

### 3.3.2 Proposed Organization and Function of the Agricultural Cooperatives

To exclude the present constraints and activate the farmers' organization to its maximum possible, it is planned to organize the Jala-Jala Multi-purpose Farmers' Cooperation through unifying various units of the existing cooperatives and associations. The fundamental function conceived for this Cooperation are as follows:

- To deal with the institutional supporting services of the Government through the joint responsibility of the member farmers.
- To operate and manage cooperative store for stable supply of farm inputs and consumables.
- To produce and distribute the quality seeds,
- To organize joint finance for establishment of farm mechanization center, including garage for machinery pool and workshop services.
- To organize joint finance for establishment of the post harvest service facilities, including production depots for fruit and vegetables, rice mill for paddy production and warehouse, etc.
- To organize joint marketing of agricultural production so as to cope with commercial risk as well as bargain force in marketing.

The conceptional organization chart prepared based on the new code prepared by the Cooperative Development Authority is as shown in Fig. VIII 3.1.

As it has been pointed out in the preceding section 3.2, majority of farmers have low incentives and/or motivation for taking the cooperative work or activities. Therefore, an education and training of farmers are indispensable so as to establish the agricultural cooperation under implementation of this integrated rural development project. To efficiently organize the objective cooperation, it is planned to pursue stepwise development through performance progress of such training and guidance as rice mill operation, workshop services, joint financing for procurement of farm machinery, etc.

#### (1) First Step Development:

Out of the existing 32 cooperatives, 7 Samahan nayong, 7 farmers cooperatives and 4 multi-purpose cooperatives will be unified at the barangay level and re-arrange the operational system according to the purposes, such as paddy cultivation, diversified crop production, etc.

The existing Irrigators' Association will be re-organized according to the proposed CIS units.

(2) Second Stage Development:

Establishment of the farmers cooperatives based on the single function, such as crop production/shipping, plant protection, farm mechanization, irrigation cum drainage, fishery, etc.

Getting technical training and guidance in various technology in respect to operation management of each cooperative.

(3) Third Stage Development:

Unifying the above single purpose cooperatives, and commencement of self management operation for all the principle facilities, i.e. rice mill, workshop, warehouse, etc.

## TABLES



Table VIII 1.1 Farmers' Organization in the Study Area, 1989

Name of Barangay	Samahang Nayon		Farmer's Association	
	No.	Membership	No.	Membership
1 Sipsipin	1	147		
2 1st District			1	69
3 2nd District	1	29		
4 3rd District			1	27
5 Bayugo	2	475	1	43
6 Punta	1	200		
7 Palaypalay	1	73	1	29
8 Pagkalinawan	1	116	1	90
9 Lubo			1	250
10 Bagumbong			1	36
11 Paalaman				
Municipality	7	1,040	7	544

Name of Barangay	Multi-purpose Coop.		Irrigators Association	
	No.	Membership	No.	Membership
1 Sipsipin			4	215
2 1st District			2	119
3 2nd District			1	47
4 3rd District			1	42
5 Bayugo	1	32		
6 Punta				
7 Palaypalay				
8 Pagkalinawan	1	70		
9 Lubo			1	43
10 Bagumbong	1	80	5	112
11 Paalaman				
Municipality	3	182	14	578

Source : Field interview by JICA 1989

Table VIII 1.2 Monthly Report of Credit Financial Status, Jala-Jala Multi-purpose Cooperative, Inc. January to September, 1989

Month 1989	Amount of Loan Granted	Loan Re- payment	Capital Share	Time Deposit	Income					Exp.	Net Income	
					Interest	Service Fee	Collection Fee	Fines	Member- ship Fee			Pass Book
January	17,700.00	18,095.35	2,885.00	-	2,212.50	177.00	177.00	163.80	10.00	7.00	600.00	2,147.30
February	17,600.00	11,436.10	5,048.88	-	2,200.00	176.60	176.00	1,118.20	10.00	7.00	600.00	3,067.20
March	8,500.00	14,847.17	3,828.88	-	987.50	85.00	85.00	389.50	40.00	28.00	750.00	865.00
April	6,700.00	16,305.61	5,607.21	-	837.50	67.00	67.00	40.00	60.00	42.00	1,553.25	(439.75)
May	33,900.00	12,486.59	1,420.00	-	4,237.50	339.00	339.00	968.60	20.00	-	904.00	5,000.10
June	19,300.00	12,334.10	2,665.00	-	2,318.75	193.00	193.00	144.60	20.00	14.00	1,345.00	1,538.35
July	11,550.00	15,073.80	1,377.50	-	1,443.75	115.50	115.50	135.00	10.00	2.50	1,710.00	112.25
August	16,750.00	18,870.00	1,837.50	-	2,104.10	167.50	167.50	284.80	10.00	2.50	1,105.00	1,631.40
September	30,750.00	17,465.00	1,686.30	-	3,750.50	300.00	300.00	285.45	-	-	1,175.00	3,460.95
Total	168,750.00	136,553.72	26,356.27	-	20,091.10	1,620.00	1,620.00	3,529.95	180.00	103.00	9,742.25	17,402.80
Average	18,750.00	15,172.64	2,928.47	-	2,232.46	180.00	180.00	392.22	20.00	11.44	1,082.47	1,933.65

Note: Figure in parenthesis is negative net income.  
 Source: Jala-Jala Multi-purpose Cooperative, Inc.  
 Jala-Jala, Rizal

Table VIII 1.3 Monthly Financial Report of Merchandizing  
Consumer Goods, Jala-Jala Multi-purpose  
Cooperative, Inc. April to October, 1989

(Unit: Peso)							
Month 1989	Cost of Stock at Beg.	Cost of Stock Acquired During the Month	Cost of Stock Sold During the Month	Cost of Bal. of Stock at the End of the Month	Interest Gained on Stock sold	Expenses	Net Income
April		2,191.00	643.20	1,547.80	55.24	2.00	53.24
May	1,547.80	2,706.90	2,648.65	1,606.05	180.62	22.90	157.72
June	1,606.05	3,787.80	3,832.50	1,561.35	294.34	29.90	264.44
July	1,561.35	4,636.10	4,919.50	1,277.95	379.82	54.00	325.82
August	1,277.95	4,961.15	4,628.10	1,611.00	375.05	59.00	316.05
September	1,611.00	3,249.60	3,901.45	959.16	318.57	45.70	272.87
October	959.15	3,665.90	4,728.00	(102.95)	366.41	35.40	331.01
Total	8,547.30	25,198.45	25,301.40	2,547.30	1,970.05	248.90	1,721.15
Average	1,221.04	3,599.78	3,614.49	1,221.04	281.44	35.56	245.88

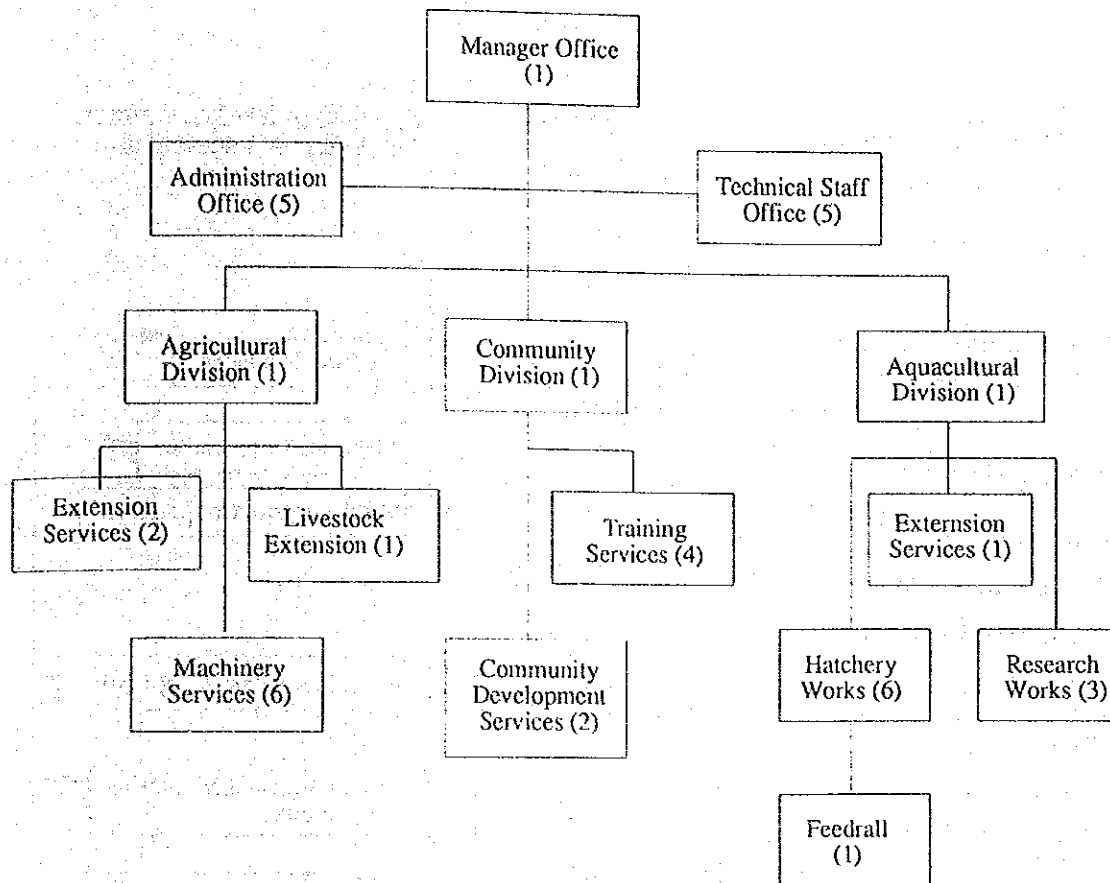
Note: Figure in parenthesis is negative cost balance of stock.  
Source: Jala-Jala Multi-purpose Cooperative, Inc.  
Jala-Jala, Rizal





## FIGURES





Remarks: - Figures in parenthesis in the above show the present staffing of the Center.  
 - The breakdown of staffing by speciality and/or designation is as follows:

1. Head of Center
2. 5-Administration staff
3. Agronomist (head of Agric. Division)
4. Horticulturist (Extension)
5. Agronomist (Extension Assistant)
6. Livestock Specialist
7. 5-Farm Attendants
8. Tractor Operator
9. Sociologist (Community Development Division)
10. 5-Technical Staff
11. Aquaculturist (head of Fishery Division)
12. Technician (Fishery Extension)
13. Sr. Reserach Officer
14. 2-Research Assistant
15. Technician (Hatchery work)
16. 5-Fishery Aid (Hatchery work)
17. Feedrall Operator
18. Technician (Training Service)
19. 3-Trainer (Training Service)
20. 2-Community Development Worker

Fig. VIII.1.1 Agro-Aquatic Development Center, MERALCO Foundation Inc.

ORGANIZATION CHART

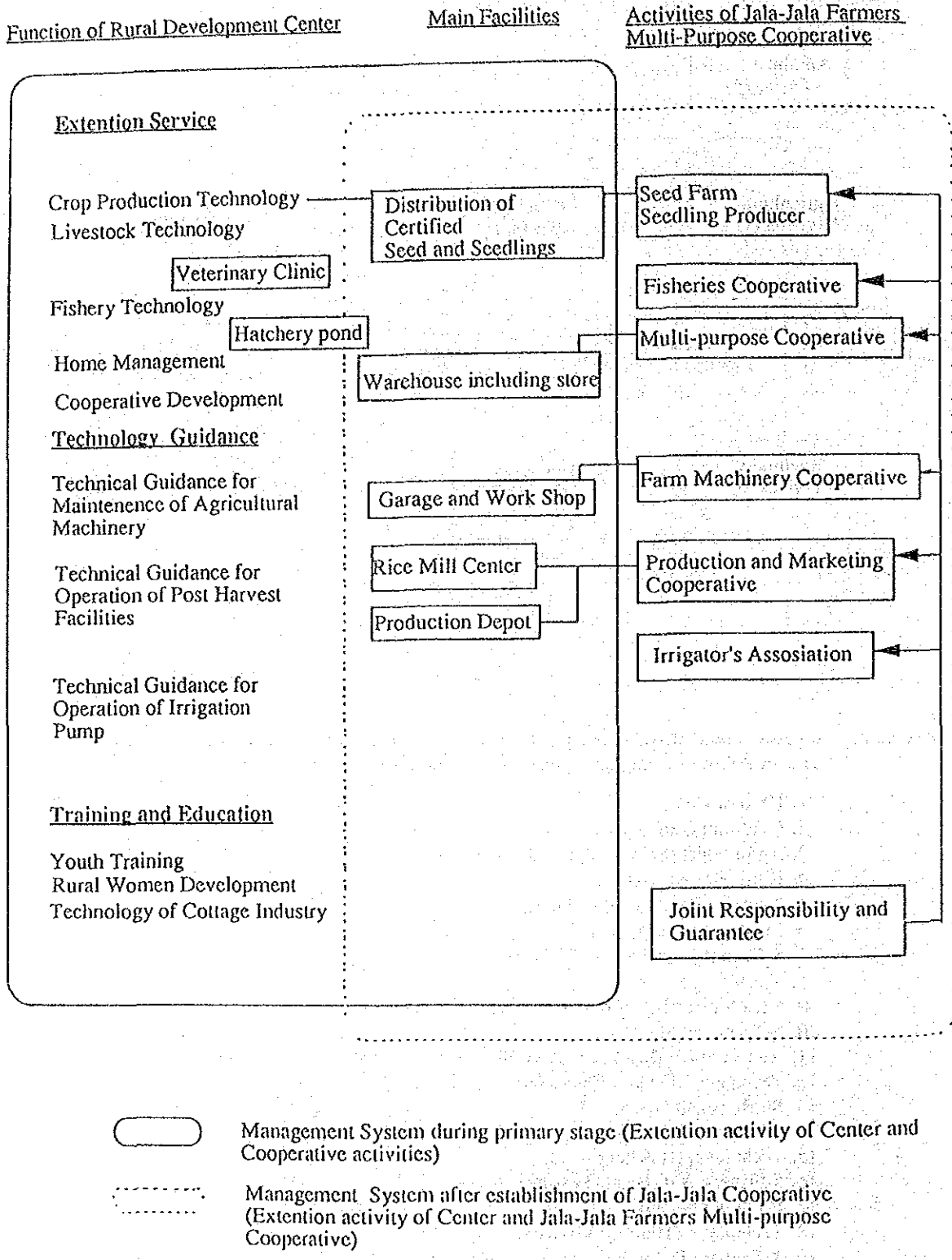


Fig. VIII.2.1 Supporting Function of RDC and Activity of Jala-Jala Farmers Multi-Purpose Cooperative

