

D. Storage for rice husk, rice bran and husks' ash : 222 m²

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|--|--|----------------------|--------------------------|
| (1) Rice husk storage
(100 m ²) | a. daily used for furnace | 4.8 t/day | consumption ; 0.2 ton/hr |
| | b. storage amount/ floor area | 0.1 t/m ³ | specific gravity |
| | c. average stacking height | 3.0 m | |
| | d. working space | 27.6 m ² | max.storing capacity |
| | (a x 5 days / b / c) + d = 10m x 10m = 100 m ²
for 5days of 24 hrs/day | | |
| (2) Rice bran storage
(51 m ²) | a. production of milled rice | 1.2 t/day | paddy 15tons x 0.08 |
| | b. storage amount/ floor area | 0.3 t/m ³ | specific gravity |
| | c. average stacking height | 1.0 m | |
| | d. working and bagging space | 31 m ² | max.storing capacity |
| | (a x 5 days / b / c) + d = 8.5m x 6m = 51 m ² for 5days | | |
| (3) Dust storage (39 m ²) | 6.5m x 6.0m = 39 m ² | | |
| (4) Husks' ash storage | 4.0m x 8.0m = 32 m ² | | |

E. Administrative and control office : 198 m²

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|--------------------------|------------------------|--|
| (1) Administrative room | (38.0 m ²) | 6 persons, 5 -7 m ² per parson |
| (2) Accountant room | (18.0 m ²) | 3 persons, 5 -7 m ² per parson, lobby 8 m ² |
| (3) Technical staff room | (16.0 m ²) | 2 persons, 8 m ² per parson |
| (4) Project manager room | (18.4 m ²) | 2 persons with secretary, 15 m ² per parson |
| (5) Meeting room | (46.0 m ²) | 18 persons, 2.5 m ² per parsons |
| (6) Others | (61.6m ²) | Kitchen (4.8 m ²), Toilet (3 for male, 2 for female, 15m ²) hallway and others |

F. Others building

- | | | |
|----------------------------------|---|-----------------------|
| (1) Garage (160 m ²) | 9 m x 3m = 27m ² per vehicle | for 2 trucks, 2 jeeps |
| (2) Toilet (15 m ²) | 5 m x 3m = 15 m ² | |
| (3) Water supply ayatem | | |

(3) Site planning

The proposed site is located along the trunk road in Llano, and approximately 5.5 km away from the Jala-Jala municipal office. The facilities will cover about 7,800 m² in total on land which is at present almost flat and grass land, and the site has sufficient area for the proposed facilities. The access to the site will be improved with concrete pavement under the Project. The site is situated almost at the center of the Project area. Therefore, such location is sufficient for the proposed rice mill facilities.

(4) Layout planning

The rice mill facilities consist of facilities required for receiving, drying, storing, milling of paddy, and storing and shipping of milled rice. The layout planning of facilities is made on the following base:

- 1) Each building shall be properly located in the premises as defined by the movement of grain through receiving, drying storing, milling and shipping.

- 2) The axis of each building shall be aligned parallel to the front road so as to utilize the entire area efficiently, making for less dead space.
- 3) The buildings for related facilities shall be constructed separately considering the differences of the characteristics of the various machinery to be installed, e.g. the degree of occurrence of noise and dust. Floor planning and building height shall be arranged in due consideration of the functions of the various buildings.

(5) Architectural planning

1) Drying, paddy warehouse building, and custom mill building

The required facilities of this building will be receiving and classifying equipment, mechanical paddy dryer with husk furnace and paddy warehouse. In arranging these equipment, proper location, space saving and flat arrangement should be given priority taking into account the working flow from loading and unloading to receiving and classifying, sun-drying to storing, etc. For the husk furnace the husk is conveyed from the adjoining husk storage by pipping system. Husk ash is stored outside ash storage. The paddy warehouse is arranged with some gateways for the receiving facility, the sun-drying floor, mechanical dryer room, and others.

A platform in receiving facility will be 90 cm in height above the ground floor to coordinate with the deck of trucks. The height of the floor will be 30 cm above the ground level to keep the paddy dry and clean, and to protect them from rodent damage, etc. The gateway shall be constructed with a slopping approach for hand carts. The height of the building depends upon the machinery to be installed. The design of the building shall be simple as possible and the arrangement of the windows as regularly as possible without any special architectural treatment.

The building of the custom milling facilities and its rice husk and bran will be constructed with the drying, paddy warehouse building. The height of building will be 5 m for the one-pass rice mill.

2) Rice milling and rice warehouse building

The required facilities of this building will be rice mill facilities, a operation control room, a testing room, a spare parts storage and a rice warehouse. In arranging these facilities, proper location, space saving and flat arrangement shall be taken into account the working flow at milling, conveying rice husk and bran, collecting dust, operation and maintenance of machinery, and storing of milled rice, etc. The operation control room, test room, and storage will be separately provided to prevent noise and dust produced by the machinery. Storage for the rice husk, bran and dust will be constructed to convey through the pipping systems outside the building.

The height of the floor will be 30 cm to keep the rice dry and clean, and to protect them from rodent damages, etc. The gateway will be constructed with a slopping approach for hand carts. The height of the building depends upon the machinery to be installed. The design of the building shall be simple as possible and the arrangement of the windows as regularly as possible without any special architectural treatment.

3) Sun drying floor

The floor will be constructed with concrete pavement to maintain a clean surface, good drainage and efficient drying along the road or near the paddy warehouse. The floor will be sloped toward the edges from the center for smooth drainage.

4) Office building

An accountant room will face the road with a separate entrance for farmers cash services and a reception window for the payment of paddy fee and custom milling charges, etc. The secretary's room will be in the manager's room following local customs. Each room will be arranged facing outside so as to enable it to take natural light and natural ventilation. With stressing its functional aspect, no special treatment on adornment will be given and the windows openings will be regularly arranged. The building will have rather deep eaves to avoid strong sunlight from coming into the rooms and to give the building a more or less clear-cut look.

5) Other buildings

Other buildings consist of an outside toilet, a water supply facility, and a garage. The outside toilet will be divided for male and female and will be used by the workers and visitors, and constructed near sun-drying floor and/or the custom mill building. The water supply system will consist of a deep well with pump, elevated water tank, and pipe system. The garage will be provided with a shelter for two (2) trucks and two (2) vehicles and/or cars.

(6) Structural design

Steel structures will be adopted for the raised buildings with long spans such as the building of drying facility, paddy warehouse, custom mill, and the building of rice mill and rice warehouse, because of their strength, light weight, easy construction, and low cost. Reinforced concrete will be used for the foundations, floor slab, and wainscot of these building. For the office building, storage, and toilet, reinforced concrete block structure will be used. For foundations and columns, reinforced concrete will be used. For walls, concrete blocks will be used.

Technical guidelines prevailing in the Philippines will be applied to loads for structural design. Structural calculations will be based on Japanese standards.

The load bearing capacity of the ground will be taken as 10 t/cm^2 for the mixed sandy loam soil in the site.

(7) Finishing scheme

On selecting finishing materials of the proposed building, the following items are considered:

- minimize kinds of furnishing materials
- select durable materials, corrosion resistant or waterproof materials as required
- select materials which are easy to maintain, such as washable materials
- select materials for the office and storage based on Philippines standard

(8) Supporting facilities for the proposed building

The grade of supporting facilities shall be comparable with those existing buildings and appropriate to the equipment to be installed as well as activities in the building. The following criteria are considered:

- economical, energy saving
- ensure easy operation and safety
- easy maintenance

1) Power supply system

- a. Power characteristics : 3-phase, 380 V and single phase 220 V, 60 Hz
- b. Power supply : 34.5 kV from distribution line
- c. Power sources : by MERALCO
- d. Distribution line in the site : Overhead lin system
- e. Power facilities
 - Motor power supply : To drying, rice mill facilities
 - Indoor lighting : Fluorescent or incandescent lamp as required
 - Plug socket : as required
 - Outdoor lighting : Fluorescent

The lighting for drying and milling buildings and warehouse will be required to the minimum.

2) Water supply system

- a. Water supply in the site : by new deep well in the site
- b. Water supply system : Gravity supply with an elevated water tank
- c. Water treatment : None
- d. Waste drainage : Waste water to be treated in a deposit tank and disposed to the soakaway
- e. Rain water drainage : conducted into the soakaway along the building

3) Cooking system

Electric cooking system will be provided in the office.

4) Air-condition and ventilation system

Some plug sockets for air-conditioner in the office, the operation control room and testing room building will be provided. The ventilation system in the drying and rice milling building, as well as warehouse will be roof type ventilation without motor, but the cyclone type dust collecting machine will be equipped in the drying and milling building.

4.5 Power Supply System

The power supply system will be constructed by the Government of the Philippines, as mentioned in the previous section. The construction works will be executed by MERALCO, which is a corporate entity that provides electrical power supply facilities in the Project area and is implementing the rural electrification program with funding being sourced from Overseas Economic Cooperation Fund of Japan. The detailed schedule of the construction of the power supply facilities will be determined after the Exchange of Notes of the Project has been prepared between the Government of the Philippines and the Government of Japan, as mentioned in the Memorandum of Agreement made and entered between DAR and MERALCO dated November 14, 1991. The time span required for implementation of the power supply facilities is estimated to be one (1) month for the detailed design and 4-6 months for construction. The general features of the power supply facilities to be constructed for the Project are as shown below.

- 1) 34.5 kV distribution line (3 phases) which is tapped from MALAYA substation and be extended for about 13 km
- 2) 220 V distribution line (3 phases) for rural water supply facilities
- 3) Pole-mounted type transformers for irrigation pumps, rural water supply pumps and ricemill center with capacities of 34.5 kV/440-220 V

The power demands of the Project facilities thus estimated are as shown below.

Description	Motor output			Voltage (V)	Phase
	(kW/set)	(set)	(kW)		
1) Irrigation pump					
i) Sipsipin					
High head pump	75	2	150	440	3
Low head pump	37	2	74	440	3
Other	-	-	2	220	single
ii) Llano					
Pump	30	2	60	440	3
Other	-	-	1	220	single
iii) Palay-Palay					
High head pump	30	2	60	440	3
Low head pump	55	2	110	440	3
Other	-	-	1	220	single
iv) Pagkalinawan					
Pump	30	2	60	440	3
Other	-	-	1	220	single
(2) Ricemill center	-	-	220	440	3
(3) Rural water supply system					
i) Punta	5.5	1	5.5	220	3
ii) Bagumbong	5.5	1	5.5	220	3
Total			750		

4.6 Implementation Plan

The Project is implemented under the implementation system and the scope of the work discussed in the preceding chapter, and the implementation plan is outlined hereinafter.

4.6.1 Construction Condition

The executing body of the Project is DAR as described in Chapter 3. The Project works covered under a Japan's grant aid are executed by the Japanese contractor selected through the competitive bidding, and the construction supervision is rendered by the Japanese consultant engaged in the basic design study. The construction is carried out under the cooperation of such Government agencies as DPWH, DA, NIA, etc.

The construction materials necessary for construction are procured in the Philippines, except PVC pipes for discharge pipes of irrigation pumps and some building materials. Almost all of the required construction equipment is procured in the the Philippines since specific equipment is not required for the construction. However, the rice mill plant excluding drying equipment, and irrigation pumps, are imported from Japan, because those in the the Philippines market do not meet the technical specification required for the Project.

The climate of the Project area is divided into a dry season and rainy season. In the rainy season, August to October, the main construction work is concentrated on structural works, and earth work is limited to some extent. The workable period is limited to 180 days which was estimated considering annual rainfall pattern, soils at work sites and national holidays. Aggregates for concrete and materials for the base course of roads are procured through aggregate suppliers who exist near the Project area.

Of the project components, the irrigation and drainage systems, rural water supply systems and rice mill center are scattered in the Project area, and therefore able to be separately constructed irrespectively to the construction sequence of the respective facilities. Whereas, since the trunk road and village roads are used at present, the improvement of the roads, particularly the trunk road, has to be carried out without

disturbance to the current traffic. The access road for the transport of the concrete and base course materials necessary for pavement is limited to the trunk road.

The construction of the Project facilities is divided into 2 Stages, taking into account the scale of the Project, quantity of the whole Project work, construction sequence of the respective roads, climatic condition of the Project area, construction period required, and allowable term to be mentioned in E/N under the Japanese grant aid system.

The construction works under each Stage are clarified as follows:

Stage-I

1) Irrigation and Drainage Facility

Sipsipin Communal Irrigation System	
Irrigation area	: 170 ha
Pump station and discharge pipeline	: 1set
Irrigation canal	: 9.93 km long, 218 structures
Drainage canal	: 5.25 km 11 structures.
Pumping equipment	: 4 units
Llano Communal Irrigation System	
Irrigation area	: 65 ha
Pump station and discharge pipeline	: 1set
Irrigation canal	: 0.94 km long, 72 structures
Drainage canal	: 18 km, 3 structures.
Pumping equipment	: 2 units

2) Improvement to Roads

Trunk Road	
Improvement of existing road section from Jala-Jala town to Llano village	: 6.5 km
Related structure	: 30 nos
Feeder Roads	
Sipsipin village road	: 2.19 km long, 0 structures.
Jala-Jala village road	: 1.30 km long, 2 structures.
Bayugo village road	: 1.40 km long, 6 structures.

3) Village Water Supply Facility

Sipsipin village	: 5 systems
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4) Rice Mill Center

:	Center yard of 8,500 m ²
:	Milling capacity of 2.5 ton/hr

Stage-II

5) Irrigation and Drainage Facility

Palay-Palay Communal Irrigation System		140 ha
Irrigation area	:	1set
Pump station and discharge pipeline	:	9.56 km long, 170 structures
Irrigation canal	:	1.18 km, 2 structures
Drainage canal	:	4 units
Pumping equipment	:	
Pagkalinawan Communal Irrigation System		55 ha
Irrigation area	:	1set
Pump station and discharge pipeline	:	3.94 km long, 72 structures
Irrigation canal	:	2.83 km, 7 structures
Drainage canal	:	2 units
Pumping equipment	:	

6) Improvement to Roads

Trunk road		
Construction of road sections from		
Punta village to Bagumbong village	:	11.6 km
Related structure	:	57 structures.
Feeder roads		
Punta village road	:	0.36 km long, 3 structures.
Palay-Palay village road	:	3.60 km long, 7 structures.
Pagkalinawan village road	:	1.02 km long, 6 structures
Lubo village road	:	1.00 km long, 2 structures
Bagumbong village road	:	3.10 km long, 6 structures

7) Village Water Supply System

Level-I		
Palay-Palay village	:	3 systems
Punta village	:	1 system
Pagkalinawan village	:	3 systems
Lubo village	:	1 system
Bagumbong village	:	3 systems
Level-II		
Punta village	:	1 system
Bagumbong village	:	1 system

The above phasing is based on the study results summarized below.

- 1) The irrigation and drainage systems, roads, water supply systems and rice mill center to be constructed at each Stage can be put into use with completion of that Stage.
- 2) The major irrigation canals of both Sipsipin communal irrigation system and Llano communal irrigation system have been constructed by NIA. Therefore, the Project benefit can promptly be expected with completion of

the pump stations and the remaining irrigation and drainage facilities in those areas under Stage-I.

- 3) The pavement to the trunk road can be completed in a short period since the sub-base course has been constructed up to Llano area by DPWH. Therefore, early return for the road rehabilitation can be expected by improving the trunk road up to Llano area and the related feeder roads under Stage-I.
- 4) Early completion of the rice mill center in Stage-1 and subsequent commencement of training of the farmers' association on operation and maintenance of the rice mill will enable it to be handed over to the farmers' association immediately after completion of the whole Project works.
- 5) The office of the rice mill center constructed under Stage-I is used as the construction office of the Project during the remaining construction period of the Project. During the period from the on-set of the implementation of the Project to the completion of the construction office, a temporary office will be used.
- 6) The irrigation and drainage systems, roads and water supply systems in the area from Punta village to Bagumbong village are constructed under Stage-II, taking into account the works quantity of the Project and the priority of the works, though early construction of all the Project facilities will be desirable.

4.6.2 Implementation Method

The key points on construction of each component involved in the Project are as follows:

- 1) Because the work sites of irrigation and drainage facilities are located in existing paddy fields and/or upland crop fields, the construction may affect the farming works and the irrigation. Therefore, the construction time schedule shall be based on the condition that the construction will not disturb both the present farming practices and the irrigation water supply in the concerned areas.

- 2) A 8 km long section of the trunk road will be used as the main road of the proposed Project area during the dry season, therefore the construction works for the road shall be carried out by employing such construction method that will not disturb the traffic on the said section.
- 3) The tubewells for rural water supply facilities shall be constructed with due attention to their optimum designs for pumping water with respect of the position and thickness of aquifer layers to be confirmed while being drilled, since the hydro-geology of the Project area varies from village to village.
- 4) The rice mill center consists of buildings and rice mill plant, and therefore the progress control on construction of the buildings shall strictly be carried out so that the plant and equipment can be installed as scheduled.
- 5) The technical specifications on the supplying and receiving sides of the power distribution line shall be well matched through sufficient discussions between the Detailed Design Team, DAR and MERALCO by which the power distribution line will be constructed. In addition, the construction schedule of the pump station, the rice mill center, and the power distribution line shall be well coordinated so that the electricity can be used for the operation of the pump station and the rice mill center immediately after completion of these facilities.

4.6.3 Construction and Supervisory Plan

(1) Detailed design and tender works

Prior to the implementation of the Project the topo-survey, investigation, detailed design and tender works have to be carried out. Immediately after conclusion of E/N, the consulting services agreement will be contracted with DAR, and the consultants will start the detailed design after discussions with DAR. In the field investigation at the detailed design stage, discussions will be held with DAR and MERALCO on the design and the implementation schedule of the transmission and distribution lines so that both electricity lines will be constructed by MERALCO before the completion of the Project facilities. DAR is requested to acquire the land required for the construction of the Project facilities, arrange the temporary construction office and other necessities prior to the commencement of the Project works.

The works involved in the detailed design are as follows:

1) Topo-Survey

Additional profile survey on the center lines of the irrigation canals, roads and pipelines for water supply aligned in the basic design study.

2) Detailed Design

(a) Review of the basic design through the topo-survey.

(b) Review of the Project costs through the detailed design.

3) Preparation of Tender Documents

(a) Preparation of the tender drawings for the civil works.

(b) Preparation of the tender documents for the civil works and the supply of the equipment and materials to be granted.

The tender for selection of the civil works contractor takes place after approval of DAR to tendering process. The first step is the pre-qualification tender of which the notice is published, on behalf of DAR to the major daily newspapers on construction business and economy in Japan.

The pre-qualification documents are distributed by the consultants to the tenderers who will offer the consultants their interest in the tender. The tender documents are distributed by the consultant to the pre-qualified tenderers.

The quoted tenders are received by the consultants and opened in the presence of the representatives of DAR. Immediately after the opening, the tender evaluation is carried out by the consultant in collaboration with the representatives of DAR, and in line with the evaluation result the draft contract is prepared by the consultants.

(2) Construction supervision

After conclusion of the civil works contract, the consultants clarifies the construction methods and the construction time schedule of the civil works in discussions with the Contractor. With the commencement of construction, the consultant's resident engineer supervises the construction, and regularly reports the progress of the construction works, the problems encountered and counter-measures if

any to both JICA Philippines Office and DAR. He also coordinates among the agencies concerned to the Project, including the contractor, to smoothly implement the Project.

Since the Project comprises many kinds of the work components, the consultant's construction engineer, in addition to the resident engineer, is assigned to render the construction supervision for the irrigation and drainage facilities, improvements of the roads and rural water supply facilities throughout the construction period. In addition, a building engineer, pump equipment engineer and rice mill engineer are dispatched for short terms to supervise the construction of the building, installation of pumps and the related equipment, and installation of rice mill plant according to the progress of the respective construction. With this arrangement, the construction supervision will assure on-schedule completion of the Project works at the scheduled progress rates and the required work qualities.

The scope of the construction supervision is outlined below:

- 1) Assistance and advice in civil works contract
Pre-qualification evaluation to the tenderers, tender evaluation, support for contract award and witness on contract sign.
- 2) Evaluation and approval of construction drawings
Evaluation and approval of construction drawings, application for commencement of works, sample of materials, specification of equipment etc. submitted by the contractor.
- 3) Progress and quality control of construction
Guidance and check on construction plan and time schedule, progress and quality control of construction, necessary inspections of construction methods.
- 4) Approval of payments to the contractor
Check and evaluation on performance of works necessary for issue of payment certificates and completion certificate to the contractor.

5) Report on progress of construction

Regular reporting and discussing to and with DAR and concerned agencies of Government of Japan on progress of construction for purposes of smooth construction.

6) Handing-over of completed facilities

Attendance at handing-over the completed facilities to the Government after confirming the completion of the works and the fulfillment of the contract.

