities - labour for agricultural work, staff and labour for testing and research institutes and agricultural support organizations, staff for schools and hospitals, staff and labour for marketing and processing facilities, staff for construction, and labour during the construction period. 4) Measures for supporting small and landless farmers - this plan contributes to the promotion of these measures as it allows settlers to have their lots, to engage in farming, and ensure a stable life through various agricultural support measures, while it also brings about the effect of income distribution. 5) Ensuring a stable living for inhabitants of rural areas - the living environment will be basically improved through rural improvement projects so that farmers have no anxiety for their livelihoods. The farmers will be able to lead a more stable life by earning the same level of income as farmers in the eastern part and urban residents as their target income will be set at the level of the former.

## 11.2 RECOMMENDATIONS

- 1) The government is recommended to initiate the implementation of the project by raising funds or working out a research plan and execution plan required for fund raising.
- 2) Because this plan is a Master Plan which shows the feasibility and basic direction of the integrated agricultural and livestock farming development in the entire Lower Chaco region, some conditions have not been clarified and some details have not been planned in the concretely at this level. Therefore, more detailed study and plans must be made for the implementation of the project.
- 3) The government is required to make the utmost effort to operate the Paraguay Chaco Integrated Development Commission effectively, and to make adjustments in administration, organizations, and systems in order to implement the project smoothly and steadily. The success of the execution scheme depends on the steady implementation of each project, thus the completion and provision of the organizations and systems of each project entity are essential conditions. It is also necessary for the government to keep close contact with the local government of Departamento Presidente Hayes where the target area is located.
- 4) Each of the plans and projects laid out in this Master Plan is in direct or indirect sequence, and their preparation and implementation are planned to be carried out in a certain systematic order. If the implementation of individual plans and projects is brought to a halt or slowed down and the order or the flow is disrupted, the farming plan, the core of the development plan, will not be materialized. Therefore, great care must be exercised and considerable attention must be paid for the smooth implementation of plans and projects to avoid such setbacks.
- 5) Indigenous people are to be incorporated into this plan as farming operators in accordance with the results of the "preference survey" carried out in this study. Although considerable attention is paid to the method for such incorporation, still more attention will be required at the stage of the implementation of the plan.
- 6) Advance acquisition of land is a prerequisite for the formation of settlements and therefore measures to facilitate this smoothly are required.
- 7) Farming is operated by people. As this plan calls for migration and settlement, people will have to move. Therefore, one must bear in mind that delays in the implementation of the farming plan after the start of such migration may cause social and environmental

problems. In particular, the agricultural support and agricultural credit plans are each indispensable for the promotion of the farming plan. Therefore, settlement and farming must be started only after the complete provision of systems for these specific projects has been verified.

- 8) Sustainable development is a prerequisite for this Master Plan, and thus attention is given to the environment in the individual sector plans as the basic policy of the Master Plan. Any development project for the study area other than this Master Plan needs to be checked for its consistency with this Master Plan. When a project has been checked and proved consistent, it can be implemented as soon as all requirements are fully met only in the Asuncion suburban zone, which has a special priority over the other zones. For other zones, any such consistent plans must be studied comprehensively in accordance with paragraphs 3 and 5 above.
- 9) Land to be allotted to settlers include forests which must remain untouched for the preservation of the environment. As these forests will not contribute directly to agricultural and livestock farming production, the burden of settlers must be taken into account when such forests are allotted.
- 10) It is necessary to carry out pilot projects and the project for preparing various data useful for the diversification of agricultural products, one of the priority projects, at an early stage in order to materialize and smoothly implement this Master Plan. A follow-up for the diversification of agricultural and livestock farming products is required to expand farm products for export.
- 11) Abundant electric power is supplied by hydroelectric power plants in Paraguay. Because of this, the government is required to come up with a method of promoting agricultural and livestock farming production by adopting a policy which allows a special rate for electricity to be used to produce agricultural and livestock farming products.
- 12) With regard to the pilot projects proposed by the Paraguay side as mentioned in 8.5 Pilot projects, these will have to be implemented in line with the recommendations in this section, as well as surveys and detailed plans.

# APPENDIX



**CONCRETE IDEAS FOR PILOT PROJECTS  
(WITHIN THE SCOPE OF THE INTEGRATED DEVELOPMENT PLAN  
IN THE LOWER CHACO REGION)**

**1. INTRODUCTION**

The study of the Integrated Development Plan at Lower Chaco will be completed when the final report is presented in March 1994. In this connection, the rationale of some projects, whose implementation is deemed possible from the next year, are shown below. These concrete projects have the nature of pilot projects and are in accordance with studies carried out in collaboration with Japan. Listed below are the pilot projects whose implementation is believed to be possible from 1994.

