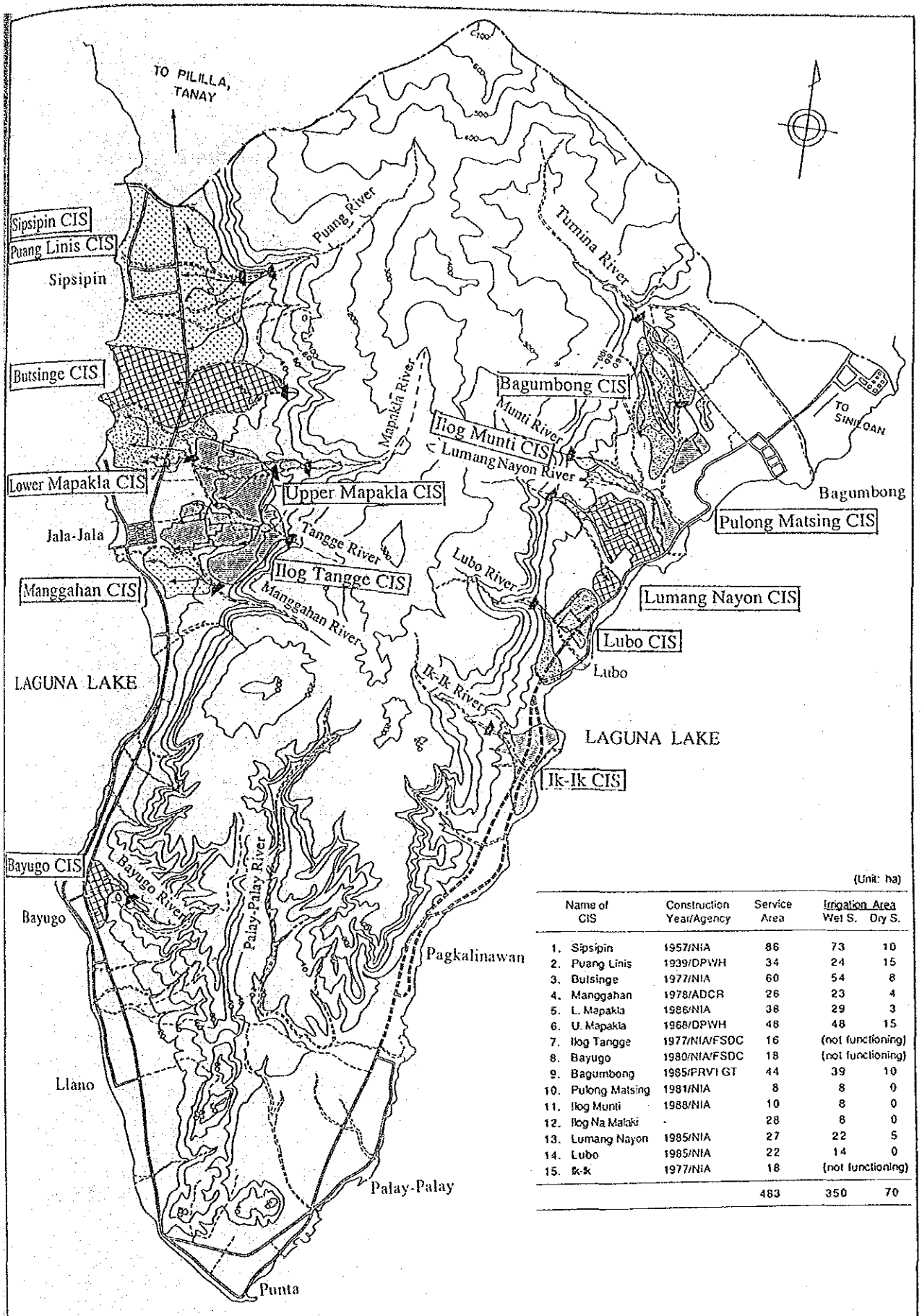
FIGURES



(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. Mapakla	1986/NIA	38	29	3
6. U. Mapakla	1968/DPWH	48	48	15
7. Ilog Tangge	1977/NIA/FSDC	16	(not functioning)	
8. Bayugo	1980/NIA/FSDC	18	(not functioning)	
9. Bagumbong	1985/PRVI GT	44	39	10
10. Pulong Matsing	1981/NIA	8	8	0
11. Ilog Munti	1988/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. VI.1.1 Existing Communal Irrigation System

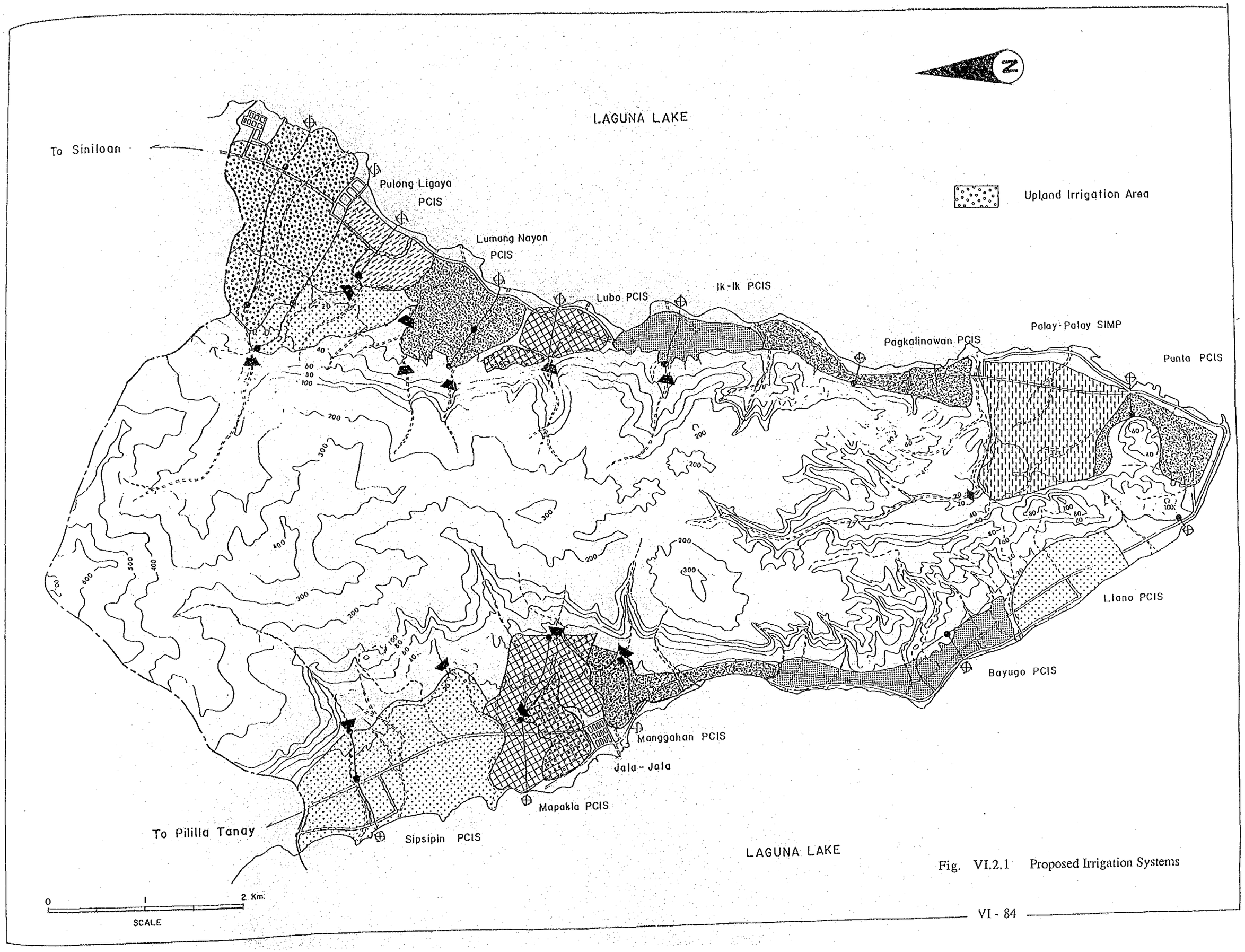
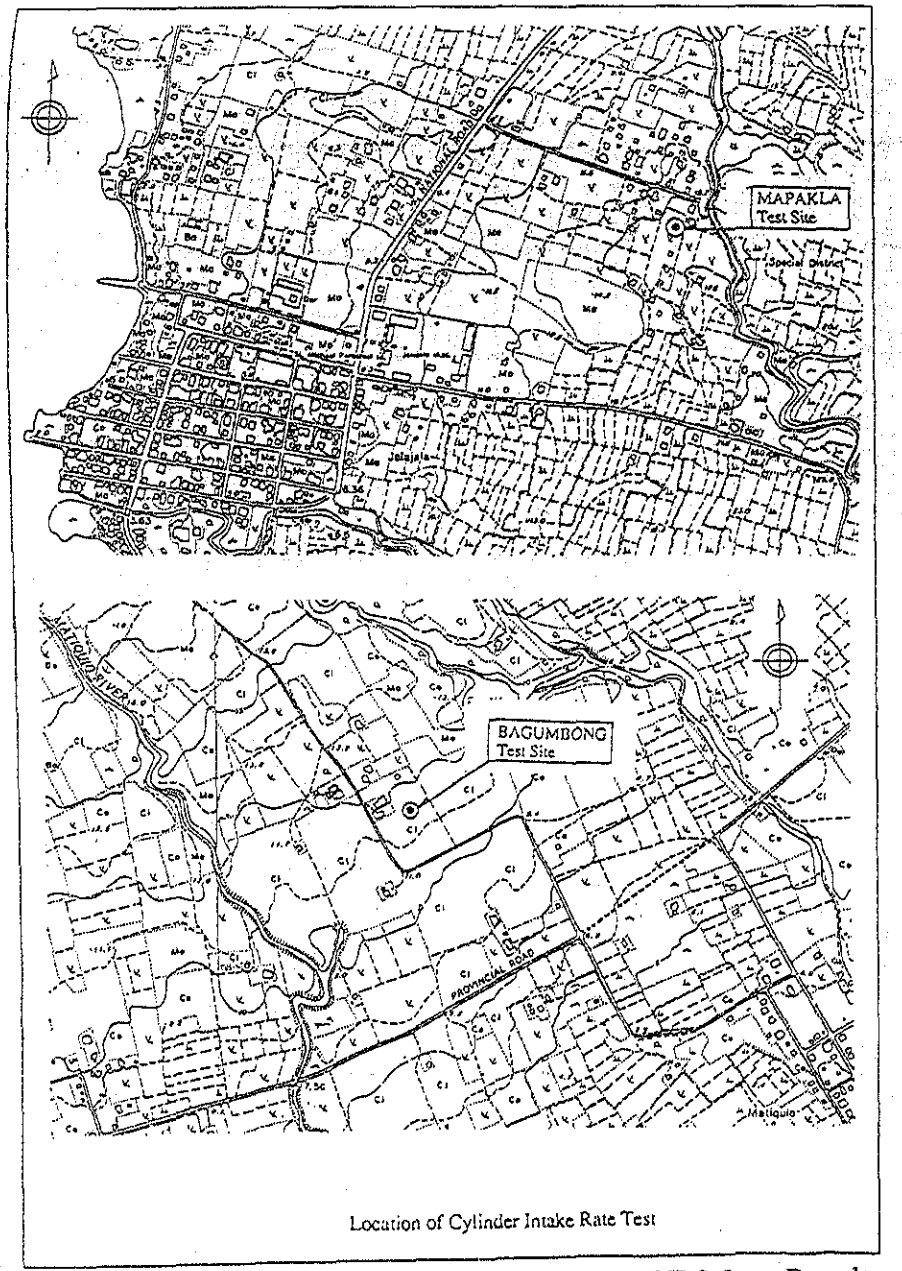


Fig. VI.2.1 Proposed Irrigation Systems



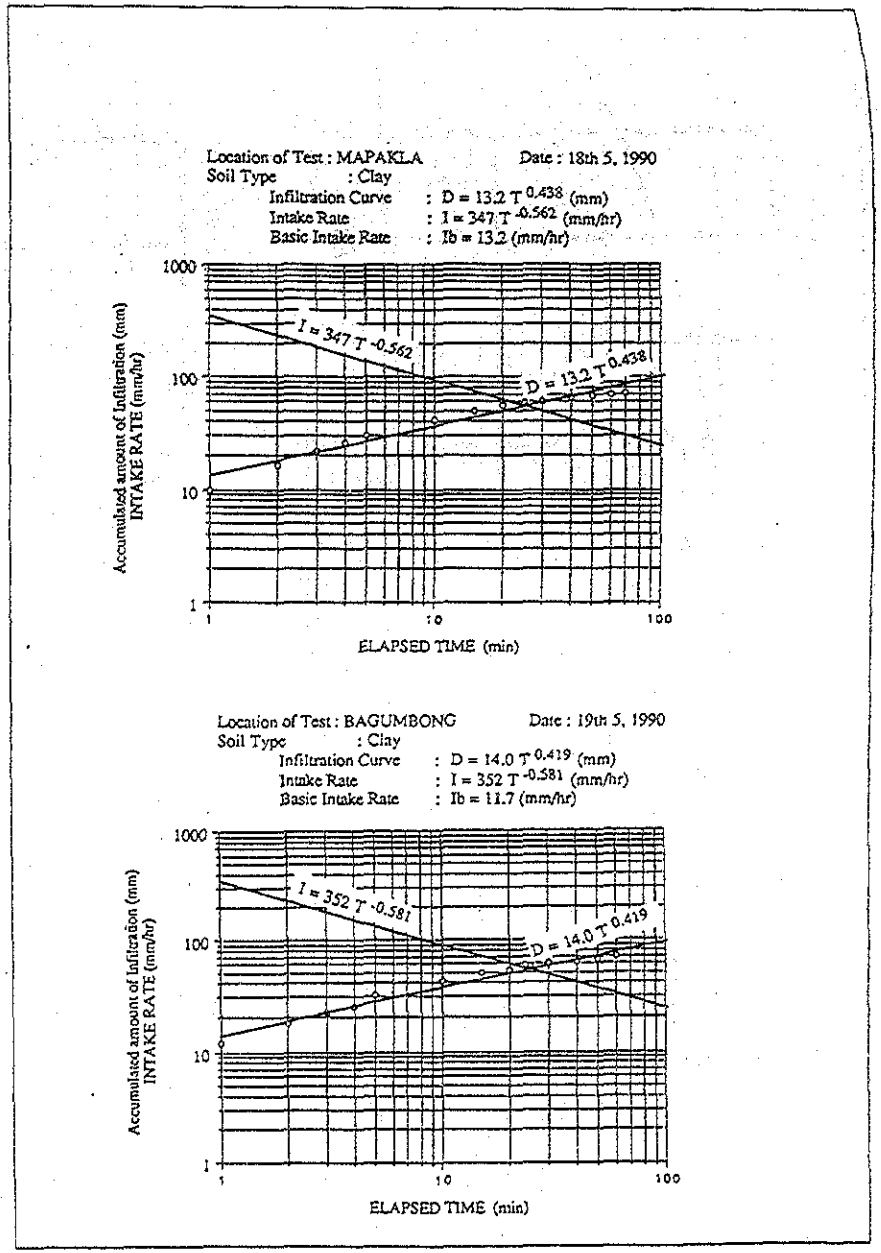
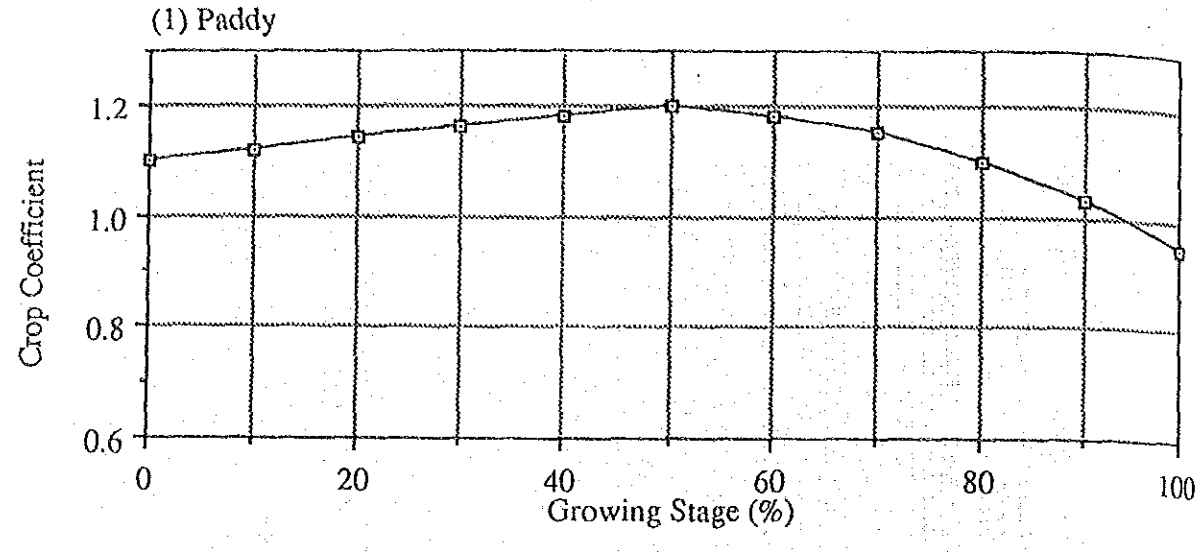
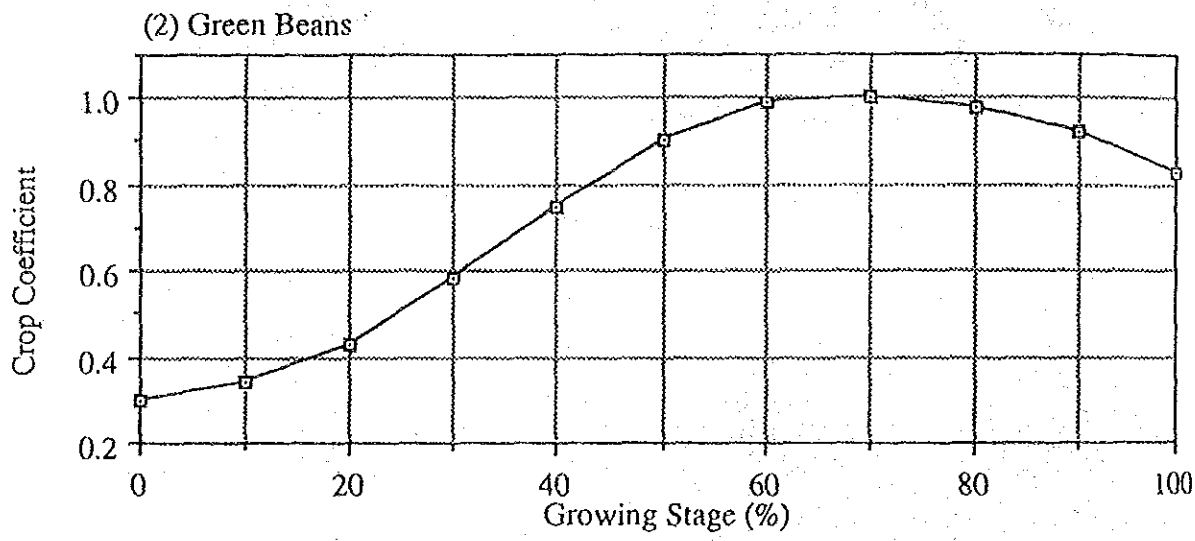