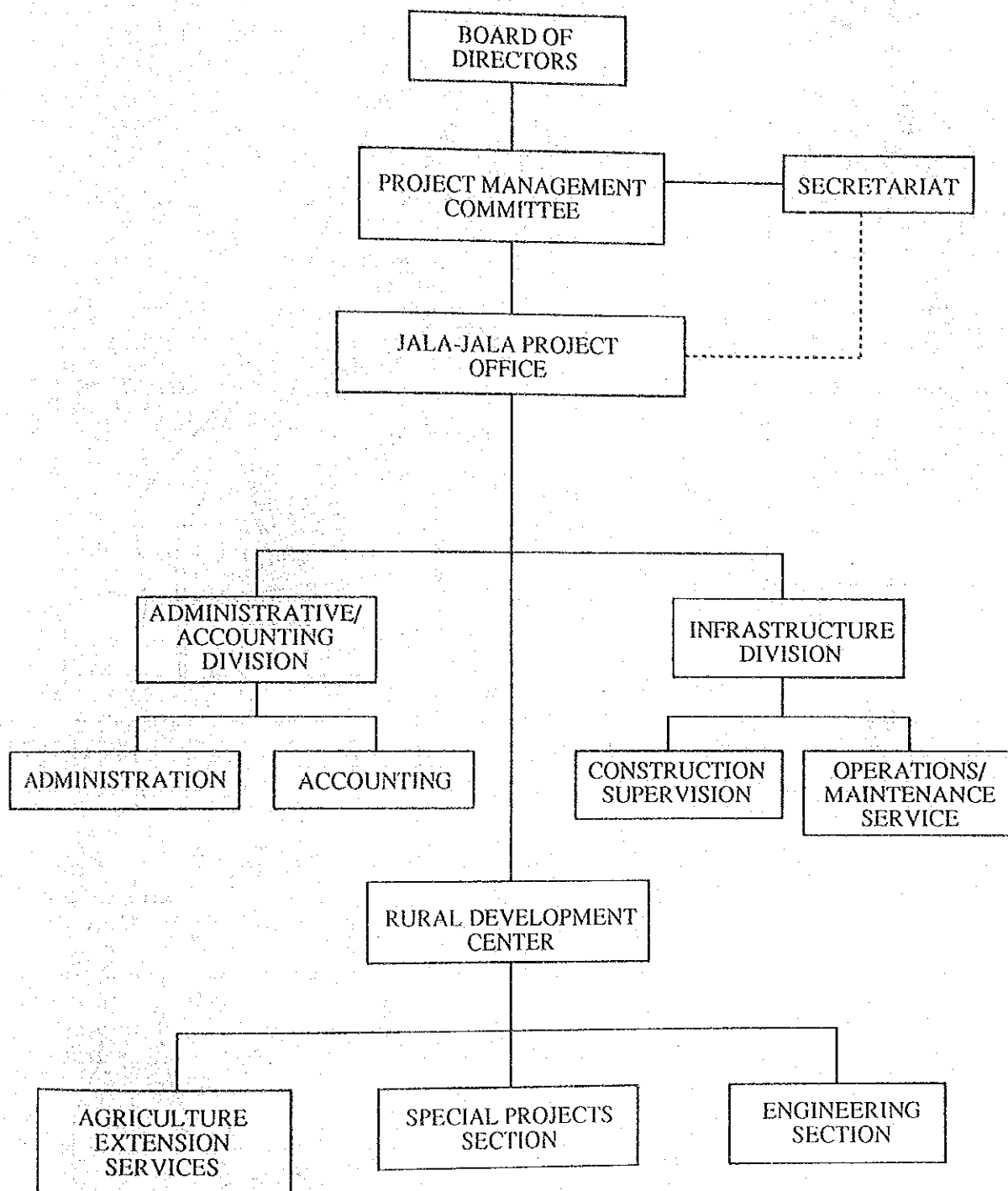


Fig. VIII 2.2 PROJECT ORGANIZATION AND MANAGEMENT STRUCTURE

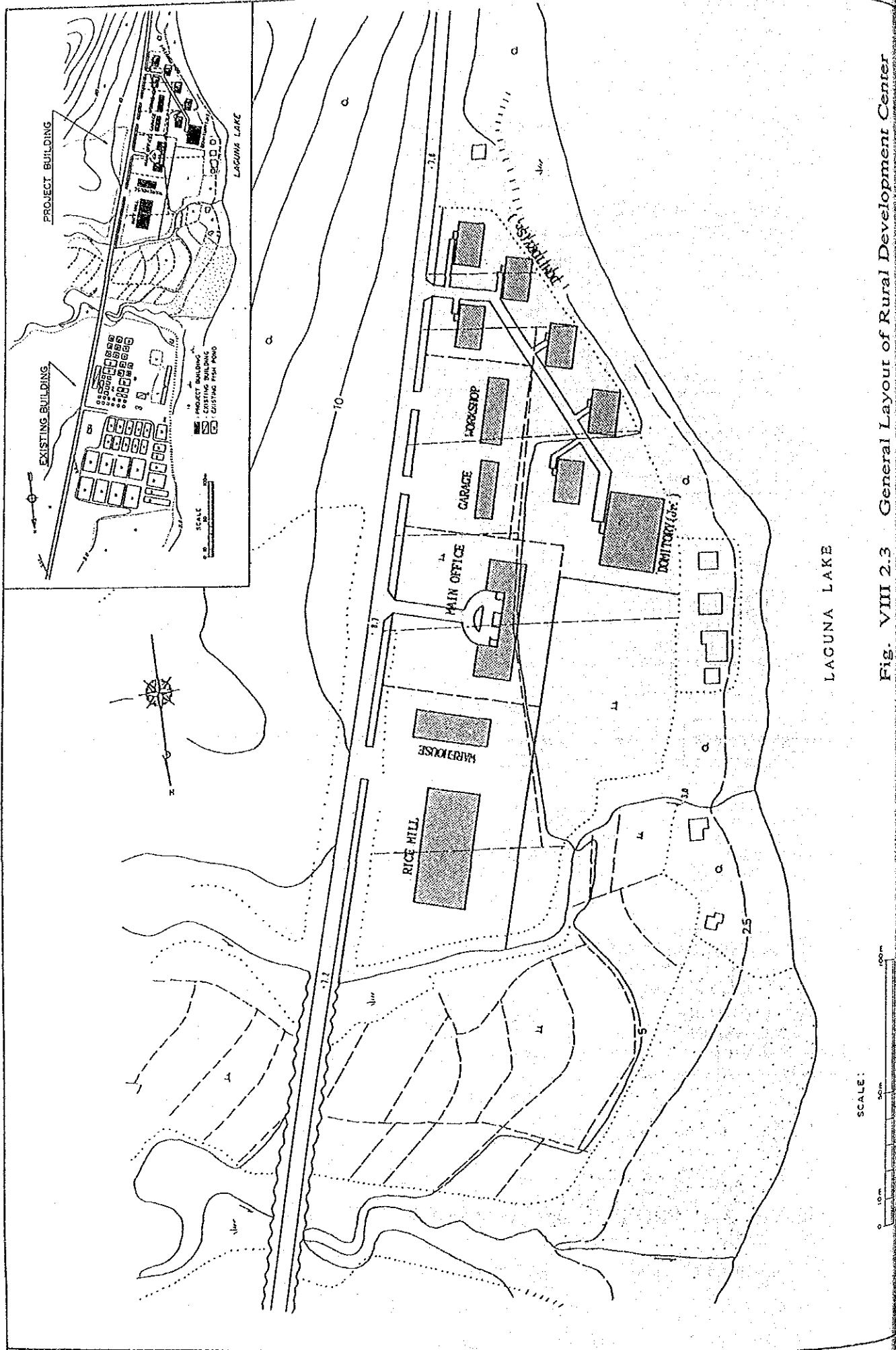


Fig. VIII 2.3 General Layout of Rural Development Center

STRUCTURAL ORGANIZATION

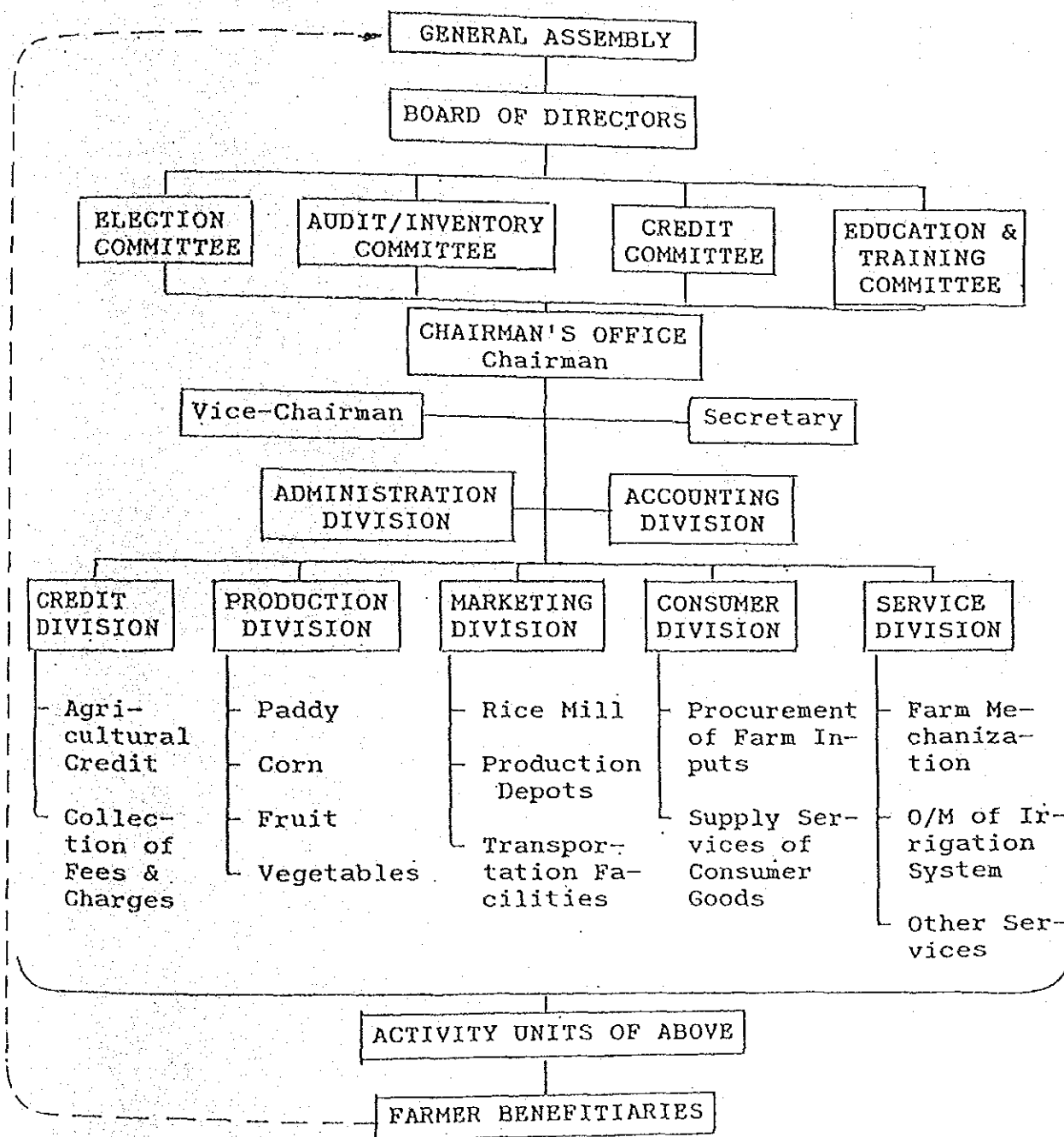


Fig. VIII 3.1 Organization Structure of Jala-Jala Farmers Multi-Purpose Cooperative





**ANNEX-IX**

**FARM MECHANIZATION AND  
POST HARVEST FACILITIES**



## ANNEX- IX

### FARM MECHANIZATION AND POST-HARVEST FACILITIES

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## **ANNEX-IX FARM MECHANIZATION AND POST HARVEST FACILITIES**

### **1. FARM MECHANIZATION**

#### **1.1 Present Conditions of Farm Mechanization**

The farm mechanization is still rare in case in the study area. The heavy work, such as ploughing, transportation, etc. is, in most case, done by use of draft animal, such as water-buffaloes and/or horse. All the other farming practices are by manual operation using the traditional implements.

#### **1.2 Farm Mechanization Plan**

##### **1.2.1 Comparative Study on Use of Draft Animal and Farm Tractors/Power Tillers**

For sustaining the operation of proposed crop production program, there are two schedules specifically for doing soil preparation, transportation, harvesting works, etc. The one schedule is the traditional way by use of water buffaloes as the draft-animal, while introduction of the power-tillers and/or farm tractors for another schedule. Each schedule has a merit and demerit as those will be described hereunder.

##### **(1) Use of Draft Animal (Water Buffaloes)**

Water buffaloes have been extensively grazing in the Study area and use as the draft animal essentially for soil preparation, transportation, etc. since long. Out of 771 heads in total grazing at present, some 60% or about 460 heads are to be used for the said works.

As classified in Table IX 1.1, major forage production for livestock grazing is expected to be produced approximately 10,580 tons in terms of the dry matters. Major increment is by significant increase of rice bran (1,420 ton) and rice straw (7,780 ton) through rice production increase program. The production of wild pasture is, however, decreased to small due to diversification of land use from grass field to agro-forest and/or social forest. It is estimated that the forage production produced is equivalent to be 2,970 ton of TDN, of which rice straw and wild pasture, which might be useful for grazing of water buffaloes, share 1,790 ton and 470 ton, respectively. The gross consumption of TDN for the present number of cattle and water buffaloes is estimated to be 2,220 ton/annum. This is almost equal to TDN expected from rice straw and wild pasture. This means that for further increasing water buffaloes and chattel, special sharing of farm land is required for producing more fodder crops.

The Table IX 1.2 is presenting the working conditions and/or working efficiency of water buffaloes specifically on soil preparation. The soil preparation by use of water buffaloes can be completed by 460 heads of workable water buffaloes, but it will take almost

one month. Accordingly, the quality of work specifically on ploughing depth is not always sufficient for maintaining a high yielding conditions due mainly to in-sufficient power for deeply enough ploughing.

To sustaining the sound conditions of water buffaloes for heavy duty work, a substantial feeding by use of the concentration, i.e. hard corn is essential and crucial. Accordingly, this substantial feeding bring particular cost for soil preparation. at present, farmers feed some 5 Kg/day of hard corn to water buffaloes during the working season. This corn feeding provides about 4 kg of TDN/day which would be sufficiently enough for the objective purpose. This substantial feeding is equal to about ₱ 329,130 (or ₱ 346.00/ha) in cost specifically for soil preparation work.

## (2) Introduction of Power-Tillers and/or Farm Tractors

Use of power-tillers and/or farm tractors for such works as soil preparation, transportation of agric. products, etc. is so far under propagation in the study area.

The farm mechanizations, in general speaking, one of the larger petroleum consumer program. However, the machinery work surely bring in a reasonable work quality and then production. In the farm management, it is also expected to be highly response in efficient operation of farming practices, and accordingly, to facilitate an intensification and diversification of the agricultural production.

Table IX 1.2 demonstrate the working efficiency of the power-tiller and draft-animal for soil preparation. The operation of power tillers will consume some 59,400 liters/annum of diesel oil, and it costs about ₱ 270,800 for the works in two crop seasons a year. This petroleum consumption is, however, so smaller than that of the cost required for the substantial feeding for water buffaloes, and consequently, bring an incremental profit of some ₱ 221,320/annum. The farm mechanization would, further more, be effective in crop diversification from forage production to profitable cash crop production.

### 1.2.2 Farm Mechanization Plan

In line with the agricultural development plan stated above, farm mechanization will be promoted in a part so as to secure an intensification of farming, and also to properly deal with crop production increase. Farm mechanization will be conceived only for three points as listed below:

- (1) Soil preparation, including ploughing, harrowing and puddling or levelling works,
- (2) Plant protection works, and
- (3) Threshing work

The soil preparation is, at present, practised by use of draft animal, mostly water buffalo. The present animal power is, however, not sufficient for maintaining the objective intensification of crop operation. On the contrary, no more enough feeds can be expected for further increase of such draft animal due to limitation of land. Thus, in stead of draft animal power, farm tractors will be introduced in both farms on paddy and upland cropping.