- 1) Pilot project for the integrated development in the Campo Aceval district
- 2) Pilot project for settlement targetted at small farmers in subsistence farming zones in the eastern and Chaco regions.
- 3) Pilot project for fruit production in the Villa Hayes zone
- 4) Pilot project for the promotion of agricultural product processing in the Villa Hayes zone
- 5) Pilot project for the support of inhabitants in the Lower Chaco region

**2. JUSTIFICATION OF PILOT PROJECTS**

- 1) Pilot project for integrated development in the Campo Aceval district  
This pilot project will allow inhabitants of the Campo Aceval district to participate in sustainable development, and is made up of the following components.
  - a) Production component  
Production of agricultural, livestock farming, and forestry for self-consumption and cash. Production components include processing, storage, and marketing of products (e.g. cold storage of milk).
  - b) Provision of infrastructure  
Provision of roads, securing drinking water and water for other purposes, storage facilities for products, etc.
  - c) Social sector  
Improvement will be made to the health, education, and training of residents in the

Campo Aceval district. The residents can get better nourishment, and drinking water can be secured by this improvement.

d) Improving the environment

The preservation of natural resources and the environment, preservation of forests and the rational utilization of forest resources, the provision of shelter belts, the recycling of green manure and products. Since people already live in this region and they are accustomed to living under the natural conditions of Chaco and have experience in farming such dairy farming, and furthermore since land resources in this region are suitable for the development of agricultural and livestock farming and forestry, this pilot project can be carried out immediately after the presentation of the final report on the Integrated Agricultural and Livestock Farming Development Project at Lower Chaco.

2) Settlement plan

Because there is a possibility of using national land suitable for agricultural and livestock farming production as well as for forestry production, it is possible to establish settlements in the Lower Chaco region. On the other hand, in addition to small farmers, there are many residents in the vicinity of Trans-Chaco Highway in the Chaco region. These residents can possibly be the beneficiaries of the pilot project for settlement. Furthermore, since there is a land problem in the eastern region, especially in subsistence farming areas, farmers in this region can also be the beneficiaries of the pilot project for settlement which will be carried out in the Lower Chaco region. Although the natural condition of this region is vastly different from that in the eastern region, the pilot project provides a good opportunity to test the feasibility of the settlement project involving residents in the eastern region.

Components assumed to be feasible

- a) Support for production: production for self-consumption, cash and processing, technical guidance, credit project, etc.
- b) Support for infrastructure: roads, schools, housing for settlers, health facilities, processing facilities, recreational facilities, drinking water, etc.
- c) Support through social programs: health, education, training, recreational activities, etc.
- d) Support for environmental improvement project



3) Pilot project for production of fruit and vegetables in Villa Hayes district

This district has a high potential for intensive farming. Since the district is close to the Asuncion market and is well provided with power supply facilities and asphalted roads, it is possible to carry out a pilot project for production of fruit and vegetables in this district.

Components assumed to be feasible

- a) Support for production of fruit and vegetables: technical guidance, credit project, technical development, etc.
  - b) Organizing producing farms: to promote the establishment of an organization of producers to facilitate technical guidance and agricultural credit project, marketing of products and production materials, processing of products, etc.
  - c) Improvement of infrastructure: roads, irrigation, drainage, meat processing facilities, wholesale markets, etc.
- 4) Pilot project for promoting the processing of agricultural products in the Villa Hayes district
- The Villa Hayes district has a readily available labour force, electricity, the possibility of using the Rio Paraguay for transportation, and roads. It is possible to carry out a pilot project to promote processing operations through the development of this zone as an industrial complex, by taking preferential measures which are likely to arouse interest in the processing of beef, milk, boiled meat, fruit, and vegetables among those in the private sector.

Components assumed to be feasible

- a) Funds for study in advance of investment: to be used to make a feasibility study of the establishment of an industrial complex
- b) Credit project: funds for processing facilities
- c) Technical guidance provided for the industrial sector
- d) Improvement of infrastructure: roads, port facilities, transformer facilities, drinking water, and water for other purposes

## **5. PILOT PROJECT FOR THE SUPPORT OF INDIGENOUS PEOPLE**

Although indigenous people form an important part of inhabitants of the study area, their cooperation is also required. In the seminar held for indigenous people in October this year, some indigenous groups expressed their intentions to participate actively in the Lower Chaco development plan. Support for indigenous people will be carried out based on the

strategy that calls for the promotion of their spirit of self-help. Specifically, support for the indigenous people includes support for production for self-consumption and cash, apiculture, raising of small livestock, and cultivation of craft crops, etc. On top of these, support in the sector of health and education is also possible.

All of the above pilot projects are to be carried out within the framework of the concept specified by the study of the Integrated Agricultural and Farming Development Project at Lower Chaco.

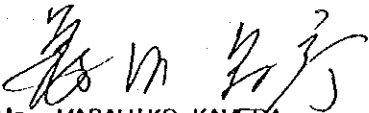



MINISTERIO DE AGRICULTURA Y GANADERIA

SCOPE OF WORK  
FOR  
THE MASTER PLAN STUDY  
ON  
THE INTEGRATED AGRICULTURAL AND LIVESTOCK DEVELOPMENT PROJECT  
AT  
LOWER CHACO  
IN  
THE REPUBLIC OF PARAGUAY

AGREED UPON BETWEEN  
MINISTRY OF AGRICULTURE AND LIVESTOCK  
OF  
THE REPUBLIC OF PARAGUAY  
AND  
JAPAN INTERNATIONAL COOPERATION AGENCY

Asuncion, December, 11, 1990

  
Mr. MASAHIKO KAMEDA  
Leader of the Preliminary  
Survey Team  
Japan International  
Cooperation Agency

  
Dr. RAUL V. TORRES S.  
Minister  
Ministry of Agriculture and  
Livestock, the Republic of  
Paraguay



MINISTERIO DE AGRICULTURA Y GANADERIA

I. INTRODUCTION

In response to the request of the Government of the Republic of Paraguay (hereinafter referred to as "Government of Paraguay"), the Government of Japan has decided to conduct the Master Plan Study on the Integrated Agricultural and Livestock Development Project at Lower Chaco in the Republic of Paraguay (hereinafter referred to as "the Study"), in accordance with the Agreement on Technical Cooperation between the Government of Japan and the Government of Paraguay.