Fig. VI.2.2 Result of Intake Rate Measurement





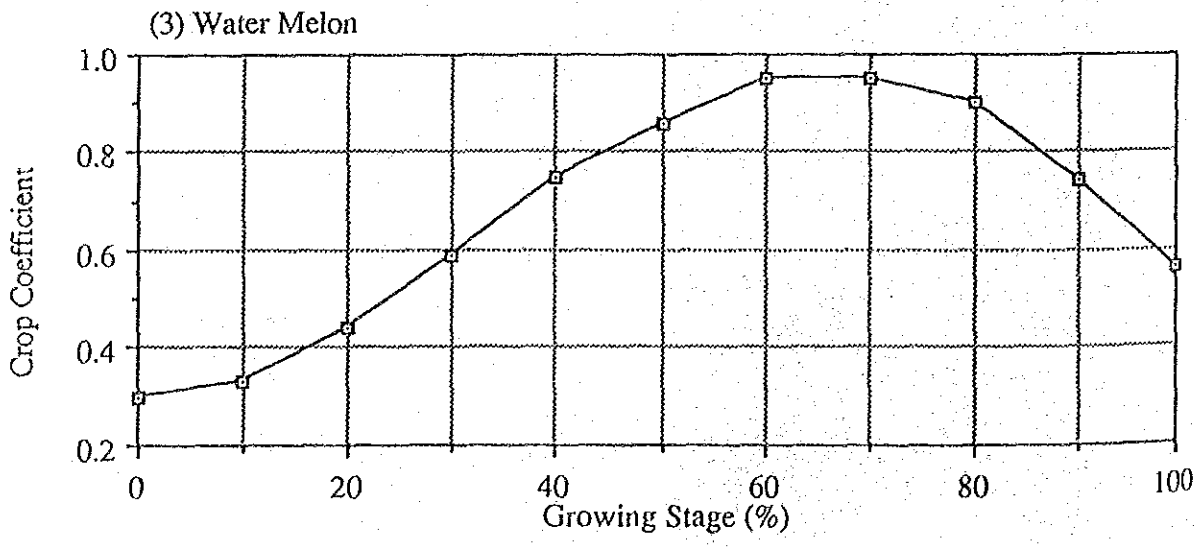
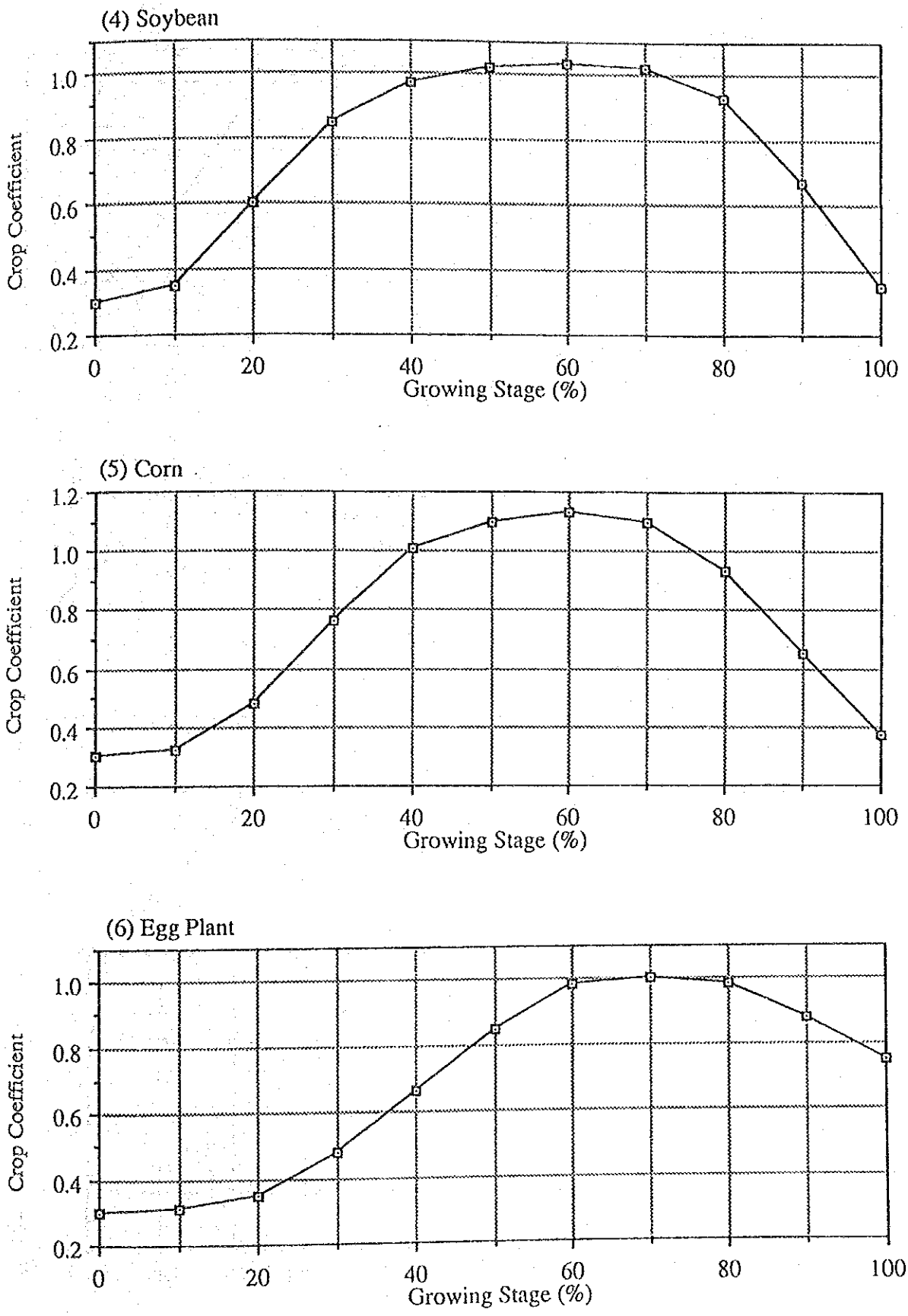


Fig. VI 2.3 (1) Crop Coefficients



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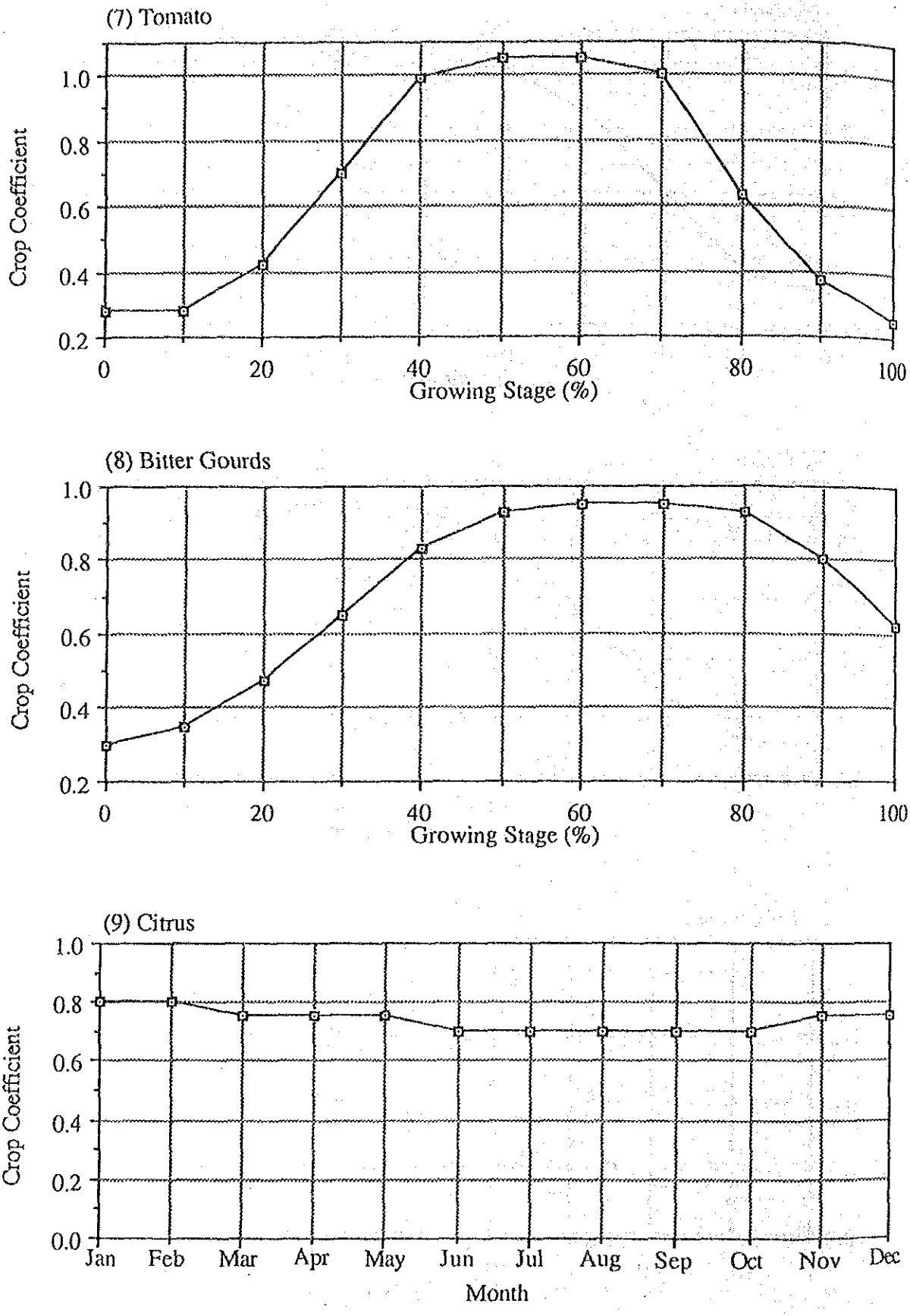
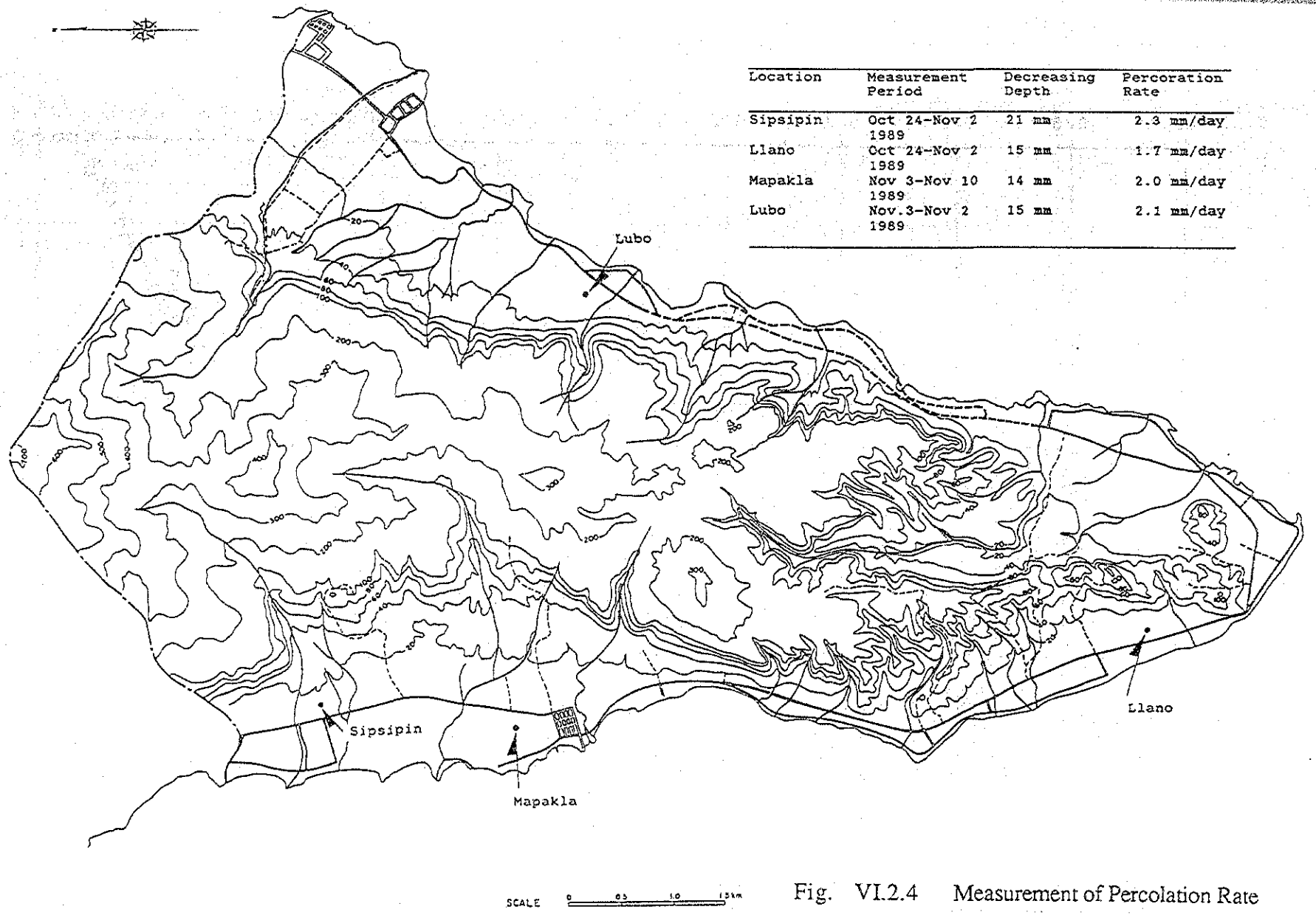


Fig. VI 2.3 (3) Crop Coefficients



Location	Measurement Period	Decreasing Depth	Percoration Rate
Sipsipin	Oct 24-Nov 2 1989	21 mm	2.3 mm/day
Llano	Oct 24-Nov 2 1989	15 mm	1.7 mm/day
Mapakla	Nov 3-Nov 10 1989	14 mm	2.0 mm/day
Lubo	Nov.3-Nov 2 1989	15 mm	2.1 mm/day

