

THE REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF AGRARIAN REFORM

FEASIBILITY STUDY
ON
INTEGRATED JALA-JALA RURAL
DEVELOPMENT PROJECT

MAIN REPORT

SEPTEMBER, 1990

JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)

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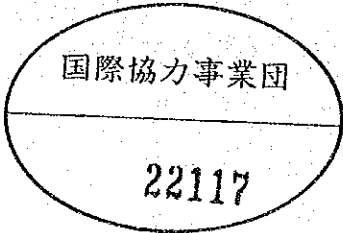


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SEPTEMBER, 1990

JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)



PREFACE

In response to a request from the Government of the Republic of the Philippines, the Government of Japan decided to conduct a Feasibility Study on the Integrated Jala-Jala Rural Development Project and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA dispatched to the Republic of the Philippines a Study Team headed by Mr. Tadashi SAKAMOTO of Nippon Koei Co., Ltd. from September, 1989 to August, 1990.

The Team exchanged views with the officials concerned of the Government of the Republic of the Philippines and conducted surveys in the country in close cooperation with the Philippine officials concerned. After the Team returned to Japan, further studies were made and the present report was prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of the Republic of the Philippines for their close cooperation extended to the Team.

September, 1990










Kensuke Yanagiya

President

Japan International Cooperation Agency

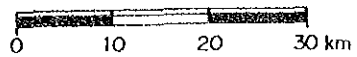
LEGEND

-  : River
-  : Road
-  : Railway
-  : Capital
-  : Provincial Capital
-  : City
-  : Town

 : Study Area

LOCATION MAP

SCALE



SUMMARY

I History of the Project

1. The Comprehensive Agrarian Reform Programme (CARP) for rural development has been active since 1987, pursuant to the policy of the National Development Programme. Through this programme, the Government of the Philippines supports beneficiary farmers of agrarian reform by stabilization of both crop productivity and their livelihood.
2. As a model project of CARP, the Integrated Jala-Jala Rural Development Project was given a top priority. The Government of the Philippines requested the technical assistance to the Government of Japan to undertake the feasibility study at the beginning of 1989. In reply to the request, the Government of Japan decided to provide the assistance for the study through the Japan International Cooperation Agency (JICA).
3. JICA sent the preliminary study team and the Implementing Arrangement (I/A) for performing the feasibility study on the subjected project was agreed upon between JICA and Department of Agrarian Reform (DAR), counterpart agency of Philippines, on 17th April, 1989.
4. JICA organized a study team according with the I/A and commenced the feasibility study from 25th of September 1989. The first phase of the study was done between 25th of September, 1989 and 28th of February, 1990, and the second between 1st of April, 1990 and 29th of September, 1990.

II Background of the Project

5. Current Situation of the National Economy

Total population was estimated to be about 57.3 million with the population density of 190 persons/km² at the end of 1987. The rate of population growth has been about 2.4% per annum during the past decade. The working population, over 16 years of age, is about 35.4 million (or about 61.7% of the total population). Real employment is, however, limited to 35.9% of the total population, or 58.2% of the potential labour force.

Economic development of the Philippines was depressed to a serious extent during the early 1980s because of less buoyant export markets. However, economic growth accelerated much in 1987 with the main impetus coming from a strong recovery in personal consumption as the result of tax reform, higher wages and the spending program of the Government. GNP in that year attained ₱706,251 million at the current market prices or US\$370 per capita approximately. However the trade balance of the Philippines has considerably worsened in the recent years. In the balance of Government expenditures and revenue, the debt servicing presents over 50% of routine expenditure and exceeds budgeted development expenditure. Total external debt stands at about US\$ 20 billion.

6. Socio-Economic Profile of Region IV and Rizal Province.

Region IV is about 46,900 km² in extent or about 16% of the entire territory of the Philippines. The Region has 11 Provinces of which Rizal is one and the prime administration of the study area. The Regional Gross Domestic Product (RGDP) of Region IV grew at 4.4% in 1986-1987, and achieved ₱14,929 million in 1988 at 1972 constant prices. Agricultural production is the basis of the rural economy and labour employment in agriculture is still as high as 43% of the total labour force and its production is about 30% of RGDP.

Rizal province has a total land area of about 1,300 km² and in 1988 had a population of 849,680 increasing with an annual growth rate at 6%. The labour force is estimated at about 361,060 or 42% of the total population. Of those in the labour force, 339,390 or 94% are gainfully employed with an average annual income estimated at about ₱38,547/family. The main product in Rizal province is paddy rice which constitutes almost 76% of the total crop cultivation area and accounts for about 48% of the annual farm production.

7. On-Going National and Regional Development Programs

The development targets of the Government of Philippines' Medium Term Development Plan for national economic development covering the specific period of 1987 to 1992 are as follows:

- 1) To alleviate rural poverty,
- 2) To reinforce existing employment and to create further labour opportunities through development of the rural economy,
- 3) To realize social justice as well as to regularize fairness, and
- 4) To achieve sustainable economic growth.

In line with the Medium Term Development Plan stated above, CARP has been operative since 1987. The essential objectives of CARP are:

- 1) To promote social justice,
- 2) To move the nation toward sound rural development and industrialization, and
- 3) To establish owner cultivation with economic farm size

The Government also intends to support the beneficiaries of agrarian reform by stabilizing both crop productivity and livelihood through implementing the integrated rural development conceived in CARP.

III Present Conditions in the Study Area

8. Location and Topography

The 49.3 km² (or 4,930 ha) study area is located about 75 km south-east of Metro-Manila, on the Jala-Jala peninsula which juts out into lake Laguna. Administratively, it belongs to Jala-Jala municipality, Rizal province, Region IV. The physiography of the study area is mainly divided into the following three categories:

Descriptions	Steeply Sloping Mountains	Lower Terraces	Alluvial Fans
Physical Extent	2,680 ha	1,340 ha	910 ha
Elevation	100 m<	100 m>	60 m>
Slope	8%<	3 - 8%	3%>

9. Climate

The climate of the study area is characterized by two distinct seasons, a dry season from December to April and a rainy season from May to November. The annual rainfall varies considerably between 1,320 mm and 3,000 mm. This is a serious physical constraint to agricultural production.

10. Geology and Geo-Hydrology

The geological constitution of the study area is of volcanic flow and pyroclastic rocks of the Plio-Pleistocene. Volcanic flow mainly lies in the steeply dissected and/or rolling mountain area. Pyroclastic rocks are mostly found on the lower terraces particularly in the south and south-western parts of the study area. There are recent alluvial fans developed on the lake shore plain which are constituted of colluvial and/or alluvial deposits. Groundwater resources are expected to be adequate for domestic requirements, but too limited for irrigation development and rural industrialization.

11. Soil

The soils are mainly derived from the recent colluvium and/or alluvium materials and from tuffaceous materials.

12. Hydrology

There are numerous small creeks in the study area. All of these creeks have characteristically small catchment areas, and short steep rivers. Runoff durations of flood flows for all creeks are very short. Only four creeks have perennial flows, other small creeks dry up in the dry season.

13. Population

The population in the study area is 18,750 as of 1989. The rate of annual population growth during the last decade has been 2.5% on the average. The population density is estimated at about 380 persons km². The working population between the ages of 15 and 65 years old is about 11,440 persons (or 60% of the total population). The family size is estimated at about 6 persons per household on the average.

Total household amount to about 3,156 of which farm household are estimated to be about 2,270 (or about 72%). Out of the total farm households, the beneficiaries of agrarian reform are about 1,670 (or 73.5% of the total farm households). Households other than agricultural are 790 for aquaculture, 96 for transportation ,public services,etc.

14. Overview of Regional Economy

Principal sector of the economy in the study area is agriculture. The present RGDP is estimated at ₱67 million. Of this value, 48% comes from agriculture, 17% from the service sector, 27% from off-farm business, and 8% from other sources.

Agricultural income by farm size is estimated to be about ₱12,800 for the smallest farm of 0.25 ha and ₱41,700 for the largest farmer of 3 ha, while the average farm income is ₱ 28,000.

15. Performance Progress of the Comprehensive Agrarian Reform Program

In actual emancipation as of April, 1990, 1,670 farmers have registered land titles, or 90% out of the total of prospective beneficiaries.

Agrarian Reform Program and Its Achievement

Description	Land Registration Units	Land Allocation	Farmer Beneficiaries
	(lot)	(ha)	(household)
Plan	3,600	1,800	1,920
Achievement	3,460	1,650	1,670

There are still 140 undistributed land titles or 150 ha lie at Punta (Paddy : 30 ha) and at Kasinsin area in Barangay of Bagumbong (Upland crop field : 120 ha).

16. Present Land Use

Present land use is summarized as follows:

Present Land Use

(Unit: ha)

Land Categories	Steeply Sloped Mountains	Lower Terraces	Alluvial Fans	Total
Agricultural Land:	310	450	680	1,440
- Irrigated Paddy Field	0	0	450	450
- Rainfed Paddy Field	0	270	50	320
- Upland Field	10	50	100	160
- Orchard Garden	170	130	50	350
- Coconut Plantation	70	0	30	100
- Others	60	0	0	60
Non-Agricultural Land	2,360	740	60	3,450
- Forest	200	80	0	280
- Bush/Shrub	1,150	340	30	1,520
- Grass land	1,010	320	30	1,360
Residence Yard/Others	10	150	170	330
Total	2,680	1,340	910	4,930

17. Agricultural Production

The staple crops in the study area are paddy, maize, root crops, vegetables and fruit. Paddy production in 1988 was 1,540 tons equivalent to a unit yield of 1.9 ton per ha on the average. The planted area in the rainy season was about 740 ha in 1988, but only 50 ha in the dry season. The planted area of vegetables is about 70 ha with 470 tons production. The plantation of the fruit covers 350 ha.

18. Post-Harvesting and Marketing

Harvesting is done manually or by conventional farm instruments and done through hired labor or a mutual assistance system. The number of power threshers or pedal threshers has so far been limited in the study area.

19. Aquaculture

Inland fishery in lake Laguna has contributed to the regional economy next to the agriculture. The total production of the fishery is about 530 tons of fish and 480 tons of snails.