4.6.4 Procurement Plan

Of the equipment and materials necessary for the civil works construction, those available in the the Philippines are, in principle, procured from the local markets. However, the equipment and materials, for which procurement is not so easy because of different specifications, limited quantity in the market, difficulty of timely procurement, etc. are imported from Japan. The major equipment and materials to be imported from Japan are rice mill plant excluding dryer, water pumps for irrigation, submersible pumps for rural water supply, and casing pipes for deep tubewell. The common materials for the building construction and civil works such as reinforcement bars, cement, formed steels, and PVC pipes for water supply can be purchased in the local market, since the building construction and civil works have recently been rushed in Manila.

The equipment and materials imported from Japan are unloaded at Manila sea port, and transported by trucks to the Jala-Jala area. The transportation by trucks is easy since the road from Manila to Jala-Jala has been paved except some sections. The period necessary for the transportation of the equipment and materials from Japan to the Site is estimated at one (1) month, including marine transport, custom clearance at Manila sea port and inland transport in the Philippines.

4.6.5 Implementation Plan

The works to be provided by Japan grant aid for the Project, of which the details are explained in the preceding Chapter, are summarized as follows:

- 1) Construction of irrigation and drainage facilities for establishment of 4 communal irrigation systems commanding 430 ha of farm lands in total,
- 2) Improvement to existing roads including a 18.1 km long trunk road and 21 feeder roads in a total length of 14.0 km,
- 3) Construction of rural water supply facilities for establishment of 16 systems of Level-I in 6 villages and 2 systems of Level-II in 2 villages, and
- 4) Construction of a rice mill center with a milling capacity of 2.5 ton per hour.

On the other hand, the works to be borne by the Philippine side are summarized below:

- 1) Supply of data, drawings, reports, documents, etc. necessary for the detailed design,
- 2) Land acquisition required for the construction of irrigation and drainage facilities, roads, rural water supply facilities and rice mill center,
- 3) Land compensation required for the construction of site office, temporary stores, materials stock yards, borrow areas, disposal areas, etc.,
- 4) Installation of power distribution lines connecting with pump station, rice mill center and rural water supply systems of Level-II,
- 5) Construction of fences and gates around the yard of the rice mill center,
- 6) Banking arrangements for payment, issue of Authorization to Pay and share of all the expenses on such arrangements,
- 7) Assurance of prompt unloading and customs clearance at ports of disembarkation in the the Philippines and internal transportation therein of the equipment, materials, vehicles, tools and spare parts necessary for the construction of the Project works,

- 8) Permission of Japanese nationals whose services maybe required in connection with the supply of the products and services under the verified contracts such facilities as may be necessary for their entry into the the Philippines and stay therein for the performance of their work,
- 9) Exemption of Japanese nationals from custom duties, internal taxes and fiscal levies which may be imposed in the Philippines with respect to the supply of the products and services under the verified contracts,
- 10) Assurance on operation and maintenance of the facilities, plant and equipment constructed or installed under the Grant and on proper and effective use of them for the Project, and
- 11) Share of all the expenses, other than those covered by the Grant, necessary for the Project.

The implementation of the Project is divided into two (2) Stages. In Stage-I, immediately after conclusion of E/N, the consulting services agreement is contracted with the Government and the detailed design is performed by the consultants in 4.5 months, which is followed by the pre-qualification, tender, tender evaluation, signing of the civil works contract, etc. In the contract the construction period is set to be 12 months.

In Stage-II, after conclusion of E/N, the detailed design for 3 months and the tendering for selection of the civil works contractor are carried out, and the construction period is set to be 12 months.

The implementation schedule of the Project is shown in Figure 8.

CHAPTER 5
PROJECT EVALUATION AND CONCLUSION

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5.1 Project Evaluation

Both direct benefits and indirect benefits are expected by the implementation of the Project. The direct benefits consist of upliftment of farmers' income by increasing the agricultural production, contribution for self-reliance of the farmers born by agrarian reform, stabilized balance of the supply and demand of staple food in the Project area, improvement to the living condition in the rural area, and activation of the farmers' activity for their association. On the other hand, the indirect benefit expected are the activation of the socio-economic activity of the rural inhabitants, and enlargement of the employment opportunity to the rural inhabitants.

The project benefit itemized above are detailed below:

(1) Significance of the project in the CARP implementation

With improvement of the agricultural infrastructure, the Project will increase agricultural production, uplift farmers' income, and thus it will contribute to the early bringing-up of financially self-reliant farmers. In view of the effects of the Project envisaged, the Government has designated the integrated Jala-Jala rural development Project as a model project of the CARP, and put emphasis on the early realization of the Project. Thus the implementation of the Project exactly meets the intent and scope of the said national plan and contributes largely to the promotion of the CARP implementation.

(2) Increase in paddy production

The annual rice production in four irrigation areas of the Project is about 1,480 ton at the present time. With the Project implementation, it will increase to 4,200 to or 2.8 times of the present. The unit yield per ha will also increase to 10 ton/ha (5 ton/ha in both dry and rainy season cropping) or 3 times the present yield of 3.5 ton/ha.

(3) Early bringing up of self-reliant farmers

Under the Project, the gross income of the paddy farm household is expected to increase from Peso 29,100/ha to Peso 62,300/ha. The capacity to pay is also expected to increase significantly from Peso 8,200/ha to Peso 33,900/ha. This will contribute much to the improvement of farm budget, and to the development of the financial self-reliant farmers. Thus it will much contribute to demonstration and extension to the other CARP implementing schemes as a model project.

(4) Enhancement of socio-economic activities

Through the improvement of the road network, the farm-to-market road network will be established. Construction of the rural water supply facilities will ensure a safe and stable water supply. Improvement of the above rural infrastructures will contribute much to the enhancement of socio-economic activities in the rural area, and to the improvement of sanitary condition of the villages.

(5) Activation of farmers' associations

The constructed irrigation and drainage facilities, rural water supply facilities and rice mill center will be transferred to the associations to be organized by the beneficiaries. They will own, operate and maintain the constructed facilities. The actual participation of the beneficiaries to the Project implementation will contribute to activation of the farmers association and to the sustainable socio-economic development of the rural area.

(6) Enhancement of employment opportunities in rural area

Double cropping of paddy a year generates employment opportunities especially in the dry season. Besides, the rice mill center requires continuous employment of 7,500 laborers per year and seasonal labor of 2,200 persons per year at the full operational stage. Thus, the implementation of the Project will increase employment opportunities in the rural area and provide a favorable effect on the rural economy.

5.2 Conclusion and Recommendation

It is concluded, that the implementation of the Project under Japan's grant aid is justifiable, because the Project will significantly contribute to the economic development in the Jala-Jala area as well as the promotion of the agrarian reform in the Philippines, in addition to the numerous direct and indirect benefits already described. Furthermore, the Philippines' operation and maintenance system for the constructed Project facilities is judged to be reliable because of the sufficient numbers of staff and supporting arrangement to be provided.

To ensure the smooth implementation of the Project and the proper operation and maintenance of the Project facilities, the Government of the Philippine is recommended to

- 1) Secure a lot of land necessary for regular and temporary construction, borrow areas and disposal areas before the start of the construction,
- 2) Complete the construction of the power supply facilities to be executed by the Philippine side with one (1) year after signing of the E/N,
- 3) Arrange a budget necessary for the implementation of the Project and the operation and maintenance (O&M) of the constructed project facilities, and education and training of the O&M staff and the farmers benefited by the Project,
- 4) Provide guidance on regular maintenance and repair of the constructed project facilities and installed plant and equipment after the completion of the Project,
- 5) Subsidize the operation and maintenance cost of the constructed project facilities for the first operation year, and
- 6) Reinforce the agricultural supporting services such as agriculture extension, training of farmers, and supply of farming equipment and materials.

TABLES

Table 1 Monthly Rainfall in Jala-Jala Area

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1969	29.8	12.7	25.0	22.5	87.1	133.5	405.6	166.1	165.2	146.7	153.7	263.9	1,611.8
1970	45.1	31.4	35.4	53.5	132.5	235.2	289.6	158.2	401.5	568.3	637.9	205.9	2,794.5
1971	25.8	39.9	102.0	32.1	261.1	438.1	356.7	192.0	238.1	465.7	381.9	553.8	3,087.2
1972	82.9	15.5	83.3	53.5	169.8	370.4	828.5	310.3	149.6	258.6	221.8	131.6	2,675.8
1973	49.9	19.0	20.3	22.7	105.4	238.6	213.0	159.0	291.5	360.2	398.8	323.8	2,202.2
1974	16.3	36.4	24.7	21.9	146.0	223.1	170.2	478.1	176.4	365.7	430.9	305.0	2,394.7
1975	133.1	21.4	110.3	231.2	80.0	174.4	105.4	279.0	268.5	304.3	212.2	397.3	2,317.1
1976	39.9	21.6	26.6	54.7	596.8	258.8	231.8	289.7	259.8	150.1	226.6	243.4	2,399.8
1977	168.0	35.7	42.1	24.4	105.0	307.2	207.3	262.2	290.2	157.2	218.7	34.9	1,852.9
1978	35.6	20.2	12.8	43.1	126.6	117.6	149.8	558.1	336.7	824.0	173.5	128.6	2,526.6
1979	22.9	23.8	15.8	216.6	259.8	314.9	159.8	322.5	263.5	263.4	235.6	39.0	2,137.6
1980	17.6	0.0	111.5	28.4	116.6	264.6	277.6	245.8	159.3 ((358.0))	405.2	218.5	218.5	2,203.1
1981	31.9	16.2	17.7	38.2	129.8	246.6	395.2	201.1	295.3	343.2	355.8	96.9	2,167.9
1982	13.7	28.3	41.3	36.9	83.1	154.8	515.1	175.9	350.9	133.8	185.8	77.2	1,796.8
1983	66.2	15.7	28.2	12.8	32.3	122.1	253.8	218.2	149.1	337.6	128.4	0.0	1,364.4
1984	21.9	14.0	23.8	74.1	205.7	236.0	88.6	362.7	188.8	682.3	145.0	41.9	2,084.8
1985	22.1	25.6	35.9	71.8	136.5	516.7	241.4	113.5	184.4	403.8	137.9	100.2	1,989.8
1986	23.7	21.8	13.4	16.8	131.1	44.8	257.9	382.4	166.9	381.1	337.2	99.4	1,876.5
1987	28.3	13.8	13.3	13.3	48.5	141.8 ((106.8))	196.3	277.1	105.6	105.6	249.3	128.0	1,322.1
1988	119.2	63.2	13.9	147.5	102.8	334.0	171.6	213.8	171.2	643.5	416.4	20.4	2,417.5
MEAN	49.7	23.8	39.9	60.8	152.8	243.7	271.3	264.2	239.2	362.7	282.6	170.5	2,161.2

Note : Estimated by correlation from the rainfall data observed at Santa Cruz,

Rainfall (Jalajala) = $12.220 + 1.084 \times \text{Rainfall (Santa Cruz)}$, Correlation coefficient = 0.916

Figures of parenthesis: estimated by correlation from the rainfall data observed at IRR1 wet land, Los Banos,

Rainfall (Jala Jala) = $13.820 + 0.794 \times \text{Rainfall (IRR1, Los Banos)}$, Correlation coefficient = 0.856

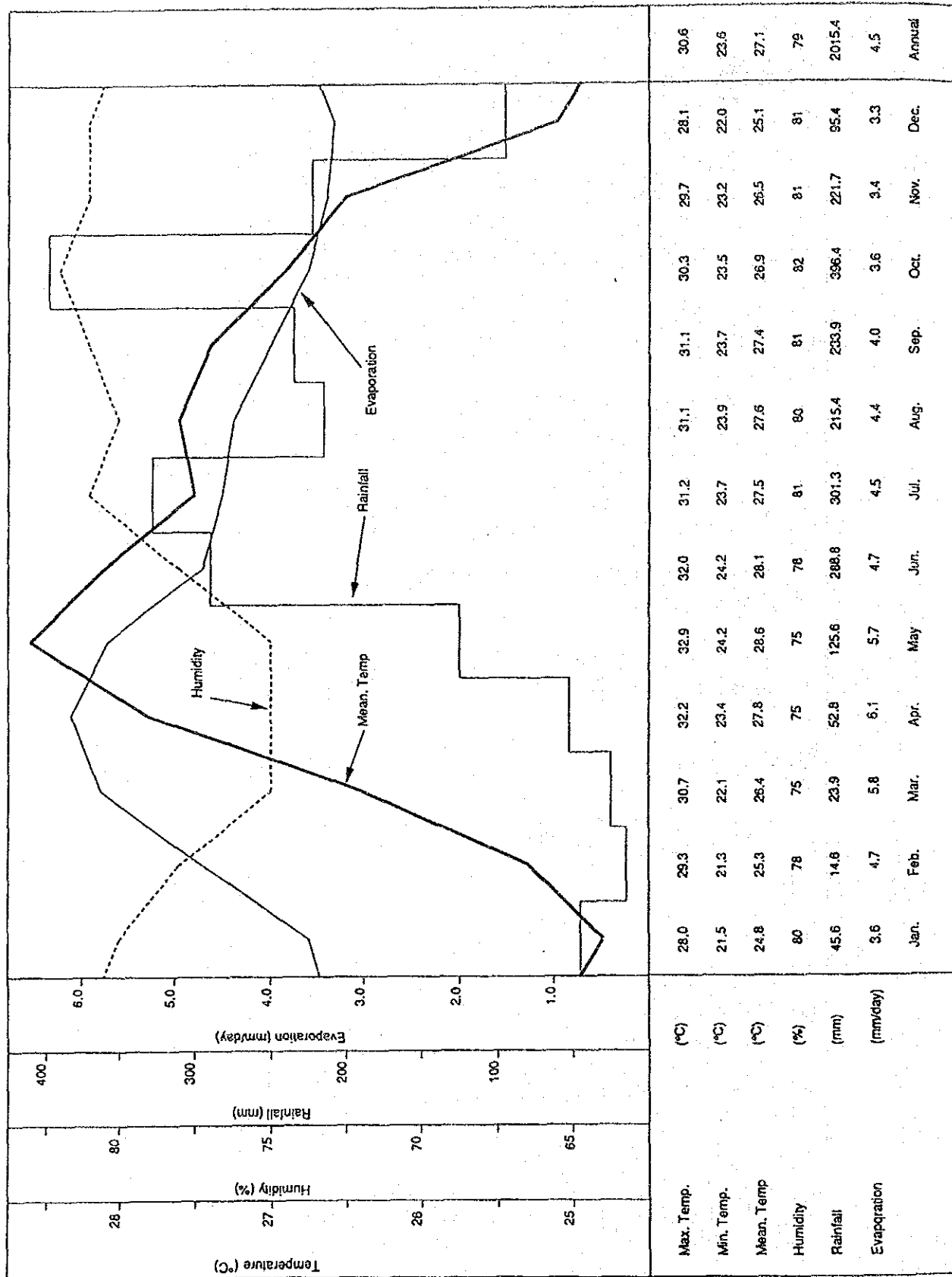


Table.2 Climate in Los Banos

Table.3 Monthly Water Level in Lagna Lake

YEAR	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Maximum	Minimum
JAN	11.69	10.74	11.24	11.40	11.07	10.96	11.18	11.06	11.96	11.40	11.70	11.96	10.74
FEB	11.13	10.53	10.84	11.05	11.00	10.69	10.79	10.78	11.39	11.15	11.23	11.39	10.53
MAR	10.71	10.46	10.59	10.72	10.81	10.50	10.57	10.56	10.84	10.82	11.03	11.03	10.46
APR	10.57	10.52	10.41	10.46	10.63	10.36	10.46	10.45	10.49	10.68	10.88	10.88	10.36
MAY	10.67	10.47	10.36	10.48	10.43	10.42	10.39	10.47	10.31	10.61	10.90	10.90	10.31
JUN	10.90	10.62	10.72	10.68	10.36	10.55	10.60	10.62	10.34	11.12	11.24	11.24	10.34
JUL	11.09	11.05	11.38	11.02	10.64	10.94	12.04	11.30	10.56	11.23	11.34	12.04	10.56
AUG	11.60	11.34	11.53	11.53	11.12	11.31	11.81	11.90	10.74	11.37	11.89	11.90	10.74
SEP	11.55	11.54	11.32	11.86	11.32	11.74	11.70	12.49	11.32	11.19	12.06	12.49	11.19
OCT	11.66	11.72	11.51	11.62	11.75	12.00	11.82	13.08	11.24	11.92	12.04	13.08	11.24
NOV	11.33	12.21	11.77	11.24	11.76	12.33	11.88	13.08	11.11	13.25	11.67	13.25	11.11
DEC	11.02	11.77	11.71	11.06	11.35	12.75	11.50	12.67	11.46	12.39	11.21	12.75	11.02
Maximum	11.69	12.21	11.77	11.86	11.76	12.75	12.04	13.08	11.96	13.25	12.06	13.25	11.69
Minimum	10.57	10.46	10.36	10.46	10.36	10.36	10.39	10.45	10.31	10.61	10.88	10.88	10.31

Note : The above measurement of water levels is referred to the datum 10.71 m below the mean lower low water (M.L.L. W)

Design Low Water Level occurred in May 16, 1981; 10.31m means EL.-0.40 (M.L.L. W. basis)
 Design High Water Level occurred in November 9, 1988; 13.55m means EL.+2.84m (M.L.L. W. basis)

Table.4 Existing Irrigation System in Jala-Jala Area

Irrigation System	Location (Village)	Year Constructed/ Executing Agency	Irrigation Area (ha)	Irrigated Area (ha)	
				Rainy Season	Dry Season
1. Sipsipin	Sipsipin	1957/NIA	86	73	10
2. Puang Linis	Sipsipin	1939/DPWH	34	24	15
3. Butsinge	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/PRV I 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

Table 5 Result of Water Quality Test

Location	Turbidity (units)	Color (units)	Odor	Dissolved solid (mg/l)	pH	EC (micro-mhos/cm)	Alkali-Hardness		Cations				Anions				Trace element		Bacteriological examination	
							(mg/l, CaCO ₃)	(mg/l, CaCO ₃)	Na (mg/l)	K (mg/l)	Ca (mg/l)	Mg (mg/l)	CO ₃ (mg/l)	HCO ₃ (mg/l)	Cl (mg/l)	SO ₄ (mg/l)	Iron (mg/l)	Manganese (mg/l)		
Barangay Sipsisipin	124.00	250.0	unobjct-inable	495	6.50	774	144	290	25	27	4	81	21	0	175	58	149	7.75	0.40	Not meet the standard
District I	1.33	2.5	- do -	177	6.22	276	68	98	35	11	1	26	8	0	83	14	42	0.20	Nil	- do -
District II	6.50	7.5	- do -	721	6.59	1,127	256	457	28	48	8	122	37	0	312	122	136	1.70	1.20	- do -
Sitio Llano	0.57	0.0	- do -	4,224	7.30	6,600	0	290	85	500	32	60	34	0	0	900	1,420	0.60	Nil	- do -
Barangay Punta	0.76	0.0	- do -	428	7.53	668	260	143	10	78	15	30	16	0	317	45	12	0.10	Nil	Meet the standard
Barangay Palay Palay	0.59	0.0	- do -	572	7.00	894	340	406	16	19	6	116	28	0	415	51	23	0.20	Nil	Not meet the standard
Sitio Ik Ik	0.90	0.0	- do -	755	6.97	1,180	252	311	14	120	2	84	24	0	307	136	96	0.15	Nil	- do -
Barangay Luibo	0.90	2.5	- do -	412	6.90	644	235	275	15	17	1	75	21	0	287	20	54	0.65	0.15	- do -
Barangay Bayugo	1.20	5.0	- do -	803	7.60	1,255	420	196	8	185	23	35	26	0	512	122	61	0.55	0.10	Meet the standard
Barangay Bagumbong	15.00	0.0	- do -	341	7.20	533	68	224	15	11	2	64	15	0	83	19	160	0.15	Nil	Not meet the standard

Table.6 Electric Charge for Pump Operation

Irrigation System	Irrigation Area (ha)	Water Requirement (1,000m ³)	Pump Capacity (act.kw)	Operation Hour (hrs/year)	Electric Usage (kWh)	Electric Charge (Peso)				
						Generation charge	Demand charge	Energy charge	Total Electric Charge per Ha	
Sipsisipin										
- High Head	75	540	63x2	867	109,249	208,665	37,800	29,497	275,962	-
- Low Head	95	685	32x2	869	55,606	106,208	19,200	15,014	140,422	2,449
Llano	65	895	25x2	1,657	82,870	158,282	15,000	22,375	195,657	3,010
Palay-Palay										
- High Head	37	510	26x2	1,667	86,667	165,533	15,600	23,400	204,533	-
- Low Head	103	1,418	47x2	1,662	156,226	298,392	28,200	42,181	368,773	4,095
Pagkalinawan	55	672	25x2	1,830	91,503	174,771	15,000	24,706	214,477	3,900

Note : 1. Electric charge is estimated based on the Rates for Electric Service, MERALCO.