Accordingly, Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programme of the Government of Japan, will undertake the Study in close cooperation with the authorities concerned of the Government of Paraguay.

The present document sets forth the Scope of Work with regard to the Study.

II. OBJECTIVES OF THE STUDY

1. To formulate master plan of integrated Agricultural and Livestock Development project at Lower Chaco and to verify technical and economic feasibility of the project.
2. To carry out technology transfer to the Paraguayan counterpart personal in the course of Study.

III. OUTLINE OF THE STUDY

1. Study Area

The study area covers about 73,000 km<sup>2</sup> in Presidente Hayes prefecture.

2. Scope of the Study

The Study will be composed of the following two(2) phases.

A. Phase I

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MINISTERIO DE AGRICULTURA Y GANADERIA

(1) Collection, review and analysis of relevant existing data, information and field survey on the followings.

(including use of remote sensing technology)

- 1) Natural Conditions
  - a) Topography
  - b) Meteorology and Hydrology
  - c) Geology and Hydrogeology
  - d) Soil
  - e) Water Resources
  - f) Vegetation
  - g) Water Quality
- 2) Social Conditions
  - a) Population
  - b) Social organization
  - c) National and Regional development programmes
  - d) Regional socio-economy
  - e) Transmigration or Settlement
  - f) Land ownership
  - g) Specific traditional and long established custom
  - h) Cultural inheritance and history
  - i) Inhabitants' need and hope
- 3) Social Infrastructure
- 4) Agriculture
  - a) Land use
  - b) Irrigation and drainage
  - c) Cropping pattern
  - d) Farming
  - e) Cultivation
  - f) Agricultural technology
  - g) Agricultural road
  - h) Agricultural credit
- 5) Livestock
  - a) Land use
  - b) Livestock technology
  - c) Livestock credit



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- 6) Agro-economy
  - a) Marketing
  - b) Processing of agricultural products
  - c) Processing of Livestock products
  - d) Farmers economy conditions
  - e) Farmers organization and supporting system
- 7) Environment
  - a) Characteristic of environment
  - b) Vegetation and animals
- 8) Others

(2) Selection of suitable crops

(3) Identification and evaluation of the development potentials of water and land resources and constraints based on the results of the above survey.

(4) Formulation of a basic plan for agricultural and livestock development in the study area.

B. Phase II

(1) Formulation of the integrated agricultural and livestock development project which will consist of the followings:

- 1) Collection of supplementary data and information and conduct of detailed survey as required,
- 2) formulation of integrated agricultural and livestock development plan consisting of;
  - a. land use, cropping pattern and farming system development plan,
  - b. agricultural and livestock infrastructure development plan,
  - c. rural infrastructure development plan
  - d. agricultural and livestock organizations and supporting services development plan,
  - e. agro product processing and marketing plan.
  - f. preliminary design of main facilities,
  - g. project implementation schedule,



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- h. operation and maintenance plan.
- 4) estimation of project cost and benefit.
- 5) project evaluation, including environmental impact study.
- 6) recommendations

IV. WORK SCHEDULE

The Study will be carried out in accordance with the tentative schedule attached in Annex.

V. REPORT

JICA will prepare and submit the following reports to the Government of Paraguay.

1. Plan of Operation  
Twenty (20) copies in Spanish at the commencements of the remote sensing.
2. Inception Report  
Twenty (20) copies in Spanish at the commencement of the second field study in Paraguay.
3. Progress Report (1)  
Twenty (20) copies in Spanish at the commencement of the third field study in Paraguay.
4. Progress Report (2)  
Twenty (20) copies in Spanish at the commencement of the fourth field study in Paraguay.
5. Interim Report  
Twenty (20) copies in Spanish at the commencement of the fifth field work in Paraguay.
6. Progress Report (3)  
Twenty (20) copies in Spanish at the end of the fifth field work in Paraguay.
7. Draft Final Report  
Twenty (20) copies in Spanish at the end of home work in Phase II.  
The Government of Paraguay is requested to provide to JICA its comments on the draft final report within one (1) month after its receiving.

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8. Final Report

Fifty (50) copies in Spanish and in English (only Main Report) within one (1) month after receiving the comments on the Draft Final Report.

VI. UNDERTAKING OF THE GOVERNMENT OF THE REPUBLIC OF PARAGUAY

The Government of Paraguay shall accord privileges, exemptions and other benefits to the Japanese Study Team in accordance with the Agreement on Technical Cooperation between the Government of Japan and the Government of Paraguay.

1. To facilitate smooth conduct of the Study, the Government of Paraguay shall take necessary measures:

- (1) To secure the safety of the Japanese Study Team,
- (2) To permit the members of the Japanese Study Team to enter, leave and sojourn in the Republic of Paraguay for the duration of their assignment therein, and exempt them from alien registration requirements and consular fees,
- (3) To exempt the members of the Japanese Study Team from taxes, duties, fees and other charges on equipment, machinery and other materials brought into the Republic of Paraguay for the conduct of the Study,
- (4) To exempt the members of the Japanese Study Team from income tax and other charges of any kind imposed on or in connection with any emolument or allowance paid to the members of the Japanese Study Team for their services in connection with the implementation of the Study,
- (5) To provide necessary facilities to the Japanese Study Team for remittance as well as utilization of the funds introduced into the Republic of Paraguay from Japan in connection with the implementation of the Study,
- (6) To secure permission for entry into private properties or restricted areas for the conduct of the Study;
- (7) To secure permission for the Japanese Study Team to take all data and documents including photographs related to the Study out of Paraguay to Japan,
- (8) To provide medical services as needed,





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Its expenses will be chargeable on the member of the Japanese Study Team.