20. Livestock Husbandry

Livestock husbandry is all categorized as small scale backyard production. The number of head raised is summarized as follows:

Beef Cattle	Water Buffaloes	Swine	Goats	Horses	Chickens	Ducks
582	771	445	455	168	3,630	6,580

21. Farm Economy

The farmers in the study area have been emancipated under present agrarian reform and 70% of the farmers have become owner farmers. These farmers may be grouped into four farm types based on the variety of production and land units.

Farm Types	Households	Proportion (%)
- Paddy Cultivator	710	43
- Upland Crop Cultivator	260	16
- Paddy cum Upland Crop	80	5
- Orchard Plantation	160	9
- Others	460	27
Total	1,670	100

Annual farm income of each typical farm is summarized as follows:

Farm Economy by Farming Types

(Unit: ₱1,000)

Descriptions	Paddy Cultivator	Upland Crop Cultivator	Paddy/Upland Crop Cultivator	Orchard Plantation
Farm income	8,550	4,300	6,400	4,800
Sub-farm income	2,500	4,900	3,000	4,900
Off-farm income	13,600	13,600	13,600	13,600
Total Income	24,650	22,800	23,000	23,800
Farming cost	2,100	1,100	1,600	1,200
Living Expenditure	18,800	18,800	18,800	1,880
Total Out go	20,900	19,900	20,400	20,000
Balance	3,750	2,900	2,600	3,300

22. Farmer's Organization

In the study area, there are four farmers' cooperatives, i.e. Samahang Nayong, farmers associations, multi-purpose cooperatives and irrigators' associations. The total number of members of each organization are 1,040, 544, 257 and 578, respectively, and 2,419 in total.

23. Irrigation

In the study area, there are 15 Communal Irrigation Systems (CIS) of which the salient features are as follows:

Existing Communal Irrigation Systems in the study area

Name of CIS	Location (Barangay)	Construction Year/Agency	Service Area (ha)	Irrigation Area (ha)	
				Wet Season	Dry Season
1. Sipsipin	Sipsipin	1957/NIA	86	73	10
2. Puang Linis	Sipsipin	1939/DPWH	34	24	15
3. Butsing	Sipsipin	1977/NIA	60	54	8
4. Manggahan	Sipsipin	1978/ADCA	26	23	4
5. L.Mapakla	District I	1986/NIA	38	29	3
6. U.Mapakla	District I	1968/DPWH	48	48	15
7. Ilog Tangge	District II	1977/NIA/FSDC	16	(not functioning)	
8. Bayugo	Bayugo	1980/NIA/FSDC	18	(not functioning)	
9. Bagumbong	Bagumbong	1985/PRVI GT	44	39	10
10. Pulong Matsing	Bagumbong	1981/NIA	8	8	0
11. Ilog Munti	Bagumbong	1988/NIA	10	8	0
12. Ilog Na Malaki	Bagumbong	-	28	8	0
13. Lumang Nayon	Bagumbong	1985/NIA	27	22	5
14. Lubo	Lubo	1985/NIA	22	14	0
15. Ik-Ik	Lubo	1977/NIA	18	(not functioning)	
Total			483	350	70

24. Drainage

There are no drainage canals as such to evacuate excess rainfall or to convey excess irrigation water to the natural streams or creeks. In the wet season, the downstream area of paddy fields suffer damage from inundation when heavy rainfall occurs.

25. Rural Electrification

10 barangays out of 11 have been energized with electric power and 2,680 households or 85% of the total households and 64 industrial consumers have been connected with distribution lines. The general features of the power supply system are as follows:

Malaya thermal plant	300 MW
Sub-station adjacent to Malaya thermal plant	20 kV/3.6 kV
Distribution lines	
Jala-Jala network (single phase, high voltage)	3.60 kV
Bagumbong network (single phase, high voltage)	7.62 kV
Tertiary line (single phase, low voltage)	220 V

26. Potable and Domestic Water

Groundwater is the main source of water for drinking and other domestic uses. At present, 713 shallow wells and 63 deep wells have been installed.

27. Road Network

Access to Jala-Jala, capital town of Jala-Jala municipality, is by national road route 301. To Bagumbong area, a branch from national road route 349 is available up to the adjacent Matikiw of Laguna Province. These roads is now under concrete pavement.

Out of 18 km of the link road from Jala-Jala to Bagumbong through Punta, only about 8.5 km between Jala-Jala and Palay Palay are passable in the dry season. About 44 km of barangay road are still unpaved and more or less affected by erosion hazards.

IV Basic Concept for Integrated Rural Development Plan

28. Prospective Goal of Current Rural Development in the Philippines

To improve and enhance the socio-economic situation, the Government of the Philippines has a medium term development plan covering the implementing period of 1987-1992.

The development goal of this plan is as follows:

- 1) Alleviation of poverty
- 2) Generation of more productive employment
- 3) Promotion of equity and justice
- 4) Attainment of sustainable economic growth

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

- 1) To improve the basis of agricultural production
- 2) To promote rural industrialization
- 3) To reinforce the agricultural support services
- 4) To improve the rural infrastructure and support the distribution and marketing

29. Fundamental Approaches to Integrated Rural Development

(1) Land resources

Rural infrastructure and a stable foundation for agricultural production will be provided intensively for 1,240 ha of land, which is recognized as arable land and recognised to be suitable for the intensification cum diversification of agricultural production so as to increase crop production and to stabilize farm incomes. As for the remaining non-arable land, it is recommended that forestation should be introduced with particular attention to soil and land conservation.

(2) Water resources

The surface water should be utilized as much as possible for irrigation with shortage of water being supplemented from lake Laguna by pumping operation. Groundwater is expected to be used only as drinking water for inhabitants in the study area.

(3) Labour force

Of the labor force in 2000 it is estimated that 7,310 persons or 65% of the total labor force will be engaged in agriculture, 12% or 1,350 persons in fishery, and 4% or 450 persons in commerce and services. Remaining 19% or 2,130 persons would be excess labour who would have to seek employment outside the area.

(4) Marketing prospects

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

(5) Rural industrialization

There is abundant labour in the study area and fruit production is expected in the agricultural development plan to be material for agro-based industries. However, it will be difficult to supply the ample cheap water and energy which are basic needs for promotion of the industrialization. In view of the investment being made in the environmental conservation of lake Laguna, the promotion of rural industrialization will not be made in the study area for the time being.

Surplus fruits production will have to be shipped to more advanced industrialized areas around lake Laguna for processing.

30. Development Target and Strategies

The following three points are taken as the primary goals of this integrated rural development:

- 1) Early development of self-reliant farmers,
- 2) Increased regional gross domestic products (RGDP) by improving the socio-economic structure and basis of production, and
- 3) Attainment of self-sufficiency in staple food production (rice) within the municipal area.

To efficiently pursue the above primary goals, the following schemes shall be implemented as the essential parts of the integrated rural development conceived below..

- 1) Establishment of a rural development centre,
- 2) Improvement / reinforcement of irrigation and drainage facilities,
- 3) Improvement of the road network,
- 4) Activation of farmers cooperative societies, including re-organization of Jala-Jala, agricultural cooperatives, and
- 5) The following facilities will be improved and expanded.
 - Water supply systems
 - Rural electrification
 - Transportation service system
 - Communication service system
 - Health center and clinic

V Integrated Rural Development Plan

31. Land Use Plan

The proposed land use plan is summarized as follows:

(Unit : ha)

	Mountainous/ Hilly Land		Lower Terraces		Alluvial Fans		Total	
	Present	Proposed	Present	Proposed	Present	Proposed	Present	Proposed
Agricultural Land:	310	960	450	1,000	680	730	1,440	2,690
Paddy Field	0	0	270	480	500	500	770	980
- Irrigated	0	0	0	450	450	500	450	950
- Rainfed	0	0	270	30	50	0	320	30
Upland Field	10	10	50	110	100	140	160	260
- Irrigated	0	0	0	10	0	120	0	130
- Rainfed	10	10	50	100	100	20	160	130
Plantation	300	320	130	190	80	90	510	600
- Orchard	170	260	130	190	50	90	350	540
- Coconut	70	0	0	0	30	0	100	0
- Others	60	60	0	0	0	0	60	60
Agro-Forest	0	630	0	220	0	0	0	850
Non-Agric. Land	2,360	1,710	740	190	60	10	3,160	1,910
- Forest	200	1,710	80	190	0	10	280	1,910
- Shrub/Bush	1,150	0	340	0	30	0	1,520	0
- Grasses	1,010	0	320	0	30	0	1,360	0
Homestead/Others	10	10	150	150	170	170	330	330
Total	2,680	2,680	1,340	1,340	910	910	4,930	4,930

32. Agricultural Production Plan

The promotion of increased agricultural production would be aimed at self-sufficiency in the staple food as well as economic self-reliance of the farmers as summarized below:

(1) Increased rice production

Field	Area (ha)	Planted area (ha/year)	Unit yield (ton/ha)	Production (ton/year)	Amount of milled rice (ton/year)
Irrigated paddy	950	1,830	5.0	9,150	5,950
Rainfed	30	30	2.5	75	50
Total	980	1,860	8	9,225	6,000

The total production of rice will meet the regional demand of about 3,000 tons and the excess of about 3,000 tons will be surplus for marketing.

(2) Intensification of upland crop production

Upland crop cultivation will have to be subject to enhanced land productivity and profitability, therefore, introduction of a crop intensification cum diversification program will be applied. Anticipated production of the main crops is estimated as follows:

Crop	Planted area (ha)	Unit yield (ton/ha)	Production (ton)
Upland crop fields			
Maize	130	2.8	364
Tomatoes	30	15.0	450
Egg Plants	30	12.0	360
Soybeans	100	1.0	100
String Beans	30	8.0	240
Bitter Gourds	30	14.0	420
Irrigated paddy fields			
Cow Peas	265	1.5	395
Mongo Beans	35	2.0	70
Watermelons	35	17.0	595

(3) Intensification of fruit plantation

Crop	Planted area (ha)	Unit yield (ton/ha)	Production (ton)
Citrus	80	15	1,200

(4) Agro-forestation

Promotion of the fruit tree plantation of 850 ha will be scheduled in the terrace area where the soil has enough depth.