- Generation charge : 1.91 Peso/kWh (Nov. 1991)

- Demand charge : 25.0 Peso/kW of bill demand

- Energy charge : 0.27 Peso/kWh

2. Pump-up Volume

- Sipsisipin.

Gross requirement

River inflow

Pump-up

- High head 75ha

- Low head 95ha

- Palay- Palay

Pump-up

- High head 37ha

- Low head 103ha

2,346 x 1,000 cum.

1,122 x 1,000 cum.

1,225 x 1,000 cum.

540 x 1,000 cum.

685 x 1,000 cum.

1,928 x 1,000 cum.

510 x 1,000 cum.

1,418 x 1,000 cum.

Table.7 Annual O & M Cost for Irrigation and Drainage Facilities

(1) Sipsipin Irrigation System

Item	Unit	Quantity	Unit Price (peso)	Amount (Peso)
1. Salary				
Staff	man · year	5	10,000	50,000
Common Labor	man · year	2	5,000	10,000
2. Pump O & M Cost	L.S.	1		416,400
3. Maintenance Cost of Facilities	man · day	340	100	34,000
4. Miscellaneous	L.S.	1		20,600
Total				531,000

(2) Llano Irrigation System

Item	Unit	Quantity	Unit Price (peso)	Amount (Peso)
1. Salary				
Staff	man · year	5	10,000	50,000
Common Labor	man · year	2	5,000	10,000
2. Pump O & M Cost	L.S.	1		195,700
3. Maintenance Cost of Facilities	man · day	130	100	13,000
4. Miscellaneous	L.S.	1		10,300
Total				279,000

(3) Palay-Palay Irrigation System

Item	Unit	Quantity	Unit Price (peso)	Amount (Peso)
1. Salary				
Staff	man · year	5	10,000	50,000
Common Labor	man · year	2	5,000	10,000
2. Pump O & M Cost	L.S.	1		573,300
3. Maintenance Cost of Facilities	man · day	280	100	28,000
4. Miscellaneous	L.S.	1		20,700
Total				682,000

(4) Pagkalinawan Irrigation System

Item	Unit	Quantity	Unit Price (peso)	Amount (Peso)
1. Salary				
Staff	man · year	5	10,000	50,000
Common Labor	man · year	2	5,000	10,000
2. Pump O & M Cost	L.S.	1		214,500
3. Maintenance Cost of Facilities	man · day	110	100	11,000
4. Miscellaneous	L.S.	1		10,500
Total				296,000

Table.8 Annual O & M Cost of Road Networks

1. Trunk Road	
Item	Amount (Peso)
1) Routine Maintenance Cost	
-Equivalent maintenance kilometrage	
EMK = L x FW x TV	
EMK = 18.1km x 1.0x 0.85 =15.4 km	
-Maintenance cost	
RMC = EMK x 26,000Peso/km	
RMC = 15.4 km x 26,000Peso/km =	
	400,400
2) Periodic Maintenance Cost	
PMC = 1% x 1/5 year x initial cost	
PMC =0.01 x 0.2 x 64,000,000 Peso	
	128,000
Total	528,400
	(Say 528,000)

2. Feeder Road	
Item	Amount (Peso)
1) Routine Maintenance Cost	
-Equivalent maintenance kilometrage	
EMK = L x FW x TV	
EMK = 10.0km x 0.8x 0.90 =7.2 km	
-Maintenance cost	
RMC = EMK x 26,000 Peso/km	
RMC = 7.2 km x 6,500 Peso/km =	
	46,800
2) Periodic Maintenance Cost	
PMC = 10% x 1/5 year x initial cost	
PMC =0.1 x 0.2 x4,000,000 Peso =	
	80,000
Total	126,800
	(Say 127,000)

Note: 1. Annual O & M cost is estimated based on the method adopted by the Bureau of Maintenance, DPWH

2. Abbreviations :

- EMK : Equivalent maintenance kilometrage
- L : Length of project road
- FW : Pavement width factor
- TV :Traffic volume in vehicles per day and surface type factor
- RMC : Routine maintenance cost
based on the rate fixed by the DPWH, 1988
Trunk road : 26,000 Peso/km
Feeder road: 6,500 Peso/km
- PMC : Periodic maintenance cost

Table.9 Annual O & M Cost of Rural Water Supply System

1. Level - I		Amount
Item		(Peso)
1. Salary		
- Staff	1,000 Peso/year x 16 wells	16,000
- Common Labor	6 persons x 2days x 0.5 time/year x 100 Peso x 16 wells	9,600
2. Consumables	200 Peso/year x 16 wells	3,200
3. Maintenance Cost	2 days x 500 Peso x 0.5 time/year x 16 wells	8,000
4. Tools	2 days x 0.5 time/year x 100 Peso x 16 wells	1,600
Total		38,400
Annual water charge per household of 800 :		48

2. Level - II		Amount
Item		(Peso)
1. Salary		
- Staff	1,000 Peso/year x 2 wells	2,000
- Common Labor	10 persons x 2days x 0.5 time/year x 100 Peso x 2 wells	2,000
2. Consumables	10,000 Peso/year x 0.5 time/year x 2 wells	10,000
3. Maintenance Cost	2 days x 1,000 Peso x 0.5 time/year x 2 wells	2,000
4. Tools	2 days x 0.5 time/year x 100 Peso x 2 wells	200
	Sub-total	16,200
5. Electric Charge		
- Operation hours	10 hours/day	
- Motor output	9.2 kW	
- Power rate	2.5 Peso/kWh	
- Electric charge	9.2 kW x 2.5 Peso/kWh x 10 hours/day x 365 days	83,950
Total		100,150
Annual water charge per household of 400 :		250

Table.10 Annual Operation and Maintenance Cost for Rice Mill Center

Items	Description		
1. Equipment for Operation and Maintenance			
1) Receiving, drying, warehouse	a. Hand tools and equipment for repairing and maintenance b. Scope, broom, winnower, etc. for drying c. Pallets, hand tool for warehouse		
2) Milling	a. Hand tools and equipment for repairing and maintenance b. Tables, chairs, cabinet for operation and inspection room		
3) Office, and others	a. Tables, chairs, cabinet, typewriter, calculator for office b. Fire extinguisher, cleaning tool and equipment c. Office consumabl supplies, medicine,		
2. Requirement of Operation and Maintenance Works			
i) Power			
1) Receiving	6kw	5hrs/day x 120days	3,600kwh
2) Mechanical Dryer	76kw	1,800hrs	136,800kwh
3) Sun-drying	15kw	3hrs/day x 220days	9,900kwh
4) Milling Machine	67kw	3hrs/day x 220days	117,250kwh
5) Custom Milling Machine	15kw	1,500hrs	22,500kwh
6) Lighting for Building, Office and others			
Drying , milling house	18kw	6hrs/day x 250days	32,000kwh
Office, others	15kw	8hrs/day x 300days	36,000kwh
		Total	358,050kwh
ii) Fuel and Lubricant			
1) Truck and car			
2) Light oil		(2 x 100km/day x 220days) / 5km/lit = 8,800 lit	
3) Gasoline		(2 x 80km/day x 300days) / 5km/lit = 8,000lit	
4) Lubricant			
5) Drying, milling machine and truck		10% of fuel cost	
iii) Suck			
Paddy		500tons / 50kg/suck = 10,000sacks	
Rice		(4,000tons x 0.67) / 50kg = 53,600sacks	
Operation and Maintenance Cost			
			Unit : peso
1) Salary	General Project Manager	1	96,000
	Grade I (officer, technical staff)	3	216,000
	Grade II (officer, technical staff)	15	816,000
	Grade III (technical staff)	3	72,000
	Sub-total	22	1,200,000
2) Wages for helpers		30	720,000
3) Operation cost	Power (2.3 peso/kw)	358,050 kwh/ year	823,500
	Fuel (desel , lubrication)		183,000
	Sacks for palay, rice, by-products		135,000
	Sub-total		1,141,500
4) Labor Cost	2,200 man/day per year		176,000
5) Maintenance and repairing cost			246,000
6) Consumable supplies			156,000
Annual Operation and Maintenance Cost			3,639,500

Table.11 Irrigation Water Requirement (1/2)

Crops	Date of water issue	Cultivation area (ha)		
		SIPSIPIN	LIANO	PALAY PALAY
1 Paddy-nursery	5/1	8.5	3.25	7
2 Wet season paddy	6/1	170	65	140
3 Paddy-nursery	10/1	8.5	3.25	7
4 Dry season paddy	11/1	170	65	140
5 Beans	2/16	51	19.5	42
Total Project Area		170	65	140

Crops	Date of water issue	Cultivation area (ha)
		Pagkalinawan
1. Paddy-nursery	5/1	2.25
2. Wet season paddy	6/1	45
3. Paddy-nursery	10/1	2.25
4. Dry season paddy	11/1	45
5. Beans	2/16	13
6. Dry season beans	12/16	2
7. Dry season corn	12/16	1
8. Wet season corn	5/1	2
9. Eggplant	4/16	1
10. String beans	5/1	1
11. Tomato	9/16	1
12. Bitter gourd	10/1	1
13. L.W.season corn	8/1	1
14. W. season soybean	8/16	1
15. Citrus	1/1	5
Total Project Area		55

Design Irrigation Water Requirement

1.Paddy -Paddy -intercrop		
Period of maximum requirement		
Puddling water supply period		
Design year with 80%		
Design year with 80%dependability ;June 1987		
Kc	-	1.1
PET	mm/month	120
ET	mm/day	4.4
PE	mm/day	2
PU	mm/day	9
ER	mm/day	3
FWR	mm/day	12.4
DWR	mm/day	19.4
	l/sec/ha	2.24
(2.30l/sec/ha)		
2.Paddy - Upland crop		
Paddy	2.24	45
Upland	0	5
Cirtus	0	5
(1.85l/sec/ha)		

(1) Irrigation Water Requirement of Sipsipin System

Year	unit :x1,000m ³												Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1969	430	128	78	82	55	704	44	251	51	30	610	0	2,463
1970	400	124	73	66	49	547	70	267	0	20	397	67	2,080
1971	438	119	40	77	32	493	55	198	14	21	440	0	1,927
1972	323	128	49	66	44	504	0	67	59	23	504	217	1,984
1973	389	128	81	82	53	541	153	265	6	22	437	0	2,157
1974	440	121	78	83	47	566	240	30	46	22	432	0	2,105
1975	221	128	36	0	56	642	372	74	7	22	520	0	2,078
1976	410	128	77	66	25	523	115	72	8	30	497	0	1,951
1977	150	121	70	82	53	515	165	78	6	30	509	414	2,193
1978	418	128	85	72	50	728	281	12	3	18	579	224	2,598
1979	440	127	83	0	32	513	263	64	7	23	483	406	2,441
1980	440	129	35	80	51	522	72	89	54	22	436	41	1,971
1981	426	128	82	74	49	529	46	180	6	22	444	288	2,274
1982	440	126	70	75	56	671	20	230	3	31	560	329	2,611
1983	357	128	77	87	63	722	77	145	59	22	650	434	2,821
1984	440	128	79	56	39	546	405	56	39	19	623	400	2,830
1985	440	127	73	57	48	480	96	356	42	21	634	282	2,656
1986	440	128	85	85	49	841	77	51	50	22	447	284	2,559
1987	434	128	85	87	60	691	368	190	7	34	463	226	2,773
1988	250	106	84	20	53	510	236	153	48	19	434	434	2,347
AVE.	386	125	71	65	48	589	158	141	26	24	505	202	2,341

Table.11 Irrigation Water Requirement (2/2)

(2) Irrigation Water Requirement of Llano System unit :x1,000m3

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1969	164	49	30	31	21	269	17	96	20	12	233	0	942
1970	153	47	28	25	19	209	27	102	0	8	152	26	796
1971	168	45	15	30	12	188	21	76	5	8	168	0	736
1972	123	49	19	25	17	193	0	26	23	9	193	83	760
1973	149	49	31	31	20	207	59	101	2	8	167	0	824
1974	168	46	30	32	18	216	92	12	17	8	165	0	804
1975	85	49	14	0	22	245	142	28	3	9	199	0	796
1976	157	49	30	25	10	200	44	27	3	12	190	0	747
1977	57	46	27	31	20	197	63	30	2	12	195	158	838
1978	160	49	32	27	19	278	107	5	1	7	221	85	991
1979	168	49	32	0	13	196	100	25	3	9	185	155	935
1980	168	49	13	30	20	200	28	34	21	8	167	16	754
1981	163	49	31	28	19	202	18	69	2	9	170	110	870
1982	168	48	27	29	21	257	8	88	1	12	214	126	999
1983	137	49	29	33	24	276	30	56	23	9	248	166	1,080
1984	168	49	30	22	15	209	155	21	15	7	238	153	1,082
1985	168	48	28	22	19	183	37	136	16	8	243	108	1,016
1986	168	49	32	33	19	322	29	20	19	8	171	109	979
1987	166	49	32	33	23	264	141	73	3	13	177	86	1,060
1988	95	41	32	8	20	195	90	59	18	8	166	166	898
AVE	148	48	27	25	19	225	60	54	10	9	193	77	895

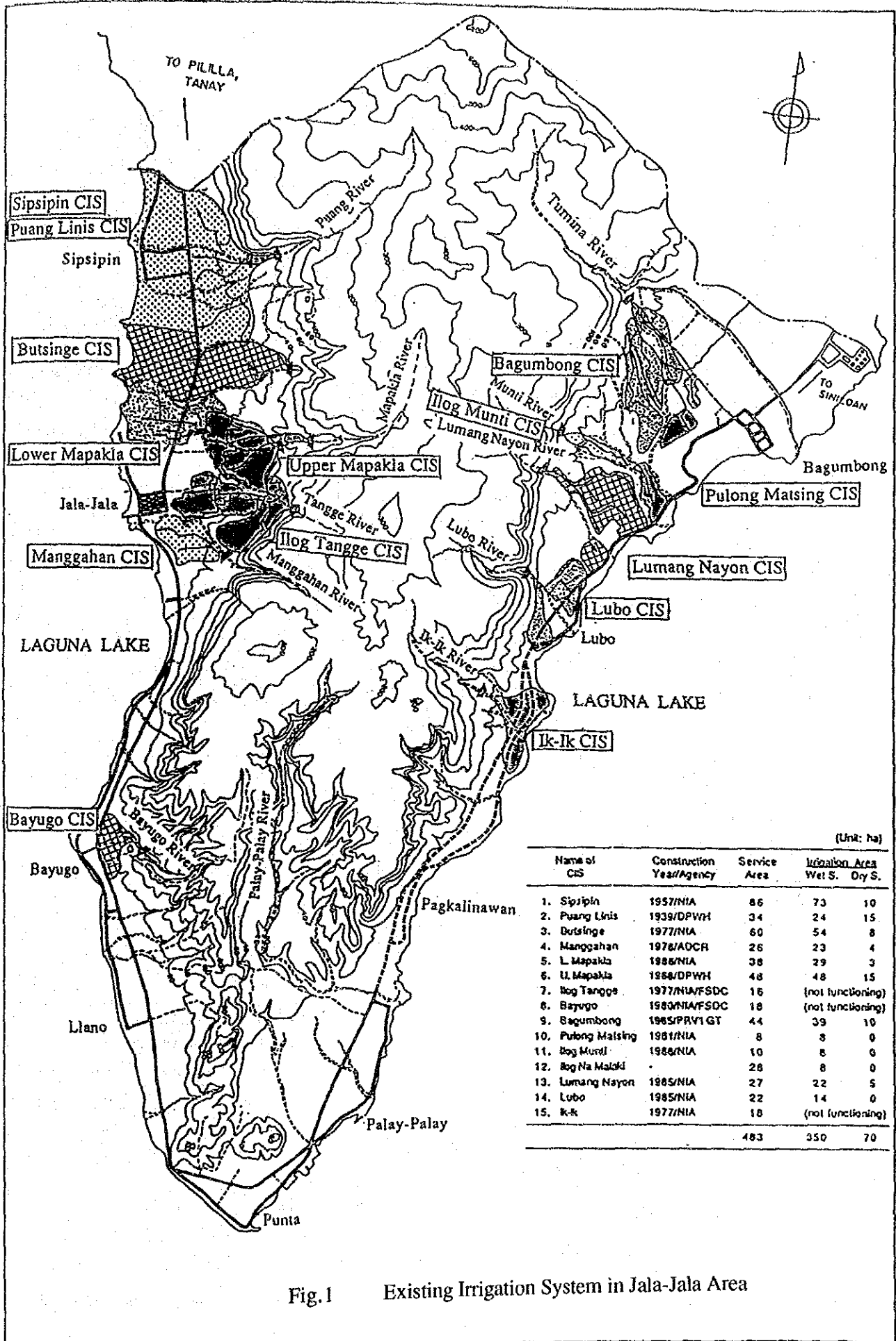
(3) Irrigation Water Requirement of Palay-Palay System unit :x1,000m3

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1969	354	105	64	68	45	580	36	207	42	25	502	0	2,028
1970	329	102	60	54	40	450	58	220	0	16	327	55	1,713
1971	361	98	33	63	26	406	45	163	12	17	362	0	1,587
1972	266	105	40	54	36	415	0	55	49	19	415	179	1,634
1973	320	105	67	68	44	446	126	218	5	18	360	0	1,776
1974	362	100	64	68	39	466	198	25	38	18	356	0	1,734
1975	182	105	30	0	46	529	306	61	6	18	428	0	1,711
1976	338	105	63	54	21	431	95	59	7	25	409	0	1,607
1977	124	100	58	68	44	424	136	64	5	25	419	341	1,806
1978	344	105	70	59	41	600	231	10	2	15	477	184	2,140
1979	362	105	68	0	26	422	217	53	6	19	398	334	2,010
1980	362	106	29	66	42	430	59	73	44	18	359	34	1,623
1981	351	105	68	61	40	436	38	148	5	18	366	237	1,873
1982	362	104	58	62	46	553	16	189	2	26	461	271	2,150
1983	294	105	63	72	52	595	63	119	49	18	535	357	2,323
1984	362	105	65	46	32	450	334	46	32	16	513	329	2,331
1985	362	105	60	47	40	395	79	293	35	17	522	232	2,187
1986	362	105	70	70	40	693	63	42	41	18	368	234	2,107
1987	357	105	70	72	49	569	303	156	6	28	381	186	2,284
1988	206	87	69	16	44	420	194	126	40	16	357	357	1,933
AVE	318	103	58	53	40	485	130	116	21	19	416	167	1,928

(4) Irrigation Water Requirement of Pagkalinawan System Unit : x 1,000 m3

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1969	123	46	35	33	23	187	12	67	14	9	161	0	710
1970	114	43	33	26	18	145	18	72	0	5	105	18	597
1971	126	41	17	31	9	130	14	53	4	6	116	0	547
1972	90	45	21	26	13	133	0	18	16	6	134	58	560
1973	111	45	37	33	21	143	41	71	2	6	116	0	626
1974	127	42	35	33	16	150	64	8	12	6	114	0	607
1975	59	45	15	0	24	170	104	20	2	6	138	0	583
1976	117	45	35	26	7	138	30	19	2	9	131	0	559
1977	40	42	31	33	21	136	44	21	2	9	135	117	631
1978	119	45	38	29	18	196	76	3	1	5	153	60	743
1979	127	45	38	0	9	136	71	17	2	6	128	115	694
1980	127	47	15	32	20	138	19	23	15	6	115	11	568
1981	122	45	37	30	18	140	12	48	2	6	118	79	657
1982	128	44	31	30	24	178	5	62	1	10	148	91	752
1983	101	45	35	35	31	194	21	39	16	6	172	126	821
1984	127	46	36	22	11	145	114	15	11	5	165	113	810
1985	127	44	33	22	17	127	26	98	11	6	168	77	756
1986	127	45	38	34	18	234	20	14	14	6	118	77	745
1987	125	46	38	35	28	184	102	51	2	13	123	60	807
1988	67	35	38	6	21	135	63	41	13	5	115	124	663
AVE	110	44	32	26	18	157	43	38	7	7	134	56	672

FIGURES



(Unit: ha)

Name of CIS	Construction Year/Agency	Service Area	Irrigation Area	
			Wet S.	Dry S.
1. Sipsipin	1957/NIA	86	73	10
2. Puang Linis	1939/DPWH	34	24	15
3. Butsinge	1977/NIA	60	54	8
4. Manggahan	1978/ADCR	26	23	4
5. L. Mapakia	1986/NIA	38	29	3
6. U. Mapakia	1968/DPWH	48	48	15
7. Ilog Tangge	1977/NAW/FSDC	16	(not functioning)	
8. Bayugo	1980/NAW/FSDC	18	(not functioning)	
9. Bagumbong	1965/PRV/IGT	44	39	10
10. Pulong Malsing	1981/NIA	8	8	0
11. Ilog Munti	1986/NIA	10	8	0
12. Ilog Na Malaki	-	28	8	0
13. Lumang Nayon	1985/NIA	27	22	5
14. Lubo	1985/NIA	22	14	0
15. Ik-Ik	1977/NIA	18	(not functioning)	
		483	350	70