Plant protection is not regularized yet in this area due mainly to inadequate supply of agro-chemicals. To ensure high crop production in this area, plant protection against damages by diseases, pests and insects is one of the most essential farming practices. Generally, plant protection work should cover certain wide area once some damages happened. Therefore, in stead of small knapsack type sprayers being prevailed on at present, motorized sprayers will have to be introduced.

To suit increased paddy production in the future, mechanization of threshing work is indispensable. Power threshing will also be required on some upland crops, i.e. beans.

Selection of machinery and equipment and those ownership and/or operation system are studied taking into account the field conditions (form of reclamation) as well as prospective financial force of farmers. The proposed system is as follows:

Agricultural Machinery and Owner/Operation System

Machinery	No. Required	Owner/Operation System	
<b>For Paddy Cultivation:</b>			
- Hand Tractors	160	Joint Investment	(1 unit/5 households)
- Power Sprayers	80	Joint Investment	(1 unit/10 households)
- Power Threshers	65	Joint Investment	(1 unit/15 households)
<b>For Upland Crop Cultivation:</b>			
- 4-W Tractors	8	Cooperative Own	(1 unit/30 households)
- Power Sprayers	25	Joint Investment	(1 unit/10 households)
<b>For Fruit Plantation:</b>			
- Power Sprayers (Stational Type)	10	Cooperative Own	(1 unit/50 households)

Note: The joint investment for procurement /joint ownership shall be organized and operated under management of the agricultural cooperatives

Other than the above mechanization, the Rural Development Center will also hold some 10 numbers of 4-w tractors (45 HP in class) and provide periodical services for deep ploughing of the paddy field. This deep ploughing practices is essential for maintaining high yielding conditions in paddy production. Besides, workshop for repair and maintenance services on farm machinery will also be established in the rural development center. These functions will be transferred to the agricultural cooperative in the future when the farmers will be skilled enough in necessary technology for machinery operation and repairing services.

## 2. POST-HARVEST FACILITIES

### 2.1 Present Conditions of Post-Harvest Activities

Post harvest activities such as reaping, threshing and winnowing, are usually done manually and the products are transported from farm to farmer's house by a animal power, such as water-buffaloes and/or horses. Harvesting is done through hired labor with contract or by mutual assistance system. In case of hired labour, remuneration for the hired labour is paid in harvested paddy with a labour/owner sharing ratio ranging from 1:4 to 1:6, depending on the distance from farm to house yard and relief conditions of paddy fields.

Pre-drying of harvested paddy is done in the field but partial in all the cases. Threshing is usually done by a beating method by use of the traditional implement, purchase to threshing table or bamboo frame threshing stand. Usage of power thresher (IRRI model) or pedal thresher is limited to rich farmers and the agriculture and aquaculture training center in Llano.

Majority of the farmers rely on conventional sun drying using public road pavement or multi-purpose concrete floor, such as basketball courts, Barangay halls, etc. In order to save the losses in drying and facilitate easy packing, some farmers use fishing nets to dry the paddy on paved roads. Paddy is usually stored at farmers' houses for home consumption and/or marketing.

About 30 small capacity rice mills equipment "Kiskisan" are available in different barangays of the study area. These mills are mainly used for milling paddy for the local population. Only one rice mill complex type (Cono: husker and whitener) has been installed in Jala-Jala area.

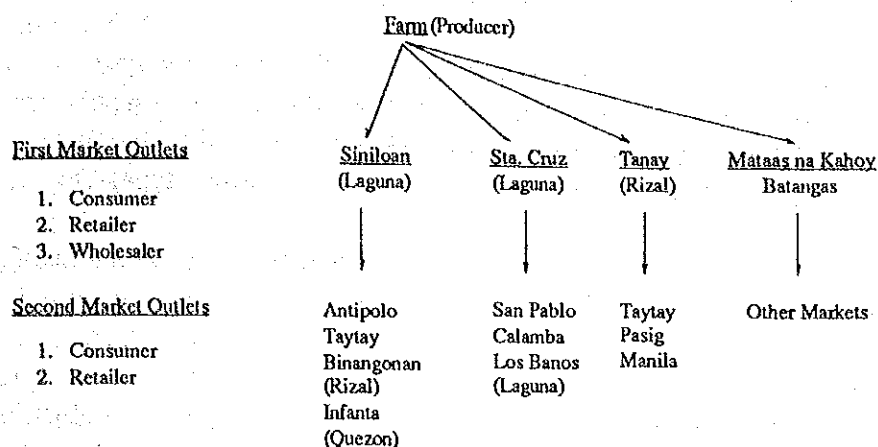
### 2.2 Marketing Structure for Agricultural Product

Marketing of farm products from the study area to outside market is made by individual farmers or private small dealers. The farmers sell their products in any manner most convenient or advantageous to them. Established cooperatives in the area have not ventured yet on organized marketing of the farm products. Thus, the performance of marketing system is relatively inefficient in terms of movement of product and marketing costs.

The farm products to be marketable are paddy, corn, root crops, vegetables, fruits, and livestock and its products. At the first market outlet, the farm products are sold by the farmers either to consumers, retailers and wholesalers. Market outlets are illustrated as follows:



## Market Outlets of Farm Products from Jala-Jala



Farm gate prices of major farm products are summarized in Table IX.2.1.

Majority of the farmers in the project area buy the farm inputs as well as consumables by themselves from the local market listed in the above Figure. The farm inputs such as fertilizers, insecticides, herbicides, sacks, etc. and some farm tools are all available in the said markets. The transportation facilities are available on both ways of land or water routes in lake Laguna.

Prices of farm inputs and other commodities are presented in Tables IX.2.2 and IX 2.3 while retail prices in Table IX 2.4. The retail and wholesale prices of milled rice are as shown in Table IX.2.5.

### 2.3 Reinforcement Plan of the Post-Harvest Facilities

The present conditions of post harvest activities still remain at minimal level. The facilities related to the post harvest works are only for rice production, such as small rice mills and simple warehouse. No other effective facilities and/or service systems are available in this area. Thus, in order to successfully achieve the intensification and diversification of crop production, establishment of supporting services for post harvest activities on each crop is essential and vital necessity in this agricultural development plan. The post-harvest facilities are preliminarily designed for two productions, i.e., rice and vegetable/fruits.

### 2.4 Post-Harvest Facilities for Rice

At present, the post-harvest facilities for rice production is limited only 30 nos. of small rice mills and simple warehouse for temporary storing of paddy. Thus, provision and reinforcement of the post harvest facilities is one of the essential needs in promotion of rice production increase program. Reinforcement of the post harvest facilities will also be effective for saving the field operation losses of the production.

General speaking, the post harvest facilities on rice could be specified into 4 types of equipment according to the type and capacity of rice mills to be installed. Namely:

- 1) Kis-Kisang type of small mill (0.25 ton/hr, right duty type):
- 2) Cono type of medium mill (0.5 - 0.75 ton/hr, light duty type):
- 3) Medium capacity complex type (1.0 ton/hr, heavy duty type):
- 4) Large capacity complex type (3.5 ton/hr, heavy duty type):

The installation cost, operational conditions and technical specifications of each rice mill equipment are as follows:

Descriptions	Kiskisan Type	Cono Type	Complex Type (Medium)	Industrial Type (Large)
Technical Specification	Right Duty For Individual Use	Right Duty For individual Use	Heavy Duty For industrial Use	Heavy Duty For industrial Use
Milling Quality	Fair	Fair	Excellent	Excellent
- Broken (%)	>20	>15	<5-7	<5-7
- Milling Effic.(%)	<60	<60	>62	>62
Operation/Mainte.	Easy/Free Operation	Easy /Free Operation	Need Operation System	Need Operation System
Beneficiary Farmers	5	10 - 15	200 - 250	850 - 950
Investment Cost(₱)	58,300	108,500	6,239,400	17,884,700
Amortization/Farmer/Annum(₱)	3,230	3,010	3,660	2,760

1) Kiskisan and 2) Cono type of rice mills are, at present, assembled in Philippines and prevailed in rice producing area extensively. These equipment are cheap in price and have a simple mechanism for easy operation. However, an annual debt repayment, if apply the farmers credit for this installation, is considered to be rather heavy for farmers. Besides, milling quality and operation losses (broken hazard) are not acceptable as profitable operation.

Rice mill equipment of 3) and 4) are the heavy duty type being capable for industrial use. Rice mill of 3) type is considered to be most suitable compact unit for doing rice milling enterprise at the farmers cooperative bases. However, to meet the total rice milling

requirement, 3) type rice mill equipment required 4 units for entire study area. Consequently, this installation cause rather heavy capital investment due to requirement of related facilities and structures for each unit. Amortization of the facilities is also large and heavy for the farmer beneficiaries. Rice mill equipment of 4) type has been designed as the capable unit for rice production program conceived in this planning. Requirement of large capital investment at one time is a demerit of this unit, although an annual due amortization would be payable by beneficiary farmers.

In due consideration of both of the technical and financial merit and demerit, 4) type of rice mill has been selected for this plan. Operation and management of this rice mill shall be the task work of the farmers cooperative. In reality, however, it is hardly expected to play such works by farmers themselves at the initial stage of development due to no skillfulness for the technical work and knowledge for management of rice milling enterprise. Thus, herein the planning, this rice mill facility will have to install as the basic facility in the Rural Development Center and provide the milling services to rice producing farmers. Through this practical operation and management of rice milling services, farmers shall study necessary technique and know-how for future handling over of this rice mill facilities into farmers cooperative.

The basic facilities and related structures to be provided to this rice mill are as follows:

- Dryer: Concrete floor of 25 m x 50 m (1,250 m<sup>2</sup>)
- Rice milling equipment: R.H.R.P Complex type having 3.5 ton/hr capacity
- Warehouse: 500 ton capacity for temporary storing of paddy and/or milled rice

## 2.5 Post-Harvest Facilities for Diversified Crops

For successful marketing of such vegetable, fruits production, etc., a speedy shipping immediately after harvesting and highly unified quality are essential requirement. To this end, establishment of the following production depots is proposed as the subjected function. To operate and manage these proposed production depots, it is also suggested the farmer beneficiaries shall organize them into the vegetable and/or fruit production/shipping cooperatives and practice joint production and shipping work.

### a. Production Depot for Vegetables

3 locations for production gathering, primary treatment, grading, and packing : Steel frame with precast form, concrete floor 50 m<sup>2</sup> including 10 m<sup>2</sup> store space.

### b. Production Depot for Fruit

3 locations for production gathering, primary treatment, grading, and packing : Steel frame with precast form, concrete floor 50 m<sup>2</sup> including 10 m<sup>2</sup> store space.

## 2.6 Establishment of Production/Shipping Cooperatives

Under establishment of the Agricultural Cooperatives in the study area, the farmers shall organize the joint production cum shipping system on rice as well as vegetable and fruit so as to easily control the production and those marketing.

## TABLES



Table IX 1.1 Major Forage Production for Livestocks

Description	Hard Corn	Rice Grain	Rice Straw	Wild Pasture	Total Production
<u>Present Conditions:</u>					
- Gross Production (ton)	110	270	1,540	5,970	-
- Dry Matters (ton)	110	230	1,310	5,130	6,780
- Effectiveness for feeding (%)	100	100	60	100	-
- TDN in Effective Utilization (ton)	90	150	300	2,050	2,590
<u>Future With-Project Conditions:</u>					
- Gross Production (ton)	190	1,650	9,150	1,380	-
- Dry Matters (ton)	190	1,420	7,780	1,190	10,580
- Effectiveness for feeding (%)	100	100	60	100	-
- TDN in Effective Utilization (ton)	140	570	1,790	470	2,970

- Remarks: (1) Wild pasture in the future will be available under the forest tree and/or in the agro-forest plantation. Therefore, the production of wild pasture will be as small as less than 1 ton/ha.
- (2) Consumptive Use of TDN by Livestock or Poultry (Present Grazing Conditions)

Livestock/poultry	Total Heads	Unit	Consumption of TDN	TDN to be Required
<b>Poultry:</b>				
Duck	6,580	20	kg/head	130 ton
Chicken	3,630	20		
<b>Livestock:</b>				
Swin	445	620		280
Cattle	580	1,640		950
Buffaloes	770	1,640		1,270
<b>Total</b>				<b>2,700</b>

Table IX 1.2 Comparison of Work Efficiencies on Soil Preparation by Water-Bufferaloes and Power-Tiller

Descriptions	Water-Buffalo	Power-Tiller
Works:	Ploughing:	Ploughing cum Pudding:
- Hourly Work	$0.2 \text{ m} \times 1,500 \text{ m/hr} \times 0.7 =$ <u>0.21 ha/hr</u>	$0.65 \text{ m} \times 2,000 \text{ m/hr} \times 0.7 =$ <u>0.091 ha/hr</u>
- Daily Work	$0.021 \text{ ha/hr} \times 4.5 \text{ hr/day} =$ <u>0.0945 ha/day</u>	$0.091 \text{ ha/hr} \times 4.5 \text{ hr/day} =$ <u>0.4 ha/day</u>
- Requirement of Working Units/Day	$950 \text{ ha} \times 1/0.0945 \text{ ha/day} =$ <u>10,053 heads-day</u>	$950 \text{ ha} \times 1/0.4 \text{ ha/day} =$ <u>2,375 tillers-day</u>
- Requirement of Net Working Days	$10,053 \times 1/(771 \times 0.6) =$ <u>22 days</u>	$2,375 \times 1/15 \text{ days} =$ <u>158 liters</u>
	Pudding:	
- Hourly Work	$1.0 \text{ m} \times 1,500 \text{ m/hr} \times 0.7 =$ <u>0.1 ha/hr</u>	
- Daily Work	$0.1 \text{ ha/hr} \times 4.5 \text{ hr/day} =$ <u>0.45 ha/day</u>	
- Requirement of Working Units/Day	$950 \text{ ha} \times 1/0.45 \text{ ha/day} =$ <u>2,111 heads-day</u>	
- Requirement of Net Working Days	$2,111 \times 1/(771 \times 0.6) =$ <u>5 days</u>	
Consumption and Operation Cost:		
	<u>Substantial feeding:</u>	<u>Fuel and Lubricant Oil:</u>
	$5 \text{ Kg/day} \times 460 \text{ heads} \times$ $27 \text{ days} =$ <u>62,100 Kg</u>	$2.5 \text{ lit/hr} \times 11,875 \text{ hrs} =$ <u>29,687 lits</u>
	$62,100 \text{ Kg} \times \text{P}5.3/\text{Kg} =$ <u>P329,130</u>	$29,687 \text{ lits} \times \text{P}4.5 \text{ lit} =$ <u>P135,400</u>
	-	Assuming 10% of above cost for oil consumption: <u>P13,500</u>
	Daily Care	Repair & Maintenance
	$1/8 \text{ Hr/day} \times \text{P}45/\text{day} \times$ $365 \text{ days}/2 =$ <u>P1,030</u>	Assuming 30% of above cost: <u>P40,600</u>
	Total <u>P330,160</u>	<u>P219,500</u>

- Remarks: (1) The substantial feeding is only made for working buffaloes specifically during the working period. Hard corn is used in general.  
 (2) Hard cone 5 kg is equivalent to about 3.9 Kg of TDN which would be sufficient enough for maintaining sound conditions for heavy duty work.