Crop	Planted area (ha)	Unit yield (ton/ha)	Production (ton)
Calamansi	550	7	3,850
Mango	300	10	3,000

33. Post Harvest Support Activities

(1) Post harvesting facilities for rice

The post harvest facilities for rice are designed as a centralized unit as follows :

- Drying yard : 150 m²
- Rice mills: milling capacity 3.5 ton/hr.
- Warehouse : storage capacity of 500 ton of sacked paddy

(2) Facilities for diversified crops

The following facilities are proposed as post harvest activities for vegetables and fruits.

1) Vegetables

Production depots for collection, primary treatment, grading and packing
(3 locations)

2) Fruits

Production depots for collection, primary treatment, grading and packing
(3 locations)

34. Farm Mechanization

Farm mechanization is conceived only for three farming practices as listed below:

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

Proposed agricultural machinery and ownership is as follows:

Agricultural Machinery and Owner/Operation System

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

Other than farm machinery listed above, 10 tractors (45~60 Hp) with deep ploughs and disk harrows will be introduced at the rural development center for the periodical deep plowing of the paddy fields. A repairshop will be established at the said center at order to support the farm mechanization.

35. Irrigation Plan

Proposed CIS and the features of each CIS are summarized as follows:

Irrigation System	Irrigation			
	Paddy	Upland	Headworks	
1. SIPSIPIN	170	-	1-intake	1-pump station
2. MAPAKLA	100	30	2-intake	1-pump station
3. MANGGAHAN	45	10	1-intake	1-pump station
4. BAYUGO	50	-	-	1-pump station
5. LLANO	65	-	-	1-pump station
6. PUNTA	35	-	-	1-pump station
7. PALAY-PALAY	140	-	1-impound	1-pump station
8. PAGKALINAWAN	45	10	-	1-pump station
9. IK-IK	45	-	1-intake	1-pump station
10. LUBO	30	15	1-intake	1-pump station
11. LUMANG NAYON	95	-	3-intake	1-pump station
12. PULONG LIGAYA	45	-	1-intake	1-pump station
13. BAGUMBONG	85	145	1-intake	2-pump station
TOTAL	950	210	12-intakes 1-impound	14-pump stations

36. Drainage Plan

Principal facilities are as shown below :

Main canal	
Length	11.2 km
Branch canals	
Length	39.3 km
Related structures	
Culverts	70 locations

37. Farm Road Network

Width	4 m
Gravel metalling	3 m, t = 20 cm
Length	9.6 km

38. Road Development

The road network plan is shown as follows:

(1) Trunk road

Total length	18.1 km
Width	9.1 m
Pavement	Concrete : t = 20 cm
Related structures	Culverts : 50 locations

(2) Feeder roads

Description	Road width 8 m	Road width 6 m	Total
Total length	1,420 m	45,310 m	46,730 m
Number of feeder road	4	61	65
Width of gravel metalling	6 m	4 m	-
Thickness of gravel metalling	20 cm	20 cm	-

39. Rural Electrification

It is foreseeable that the power demand in the study area will increase considerably with implementation of the rural and agricultural development, i.e. supply of electric power to the pump stations for irrigation and domestic water supply, post harvest processing (rice mill), and electrification of households, etc. In this plan, a distribution line of three phase 34.5 kV will be installed from the Malaya sub-station, and additional rural electrification is provided for domestic lighting. Major features of the lives are summarized below:

Power transmission line,	34.5 kV,	3 phase	:	23 km
Power distribution line,	460/230 V,	3 phase	:	5.1 km
Tertiary distribution line,	220 V	single phase	:	3.5 km

40. Rural Water Supply System

In the study area, the majority of local inhabitants are using the shallow wells which are more or less contaminated and suffer a decrease water yield in the dry season. To improve the rural water supply with particular attention to the above problems, installation of deep wells is proposed.

41. Establishment of the Rural Development Center

Establishment of a Rural Development Center to reinforce the institutional supporting services is proposed as one of the essential functions of the rural development plan.

(1) The essential functions of the Rural Development Center will be to provide:

- 1) Extension services in agricultural and home management technology
- 2) Supporting services in farm mechanization
- 3) Training for the farmers
- 4) Production and distribution of certified seeds and seedlings
- 5) A stable supply of the farm inputs
- 6) Supporting services in post harvest work

Of the functions listed above, the extension services would be provided as regular services of the Rural Development Center, while the other functions will be transferred to the farmer's cooperatives as soon as the farmers cooperatives are fully functioning.

(2) Facilities of the Rural Development Center

It is proposed that the Center together with the Project Office be established at the site of MFI Agro-Aquatic Development Center of Meralco Foundation Inc. Requirement of the land space for construction of the facilities of the Rural Development Center will be as follows :

Building for rural development center	3,600 m ²
Dormitories for the staff	4,300 m ²
Garage and workshop	2,600 m ²
Rice mill and related facilities	6,000 m ²
Warehouse	2,500 m ²
<hr/>	
Total	19,000 m ² (1.9 ha)

42. Reinforcement and Activation of Farmers Cooperative Societies

The farmers already have four types of cooperative societies. These cooperatives were organized separately in each barangay. Each cooperative society is small in membership and thus in financial resources. Farmers' motivation for cooperative activities is also minimal, at present. To simulate agricultural production as well as to maintain the project facilities satisfactorily, it is essential to reinforce the present organization of farmers' cooperatives. It is therefore proposed to establish a Jala-Jala multi-purpose farmers' cooperation. To this end, integration and unification of the existing cooperatives is conceived.

VI. Implementation Schedule of the Project

43. Implementation Schedule of the Project

For implementation of the project, the development components and related schemes have been grouped into two schedules, namely:

(1) CARP-based implementation

Improvement and development of the infrastructure

- Irrigation and drainage facilities
- Road network
- Electric transmission and distribution lines
- Facilities of the rural water supply system
- Rural development center
- Post harvest facilities (rice mill)
- Fish ports

Improvement of the functions of production activities

- Activation of the farmers' cooperative

(2) Ordinary program of rural development

- Construction of educational facilities
- Reinforcement of the tertiary system for rural water supply
- Reinforcement of health and sanitation services
- Environmental conservation

- Reinforcement and activation of rural institutions, i.e. farmer's credit

The CARP-based implementation program will be implemented by in stages as follows:

- 1st stage : Development of the area where the agrarian reform has been completed (1,650 ha)
- 2nd stage : Development for the area where the agrarian reform is going on (150 ha)
- 3rd stage : Land conservation in steep mountainous area (the agrarian reform program-D)

44. Organization of Project Implementation

The Department of Agrarian Reform (DAR) will be the agency primarily responsible for implementation of this project. In line with the policy and principles 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 project, close cooperation between the CARP coordinating agencies, namely DA, DPWH, DENR, etc. as well as Meralco Foundation Inc., will be essential and crucial.

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

(1) Board of Directors (BOD)

This will be composed of representatives of DAR and related agencies and will be ultimately responsible for the project implementation. The Undersecretary of DAR will act as the chairman of the BOD.

(2) Project Management Committee (PMC)

This committee will be responsible for implementing the policies and guideline formulated by the BOD. The Assistant Secretary of DAR will act as the chairman of this committee.

(3) Secretariat

The project secretariat will be constituted from a designated DAR Central Office Unit, utilizing staff resources already available. The secretariat will function to handle general matters.

(4) Jala-Jala Project Office

The Project Office will be located at the project site and will administer the Rural Development Cluster. It will be assisted by an Infrastructure Division and an Administrative/Finance Division.

(5) Rural Development Center

The Rural Development Center will be established as part of the Jala-Jala Project Office. The Center will have three distinct functions: Agricultural Extension Services, Engineering and Maintenance, and Special Projects.

45. Project Cost

(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 ports	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

VII Economic Evaluation

46. Project Benefits

The project benefits will be primarily generated from the agricultural development, road network, rural electrification and water supply system.

(1) Agricultural benefits

The economic benefits will be derived from the incremental crop production attributable to a stable irrigation water supply, improvement of the quality and quantity of the farm input, crop intensification, crop diversification, farm mechanization, etc.

(Unit : ₱ 1,000)

Crop	Without Project	With Project	Benefit
Milled Rice	2,876	21,286	18,410
Upland crop	1,409	15,339	13,930
Plantation	1,525	5,688	4,163
Livestock	457	4,860	4,403
Total	6,267	47,173	40,906

(2) Benefits of road construction

The economic benefits will be derived from the savings in the transportation cost of agricultural products by means of the new road construction and improvement of the road network.

(Unit : ₱ 1,000)

Crop	Without Project	With Project	Benefit
Milled Rice/Upland crops	34,445	3,290	31,155
Plantations	976	343	633
Total	35,421	3,633	31,788

(3) Benefit of rural electrification

Applying the concepts of willingness to pay, the economic benefits of rural electrification will consist of the tariff revenue and the consumers surplus which is the

saving in cost caused by changing the energy source from the kerosene to electricity. The annual economic benefits that will accrue from Paalaman area are estimated at about ₱ 37,000.

(4) Benefits of water supply

Applying the concept of willingness to pay, the economic benefit of the water supply will consist of the water fee for operation and maintenance of the proposed wells and supplemental facilities. The annual economic benefits are estimated at about ₱ 97,000.