Fig. 1 Existing Irrigation System in Jala-Jala Area

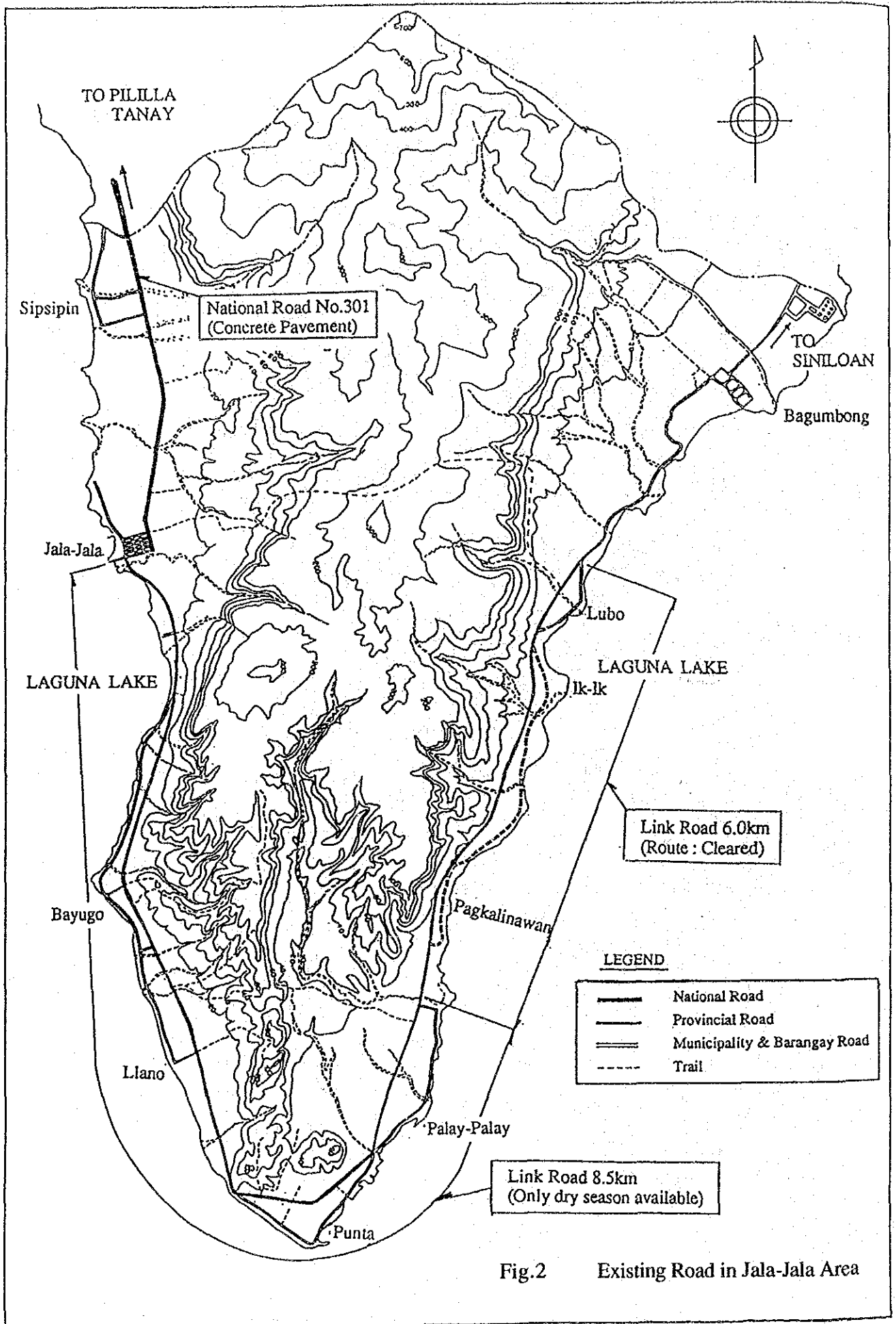
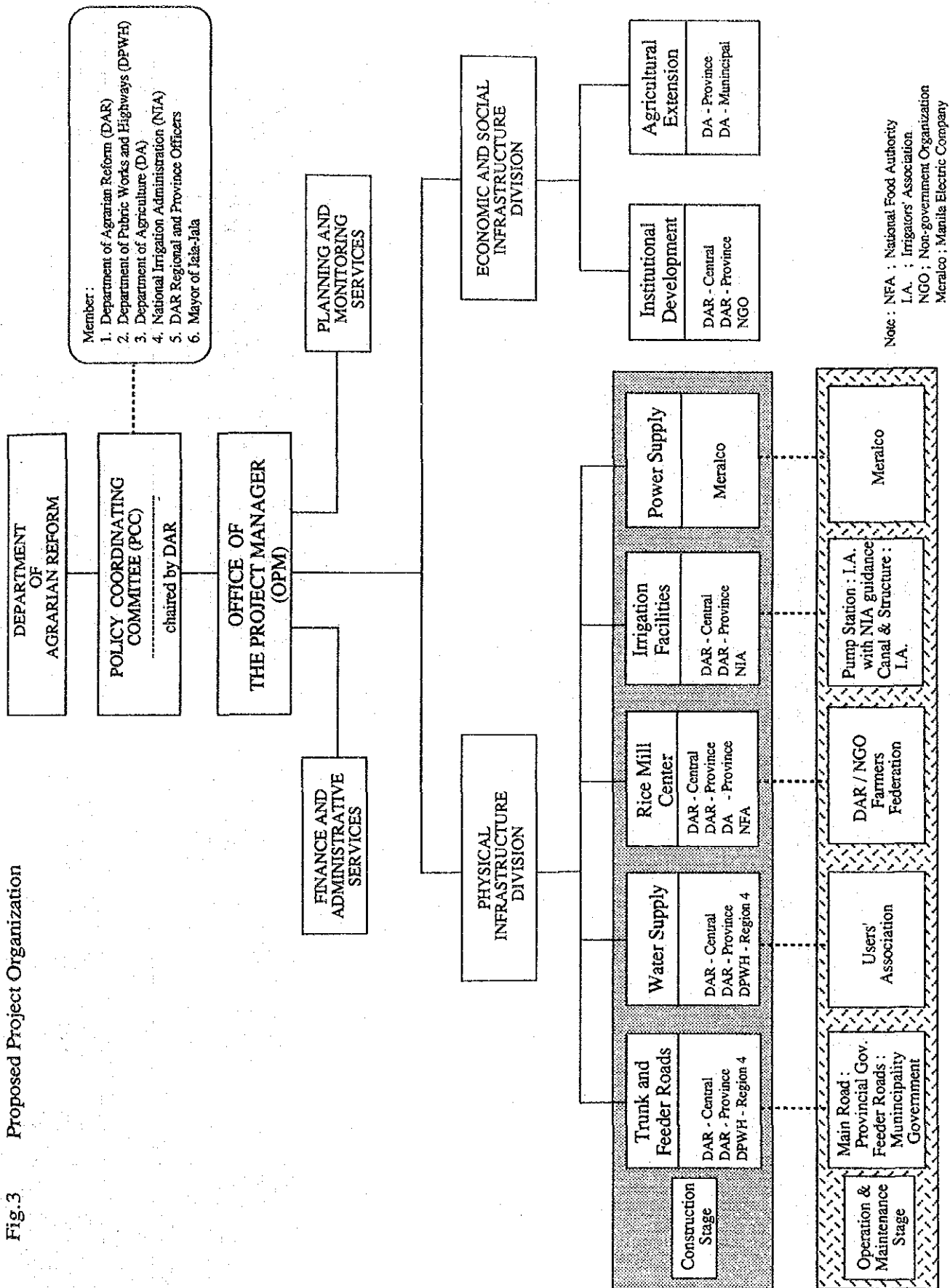


Fig.2 Existing Road in Jala-Jala Area

Fig. 3 Proposed Project Organization



Note: NFA : National Food Authority
 I.A. : Irrigators' Association
 NGO : Non-government Organization
 Meralco : Manila Electric Company

Fig. 4 Proposed Organization of Rice Mill Center

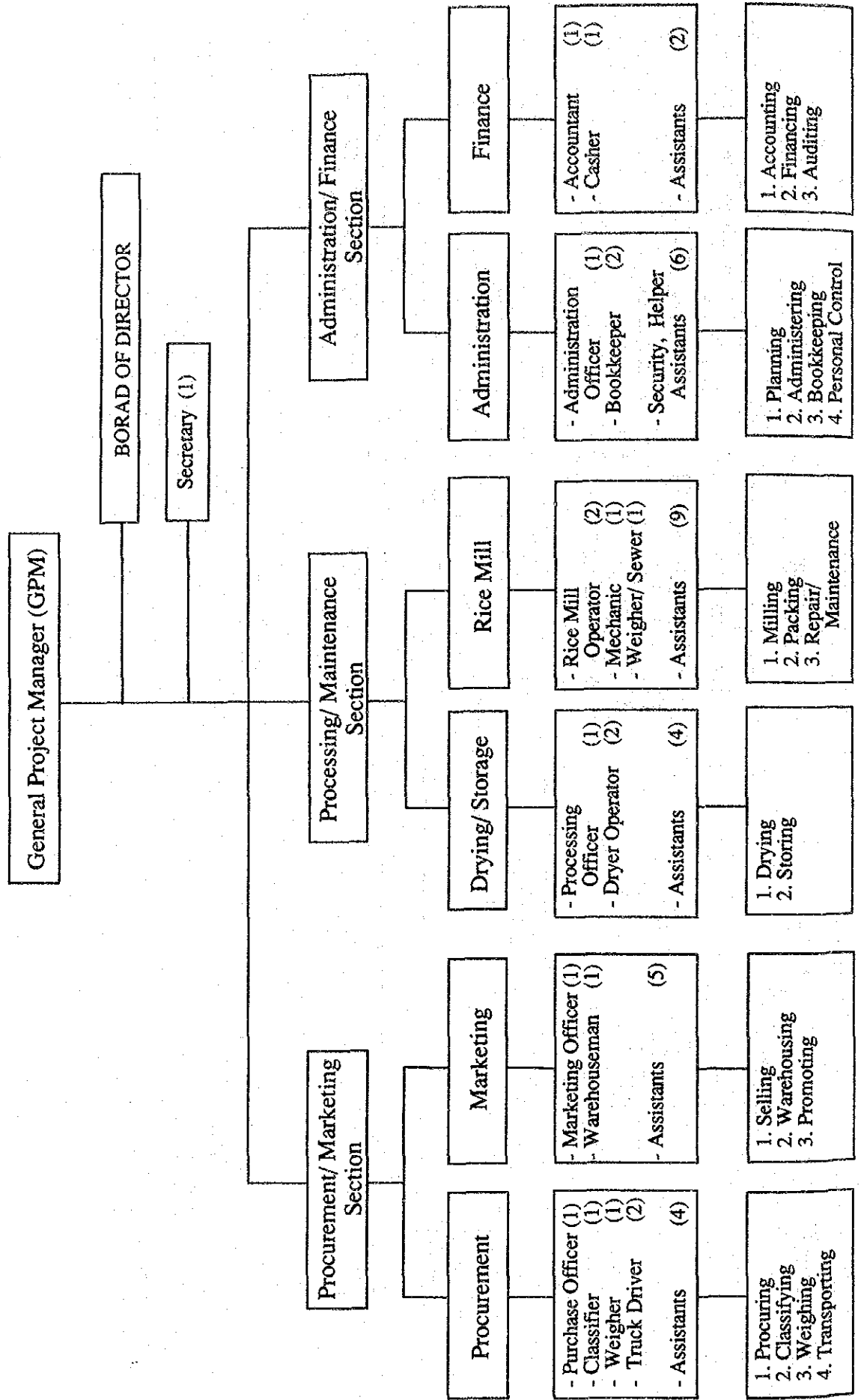
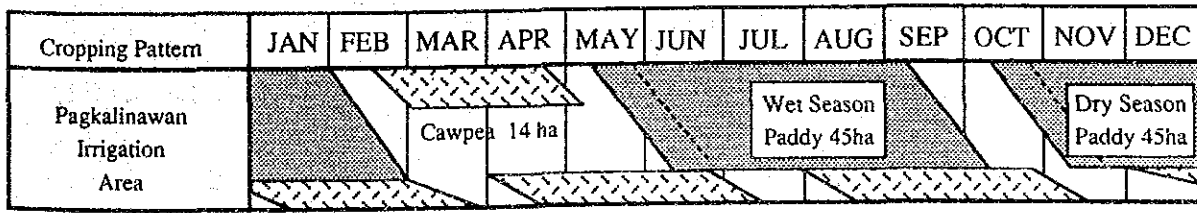
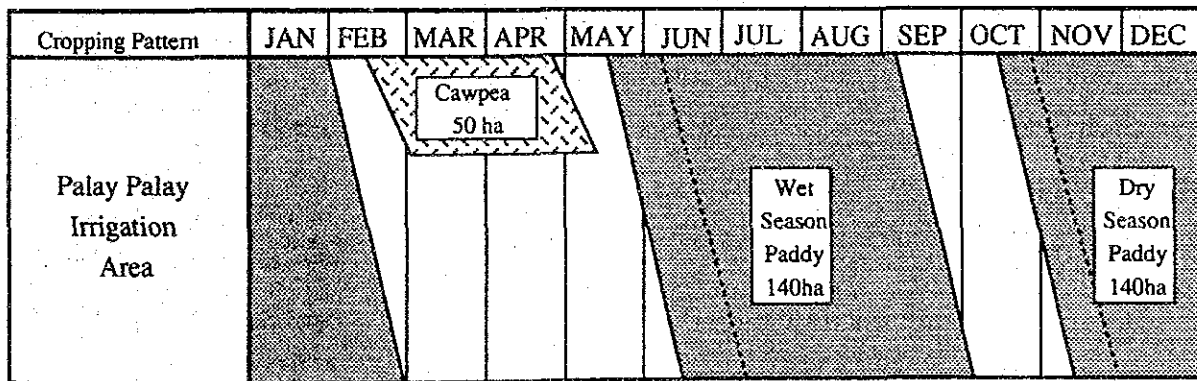
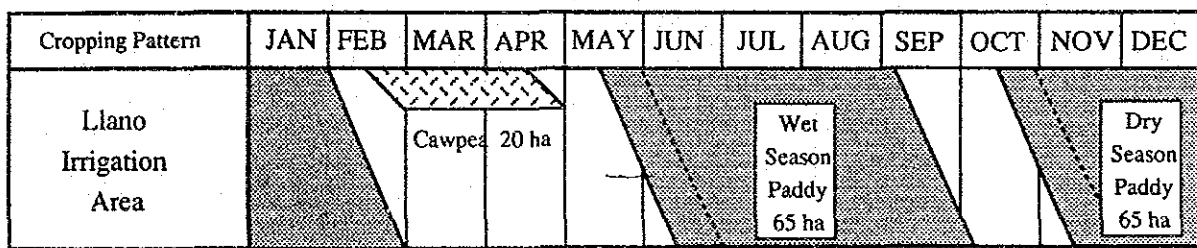
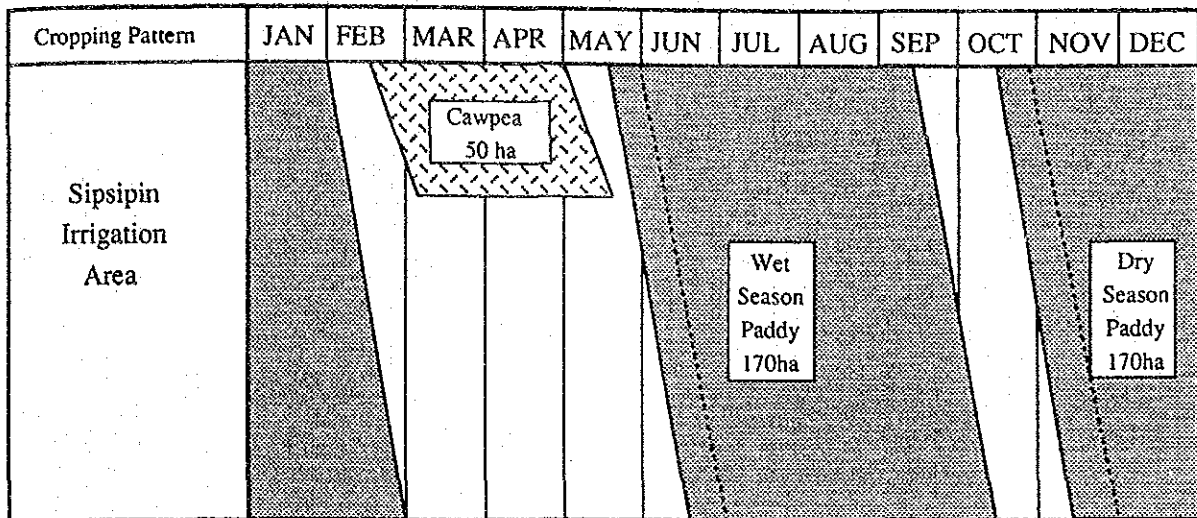