Table IX 2.1 Farmgate Price of Selected Farm Products,  
Jalajala, Rizal, Nov. 1989

Item	Unit	Unit Price (peso)		
		Financial / 1	Economic / 2	
<b>Crops</b>				
Banana	kg	5.00	5.00	
Bitter Gourd	kg	10.00	10.00	
Cassava	kg	3.00	3.00	
Citrus, calamansi	kg	4.00	4.00	
Citrus, szingkom	kg	5.00	5.00	
Coconuts	kg	5.00	5.00	
Coffee bean, robusta	kg	14.30	14.30	
Corn, shelled	kg	5.30	4.15	
Eggplant	kg	12.00	12.00	
Guyabano	kg	5.00	5.00	
Mango, carabao	kg	5.00	5.00	
Mung bean	kg	13.50	13.50	
Paddy	kg	4.50	4.19	
Squash	kg	5.00	5.00	
String bean	kg	5.15	5.15	
Sweet potato	pc	2.70	2.70	
Taro	kg	2.85	2.85	
Watermelon	kg	3.20	3.20	
Yam	kg	7.80	7.80	
<b>Livestock and Poultry/_3</b>				
Cattle	head	7,670.00	7670.00	
Carabao	head	7,250.00	7250.00	
Horse	head	5,000.00	5000.00	
Goat	head	325.00	325.00	
Pig	kg	29.00	29.00	
Chicken	kg	37.00	37.00	
Duck for: layer	head	52.00	52.00	
meat	head	25.00	25.00	
<b>Products (Livestock and Poultry)</b>				
Egg	chicken	pc.	1.50	1.50
	duck	pc.	2.50	2.50
Milk	carabao	li.	6.00	6.00
	cattle	li.	4.50	4.50
<b>Other Products</b>				
Charcoal	kg	1.60	1.60	
<b>Fish (Fresh)</b>				
Bangus	kg	32.00	32.00	
Tilapia	kg	32.00	32.00	
Biya	kg	45.00	45.00	
Dalag	kg	50.00	50.00	

/\_1: Financial Price in 1990

/\_2: Economic Price in 2000 (1990 constant)

/\_3: Live animals of average size for sale

Source: Interviews with Barangay Officials and Farmers in  
Project Area, Jalajala, Rizal

Table IX 2.2 Prices of Selected Farm Inputs, Tanay, Rizal,  
November, 1989

Item	Unit	Price per Unit (Ex-Tanay) (pesos)
<b>Fertilizers</b>		
Urea (46-0-0)	50 kg - bag	200.00
Ammonium Sulfate (21-0-0)	50 kg - bag	150.00
Ammophos (16-20-0)	50 kg - bag	245.00
Complete (14-14-14)	50 kg - bag	245.00
<b>Insecticides</b>		
Carphoz	liter	205.00
Thiodan	liter	160.00
Azodrin	liter	170.00
Cymbus	liter	350.00
Decis	liter	630.00
Folidol	liter	150.00
Guzathion	liter	240.00
Sumicidin	liter	165.00
Lannate	liter	195.00
Meptox	liter	110.00
sevin 85 s	500 g - can	105.00
Sevin 50 w	500 g - box	78.00
Aquatin (for snails)	liter	300.00
<b>Herbicides</b>		
Machete	liter	205.00
Roque	liter	180.00
<b>Fungicides</b>		
Benlate	500 g - box	425.00
Dithane	kg	155.00
Vetigran Blue	kg	135.00
<b>Plastic Bags</b>		
5" x 7"	piece	0.35
8" x 11"	piece	0.65

Source: Agricultural Supply Dealer, Tanay, Rizal (Nov. 1989)

Table IX 2.3 Financial Price List of Agricultural Machinery

Machinery	Model	Specification	Price (peso)		
			Without Engine	Engine	Total
1. Power Tiller	IRRI model	5.0 hp diesel engine	14,000	7,000	21,000
2. Power Sprayer	Mist Duster	Gasoline engine	-	-	9,000
3. Power Thresher	IRRI model	5.0 hp diesel 300-600kg/hr	6,000	7,000	13,000
4. Rice Mill	20 hp electric	600-900kg/hr	-	-	58,300
	30 hp electric	700-900kg/hr	-	-	54,000
	40 hp electric	1,500kg/hr	-	-	108,500
5. Tractor	2 WD	34 hp diesel engine	-	-	161,000
6. Corn Sheller		20 hp diesel	-	-	90,000
7. Dryer	IRRI batch	1ton/4-6hr	28,000	35,000	63,000

Table IX 2.4

Retail Prices of Selected Consumer Goods  
Sold at Jala-Jala, November, 1989

Commodity	Unit	Price/Unit (pesos)
1. Sugar		
refined	kg	14.50
washed	kg	13.70
unwashed	kg	11.50
2. Coffee		
nescafe	25 gm	7.25
blend 45	25 gm	6.25
great taste	25 gm	6.75
3. Sardines		
ligo	155 gm	5.75
master	155 gm	5.35
4. Soap		
camay	90 gm	6.50
lux	90 gm	6.80
palmolive	90 gm	6.80
tender care	90 gm	6.80
5. Laundry Soap		
tide	480 gm	12.00
superwheel	480 gm	12.00
mr. clean	480 gm	12.00
ajax	480 gm	12.00
detergent (tide powder)	25 gm	1.15
6. Shampoo		
sunsilk	10 ml	1.25
palmolive	10 ml	1.25
8. Milk Powder		
alaska	80 gm	7.00
bear brand	200 gm	16.50
Evaporated		
alpine (s)	158 ml	6.50
alpine (b)	370 ml	12.00
Condensed (b)		
carnation	300 ml	12.75
9. Toothpaste		
colgate	50 ml	13.40
10. Meat Loaf		
elcano	160 gm	6.60
11. Catsup		
UFC	330 gm	6.25
Patis	150 cc	3.50
Soysauce	350 ml	5.40
12. Edible Oil	li.	14.50
Venegar		
datu puti(s)	350 ml	4.30
13. Match	1 box	0.75
14. Ovaltine(s)	100 gm	8.75
15. Milo (b)	200 gm	15.75

Note : s- small, b- big

Source : Jala-Jala multipurpose Cooperative, Inc.  
Jala-Jala, Rizal

Table IX 2.5

Wholesale and Retail Price of Rice, Philippines  
1980-1989 (Regular Milled Rice)

Year	Price (pesos/kg)		Retail Minus Wholesale
	Retail	Wholesale	
1980	2.41	2.28	0.13
1981	2.65	2.53	0.12
1982	2.86	2.71	0.15
1983	3.06	2.90	0.16
1984	4.73	4.55	0.18
1985	6.38	6.07	0.31
1986	5.70	5.32	0.38
1987	5.88	5.50	0.38
1988	6.41	6.07	0.34
1989 /_1	7.56	7.19	0.37
Average	4.76	4.51	0.25

/\_1 : Preliminary

Source : National Food Authority, Metro Manila



**ANNEX-X**

**PROJECT FORMULATION AND  
IMPLEMENTATION SCHEDULE**





ANNEX- X  
PROJECT FORMULATION AND IMPLEMENTATION SCHEDULE

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## ANNEX-X. PROJECT FORMULATION AND IMPLEMENTATION SCHEDULE

### 1. DEVELOPMENT CONSTRAINTS AND LIMITATIONS

In the study area, the population has been inhabiting densely. Recently, promotion of socio-economic modernization has been taken place in the study area. Besides, structural improvement on agricultural production is progressed in, i.e., crop production by the tenant farmers under traditional tenure system to production of diversified crops by new owner-cultivationship under the current implementation of the agrarian reform programme. In reality, however, the socio-economic situation in the study area is still inactive.

The major constraints lying in the current rural development are as summarized belows:

#### (1) Physical constraints and unfavorable circumstances

- 1) Rain distribution during the rainy season is always irregular, month by month as well as year by year, and accordingly, the productive conditions of crops still remains unstable.
- 2) A shortage of soil moisture in the dry season is one of the serious constraints on the present agricultural production.
- 3) Typhoon attacks very frequently, and gives damages on agricultural production as well as properties of local inhabitants.
- 4) Arable land for profitable crop production is limited to 2,830 ha, of which only 1,210 ha is recognized to be suitable for intensive development investment for crop production increase.
- 5) Major portion of total rainfall runs off immediately after precipitation, and eventually, rivers have only a small regular flow discharges.

## (2) Socio-economic constraints and unfavorable circumstances

- 1) Dense population cum high annual population growth, in contrast, limited arable land in the study area.
- 2) Major part of beneficiaries of agrarian reform still remains poor and therefore has no enough working capital for efficiently operating crop production.
- 3) Production diversification has been tried by the local farmers. However, economic effect of those activities is still low at minimal level. Low bargain power due to small quantity of each production is the main cause.
- 4) Insufficient development of agricultural infrastructure is one of the most critical constraints in agricultural production. Inadequate operation and maintenance of the existing service facilities obstruct those function and shorten those useful life.
- 5) Poor road network is another critical constraint in the socio-economic activities in the study area.
- 6) Agricultural institution and supporting services are still not effectively functioning yet so as to maintain an agricultural production and to promote modernization of farming.

In the exceptional case, MERALCO Foundation Inc. (MFI) has recently established the Agro-Aquatic Development Center including the nursery ponds for fish cultivation. Technical extension services as well as guidance in community development to the local farmers are carried out, however, the facilities and technical staff are still short to the requirement.

- 7) Social infrastructure and public services are still short to the need of local inhabitants.

## 2 FARMERS' WISHES AND ANTICIPATION IN RURAL DEVELOPMENT

Farmers' wishes and anticipations in the rural development are confirmed through the field interview with 395 farmers selected at random in the entire study area. These are broadly grouped into two conditions, namely:

- (1) Stabilization of agricultural production, and
- (2) Infrastructural development and reinforcement of rural institutions for upliftment of livelihood standard.

The former wishes are mainly concentrated on the following seven conditions as summarized below:

#### Farmers Wishes in Agricultural Development

Description	Wishes by Priority			
	First Priority	Second Priority	Third Priority	Fourth Priority
Irrigation Water	354	12	2	2
Farm Road Improve.	14	98	43	133
Plant Protection	7	84	51	46
Mechanization of Harvest.	4	57	62	39
Fertilizer Supply	4	27	89	59
Drainage Improve.	2	21	7	4
Seeds Supply	0	79	105	39

Note: Figures show number of respondent to interview (farmers).

Source: Farm Economic Survey in Phase I.

About 90% of farmers recognize necessity of stable supply of irrigation water even in the rainy season so as to stabilize agricultural production as well as sustain growth of farm economy, and then, give the top priority for early realization of the stable and year-round communal irrigation service system. Improvement of farm road network and farm input supply, such as agro-chemicals for plant protection, fertilizers and quality seeds are pointed out as the second important matters to be required to implement in line with the rural development. Farmers also pay attention to the farm mechanization especially on the rice post-harvest activities of threshing and milling.

As for development of the rural infrastructure as well as reinforcement of institutional structures, the farmers emphasize the following:

Farmers Wishes on Development of Infrastructure and Institutional Structures  
(Summary List of Development Schemes)

---

1.	Construction of Fishery Harbor	(7)
2.	Construction of Bridges	(1)
3.	Construction of Barangay Road	(1)
4.	Provincial Road/Trunk Road	(11)
5.	Water Supply System,	
	- Deep Well	(6)
	- Spring Development	(2)
6.	Improvement of Irrigation Dam/Intakewire	(4)
7.	Improvement of Communal Irrigation System	(7)
8.	Market and Slaughter-House	(2)
9.	Construction of Public Buildings,	
	- Public Building Complex	(3)
	- Barangay Hall	(4)
10.	Rural Electrification	(1)
11.	Procurement of Equipment	(3)
12.	Rural Institution (Emergency Fund)	(11)
13.	Establishment of Health Center	(1)
14.	Establishment of Day Care Center	(5)
15.	Periodic Health Control Programme	(4)
16.	Sport Programme and Facilities	(4)
17.	School Project	(5)

---

Source: Farm Economic Survey carried out in Phase I Study Period.  
Figures in parentheses are the number of Barangays requested.

Among the major anticipations listed above, improvement of the road network is given the highest priority. Up-grading of the water supply system by installation of deep wells is another essential scheme in their anticipation.

### 3 BASIC CONCEPT FOR INTEGRATED RURAL DEVELOPMENT PLAN

#### 3.1 Prospective Goal of Current Rural Development in the Philippines

To cope with the above problems and to improve/enhance the socio-economic situation, the Government of Philippines has launched the medium term development plan covering the implementing period of 1987-1992. The development goal conceived for this plan is as follows:

(1) Alleviation of poverty

Poverty alleviation is a strong argument for the socio-economic development particularly in the rural areas. Possible approaches suggested for poverty alleviation is to increase food production for family, to extend cash crop production (annual and perennial crops), and further to diversify into other on and off-farm activities especially through the rural industrialization.

(2) Generation of more productive employment

Medium term development programme emphasizes to create the labour opportunity through modification and/or development of employment structures, such as agro-based and labour-intensive as well as capability of cooperative enterprises preferably within the rural area.

(3) Promotion of equity and justice

Realization of the self-reliance and then social justice is another essential argument for socio-economic development of the Philippines. To this end, therefore, it is emphasized to develop the domestic resources at the potential maximum through the full mobilization of the local people, and to spread those development benefits widely over the society for avoiding disparities in income and wealth.

(4) Attainment of sustainable economic growth

In order to realize the above development principles and achieve sustainable growth of national as well as regional economy, the Government has placed the highest priority on agricultural development in the development strategy. The target of this development has been conceived to be continuously increased of staple food crop, i.e. rice and corn although these production have already been achieved over the self-sufficiency. The crop diversification and then increase of industrial and/or exportable crop production are also essential target for the subjected attainment.

The principle strategies for achieving the above development goal and/or targets emphasize the following activities:

- 1) to improve the production basement by means of irrigation development, drainage improvement, flood control, land and soil conservation against serious erosion, etc.
- 2) to increase industrial crop production for activation of the rural industrialization
- 3) to reinforce the agricultural support services, such as farmers credit, farm input supply, extension services, etc.

- 4) to improve rural infrastructures for sustaining the production activities as well as supporting the distribution cum marketing of those agricultural production.

### 3.2 Necessity of Rural Development and Development Potential in Jala-Jala Area

In the study area, socio-economic modernization has been taken place through implementation of the current regional development programme. CARP has also been implemented under the current development policy of the Government. However, the socio-economic aspect as well as the infrastructural setting still remain at a minimal level.

As already explained in the Chapter 3, the regional gross domestic product (RGDP) is about P. 66 million as at 1988 of which most half of product is brought by off-farm works. The potential resources for rural economic development is limited to the labour forces and arable land of 1,210 ha (class I,II and III). Other resources are quite marginal in this area. Therefore, it is foreseeable that agricultural activities will have to be the mainstay in the rural economy of this area even in the future. In general speaking, agricultural development broadly have two ways, i.e. "production increase" and "structural improvement of agricultural production". In this area, the structural improvement, e.g. introduction of agro-based industrialization is hardly expected since the rural industrialization has been already pursued intensively around the study area. Thus, herein the planning, the rural economic development for goal to 2000 year will have to be implemented in agriculture with particular emphasis on a production increase and stabilization of farm economy.

Other than the agricultural development, there are small opportunity for tourism development. In reality, however, the natural environment has been destroyed to a serious extent especially in both mountainous area and lake Laguna. Thus, in comparison with the advanced areas surrounding lake Laguna, it is hardly expected to pursue new development, at this moment.

The following are fundamental approaches to development of the study area.

#### (1) Land Resources

Out of 4,930 ha of the total study area, the land to be capable for agricultural development is demarcated about 2,830 ha in gross (or 57%) of which only 1,210 ha (or 25% of total area) is recognized as arable land to be suitable for intensive development investment for crop production increase (ANNEX-III, SOIL AND LAND CLASSIFICATION).

In this planning, it is proposed that an arable land of 1,210 ha shall be intensively developed with provision of the basic infrastructure and reinforcement of the supporting services. This intensification of agricultural production would be effective to create the basement of the rural economy as well as stabilize livelihood of the beneficiary farmers.