47. Economic Cost

(1) Capital cost

The economic cost is estimated as shown below :

(Unit : ₱ 1,000)

Item	Economic Cost
Rural Development Center	28,983
Rice Mill Center	17,782
Irrigation and Drainage	196,088
Road Network	103,039
Rural Water Supply	13,928
Power supply system	25,709
Fish Ports	2,059
Procurement	6,351
Sub-total	393,939
E/S and Administration	71,012
Land Acquisition	1,414
Physical contingency	46,639
Price escalation	-
Total	513,004

(2) Annual operation and maintenance cost

Annual operation and maintenance cost in terms of economic value is estimated as follows :

(Unit : ₱ 1,000)

Item	Economic Cost
Administration, store, etc.	2,265
Irrigation/Drainage	3,790
Rice Mill Center	887
Rural Water Supply System	97
Road Network	1,510
Total	8,549

(3) Replacement cost

Annual replacement cost in terms of economic value is estimated as follows :

(Unit : ₱ 1,000)

Item	Useful Life	Economic Cost
Irrigation/Drainage	20	44,464
Rural water supply	20	2,415
Rice mill equipment	20	10,242
Power supply system	20	31,023
Farm machinery	10	6,587

48. Economic Evaluation

The economic evaluation for the project is made by analyzing the economic internal rate of return (EIRR) taking into account all the economic benefits and costs.

EIRR	:	14.4%	
B-C	:	-10,372	(at a discount rate of 15%)
B/C	:	0.97	(at a discount rate of 15%)

49. Sensitivity Analysis

The sensitivity analysis is as shown below:

		<u>EIRR</u>
Case 1	10% up on cost	12%
Case 2	20% up on cost	11%
Case 3	10% down on benefit	12%
Case 4	20% down on benefit	10%

50. Financial Evaluation

(1) Farm budget (capacity to pay) analysis

The farm budget analysis under without project and with project conditions was made from the standpoint of the farm economy to assess the financial viability of the project as well as the development effect to be expressed in "payability of all the duties and redemption" in the farm economy. Net profit will increase about 3 to 10 times over the without project condition.

(Unit : ₱ 1,000)

	<u>Standard Farmer in the typical Farming Category</u>			
	<u>Rice</u> (1.0 ha)	<u>Rice/upland crop</u> (0.7 ha)	<u>Upland crop</u> (0.4 ha)	<u>plantation</u> (0.5 ha)
I. Farmer's net income	33,863	24,889	12,377	6,028
II. Annual fee				
- Irrigation fee (O&M cost)	3,585	2,510	1,434	0
- Water charge of well (O&M cost)	66	66	66	66
- Milling charge	1,200	480	0	0
III. Amortization				
- Land	4,405	3,084	1,762	2,203
- Rice mill	2,760	2,760	0	0
- Agricultural machinery	2,484	2,484	1,551	375
Total (II+III)	14,500	11,384	4,813	2,644
IV. Net Revenue(I-II-III)	19,363	13,505	7,564	3,384

51. Social Impact of the Project

The project will generate not only direct benefits, but also beneficial social impacts. The social impacts to accrue will include :

- 1) Improvement of living standards due to the large increase in farm revenue
- 2) Expansion of the willingness to work
- 3) Production of processing materials for the agro-based industries
- 4) Advancement of farming technology
- 5) Enhancement of social support services
- 6) Contribution to regional socio-economic development in province
- 7) Improvement of sanitary conditions
- 8) Promotion of regional solidarity

52. Justification of the Project

It is verified and confirmed that an increase in agricultural production can be achieved through promotion of agricultural intensification with the support of irrigation services.

Increased agricultural production can achieve self-sufficiency in the staple food crop, as well as upgrading the farm economy. Accordingly, the balance of farm budgets will have enough capacity to meet annual dues for duties and redemption, such as land amortization cost, water charges for both irrigation and domestic water supply, debt repayment for rice mill, farm machinery, etc.

RGDP of about ₱ 77 million or corresponding to about ₱ 7,000/capita will be generated through project implementation. This large increase in agricultural production will accelerate further production activities as well as rapid growth of the regional economy.

The economic internal rate of return (EIRR) at 14.4% is a little low if compared with that of 15% for viable project as specified by NEDA . However, in due consideration of the project features and principal objectives, it is certainly as "viable".

VIII Recommendation

53. Early Project Implementation

It is recommended that DAR shall make the necessary arrangements for early implementation of the project so as to effectively demonstrate the impact of CARP.

54. Organization for Project Implementation

The integrated rural development plan herein conceived includes various components with a wide range of both soft and hard ware technologies. Thus, it is suggested that DAR organize a coordination system among the inter CARP coordinating agencies for efficiently project implementation. To this end, organizations of the Board of Directors, Project Management Committee, Jala-Jala Project Office, etc. are recommended for the said purposes.

Efficiently operation and management of the Rural Development Center will also require both administrative and technical assistance from the inter CARP coordinating agencies as well as non-government organizations such as Meralco Foundation Inc. etc. Accordingly, DAR should organize the joint operation system among the agencies organizations concerned.

55. Land Space for Construction of Rural Development Center

The land space requirement for construction of the Rural Development Center is about 1.9 ha (19,000 m²). As result of the studies, it is recommend that the Rural Development Center be established within the yard area of existing Agri-Aquacultural Development Center of MFI. Thus, it is suggested that DAR negotiate with MFI and acquire the land for establishing the Rural Development Center.

56. Financial Assistance to Farmer Beneficiaries

The Philippines Land Bank (PLB) has been appointed as the main institute and has prepared the farmers credit service system. It is suggested that PLB offer the special arrangement to the farmers to enable them to apply for credit smoothly and effectively, in conjunction with DAR and related agencies.

57. Operation and Maintenance Charges for CIS

In this plan, 13 CIS will be constructed in the entire study area. It is recommended that NIA shall provide intensive guidance and assistance in operation and maintenance of these facilities.

Under future project conditions, it is projected that the rate of O/M cost and amortization cost on capital investment to the farmer's income will increase too heavily for small holder farmers. It is recommended that the Government shall subsidize a greater part of the capital investment so as to reduce the annual due amortization cost.

58. Environmental Conservation

The mountainous area of 2,680 ha has been steeply dissected, and accordingly has low capability for economic development. Since the vegetation of this area has degenerated to a serious extent due to heavy deforestation and/or operation of traditional shifting cultivation protective measures against soil erosion as well as the ecological conservation are essential and urgently needed in this area. Thus, in this area, promotion of re-afforestation is proposed.

**FEASIBILITY STUDY ON
INTEGRATED JALA-JALA RURAL DEVELOPMENT PROJECT**

MAIN REPORT

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ABBREVIATION

A

A & D	Alienable and Disposable
AFF	Agro-Forestry Farms
AITTP	Agro-Industrial Technology Transfer Program
APD	Areas for Priority Development

B

BAEcon	Bureau of Agricultural Economics
BAEx	Bureau of Agricultural Extension
BAPA	Barangay Power Association
BAS	Bureau of Agricultural Statistics
BAT	Bureau of Air Transportation
BCGS	Bureau of Coast and Geodetic Survey
BOT	Bureau of Domestic Trade
BFD	Bureau of Forest Development
BFT	Bureau of Foreign Trade
BHS	Barangay Health Station
BIR	Bureau of Internal Revenue
BL	Bureau of Land
BMG	Bureau of Mines and Geo-Sciences
BOI	Board of Investment
BOP	Board of Posts
BOS	Board of Soils
BSMI	Bureau of Small and Medium Industries
BUTEL	Bureau of Telecommunications

C

CAL	Certificate of Agricultural Leasehold
CARP	Comprehensive Agrarian Reform Programme
CB/CBP	Central Bank of the Philippines
CBR	Crude Birth Rate
CCHP	Comprehensive Community Health Programme
CDR	Crude Death Rate
CEDP	Community Employment and Development Program
CLT	Certificate of Land Transfer
CPI	Consumer Price Index

CSME	Cottage Small and Medium Enterprise
CSMI	Cottage Small and Medium Industries
<u>D</u>	
DA	Department of Agriculture
DAF	Department of Foreign Affairs
DAR	Department of Agrarian Reform
DBM	Department of Budget and Management
DECS	Department of Education, Culture and Sports
DLG	Department of Local Government
DOF	Department of Finance
DOH	Department of Health
DOLE	Department of Labor and Employment
DOTC	Department of Transportation and Communication
DPWH	Department of Public Works and Highways
DSWD	Department of Social Welfare Development
DTI	Department of Trade and Industry

E

ELCO	Electric Cooperative
EO	Executive Order
EOJ	Embassy of Japan

F

FB	Farmer Beneficiary
FDC	Forestry Development Center
FIDA	Fiber Industry Development Authority
FIES	Family Income and Expenditure
FNRI	Food and Nutrition Research Institute
FOB	Free on Board
FORI	Forest Research Institute
FPOP	Family Planning Organization of the Philippines
FPRD	Forest Products Research and Development
FSDC	Farm System Development Cooperation

G

GCMCC	Government Corporate Monitoring Coordination Committee
GDP	Gross Domestic Product
GNP	Gross National Product

GO	Government Organization
GOJ	Government of Japan
GOP	Government of the Philippines
GRDP	Gross Regional Domestic Product
GSIS	Government Service Insurance System
GVA	Gross Value Added
<u>H</u>	
HNFP	Health Nutrition and Family Planning
<u>I</u>	
IAD	Integrated Area Development
IBRD	International Bank for Reconstruction and Development
IEC	Information Education and Communication
IMF	International Monetary Fund
IMR	Infant Mortality Rate
IRRI	International Rice Research Institute
ISH	Integrated Survey of Households
<u>J</u>	
JICA	Japan International Cooperation Agency
JSPS	Japan Society for the Promotion of Science
<u>K</u>	
KKK	Kilusang Kabuhayan at Kaunlaran
<u>L</u>	
LADP	Local Administration Development Programme
LBP	Land Bank of the Philippines
LHO	Leasehold Operation
LIT	Land Investment Trust
LWUA	Local Water Utilities Administration
<u>M</u>	
MCRA	Married Couples of Reproductive Age
MIA	Manila International Airport
MIS	Management Information System
MWSS	Metropolitan Waterworks and Sewerage System

N

NACIAD	National Council on Integrated Area Development
NACIDA	National Cottage Industries Development
NCSO	National Census and Statistics Office
NDC	National Development Corporation
NEA	National Electrification Administration
NEDA	National Economic and Development Authority
NEPC	National Environmental Protection Council
NFA	National Food Authority
NFE	Non-Formal Education
NGO	Non-Government Organization
NHA	National Housing Authority
NIA	National Irrigation Administration
NIST	National Institute of Science and Technology
NLUC	National Land Use Committee
NMYC	National Manpower and Youth Council
NNC	National Nutrition Council
NPC	National Power Corporation
NPCC	National Pollution Control Commission
NRCP	National Research Council of the Philippines
NWRC	National Water Resources Council