Fig.5 Proposed Cropping Pattern in the Project Area



Fruits / Upland Crops 10ha

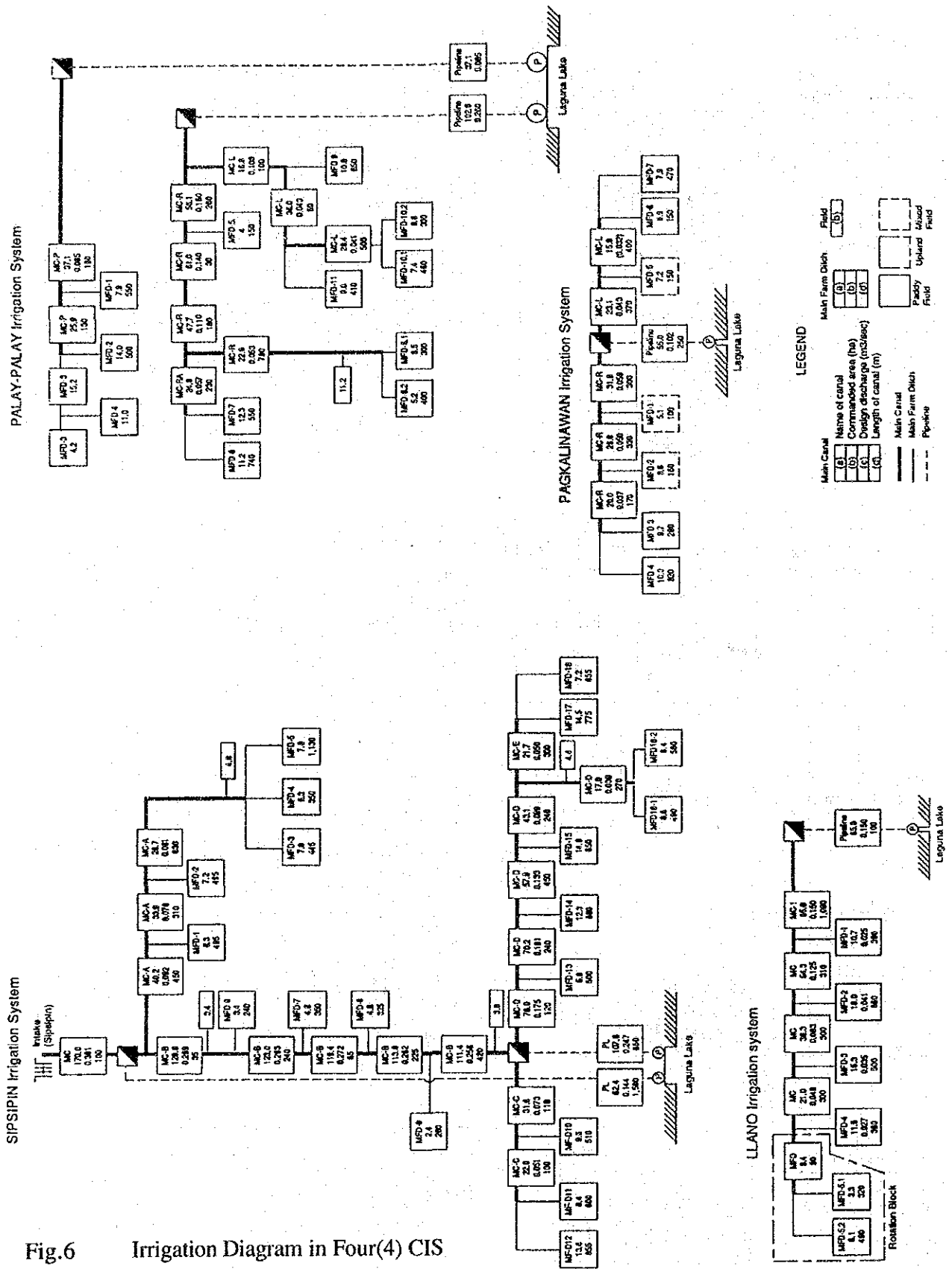
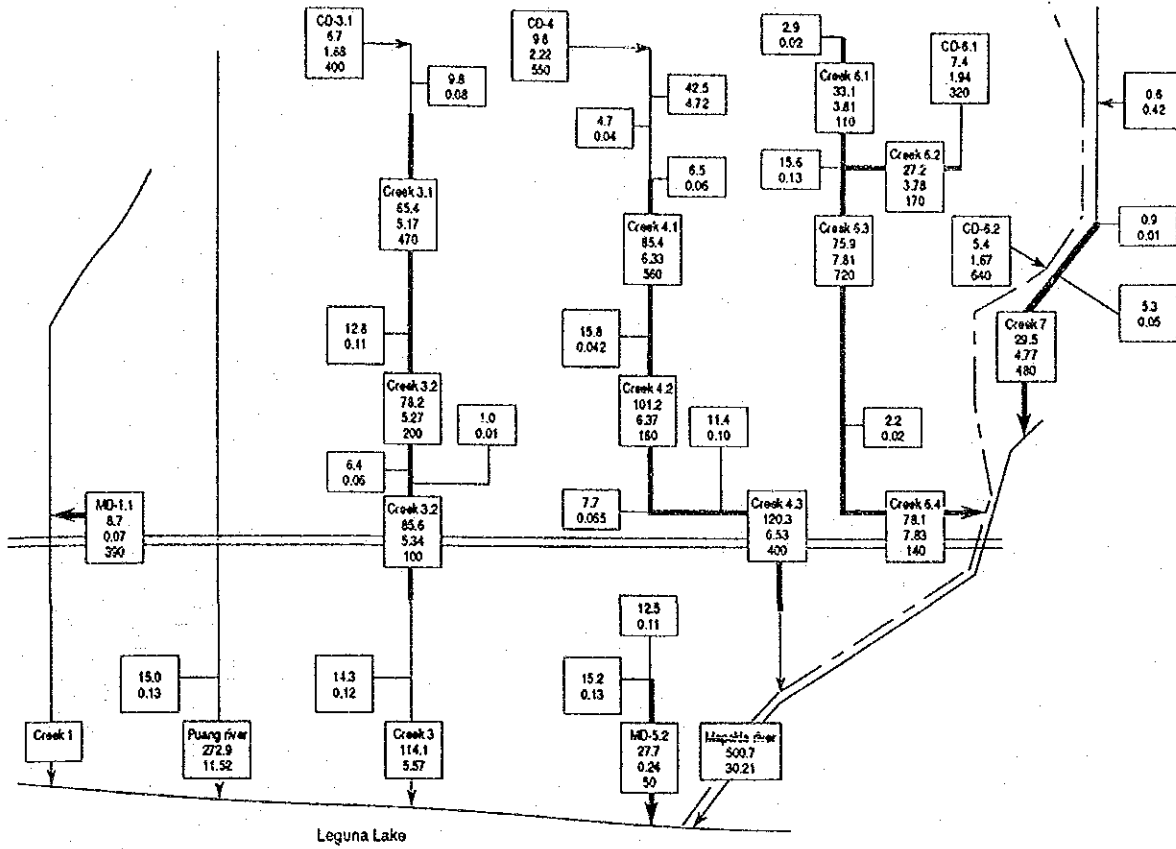


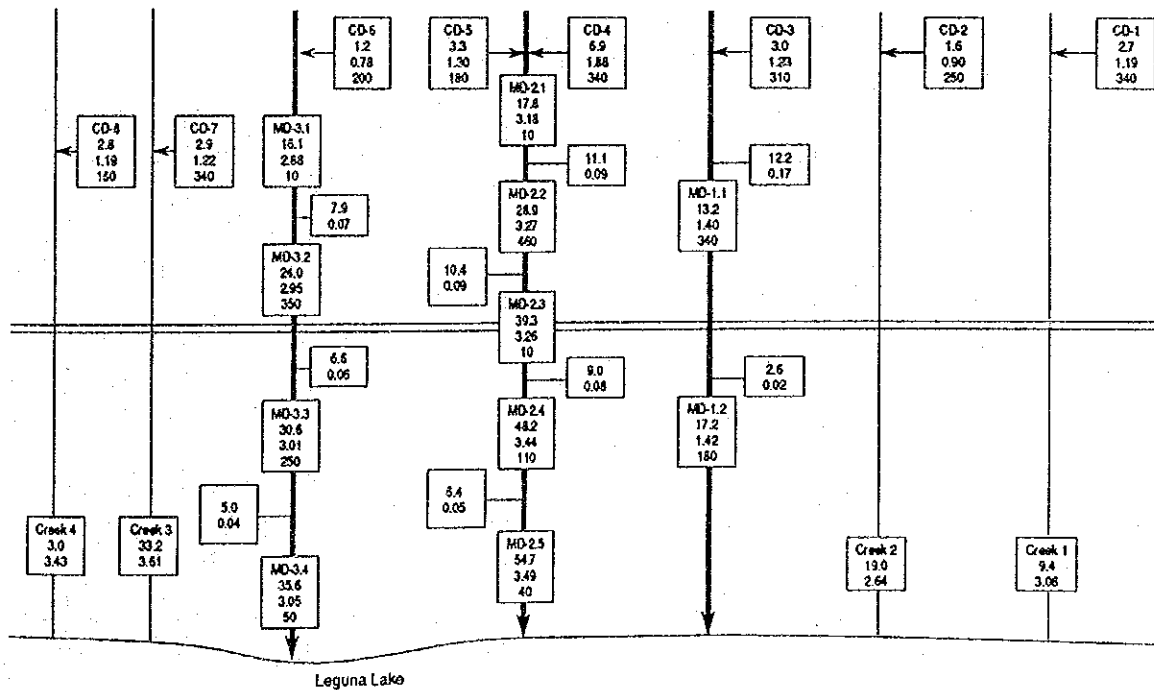
Fig.6 Irrigation Diagram in Four(4) CIS

Fig.7 Drainage Diagram (1/2)

SIPSIPIN Drainage System



LLANO Drainage System

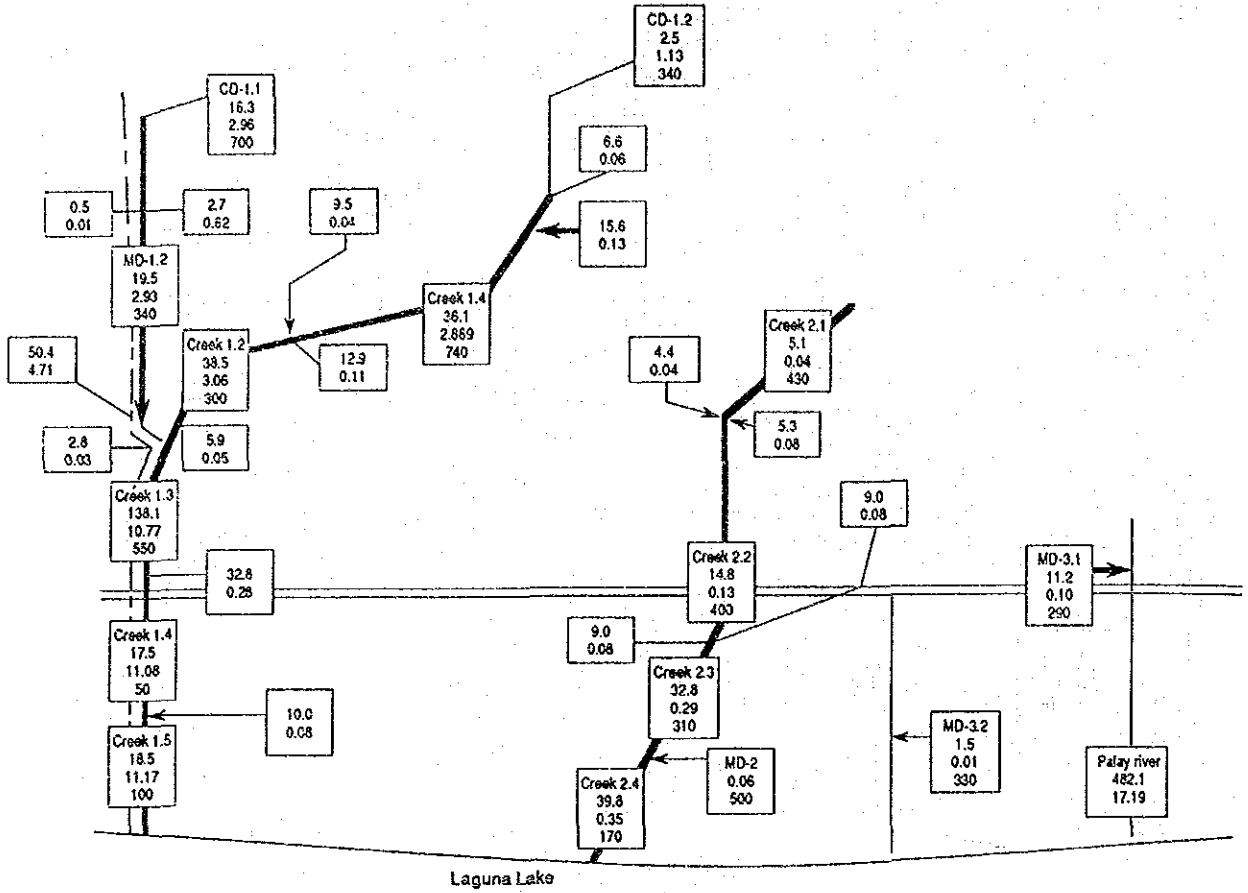


LEGEND

- | | | | |
|--|------------|--|--|
| | Main Drain | | Field |
| | Road | | Commanded area (ha) |
| | Boundary | | Design discharge (m ³ /sec) |
| | | | Length of canal (m) |

Fig.7 Drainage Diagram (2/2)

PALAY-PALAY Drainage System



PAGKALINAWAN Drainage System

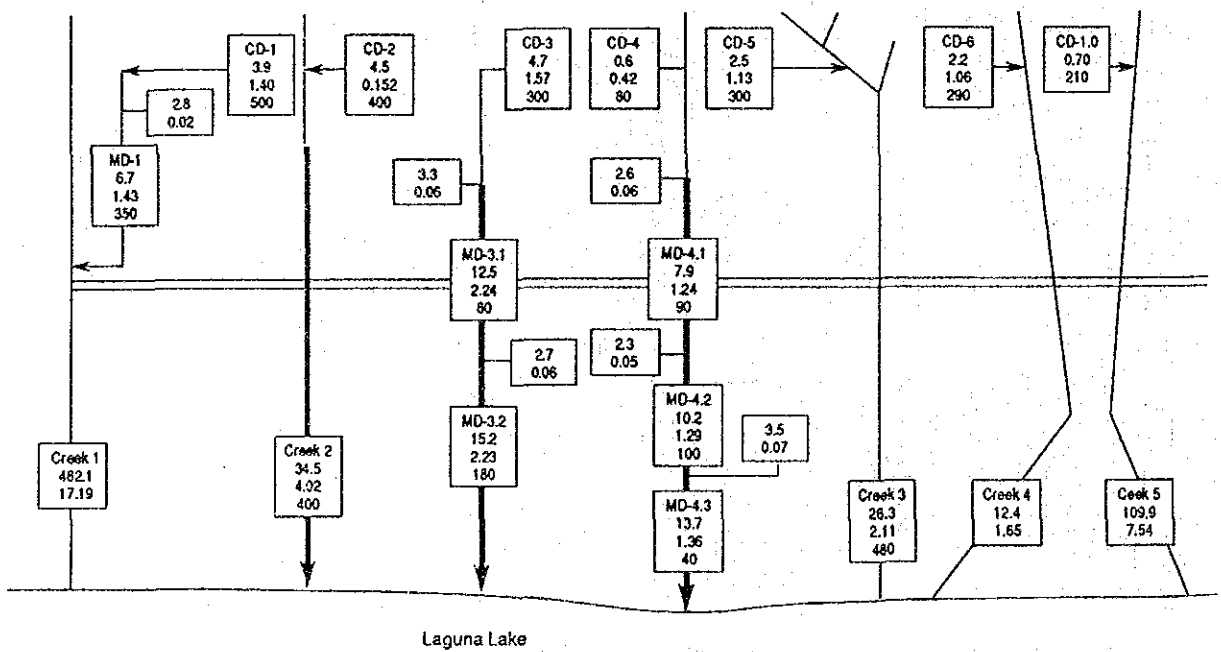
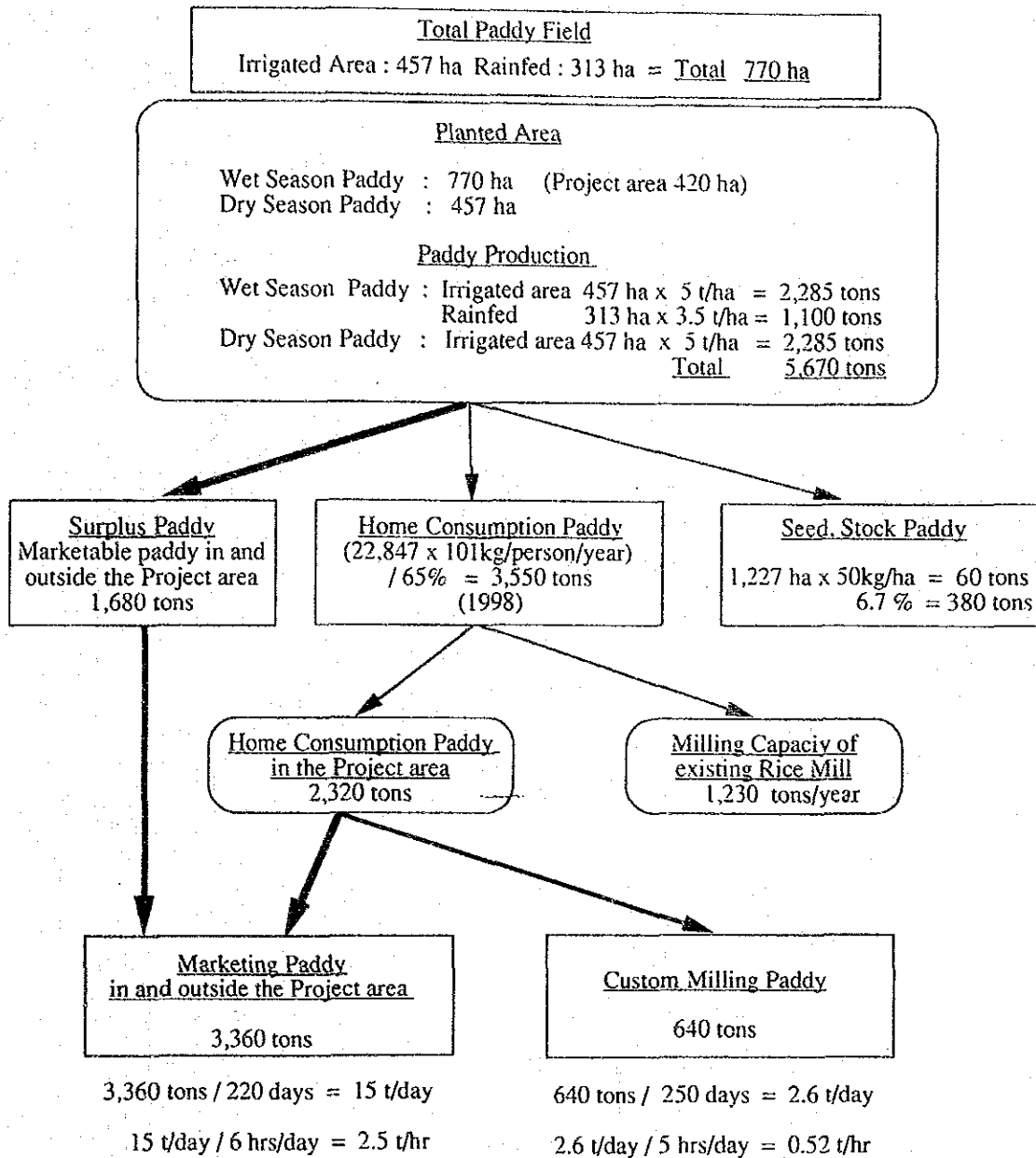


Fig.8 Post Harvesting Work Flow for Paddy



PROPOSED RICE MILL FACILITIES

Receiving Facility	: Max. receiving quantity	; 50 t/day	2 trucks
Drying Facility	: Mechanical dryer	; 20 t/day	5 t/tank x 4
	: Sun drying	; 30 t/day	1,300 m ²
Rice Milling Facility	:	2.5 t/hr	1 unit/ line
Custom Rice Milling Facility	:	0.3 t/hr	2 sets
Paddy Warehouse	:	500 tons	351 m ²
Rice Warehouse	:	100 tons	88 m ²
Other Facilities and Building	:	Rice husk, Rice bran, Dust and Ash store Office, Water supply facility, Toilet and Garage	