The greater remain of 2,800 ha is classified into non-arable land due mainly to steep or rolling topography, shallow effective soil depth underlying the base-rocks. The land is subjected to protect against serious erosion problem. Therefore, it is recommended that the forestation should be on-scheduled with particular attention to land cum soil conservation of this area.

(2) Water Resources

At present, utilization of the river water is limited to 430 ha irrigation in the rainy season, while only 70 ha in the dry season. With structural improvement of the existing intake facilities, supplementary irrigation to the rainy season cropping could be maintained to a certain extent.

For promotion of the dry season cropping, additional water resource development should be made by utilizing the lake water. Lake Laguna has a enough potential for the said development, nevertheless the installation cost and technical training programme on pump irrigation should be carefully taken into consideration.

It has been confirmed that the groundwater resources is considerably small and the unit yield of well is marginal for irrigation use. Thus, herein the planing, the groundwater will utilize only for the domestic use.

(3) Labour Force

Population growth in the study area is foreseen in 2000 year with an assumption of annual growth rate at 2.5%. Forecasted population and labour force are as summarized below:

Forecasted Population

Description	1987	1990	1995	2000
Population	18,750	19,220	21,560	23,910
Labour Force	8,430	8,830	9,920	11,240

According to the above forecast, the labour employment opportunity under the conditions with the project as well as an anticipated setting of labour employment in 2000 year is estimated as follows:

### 1) Employment opportunity in project implementation

- Annual requirement of labour force for the construction works :  
1,000 person/day x 150 days/year = 150,000 persons/day/year
- Labour force to be available :  
Total labour force 9,920 person /day
  - Employed labour 9,010 persons/day
  - Free from 910 persons/day

As seen in the above , it is expected to employ the farmers in off-farm season for the construction work until 1993 where the irrigation facilities will be completed. However, after 1994 when the dry season farming is commenced under irrigated conditions, labour shortage totaled more than 13,500 persons/day will appear during the construction work.

### 2) Labour Work in Agriculture

The labour requirement under implementation of the intensified crop production is estimated as shown in Fig. X.3.1. The peak requirement of labour will appear on transplanting and harvesting works for paddy cultivation of both wet and dry seasons. Practically, however, the labour requirement still remain within the total family labour force, and never exceed over the total force even at the peak times. The labour requirement for the daily care and/or casual work on crop production is around 30% of the total family force. Greater remain shall use for off-farm work and/or side business for earning the additional income.

### 3) Labour Employment in 2000 Year

Total Labour Force	11,240 persons
- Agriculture	7,310
- Aquaculture	1,350
- Commerce/Services	450
-----	
Total	9,010
-----	
Balance	2,130

As at 2000 year, it is foreseen that about 2,130 persons will remains from the employment in the study area. After completion of all the project facilities, some employment opportunity will be brought in rice mill, workshop, etc., however, greater part of labour force shall get job outside of the study area.

#### (4) Marketing Prospect

It is foreseeable that the study area would, in near future, be included into the commercial zone of Metro-Manila. Therefore, diversification of agricultural production as well as its production increase could be pursued based on the demand of market in Metro-Manila.

Agricultural production to Metro-Manila is mostly supplied from the surrounding area, of which Pampanga Delta has the greatest share in the said marketing. No serious marketing concurrence has been observed so far in the center market of Metro-Manila. Since the consumer demand in Metro-Manila is always larger than the total supply of production, it is also expected that a prospective marketing on agric production in the study area will be of sunjune although harvesting/shipping pattern of the production is similar to those of Pampanga Delta.

Many agro-based industries have been developed in and around Rizal province. However, in most cases, these factories are not always operated satisfactorily and successfully. A shortage and/or unstable supply of processing materials are one of the most serious constraints. Since most of the said industries are located near to the study area, it is expected that the agricultural production in the study area could be traded smoothly with those agro-based industries without any serious hindrance.

#### (5) Rural Industrialization Program

As already explained in the preceding chapters, the study area has been exceedingly rich in labour force. Besides, certain quantity of materials for industrial use could also be expected from agricultural production. However, as far as the agro-based industrialization is concerned, it is hardly expected to realize an agro-processing factory in the study area due to the following critical constraints:

- Lack of water resources to be capable for industrial use
- Lack of fuel and/or power supply with reasonable cost
- Large investment cost to be required for additional installation of water treatment plant especially for drainage work as the environment protection measure against water contamination of lake Laguna.

In attempt to create labour opportunity as well as up-grade the labour productivity, the following program will be pursued in line with the production cum marketing activities as well as technical extension services.

- Agricultural production to be excessive from the marketing demand will be sold as the agro-processing materials to the advanced factories which have been established and operated in the areas surrounding lake Laguna.

- Promotion of family-based cottage industry will be made especially for activation of the labour force in the off-farm season. Among the existing cottage works, embroidery and garments sewing, mat weaving and ceramic articles could be extended as the side-business of the farmers.

### 3.3 Development Target and Strategies

In due consideration of the Government policy applied to the rural development and CARP as well as the present socio-economic situation of the study area, it is presumably taken the following three points as the primary goals of this integrated rural development of the study area.

#### (1) Early bringing up self-reliance farmers

In the agrarian reform law, it has been set forth that the beneficiaries of agrarian reform (BAR) shall efficiently amortize the allocated land and pay up the land charges within 15 years. In case of the study area, the due land charges is estimated at around ₱30,000/ha (or equivalent to annual due ₱4,405/ha).

The unit farm size set under the present agrarian reform is a little smaller than 1.0 ha/household. Therefore, to achieve land amortization and financial self-reliance of BAR, increase of farm production and up-grading of productivity of family labour shall be realized through promotion of intensification of farming and diversification of crop production. To this end, it is urgently needed to develop the irrigation service system, and to enable steady supply of water to both paddy and upland fields.

In the intensification particularly of the upland cropping, it shall be scheduled on to introduce cash crops, such as legume, vegetables, cut-flower, etc. in stead of such traditional food crops as corn, taro, cassava, etc. being planted at present. Since the study area is favorably located near to Metro-Manila, these cash crops would be lucratively traded to Manila market.

#### (2) Increase regional gross domestic product (RGDP) by improving the socio-economic structures and foundations

As for up-liftment of the actual regional gross domestic product (RGDP) in the study area, the primary target is set up at ₱22,500/capita or ₱135,000/family making reference to the per capita income level in the advanced areas, such as Antipolo, Tay-Tay, etc. where socio-economic modernization has been pursued with industrialization under favorable geo-economic position to be proximity to Metro-Manila.

#### (3) Self-sufficiency of food production within the municipal area

As estimated in the preceding Section 5.1.2, population in 2000 year would be 23,910 persons. If applied the Government controlled "per capita consumption of

staple food" in terms of milled rice at 125 kg/person, the total demand of staple food production is corresponding to 2,990 ton of rice, approximately.

To meet the above demand of rice, it is necessary to generalize double cropping of paddy a year as well as to secure a unit yield of paddy. Improvement of the existing communal irrigation systems is essential and urgently needed to this end, accordingly. Besides, irrigation service to the dry season cropping should be secured through development of new irrigation systems, such as pumping system by use of lake Laguna, small water impounding system on rivers, etc.

It is expected that rice produced in the study area could be sufficient to meet the gross demand of staple food. Great surplus of rice production would also contribute to the rural economy to significant extent.

To efficiently pursue the principle strategies stated above and achieve the development goal, successfully, the following schemes shall be implemented as the essential functions of the integrated rural development envisaged hereby.

- a. Establishment of Rural Development Center, including the following essential functions:
  - Supply of farm inputs
  - Supply of qualified seeds and nursery for crop production
  - Farm mechanization service center
  - Training and guidance in operation and maintenance of project facilities
  - Supporting services in post harvest activities, including rice mill facilities
- b. Improvement/reinforcement of irrigation and drainage facilities
- c. Improvement of road network, including construction of trunk road to be going around the peninsula
- d. Reinforcement of agricultural supporting institution such as farmers' credit, technical extension services, covering the production technology on crops, livestock, poultry, aquaculture, etc.

In addition to the above institutional reinforcement, the following programs shall also be emphasized:

- Training cum guidance to farmers in home management technology, including youth and women education through activation of the existing programs.
- Community development, including activation of cottage industries.

Activation of farmers cooperative societies and organization of integrated Jala-Jala Agricultural Cooperative through unification of the existing barangay farmers associations.

- f. Reinforcement of the rural infrastructure, such as
- Rural water supply system
  - Rural electrification system
  - Transportation service system
  - Communication service system
  - Health center, clinic, etc.

The framework of Integrated Rural Development Program prepared in due consideration of the development targets as well as the principle development strategies is as illustrated in Fig. X.3.2 attached hereto.

#### 4. PROJECT IMPLEMENTATION SCHEDULE

##### 4.1 Principle Approach to Project Implementation

The integrated rural development plan hereby formulated includes various schemes for development and/or consolidation of infrastructural facilities as well as for reinforcement and/or activation of supporting functions. These development components can be divided into the following two groups according to the principal concept of CARP implementation and the basic concept applied to this development planning.

(1) CARP-oriented development components

This group will include the following components :

- Leading program and its principal components for achieving the three essential development goals,
- Fundamental function or basement for promoting the subjected rural development program,
- Development to be urgently needed, and
- Large investment cost and technical assistance cum supervision to be required for implementation.

Major components included into this group are:

- Rural Development Center,

- Consolidation works of agricultural infrastructure, such as irrigation cum drainage facilities, farm road network, agricultural machinery center, post harvest support facilities, fishery ports, etc.
- Consolidation of social infrastructures, such as road network, including trunk road and barangay roads, electrification especially amendment of transmission line, rural water supply system, etc.
- Reinforcement of institutional supporting system and activation of farmers organization.

(2) Components to be implemented in the ordinary regional/rural development program.

The development components included into this group is identified as:

- Development scale is small enough to arrange the financial budget within the local government,
- Stepwise development shall be made according to long focus on future socio-economic requirement.

Major components and/or schemes are as listed below:

- Enhancement of education facilities,
- Construction of public buildings, such as barangay hall, etc.
- Promotion of rural electrification program on terminal utilities,
- Improvement of health and sanitation services
- Environmental conservation measure, i.e. forestation in mountain area, treatment of drainage water from living yard, etc..
- Establishment of emergency fund
- Reinforcement of transportation and communication facilities
- Improvement of the public market facilities
- Provision of the Sport Club and related facilities

As for the CARP-oriented schemes and components, the development package for the CARP-based implementation schedule is arranged so as to realize the development goals and to demonstrate the development impacts to other areas. It is proposed to implement these development components and related schemes by three steps according to the current progress and the schedule of agrarian reform program (see Fig. X.4.1).

### (1) First Stage Development :

At the first stage, implementation will be concentrated on 1,650 ha area where the land has been distributed to the farmers, successfully. The implementation program will include the following:

- Improvement and development of 13 CIS schemes, covering 895 ha of paddy field and 120 ha of upland field.
- Construction of the trunk road (18 Km) from Jala-Jala to Bagumbong and improvement of feeder roads
- Construction of the transmission line (3 phase and 34.5 KV) and distribution line (3 phase 460/230 V)
- Construction of the Rural Development Center, including workshop, rice mill etc.
- Installation of deep well for rural water supply, including 2-level II and 15-level I
- Construction of four fish ports

### (2) Second Stage Development:

The second stage development will cover the area where the agrarian reform is now under implementation. Commencement of the construction work will be subjected to completion of the agrarian registration.

- Construction of 2-locations of CIS, including 30 ha of Punta CIS and 120 ha of Bagumbong CIS
- Installation of rural water supply system for 3 villages, such as Punta, Paalaman and Bagumbong.
- Improvement of barangay road for the same villages to the above
- Installation of rural electrification for the same villages .
- Construction of one fish port

### (3) Third Stage Development

The area to be subjected to this stage is mainly the steep mountainous area. As already suggested in the preceding chapters, 5 and 6, the land of this subjected area is



not suitable for intensive development investment. Moreover, the land highly needs conservation measure against the soil erosion hazard. Thus, for implementing the land distribution, careful attention shall be paid to those circumstances and requirement.

#### 4.2 Implementation Schedule of First Stage Development

##### (1) Construction Works

The main construction works of the first stage development consist of irrigation and drainage development works, social infrastructure development works and rural development center. Main works for each category are as follows:

##### 1) Irrigation and drainage development works (12 irrigation systems )

- Intake structures
- Pump stations
- Small impounding
- Irrigation canals and related structures
- Drainage canals and related structures
- Farm roads
- On-farm works

##### 2) Social infrastructure development works

###### a. Road component

- Trunk road with related structures (18.1 km)
- Feeder roads with related structures (41.4 km)

###### b. Rural water supply component

- Level-I rural water supply system (15 wells)
- Level-II rural water supply system (2 systems)

###### c. Power supply component

- Power transmission line (23 km)
- Power distribution line (4.2 km)

###### d. Fish port (4 locations)

##### 3) Rural development center, rice mill center and work shop

##### (2) Construction Schedule

The implementation schedule of the first stage development works is shown in Fig.X.4.2. It includes the preparatory works and the construction works. The

preparatory works will last 12 months including the time necessary for detailed design works, tendering, project mobilization for implementation. The construction works will last 36 months for main works and on-farm works. All the works will be completed for 4 years.

The rural development center is first implemented in the beginning of the second year to be used as the construction office. The rice mill center and machinery center will be implemented in the fourth year, including procurement and installation of equipment.

Irrigation and drainage works will be implemented with stage wise construction. The stage-1 will be commenced in the beginning of the second year. It includes improvement of intake, construction of impounding dam and irrigation and drainage canals of 9 irrigation systems, which will be irrigated by river discharges during the rainy season. The stage-2 will be commenced in the beginning of the third year. It includes construction of all pumping stations and the remaining irrigation and drainage canals of 3 irrigation systems.

Road works will also be executed with stage wise construction. The first stage will be commenced in the beginning of the second year. It includes the pavement works of trunk road for the route from Jala Jala to Bayugo to provide access to the Rural Development Center, and preparation of the trunk road embankment for the route from Bagumbong to Pagkalinawan to ensure construction access to relating works. Gravel metalling of feeder roads will be commenced in the third year by village and completed in the end of the dry season of the fourth year.

Rural water supply component will be implemented firstly from Level-I facilities in consideration of urgency water supply and Level-II will follow, after completion of Level-I facilities.

All the construction works will be executed by contractor(s) selected through competitive tendering, except for the extension of the power supply system and on-farm irrigation and drainage works. The power supply system will be constructed by MERALCO under the supervision of the Project office, and on-farm works will be executed by water users under the guidance of NIA.

## 5 ORGANIZATION FOR PROJECT IMPLEMENTATION

Implementation of the project will be managed basically in accordance with the execution rule being applied to the current operation of CARP.

Department of Agrarian Reform (DAR) shall primarily be responsible for implementation of this project. In line with the policy and the principle rule prepared by the Presidential Reform Council (PARC), DAR shall prepare the implementation program and its budget for execution of the development works.

To efficiently implement the subjected project, the close coordination among the CARP coordinating agencies, namely DA, DPWH, DENR, etc. as well as Meralco Foundation Inc., is essential and crucial.