Fig. VI.2.4 Measurement of Percolation Rate

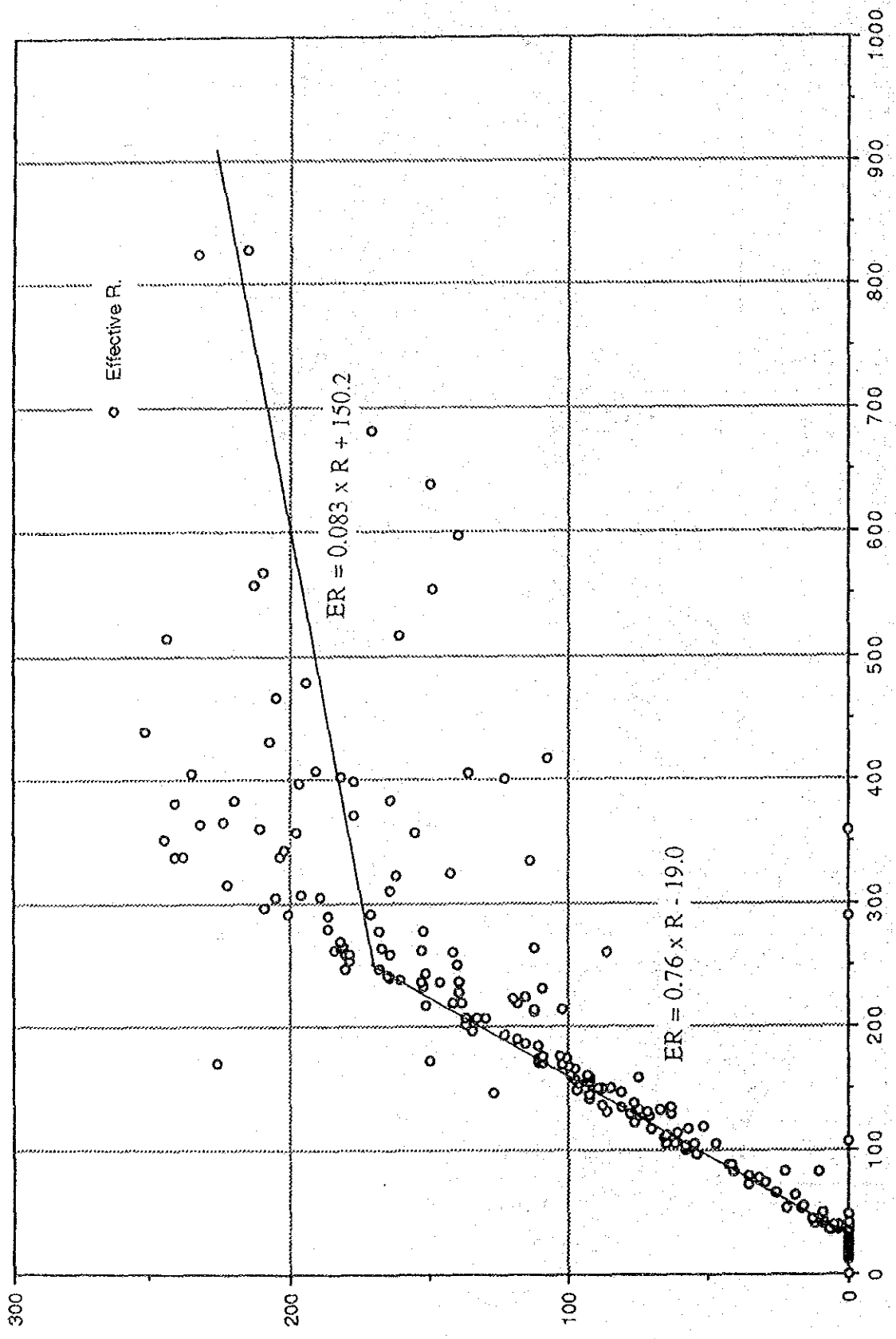


Fig. VI.2.5 *Effective Rainfall*

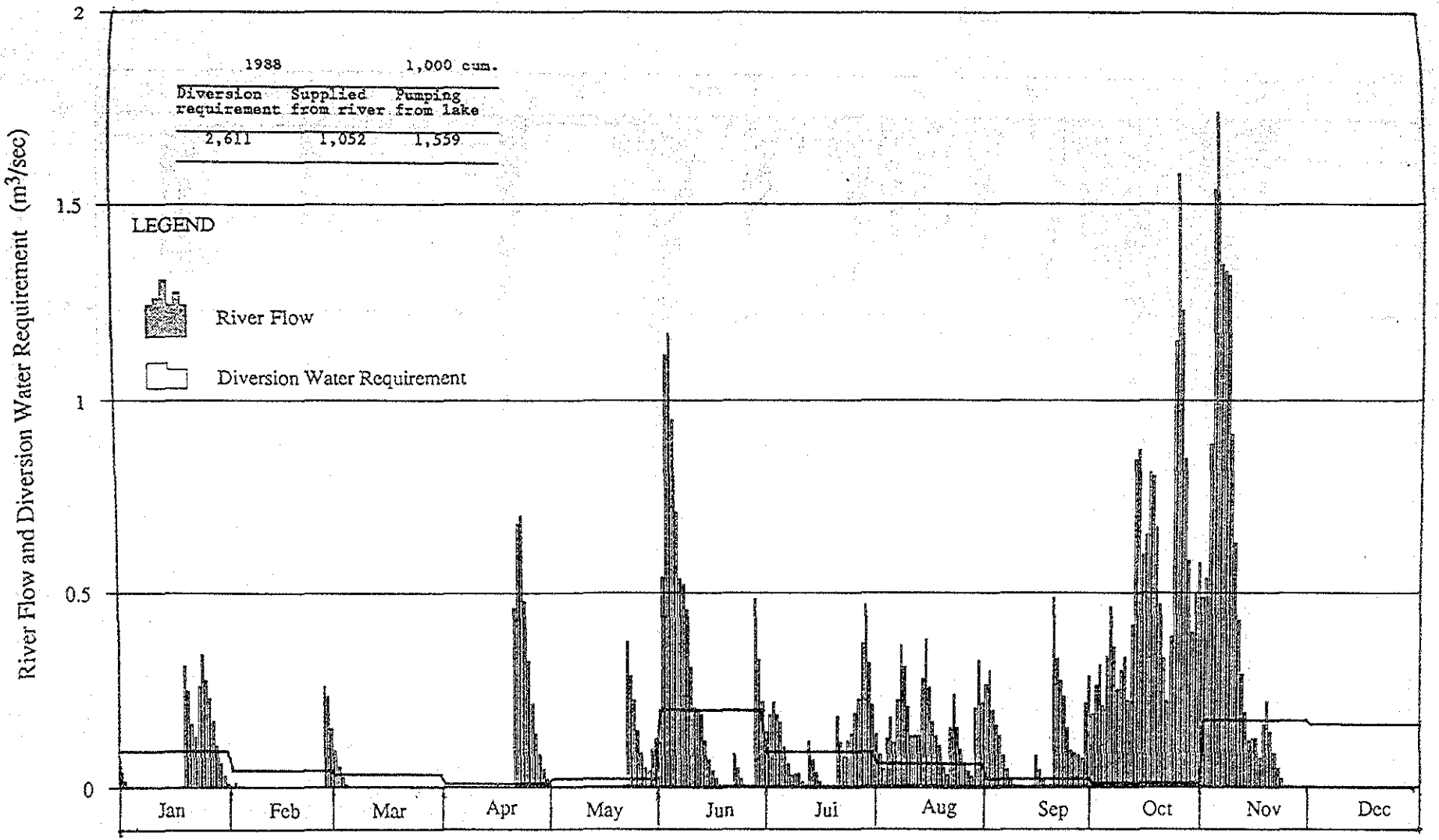


Fig. VI 2.6 (1) Results of Water Balance PUANG RIVER

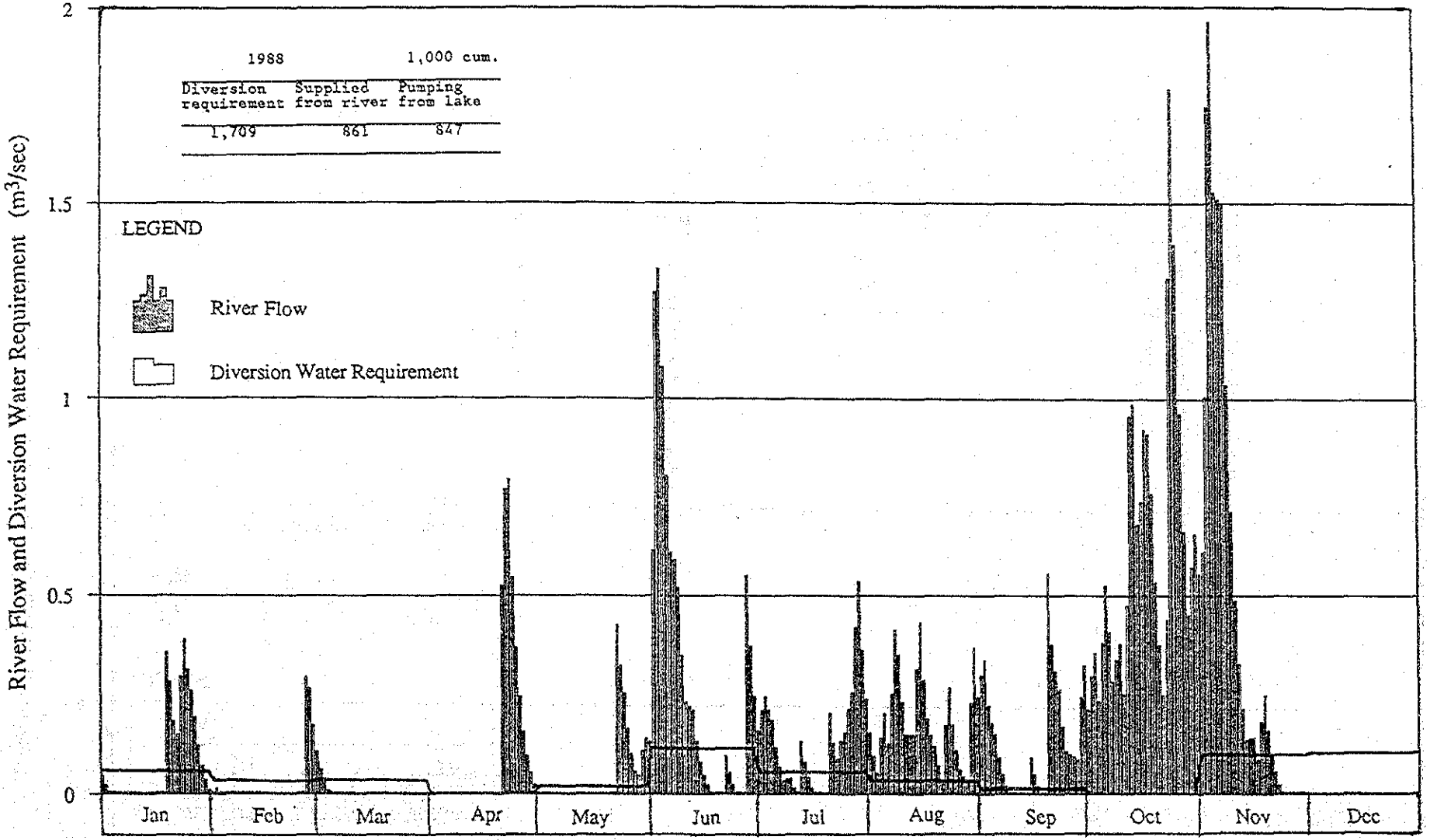


Fig. VI 2.6 (2) Results of Water Balance MAPAKLA RIVER

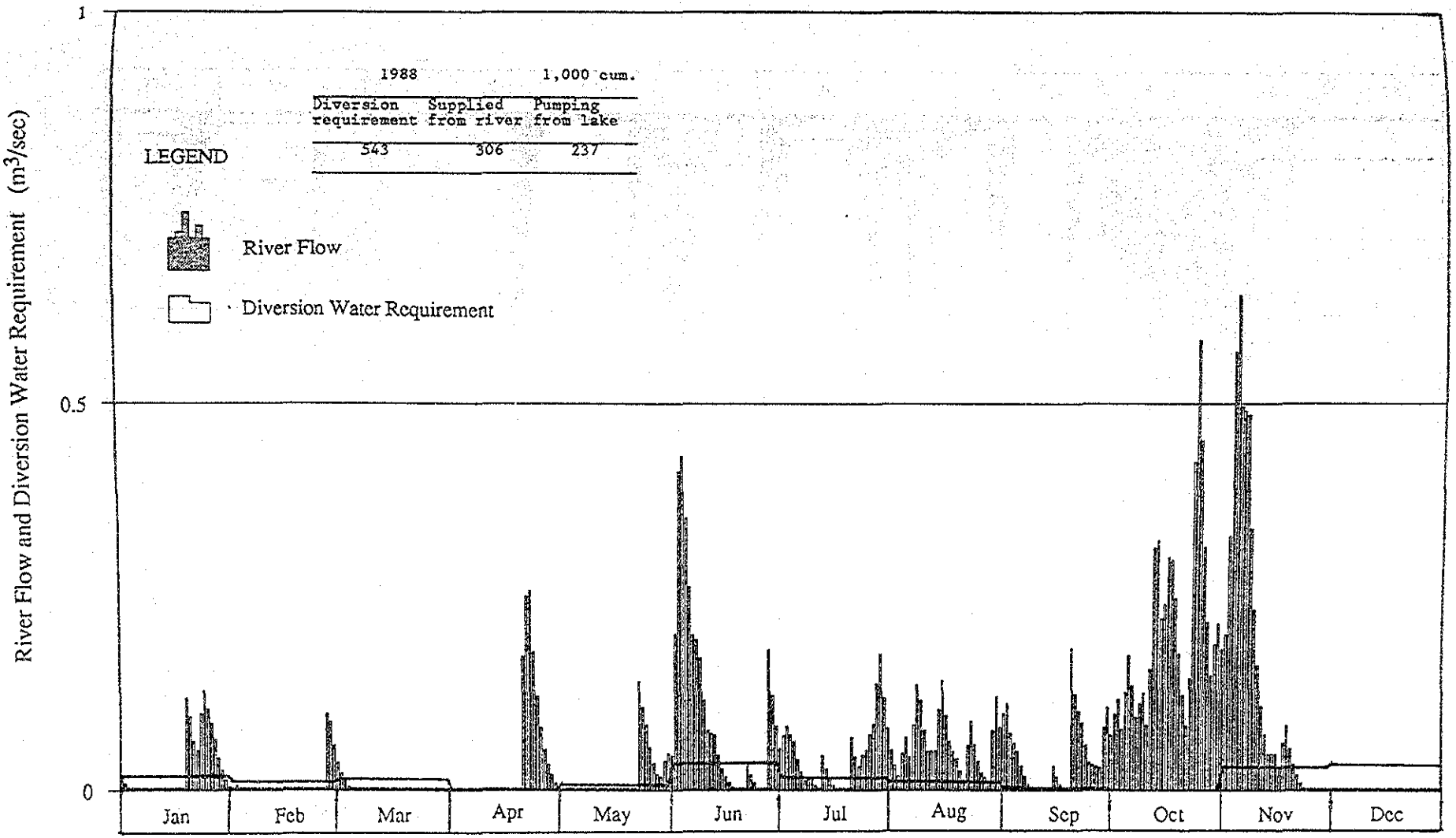


Fig. VI 2.6 (3) Results of Water Balance LUBO RIVER

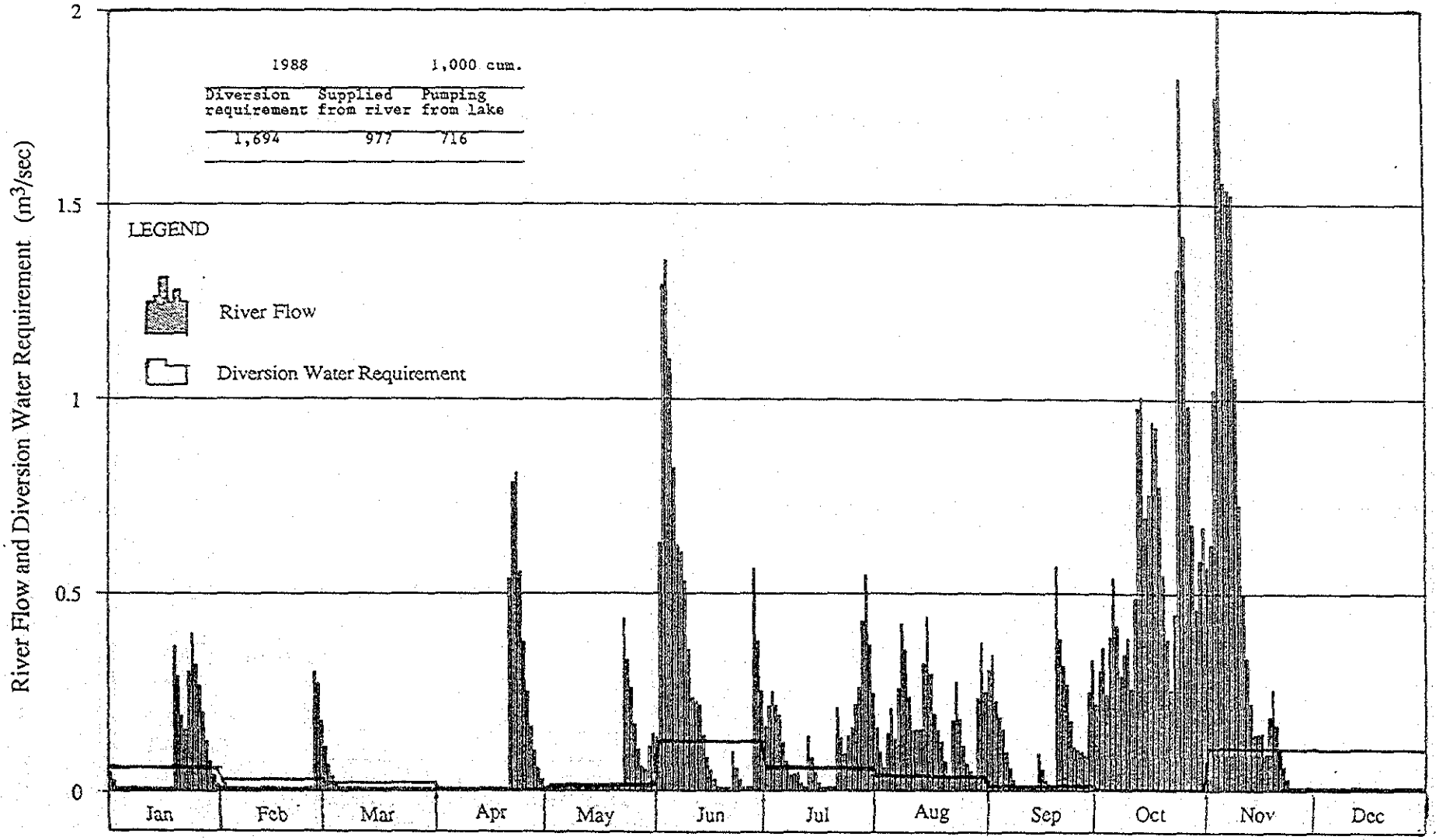
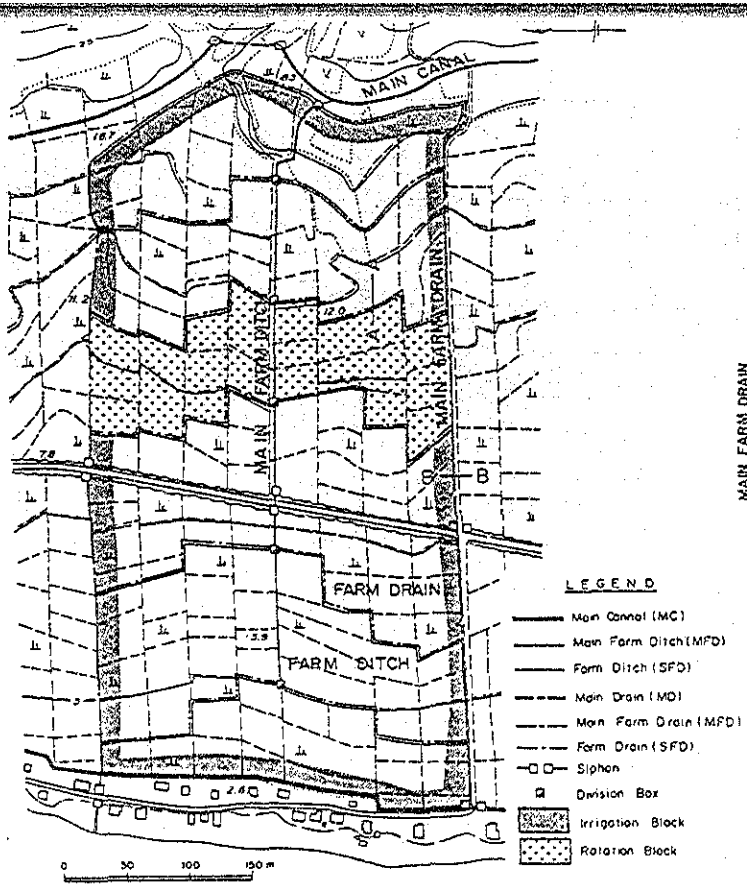
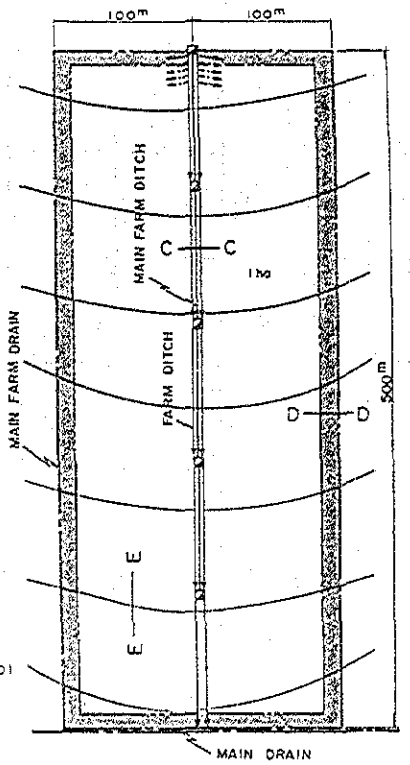


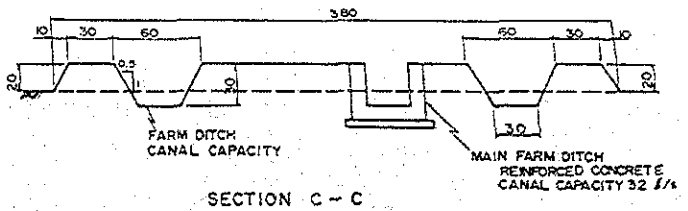
Fig. VI 2.6 (4) Results of Water Balance TUNIA RIVER



PADDY FIELD



UPLAND FIELD



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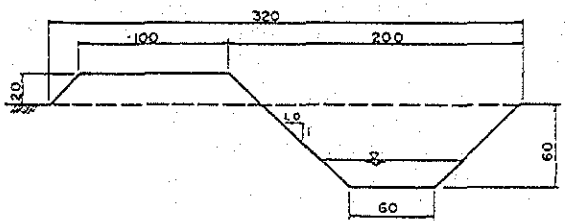

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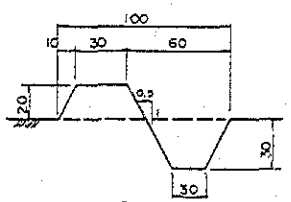
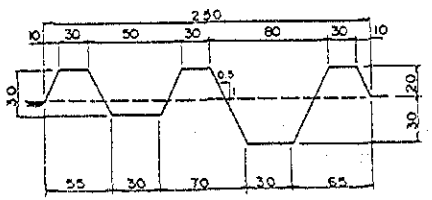
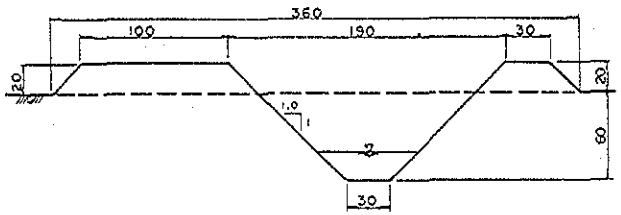


SECTION E — E

CROSS-SECTION OF ON-FARM FACILITIES (UPLAND)