Fig.9 Working Flow on Rice Mill Facilities

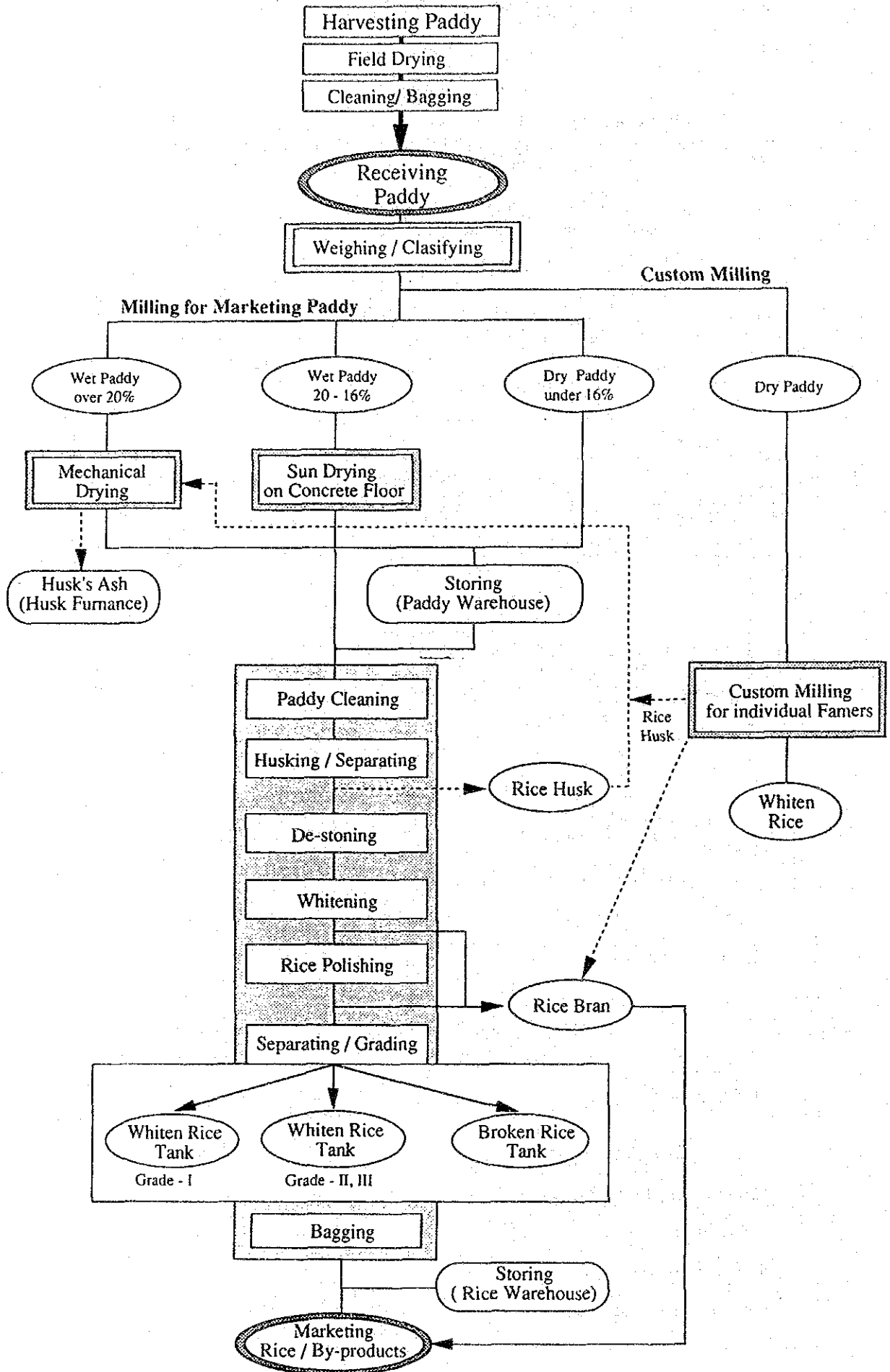


Fig. 10 Working Flow of Post Harvesting Facility

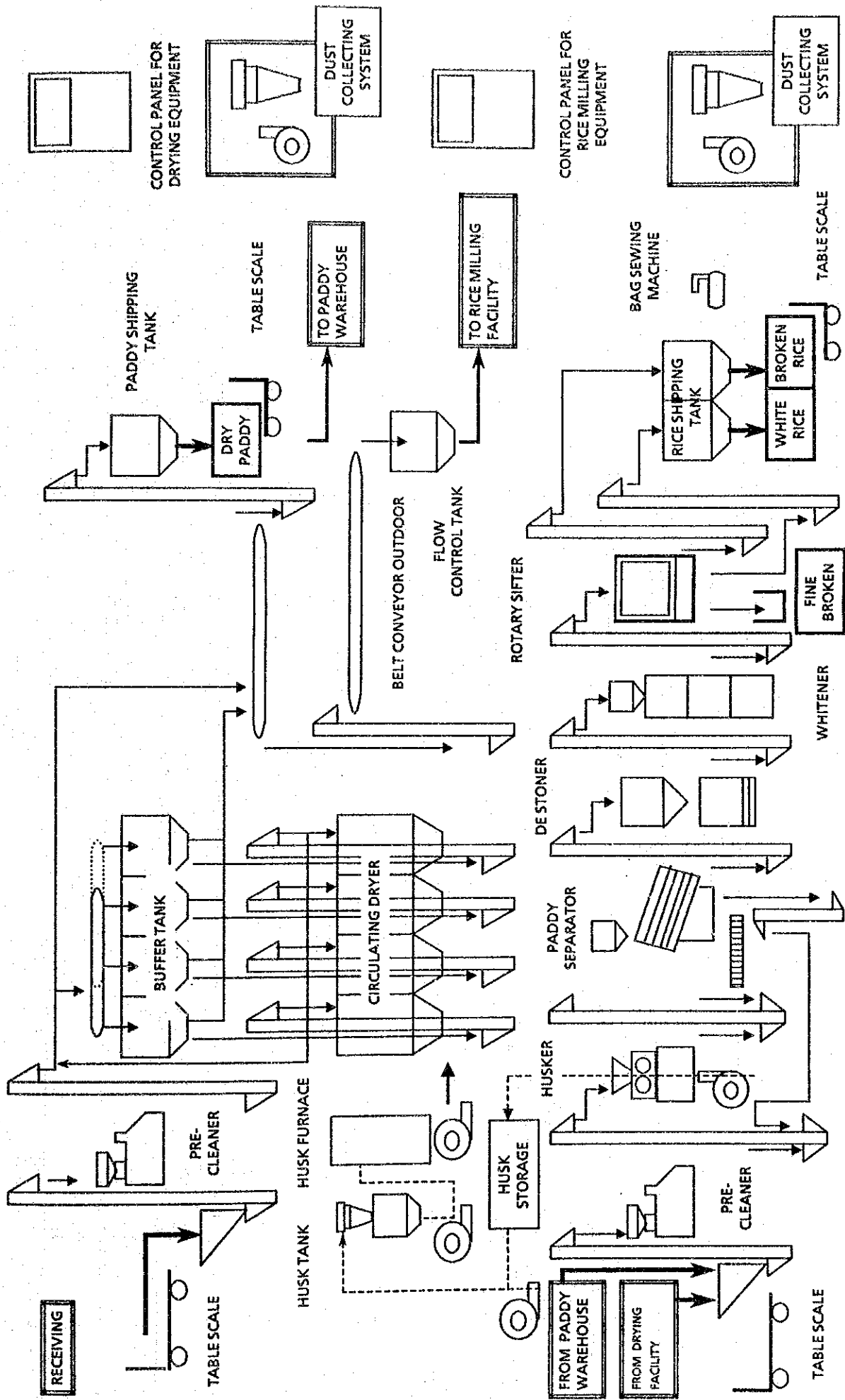
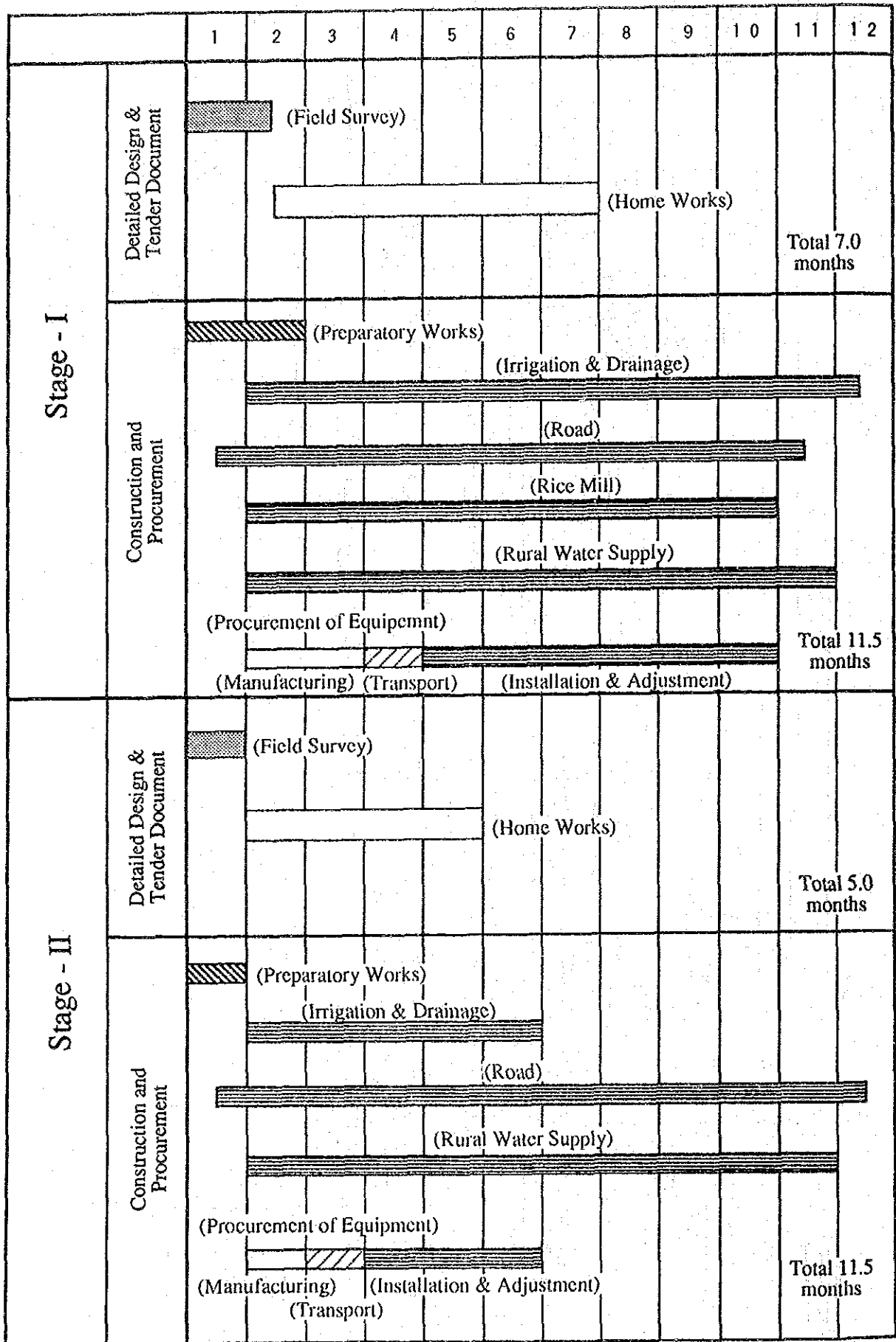


Fig.11 Tentative Implementation Schedule of the Project



APPENDIX

Appendix - 1 Member List of the Basic Design Study Team

Position	Name	Home Post
Team Leader	Mr. Tatsuou Katsuyama	Ministry of Agriculture, Forest and Fishery
Project Coordinator	Mr. Masashi FUJITA	Japan International Cooperation Agency
Irrigation/Drainage Planner	Mr. Hiroshi KURONUMA	Nippon Koei Co., Ltd.
Facility Design Engineer	Mr. Humihiro NAGAO	Nippon Koei Co., Ltd.
Civil Design Engineer	Mr. Kenji KYOIZUMI	Nippon Koei Co., Ltd.
Mechanical/Electrical Engineer	Mr. Hidemaro IMOTO	Nippon Koei Co., Ltd.
Cost Estimate	Mr. Yoshikazu TAKAHASHI	Nippon Koei Co., Ltd.

Appendix - 2

Activities of the Study Team

No.	Date	Itinerary	Description
1	Oct. 17 (Thr.)	Tokyo - Manila	Depart Tokyo for Manila (Messrs. Fujita, Kuronuma, Nagao, Kyoizumi)
2	18 (Fri.)	Manila	Courtesy call to DAR and Explanation of Inception Report and survey schedule
3	19 (Sat.)	Tokyo - Manila	Depart Tokyo for Manila (Mr. Katsuyama) Set-up of office
4	20 (Sun.)	Manila - Jala-Jala	Field inspection of the project site with DAR and lined agencies
5	21 (Mon.)	Manila	Discussion with DAR and lined agencies concerning Inception Report, result of field inspection, minutes of meeting
6	22 (Tue.)	Manila	Discussion with DAR and NIA Internal meeting
7	23 (Wed.)	Manila	Courtesy call to Secretary of DAR, Discussion with DAR/DA, Discussion with MERALCO
8	24 (Thr.)	Manila	Discussion with DAR and lined agencies Signing of Minutes of Meeting
9	25 (Fri.)	Manila - Pampanga	Field survey
10	26 (Sat.)	Manila - Tokyo	Leave Manila for Tokyo (Messrs. Katsuyama, Fujita)
11	27 (Sun.)	Manila - Tarlac	Inspection of rice mill center of Tarlac Integrated Livelihood Center
11	27 (Sun.)	Manila	Data analysis
12	28 (Mon.)	Manila	Internal meeting Discussion with DAR
13	29 (Tue.)	Manila	Data collection at MERALCO and NIA
14	30 (Wed.)	Manila/Jala-Jala	Field survey for confirmation of location of rice mill
15	31 (Thr.)	Manila/Jala-Jala	Field survey for rice mill, road, irrigation and drainage facilities Data collection at DPWH
16	Nov. 1 (Fri.)	Manila	Data analysis
17	2 (Sat.)	Manila	Data analysis Field inspection at dam site
18	3 (Sun.)	Manila/Jala-Jala	Data analysis
19	4 (Mon.)	Manila/Jala-jala	Discussion with DAR
20	5 (Tue.)	Tokyo - Manila	Depart Tokyo for Manila (Mr. Imoto)
20	5 (Tue.)	Manila	Discussion with counterparts of DAR Data collection of construction materials
21	6 (Wed.)	Manila/Jala-Jala	Field survey for rice mill, road, irrigation and drainage, rural water supply, power
21	6 (Wed.)	Tarlac	
22	7 (Thr.)	Manila/Jala-Jala	Field survey for rice mill, road, irrigation and drainage, rural water supply, power
23	8 (Fri.)	Manila/Jala-Jala	Field survey for rice mill, road, irrigation and drainage, rural water supply, power
24	9 (Sat.)	Manila	Data analysis
25	10 (Sun.)	Manila	Data analysis

No	Date	Itinerary	Description
26	Nov. 11 (Mon.)	Manila/Jala-Jala Cabanatuan	Field survey for rice mill, road, irrigation and drainage, rural water supply, power Data collection of post harvest facilities at NAPHIRE and NFA
27	12 (Tue.)	Manila/Jala-Jala	Field survey for rice mill, road, irrigation and drainage, rural water supply, power Data collection at CDA
28	13 (Wed.)	Manila/Jala-Jala Cavite, Laguna	Field survey for rice mill, road, irrigation and drainage, rural water supply, power Data collection on post harvest facilities
29	14 (Thr.)	Manila/Jala-Jala	Signing of Agreement for Electrification between DAR and MERALCO Explanation to farmers' representatives in Jala-Jala area for farmers association
30	15 (Fri.)	Manila/Jala-Jala	Field survey for rice mill, road, irrigation and drainage, rural water supply, power
31	16 (Sat.)	Manila	Data analysis
32	17 (Sun.)	Manila	Data analysis
33	18 (Mon.)	Manila/Jala-Jala	Field survey for rice mill, road, irrigation and drainage, rural water supply, power Data collection of construction materials
34	19 (Tue.)	Manila/Jala-Jala	Field survey for rice mill, road, irrigation and drainage, rural water supply, power Discussion with DPWH
35	20 (Wed.)	Manila/Jala-Jala	Field survey for rice mill, road, irrigation and drainage, rural water supply, power Discussion with NIA
36	21 (Thr.)	Manila/Jala-Jala	Meeting with DAR and lined agencies
37	22 (Fri.)	Manila	Meeting with DAR
38	23 (Sat.)	Manila - Tokyo	Leave Manila to Tokyo (Messrs. Kuronuma, Nagao, Imoto and Kyoizumi)

Abbreviations :
DAR : Department of Agrarian Reform
DA : Department of Agriculture
NIA : National Irrigation Administration
NFA : National Food Authority
DPWH : Department of Public Works and Highways
CDA : Cooperative Development Authority
NAPHIRE : National Post Harvest Institute for Research and Extension
MERALCO : Manila Electric Company

Appendix - 3 List of Officials Concerned

1. Department of Agrarian Reform (DAR)

Benjamin T. Leong	Secretary
Renato B. Padilla	Under Secretary , SSO
Severino T. Madronio	Asst. Secretary, SSO
Virgilio Cabezon	Asst. Secretary, PPO
Wilfredo B. Leano	Regional Director / DAR-IV
Ma. Isabel Perez	Director III / DAR-PMS
Naomi Capinpin	PARO/ DAR Rizal
Miguel Puzon	Director III / DAR-SSO

2. National Irrigation Agency (NIA)

Rogelio Rotoni	Project Manager of NIA-CARP
Edilberto C. Berena	Provincial Irrigation Engineer

3. Department of Public Works and Highways (DPWH)

Ricardo Bamero	Project Manager of DPWH-CARP
Melino E. STO. Domuwao	Negun N-A

4. Department of Agriculture (DA)

Roberto G. Villa	Chief of Project Development & Evaluation Division Planning & Monitoring Services
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5. Department of Energy and Natural Resources (DENR)

Manuel Gerochi	DENR-CARP
Adelaida Balanza	DENR-CARP

6. Others

Manila Electric Company (MERALCO)	
Vicerte J. Locsin	Manager of Community Relator Division
Meralco Foundation Inc.	
Benjamin Raneses Jr.	Head of Meralco Foundation Inc.
Cooperative Development Authority (CDA)	
Candelario L. Verzosa	Executive Director
Benedicto C. Acierto	Cooperative Research Information & Training Division
National Food Authority (NFA)	
Antonio E. Paris	Chief of Technical Extension Division
Nemesin Pineda	Chief of Monitoring & Evaluation Division
Jala-Jala Municipal Office	
Alejandro Perez	Mayor
Tarlac Integrated Livelihood Center (TILC)	
Bernabe G. Burscayno	President

8. JICA Toshio HIRODO DAR, Irrigation Engineer
 OOISHI NIA
 Mamoru FUKUDA NIA, Team Leader, Diversification Crops Irrigation
 Engineering Project
 Shigetaka SABURI DA, Adviser

Appendix - 4 Minutes of Discussion

MINUTES OF DISCUSSIONS
BASIC DESIGN STUDY
ON
THE INTEGRATED JALA-JALA RURAL DEVELOPMENT PROJECT
IN THE REPUBLIC OF THE PHILIPPINES

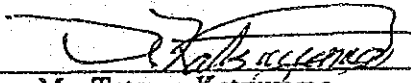
In response to a request from the Government of the Philippines, the Government of Japan decided to conduct a Basic Design Study on the Integrated Jala-Jala Rural Development Project (hereinafter referred to as " the Project"), and entrusted the study to the Japan International Cooperation Agency (JICA).

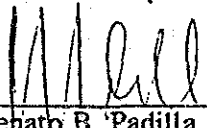
JICA sent to the Philippines a study team, which is headed by Mr. Tatsuhiro Katsuyama, Deputy Director, Design Division, Agricultural Structure Improvement Bureau, Ministry of Agriculture, Forestry and Fisheries, and is scheduled to stay in the country from October 17 to November 23, 1991.

The team held discussions with the officials concerned of the Government of the Philippines and conducted a field survey at the study area.

In the course of discussions and field survey, both parties have confirmed the main items described on the attached sheets. The team will proceed to further works and prepare the Basic Design Study Report.

Manila, October 24, 1991


Mr. Tatsuhiro Katsuyama
Leader
Basic Design Study Team
JICA


Hon. Renato B. Padilla
Undersecretary
Department of Agrarian Reform

ATTACHMENT

1. Objective

The objective of the Project is to improve agricultural and social infrastructure facilities to effectively demonstrate an impact of the Comprehensive Agrarian Reform Program as a model development of the Integrated Jala-Jala Rural Development Project.

2. Project Site

The project sites are located in Jala-Jala municipality, Rizal province, Region IV which appear in ANNEX I.

3. Executing Agency

The Department of Agrarian Reform (DAR) bears overall responsibilities for the administration and execution of the Project with support of :

- Department of Public Works and Highways
- Department of Agriculture
- National Irrigation Administration
- National Power Corporation / MERALCO

The organization chart of the Project is as shown in ANNEX II.

4. Items requested by the Government of the Philippines

After discussions with the Basic Design Study Team, the following items are finally requested by the Philippine side. However, the final items of the Project will be decided after further studies.

(1) Improvement of Trunk and Feeder Roads

Note : The Feeder Road to be improved will be determined based upon a result of the further study.

(2) Construction of Irrigation and Drainage Facilities

(a) Sipsipin Irrigation System for 170 ha of Farm Land:

Intake, Pump Station, irrigation and Drainage Canals, other incidental facilities

(b) Palay-Palay Irrigation System for 140 ha of Farm Land:

Impound, Pump Station, Irrigation and Drainage Canals, other incidental facilities

- (c) Llano Irrigation System for 65 ha of Farm Land:
Pump Station, Irrigation and Drainage Canals, other incidental facilities
- (d) Pagkalinawan Irrigation System for 55 ha of Farm Land:
Pump Station, Irrigation and Drainage Canals, other incidental facilities

(3) Construction of Rural Water Supply Facilities

Note : The number of level I and level II water supply facilities to be constructed will be determined based upon a result of the further study.

(4) Construction of Rice Mill Center

Note : Both parties have confirmed that the Rice Mill Center is necessary for the Project, although the further detailed study especially on management, operation, maintenance and organization of the Center is required for realization of this component.