From the viewpoint mentioned above, in order to effectively manage and operate the Jala-Jala Integrated Rural Development Project, the organization structure of the project shall consist of the following:

(1) Board of Directors (BOD)

The Undersecretary of DAR shall act as the chairman of BOD. It shall be composed of the representatives of DAR and related agencies and functioned to deliberate the essential substances, showing in detail as follows:

a. Members

- Two undersecretaries of DAR
- Assistant secretaries of DA, DENR, DPWH and NIA
- Assistant Director-General of NEDA
- Operation Manager of MERALCO Foundation Inc.
- Governor of Rizal Province

b. Functions

- Decision on matters/policies related to overall project implementation
- Action on recommendations related to project management (i.e. audit and monitoring of evaluation reports, etc.)
- Approval of the project's annual operating budget

(2) Project Management Committee (PMC)

This committee has the responsibility to implement the policies and guideline formulated by BOD. The assistant Secretary of DAR shall act as the head of this committee. Members and functions of the committee are shown as follows:

a. Members

- Assistant secretary of DAR
- Regional directors of DAR, DA, DENR, DPWH and NEDA
- Project manager of NIA-CARP
- Head of ADS-Meralco Foundation Inc.
- Jala-Jala Project Office Manager
- Mayor of Jala-Jala

b. Functions

- Overall project planning and scheduling
- Review of project performance

- Recommendation to BOD policies and strategies related to overall project implementation
- Facilitation of the timely provision of their respective agency inputs to the project
- Implementation of the policies and directions set by BOD for project implementation

(3) Secretariat

The project secretariat shall be constituted from a designated DAR Central Office Unit, utilizing already available staff resources. The secretariat has the functions as to the exaction of the general matters.

(4) Jala-Jala Project Office

This office is headed by a full-time Project Manager, this unit shall be principally based at the project site, while maintaining a project coordination desk at the DAR Central Office. The Project Office shall administer the Rural Development Cluster and be assisted by an infrastructure Division and an Administrative/Finance Division.

a. Infrastructure Division

This is essentially an interagency group, composed of designated technical counterparts from the DPWH, NIA, DA, DENR and the Municipal Government. It shall generally assist in providing necessary counterpart assistance in the implementation of the various project components outside of the Rural Development Center.

b. Administrative and Finance Unit

This shall undertake all administrative, financial and legal services, i.e., accounting, treasury, personnel, records, construction works supervision other general services, and review of contracts for the Project.

(5) Rural Development Center

This shall have three distinct functional sections, as further described below;

a. Agricultural Extension Services Section

This shall assume all functions related with agricultural technology extension, inclusive of the development of demonstration farms and seed farms, and covering both livestock and plant agriculture.

b. Engineering and Maintenance Section

This group shall assume all responsibilities related to the physical operations, repairing and maintenance of the tasked to provide engineering support services to the irrigation facilities in particular.

c. Special projects Section

This section is so named because it shall tackle a variety of center programs which shall involve the participation of other sectors, particularly the non-government organization, cooperatives, other government agencies, and the private sector.

Among the basic concerns of this Section are Institutional Development Works, community and Cooperatives Development, administration of the center's economic and training facilities, and market development.

In the operationalization of the various activities of the project, Meralco's participation shall focus on the provision of consulting services and technical assistance specifically on community organizing. It shall also make available the use of Meralco facilities in the area for the development activities of the project.

The conceptional skeleton conceived on the project implementation is as shown in Fig. X.5.1. and the coordination system among the inter coordinating agencies is as illustrated in Fig. X.5.2.



## FIGURES





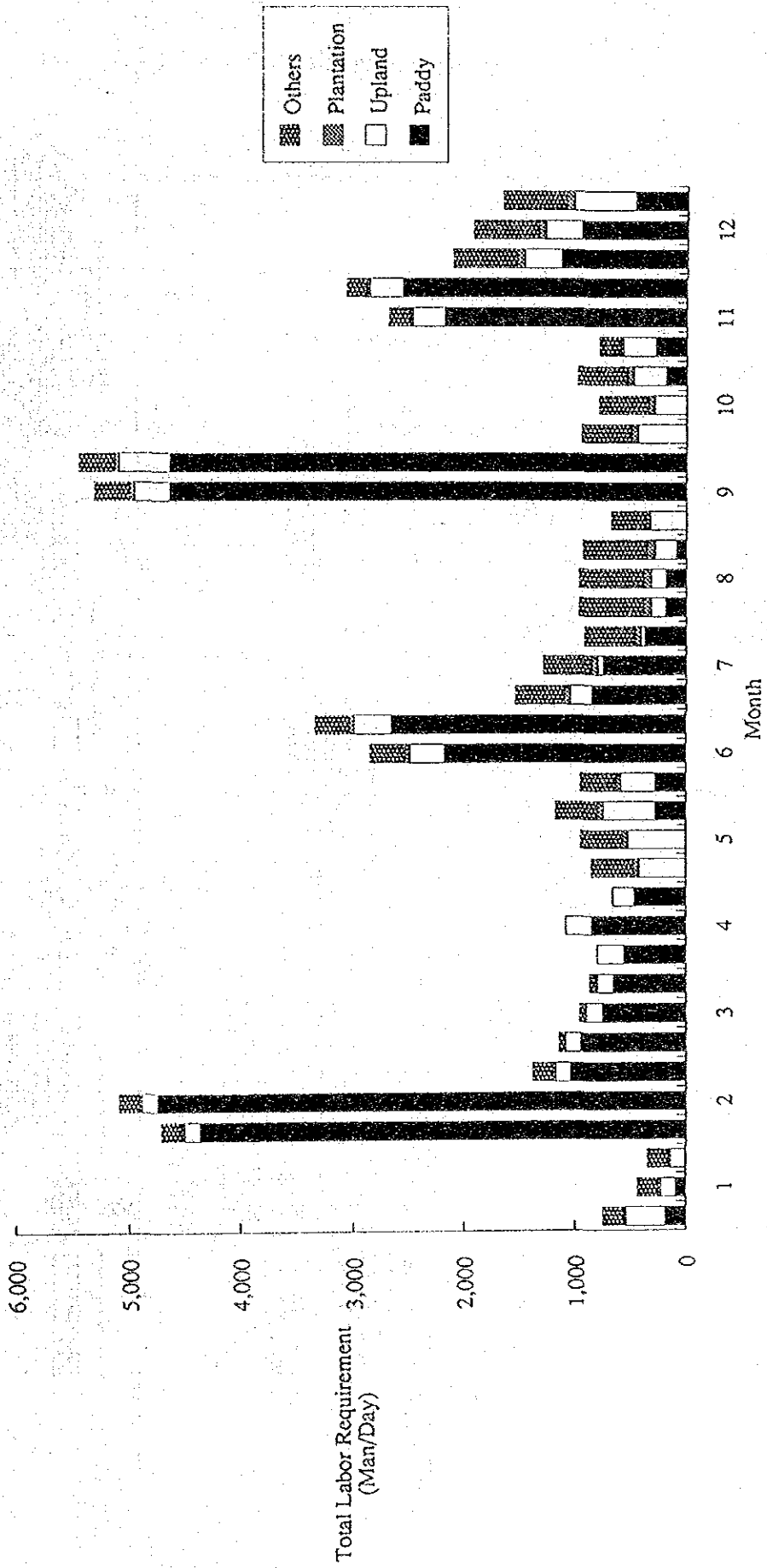


Fig. X.3.1 Agricultural Labor Requirement by Month Under With Project Condition

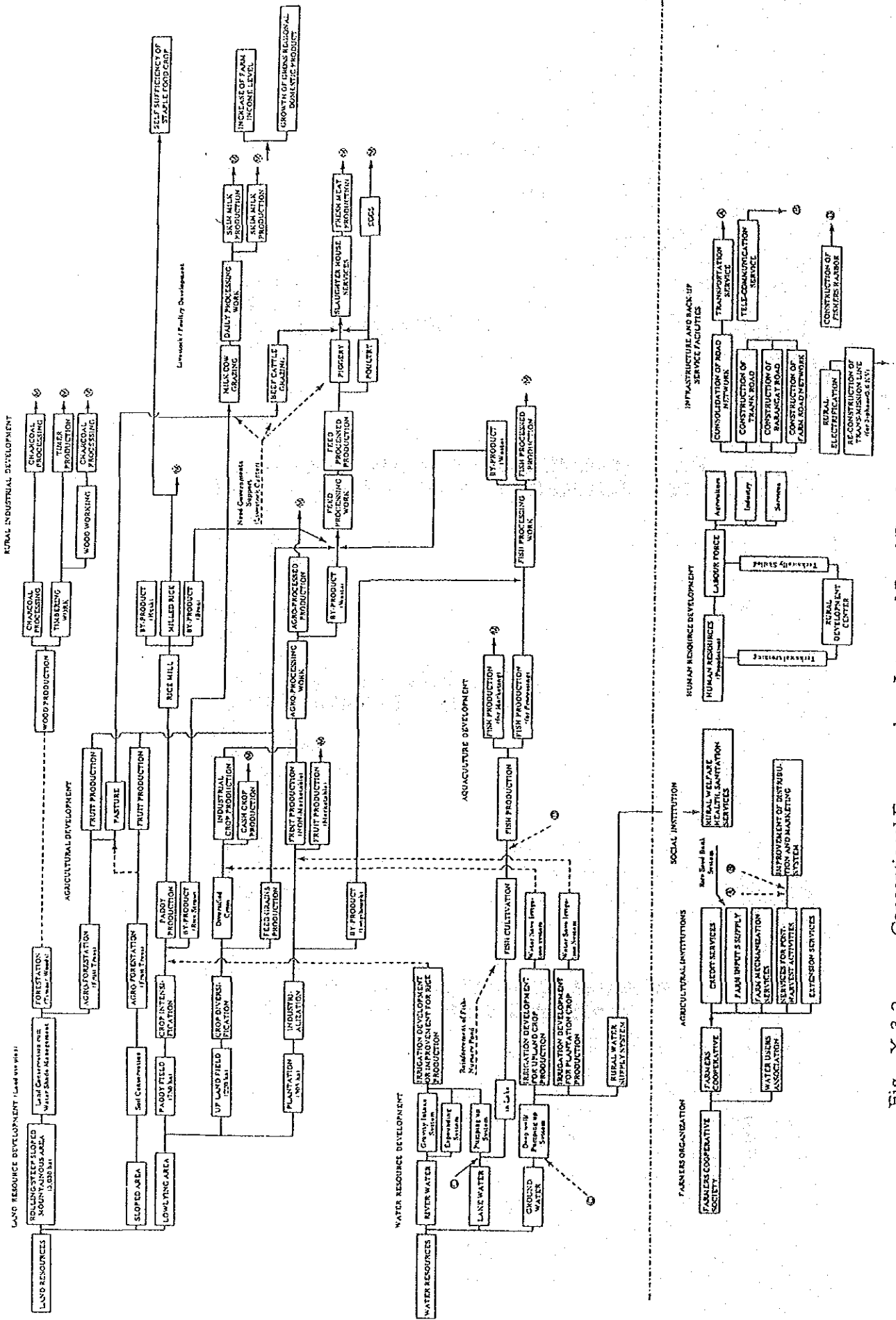


Fig. X-3.2 Conceptual Framework on Integrated Rural Development

Fig. X.4.1 Overall Implementation Schedule of the Project

WORKS	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
1. CARP Oriented Project										
(1) 1st Stage										
- Rural Development Center		■	■	■						
- Irrigation Component		■	■	■						
- Road Component		■	■	■						
- Power Supply Component		■	■	■						
- Rural Water Supply Component		■	■	■						
(2) 2nd Stage										
- Irrigation Component					▨	▨				
- Road Component					▨	▨				
- Rural Water Supply Component					▨	▨				
- Power Supply Component					▨	▨				
(3) 3rd Stage										
- Land Conservation							▨	▨	▨	▨
							▨	▨	▨	▨
							▨	▨	▨	▨
							▨	▨	▨	▨
							▨	▨	▨	▨
							▨	▨	▨	▨
2. Ordinary Development Program										
- Transportation facility	□	□	□	□	□	□	□	□	□	□
- Communication facility	□	□	□	□	□	□	□	□	□	□
- Market facilities	□	□	□	□	□	□	□	□	□	□
- Barangay hall	□	□	□	□	□	□	□	□	□	□
- Sports center	□	□	□	□	□	□	□	□	□	□