Q

ODA	Official Development Assistance
OEA	Office of Energy Affairs
OECE	Overseas Economic Cooperation Fund
OSY	Out of School Youth

P

PAGASA	Philippine Atmospheric, Geophysical and Astronomical Service Administration
PCA	Philippine Coconut Authority
PCARRD	Philippine Council for Agricultural Resources Research and Development
PCCI	Philippines Chamber of Commerce and Industry
PCIERD	Philippine Council for Industry and Energy Research and Development
PCGG	Philippine Commission on Good Government
PCGR	Presidential Commission on Government Reorganization
PD	Presidential Decree
PFNF	Philippine Food and Nutrition Programme

PNB Philippine National Bank
 PNOC Philippine National Oil Corporation
 PPA Philippine Ports Authority

R
 RA Republic Act
 R & D Research and Development
 RDC Regional Development Community
 RDF Regional Development Fund
 RHU Rural Health Unit
 RIDP Regional Development Investment Program
 RWDC Rural Waterworks Development Corporation

S
 SAMELCO I Samar I Electric Cooperation Inc.
 SAMELCO II Samar II Electric Cooperation Inc.
 SIRDP Samar Integrated Rural Development Projects
 SSS Social Security System

T
 TB Tuberculosis
 TBAC Technical Board for Agricultural Credit
 TFR Total Fertility Rate
 TLA Timber Lease Agreement

U
 UEP University of the Eastern Philippines
 UN United National
 UNDP United Nations Development Program
 UNESCO United Nations Educational, Scientific and Cultural Organization
 UNICFF United Nations Children's Fund
 UNIDO United Nations Industrial Development Organization
 UP University of the Philippines

V
 VISCA Visayas State College of Agriculture

W
 WFP World Food Program

MEASUREMENT UNIT

mm	: millimeter(s)	Cl	: chlorine
cm	: centimeter(s)	HP	: horse power
m	: meter(s)	W	: watt(s)
km	: kilometer(s)	KW	: kilowatt(s)
cm ²	: square centimeter(s)	MW	: megawatt(s) hour
m ²	: square meter	WH	: watt(s) hour
km ²	: square kilometer(s)	KWH	: kilowatt(s) hour = 1,000 WH
lit	: liter	MWH	: megawatt(s) = 1,000 KWH
m ³	: cubic meter	EL	: elevation above MSL
MCM or 10 ⁶	: million cubic meter(s)	MSL	: mean sea level
lit/sec	: liter per second	FWL	: fullwater level
m/sec	: meter(s) per second	HWL	: high water level
PPM or ppm	: part(s) per million	LWL	: low water level
g	: gram(s)	ET	: evapotranspiration
kg	: kilogram(s)	ETcrop	: evapotranspiration of crop
ton	: tons(s)	N	: nitrogen
cavan	: 50 kg	P	: phosphorus
m ³ /sec	: 1,000 lit/sec = 35,3145 cubic feet per second = 15,850 US gallons per minute	K	: potassium
knot(s)	: 1.86 km/hr = 0.515 m/sec	LV	: local variety
lit/sec/day	: 8.64 mm depth over one hectare 10 mm depth over one (1) hectare = 1.157 lit/sec/day = 3,532 cubic feet	LIV	: local improved variety
sec	: second	HYV	: high yielding variety
min	: minute(s)	O & M	: operations and maintenance
hr	: hour(s)	EIRR	: economic internal rate of return
Max or max	: maximum	FIRR	: financial internal rate of return
Min or min	: minimum	B/C	: benefit cost ratio
%	: percent(s)	FY	: fiscal year
No.	: number		
C	: degree centigrade		
F	: degree fahrenheit		

CONVERSION FACTOR

Unit		Comparison	English Equivalent
Unit of Length			
Millimeters	(mm)	0.01 m	0.0394 inch
Centimeter	(cm)	0.01 m	0.3937 inch
Meter	(m)		3.2800 feet
kilometer	(km)	1,000 m	0.6213 mile
Unit of Area			
Square centimeter	(cm ²)	0.0001 m ²	0.155 square inch
Square meter	(m ²)		10.764 square feet
Hectare	(ha ²)	10,000 m ²	2.471 acres
Square kilometer	(km ²)	1,000,000 m ²	0.3861 square mile
Unit of Volume			
Cubic centimeter	(cm ³)		0.061 cubic inch
Liter	(lit)	1,000 cm ³	2.471 acres
Cubic meter (liquid)	(m ³)	1,000 lit	1.056 quarts
Deciliter	(dl)	10 lit	
Unit of Weight			
Gram	(g)		0.0353 ounce
Kilogram	(kg)	1,000 g	2.2046 pounds
Metric ton	(ton or mt)	1,000 kg	2,204.6 pounds
Cavan	(Cav)	50 kg	
mm	millimeter(s)		
cm	centimeter(s)		
m	meter(s)		
km	kilometer(s)		

ATTACHMENTS

- Attachment-1 IMPLEMENTING ARRANGEMENT ON TECHNICAL COOPERATION BETWEEN JAPAN INTERNATIONAL COOPERATION AGENCY AND DEPARTMENT OF AGRARIAN REFORM FOR FEASIBILITY STUDY ON INTEGRATED JALAJALA RURAL DEVELOPMENT PROJECT
- Attachment-2 MINUTES OF MEETING FOR FEASIBILITY STUDY ON INTEGRATED JALA-JALA RURAL DEVELOPMENT PROJECT
- Attachment-3 MINUTES OF MEETING ON THE DRAFT FINAL REPORT OF FEASIBILITY STUDY
- Attachment-4 ORGANIZATION FOR EXECUTION OF FEASIBILITY STUDY ON INTEGRATED JALA-JALA RURAL DEVELOPMENT PROJECT

ANNEXES

- ANNEX-I METEOROLOGY AND HYDROLOGY
- ANNEX-II GEOLOGY AND GEO-HYDROLOGY
- ANNEX-III SOIL AND LAND CLASSIFICATION
- ANNEX-IV SOCIO-ECONOMY
- ANNEX-V AGRICULTURE AND AGRO-ECONOMY
- ANNEX-VI IRRIGATION AND DRAINAGE
- ANNEX-VII SOCIAL INFRASTRUCTURE
- ANNEX-VIII INSTITUTIONAL SUPPORTING SERVICES AND FARMERS' ORGANIZATION
- ANNEX-IX FARM MECHANIZATION AND POST HARVEST FACILITIES
- ANNEX-X PROJECT FORMULATION AND IMPLEMENTATION SCHEDULE
- ANNEX-XI COST ESTIMATE
- ANNEX-XII PROJECT EVALUATION

CHAPTER I. INTRODUCTION

1.1 Authority

This is the Final Report on the Feasibility Study on the Integrated Jala-Jala Rural Development Project which was undertaken by JICA Study Team under the technical cooperation program of Japanese Government.

The Report consists of the Main Text, Annexes and Drawings. The Main Text, including the Summary briefly explains the development plan for the integrated rural development as well as verifies the technical feasibility and economic cum financial viability of the subject development. The Annexes provide a detailed report on the study covering assessment of the present situation of study area, all the development components with alternative case studies, etc. The Drawing was prepared as one of the essential references of the development plan.

This Feasibility Study was conducted in accordance with the Implementing Arrangement (I/A) prepared/signed between Japan International Cooperation Agency (JICA) and Department of Agrarian Reform (DAR) on 17th April, 1989. The study work was completed in two steps, i.e., Phase I from 25th September, 1989 to 28th February, 1990 and Phase II from 1st April to 29th July, 1990.

1.2 History of the Project

In line with the current national development program, the Government of Philippines prepared the Comprehensive Agrarian Reform Program (CARP) and which has been followed since 1987. To bring up self-reliant farmers with new land-ownership and to promote regional economic development, the Government intends to support the beneficiaries of agrarian reform through implementation of the integrated rural development program conceived in CARP.

With the object of efficient implementation of CARP, the Government of Philippines selected Jala-Jala municipal area as a model area for promotion of CARP and for implementation of the integrated rural development. Accordingly the Government of the Philippines requested the Government of Japan to assist in implementing the subject rural development in early 1989. The Government of Japan accepted this request under its technical cooperation program.

Japan International Cooperation Agency (JICA), which is the official agency responsible for implementation of the technical cooperation program, did the necessary preparatory works and prepared the Implementing Arrangement (I/A) which was entered into with the Department of Agrarian Reform (DAR), the counterpart agency of the Government of Philippines, on 17th April, 1989.

In accordance with I/A, JICA organized the Study Team, headed by Mr. Tadashi SAKAMOTO which was dispatched to the project site on 25th September, 1989.

1.3 Implementing Arrangement (I/A)

The Implementing Arrangement (reproduced in Attachment I) may be summarized as follows:

(1) Objectives of the study

The objective of the Study is to formulate an integrated rural development project in Jala-Jala Municipal area and to verify its technical feasibility as well as, economic and financial viability.

To undertake on-the-job training and transfer of knowledge to the counterpart personnel of the concerned Department of the Government of Philippines in course of the study.

(2) Study area

The objective area is located on the Jala-Jala peninsula which juts out into lake Laguna and has an area of about 4,930 ha. Administratively, the study area belongs to Jala-Jala Municipality, Rizal Province.