2. The Government of Paraguay shall bear claims, if any arises, against the members of the Japanese Study Team resulting from, occurring in the course of, or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or wilful misconduct on the part of the members of the Japanese Study Team.
3. The Ministry of Agriculture and Livestock (hereinafter referred to as "MAG" ) shall act as a counterpart agency to the Japanese Study Team and also as a coordinating body in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the Study.
4. MAG shall, at its own expenses, provide the Japanese Study Team with the following, in cooperation with other relevant organisations:
  - (1) Available data and information related to the Study,
  - (2) Counterpart personnel,
  - (3) Suitable office space with necessary equipment in Asuncion,
  - (4) Credentials or identification cards,
  - (5) Necessary vehicles.

VII. UNDERTAKING OF JICA

For the implementation of the Study, JICA shall take the following measures:

1. To dispatch, at its own expense, the Study Team to Paraguay;
2. To pursue technology transfer to the Paraguayan counterpart personnel in the course of the Study.

VIII. CONSULTATION

JICA and MAG shall consult with each other in respect of any matter that may arise from or in connection with the Study.

APPENDIX

TENTATIVE WORK SCHEDULE

	MONTH																			
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
Phase I Remote Sensing Phase II Submission of DF/R																				
Report	△ P/O		△ IC/R		△ P/R(1)		△ P/R(2)			△ ITR		△ P/R(3)		△ DF/R		△ F/R				

P/O : Plan of Operation  
 IC/R : Inception Report  
 ITR : Interim Report  
 DF/R : Draft Final Report  
 P/R(1) : Progress Report I  
 P/R(2) : Progress Report II  
 P/R(3) : Progress Report III  
 F/R : Final Report

Work in Paraguay

Work in Japan

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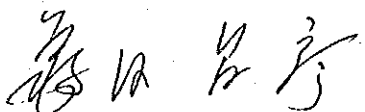
MINUTES OF MEETING  
FOR  
THE SCOPE OF WORK  
ON  
THE MASTER PLAN STUDY  
ON  
THE INTEGRATED AGRICULTURAL AND LIVESTOCK DEVELOPMENT PROJECT  
AT  
LOWER CHACO  
IN  
THE REPUBLIC OF PARAGUAY


AGREED UPON BETWEEN

MINISTRY OF AGRICULTURE AND LIVESTOCK  
OF  
THE REPUBLIC OF PARAGUAY  
AND

JAPAN INTERNATIONAL COOPERATION AGENCY

ASUNCION, December, 11, 1990

  
Mr. MASAHIKO KAMEDA  
Leader of the Preliminary  
Survey Team  
Japan International  
Cooperation Agency

  
Dr. RAUL V. TORRES S.  
Minister  
Ministry of Agriculture and  
Livestock, The Republic  
of Paraguay



MINISTERIO DE AGRICULTURA Y GANADERIA

MINUTES OF MEETING

In response to the request of the Government of the Republic of Paraguay, the Government of Japan has dispatched a Preliminary Survey Team (hereinafter referred to as "the Team") for the Master Plan Study on the Integrated Agricultural and Livestock Development Project at Lower Chaco (hereinafter referred to as "the Study") to Paraguay from December 1st to 14th, 1990.

The Team headed by Mr. Masahiko Kameda and Paraguay counterpart official headed by Dr. Raul Torres Segovia, Minister of Ministry of Agriculture and Livestock (hereinafter referred to as "the MAG") had a series of discussions and exchanged their views on the Scope of Work for the Study. The field survey was also carried out with good relationship.

As a result of the meetings, both sides have agreed upon the Scope of Work for the Study and the following is an additional conclusion of the meetings. List of attendants in a series of meetings were attached in annex 1.

1. Both sides confirmed that the English Scope of Work was the original and the Spanish Scope of Work was the duplicate.
2. Both sides confirmed the necessity and justification of the project as follows:
  - 1) to contribute the proportional development of the national land,
  - 2) to improve the anbalance between the import and the export,
  - 3) to consider a countermeasure for the small and landless farmers.
3. Both sides agreed that the exhibition farm was not included the Study.

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4. Both sides agreed that the environmental impact should be included in the Study and mainly carried out by Paraguayan side, and the Master Plan Study Team would assist it.

5. Both sides agreed that the all reports would be prepared to the Paraguay sides in Spanish and the final main report would be prepared in Spanish and in English.

6. The MAG requested to provide Paraguay counterpart personnel with efficient technology transfer by means of training courses in Japan. The Team took note of it.

7. The MAG requested to send the Team to Paraguay as soon as possible. The Team took note of it.

8. The MAG requested to held the seminar about the result of the study for the technology transfer to Paraguay counterpart personel at the end of the Study. The Team took note of it.

9. The MAG requested the following equipment nesesity for the study would be procured by JICA and donated to the MAG after the termination of the study. The Team took note of it.