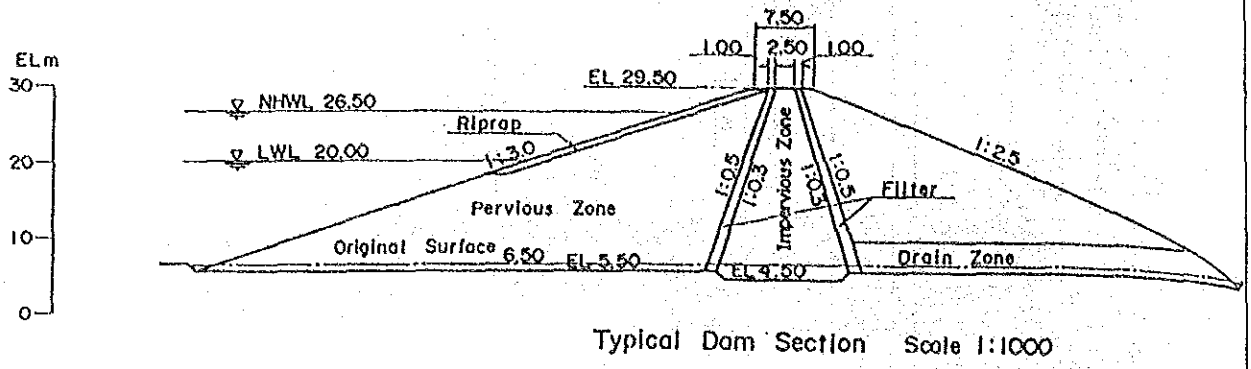
SECTION A - A



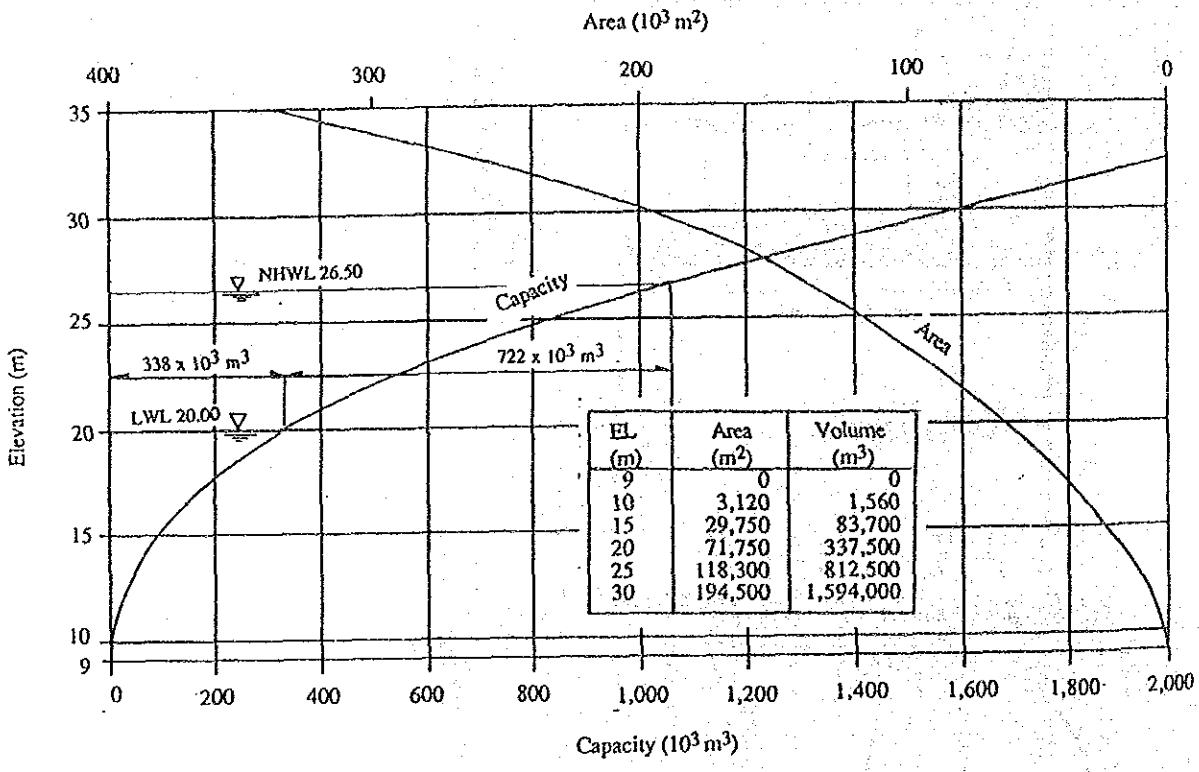
SECTION B - B

CROSS-SECTION OF ON-FARM FACILITIES (PADDY FIELD)

Fig. VI.2.7 Typical Layout of Terminal Irrigation System



Typical Dam Section Scale 1:1000



EL (m)	Area (m^2)	Volume (m^3)
9	0	0
10	3,120	1,560
15	29,750	83,700
20	71,750	337,500
25	118,300	812,500
30	194,500	1,594,000

Fig. VI.2.8 Volume-Area Curve of Palay-Palay Impound

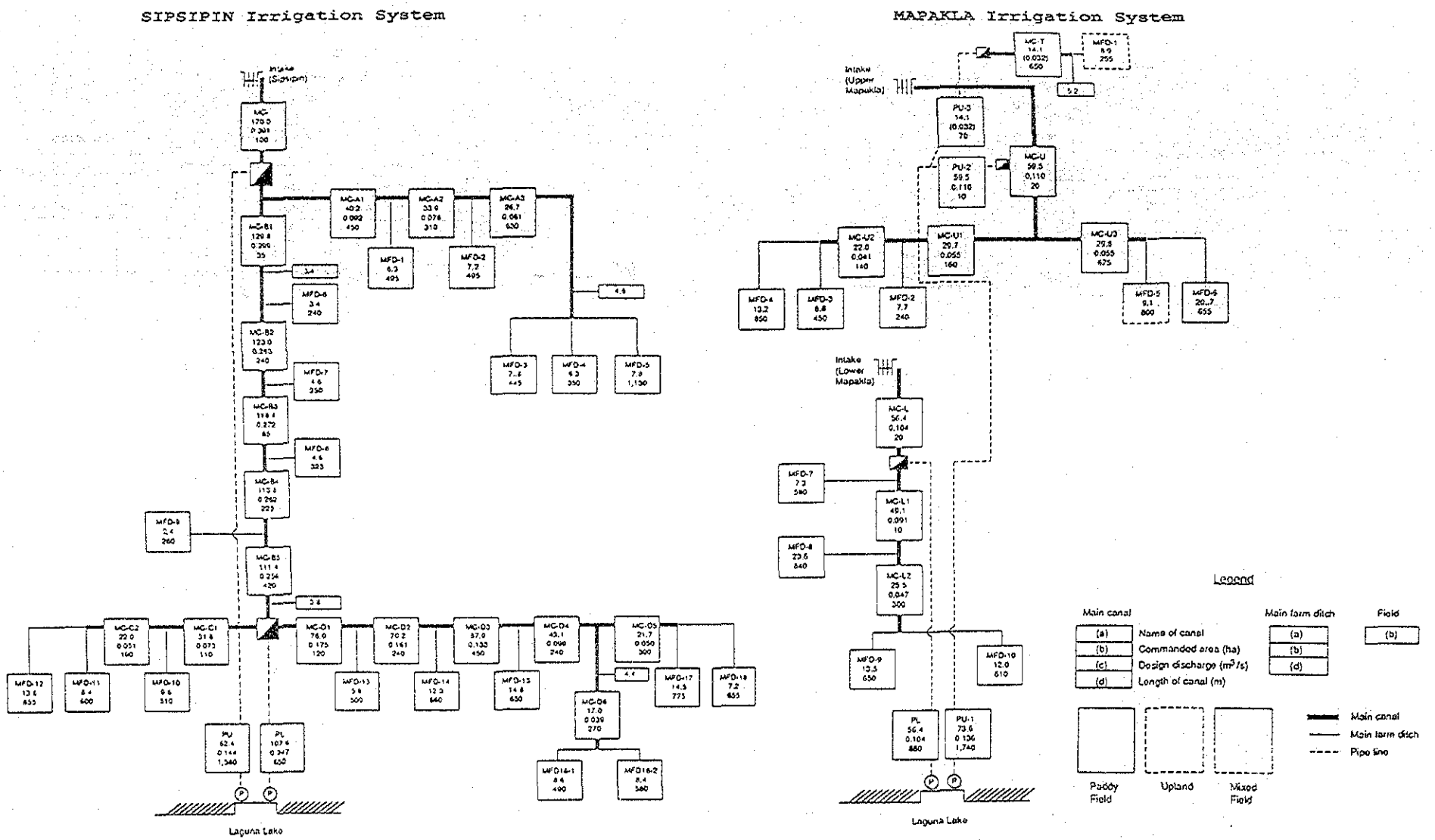
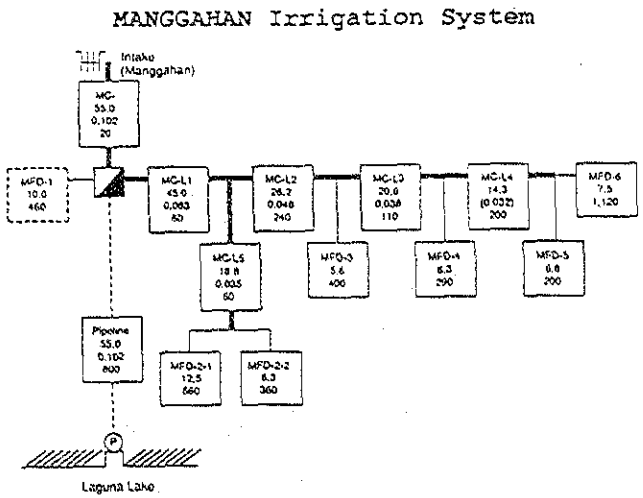
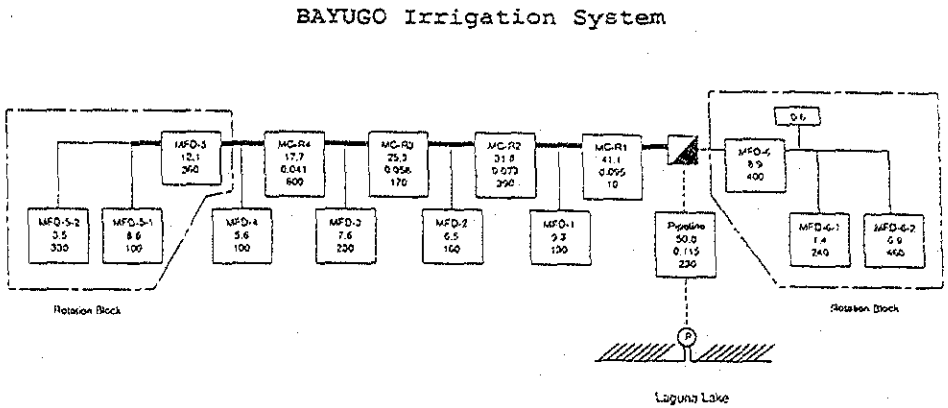
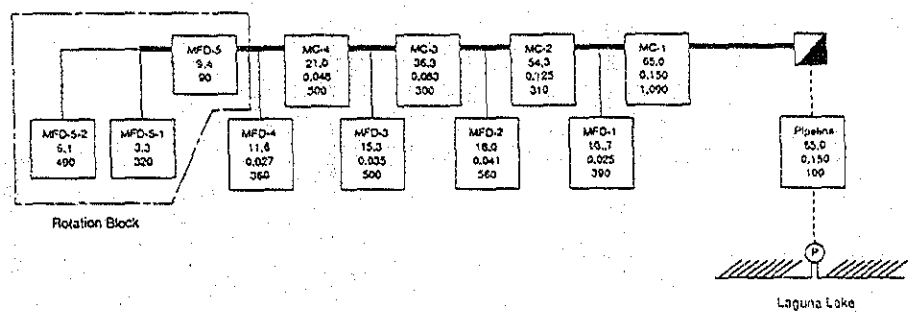


Fig. VI 2.9 (1) Irrigation Diagram of Respective Irrigation Systems







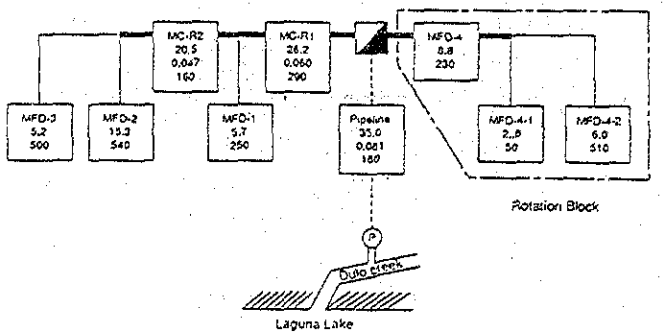
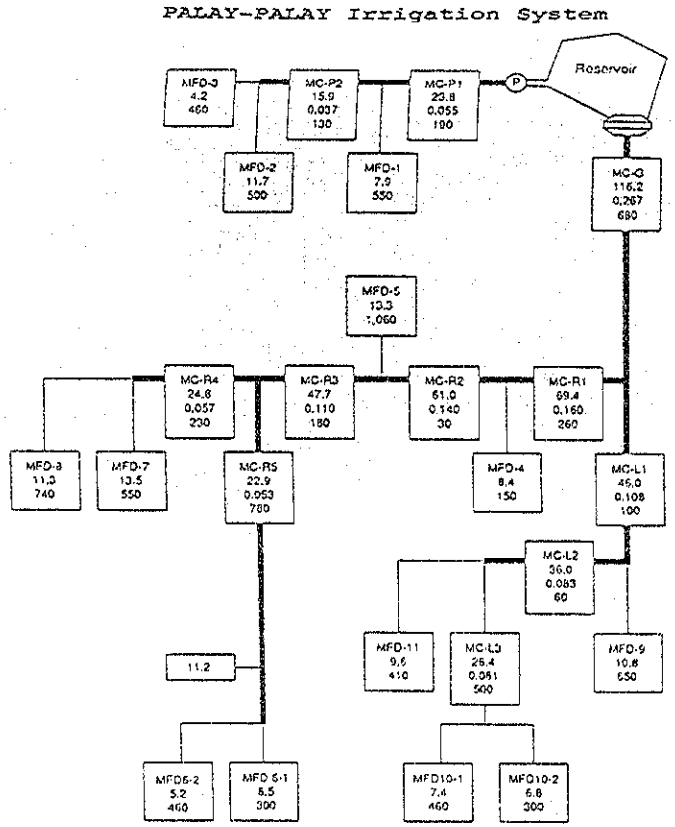
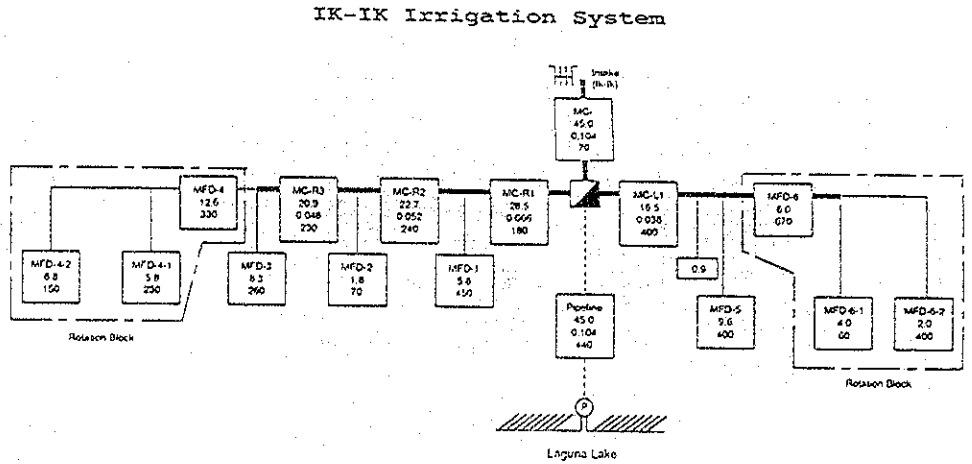
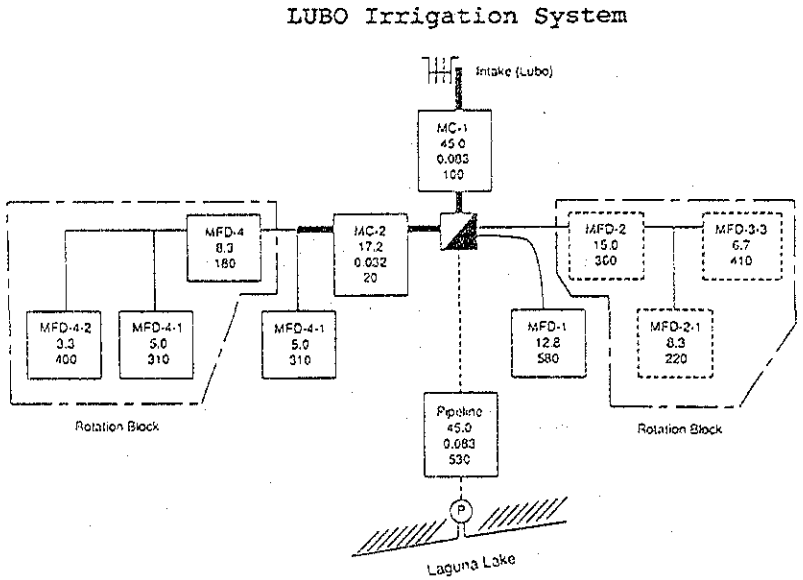