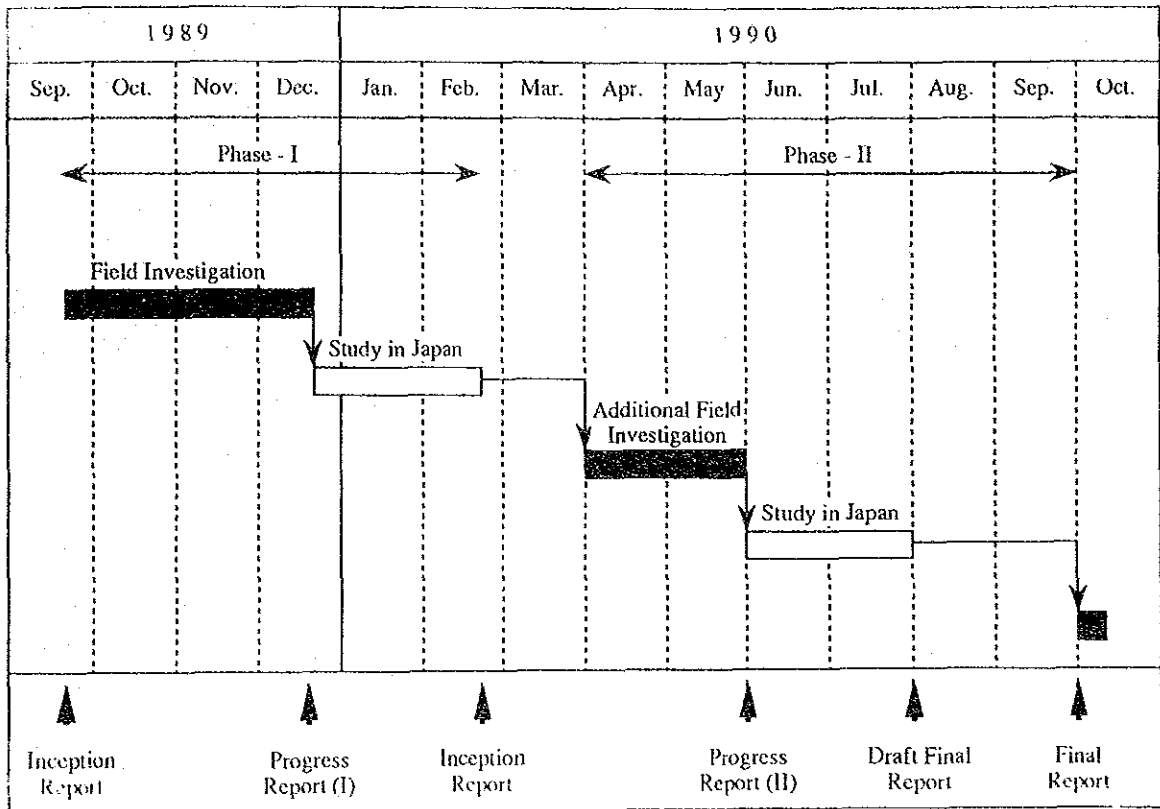
(3) Scope of the study

The scope of the study is specified in I/A is as follows:

To formulate an Integrated Jala-Jala Rural Development Project which will function effectively to support early stabilization of both agricultural production and farmers' livelihood under CARP.

To prepare an implementation plan for a Pilot Area Development Scheme in Lubo and Llano areas where the land had already been distributed to local farmers.

The Study was to be carried out in two stages, i.e., Phase I and Phase II as follows:



CHAPTER II. BACKGROUND OF THE PROJECT

2.1 Current Situation of the National Economy

The Republic of the Philippines consists of numerous islands with a total geographical area of approximately 299,410 km².

The total population was estimated to be about 92.3 million in 1987 with a population density of 308 persons/km². The population growth rate has been 2.4%/annum during the past decade. The population, over 16 years of age, participating in the labour force is about 56.9 million (or about 61.7% of the total population). Real employment is, however, limited to only 20.6 million or 22.3% of the total population. The majority remaining are employed and/or under-employed. Accordingly, creation of labour employment opportunities is essential and urgently needed in the current socio-economic development in the Philippines.

Labour Employment in Each Economic Sector

Description	Agriculture	Industry	Commerce	Service	Total
Labour Employment (million)	10,289	2,746	3,655	3,905	20,595
Proportion (%)	50.0	13.3	17.7	19.0	100.0

Economic development of the Philippines was depressed to a serious extent during the early 1980s because of less buoyant export markets. However, economic growth accelerated much in 1987 with the main impetus coming from a strong recovery in personal consumption as the result of tax reforms, higher wages and the spending program of the Government. The GNP attained in 1987 amounted to ₱ 706,251 million at the current market prices or US\$370 per capital approximately. The sectoral share of GDP is shown in Table 2.1.1 and as summarized below:

National Gross Domestic Product by Industrial Origin

Description	GDP (Unit : ₱ Million)	Proportion (%)
Agriculture, Fisheries and Forestry	177,017	25.0
Industries	230,182	32.3
Services	304,337	42.7
Total	711,536	100.0

The trade balance of the Philippines has deteriorated considerably in the recent years. The balance deficit has grown increasingly, year on year, and exceeded ₱24,120 million in 1987. Export have been dominated by agricultural products which accounted for about 70% of total exports. Major imports are crude oil and petroleum products, industrial materials and non-electrical machinery. These imports represent almost 43.7% of total imports.

Current Foreign Trade

(Unit : ₱ Million)

Description	1982	1983	1984	1985	1986	1987
Export (FOB)	42,411	54,641	88,339	85,283	97,375	104,439
Import (CIF)	70,569	88,657	107,670	101,518	107,324	128,559
Balance	-28,158	-34,016	-19,331	-16,235	-9,949	-24,120

In the national budget debt servicing amounts to over 50% of routine expenditure and exceeds budgeted development expenditure. With the total external debt standing at about US\$20 billion, and with the adverse movement not only in the value of the Philippines peso vis-a-vis the US dollar but more particularly between the US dollar and the currencies of the other creditor countries, foreign debt service payments have increased to a level of 40% of gross export earnings and continue to grow.

2.2 Socio-Economic Profile of Region IV and Rizal Province

Region IV occupies approximately 46,900 km² of land which corresponds to about 16% of the entire territory of the Philippines. The Region has 11 Provinces. Rizal province is the prime administration of the Study area.

The regional population was estimated at about 7.8 million in 1988 of which 6 million (or 77%) is in Growth Corridor Sub-Region, mainland Luzon portion, especially in the provincial area close to Metro-Manila.

The Regional Gross Domestic Product (RGDP) of Region IV has grown steadily in the recent years at an annual rate of 4.4% for 1986-1987, and achieved ₱14,929 million as of 1988 at 1972 constant prices. This RGDP contributes about 15% to the national GDP. Per capital RGDP has increased significantly since 1986 to ₱1,940 in 1988 at 1972 constant prices.

Regional Gross Domestic Product (RGDP) in Region IV

Economic Sector	Unit: %				
	1972	1980	1985	1987	1988
Agriculture	29.10	28.84	31.20	32.51	30.00
Industry	36.04	41.04	34.96	33.88	39.00
Commerce/Service	34.88	30.32	33.84	33.61	31.00

Agricultural production is the prime sector of the rural economy in the Region. In fact, the labour employment in the agricultural sector still remains as high as 43% of the total labour force and its production represents about 30% of RGDP. Nevertheless, regional industrialization has recently been promoted notably in Calabar area, such as in Cavite, Laguna, Batangas and Rizal provinces. Rice production as the staple food crop has attained over 130% of regional demand as of 1987. Fish from both sea and fresh water are also essential products not only for domestic consumption but also for export to other regions.

Rizal province has a total land area of about 1,300 km² with 186 barangays in 14 municipalities. Recently, the population in the Province has significantly increased at an annual growth rate of 6%, and exceeded over 859,680 in 1988. This is attributed to the in-flow of labour force due to industrialization. The natural growth of the population is estimated at about 2.4% per annum. The total number of families is about 121,770.

The labour force is estimated at about 361,060 or 42% of the total population. Of these, 339,390 or 94% are gainfully employed and 21,670 or 6% are un-employed and/or under-employed. About 68% of the employed labour force is working in the urban area and the remaining 32% is in the rural area.

Employment of the labour force by economic sectors is summarized as follows:

Labour Employment by Economic Sectors

Economic Sectors	Employment (%)
Agriculture	28
Manufacturing	22
Commerce	13
Services	19
Other	18
Total	100

The average annual family income is estimated at about ₱38,547. The main income sources are wages and salaries for 53% of families, and entrepreneurial activities for about 30%.

The main agricultural product of Rizal province is paddy rice which covers almost 76% of the total crop cultivation area and shares about 48% of the annual farm production.

2.3 National and Regional Development Programs

The Government of the Philippines' Medium Term Plan for national economic development for 1987 to 1992 has the following objectives:

- a. To alleviate rural poverty,
- b. To reinforce existing employment and to create further labour opportunities through development of the rural economy.
- c. To realize social justice as well as to regularize fairness, and
- d. To maintain durable economic growth

To achieve the above goals, priority is geared to agricultural development in which self-sufficiency in staple crops and increased production of diversified crops are the primary targets. For the industrial sector, the emphasis is on export-oriented and labour intensive industries, including agro-processing and manufacturing. Emphasis is also placed on the

development of tourism. Deregulation and other measures to encourage trade, manufacturing and service industries are presented as approaches to reducing the level of un-employment. These objectives and trends imply a continuing decline in agriculture's share of the economy, and hence, a substantial increase in non-farm income.

In line with the Medium Term Development Program stated above, CARP has been on-schedule since 1987. The essential objectives of CARP are:

- (1) To promote social justice,
- (2) To move the nation toward sound rural development and industrialization, and
- (3) To establish owner cultivationship of economic farm size

The Government also intends to support the beneficiaries of agrarian reform by stabilizing both crop productivity and livelihood through implementing the integrated rural development conceived in CARP.

DAR, DENR, LRA and LBP are CARP implementing agencies with complementary roles in land acquisition and distribution. The current progress of CARP implementation is summarized as follows:

- Survey of 137,832 lots/141,967 ha of paddy and corn field (DENR),
- Survey of 12,958 lots/39,172 ha of other private agricultural land (DENR),
- Cadastral survey of 226,778 lots/453,556 ha of public alienable and disposable land (DENR),
- Survey of 120,439 ha of parcellary area for integrated social forestation program (DAR),
- Registration of 107,717 emancipation patents and certificate of land ownership awards for 18,426 ha (LRA)
- Land acquisition of 54,216 ha from 521 landowners costing ₱603 million. This will be distributed to 15,711 beneficiary farmers (LBP)
- Land distribution of 201,261 ha of rice and/or corn field to 138,904 beneficiary (DAR)

- 10,187 ha of private agricultural land to 11,883 beneficiary farmers (DAR)

Support service activities under CARP are being implemented by CARP coordinating agencies, DPWH, NIA, DA, DENR, DTI and LBP.