- Three number of four wheel drive vehicles
- Three number of automatic water gauge
- Current meter
- PH meter
- EC meter
- Meteology survey equipment (recording rain gauge, hygrotermograph, earth termometer, barometer, anemograph)
- Tensiometer
- Seminar equipment
- Micro computer
- Word processor

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MINISTERIO DE AGRICULTURA Y GANADERIA

ANNEX I

ATTENDANTS LIST

PARAGUAY SIDE

DR. RAUL TORRES SEGOVIA	Minister of MAG
ING. AGR. RONALDO DIETZE	Director of technical cabinet
ING. AGR. OSVALDO GENES QUEVEDO	Coordinator of technical cabinet
ING. AGR. CESAR CACERES	Staff of technical cabinet
ING. AGR. ZULEMA PINEDA	Staff of technical cabinet
ING. AGR. PEDRO E. MEZA	Staff of technical cabinet
ING. AGR. JUAN MOLINAS	Staff of technical cabinet/IBR
ING. AGR. JOSE LUIS LANERI	Director of PRONIEGA
WALTER FLORES	Member of committee of INDI
ING. AGR. ALFREDO R. LEDESMA	Staff of EECC
ING. AGR. PEDRO J. GIMENEZ	University of Asuncion
ING. AGR. NELSON AYALA	Staff of CAH
ING. AGR. SAUL CAONA	Staff of Ministry of Public Works and Communication
ING. AGR. EDGAR RAMIREZ	Staff of Committee of Chaco Integrated Development
ING. AGR. GUSTAVO MORINIGO	Director of Planning, FD
ING. AGR. SHOSUKE SUENAGA	Expert of JICA
ING. AGR. KAZUNARI MORIMOTO	Expert of JICA

JAPANESE SIDE

MR. MASAHIKO KAMEDA	Team leader, Preliminary Survey Team
MR. JIRO KOMATSU	Cooperation policy, PST
MR. HIROFUMI NIWA	Regional development, PST
MR. KEIICHI MINODA	Agriculture, PST
MR. UKAI AKIMUNE	Livestock, PST
MR. SHIGEMITSU TSUKAMOTO	Coordinator, PST

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MINISTERIO DE AGRICULTURA Y GANADERIA

MINUTA REFERENTE AL ESTUDIO DEL PROYECTO DE  
DESARROLLO AGROPECUARIO INTEGRADO EN EL BAJO  
CHACO DE LA REPUBLICA DEL PARAGUAY

El 11 de Diciembre de 1990, se ha firmado el Scape of work del Plan Maestro del Proyecto de Desarrollo Agropecuario Integrado en el Bajo Chaco de la República del Paraguay.

La Agencia de Cooperación Internacional del Japón (JICA), ha enviado a la Misión de Estudio encabezada por el Señor Hisashi Terakado, para la realización del primer período de los estudios, así como al Señor Tadao Ito, desde el 15 hasta el 23 de octubre, para orientar y controlar las labores de la Misión de Estudio, en el inicio de los trabajos.

El Ministerio de Agricultura y Ganadería del Paraguay (MAG), institución responsable del Proyecto, recibió en el inicio de los estudios, 20 ejemplares del Informe Inicial (en español) que describe el contenido de los trabajos en los tres años que abarca el presente estudio.

La reunión de explicación del Informe Inicial organizada por el Gabinete Técnico del Ministerio de Agricultura y Ganadería del Paraguay, que es el responsable del presente Proyecto, se llevó a cabo el 16 de octubre de 1991, ante los representantes de las instituciones pertinentes convocados por el mismo.

Luego de ser discutido por las partes, se ha arribado a un acuerdo, sobre el contenido del Informe Inicial presentado por la Misión de Estudio.

Asunción, 21 de octubre de 1991

MR. HISASHI TERAKADO  
Jefe de la Misión de Estudio  
del Proyecto de Desarrollo  
Agropecuario Integrado del  
Bajo Chaco

DR. RAUL TORRES SEGOVIA  
Ministro de Agricultura y  
Ganadería

Testimoniado por:

MR. TADAO ITO  
Fiscalizador de Trabajos  
de la JICA



MINISTERIO DE AGRICULTURA Y GANADERIA  
GABINETE TECNICO

" PROYECTO DE DESARROLLO AGROPECUARIO  
INTEGRADO DEL BAJO CHACO "

Nombre y Apellido	Cargo	Institucion	Telefono
1. Hiroshi Miyakawa	Enc. Coop. Téc.	Embajada del Japón	604-616/
2. Kaon Javagida	"" ""	Asist. Embajada del Japón	
3. Hisashi Terakado		Misión	
4. Tomio Hanano	Miembro de la Misión	JICA	
5. Tadao ITO		JICA	
6. Hitoshi- Mathumoto	Miembro de la Misión	Jica	
7. Katsuya Kawakami	Miembro de la Misión	JICA	
8. Yasuo Kamiya	Miembro de la Misión	JICA	
9. Akira Nagaoka	Miembro de la Misión	JICA	
10. Tsugio Horii	Miembro de la Misión	JICA	
11. Yasusada OUE	Miembro de la Misión	JICA	
12. Kaichiro Shimizu	JICA	Paraguay	
13. Zentaro Pablo Ibarra	JICA	Paraguay	
14. Masao Shikano	JICA	Paraguay	
15. Dr. Sergio Echeverria	Ministerio de Defensa		204-987
16. Maria A. Amarilla	Dirección de Comercialización		448-787
17. Jorge Cabrera	SENASA		448-408
18. Benicio Cañete	Dirección de Ordenamiento Ambient.		492-656
19. Hideo A. OKA (FELIX - OTAZU)	Sub Secretaria de Ganaderia	NAC.	506-182
20. Blas Denis	Dirección de Meteorología e Hidro.		22-139
21. Juan Bautista Nuñez	" " " " " "		" "
22. Maria Noce de Meza	Gabinete Técnico		
23. Hideo Ago	Experto de JICA		
24. César Cáceres	Coordinador Bajo Chaco		
25. Ronaldo Dietze	Director del Gabinete Tecnico		
26. Luis M. Iriarte	DIA/MAG		