Note : — : Preparatory work  
 ■ : Construction work

Fig. X.4.1 Overall Implementation Schedule of the Project

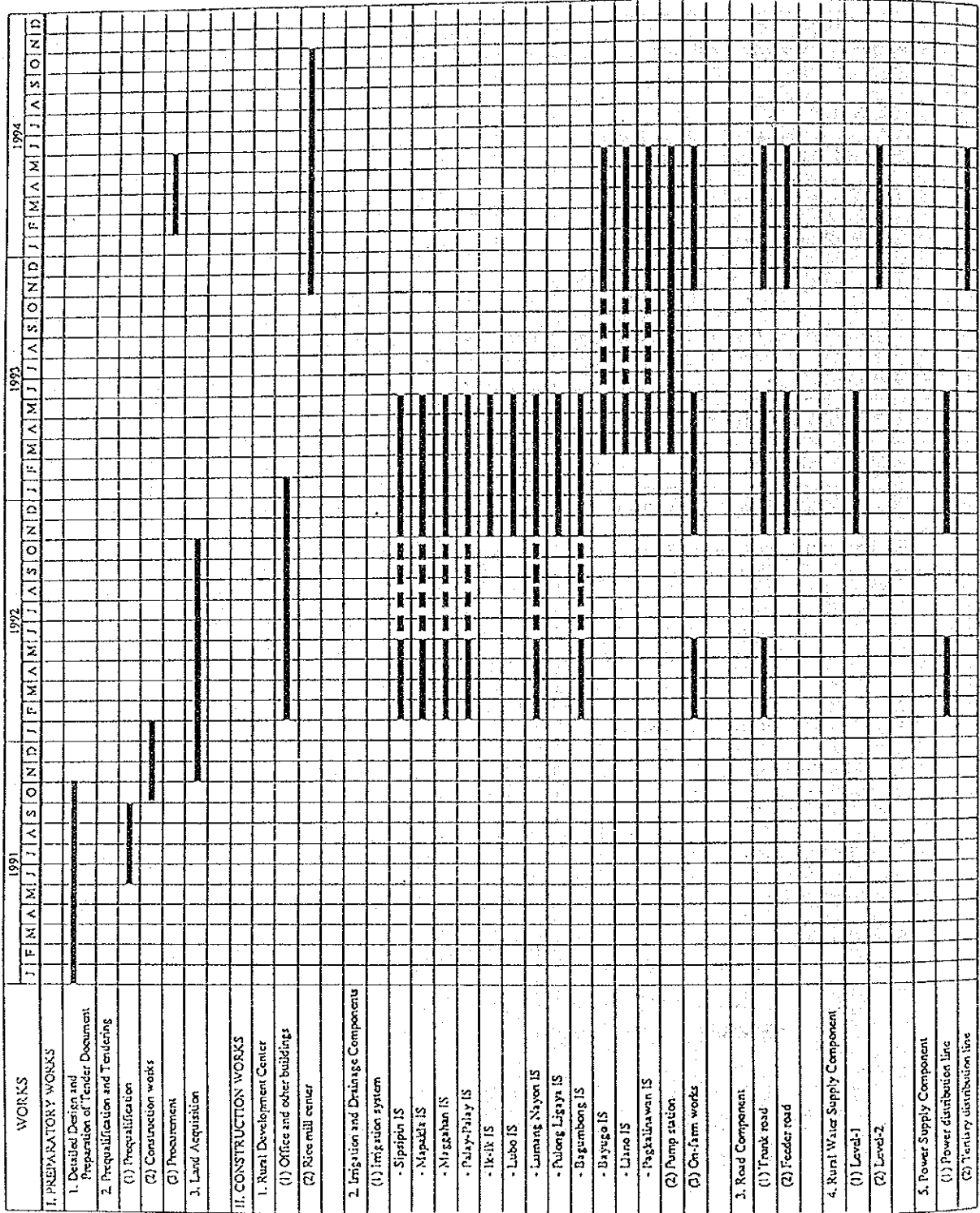


Fig. X.4.2 Implementation Schedule of First Stage of the Project

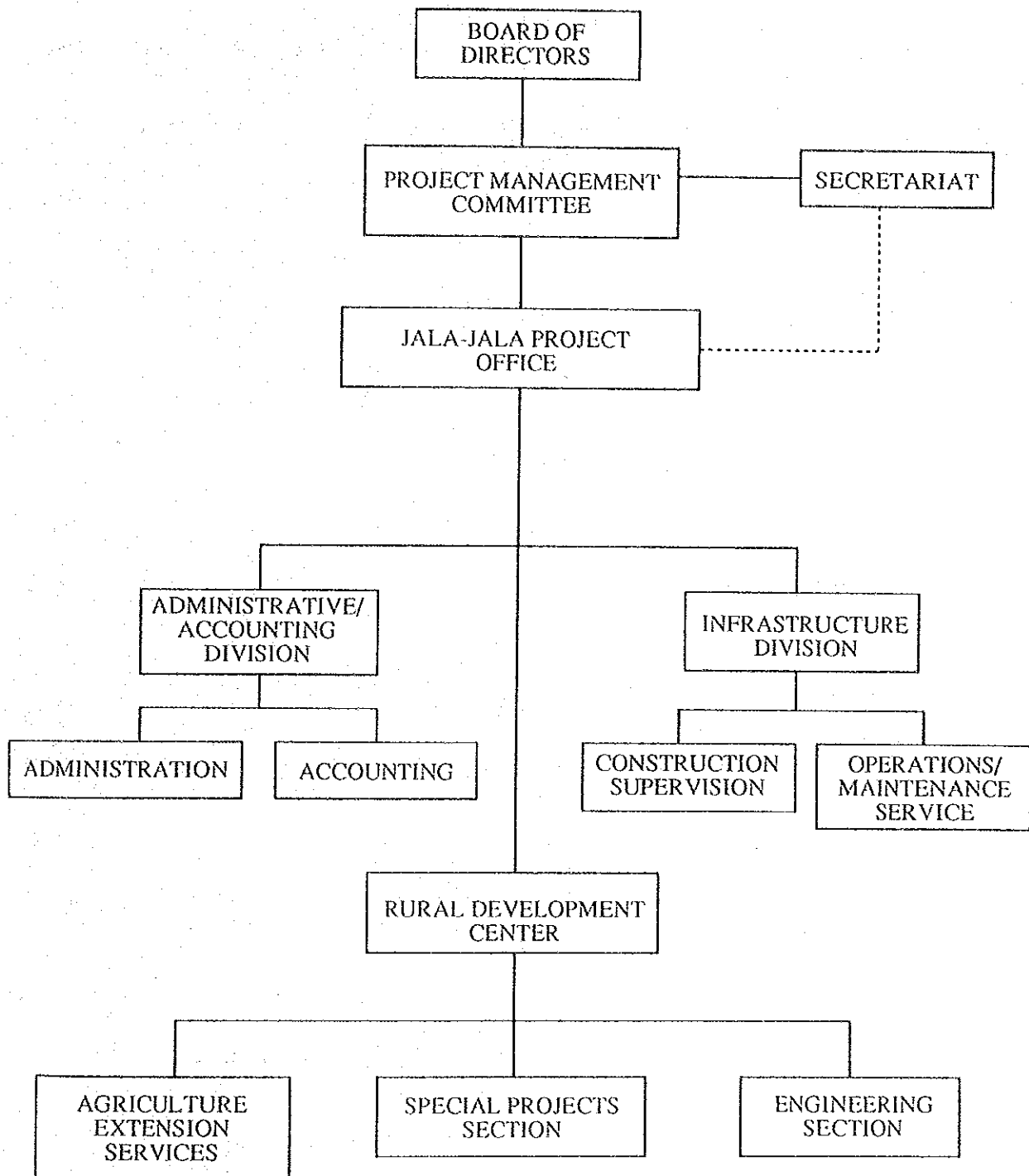


Fig. X.5.1 Project Organization and Management Structure

MAJOR DEVELOPMENT COMPONENTS	CARP COORDINATING AGENCIES										
	DAR	DA	DENR	DPWH	NIA	DTI	DOLE	LRA	LBP	LLDA	LGU
= Rural Development Center	***	***	***	***	***	*	*	*	*	***	*
= Const. Trank Road	-	-	-	***	-	-	-	-	-	-	-
= Improve. Baran-gay Road	-	-	-	**	-	-	-	-	-	-	***
= Const. Farm Road	-	-	-	-	***	-	-	-	-	-	**
= Const Fish Ports	-	-	-	***	-	-	-	-	-	**	-
= Const. Public Building	-	-	-	***	-	-	-	-	-	-	***
- Install. Deep Well.	-	-	-	***	***	-	-	-	-	-	-
= Up-Grad. Trans-mission Line	-	-	-	-	-	-	-	-	-	-	**
= Agric. Insti-tution	**	***	**	**	**	-	-	-	***	**	**
= Farmers' Organi-zation	***	***	-	-	**	-	-	-	-	-	*

Remarks: \*\*\*: Main force expected for implementation of work,  
 \*\*: Assistance in implementation of work, and  
 \*: Coordination in implementation of work

Fig. X.5.2 Supporting System of Project Organization

**ANNEX-XI**

**COST ESTIMATE**





## ANNEX- XI COST ESTIMATE

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## ANNEX XI COST ESTIMATE

### 1. GENERAL

The costs of implementation of the Project are estimated on the basis of the following conditions:

- 1) The exchange rate used is :  
1 US\$ = ₱ 23.00
- 2) The main construction works will be carried out by contractor(s) selected through competitive bidding.
- 3) The unit price of the works are divided into foreign currency portion and local currency portion. Local currency portion is estimated with reference to the current market prices in the early 1990, and the cost data obtained from similar on-going works around the Project area. Foreign currency portion of materials and equipment to be imported is estimated on the basis of CIF Manila.

The classification of local currency portion and foreign currency portion is carried out by the following basis:

#### Local currency portion

- Land acquisition cost
- Labor force
- Wooden materials
- Concrete aggregates
- Cement
- Inland transportation
- Administration expenses

#### Foreign currency

- Reinforcement bars
- Fuel
- Depreciation of construction equipment and machinery
- Pumping equipment
- Post harvest processing machinery
- Metal works of irrigation system
- Structural steel
- Contractors' general expenses and profit of the contractors
- Expenses and fees of engineering services by foreign consultants

- 4) Physical contingency of the cost estimate is 10 % of the construction cost. Price contingency applied is : 7 % per annum for the local currency portion and 3 % per annum for the foreign currency portion.

## 2. COST ESTIMATE

### 2.1 Construction Cost

The project cost consists of construction cost, procurement cost of agricultural machinery, land acquisition cost, engineering services and administration cost, and contingencies. The total cost is estimated to be ₱ 631 million, consisting of the foreign currency portion of Peso 379 million and the local currency portion of Peso 252 million as summarized below. The breakdown is shown in Table XI.2.1.

(Unit : ₱ 1,000)

Description	Foreign Currency	Local Currency	Total
I. Construction cost			
1. Rural development center	17,777	13,736	31,513
2. Rice mill center	15,887	1,998	17,885
3. Irrigation and drainage	139,881	70,916	210,797
4. Road network	58,785	52,405	111,190
5. Rural water supply system	10,096	4,998	15,094
6. Power supply system	10,306	19,138	29,444
7. Fish port	1,072	1,295	2,367
8. On-farm development	0	3,057	3,057
Sub-total	253,804	167,543	421,347
II. Procurement	5,088	1,366	6,454
III. Engineering services and administration	55,600	16,824	72,424
IV. Land acquisition	0	1,664	1,644
V. Contingencies			
1. Physical	31,449	18,741	50,190
2. Price	33,145	45,982	79,127
Total	379,086	252,120	631,206

The detailed breakdowns of the cost estimate of respective project components, procurement cost of farm machinery and supporting equipment, and other related cost are shown in Table XI.2.2 to XI.2.13.

The prices of the local materials and labor wages used in the cost estimate and the unit prices of major work items are as shown in Table XI.2.14 to XI.2.15.

The major construction materials needed for respective project components and major construction equipment are estimated as shown in Table XI.2.16 and XI.2.17, respectively.

## 2.2 Annual Disbursement Schedule

The annual disbursement is worked out according to the implementation schedule as shown below. The breakdown is as shown in Table XI.2.18.

(Unit: ₱ 1,000)

Year	Foreign Currency	Local Currency	Total
1991	19,034	4,550	23,584
1992	95,349	89,373	184,722
1993	119,902	76,351	196,253
> 1994	114,041	62,994	177,035
1995	30,760	18,852	49,612
<b>Total</b>	<b>379,086</b>	<b>252,120</b>	<b>631,206</b>

## 3. OPERATION AND MAINTENANCE COST

Operation and maintenance costs at the full operation stage of the Project are estimated to be ₱ 9.6 million, comprising operation and maintenance of the rural development center, operation and maintenance of the Project facilities. The breakdowns of operation and maintenance cost respective project components are as shown in Table XI.3.1 to XI.3.5.

## 4. COST OF REPLACEMENT OF PROJECT FACILITIES

Pumping equipment of irrigation and rural water supply systems, post harvest processing equipment and metal works of irrigation canal related structures are periodically to be replaced. The economic life and the replacement cost used in the estimate are shown in Table XI.4.1.





## TABLES



Table XI.2.1 Construction Cost Estimate

Unit : 1,000 Peso

Cost Items	Total	Foreign Currency	Local Currency
1. Rural Development Center	31,513	17,777	13,736
2. Rice Mill Center	17,885	15,887	1,998
3. Irrigation and Drainage			
1) Irrigation System			
- Intake	11,468	6,149	5,319
- Pump Station	120,783	91,668	29,115
- Impound	18,017	10,447	7,570
- Irrigation Canals	36,060	18,643	17,417
- Related Structures	12,298	7,068	5,230
2) Drainage System			
- Drainage Canals	4,922	2,296	2,626
- Related Structures	3,736	1,940	1,796
3) Farm Roads			
- Farm road	3,513	1,670	1,843
4. Road Networks			
1) Trunk Road	84,086	44,642	39,444
2) Feeder Road	27,104	14,143	12,961
5. Rural Water Supply			
1) Level-I	5,896	3,947	1,949
2) Level-II	9,198	6,149	3,049
6. Power Supply System			
1) Power Transmission Line	22,309	7,808	14,501
2) Power Distribution Line	7,135	2,498	4,637
7. Fish port	2,367	1,072	1,295
8. On-farm Development	3,057	0	3,057
Sub-total (1 to 8)	421,347	253,804	167,543
9. Equipment	6,454	5,088	1,366
10. Land acquisition	1,664	0	1,664
11. Administration	11,424	0	11,424
12. Engineering Services	61,000	55,600	5,400
13. Contingencies			
1) Physical Contingency	50,190	31,449	18,741
2) Price Contingency	79,127	33,145	45,982
<b>Grand Total</b>	<b>631,206</b>	<b>379,086</b>	<b>252,120</b>

Table XI.2.2 Breakdown of Construction Cost of Rural Development Center

Work	Unit	Q'ty	Foreign Currency (Pesos)	Local Currency (Pesos)
1 Building				
1.1 Main building	m2	616	3,388,000	2,772,000
1.2 Warehouse	m2	294	1,213,000	992,000
1.3 Workshop	m2	200	825,000	675,000
1.4 Garage	m2	154	635,000	520,000
1.5 Dormitory (Sr.)	m2	960	3,432,000	2,808,000
1.6 Dormitory (Jr.)	m2	560	2,002,000	1,638,000
Sub-total			11,495,000	9,405,000
2 Outdoor Works				
2.1 Road paving	m2	6,300	491,000	813,000
2.2 Electrical work	L.S.	1	867,000	570,000
2.3 Waater supply	L.S.	1	3,709,000	2,150,000
2.4 Air conditioning	L.S.	1	1,214,000	798,000
Sub-total			6,281,000	4,331,000
Total			17,776,000	13,736,000

Table XI.2.3 Breakdown of Construction Cost of Rice Mill Center

Work	Unit	Q'ty	Foreign Currency (Pesos)	Local Currency (Pesos)
1 Building	m2	592	5,852,000	1,998,000
2 Equipment	L.S.	1	10,035,000	0
Total			15,887,000	1,998,000

Table XI.2.4 Summary of Construction Cost of Irrigation System

Irrigation Scheme	(Unit : Pesos)		
	Foreign Currency	Local Currency	Total
(1) Sipsipin	20,468,000	10,657,000	31,125,000
(2) Mapakta	17,656,000	8,541,000	26,197,000
(3) Manggahan	6,330,000	3,110,000	9,440,000
(4) Bayugo	4,562,000	2,152,000	6,714,000
(5) Llano	4,778,000	2,391,000	7,169,000
(6) Punta	3,352,000	1,590,000	4,942,000
(7) Palay-Palay	15,801,000	11,174,000	26,975,000
(8) Pagkalinawan	4,275,000	1,912,000	6,187,000
(9) Ik-Ik	6,275,000	3,190,000	9,465,000
(10) Lubo	5,201,000	2,659,000	7,860,000
(11) Lumang Nayon	12,930,000	6,500,000	19,430,000
(12) Plong Ligaya	5,576,000	2,661,000	8,237,000
(13) Bagumbong No. 1	19,540,000	8,953,000	28,493,000
(14) Bagumbong No. 2	13,137,000	5,426,000	18,563,000
Total	139,881,000	70,916,000	210,797,000

Note) Refer to Table XI.2.5 for the breakdown

Table XI.2.5 (1) Breakdown of Construction Cost of Irrigation System

(1) Sipsipin I.S.

Work	Unit	Q'ty	Foreign Currency (Pesos)	Local Currency (Pesos)
1 Irrigation Facilities				
1.1 Pump station	site	1	14,975,000	5,354,000
1.2 Intake	site	1	820,000	674,000
1.3 Canal	m	13,330	3,260,000	3,046,000
1.4 Turnout	Nos.	103	459,000	438,000
1.5 Related structures	L.S.	1	215,000	226,000
Sub-total			19,729,000	9,738,000
2 Drainage Facilities				
2.1 Main drain	m	6,990	399,000	544,000
2.2 Road crossing	Nos.	4	62,000	68,000
Sub-total			461,000	612,000
3 Farm Road	m	1,600	278,000	307,000
Total			20,468,000	10,657,000

(2) Mapakla I. S.

Work	Unit	Q'ty	Foreign Currency (Pesos)	Local Currency (Pesos)
1 Irrigation Facilities				
1.1 Pump station	site	1	14,264,000	5,322,000
1.2 Intake	site	1	901,000	831,000
1.3 Canal	m	7,905	1,805,000	1,686,000
1.4 Turnout	Nos.	72	285,000	278,000
1.5 Related structures	L.S.	1	163,000	180,000
Sub-total			17,418,000	8,297,000
2 Drainage Facilities				
2.1 Main drain	m	2,620	119,000	122,000
2.2 Road crossing	Nos.	3	67,000	65,000
Sub-total			186,000	187,000
3 Farm Road	m	300	52,000	57,000
Total			17,656,000	8,541,000

Table XI.2.5 (2) Breakdown of Construction Cost of Irrigation System

(3) Manggahan I.S.