- DPWH was being focused on pre-construction activities.
- NIA had endorsed 440 CIS projects to DAR-SSO for validation of which 223 CIS have been validated and confirmed.
- About 2,491 km of access trails and dams capable for impounding 13,321 m³ in ISF area was constructed.
- DA has completed a total of 197 feasibility studies for check weirs, crop production increase program, post production facilities, etc.
- DTI together with DA promoted the installation and fabrication of agro-industrial prototype equipment for small scale agro-based industries.

The extension services to be undertaken by DA include training, technical assistance, educational information dissemination and legal assistance to beneficiary farmers and land owner alike.

- 3,000 training course and classes on crops, livestock and fisheries were promoted to the benefit of 89,000 farmers.
- 1,100 skills training classes were conducted for 40,400 of farmers, housewives, and youths.

CHAPTER III PRESENT CONDITIONS OF STUDY AREA

3.1 Physical Environment

3.1.1 Location and Topography

The study area is located about 75 km south-east of Metro-Manila. The area lies on the Jala-Jala peninsula which juts out into lake Laguna. The geographical extent of the study area is approximately 49.3 km² (or 4,930 ha).

The study area is a narrow peninsula with both low-lying land and steeply dissected mountains and rolling hills originating from the volcanic chains formed in Plio-Pleistocene. The area has three physiographical land units, i.e., Steeply Sloped Mountains, Lower Terraces and Alluvial Fans. These land units have the following essential features:

Physiographical Features of the Study Area

Descriptions	Steeply Sloped Mountains	Lower Terrace	Alluvial Fans
Physical Extent	2,680 ha	1,340 ha	910 ha
Elevation	100 m<	100 m>	60 m>
Slope	8%<	3 - 8%	3%>
Lithology	Basaltic Andesites	Volcanic Tuff	Alluvium

3.1.2 Climate

According to Corona's meteorological classification, the study area is specified as Type I which is characterized by two distinct seasons, dry and rainy (see Fig. 3.1.1). In general, the dry season is from December to April and the rainy season is from May to November.

The monthly mean temperature ranges from 24.8°C to 28.6°C and has little seasonal variation. Monthly mean maximum and minimum temperatures are 32.9°C and 21.5°C,

respectively. The annual average evaporation is 1,637 mm. The monthly average evaporation reaches its maximum in April, about 6.1 mm/day, while its minimum in December, 3.3 mm/day. The annual relative humidity is approximately 79% with very little seasonal variation (Fig. 3.1.2).

The annual rainfall varies widely from 1,320 mm to 3,100 mm (Table 3.1.1). Almost 90% of the annual rainfall is precipitated during the rainy season. Wide variation of annual rainfall is, in most cases, dependent on occurrence of typhoons. Irregular precipitation is one of the low crop production in this area. Frequent occurrence and attack of typhoon are also the physical constraints on economic activities in this area.

3.1.3 Geology and Geo-Hydrology

(1) Geology

The geological constitution of the study area is of volcanic flow (lava) and pyroclastic rocks (volcanic tuff) in the Plio-Pleistocene. The volcanic flow is composed of basaltic andesites and mainly lies in the steeply dissected and/or rolled mountain area. Pyroclastic rocks are mostly found out on the lower terraces particularly in the south and south-western parts of the study area. The recent alluvial fans developed on the lakeshore plain of Bagumbong and Sipsipin-Jala-Jala areas are of the alluvium and/or colluvium.

With intensive volcanic action during the Plio-Pleistocene, many fault have developed in this area. The predominant trend of faulting is mostly N-S and NE-SW in directions (Fig. 3.1.3). The structural features of each geological basement are as follows:

a) Volcanic Flow (Lava)

In the vicinity of the summit of Mt. Sembrano, dark grayish basaltic andesites are predominant, while the composition of rocks changes to basalt for the spur of peninsula.

b) Pyroclastic Rocks (Tuff/Tuffaceous Rocks)

Pyroclastic rocks are mainly composed of gray to grayish brown clayey tuff and tuffaceous sandstones. The sequences of these tuff and tuffaceous rocks are

clearly formed with interbedding of thin and unconsolidated clay layers. These tuff and tuffaceous rocks have a slight gradient toward the west from the N-S fault formation.

c) Recent Colluvium and Alluvium

The colluvium and alluvium are recent deposits, and as such not consolidated yet. These deposits include numerous cobbles, boulders, gravels, fragments of weathered rocks, etc. in the shallow profile.

(2) Geo-hydrology

The potential for development of groundwater was studied through geo-electric prospecting tests and pumping tests on the existing wells. These field investigation revealed that the potential for groundwater is, unfortunately, marginal for the intensive development conceived by the local people.

- The potential aquifer lies in sand and/or gravel layers which are interbedded in the tuff or tuffaceous rocks less than 100 m deep.
- The tuff and tuffaceous rocks deeper than 100 m are highly consolidated in most layers. Furthermore, sand/gravel layers interbedded in the tuff are all very thin. Thus, the groundwater potential of these layer is considered to be limited to small.
- In Bagumbong area where a large potential for groundwater has been anticipated for a long time, it was clarified that all the available aquifers are thin and have marginal groundwater. In fact, the actual yield of the existing wells is as small as 3 to 5 lit/sec.

According to the geo-hydrological investigation, the study area can be divided into four specific zones (see Fig. 3.1.4). The physical features of the aquifers in each zone are as summarized below:

Specific Features of Aquifer

Geo-Hydrological Zone	Depth of Effective Deep Aquifer	Transmissibility	Specific Capacity
	(m)	(m ² /day)	(m ² /hr.)
Sipsipin - Jala-Jala Area	28	20	0.5
Bagumbong - Lubo Area	13	16	1
Bayugo - Punta Area	25	83	3
Palay-Palay - Pakalinawan	26	78	3

Based on the field investigations, it is estimated that the anticipated yield of ground water would be 3 to 5 lit/sec. These potential yields would possibly cover a requirement for domestic water use, but would be quite marginal for irrigation purposes and/or the industrial development.

3.1.4 Soils

A semi-detailed soil survey was performed in accordance with USDA standards which is regularly used by the Bureau of Soils for soil and land classification throughout the entire country. The soil map in the study area is shown in Fig. 3.1.5.

The soils in the study area can be classified into two main soil groups, i.e., the residual soils from weathered volcanic rocks and alluvial soils from the recent alluvium and/or colluvium. The soil classification by USDA standard is as follows:

Great Group	Great Soil Group	Soil-Sub-Group	Soil Type	Physiography	Area (ha)
Entisols	Fluvaquents	Typic-Fluvaquents	Matikiw Fluvaquents	Alluvial Fans	780
Entisols	Hydraquents	Typic-Hydraquents	Mapakura Clay	Alluvial Fans	10
Entisols	Troporthents	Lithic-Troporthents	Calantas Clay	Alluvial Fans	50
Entisols	Troporthents	Lithic-Troporthents	Calantas Clay	Alluvial Fans	70
Inceptisols	Entropepts	Typic, Lithic Entropepts and Lithic-orthents	Paalaman Clay	Steep Slope Mountainous	2,680
Inceptisols	Tropaquepts	Verti-Tropaquepts	Jala-Jala Clay	Lower Terrace	400
Inceptisols	Tropaquepts	Verti-Tropaquepts	Jala-Jala Loam	Lower Terrace	220
Inceptisols	Tropaquepts	Verti-Tropaquepts	Bagumbong Loam	Lower Terrace	380
Vertisols	Pellusterts	Udorthentic-Pellusterts	Yutulo Clay	Lower Terrace	340

Out of six soil sub-groups classified above, Typic Fluvaquents are the typical soils of the alluvial fans. These soils are still young in soil formation, but definitely defined as quite capable soils for intensive agricultural development. Typic Hydraquents are also found in recent alluvial deposits and have no unique soil features. These soils are found mainly on the lowlying area along the lake-shore, and thus, the soils might form "gley" under seasonal standing or perched water in the shallow profile. To develop and /or intensively use these soils, drainage improvement is essential and crucial. Lithic Troporthents are the soils mainly lying on the upper part of the alluvial fans. These soils have almost the same physical and chemical features as the Typic Fluvaquents. Generally, capability for agricultural development of these soils is low due to shallow effective soil depth.

The associated soils among Typic-, Lithic Entropepts and Lithic Troporthents are the representative soils in the mountainous area. These soils originate from weathered volcanic rocks. Since the land had been steeply dissected, and the vegetation has recently degenerated,

these soils have for the most part been seriously eroded. Thus, these soils have always shallow effective soil depth. Generally, these soils have no suitability for intensive development investment, except in the bottom of a valley where colluvial soils are deeply deposited. Land and soil conservation is the most essential need in this soil area.

Both the Vertic Trophaquepts and Udorthentic Pellusterts are from the volcanic tuff and/or tuffaceous rocks and are formed of very fine textured cum sticky soils. These soils lie on the lower terraces and have mostly been reclaimed for agricultural production. These soils generally have low inherent fertility but could be expected to be used for productive paddy cultivation if modern farming technology is applied.

3.1.5 Hydrology

There are numerous small drainage channels in the study area. All of these channels are characterized by small catchment areas, steep and short river courses. The general features and basic flow of major drainage channels are as summarized below.