MINISTERIO DE AGRICULTURA Y GANADERIA

### MINUTA DE DISCUSION

En base al Scope of Work del Estudio del Proyecto de Desarrollo Agropecuario Integrado en el Bajo Chaco de la República del Paraguay, firmado el 11 de diciembre de 1990, la Agencia de Cooperación Internacional del Japón ha enviado al Equipo de Estudio encabezado por el Señor HISASHI TERAKADO para realizar el estudio correspondiente a la Segunda Fase del citado proyecto de desarrollo. Igualmente, ha enviado al Señor TORU KAWAKAMI entre los días 2 y 9 de junio del corriente, para orientar y supervisar el estudio correspondiente a la Segunda Fase que realizará el Equipo de Estudio, al inicio del mismo.

El Ministerio de Agricultura y Ganadería del Paraguay, máxima institución responsable del presente proyecto, ha recibido al inicio de la presente fase, 20 ejemplares del Informe de Progreso I (en español) que ha sido elaborado al término de la Primera Fase del estudio.

La reunión explicativa del mencionado informe, organizada por el Gabinete Técnico del Ministerio de Agricultura y Ganadería del Paraguay, se ha realizado en fecha 4 de junio de 1992 en el Ministerio de Agricultura y Ganadería, con la presencia de los representantes de las instituciones pertinentes convocados por la citada repartición.

Luego de la discusión, las partes han arribado al acuerdo sobre el contenido del Informe de Progreso presentado por el Equipo de Estudio.

Asunción, 4 de junio de 1992

ING. HISASHI TERAKADO  
Líder del Equipo de Estudio  
Agencia de Cooperación  
Internacional del Japón



DR. RAUL TORRES SEGOVIA  
Ministro de Agricultura  
Ganadería del Paraguay

ING. TORU KAWAKAMI  
Supervisor de Trabajo  
Agencia de Cooperación  
Internacional del Japón



MINISTERIO DE AGRICULTURA Y GANADERIA

### MINUTES OF THE MEETING

For the implementation of the second phase study on the Integrated Agricultural and Livestock Development Project at Lower Chaco in the Republic of Paraguay, the JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) has sent a study team headed by Hisashi Terakado in accordance with the Scope of Work signed on the 11th December 1990. At the same time, JICA has dispatched Masaki Oga, chairman of the advisory team of the project, for the period from the 1st June to the 9th June for supervising the project.

The Ministry of Agriculture and Livestock, the highest authority responsible for this project, received 20 copies of the INTERIM REPORT (Spanish Version) finalizing the first phase of the study.

The explanatory meeting of the report was held by Planning Department, Ministry of Agriculture and Livestock. The study team explained the contents of the INTERIM REPORT to the representatives from the institutions related to this project, who were invited by Planning Department.

As a result of the discussion, both parties agreed on the content of the INTERIM REPORT submitted by the team.

Asunción, 4th June 1993.

Mr. HISASHI TERAKADO  
Leader of the Master  
Plan Study Team  
Japan International  
Cooperation Agency

Dr. RAUL TORRES SEGOVIA  
Minister  
Ministry of Agriculture  
and Livestock

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Witness: Mr. MASAKI OGA  
Chairman of JICA  
Advisory Team



MINISTERIO DE AGRICULTURA Y GANADERIA

MINUTA DE DISCUSION

En base al Scope of Work del Estudio del Proyecto de Desarrollo Agropecuario Integrado en el Bajo Chaco de la República del Paraguay, firmado el 11 de Diciembre de 1990, la Agencia de Cooperación Internacional del Japón ha enviado a la Misión de Estudio encabezada por el ING. HISASHI TERAOKADO durante 87 días, comprendidos entre el primero de Junio y el 26 de Agosto de 1993, para realizar el estudio correspondiente a la Segunda Fase del citado Proyecto.

El Ministerio de Agricultura y Ganaderia del Paraguay, máxima Institución responsable del presente Proyecto, ha recibido 20 ejemplares del Informe de Progreso III (en español), que ha sido elaborado al término de la Segunda Fase del Estudio.

La reunión explicativa del mencionado informe, organizada por la Dirección General de Planificación del Ministerio de Agricultura y Ganaderia del Paraguay, Institución responsable de la Coordinación del presente Proyecto, se ha realizado en fecha 23 de Agosto de 1993, en la cual la Misión de Estudio procedió a la explicación a los representantes de las Instituciones pertinentes, convocados por la citada repartición.

En la ocasión se labró un acta de entendimiento del informe de Progreso III a que se ha arribado con los participantes contrapartes nacionales.

Asunción, 23 de Agosto de 1993.