Work	Unit	Q'ty	Foreign Currency (Pesos)	Local Currency (Pesos)
<b>1 Irrigation Facilities</b>				
1.1 Pump station	site	1	4,271,000	1,229,000
1.2 Intake	site	1	656,000	539,000
1.3 Canal	m	4,180	955,000	892,000
1.4 Turnout	Nos.	33	149,000	143,000
1.5 Related structures	L.S.	1	57,000	61,000
Sub-total			6,088,000	2,864,000
<b>2 Drainage Facilities</b>				
2.1 Main drain	m	3,230	159,000	163,000
2.2 Road crossing	Nos.	4	83,000	83,000
Sub-total			242,000	246,000
Total			6,330,000	3,110,000

(4) Bayugo I.S.

Work	Unit	Q'ty	Foreign Currency (Pesos)	Local Currency (Pesos)
<b>1 Irrigation Facilities</b>				
1.1 Pump station	site	1	3,004,000	599,000
1.2 Canal	m	3,680	850,000	795,000
1.3 Turnout	Nos	32	152,000	145,000
1.4 Related structures	L.S.	1	217,000	285,000
Sub-total			4,223,000	1,824,000
<b>2 Drainage Facilities</b>				
2.1 Main drain	m	3,290	128,000	137,000
2.2 Road crossing	Nos.	7	211,000	191,000
Sub-total			339,000	328,000
Total			4,562,000	2,152,000

Table XI.2.5 (3) Breakdown of Construction Cost of Irrigation System

(5) Llano I.S.				
Work	Unit	Q'ty	Foreign Currency (Pesos)	Local Currency (Pesos)
1 Irrigation Facilities				
1.1 Pump station	site	1	2,780,000	446,000
1.2 Canal	m	4,710	1,194,000	1,115,000
1.3 Turnout	Nos.	38	165,000	159,000
1.4 Related structures	L.S.	1	156,000	206,000
Sub-total			4,295,000	1,926,000
2 Drainage Facilities				
2.1 Main drain	m	4,950	215,000	226,000
2.2 Road crossing	Nos.	8	268,000	239,000
Sub-total			483,000	465,000
Total			4,778,000	2,391,000
(6) Punta I. S.				
Work	Unit	Q'ty	Foreign Currency (Pesos)	Local Currency (Pesos)
1 Irrigation Facilities				
1.1 Pump station	site	1	2,218,000	453,000
1.2 Canal	m	2,530	577,000	539,000
1.3 Turnout	Nos.	21	96,000	93,000
1.4 Related structures	L.S.	1	36,000	43,000
Sub-total			2,927,000	1,128,000
2 Drainage Facilities				
2.1 Main drain	m	2,950	61,000	78,000
2.2 Road crossing	Nos.	5	129,000	125,000
Sub-total			190,000	203,000
3 Farm Road	m	1,350	235,000	259,000
Total			3,352,000	1,590,000



Table XI.2.5 (4) Breakdown of Construction Cost of Irrigation System

(7) Palay-Palay I. S. (1/2)

Work	Unit	Q'ty	Foreign Currency (Pesos)	Local Currency (Pesos)
<b>1 Irrigation Facilities</b>				
1.1 Pump station	site	1	1,934,000	301,000
1.2 Intake	site	1	10,447,000	7,570,000
1.3 Canal	m	9,720	2,248,000	2,101,000
1.4 Turnout	Nos.	81	339,000	321,000
1.5 Related structures	L.S.	1	186,000	203,000
Sub-total			15,154,000	10,496,000
<b>2 Drainage Facilities</b>				
2.1 Main drain	m	7,320	301,000	319,000
2.2 Road crossing	Nos.	6	155,000	148,000
Sub-total			456,000	467,000
<b>3 Farm Road</b>				
	m	1,100	191,000	211,000
Total			15,801,000	11,174,000

(7) Palay-Palay Impound (2/2)

Work	Unit	Q'ty	Foreign Currency (Pesos)	Local Currency (Pesos)
<b>1 Main Dam</b>				
1.1 Excavation	site	11,400	119,000	84,000
1.2 Embankment	site	65,000	2,281,000	1,736,000
Sub-total			2,400,000	1,820,000
<b>2 Sub Dam</b>				
2.1 Excavation	m	7,300	76,000	54,000
2.2 Embankment	Nos.	13,200	421,000	309,000
Sub-total			497,000	363,000
<b>3 Spillway</b>				
3.1 Excavation	cum	9,800	102,000	73,000
3.2 Back fill	cum	1,960	66,000	58,000
3.3 Reinforced concrete	cum	2,560	4,850,000	4,287,000
Sub-total			5,018,000	4,418,000
<b>4 Diversion</b>				
	L.S.	1	492,000	657,000
<b>5 Outleyt</b>				
	L.S.	1	2,040,000	312,000
Total			10,447,000	7,570,000

Table XI.2.5 (5) Breakdown of Construction Cost of Irrigation System

(8) Pagkalinawan I. S.

Work	Unit	Q'ty	Foreign Currency (Pesos)	Local Currency (Pesos)
<b>1 Irrigation Facilities</b>				
1.1 Pump station	site	1	2,824,000	478,000
1.3 Canal	m	3,660	835,000	779,000
1.4 Turnout	Nos.	33	149,000	143,000
1.5 Related structures	L.S.	1	180,000	234,000
Sub-total			3,988,000	1,634,000
<b>2 Drainage Facilities</b>				
2.1 Main drain	m	3,320	117,000	127,000
2.2 Road crossing	Nos.	5	170,000	151,000
Sub-total			287,000	278,000
<b>Total</b>			<b>4,275,000</b>	<b>1,912,000</b>

(9) Ik-Ik I. S.

Work	Unit	Q'ty	Foreign Currency (Pesos)	Local Currency (Pesos)
<b>1 Irrigation Facilities</b>				
1.1 Pump station	site	1	4,025,000	1,151,000
1.2 Intake	site	1	656,000	538,000
1.3 Canal	m	4,140	946,000	884,000
1.4 Turnout	Nos.	29	142,000	136,000
1.5 Related structures	L.S.	1	45,000	47,000
Sub-total			5,814,000	2,756,000
<b>2 Drainage Facilities</b>				
2.1 Main drain	m	3,900	163,000	173,000
2.2 Road crossing	Nos.	8	298,000	261,000
Sub-total			461,000	434,000
<b>Total</b>			<b>6,275,000</b>	<b>3,190,000</b>

Table XI.2.5 (6) Breakdown of Construction Cost of Irrigation System

(10) Lubo I. S.

Work	Unit	Q'ty	Foreign Currency (Pesos)	Local Currency (Pesos)
<b>1 Irrigation Facilities</b>				
1.1 Pump station	site	1	3,114,000	748,000
1.2 Intake	site	1	656,000	539,000
1.3 Canal	m	3,080	702,000	656,000
1.4 Turnout	Nos.	26	112,000	109,000
1.5 Related structures	L.S.	1	35,000	38,000
Sub-total			4,619,000	2,090,000
<b>2 Drainage Facilities</b>				
2.1 Main drain	m	2,820	193,000	188,000
2.2 Road crossing	Nos.	7	232,000	208,000
Sub-total			425,000	396,000
3 Farm Road	m	900	157,000	173,000
Total			5,201,000	2,659,000

(11) Lumang Nayon I. S.

Work	Unit	Q'ty	Foreign Currency (Pesos)	Local Currency (Pesos)
<b>1 Irrigation Facilities</b>				
1.1 Pump station	site	1	8,897,000	2,617,000
1.2 Intake	site	1	1,558,000	1,369,000
1.3 Canal	m	6,210	1,427,000	1,334,000
1.4 Turnout	Nos.	95	366,000	354,000
1.5 Related structures	L.S.	1	139,000	151,000
Sub-total			12,387,000	5,825,000
<b>2 Drainage Facilities</b>				
2.1 Main drain	m	1,890	117,000	217,000
2.2 Road crossing	Nos.	3	78,000	74,000
Sub-total			195,000	291,000
3 Farm Road	m	2,000	348,000	384,000
Total			12,930,000	6,500,000

Table XI.2.5 (7) Breakdown of Construction Cost of Irrigation System

(12) Plong Ligaya I. S.				
Work	Unit	Q'ty	Foreign Currency (Pesos)	Local Currency (Pesos)
1 Irrigation Facilities				
1.1 Pump station	site	1	4,266,000	1,289,000
1.2 Intake	site	1	81,000	156,000
1.3 Canal	m	2,920	666,000	622,000
1.4 Turnout	Nos.	25	102,000	100,000
1.5 Related structures	L.S.	1	49,000	57,000
Sub-total			5,164,000	2,224,000
2 Drainage Facilities				
2.1 Main drain	m	2,690	81,000	92,000
2.2 Road crossing	Nos.	4	124,000	115,000
Sub-total			205,000	207,000
3 Farm Road	m		209,000	230,000
Total			5,578,000	2,661,000

(13) Bagumbong No. 1 I. S.				
Work	Unit	Q'ty	Foreign Currency (Pesos)	Local Currency (Pesos)
1 Irrigation Facilities				
1.1 Pump station	site	1	14,892,000	5,550,000
1.2 Intake	site	1	820,000	674,000
1.3 Canal	m	7,690	1,796,000	1,678,000
1.4 Turnout	Nos.	68	277,000	265,000
1.5 Farm pond	site	1	1,152,000	147,000
1.5 Related structures	L.S.	1	155,000	175,000
Sub-total			19,092,000	8,489,000
2 Drainage Facilities				
2.1 Main drain	m	3,720	233,000	226,000
2.2 Road crossing	Nos.	1	15,000	17,000
Sub-total			248,000	243,000
3 Farm Road	m	1,150	200,000	221,000
Total			19,540,000	8,953,000

Table XI.2.5 (8) Breakdown of Construction Cost of Irrigation System

(14) Bagumbong No.2 I. S.

Work	Unit	Q'ty	Foreign Currency (Pesos)	Local Currency (Pesos)
<b>1 Irrigation Facilities</b>				
1.1 Pump station	site	1	10,205,000	3,576,000
1.2 Intake	site	6,040	1,382,000	1,291,000
1.3 Canal	m	61	241,000	232,000
1.4 Turnout	Nos.	1	1,152,000	147,000
1.5 Related structures	L.S.	1	98,000	113,000
Sub-total			13,078,000	5,359,000
<b>2 Drainage Facilities</b>				
2.1 Main drain	m	730	12,000	16,000
2.2 Road crossing	Nos.	3	47,000	51,000
Sub-total			59,000	67,000
<b>Total</b>			<b>13,137,000</b>	<b>5,426,000</b>

Table XI.2.6 Summary of Construction Cost of Road Networks

(Unit: Pesos)			
Road	Foreign Currency	Local Currency	Total
<b>1 Trunk Road</b>			
1.1 Provision of new road	9,319,000	8,291,000	17,610,000
1.2 Improvement of existing road			
- Flat Portion	22,861,000	20,166,000	43,027,000
- Hilly Portion	12,462,000	10,987,000	23,449,000
Sub-total	44,642,000	39,444,000	84,086,000
<b>2 Feeder Road</b>			
2.1 Sipsipin	1,392,000	1,275,000	2,667,000
2.2 District I	1,279,000	1,172,000	2,451,000
2.3 District II	389,000	356,000	745,000
2.4 District III	702,000	643,000	1,345,000
2.5 Bayugo	2,433,000	2,230,000	4,663,000
2.6 Punta	833,000	765,000	1,598,000
2.7 Palay-Palay	1,602,000	1,468,000	3,070,000
2.8 Pagkalinawan	1,081,000	990,000	2,071,000
2.9 Lubo	1,279,000	1,172,000	2,451,000
2.10 Bagumbong No.1	2,330,000	2,136,000	4,466,000
2.11 Bagumbong No.2	823,000	754,000	1,577,000
Sub-total	14,143,000	12,961,000	27,104,000
<b>Total</b>	<b>58,785,000</b>	<b>52,405,000</b>	<b>111,190,000</b>

Note) Refer to Table XI.2.7 for the breakdown

Table XI.2.7 (1) Breakdown of Construction Cost of Road Networks

(1) Trunk Road - Provision of new road

Work	Unit	Q'ty	Foreign Currency (Pesos)	Local Currency (Pesos)
<b>1 Earth Work</b>				
1.1 Excavation	m3	16,000	333,000	285,000
1.2 Banking	m3	35,600	1,193,000	1,057,000
1.3 Compaction of existing ground below embankment	m2	52,000	114,000	109,000
Sub-total			1,640,000	1,451,000
<b>2 Pavement</b>				
2.1 Lower sub-base	m3	11,000	1,518,000	1,397,000
2.2 Upper sub-base	m3	4,800	926,000	854,000
2.3 Concrete paving	m2	19,700	3,664,000	3,113,000
Sub-total			6,108,000	5,364,000
<b>3 Structure</b>				
3.1 Box culvert	Nos.	8	1,040,000	587,000
3.2 Pipe culvert	Nos.	26	531,000	889,000
Sub-total			1,571,000	1,476,000
Total			9,319,000	8,291,000

(2) Trunk Road - Improvement of existing road : Flat Portion

Work	Unit	Q'ty	Foreign Currency (Pesos)	Local Currency (Pesos)
<b>1 Earth Work</b>				
1.1 Excavation	m3	24,400	508,000	434,000
1.2 Banking	m3	19,700	660,000	585,000
1.3 Compaction of existing ground below embankment	m2	137,000	288,000	260,000
Sub-total			1,456,000	1,279,000
<b>2 Pavement</b>				
2.1 Lower sub-base	m3	34,300	4,733,000	4,356,000
2.2 Upper sub-base	m3	15,000	2,895,000	2,670,000
2.3 Concrete paving	m2	61,600	11,457,000	9,733,000
Sub-total			19,085,000	16,759,000
<b>3 Structure</b>				
3.1 Box culvert	Nos.	18	579,000	640,000
3.2 Pipe culvert	Nos.	28	1,741,000	1,488,000
Sub-total			2,320,000	2,128,000
Total			22,861,000	20,166,000

Table XI.2.7 (2) Breakdown of Construction Cost of Road Networks

(3) Trunk Road - Improvement of existing road : Hilly Portion				
Work	Unit	Q'ty	Foreign Currency (Pesos)	Local Currency (Pesos)
1 Earth Work				
1.1 Excavation	m3	50,000	1,040,000	890,000
1.2 Banking	m3	142,000	476,000	422,000
1.3 Compaction of existing ground below embankment	m2	95,000	142,000	143,000
Sub-total			1,658,000	1,455,000
2 Pavement				
2.1 Lower sub-base	m3	16,200	2,236,000	2,057,000
2.2 Upper sub-base	m3	7,100	1,370,000	1,264,000
2.3 Concrete paving	m2	29,100	5,413,000	4,598,000
Sub-total			9,019,000	7,919,000
3 Structure				
3.1 Box culvert	Nos.	17	1,438,000	1,229,000
3.2 Pipe culvert	Nos.	18	347,000	384,000
Sub-total			1,785,000	1,613,000
Total			12,462,000	10,987,000

(4) Feeder Road				
Work	Unit	Q'ty	Foreign Currency (Pesos)	Local Currency (Pesos)
1 Sipsipin	m	4,650	1,392,000	1,275,000
2 District I	m	4,280	1,279,000	1,172,000
3 District II	m	1,300	389,000	356,000
4 District III	m	2,350	702,000	643,000
5 Bayugo	m	8,140	2,433,000	2,230,000
6 Punta	m	2,540	833,000	765,000
7 Palay-Palay	m	5,350	1,602,000	1,468,000
8 Pagkalinawan	m	3,620	1,081,000	990,000
9 Lubo	m	4,280	1,279,000	1,172,000
10 Bagumbong No.1	m	7,460	2,330,000	2,136,000
11 Bagumbong No.2	m	2,760	823,000	754,000
Total			14,143,000	12,961,000