General Features of the Rivers

Rivers	Catchment Area (ha)	Head Water Elevation (m)	Discharge Flow	
			Dry S. (lit/sec)	Rainy S. (lit/sec)
Sipsipin	330	743	354	<1
Butsinge	60	60	-	-
Mapakla	340	480	138	5.1
Tangge	60	339	-	-
Manggahan	110	240	-	-
Bayugo	90	230	6	-
Palay-Palay	380	312	33	0.0
Lumang Nayon	60	320	-	-
Lubo	110	339	-	3.7
Ik-Ik	115	339	10	0.0
Ilog Munti	70	380	-	-
Tourunina	345	743	165	10.0

Note: <1: measured 1 to 3 days after typhoon on October 11, 1989

Run-off durations of flood flows for all the drainage channels are very short. In fact, discharges in channels are sharply reduced within a few hours after the rain. Only 4 drainage channels have perennial flows. These discharge flows are from springs, and thus, the discharges depend on the extent and geological constitution of the catchment area of the

drainage channels. Generally, these discharges are reduced to as little as 3 to 5 lit./sec during the dry season.

3.2 Economic, Social and Administrative Setting

3.2.1 Population

The population in the study area was 18,750 in 1989 (see Table 3.2.1). The annual population growth during the latest decade has been 2.5% on the average. The population density is estimated to be about 380 persons per square-kilometer. The population by sex is 9,640 male and 9,110 female. The labour force which has been estimated by the ages of between 15 and 65 years old is about 11,440 persons (or 60% of the total population) as shown in Table 3.2.1. The family size is estimated at about 6 persons per household on average.

There are about 3,156 households of which the farm households are estimated to be about 2,270 (or about 72%). Out of the total farm households, the beneficiaries of agrarian reform are about 1,670 (or 73.5% of the total farm households). The remaining farm households are landless farmers. The households other than agriculture are respectively 790 for fishery (25%), of which only 178 families are recognized to be owners of fishpens and/or fishcages for aquaculture, and the remainder are mostly the employees of the owner fish cultivators. The households for other businesses are 10 for transportation services and 56 for public services.

3.2.2 Administration

The study area is administered by Jala-Jala municipality in Rizal province.

Jala-Jala municipality is administered by a mayor who is elected by the local people. He exercises control over 11 barangays headed by a corresponding number of elected barangay captains. The mayor of the municipality is assisted by 9 councilors (who are also elected by the local people) in the legislation of local ordinances and chairing various program committees organized for running the affairs of local government (Fig. 3.2.1).

There are different political parties in the municipality as these are allowed by the incumbent administration nationwide. These include the Kilusang Bagong Lipunan, Nationality Party, Liberal Party and others.

Some of the national government agencies attached to the municipal government include the offices of the Departments of Agriculture, Agrarian Reform, Local Government, Health, Trade and Industry and Social Welfare and Development. The staff assigned from these departments for the undertaking of services in this area are so far limited in number. Accordingly, services of these offices are not always functioning well.

Financing for local affairs of the municipality comes from various sources but a substantial part of it comes from the national government and various local tax collections. Public works implemented in the municipality are funded by both the provincial and national government with the approval of municipal resolutions. Funding is often scarce or limited.

Farmers' organizations and cooperative societies have little participation in public works or services of the local government.

3.2.3 Economic Sectoral Overview

The economy of study area is predominantly dependent on agricultural production. Other economic activities are small scale off-farm businesses, such as garment sewing, weaving, ceramics, etc., and transportation services.

The present gross value of the regional production of the study area is estimated to be about ₱ 66,980,700/annum. Of this value, 48.3% comes the agricultural production, 17% from service, 27.4% from off-farm business and 7.2% from other production activities. Agricultural production includes crops, livestock and fishery in lake Laguna. The agricultural production contributes about ₱31,373,400 to the total gross value of regional production. Crop production is the greatest concentration of economic activities followed by livestock and fisheries, whose contributions are respectively 62%, 27% and 11% of the total value of agricultural production. The other sectors of the economy are small scale off-farm businesses and services contributing about ₱18.4 million and ₱11.4 million, respectively. Other than the above, off-farm work especially from the labour work for the National Power Corporation, Philippines Petroleum Corporation, Metro-Manila area, etc. contribute some P5 million to the rural economy.

Gross Regional Domestic Product (1,000P)

Agricultural Production	31,373
- Crop Production	19,451
- Livestock	8,470
- Fishery	3,451
Off-Farm business	18,400
Services	11,400
Others	5,807
Total	66,980

Annual income of a farm household in the study area is projected in Table 3.2.2 and Fig 3.2.2 based on the farm economic survey results. The income per household varies widely from ₱10,000 to 100,000/household. Mean income level per farm household by farm size is about ₱12,000 in the case of the smallest farm and ₱41,700 in case of the largest farm. The average mean income is estimated to be about ₱ 28,000/household.

Generally speaking, the standard of living in the study area is relatively low if expressed in terms of family expenditure at about ₱ 18,770/annum for a family of 6 members. The average family expenditure for food items is about 44.5%. The expenditure for rice consumption alone is about 65% of the total cost for food consumption (see Table 3.2.3). Other significant cost items include education (12%), clothing (8%), medical care (7.4%) and beverages and tobacco (7%). Expenditures on all other items is small to negligible. According to assessment of livelihood standards by means of the Engel Factor, the livelihood of most of the farm families requires improvement through reinforcement of financial support and but also in nutrition in the meal services.

3.2.4 Rural Institutions and Social Aspects

In the study area, Jala-Jala municipality, as well as the 11 barangays, is administrated under the political guidance and supervision of the Department of Local Government and other coordinating Departments. Although each function is still low at minimal level, the following institutional structures have been established and are providing supporting services to the local people.

- Barangay Agrarian Reform Committee (BARC)

- Jala-Jala Municipality Development Committee (MDC)
- Anak Bukid Club (formerly the 4H Club)
- Rural Improvement Club (RIC)
- Agricultural Extension Services
- Educational Schooling
- Health Control Services
- Promotion of Farmers Cooperative and Association
- General Information Center

In addition to the above, Meralco Foundation Inc.(MFI) has been established in the Bayugo area, the Agricultural and Aquacultural Development Center (AADC) including the function of agricultural extension, extension for home economy/management, demonstration farm and operation and management of fish nursery pond. Although both facilities and technical staff still remain short in relation to the rural requirements, the extension services are gradually progressing effectively. The organization chart of AADC is shown in Fig. 3.2.3.

According to the school heads in the study area, the current status of education is still behind the national standard. About 80 % of the total adult population has been attended or completed schooling at elementary level, while 40% has attended to the middle school. Only 10% or less of the total population has graduated at a vocational level of schooling. At present, there are about 3,285 elementary pupils enrolled from the grades 1 to 6, and 909 for in middle school. For high school and/or more advanced schooling, a little less than 100 students are enrolled in Tanay, Manila, etc.

About 80% of the population in the study area are the Roman Catholics and the remaining belongs to other denominations or religions. The Parish Council of Jala-Jala is now undertaking community development effectively in the area.

3.2.5 Implementation of the Comprehensive Agrarian Reform Program (CARP)

The DAR Provincial office is based at Teresa, Rizal. It has four functional offices, namely, administrative and finance, operations, legal and planning and extends its services to agrarian reform beneficiaries through the municipal agrarian reform offices (MARO) for every municipality. MARO Jala-Jala has six staff, one municipal agrarian reform officer, three agrarian reform technologists, one statistician and one clerk. The main tasks of agrarian

reform in the study area is the improvement of tenure of agrarian reform beneficiaries. This covers activities such as surveys of present land occupants and the area occupied, documentation processing, and titling of lands (emancipation patents) being redistributed to beneficiaries.

As of April, 1990, the agrarian reform has been performed and achieved land distribution of about 1650 ha, and has registered 1,670 new farmers. This corresponds to about 90 % achievement of the program.

Agrarian Reform Program and Its Achievement

Description	Land Registration Units	Land Allocation	Farmer Beneficiaries
	(lot)	(ha)	(household)
Plan	3,600	1,800	1,922
Achievement	3,460	1,650	1,672

The remaining 140 lots or 150 ha land are still under negotiation between the agrarian reform office and land owners. As for the mountainous area, the agrarian office with other coordinating agencies is now undertaking land survey work for future land allocation and distribution.

3.3 Present Agricultural Setting

3.3.1 Land Use

Agricultural land covers 1,440 ha or 30% of the study area. The other land is grass land (cogonal area) 1,360ha or 28% , bush/shrub 1,520 ha or 31%, forest 280 ha or 6% and buildings or residence 330 ha or 7% (Table 3.3.1 and Fig. 3.3.1).

Present Land Use (ha)

Land Categories	Steeply Sloped Mountains	Lower Terraces	Alluvial Fans	Total
Agricultural Land:	310	450	680	1,440
- Irrigated Paddy Field	0	0	450	450
- Rainfed Paddy Field	0	270	50	320
- Upland Field	10	50	100	160
- Orchard Garden	170	130	50	350
- Coconut Plantation	70	0	30	100
- Others	60	0	0	60
Non-Agricultural Land	2,360	740	60	3,160
- Forest	200	80	0	280
- Bush/Shrub	1,150	340	30	1,520
- Grass land	1,010	320	30	1,360
Residence Yard/Others	10	150	170	330
Total	2,680	1,340	910	4,930

Paddy fields occupying 770 ha or 53% of total agricultural land have been developed on low lying land (500 ha) and some on gently sloped terrace (270 ha). About 450 ha of these paddy fields are irrigated by communal irrigation systems. However, rainy season cropping is practiced only on 350 ha of this area since rainfall and river water discharges fluctuate to a certain extent. Due to quite limited available water, dry season cropping is limited to only 50 ha of paddy and 20 ha of vegetables and some corn production. About 160 ha of upland fields are used for traditional crops such as corn, root crops, vegetables, etc. The remaining 510 ha are used for plantations such as mango, citrus, banana (350 ha) and industrial crops such as coconuts (100 ha), coffee, cacao, etc (60 ha).

3.3.2 Land Ownership and Tenure Systems

Before implementation of the agrarian reform, the study area including the mountainous area as a whole belonged to nine land owners. The majority of the farm land had been reclaimed as paddy fields for rice plantation by those land owners. The farmers who are the beneficiaries of the current agrarian reform were peasants employed on those rice plantations.

DAR as of the end of April, 1990 has already distributed 3,460 emancipation patents to 1,670 farmer beneficiaries covering 1,650 ha of which the farm land shares 920 ha, housing yards 250 ha and non-cultivated land 480 ha.