Fig. VI 2.9 (2) Irrigation Diagram of Respective Irrigation Systems







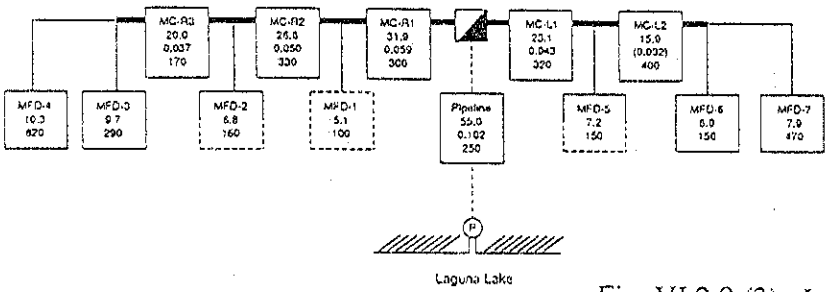


Fig. VI 2.9 (3) Irrigation Diagram of Respective Irrigation Systems

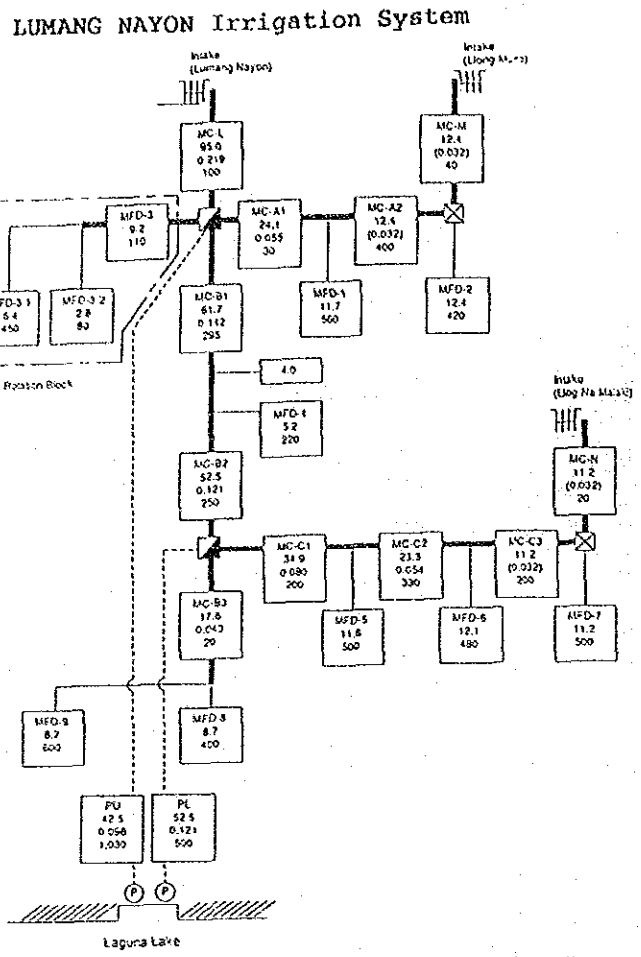


Fig. 12.11 Lumang Nayon

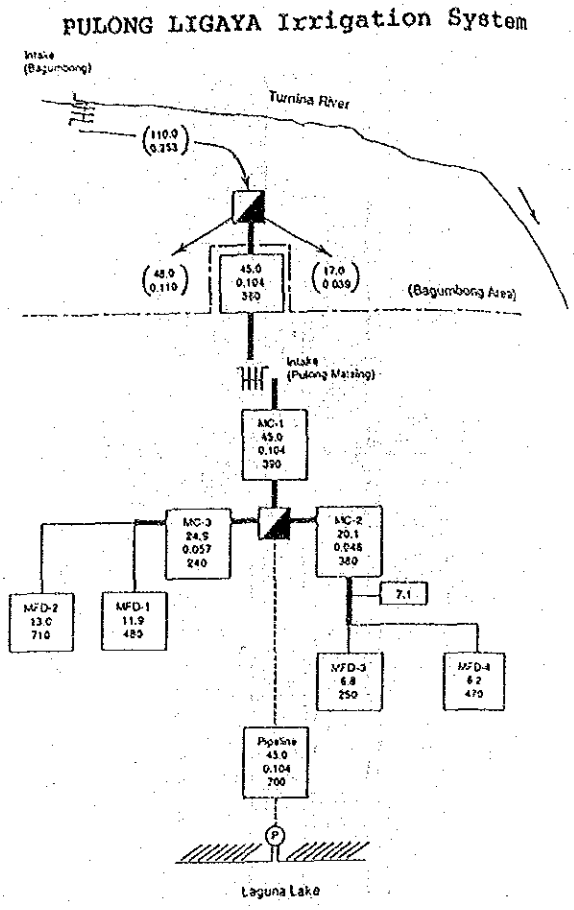


Fig. 12.12 Pulong Ligaya

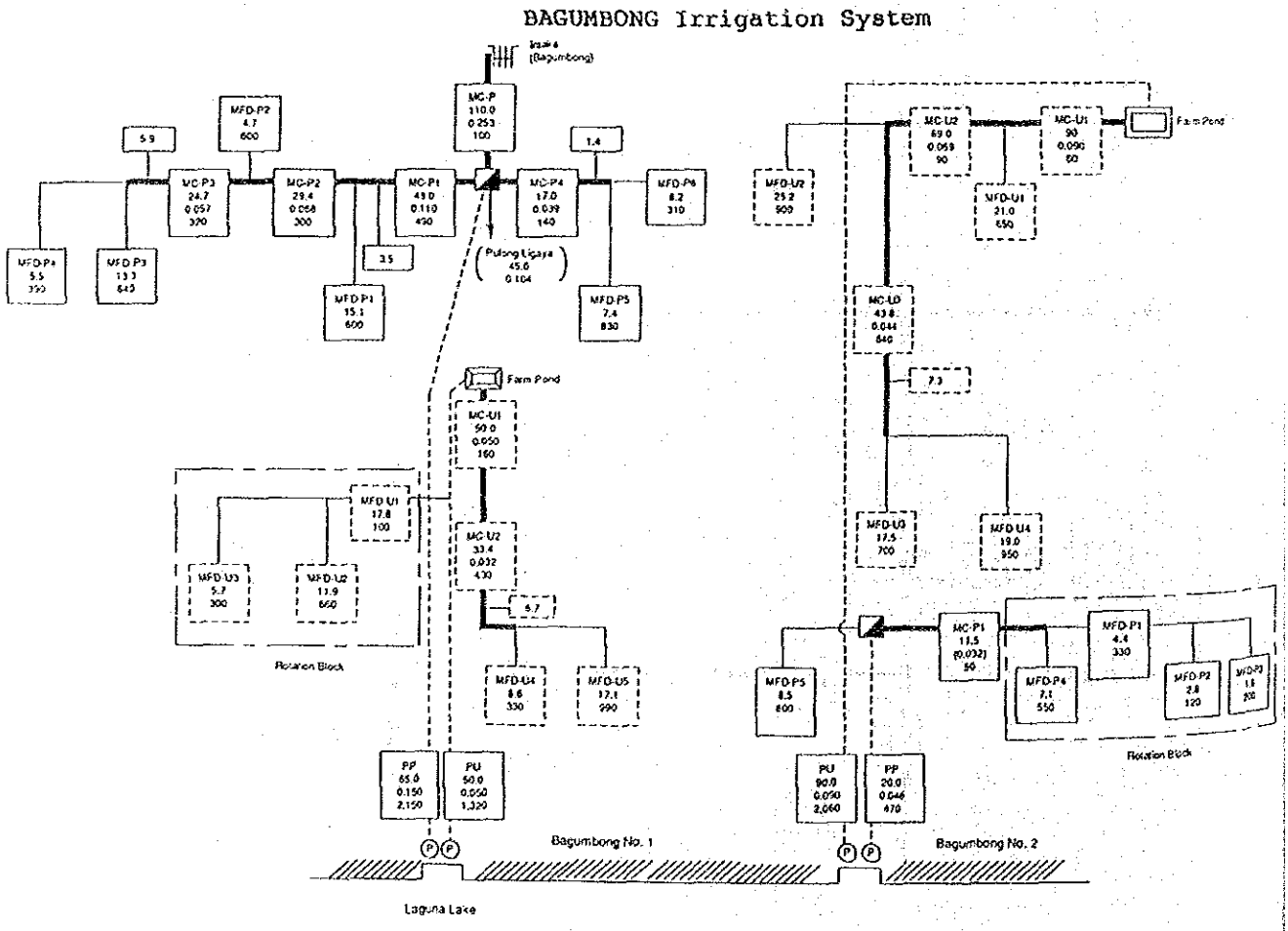
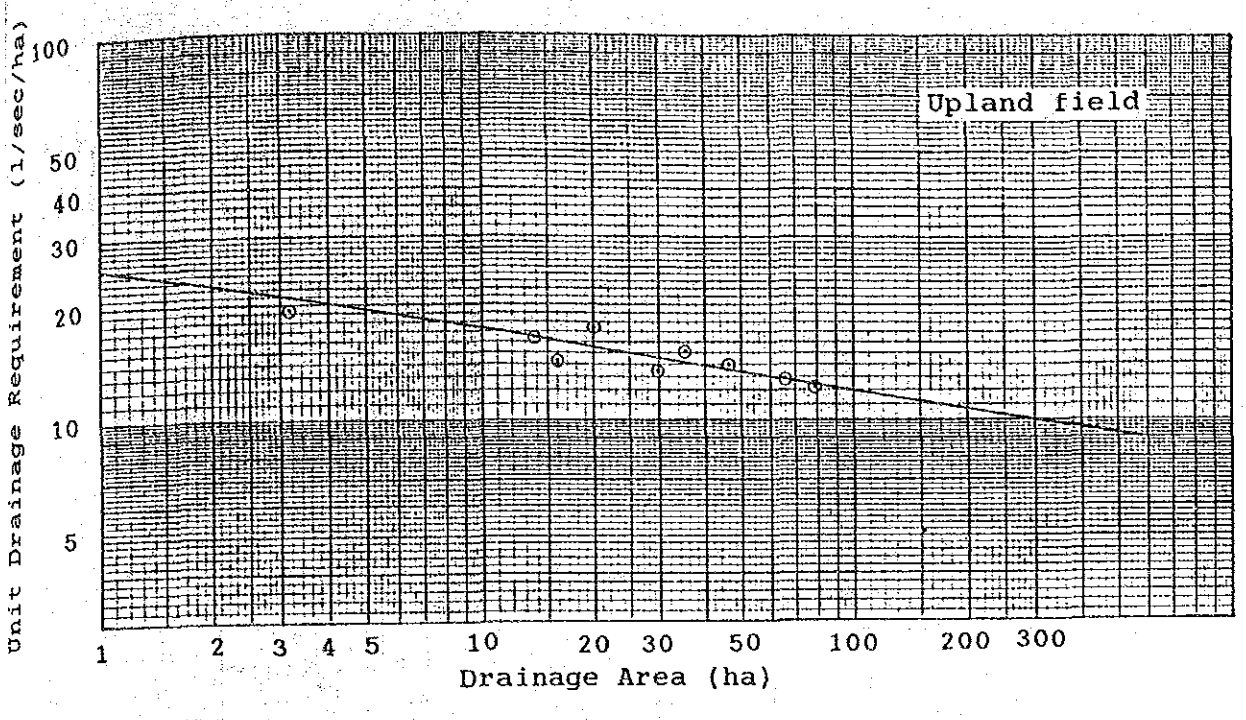


Fig. VI 2.9 (4) Irrigation Diagram of Respective Irrigation Systems



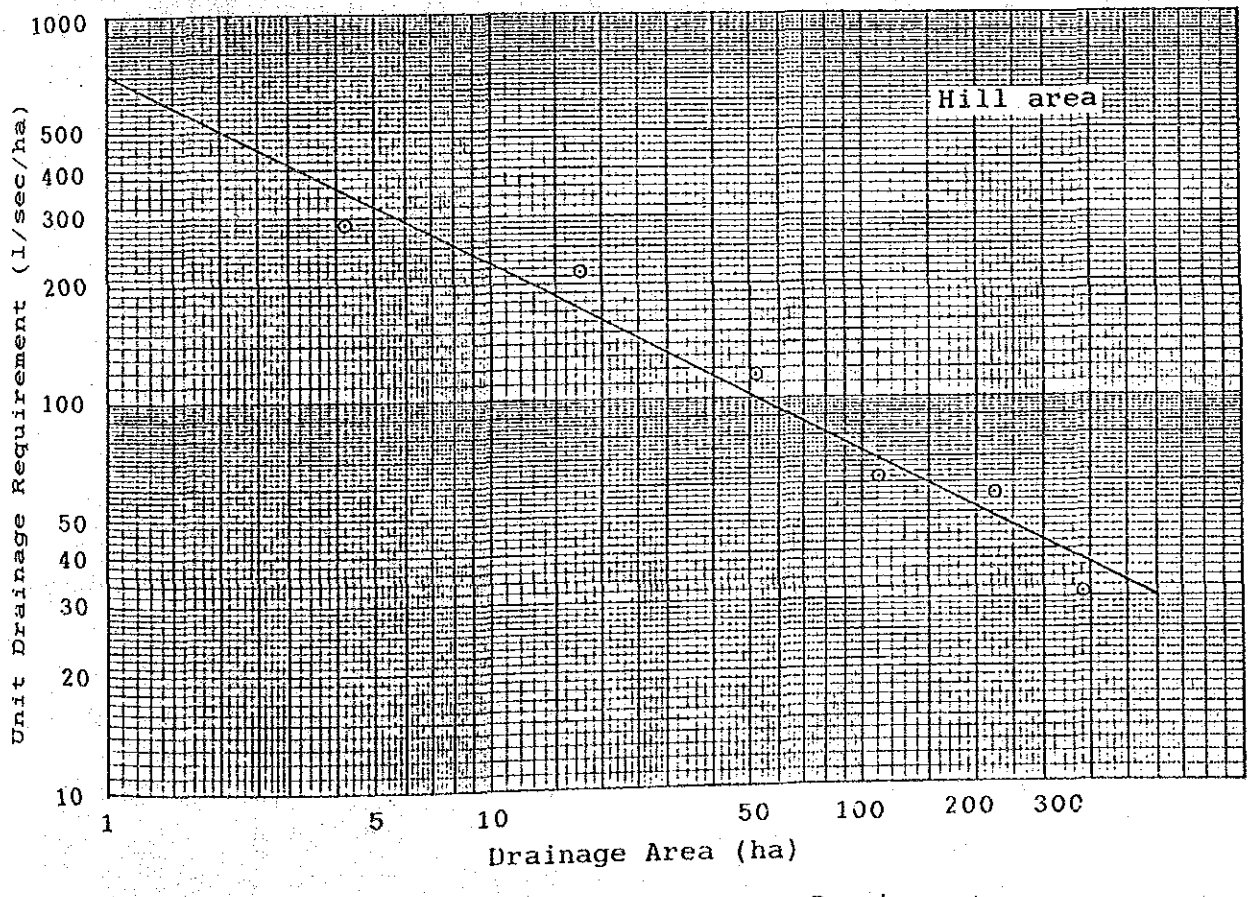


Fig. VI.2.10 Unit Drainage Water Requirements

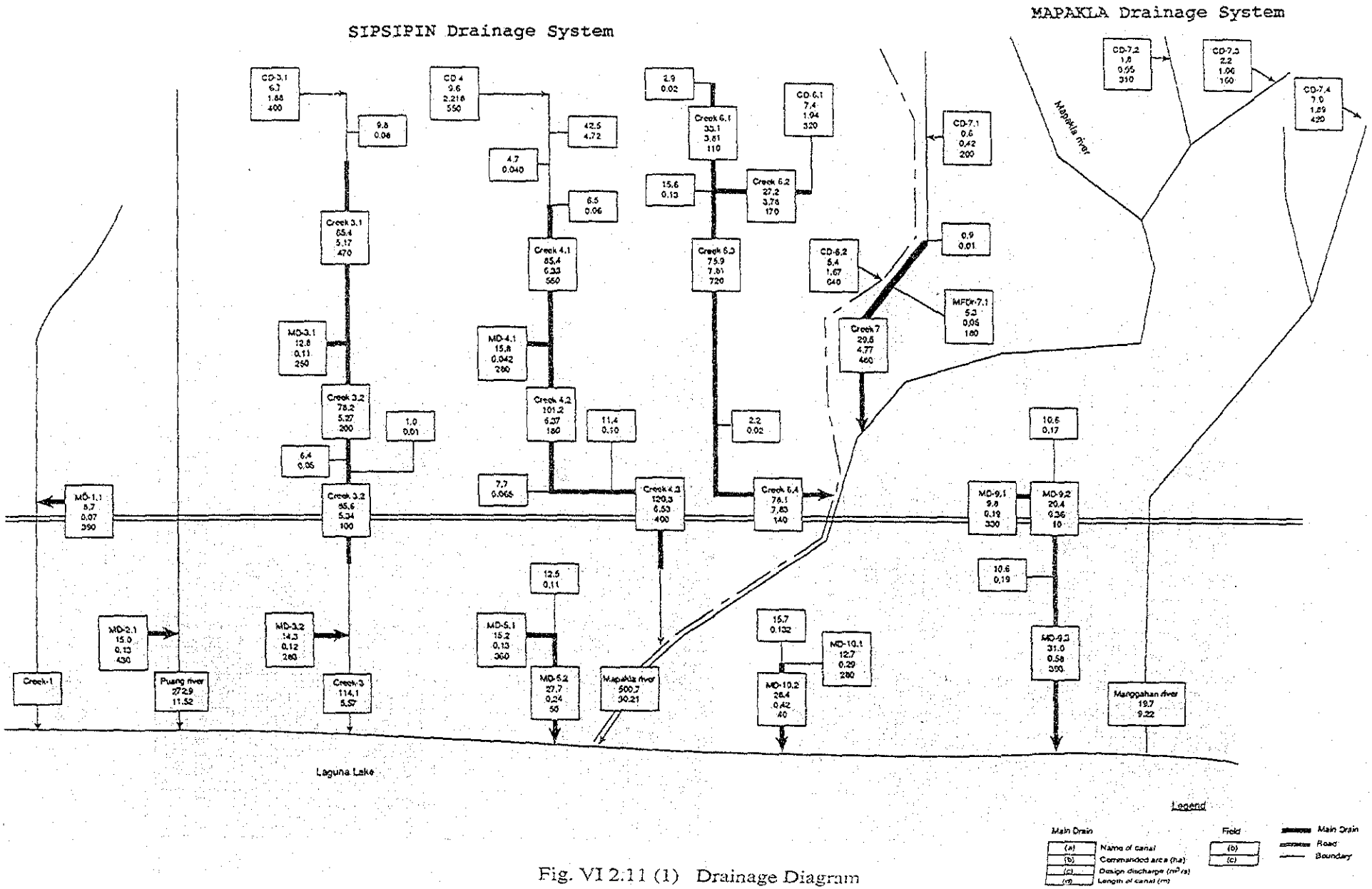
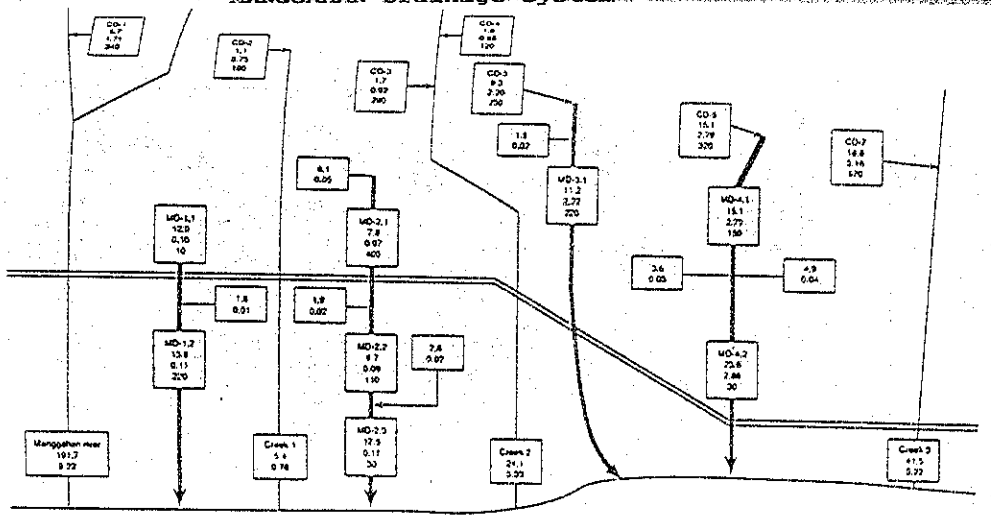
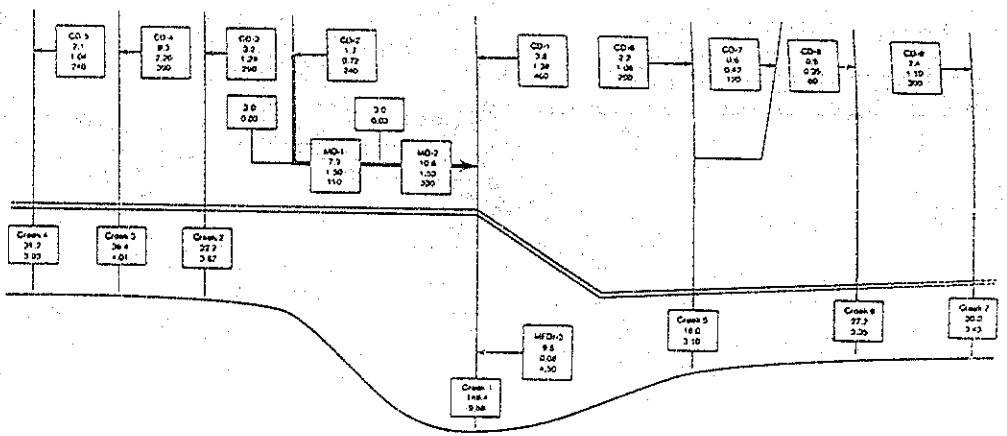