5. Electric Power Supply System

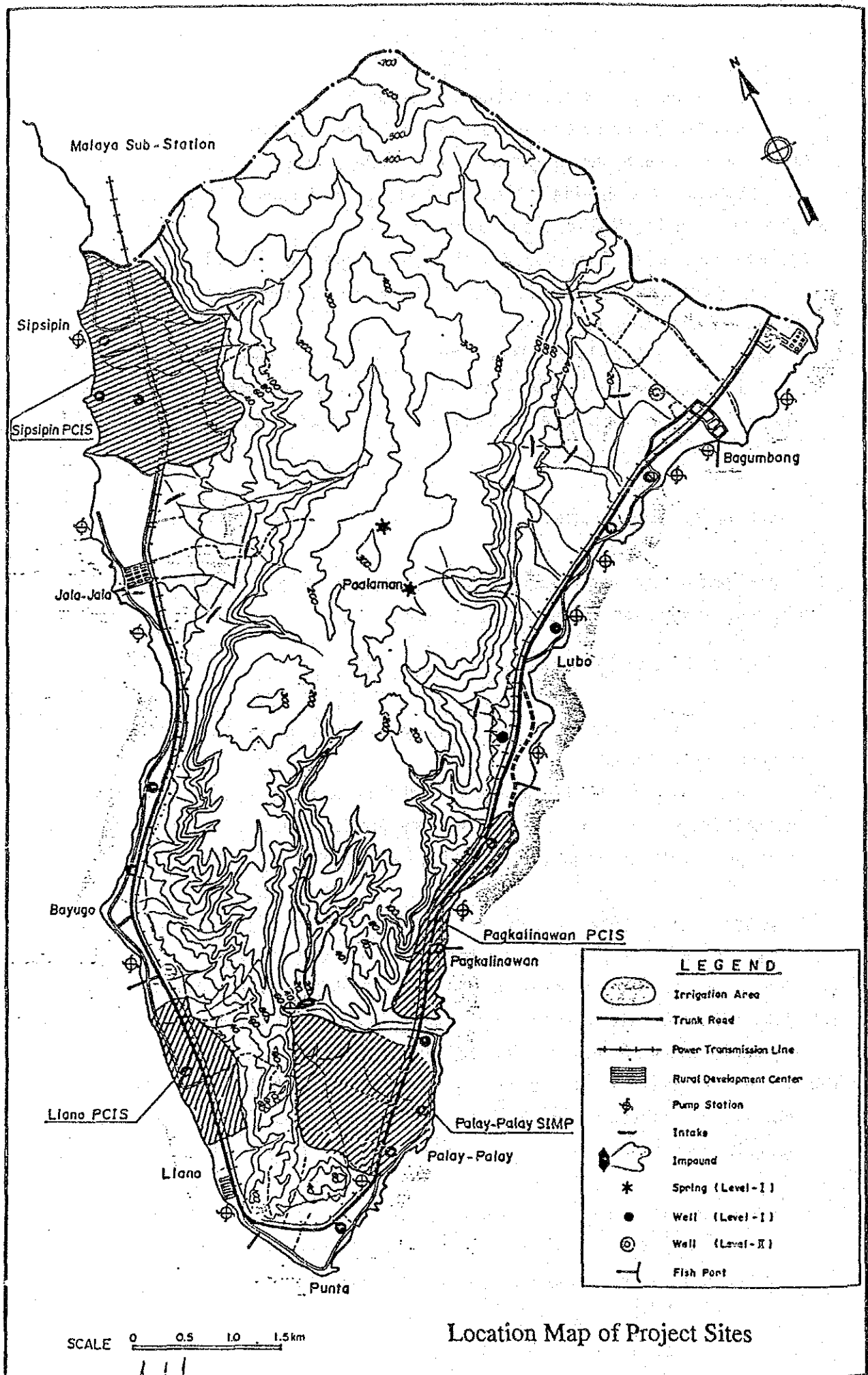
Both parties have confirmed that the Electric Power Supply System for the Project shall be constructed by the Philippine side.

6. Japan's Grant Aid System

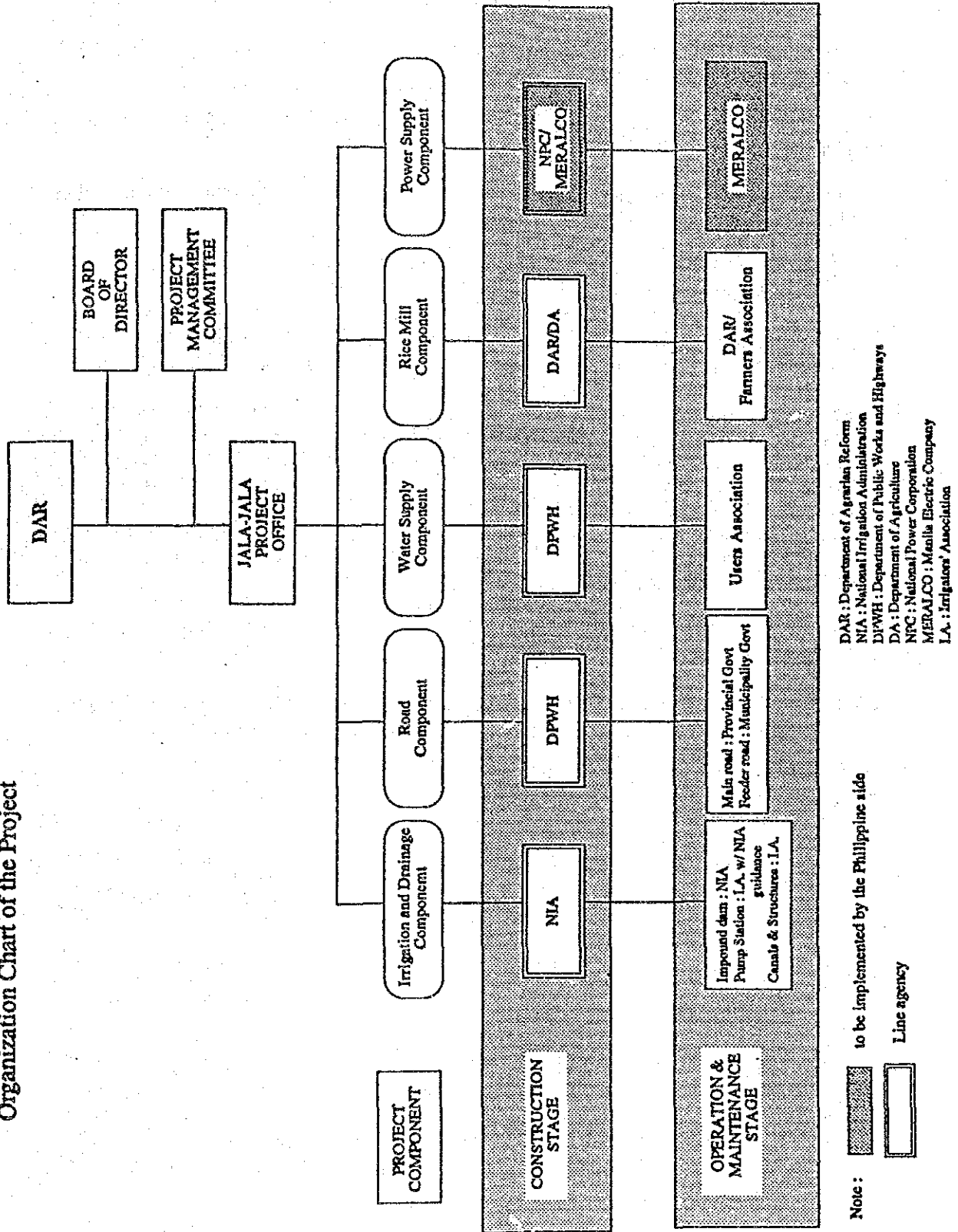
- (1) The Government of the Philippines has understood the system of Japanese Grant Aid explained by the team.
- (2) The Government of the Philippines will take the necessary measures, described in ANNEX III, for smooth implementation of the Project, on condition that the Grant Aid assistance of Japan is extended to the Project.

7. Schedule of the Study

- (1) The consultants will proceed to further studies in the Philippines until November 23.
- (2) JICA will prepare the draft final report in English and dispatch a mission in order to explain its contents in the beginning of March, 1992.
- (3) In case that the contents of the report is accepted in principle by the Philippine side, JICA will complete the final report and send it to the Government of the Philippines by the end of April, 1992.



Organization Chart of the Project



TK

Necessary Measures to be taken by the Government of the Philippines

1. To secure the land necessary for construction of the Project facilities
2. To provide the land for a temporary site office, warehouse and stock yard during the implementation of the Project
3. To provide facilities for distribution of electricity and other incidental facilities to the Project site
4. To bear the following commissions to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement
 - 1) Advising commission of Authorization to Pay (A/P)
 - 2) Payment commission
5. To ensure speedy unloading, tax exemption, customs clearance at the port of disembarkation and prompt inland transportation of products purchased for the Project.
6. To accord the Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such facilities as may be necessary for their entry into the Philippines and stay therein for the performance of their works
7. To exempt Japanese nationals involved in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in the Philippines with respect to the supply of equipment/machine and services under the verified contracts
8. To properly and effectively utilize and maintain the facilities and equipment purchased under the Grant Aid
9. To bear all expenses other than those to be borne by the Grant, necessary for construction of the facilities as well as for the transportation and the installation of the equipment

MEMORANDUM OF AGREEMENT

KNOW ALL MEN BY THESE PRESENTS

This agreement made and entered into and between:

The DEPARTMENT OF AGRARIAN REFORM, a government agency with principal office at Elliptical Road, Diliman, Quezon City, represented by its Undersecretary, HON. RENATO B. PADILLA, hereinafter referred to as "DAR",

- and -

The MANILA ELECTRIC COMPANY, a corporation duly organized and existing under and by virtue of the laws of the Republic of the Philippines, with principal office at Lopez Building, Ortigas Avenue, Pasig, Metro Manila, herein represented by its Sr. Vice-President and Head Customer Services Group, MR. MAGSIKAP B. MOLE, hereinafter simply referred to as "MERALCO".

WITNESSETH: That

WHEREAS, the DAR, in collaboration with Japan International Cooperation Agency (JICA), is implementing the Integrated Jala-Jala Rural Development Project (IJRDP), herein referred to as the "Project" with components for a rice mill center, irrigation and drainage facilities, road network, water supply and electrification.

WHEREAS, the DAR and the Basic Design Study Team, of the JICA, during the October 24, 1991 meeting, have confirmed that the funding, the construction, and operation and maintenance of the electric power supply facility requirements of the Project shall be the responsibility of the Philippine government:

WHEREAS, the MERALCO is a corporate entity that provides electrical power supply facilities in the Project area;

WHEREAS, the MERALCO is implementing the Rural Electrification Program with funding being sourced from the Overseas Economic Cooperation Fund (OECF);

WHEREAS, during a meeting between the MERALCO and the DAR on October 23, 1991, the former, through its representative, MR. MAGSIKAP B. MOLE, expressed full support to the IJRDP;

NOW THEREFORE, for and in consideration of the above premises, the parties therein have agreed to the following:

SECTION I.

SCOPE OF UNDERTAKING

This agreement shall cover and include collaboration of both parties in the implementation of the electrification component of the Project.

SECTION II.

RESPONSIBILITIES OF THE PARTIES

1. The DAR shall:

a. Provide MERALCO with all necessary data, information and documents that may be required for the establishment of the electrical supply facility requirements of the Project,

b. Secure the needed grants of right of way, easements, or permits for said facilities: and

c. Provide the following administrative support and logistic assistance to MERALCO:

- a) field personnel assistance;
- b) transportation facilities; and
- c) coordination with the other line agencies involved in project implementation

2. The MERALCO shall:

a. Implement the electrification component of the Project on behalf of the Philippine Government;

b. Include the said Project component under its Rural Electrification Program;

c. Identify alternative sources of funds for the electrification components as may be deemed necessary;

d. Under take the following activities for the electrification components of the Project:

- 1) Preparation of detailed electrical system design;
- 2) Provision of materials and labor requirements;
- 3) Actual construction of the electrical power supply facilities: and
- 4) Operation and Maintenance of the said facilities.

e. Ensure that the construction of the electrical power supply facilities of the Project shall be in accordance with the implementation scheduled to be indicated in the Exchange of Notes between the Government of the Philippines and Government of Japan; and

f. Operate and maintain the electrical power supply facilities during project implementation, and bill the end-users or customers for their electric consumption.

SECTION III.

GENERAL SPECIFICATION AND COST ESTIMATE

The electrical power supply facility requirements and its corresponding cost estimates have been determined by a joint survey team composed of the DAR, MERALCO and JICA representatives.

I. General Specifications

Source of power: MALAYA 333 KVA Special Transformer
(Malaya Power Plant)

Distribution Lines: 15.7 km. using 34.5 kV

Handwritten initials/signature

II. Project Cost Estimate

A. NET JOB COST

1. EA-03040 - P 1,570,748.00

2. EA-03045 - P 4,427,883.00

B. TOTAL JOB COST - P 5,998,631.00

C. 10% CONTINGENCY - P 599,863.10

GRAND TOTAL - P 6,598,494.10

The schematic design of the electrification component of the project is hereto attached as Annex "A" and is made as an integral part of this Memorandum of Agreement.

SECTION IV. AMENDMENT

Any modification of this Memorandum of Agreement shall be mutually discussed and agreed upon by both parties.

SECTION V. EFFECTIVITY PERIOD

This Memorandum of Agreement shall be deemed effective upon signing of the parties hereto.

IN WITNESS WHEREOF, the parties have caused their duly authorized representatives to affix their signatures hereto on the date and at the place first above set forth.

DEPARTMENT OF AGRARIAN REFORM
By:

Handwritten signature of Renato B. Padilla
RENATO B. PADILLA
Undersecretary

MANILA ELECTRIC COMPANY
By:

Handwritten signature of Magdikap B. Mole
MAGSIKAP B. MOLE
Sr. Vice-President and Head
Customer Services Group

SIGNED IN THE PRESENCE OF :

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R.F. W.P.

A C K N O W L E D G M E N T

REPUBLIC OF THE PHILIPPINES)

QUEZON CITY) S.S.

Before me, a Notary Public for and in Quezon City, personally appeared

[Handwritten signature]

<u>NAME</u>	<u>RES. CERT. NO.</u>	<u>DATE/PLACE ISSUE</u>
RENATO B. PADILLA	<u>4620367-L</u>	<u>3-26-91 Q.C.</u>
MAGSIKAP B. MOLE	<u>1000396-L-E</u>	<u>3-25-91 Manila</u>

who are both known to me and personally to me known to be the same persons who executed the foregoing document and acknowledged to me that the same are their free and voluntary act and deed.

[Handwritten signature]

WITNESS MY HAND AND SEAL this 14th day of November 1991 at Diliman, Quezon City.

[Handwritten signature]

[Handwritten signature]
ATTY. RODOLFO C. SABIO
NOTARY PUBLIC
 Until December 31, 1992
 P.T.R. No. 857473
 January 23, 1991
 Quezon City

Doc. No. 410
 Page No. 67
 Book No. VII
 Series of 199 1

[Handwritten signature]

PROJECT NO : 10440744
 DATE : 11/21/51

MANILA ELECTRIC COMPANY
 DESIGN ESTIMATING SUBSYSTEM

PAGE 1

SUMMARY OF ESTIMATES FOR COMMERCIAL PROJECTS

PROJECT NO : EC07000
 JOB NO. : 01

SUFFIX : C 31
 REV NO. : 00

CUSTOMER NAME : D.A.R.
 ADDRESS : 30. SIPSIPIN TANKY
 ENGR'S INITIALS : *JRV*

SUMMARY OF COSTS:	NET MATERIAL	STORES	LABOR	TRANSPORTATION	SUB-TOTALS	SALVAGE	RETIREMENT
1. DISTRIBUTION						6,252	15
NECO	11,225	1,555	7,431	1,267	21,478		
CONTRACTOR	1,040,614	98,546	132,795	22,709	1,300,664		
NET DIST. COST	1,051,839	100,101	140,226	23,976	1,322,292		
2. TRANSFORMER COST	215,934	20,543	4,516	772	242,765	0	0
3. SERVICE COST	4,511	436	581	99	5,727	0	0
4. STREETLIGHT COST	0	0	0	0	0	0	0
5. METER COST	0	0	0	0	0	0	0
SUB-TOTALS	1,273,384	121,180	151,373	24,947		6,252	15
						NET JOB COST	1,570,784

COMMERCIAL PROJECT COMPUTATIONS:

CASH ADVANCE 1,355,057
 DIFFERENCE-IN-COST 0
 INSTALLATION/REMOVAL COST 0

SUMMARY OF LABOR MANHOURS	PRODUCTIVE	NON-PRODUCTIVE
1. NECO .. INSTALL	212.40	199.53
.. RETIRE	19.92	19.71
2. CONTRACTOR	2,419.30	2,361.16
	TOTAL PROJECT MAN-HOURS	5,231.52



Republic of the Philippines
Province of Rizal
Municipality of Jala-Jala

EXCERPT FROM THE MINUTES OF THE MEETING OF NA-NA-JA (UNITED FARMERS
IN JALAJALA) NAGRAKASANG MAGSASAKA NG JALAJALA, HELD AT D.A.R.
OFFICE, JALAJALA, RIZAL ON NOVEMBER 14, 1991.

- PRESENT :
- | | | |
|---------------------------|-------|----------------------------------|
| Mr. JESUS BELA VEGA | ..... | Chairman |
| Mr. JESUS CUBILLA | ..... | Vice-Chairman (Internal Affairs) |
| Mr. MELECIO FRANCISCO | ..... | Vice-Chairman (External ") |
| Mr. ROLANDO SAN JUAN | ..... | Sec/Treas. |
| Mr. HERMOGENES CANDELARIA | ..... | M E M B E R S |
| Mr. JUANITO DE LOS SANTOS | .. | -do- |
| Mr. BENJAMIN REYES | ..... | -do- |
| Miss EDITH CAMPO | ..... | -do- |
| Mr. CAMILO TECODORO | ..... | -do- |
| Mr. BERNARDO V. DAGUM | ..... | -do- |
| Mr. T. SAN JUAN | ..... | -do- |
| Mr. D. ESCAMILLAN | ..... | -do- |
| Mr. E. RODRIGUEZ | ..... | -do- |
| Mr. G. HERNANDEZ | ..... | -do- |
| Mr. PEDRO LARA | ..... | -do- |
| Mr. JULIAN BALAKIT | ..... | -do- |
| Mr. EUREN UMANDAB | ..... | -do- |
| Mr. GABRIEL CRUZ | ..... | -do- |
| Mr. FELIPE LAUREL | ..... | -do- |
- ABSENT : N C N E

Resolution No. 01, S-1991

A RESOLUTION REQUESTING JICA-JAPAN INTERNATIONAL COOPERATION AGENCY
THROUGH THE DEPARTMENT OF AGRARIAN REFORM, FOR THE CONSTRUCTION OF RICE
MILL CENTER IN THE MUNICIPALITY OF JALAJALA, RIZAL.

WHEREAS, the construction of rice mill will reduce the post harvest
losses of palay;

WHEREAS, it will maximize the farmers profit and improve the market-
ing System and definitely provide employment for the people of Jala-
Jala, Rizal by means of:

- a) Proper timing in disposition of the produce
- b) establish a ready market channel
- c) Reduce monopoly in rice business
- d) minimize the operation of unscrupulous middlemen

WHEREAS, if the proposed (construction) construction of RICE MILL
CENTER will be undertaken within the two (2) hectare land area located
at Sitio Llano; Baranggy Bayugo, Jalajala, Rizal being owned by MERIL-
CO FOUNDATION, INC. it will uplift the morale, living condition of the
Filipino people more particularly the "NAGRAKASANG MAGSASAKA NG JALA-
JALA, RIZAL" ;

NOW THEREFORE, after careful deliberation on the matter, on motion
by Mr. HERMOGENES CANDELARIA, duly seconded by Mr. GABRIEL CRUZ, it
was;

RESOLVED, as it is hereby resolved to request the JICA, to expedite
immediate approval of this resolution in the interest of public service
especially the "UNITED FARMERS in JALAJALA" NA-NA-JA;

RESOLVED FINALLY, that certified copies of this resolution be res-
pectfully forwarded to the Chairman, JAPAN INTERNATIONAL COOPERATION
AGENCY, through the Department of Agrarian Reform; for their informa-
tion and favorable action;

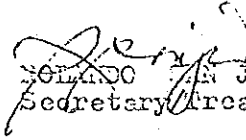
C A R R I E D


I HEREBY CERTIFY, to the veracity and correctness of the foregoing
resolution.



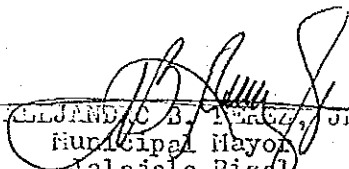
Republic of the Philippines
Province of Rizal
Municipality of Jala-Jala

Continuation: Page -2- Resolution No. 01,3-1991


ROLANDO BEN JUAN
Secretary/Treasurer


ROLANDO BEN JUAN
Chairman

A T T E S T E D:


Hon. BENJAMIN B. TERCA, JR.
Municipal Mayor
Jalajala, Rizal

Appendix - 5 Country Data

I. BASIC INDICATORS

1. Name of Country	:	PHILIPPINES			
2. Capital	:	Manila			
3. Date of Independence	:	June 12, 1898			
4. Area of Territory	:	300,000 km ²			
5. Population	:	60,685,000 (as of May 1, 1990)			
6. Population Density	:	202.3 person/km ²			
7. Population Growth Rate	:	2.35% per year			
8. Life Expectancy	:	55 years old			
9. Political Conditions					
(1) Form of Government	:	Presidential Form			
(2) Form of National Assembly	:	Governmental affairs consists of 3 department namly ; Legislative, Executive and Judicial			
(3) Political Party	:	Multi-party System			
(4) Sovereign (President)	:	Corazon Cojuangco Aquino (February 25, 1986)			
10. Religious Conditions	:	Catholic	:	85.0%	
		Islam	:	4.3%	
		Aglipayan	:	3.9%	
		Protestant	:	3.1%	
		Iglesia ni Kristo	:	1.3%	
		Buddhist	:	0.9%	
11. Languages	:	87 languages and dialects			
		Major are Tagalog and Cebuano			
		English is also prevalent			
12. Racial Conditions	:	Tagalog	29.7%	Cebuano	24.2%
		Ilocano	10.3%	Ilongo	9.2%
		Bicol	5.6%	Samr-Leyte	4.0%
		Panpanga	2.8%	Pangasinan	1.8%
		Others	12.4%		

13. Education

- (1) Education System : Two (2) forms of education
- 1) Formal education
 - Pre-school ; (1 or 2 years, optional)
 - Primary school ; (6 years)
 - Secondary school ; (4 years)
 - Tertiary or college education ; (4 to 5 years)
 - Post-tertiary (masters and Doctorate) ; Post-secondary non-degree technical/ training (3 years)
 - 2) Non- formal
 - Educational activities for employable skills in short-term non-degree course.