ING. HISASHI TERAOKADO  
Lider del Equipo de Estudio  
Agencia de Cooperación Técnica  
Internacional del Japón

DR. RAUL TORRES SEGOVIA  
Ministro de Agricultura  
y Ganaderia del Paraguay



**MINISTERIO DE AGRICULTURA Y GANADERIA**

**ACTA DE ENTENDIMIENTO DEL INFORME DE PROGRESO III PRESENTADO POR LA MISION JAPONESA EN REUNION PLENARIA A LA CONTRA-PARTIDA NACIONAL, DEL PROYECTO DE DESARROLLO AGROPECUARIO INTEGRADO DEL BAJO CHACO.**

En la ciudad de Asunción, siendo las 08:30 hs., del día 22 de Agosto del corriente año en la sala de reuniones de la DIRECCION GENERAL DE PLANIFICACION se dió inicio a la reunión informativa de Avance III del Proyecto de Desarrollo Integrado Agropecuario del Bajo Chaco, luego del cual por desición unánime de la plenaria se aceptó dicho informe, procediendose a la rúbrica del presente acta.

Queda expresado que el mencionado informe fué puesto a consideración de cada contraparte por área temática para su atención y análisis, luego del cual si hubiere necesidad de efectuar ajustes lo mencionen por escrito a la Coordinación a los efectos de su corrección o complementación.

Se anexan la lista y rúbrica de los asistentes a la mencionada reunión.



MINISTERIO DE AGRICULTURA Y GANADERIA  
DIRECCION GENERAL DE PLANIFICACION

LISTA DE CONTRAPARTE NACIONAL DEL "PROYECTO BAJO CHACO"

Asunción, 23 de agosto de 1993

NOMBRES	REPARTICION	FIRMAS
RONALDO DIETZE	D.G.P.	<i>Ronald Dietze</i>
ING. AGR. NERI AGUERO	ORDENAMIENTO AMBIENTAL	AUSENTE
LIC. DANIEL ALVARENGA	ORDENAMIENTO AMBIENTAL	AUSENTE
DR. HIDEO OKA	DIPA	<i>Hideo Oka</i>
DR. FELIX OTAZU	DIPA	<i>Felix Otazu</i>
ING. AGR. CESAR DUARTE	DIA	<i>Cesar Duarte</i>
DR. PATROCINIO ALONSO	DEAG	AUSENTE
ING. AGR. MIGUEL K. MORIYA	DEAG	AUSENTE
ING. AGR. ENRIQUE BRAGAYRAC	PARQUES NACIONALES	<i>Enrique Bragayrac</i>
ING. AGR. MARIA AMARILLA	COMERCIALIZACION	<i>Maria Amarilla</i>
ING. AGR. JORGE OGASAWARA	D.G.P.	<i>Jorge Ogasawara</i>
DR. AUGUSTO VOGEL	I.N.D.I.	AUSENTE
ING. AGR. RAMON RAMIREZ A.	I.B.R.	AUSENTE
ING. AGR. JUAN MOLINAS	I.B.R.	AUSENTE
LIC. FEDERICO DOLDAN	I.N.D.I.	AUSENTE
LIC. GUILLERMO SERRATI	FONDO GANADERO	AUSENTE
ING. AGR. VICTOR ORTIZ	BANCO NACIONAL DE FOMENTO	<i>Victor Ortiz</i>
DR. JOSE LUIS LANERI	PRONIEGA	<i>Jose Luis Laneri</i>
ING. AGR. JORGE DAVALOS	S.F.N.	<i>Jorge Davalos</i>
ING. AGR. LUIS D. MACCHI	PRONIEGA	<i>Luis D. Macchi</i>
ING. AGR. CESAR CACERES	D.G.P.	<i>Cesar Caceres</i>
<i>Juan...</i>		
<i>Cecilio Jara Rodriguez</i>	<i>Fondo Ganadero</i>	<i>Cecilio Jara Rodriguez</i>
<i>Gerónimo Bernis</i>	<i>PRONIEGA</i>	<i>Gerónimo Bernis</i>
<i>Osvaldo Cobarrubia</i>	<i>Proniega</i>	<i>Osvaldo Cobarrubia</i>
LISTA Y RUBRICA DE LOS ASISTENTES A LA MENCIONADA REUNION		
ACTA DE ENTENDIMIENTO DEL	INFORME DE PROGRESO III	PRESENTADO
POR LA MISION JAPONESA EN REUNION	PLENARIA A LA CONTRAPARTE	NACIONAL
DEL PROYECTO DE DESARROLLO AGROPECUARIO INTEGRADO DEL BAJO CHACO.		

SE ANEXA EL ACTA



MINISTERIO DE AGRICULTURA Y GANADERIA

MINUTES OF THE MEETING

For the implemetation of the second phase study on the Integrated Agricultural and Livestock Development Project at Lower Chaco in the Republic of Paraguay, the JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) has sent a study team headed by Hisashi Terakado in accordance with the Scope of Work signed on the 11th December 1990. At the same time, JICA has dispatched Masaki Oga, chairman of the advisory team of the project, for the period from the 1st June to the 9th June for supervising the project.

The Ministry of Agriculture and Livestock, the highest authority responsible for this project, received 20 copies of the INTERIM REPORT (Spanish Version) finalizing the first phase of the study.

The explanatory meeting of the report was held by Planning Department, Ministry of Agriculture and Livestock. The study team explained the contents of the INTERIM REPORT to the representatives from the intitutions related to this project, who were invited by Planning Department.

As a result of the discussion, both parties agreed on the content of the INTERIM REPORT submitted by the team.

Asunción, 4th Junes 1993.