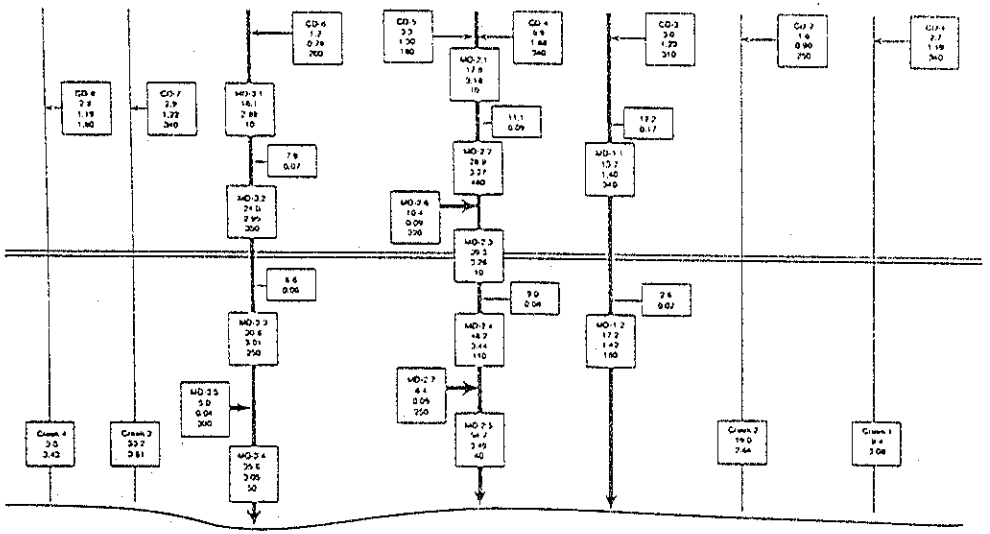
Fig. VI 2.11 (1) Drainage Diagram



BAYUGO Drainage System



LIANO Drainage System



PUNTA Drainage System

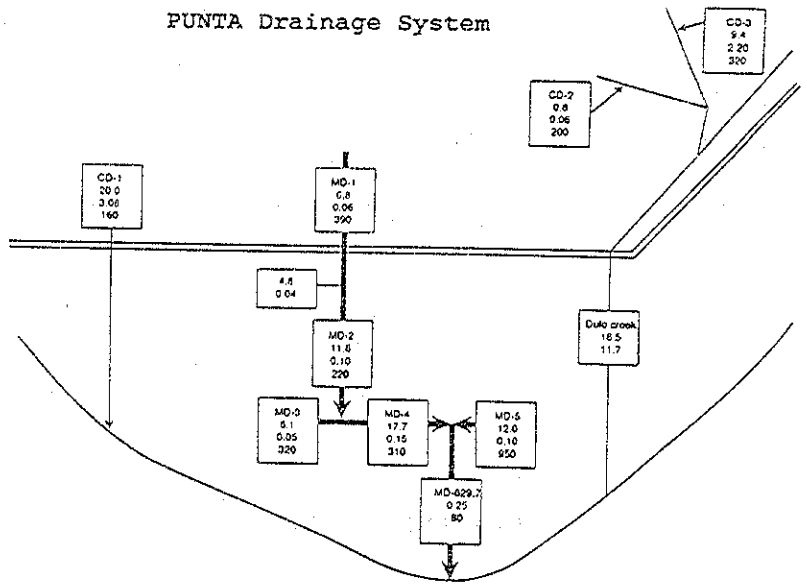
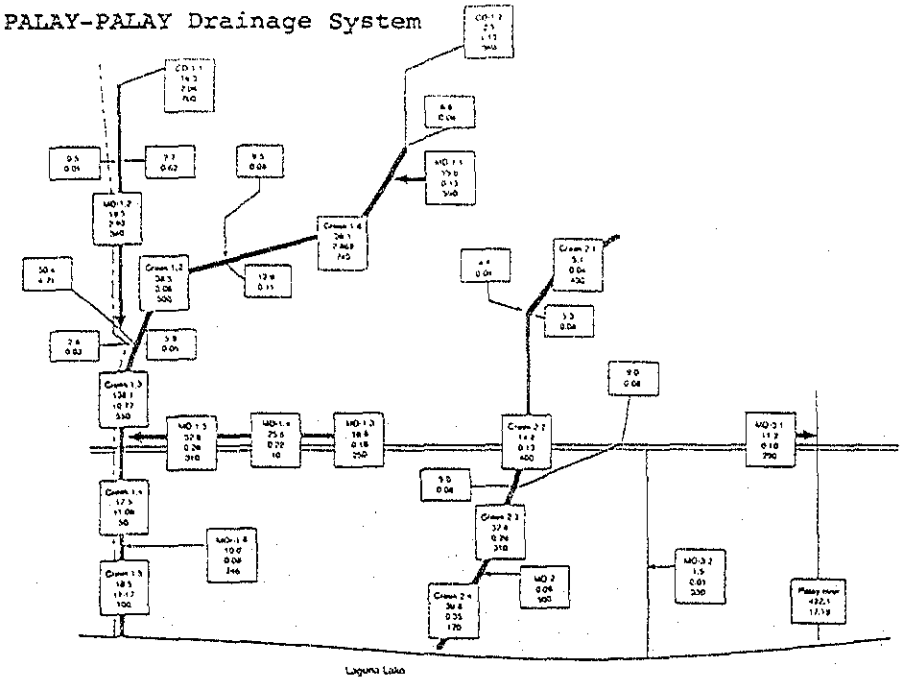
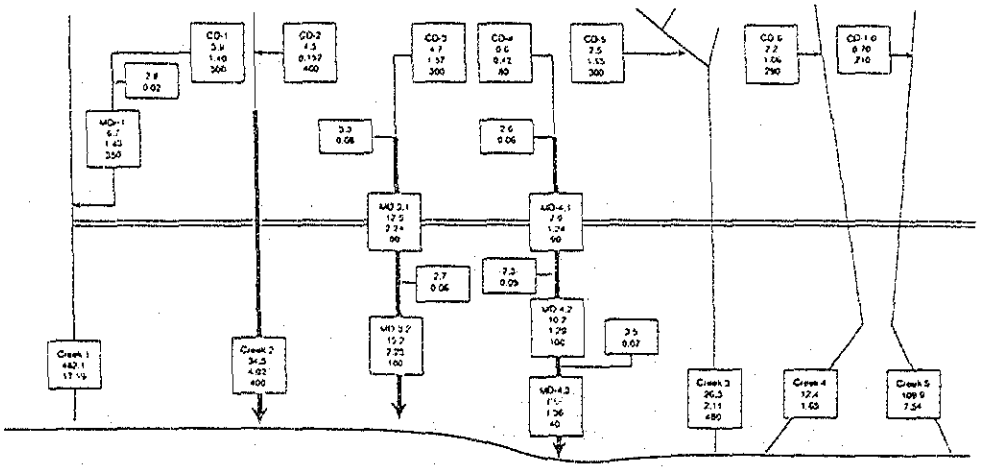


Fig. VI 2.11 (2) Drainage Diagram

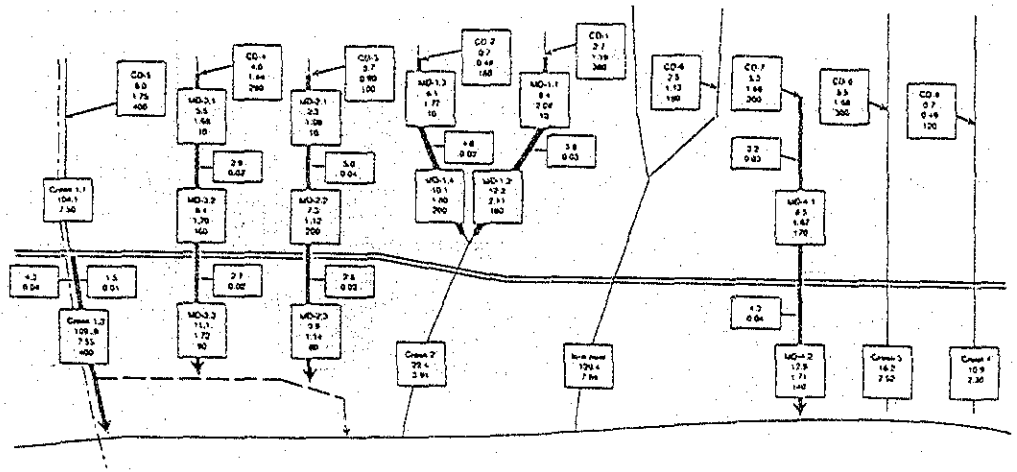
PALAY-PALAY Drainage System

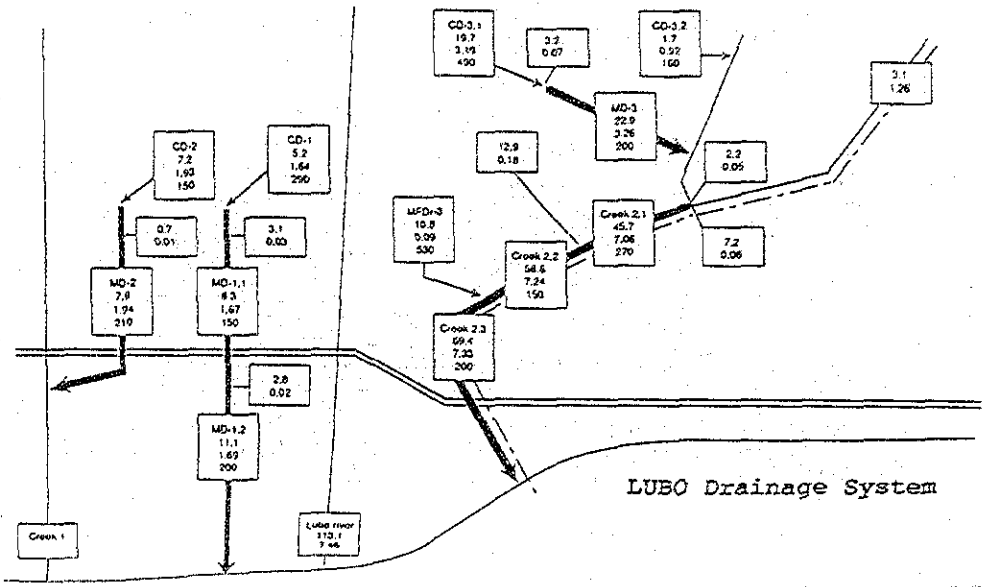


PAGKALINAWAN Drainage System



IK-IK Drainage System





LUBO Drainage System

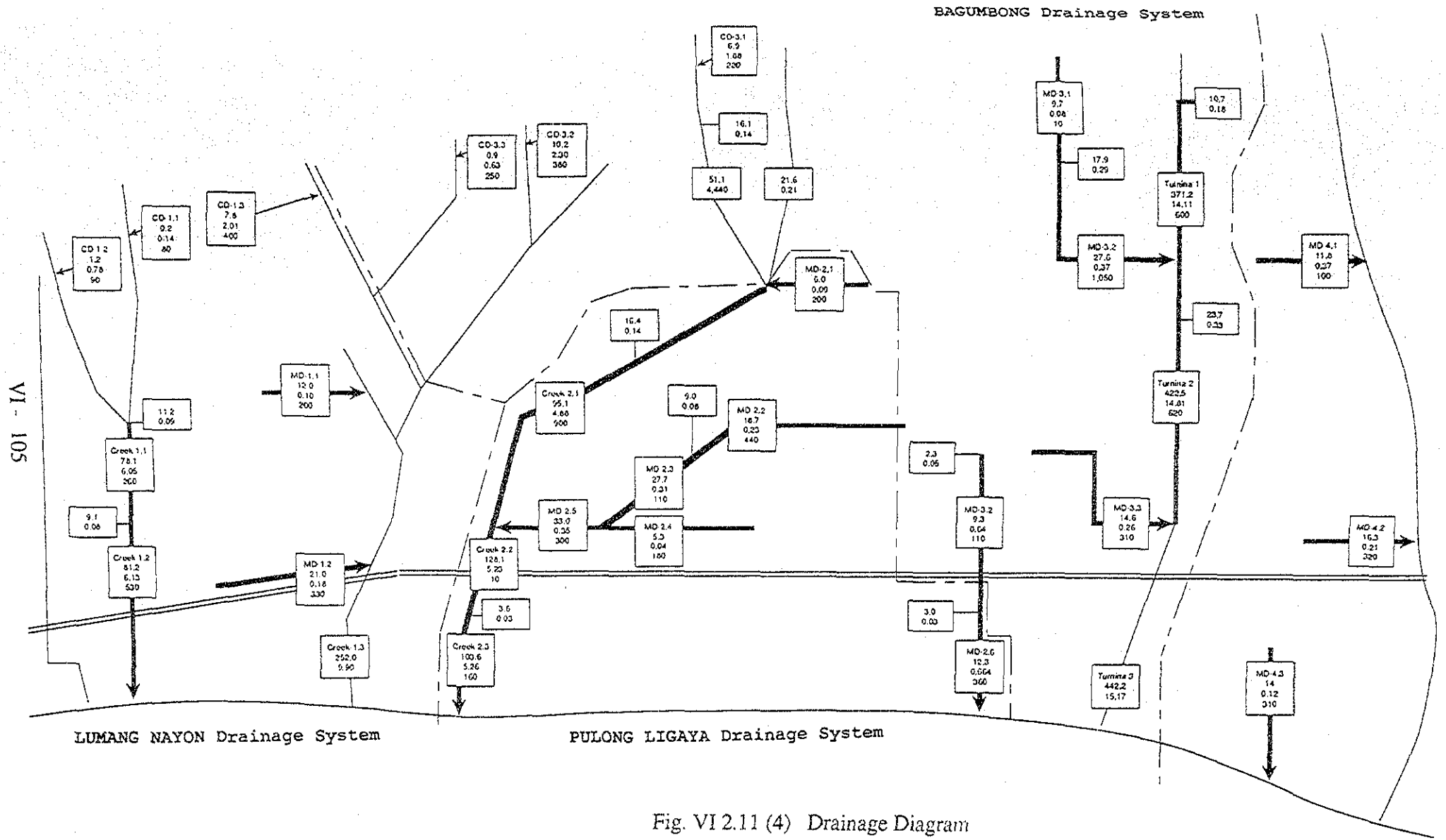


Fig. VI 2.11 (4) Drainage Diagram

ANNEX-VII

SOCIAL INFRASTRUCTURE

ANNEX-VII

SOCIAL INFRASTRUCTURES

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ANNEX-VII

SOCIAL INFRASTRUCTURES

1. POWER SUPPLY SERVICES

1.1 Present Conditions

1.1.1 Rural Electrification

Under the recent rural electrification program, 10 Barangays out of 11 Barangays have been energized in the Study area, and 1,577 numbers are registered as the customers of MERALCO. According to the information from MERALCO on the customers-household ratio of about 1.7, the energized households in the Study area are estimated to be 2,680. Therefore, most of the households in the Study area are energized.

It can be said that the present level of the rural electrification in the Study area reaches to the target mentioned in the rural electrification program in the Medium Term Development Plan in Region IV as shown below. Only isolated hilly areas and Barangay Paalaman are presently unconnected.

Rural Electrification

	Barangay	Household
Region IV		
- As of 1986	61 %	51 %
- Target up to 1992	92 %	91 %
Study area (1989)	91 %	85 %

1.1.2 Power Supply Service System

Electric power in the Study Area is supplied by Manila Electric Company (MERALCO) which receives electric power in bulk from the National Power Corporation (NPC) and distributes the power to consumers.

There are two power distribution networks in the Study Area. Electric power for Jala-Jala up to Lubo through Punta is supplied from a sub-station at Malaya which is located 5 km north of Jala-Jala township in Pililla Municipality. The power is supplied from Malaya Thermal Plant with a generating capacity of 300 mega watt. The power distribution line is of 3.6 kV with a single phase current.

Bagumbong area is served from Kaliraya Hydro-Power Station with a generating capacity of 330 mega watt through Matikiw Municipality in Laguna Province. The power distribution line is of 7.62 kV with a single phase current. The layout of the power line in the Study Area is as shown in Fig.VII.1.1.

Tertiary lines branching from the above mentioned distribution lines connect households after stepped down to 220 V through electric pole mounted transformers.

Construction of distribution lines and connection to households were executed by MERALCO, and maintenance of the power distribution lines is also executed by it.

The general features of the existing power supply systems in Jala- Jala area are as follows:

Existing Power Distribution System

Sub-station adjacent to Malaya Thermal Plant	(stepdown)	20 kV/3.6 kV
Distribution line		
• Jala-Jala network	(single phase, high voltage)	3.60 kV
• Bagumbong network	(single phase, high voltage)	7.62 kV
Tertiary line	(single phase, low voltage)	220 V

1.2 Development Plan

1.2.1 General

The Project will provide irrigation pumps, deep well pumps for rural water supply, farm product processing facilities and other electric equipment to be furnished to public facilities. With implementation of the Project, the power demand will be increased largely. The power demand to be generated with the Project is shown below and the schematic diagram of power demands is as shown in Fig.VII.1.2.

Power Demand with Project

Irrigation pumps	993 kW
Deep well pumps for rural water supply	13 kW
Farm product processing facilities	90 kW
Others (Rural Development Center,etc.)	10 kW
Total	1,106 kW

The existing power distribution lines of 3.6 kV and 7.62 kV with a single phase are not sufficient to satisfy the above- mentioned future power demand. As mentioned in ANNEX-VI, it is concluded that an electric motor system for supplying the energy to pumps is more advantageous than the diesel engine system. Therefore, the power distribution line is proposed to be constructed for the Project.

1.2.2 Power Supply System

The power distribution line of 34.5 kV with three phase current will be constructed along the trunk road for 23 km by extension from a sub-station at Malaya up to Bagumbong area. The power distribution lines will be constructed to irrigation pump stations and rural water supply system Level II, after the voltage will be stepped down to 460 or 230 V through transformers.

In the Study area, only Barangay Paalaman is not energized at the present. The tertiary line of 220 V single phase current is extended from the existing tertiary line. It is constructed along the barangay road to be improved. The total length of the tertiary line is 3.5 km.

The route of the power transmission line and distribution line is as shown in Fig.VII.1.3. The general features of power supply system to be constructed are as shown below.