Kind of School	No of School	No of Teachers*	No of Pupils
Pre-school	3,837	11,018	321,459
Elementary school	34,382	315,585	10,284,816
Secondary school	5,521	118,805	3,961,639
Tertiary or college	1,755	-	1,347,715
Bon-formal school	-	-	269,011

*) ; Teachers in government schools only

Source ; 1991 Philippine Statistical Yearbook, NSCB

II. SOCIO-ECONOMIC INDICATORS

1. Trend of Gross Domestic Product

Unit : million peso

Items	1986	1987	1988	1989	1990
GDP (at current prices)	91,180	95,398	101,450	107,168	109,890
GDP Expenditure (at current price)	11,413	12,350	14,064	16,049	18,377
Per Capita National Income					
- at current prices	8,930	9,685	11,564	13,250	15,307
- at 1972 prices	1,309	1,314	1,420	1,473	1,492
Per Capita Private (personal)					
- at current prices	8,644	9,172	10,274	11,723	13,715
- at 1972 prices	1,212	1,228	1,271	1,313	1,363
Population (,000 persons)	54.95	57.36	58.72	60.10	61.48
Exchange Rate to US \$ (peso)	20.40	20.57	21.07	21.74	24.38

2. Gross Domestic Product by Industrial Origin
(at 1972 constant price)

Unit : million peso

Items	1986	1987	1988	1989	1990
Agriculture, fishery and forest	27,110	26,834	27,793	28,986	29,620
Mining and quarrying	1,574	1,574	1,615	1,563	1,602
Manufacturing	21,717	23,076	25,281	26,886	27,259
Construction	3,382	3,967	4,344	4,947	5,153
Electricity, gas and water	1,723	1,908	1,995	2,137	2,206
Transport and communication	5,105	5,251	5,487	5,761	5,977
Trade	14,337	15,153	15,998	16,795	17,352
Finance and housing	4,831	5,832	6,250	6,843	7,205
Private services	6,039	6,106	6,445	6,767	6,997
Government services	5,362	5,697	6,242	6,483	6,519
Total	91,180	95,398	101,450	107,168	109,890

3. Currency Unit Trend of Exchange Rate to US Dollar

(1) Currency Unit : Philippine peso

(2) Trend of Exchange Rate to US Dollar

Unit : peso

Item	1986	1987	1988	1989	1990
Exchange Rate to US\$ 1.00	20.403	20.565	21.065	21.738	24.381

4. Consumer Price Rate

Item	1987	1988	1989	1990	1991
Annual Inflation Rate	3.8	8.8	10.6	12.7	16.6

Source : NSO

5. Trend of Foreign Trade

(1) Trend of Foreign Trade

Unit : peso

Item	1986	1987	1988	1989	1990
Export*	98,578.64	117,608.13	149,053.39	169,717.44	198,101.93
Import	102,889.44	138,579.47	171,918.14	226,505.15	297,586.18
Balance	(4,310.80)	(20,971.34)	(22,864.74)	(56,787.71)	(99,484.25)

*) : Sum of domestic exports and re-exports

Source : National Statistics Office

(2) National Commodities Traded

1) Agricultural Products

a. Export

Unit : million US\$

Items	1986	1987	1988	1989	1990
Sugar	86.8	60.3	60.2	80.0	110.5
Coconut oil	332.8	380.5	408.2	376.8	360.7
Banana	130.2	121.2	146.0	146.2	149.3
Pineapple in syrup	83.5	86.3	83.2	91.3	78.2
Copra cake or meal	74.8	73.4	63.4	53.5	54.0
Desiccated coconut	44.3	75.3	78.3	78.0	60.7
Tuna, frozen except fillet	63.1	69.9	113.2	1,130.0	102.6
Coffee, raw or green, not roasted	118.8	33.1	49.9	42.0	8.0
Copra	17.5	31.9	28.0	25.2	20.5
Abaca (in '000 bales)	13.0	11.8	16.3	17.6	14.8

Source : Foreign Trade Statistics, NSO

b. Imports

Unit : million US\$

Items	1986	1987	1988	1989	1990
Cereals and cereal preparations	168.31	134.41	228.25	337.01	437.10
Fertilizers, manufactured	83.41	89.24	107.74	103.69	117.29
Daily products and bird eggs	98.22	149.54	161.44	216.56	229.30
Feeding stuff for animal (milled)	87.05	97.64	166.50	176.97	173.90
Tobacco, tobacco manufactures	65.90	94.39	78.10	65.50	62.85
Coffee, tea, cocoa, spices	3.70	5.44	8.10	13.68	18.19
Fish, crustaceans, mollusks	18.90	30.96	35.39	36.50	47.90
Meat and meat preparations	3.67	6.93	9.80	17.76	19.14
Vegetables and fruits	16.43	18.08	36.85	51.00	42.75
Fixed vegetable oil and fats	8.39	8.99	12.49	18.39	17.42

Source : Foreign Trade Statistics, NSO

2) Non-agricultural Products

a. Exports

Unit : million US\$

Items	1986	1987	1988	1989	1990
Mineral products	267.00	224.00	383.00	424.00	361.00
Mineral, fuel and lubricants	66.00	97.00	153.00	118.00	155.00
Chemicals	243.00	245.00	256.00	279.00	261.00
Textiles	44.00	68.00	71.00	88.00	93.00
Miscellaneous manufactures	2874.00	3558.00	4647.00	5689.00	6158.00
Re-export	112.00	149.00	80.00	70.00	95.00

Source : National Statistics Office, Central Bank of the Philippines for data prior to 1973

b. Imports		Unit: million US\$				
Items	1986	1987	1988	1989	1990	
Machinery and equipment	305.20	453.60	837.40	1,105.80	1,531.20	
Un-processed raw materials	997.30	1,359.90	1,386.30	1,791.80	2,357.10	
Semi-processed raw materials	3,104.90	4,092.80	4,982.50	6,329.20	6,924.20	
Supplies	321.40	370.90	384.40	504.60	538.20	
Consumer goods (non-durable)	294.60	440.00	531.10	623.90	773.80	

Source : National Statistics Office, Central Bank of the Philippines for data prior to 1973

6. Economically Active Population Employment by Sector, Daily Wage Rate and Employment by Major Industry

(1) Economic active population

Unit ,000 persons

Year	Population (15 years and over)	Active Population	Inactive Population
1985	33,646	29,911	3,735
%	100.0	88.9	11.1
1986	4,738	4,212	526
%	100.0	88.9	11.1
1987	34,840	31,670	3,170
%	100.0	90.9	9.1
1988	35,865	32,888	2,977
%	100.0	91.7	8.3
1989	36,916	33,815	3,101
%	100.0	91.6	8.4
1990	37,999	34,921	3,078
%	100.0	91.9	8.1

(2) Employment by Sector

Unit : ,000 persons

Major Industry Group	1987	1988	1989	1990
Agriculture, forestry, hunting and fishing	9,940	9,920	9,852	10,185
Mining, quarrying	157	154	133	
Construction	2,059	2,238	2,298	2,188
Manufacturing	95	83	91	
Electricity, gas, water, and sanitary services	759	858	911	974
Commerce	2,972	3,074	3,145	
Transport, communication and storage	946	1,049	1,095	1,137
Government, community, business, recreation	379	398	444	
Personal services other than domestic	3,621	3,827	3,972	4,220
<u>Total</u>	<u>20,795</u>	<u>21,495</u>	<u>21,837</u>	<u>22,517</u>

(3) Daily Wage Rate, 1987 - 1990

Unit : peso

Items	1987	1988	1989	1990
Agriculture				
Metro Manila	58.27	69.33	82.88	96.42
Outside Metro Manila	57.24	69.33	82.88	96.42
Non-agriculture				
Plantation	46.67	47.67	72.04	85.85
Non-plantation	35.67	36.49	55.28	63.38

(4) Employment by Major Industry

Unit : %

Major Industry Occupation	1987	1988	1989	1990
Number of person employed 15 years and over (,000 persons)	34,840	35,865	36,916	37,999
Agriculture, forestry, hunting, fishing	28.53	27.66	26.69	26.80
Mining, quarrying	0.42	0.44	0.42	0.35
Construction	5.91	6.24	6.22	5.76
Manufacturing	0.23	0.26	0.22	0.24
Electricity, gas, water, sanitary services	2.18	2.39	2.47	2.56
Commerce	8.20	8.29	8.33	8.28
Transport, communication, storage	2.72	2.92	2.97	2.99
Government, community, business, recreat	1.11	1.06	1.08	1.17
Personal services other than domestic	10.39	10.67	10.76	11.11
<u>Total</u>	<u>59.69</u>	<u>59.93</u>	<u>59.15</u>	<u>59.26</u>

7. Balance of Payment (1)

Unit : million US\$

Items	1986	1987	1988	1989	1990
I. Current Transactions					
a. Merchandise Trade	(202)	(1,017)	(1,085)	(2,598)	(4,020)
Export	4,842	5,720	7,074	7,821	8,186
Import	5,044	6,737	8,159	10,419	12,206
b. Non-merchandise Trade	783	0	(80)	303	618
Inflow	3,791	3,454	3,592	4,586	4,836
Outflow	3,008	3,454	3,672	4,283	4,218
c. Transfor (donations, etc.)	441	573	775	830	714
Inflow	445	575	778	832	717
Outflow	4	2	3	2	3
<u>Current net inflow, total</u>	<u>1,022</u>	<u>(444)</u>	<u>(390)</u>	<u>(1,465)</u>	<u>(2,688)</u>

7. Balance of Payment (2)

Unit : million US\$

Items	1986	1987	1988	1989	1990
II. Non-monetary Capital					
d. Long-term capital	815	159	(519)	379	392
Inflow	2,545	2,598	2,412	2,811	4,398
Outflow	1,730	2,439	2,931	2,432	4,006
e. Lon- term capital	114	326	986	854	469
Inflow	186	439	1,077	972	695
Outflow	72	113	91	118	226
f. Short-term capital	(814)	80	(303)	(91)	9
Errors and omission*	101	144	479	385	620
g. Monetization of gold	279	365	314	288	218
h. Allocation	(68)	(78)	83	101	797
III. Overall Surplus (deficit)	1,247	264	650	451	(183)

Source : Philippine Statistical Yearbook, 1991

8. Public External Debt

Unit : million US\$

Items	1984	1985	1986	1987	1988
Total	25,418	26,252	28,256	28,649	28,039
<i>Official Creditors</i>					
- Multilateral	4,090	4,486	4,688	5,033	4928
- Bilateral	2,276	2,860	3,925	5,203	6,234
- Others	139	373	374	844	723
<i>Private Creditors</i>					
- Suppliers	3,103	3,264	3,085	2,355	2,036
- Financial markets	1,089	795	828	390	399
- Banks	14,721	14,474	15,356	14,624	13,719

Source : Philippine Yearbook, 1989

9. Public Finance

Unit : million peso

Items	1987	1988	1989	1990	1991
Revenues	103,214	112,861	142,136	177,216	206,381
Tax	85,923	90,352	121,352	155,453	184,482
Non-tax	17,291	22,509	20,784	21,763	21,899
Expenditures	115,073	137,045	156,683	183,850	210,123
Current Operating	94,812	118,807	127,483	151,233	162,777
Capital Outlays	20,261	18,238	29,200	32,617	47,346
Net Budgetary					
Suplus / deficit	(19,459)	(24,184)	(14,547)	(6,184)	(4,519)
Budgetary					
Transactions	(11,859)	(19,277)	(10,873)	6,634	(3,742)
Net lending	(7,600)	(4,907)	(3,666)	(450)	(777)
Others					
Financing	41,118	64,629	13,039	4,684	3,019
Domestic (net)	34,337	47,339	1,644	(6,815)	(29,398)
External (net)	6,781	17,290	11,395	11,499	32,417
Change in each	21,659	40,445	1,500	1,500	1,500

Source : Budget of Expenditures and Sources of Financing, Dept. of Budget & Management.

10. Expenditure by Purpose

Unit : million peso

Items	1987	1988	1989	1990	1991
Public Debt	70,223	71,321	56,498	60,871	74,763
General Services	12,559	15,730	17,453	22,144	25,982
Social Services	27,493	31,061	38,511	56,144	62,509
(% of education)	62	71	71	63	63
(% of health)	15	18	17	15	16
Economic Services	25,039	26,092	39,523	49,747	64,344
(% of agriculture)	30	32	33	34	33
(% of infrastructure)	37	50	43	34	30
Defense	70,223	71,321	56,498	60,871	74,763
Total	<u>205,537</u>	<u>215,525</u>	<u>208,483</u>	<u>249,777</u>	<u>302,361</u>

Source : Budget of Receipts and Expenditures, Dept. of Budget and Management & Annual Finance Report, Commission on Audit.

11. Trend of Trade

Unit : million US\$

Items	1986	1987	1988	1989	1990
Exports to Japan	851.1	981.5	1,420.4	1,585.9	1,616.0
Import from Japan	868.3	1,121.2	1,421.3	2,043.2	2,232.0
<u>Balance</u>	-17.2	-139.7	-0.9	-457.4	-616.1

Source : Statistical Yearbook

12. Gross Official Foreign Reserves

Unit : million US\$

Items	1985	1986	1987	1988
Reserves (international)	1,061.14	2,458.98	1,958.68	2,058.88

Source : Central Bank of the Philippines

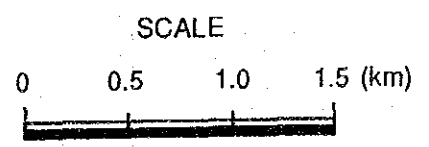
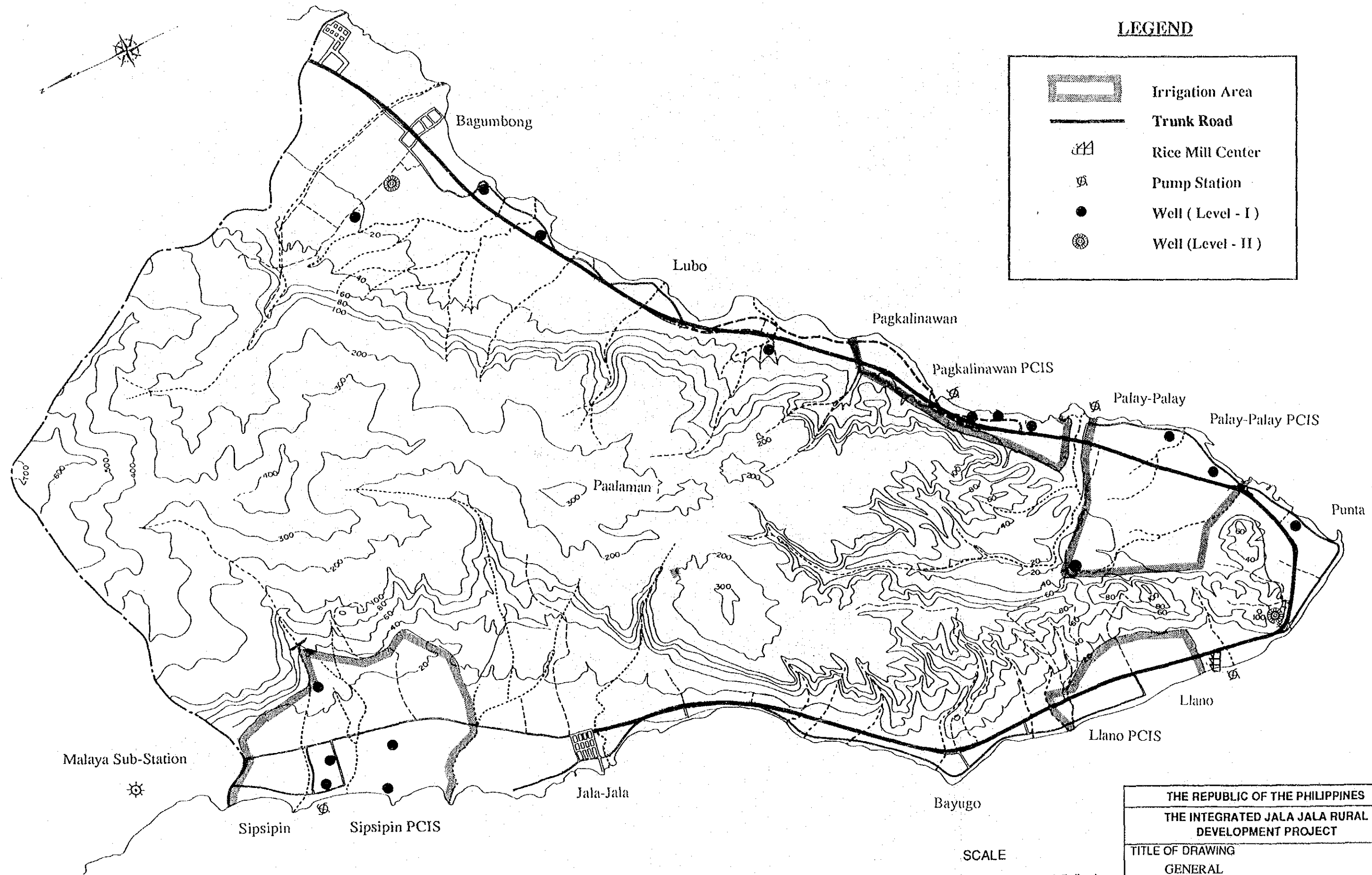
DRAWINGS

List of Drawings

No.	Title of Drawings		
I. GENERAL			
1	General Layout		
II. IRRIGATION AND DRAIN			
2	Layout of Spisipin PCIS		
3	Layout of Llano PCIS		
4	Layout of Palay Palay and Pagkalinawan PCISs		
5	Pump Station Sipsipin PCIS	General plan & profile	
6		Pump station	
7		Llano PCIS	General plan & profile
8			Pump station
9		Palay-Palay PCIS	General plan & profile
10			Pump station
11		Pagkalinawan PCIS	General plan & profile
12			Pump station
13	Profile of Pipeline	Sipsipin PCIS	
14		Llano PCIS	
15		Palay-Palay PCIS	
16		Pagkalinawan PCIS	
17 - 18	Canal Profile	Palay-Palay PCIS	4 canals
19 - 20		Pagkalinawan PCIS	2 canals
21	Canal Related Structures	Typical section, Discharge Sump, Turnout	
22		Drop, Siphon	
23		Culvert, Cross Drain, Field Inlet	
24		Gate on Intake	
25		Drainage Culvert	
III. ROAD			
26 - 31	Trunk Road	Plan and Profile (1/6 - 6/6)	
32 - 36	Feeder Road	Layout (1/5 - 5/5)	
37	Structures	Typical Cross Section	
38		Culvert	Type-A to E
39			Type-F, G
IV. RURAL WATER SUPPLY SYSTEM			
40	Location Map		
41	Profile of Well (Level - I & Level - II)		
42 - 43	Water Tank		
44	Plan of Water Supply System in	Punta	
45		Bagunbon	
46	Structures	Pipe Fitting Arrangement	
V. RICE MILL			
47	General Plan		
48	Finishing Schedule		
49	Plan of Office, Lavatory, Garage		
50	Plan of Drying House		
51	Plan of Milling House		
52	Plan of Husk Storage, Ash Storage and Dust & Bran House		

LEGEND

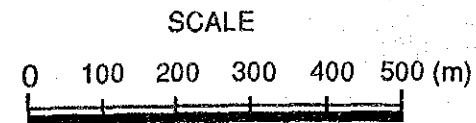
	Irrigation Area
	Trunk Road
	Rice Mill Center
	Pump Station
	Well (Level - I)
	Well (Level - II)



THE REPUBLIC OF THE PHILIPPINES		
THE INTEGRATED JALA JALA RURAL DEVELOPMENT PROJECT		
TITLE OF DRAWING		
GENERAL		
General Layout		
Date	Drawing No.	
JAPAN INTERNATIONAL COOPERATION AGENCY		



LEGEND	
	Pipeline
	Irrigation Canal
	Drainage Canal
	Pump House
	Discharge Sump
	Turnout
	Road Crossing on Irrigation Canal
	Road Crossing on Drainage Canal
	Syphon
	Cross Drain
	Aqueduct Bridge
	Irrigation Area



THE REPUBLIC OF THE PHILIPPINES		
THE INTEGRATED JALA JALA RURAL DEVELOPMENT PROJECT		
TITLE OF DRAWING		
IRRIGATION AND DRAINAGE FACILITIES		
Layout of Spisipin PCIS		
Date	Drawing No.	
JAPAN INTERNATIONAL COOPERATION AGENCY		