Mr. HISASHI TERAKADO  
Leader of the Master  
Plan Study Team  
Japan International  
Cooperation Agency

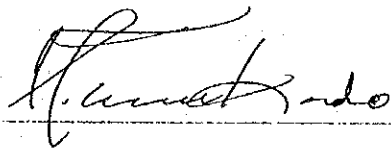
Dr. RAUL TORRES SEGOVIA  
Minister  
Ministry of Agriculture  
and Livestock

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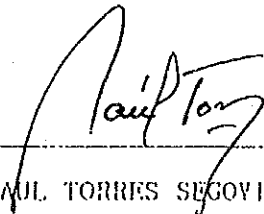
Witness: Mr. MASAKI OGA  
Chairman of JICA  
Advisory Team

Minutes of Meeting  
For  
The Draft Final Report  
On  
The Integrated Agriculture and Livestock Development Project  
At  
Lower Chaco  
In  
The Republic of Paraguay  
Agreed Upon Between  
Ministry of Agriculture and Livestock  
And  
Japan International Cooperation Agency (JICA)

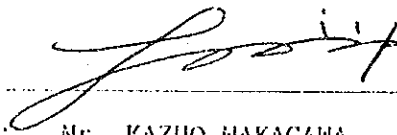
Asunción, 16 December 1993



Mr. HISASHI TERAKADO  
Leader of the Master Plan  
Study Team  
Japan International  
Cooperation Agency



Dr. RAÚL TORRES SEGOVIA  
Minister  
Ministry of Agriculture  
and Livestock



Witness: Mr. KAZUO NAKAGAWA  
Director of Agricultural Development  
Study Division, Japan International  
Cooperation Agency

For the explanation of the Draft Final Report on the Integrated Agricultural and Livestock Development Project at Lower Chaco in the Republic of Paraguay, The Japan International Cooperation Agency (JICA) has sent the study team headed by Mr. Hisashi TERAKADO in accordance with the Scope of Work signed on the 11th December 1990. At the same time, JICA has dispatched Mr. Kazuo NAKAGAWA, director of Agricultural development Study Division, JICA Tokyo, for the period from the 8th December to the 22th December 1993 for supervising the project.

The Ministry of agriculture and Livestock, the highest authority responsible for this project, received 20 copies of the Draft Final Report (Spanish Version) finalizing the second phase of the study.

The meeting for the discussion on the Draft Final Report was held on 14th December between Planning Department, Ministry of Agriculture and Livestock and the study team. The study team explained the contents of the Draft Final Report to the representatives from the institutions related to this project, who were invited by Planning Department. The list of participants who attended the meeting is attached.

As a result of the discussion, both parties agreed on the content of the Draft Final Report submitted by the team.

Discussions were focused on the following points.

- a) The study team explained the main points of the Draft Final Report, and Ministry of Agriculture and Livestock agreed on them.
- b) The counterpart technician, and the technician from other Paraguayan institution proposed to add the advantage of a deferential price policy for the use of electricity in agricultural activities in the chapter of Conclusion and Recommendation. Japanese side accepted this proposal.



The following were agreed:

- a) The Ministry of Agriculture and Livestock has no objection to make the Final Report open to the public in general.
- b) The Ministry of Agriculture and Livestock will submit to JICA a letter to request donate the equipments listed in the attached sheet.
- c) According to the Scope of Work, The Ministry of Agriculture and Livestock will present to JICA the Ministry's comments regarding the Draft Final Report in a period of one month after the signature of the Minutes of Meeting. However, because of the Christmas and new year holidays, the Ministry of Agriculture and Livestock requested to prolong the period of time to present the comments. Japanese side accepted this request. According to this agreement, The Ministry of Agriculture and Livestock will present the comments regarding the Draft Final Report to JICA Paraguay Office until 31 th January, 1994, and JICA will send this document to its central office in Tokyo.



MINISTERIO DE AGRICULTURA Y GANADERIA  
DIRECCION GENERAL DE PLANIFICACION

LISTA DE PARTICIPANTES EN LA REUNION

TEMAS:

FECHA:

NOMBRE	INSTITUCION/CARGO	TELEFONO
1. Augusto Rojas	INDI/D. Planificacion y Proyectos	550739
2. JORGE DAVALES	S. F. N. Coordinador Depto. Blanco	443971
3. Benicio Enrique Torz	S. D. A. - Asistente	433-453
4. ENRIQUE BRAGAMAC	DPNUS - WASHINGTON UPP	495568
5. Luis Dorio Moschi	Est. Exp. Gond. del Choco. PRONIEGA	505 203
6. JORGE GUASAWAQA	DGP	495420
7. Miguel A. Orrego	D. R. H. C. N. D. I. C. H. - U. D. N	203373
8. Maria Amicelli	Dircc. Comercializacora	443675-
9. Felix Staxii	Dircc. de Tuvesty Prod Animal	022-2369
10. Felipe H. Aquilera S.	Banco Nacional de Fomento	444440.
11. Geronimo Bernis	PRONIEGA (M.A.G)	505-203
12. CESAR DURATE	DIA (MAG)	447-304
13. CESAR COCERES	D. C. P. / MAG	
14. Oscar B. Cabrera	PRONIEGA (MAG)	505.203
15. Juan Holman	I. B. R. (Gabinete tecnico)	446567-
16. Jose Luis Laneri	PRONIEGA/MAG - Director	505-203
17. RONALDO DIETZE	DIRECTOR GENERAL de Planific.	
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JICA