Power Supply System

Power transmission line, 34.5 kV, 3 phase		23 km
Power distribution line, 460/230V, 3 phase		4.2 km
- Irrigation Pump		
Sipsipin	500 m	
Mapakla	600 m	
Manggaham	100 m	
Bayugo	50 m	
Punta	50 m	
Palay-Palay	1,500 m	
Pagkalinawan	50 m	
Ik-Ik	150 m	
Lubo	100 m	
Lumang Nayon	50 m	
Pulong Ligaya	150 m	
Bagumbong-1	300 m	
Bagumbong-2	500 m	
- Rural Water Supply, Level-II		0.85 km
Bagugo	50 m	
Punta	50 m	
Bagumbong-1	50 m	
Bagumbong-2	250 m	
Tertiary distribution line, 220 V,single phase		3.5 km

2. RURAL WATER SUPPLY SERVICES

2.1 Present Conditions

2.1.1 Present Water Use

In the Study area, groundwater is the main source of the drinking and other domestic use. At present, total 713 nos. of shallow wells and 63 nos. of deep wells, which are graded into Level-I ,have been installed under the current rural water supply program. Shallow wells have a depth ranging from around 6 to 10 m, while deep wells are at around 30 m. Most of those wells are equipped with jetmatic manual operating pumps.

Other than the above, the water service system of Level-III has been established in Jala-Jala town in 1981 by Jala-Jala Waterworks Association This system includes 150 m deep well with 3.7 kW submersible pump, pump house, 38 cu. m of steel storage tank and more than 2 km of distribution pipelines.

The inventory of water supply facilities in the Study area is as summarized below.

	Level III	Level II	Level I	
			Deep Well	Shallow Well
Number of well	1	-	63	713
- Not functioning well	1	-	-	185
- Functioning well	-	-	63	528
Beneficiary household	(1,753)	-	870	2,286

There are several springs in the mountains and hilly areas as well as low-lying area along the shore line of Lake Laguna with yields of 2 to 3 l/sec. Some of those springs are used for domestic use.

In order to grasp the present conditions of the existing wells in the study area, especially in the dry season, 655 numbers of the existing wells were investigated with respect of water quality, yielding in the dry season, lowering of water level,etc. The following is the summary of the existing conditions of the wells:

Barangay	Nos.of well	Function Good	Not	Reducing yield	No use due to low quality
	(nos)	(nos)	(nos)	(nos)	(nos)
Sipsipin	46	40	6	8	16
Jala-Jala	212	193	19	18	28
Bayugo	116	114	12	7	3
Punta	65	60	5	2	4
Palay-Palay	40	40	0	3	7
Pagkalinawan	32	29	3	2	3
Lubo	45	33	12	15	5
Bagumbong	97	80	17	20	20
Paalaman	2	2	2	2	0
Total	655	591	76	77	86

As shown in the above table, in Sipsipin, Lubo and Bagumbong, there are a large number of wells of which water levels are lowered in the dry season. Further, Sipsipin and Bagumbong are confronted with low water quality. Most of wells in Pagkalinawan produce warm water. In Paalaman locating in the hilly area, there are two water supply facilities using spring water. Most of inhabitants in that area are using the natural spring water.

2.1.2 Water Quality of Groundwater

To identify the quality of the groundwater, some 37 wells were selected, and water samples taken from those were tested at the field in October and November 1989 for the items of electric conductivity (EC) and pH. The result is as shown in Table VII.2.1. As far as the EC values are concerned, the well water is recognized to be permissible for the potable water.

As for the pH value of water, the well water in Sipsipin shows acidity of less than pH 6.5. The other well water ranges within the permissible limit of 6.5 to 8.5.

Detailed chemical analysis and biological test were conducted in the Laboratory of Rural Water Utilization Administration. To this work, some 10 water samples were taken. The test results are shown in Table VII.2.2. Most of water is permissible as the potable water. However, some water samples shows an abnormal value of turbidity and color, indicating that these water have been contaminated to a certain extent.

According to the result of the biological test, the well water being free from the color bacillus is only two among 10 sampled wells. The other wells are all contaminated with bacillus. This is due to provision of non- or weak protection measures against seepage of drained water because of the proximity to septic and sewage tanks.

According to the above observation, installation of deep wells is necessary for protection from contamination by seepage water and for up-grading of water supply system.

2.2 Rural Water Supply System

2.2.1 General

The present water supply in the Study area confronts with water shortage, low water quality, long distance from the water source or well, as mentioned in the previous Chapter. In order to establish and improve the water supply system, the rural water supply systems are provided to the following areas:

- poor water quality
- water shortage in the dry season
- long distance from water source or well

Rural water supply system to be supplied in the Study area is Level-I or Level-II depending on the following population density:

Level-I	:	About 25 to 50 beneficiary households should be located within 250 m from a well or within about 6 ha
Level-II	:	Numbers of beneficiaries should be about 50 to 100 households located within about 6 ha. One faucet should serve about 4-6 households within a distance of approximately 25 m.

2.2.2 Preliminary Design

The water supply facilities are designed to accommodate the water requirements for 2000 year. The design criteria of the respective Levels are as follows:

1) Level-I :

Level-I facilities consist of simple wells with cylinder-type manual pump. The facilities of Level-I are designed on the following basis:

i) Water supply per day

Daily average water supply, q	:	40 l/day/person
Average daily water supply,Q1	:	q x design population
Maximum daily water supply,Q2	:	1.3 x Q1
Maximum hourly water supply,Q3	:	2.5 x Q1

2) Level-II

Level-II facilities consist of a deep well,pumping equipment, water tank, main pipeline, distribution pipeline and communal faucets. The design criteria of Level-II are as follows:

i) Water supply per day

Daily average water supply,q	:	80 l/day/person
Average daily water supply,Q1	:	q x design population
Maximum daily water supply,Q2	:	1.3 x Q1
Maximum hourly water supply,Q3	:	2.5 x Q1

ii) Faucet : 3.5 m in head

Minimum diameter	:	13 mm
Water head at the end	:	3.5 m

iii) Storage tank

Structure	:	overhead tank, reinforced concrete structure
Storage volume	:	0.20 to 0.25 x Q2

iv) Distribution pipeline : PVC pipe

v) Pump operation hour per day

Pump operation	:	12 hr per day
Pump capacity	:	Q2

2.2.3 General Features of Rural Water Supply Facilities

The following rural water supply facilities are proposed to be constructed,as summarized below. The typical plan of the facilities of respective Levels are as shown in Fig.VII.2.1. The locations of the proposed rural water supply facilities are as shown in Fig.VII.2.2.

Level-I

Deep wells with manual pumps.....	16 sites
Spring water development with concrete box.....	2 sites
Level-II.....	4 sites

Eighteen numbers of Level-I are constructed for beneficiary households of 900 in 8 Barangay. The facilities of Level-I are designed on the basis of the beneficiary household of 50 and population of 300. The general features of Level-I to be constructed are as shown in Table VII.2.3 and summarized below.

Barangay	Type of facility	No.	Beneficiary Household (Nos.)	Depth of Well (m)
Sipsipin	Deep well	3	150	50
Bayugo	Deep well	3	150	30
Punta	Deep well	1	50	40
Palay-Palay	Deep well	3	150	40
Pagkalinawan	Deep well	2	100	30 and 50
Lubo	Deep well	2	100	30 and 60
Bagumbong	Deep well	2	100	50
Paalaman	Spring	2	100	-
Total	Well	16	900	-
	spring	2		

Four numbers of Level-II are constructed for 850 beneficiary households in 3 barangay. The general features of facilities are as shown in Table VII.2.4, and summarized below.

Description	Unit	Bayugo	Punta	Bagumbong No.1	Bagumbong No.2
Beneficiary					
Present household	nos	253	260	227	110
Present population	person	1,518	1,755	1,533	660
Design population	person	1,943	2,246	1,962	845
Deep well					
Depth	m	80	80	100	50
Diameter	mm	100	150	150	150
Pump					
Pump type		------	Submersible	------	
Capacity	cu.m/min	0.30	0.30	0.25	0.12
Motor	kW	3.7	3.7	3.7	1.5
Total head	m	30	35	50	30
Water tank volume	cu.m	40	40	40	20
Pipeline	m	2,665	1,292	2,306	1,143
Faucet	nos	51	54	47	24

3. ROAD NETWORK

3.1 Present Conditions

3.1.1 Transportation System

The transportation system in the Study Area consists of roadway and waterway. The road system includes simple pathways,feeder roads,barangay, municipality,provincial and national roads. To travel across Lake Laguna from Jala-Jala area to other towns of Laguna province, water transportation system is used.

Private light buses and bus service are available to transport goods or move people from Jala-Jala area to other provinces and Metro Manila. To transport large quantities of goods to or from a market place ,vehicles to be used are contracted between shippers and vehicle owners.

Transportation of farm produce from farms to residences is made by various means; human labor,water buffalo-drawn sledges, horses, private light buses and motorized tricycles. About 80 % of farmers depends on water buffalo-drawn sledges to transport paddy from fields to their residences. In hilly areas, the horse is an important means of transportation. Hired light buses and tricycles are used in case of remote farms lying along passable roads.

Water transportation using motorized boats is patronized by farmers or non-farmers living in the lakeside barangays in transportation of goods and farm products to and from Laguna market outlets like Santa Cruz, Pila, and other towns along the lake coast. Those boats are usually private owned ones.

The transportation system in the Study Area is not usually organized under schedules and routes. It depends on the number of passengers and amount of cargoes. Under the present conditions of roads, the owners of vehicles are not willing to arrange transportation of small quantities.

3.1.2 Road Networks

The access to Jala-Jala, capital town of Jala-Jala municipality, is facilitated by a national road route 301 ,which leads to Metro Manila with about 70 km in length. This route 301 is presently under concrete pavement by the Provincial DPWH. Essential sections of the road have been paved. To barangay Bagumbong, a branch from a national road route 349 is available up to the adjacent barangay Matikiw of Laguna Province. This road is also under pavement by the Provincial DPWH. The present road system in the Study area is as shown in Fig.VII.3.1.

In the Study Area, there exist about 44 km of barangay roads and about 3 km of municipality roads. The municipality roads located in Jala-Jala town are mostly paved with

concrete. Barangay roads are still unpaved, and more or less affected by erosion hazard,at present. In fact, most Barangay roads are hard to pass in the rainy season. The inventory of Barangay roads is as shown in Table VII.3.1.

The link road of Jala-Jala Peninsula from Jala-Jala to Bagumbong through Punta for about 18.5 km in length was implemented by the Municipality office by use of equipment supplied from DPWH in 1975, and clearing and excavation were executed up to Bagumbong without any structure works. At the present, however, only the route between Jala-Jala and Palay-Palay for about 8.5 km can be passed, and the remaining 10 km is not passable.

Farm road networks are insufficient so as to support an efficient operation of crop cultivation. Barangay roads presently serve the function of farm roads. In the rainy season, those roads are so difficult to pass in major parts due to muddy or serious erosion because of lack of proper drainage facilities and maintenance works.

3.2 Development Plan

3.2.1 General

The main purpose of road network development is to establish sufficient transportation routes to improve daily transportation conditions and to promote regional and agricultural development in the Study area.

The road network to be provided will consist of the trunk road and feeder roads. The preliminary design of the roads is as shown below.

3.2.2 Preliminary Design

(1) Trunk road

The link road starting from Jala-Jala to Bagumbong through Punta running along the lake coast is required to link all barangays and to lead transportation to the national road. The link road will provide the function of the trunk road which will much improve inhabitants'economic life and save the time of transportation for them. The layout of the trunk road is as shown in Fig. VII.3.2.

The design criteria of the trunk road is as described below.

Design speed	60 km/hr
Radius (standard)	120 m
Grade	6.0 %
Total width	9.1 m
Pavement	
Type	concrete
Width	6.1 m

Thickness	20 cm
Shoulder width	1.5 m

To ensure all weather condition, the trunk road will be paved for the total length of 18.1 km with concrete with a net width of 6.1 m. The standard cross section is shown in Fig.VII.3.3. At the locations to cross natural drains, culverts are provided.

The general features of construction works of the trunk road are as summarized below.

Improvement	10.1 km
Construction (hilly area)	4.8 km
Construction (flat area)	3.2 km
Related structures	50 nos

(2) Feeder roads

Based on the inventory survey of the barangay roads,the improvement plan is established to ensure smooth connection of villages with the trunk road and village with farmland. The improvement road layouts are as shown in the DRAWINGS.

The improvement works of the roads consist of gravel metalling and widening,and construction of related structures. The total length of 46,730 m of 65 numbers is improved. The location of the barangay roads to be improved are as shown in the attached Drawings. The standard cross section is as shown in Fig.VII.3.3. The following is the summary of the improvement works of the Barangay roads:

Barangay	Nos of Roads	Length of Road improvement (m) Type A	Type B	Type C	Total
Sipsipin	7	0	1,750	2,900	4,650
Jala-Jala	11	0	4,680	3,250	7,930
Bayugo	12	0	4,540	3,600	8,140
Palay-Palay	3	0	1,500	3,850	5,350
Punta	5	590	0	1,950	2,540
Pagkalinawan	5	0	2,610	1,010	3,620
Lubo	10	0	2,300	1,980	4,280
Bagumbong	12	830	6,740	2,650	10,220
Total	65	1,420	24,120	21,190	46,730

Note; Type A : gravel metalling, t = 20 cm, to existing width 6 m
Type B : gravel metalling, t = 20 cm, to existing width 4 m
Type C : gravel metalling, t = 20 cm, and widening to 4 m of width

TABLES

Table VII.2.1(1) Inventory of wells (From Oct. 17 to Nov. 3)

Well No.	Location/Owner	Depth (m)	Length of Pipe	Diameter		Date of Const.	EC (/cm)	R (/m)	Cl- (ppm)	pH	Remarks S: Shallow well D: Deep well G: Dug well
				Casing (mm)	Straw (mm)						
	SIPSIPIN										
S-1	Barangay	6	5	50	31	1989	350	28.6	100	6.1	Portable; available all season; jetmatic type
S-2	Barangay	15	9	50	31	1988	550	18.2	166	6.4	Recently not potable due to "rusty" taste; available all season; jetmatic type
S-3	Isagani Soriano	15	12	50	31	1982	490	20.4	145	6.5	Potable; available all season; jetmatic type
S-4	Laureano Alejan	14	9	50		1974	1470	6.8	460	6.8	Potable; available all season; pitcher type;
D-1	Elementary School	30	24	50	31	1989	410	22.7	129	6.5	Awaiting water quality analysis before students use it for drinking purposes.
	POBLACION										
S-5	Private	15	12	50			1620	6.2	520	6.6	Pitcher type
S-6	Jalajala Elem. Sch.	9	6	50	31		320	31.3	91	6.8	Not potable; available all season jetmatic type
S-7	Private	15	9	50	31		740	13.5	228	6.4	Potable; available all season
S-8	Pricilla Balajadja	15	12	50	31	1988	1230	8.1	390	6.9	Not potable; available all season; jetmatic type
S-10	Boni Bucal	15	12	50	31	1985	1010	9.9	320	7.9	Potable; available all season; cylinder type
S-9	Barangay	15	12	50	31		740	13.5	228	6.5	Potable; available all season; jetmatic type
D-2	Barangay	24	15	50	31	1988	1330	7.5	420	7.1	Not potable; available all season; bitter taste
D-3	Barangay	24	9	50	31	1989	590	16.9	175	6.8	Potable; jetmatic type DPWH No. 448929 (OECF Proj.)
D-4	Barangay	21	18	50	31	1989	650	15.4	196	8.0	Potable
	BAYUGO										
S-11	Barangay	15	12	50	31	1981	1500	6.7	470	7.4	Potable; available all season; jetmatic type
S-12	Barangay	15	12	50	31		1240	8.1	390	7.0	Potable; available all season;
S-13	Delfin Ocampo	15	12	50	31	1968	1160	8.6	365	7.5	Potable; available all season; jetmatic type

Table VII.2.1(2) Inventory of Wells

(From Oct. 17 to Nov. 3)

Well No.	Location/Owner	Depth (m)	Length of Pipe	Diameter		Date of Const.	EC (/cm)	R (/m)	Cl- (ppm)	pH	Remarks (S: Shallow well, D: Deep well, G: Dug well)
				Casing (mm)	Straw (mm)						
	PUNTA										
D-5	Meralco Foundation						1290	7.7	405	7.2	Potable; available all season; with sumersible pump
D-6	Meralco Foundation						1280	7.8	400	7.1	Free-flowing; temp. above normal (35°) potable; all season
D-7	Jaime Gallido	33	9	50	31	1968	710	14.1	215	7.1	Not potable; starting this year due to "rusty" taste; available all season; jetmatic type
D-8	Private	24	12	50	31	1965	740	13.5	225	7.7	Potable: available all season; jetmatic type
D-9	Barangay	21	6	50	31	1987	1120	8.9	350	7.4	Potable; available all season; but less Q in summer; jetmatic type
D-10	Barangay	30		100	31	1955	1170	8.5	370	7.9	Potable; all season; original cylinder type was replaced by jetmatic pump
S-14	Elementary School	18	12	50	31	1989	990	10.1	310	7.5	Not potable; jetmatic type
	PALAY-PALAY										
D-11	Barangay	48		100	50	1983	620	16.1	180	--	Potable; available all season; cylinder type
D-12	Barangay	39	12	50	31	1988	2000	5	640	--	Slightly brackish but people still use it for drinking; jetmatic type
S-15	Maria de Leon	15	12	50	31		1990	5	630	--	Potable; available all season; jetmatic type
	LUBO										
S-16	Barangay	9	6	200	31	1986	1370	7.3	430	7.2	Potable; available all season; less Q in summer
S-17	Leopoldo Salgatar	9	6	50	31	1985	810	12.3	255	7.0	Potable; all season; jetmatic type
G-1	Loreto Pedroja	4	3	50	31	1988	920	10.9	285	7.2	Dry during summer; jetmatic type
G-2	Barangay	5	3	50	31	1989	730	13.7	225	7.3	Potable; jetmatic type
	BACUMBONG										

Table VII.2.1(3) Inventory of Wells (From Oct. 17 to Nov. 3)

Well No.	Location/Owner	Depth (m)	Length of Pipe	Diameter		Date of Const.	EC (/cm)	R (/m)	Cl- (ppm)	pH	Remarks (S: Shallow well D: Deep well G: Dug well)
				Casing (mm)	Straw (mm)						
G-4	Pedro Barrion	14	12	100	31	1959	760	13.1	235	–	Potable; dry during summer
G-5	Julian Bonita	14	12	50	31	1985	760	13.1	235	–	Potable; available all season but less Q in summer; jetmatic type
G-6	Private	3					600	16.7	180	–	Potable all season; originally a spring
S-18	Barangay	12	6	100	31		510	19.6	150	–	Potable; SWL fluctuates with lake
S-19	Elementary School	15	12	50	31		520	19.2	155	–	Potable; all season; with electric motor

Table VII 2.2 Analyses Results of Groundwater Water Quality

Sample No.	Sampling Date (Nov.'89)	Location of SampLing	pH (25°C)	EC (uS/cm)	Cations (ppm)				Anions (ppm)					Remarks
					Na	K	Mg+Ca	NH4	CO3	HCO3	Cl	SO4	NO3	
G-1	9	Barangay Sipisipin (Near Barangay) Road)	6.50	774	26.9	3.9	739.8	tr.	0.00	175.1	57.4	595.2	tr.	*
G-2	9	District I of Jala-Jala (Elementary School Campuss)	6.22	276	11.0	1.2	250.9	tr.	0.00	83.0	13.7	169.0	tr.	*
G-3	9	District II of Jala-Jala (Lakefront)	6.59	1,127	48.1	8.2	1,171.2	tr.	0.00	311.7	120.4	543.4	tr.	*
G-4	3	Sitio Llano (AADC, MFI, MERALCO)	7.30	6,600	500.0	32.0	742.4	tr.	0.00	0.0	888.7	5,679.4	tr.	
G-5	3	Barangay Punta (Near Barangay Road)	7.53	668	78.0	14.8	361.0	tr.	0.00	317.2	44.5	48.0	tr.	*
G-6	9	Barangay Palay-Palay (Near Barangay Road)	7.00	894	19.1	5.9	1,036.8	tr.	0.00	414.8	50.4	92.2	tr.	*
G-7	2	Sitio Ik-Ik (Near Barangay Road)	6.97	1,180	120.1	2.0	791.0	tr.	0.00	306.8	134.4	384.0	tr.	*
G-8	2	Barangay Lubo (Capatain House Side)	6.90	644	17.0	1.2	701.4	tr.	0.00	286.7	19.6	217.0	tr.	*
G-9	17	Barangay Bayugo (Near Provincial Road)	7.60	1,255	184.9	23.0	797.9	tr.	0.00	511.8	120.4	243.8	tr.	
G-10	16	Barangay Bagumbong (Elementary School Campuss)	7.20	533	11.0	2.0	567.0	tr.	0.00	83.0	18.9	639.4	tr.	*

Note; * :Contaminated (Colitis Germs)

Table VII.2.3 General features of Rural water supply system Level-I

Description		Sipsipin	Bayugo	Punta	Palay-Palay	Pagkali-nawan	Lubo	Bagumbong	Paala-man
1. Design population									
1) Household	nos	50	50	50	50	50	50	50	50
2) Population	person	300	300	300	300	300	300	300	300
2. Design discharge									
1) Average daily discharge	l/sec	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
2) Maximum daily discharge	l/sec	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
3) Maximum hourly discharge	l/sec	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
3. Number of facility									
1) Deep well	nos	3	3	1	3	2	2	2	0
2) Spring	nos	0	0	0	0	0	0	0	2
4. Well size									
1) Depth	m	50	30	40	40	30, 50	30, 60	50	-
2) Diameter	mm	100	100	100	100	100	100	100	-

Table VII.2.4 General features of rural water supply system Level-II

Description	Unit	Bayugo	Punta	Bagumbong No.1	Bagumbong No 2
1. Design population					
1) Household	nos	253	260	227	110
2) Population	person	1,518	1,560	1,362	660
3) Design population	person	1,948	1,997	1,743	844
2. Design discharge					
1) Maximum daily discharge	cu,m/day	155.4	159.8	139.4	67.5
2) Maximum daily discharge	cu,m/day	202.1	207.7	181.3	87.8
3) Maximum hourly discharge	cu,m/day	388.6	399.4	348.6	168.8
3. Deep well					
1) Depth	m	80	80	100	50
2) Diameter	mm	100	150	150	150
4. Pump					
1) Type		----	submersible		----
2) Discharge	cu./min	0.30	0.30		0.25
3) Motor output	kW	3.7	3.7	3.7	1.5
4) Total head	m	30	35	50	30
5. Storage tank					
1) Type		----	overhead concrete type		----
2) Storage volume	cu.m	40	40	40	20
6. Discharge pipe					
1) Pipe material		----	p v c pipe	----	
2) Diameter	mm	25 to 100	25 to 100	25 to 100	19 to 63
3) Total length	m	2,665	1,292	2,306	1,143
7. Faucet	nos	51	54	47	24

Table VII.3.1 (1) Inventory of Barangay Roads

Barangay/ Name of Road	Road Condition	Pavement	Width (m)	Length (m)	Required Improvement
Sipdipin					
1. Soriano St.	P	Gravel	4.00	600	Gravel metalling
2. Balajadia Fdr. Rd.	P	Asphalt	4.00	250	Good condition
	PERS	Earth	4.00	250	Gravel metalling
3. Estrella Fdr. Rd.	P	Gravel	3.00	450	Widening ,gravel metalling
4. C.Santos Fdr. Rd.	PERS	Earth	3.00	520	Widening, gravel metalling
5. C.Bautista St.	PERS	Earth	3.00	650	Widening, gravel metalling
6. G.Valsoncia St.	P	Gravel	4.00	400	Gravel metalling
7. M.Alejandro St.	P	Gravel	3.00	800	Widening, gravel metalling
8. M.Santos Fdr. Rd.	P	Gravel	40.00	500	Gravel metalling
Total				4,420	
	PERS	Widening,gravel metalling			1,170
		Gravel metalling			250
	P	Widening,gravel metalling			1,250
		Gravel metalling			1,500
		Good condition			250
		Total			4,420
Poblacion					
1. Calderon St.	P	Concrete	4.00	250	Good condition
2. G.Patang Fdr. Rd.	P	Concrete	5.80	300	Good condition
3. M.Delavega St.	P	Concrete	5.00	300	Good condition
4. Villaran St.	P	Concrete	6.70	400	Good condition
5. G.Borja St.	P	Gravel	6.00	150	Gravel metalling
6. A.Luna St.	P	Concrete	4.00	150	Good condition
7. A.Bonifacio St.	P	Concrete	6.10	150	Good condition
8. E.Rodriguez Sr. St.	P	Concrete	6.00	300	Good condition
9. S.Perez St.	P	Asphalt	3.00	200	Good condition
10. J.P.Rizal St.	P	Concrete	6.00	300	Good condition
11. G.Sena St.	P	Gravel	4.00	200	Gravel metalling
12. Mapaskia Fdr. Rd.	P	Earth	3.00	150	Widening,gravel metalling
13. Tangge Fdr. Rd.	P	Earth	4.00	3,000	Gravel metalling
14. Jalajala-Bagumbon Rd	P	Gravel	6.00	1,500	Gravel metalling
15. Daan Poon Rd.	PERS	Gravel	4.00	2,000	Gravel metalling
Total				9,350	
	PERS	Gravel metalling			2,000
	P	Widening,gravel metalling			150
		Gravel metalling			4,850
		Good condition			2,350
		Total			9,350

Barangay/ Name of Road	Road Condition	Pavement	Width (m)	Lengh (m)	Required Improvement
Bayugo					
1. B.Gonzales St.	P	Gravel	4.00	210	Gravel metalling
2. G.Patang Fdr. Rd.	PERS	Earth	3.00	400	Widening, gravel metalling
3. M.H.Delpilar St.	PERS	Earth	4.00	120	Gravel metalling
4. R.Magsaysay St.	P	Earth	4.00	4,000	Gravel metalling
5. Bo.Rd.3rd. Dist.	P	Gravel	4.00	1,500	Gravel metalling
6. M.Camungul Fdr. Rd.	PERS	Earth	4.00	200	Gravel metalling
7. Daling Fdr. Rd.	P	Gravel	6.00	500	Gravel metalling
8. A.Matienzo St.	PERS	Earth	3.00	300	Widening, gravel metalling
9. F.Borja St.	NP	Earth	3.00	300	Widening, gravel metalling
10. Bayunihan Rd.	NP	Earth	3.00	500	Widening, gravel metalling
11. Delacruz Fdr. Rd.	NP	Earth	3.00	500	Widening, gravel metalling
12. Ilalang Fdr. Rd.	NP	Earth	3.00	300	Widening, gravel metalling
13. Biga Fdr. Rd.	PERS	Earth	3.00	150	Widening, gravel metalling
Total				8,980	
	NP	Widening, gravel metalling			1,600
	PERS	Gravel metalling			320
		Widening, gravel metalling			850
	P	Gravel metalling			6,210
		Total			8,980
Punta					
1. Punta Brgy. Rd.	P	Asphalt	2.90	675	Good condition
	PERS	Earth	2.90	1,150	Widening, Gravel metalling
2. Panggito Fdr. Rd.	PERS	Earth	4.00	200	Gravel metalling
3. Torres Fdr.Rd.	PERS	Earth	6.00	800	Gravel metalling
4. Villanueva Fdr. Rd.	PERS	Gravel	6.00	300	Gravel metalling
Total				3,125	
	PERS	Gravel metalling			1,300
		Widening, gravel metalling			1,150
	P	Gravel metalling			675
		Total			3,125
Palay-Palay					
1. Palay-Palay Brgy Rd.	P	Asphalt	2.00	190	Good condition
	PERS	Earth	2.00	1,650	Widening, gravel etalling
2. Tanauan Fdr. Rd.	NP	Earth	3.00	3,000	Widening, gravel etalling
Total				4,840	
	NP	Widening, gravel etalling			3,000
	PERS	Widening, gravel etalling			1,650
	P	Good condition			190
		Total			4,840

Table VII.3.1 (2) Inventory of Barangay Roads

Barangay/ Name of Road	Road Condition	Pavement	Width (m)	Length (m)	Required Improvement
Pagkalinawan					
1. Pagkalinawan Brgy Rd.	PERS	Earth	4.00	3,000	Gravel metalling
2. Malabanan Fdr. Rd.	P	Gravel	4.00	300	Gravel metalling
3. Samaniego Fdr. Rd.	PERS	Earth	4.00	400	Gravel metalling
4. Rodriguez Fdr. Rd.	PERS	Earth	4.00	350	Gravel metalling
5. Sangalang Fdr. Rd.	P	Gravel	4.00	350	Gravel metalling
6. Masikat Fdr. Rd.	P	Gravel	4.00	300	Gravel metalling
7. Marasigan Fdr. Rd.	NP	Earth	3.00	150	Widening, gravel metalling
8. Grasa Fdr. rd.	PERS	Gravel	6.00	150	Gravel metalling
9. Tanauan Fdr. Rd.	NP	Earth	4.00	80	Gravel metalling
10. Pawid Fdr. Rd.	PERS	Earth	4.00	200	Gravel metalling
11. Artega Fdr. Rd.	NP	Earth	4.00	50	Gravel metalling
Total				5,330	
	NP	Widening,gravel metalling			150
		Gravel metalling			130
	PERS	Gravel metalling			4,100
	P	Gravel metalling			950
		Total			5,330
Lubo					
1. Ik Ik Fdr. Rd.	PERS	Earth	4.00	1,500	Gravel metalling
2. Lubo Brgy. Rd.	PERS	Earth	4.00	2,000	Gravel metalling
3. Centro Fdr. Rd.	PERS	Gravel	4.00	160	Gravel metalling
Total				3,660	
	PERS	Gravel metalling			3,660
Bagumbong					
1. Burgos St.	P	Gravel	6.00	400	Gravel metalling
2. J.P.Rizal St.	P	Gravel	6.00	200	Gravel metalling
3. Magsaysay St.	P	Gravel	6.00	1,000	Gravel metalling
4. J.delos Santos St.	P	Gravel	6.00	850	Gravel metalling
5. Pulong Ligaya St.	P	Gravel	6.00	400	Gravel metalling
6. Kalaw St.	P	Gravel	6.00	120	Gravel metalling
7. A.Bonifacio St.	P	Gravel	6.00	1,500	Gravel metalling
8. Nayong Luma St.	PERS	Gravel	6.00	120	Gravel metalling
9. Mabini St.	P	Gravel	6.00	270	Gravel metalling
10. Borja St.	P	Gravel	6.00	1,400	Gravel metalling
11. Inood St.	P	Gravel	6.00	150	Gravel metalling
12. Quezon St.	proposed				
13. E.Rodorigue St.	P	Gravel	6.00	200	Gravel metalling
14. Paalaman Fdr. Rd.	NP	Gravel	4.00	300	Gravel metalling
Total				6,910	
	NP	Gravel metalling			300
	PERS	Gravel metalling			120
	P	Gravel metalling			6,490
		Total			6,910
Grand Total					46,615

Summary of Improvement Works of Barangay Roads

NP	Widening, gravel metalling	4,750	NOTE
	Gravel metalling	430	NR
PERS	Widening, gravel metalling	4,820	PERS
	Gravel metalling	11,750	P
P	Widening, gravel metalling	1,400	
	Gravel metalling	20,675	
GOOD CONDITION	Not required	2,790	
Grand Total		46,615	

FIGURES

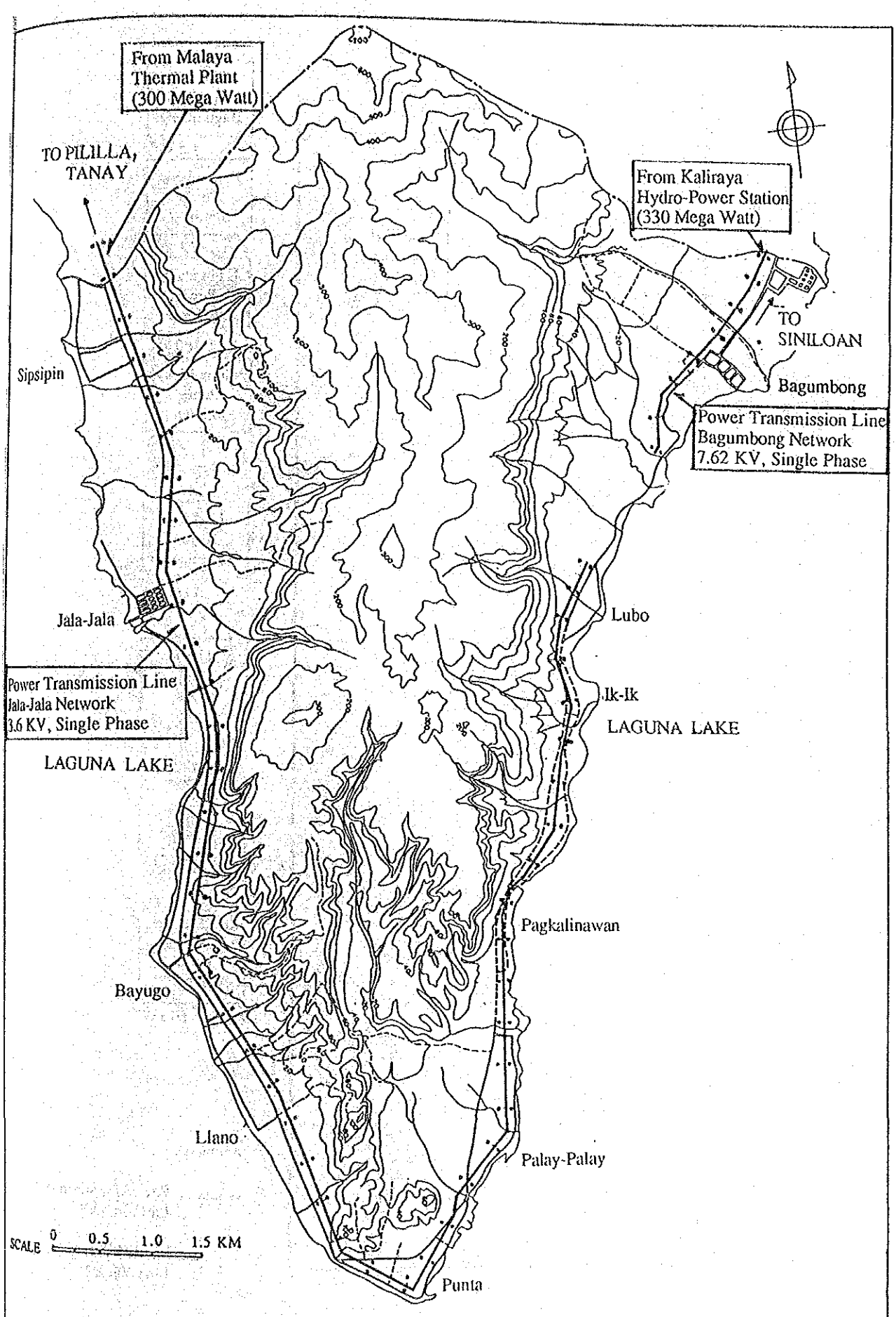

Fig. VII.1.1 Existing Power Supply System

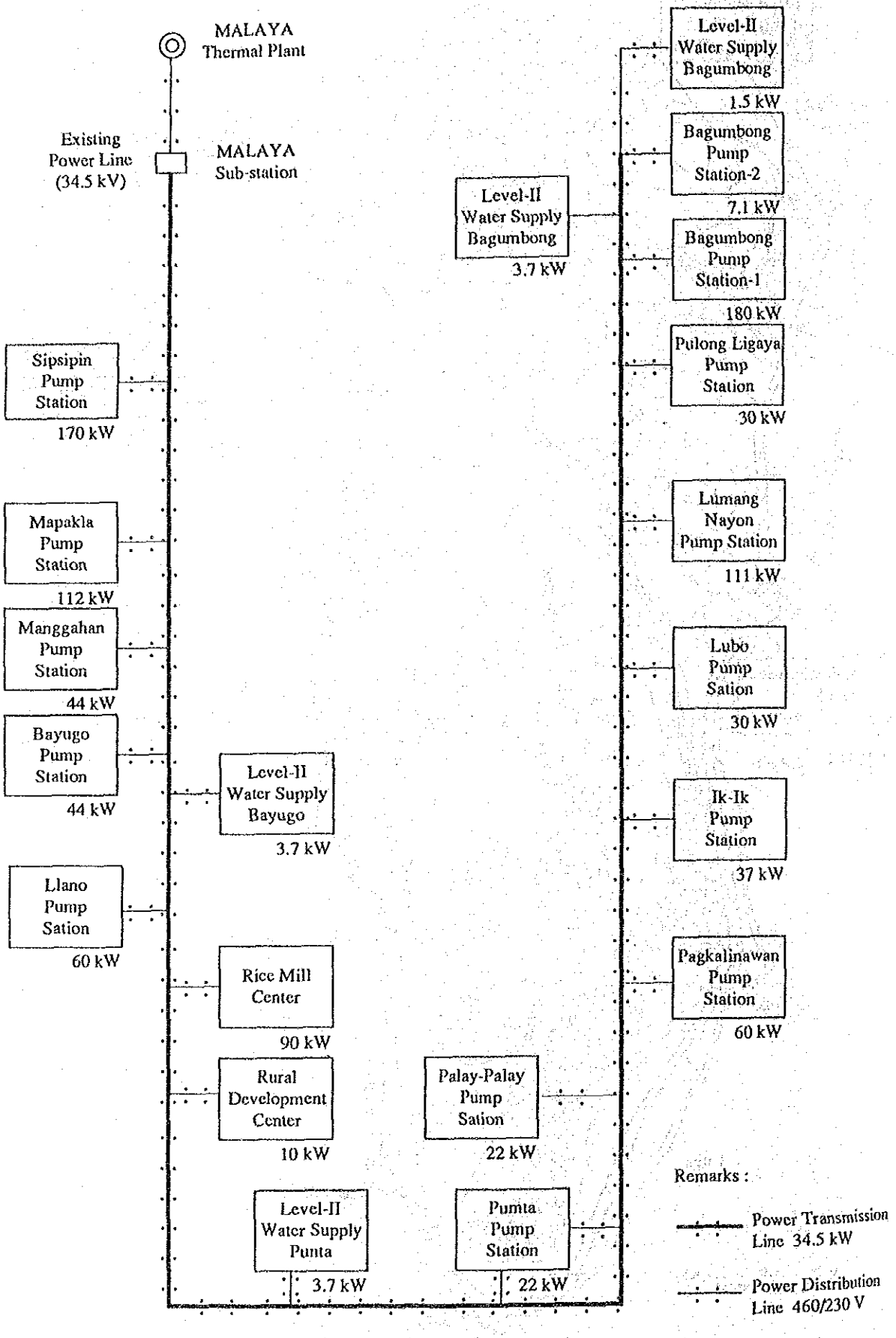

Fig. VII.1.2 Schematic Diagram of Power Demands

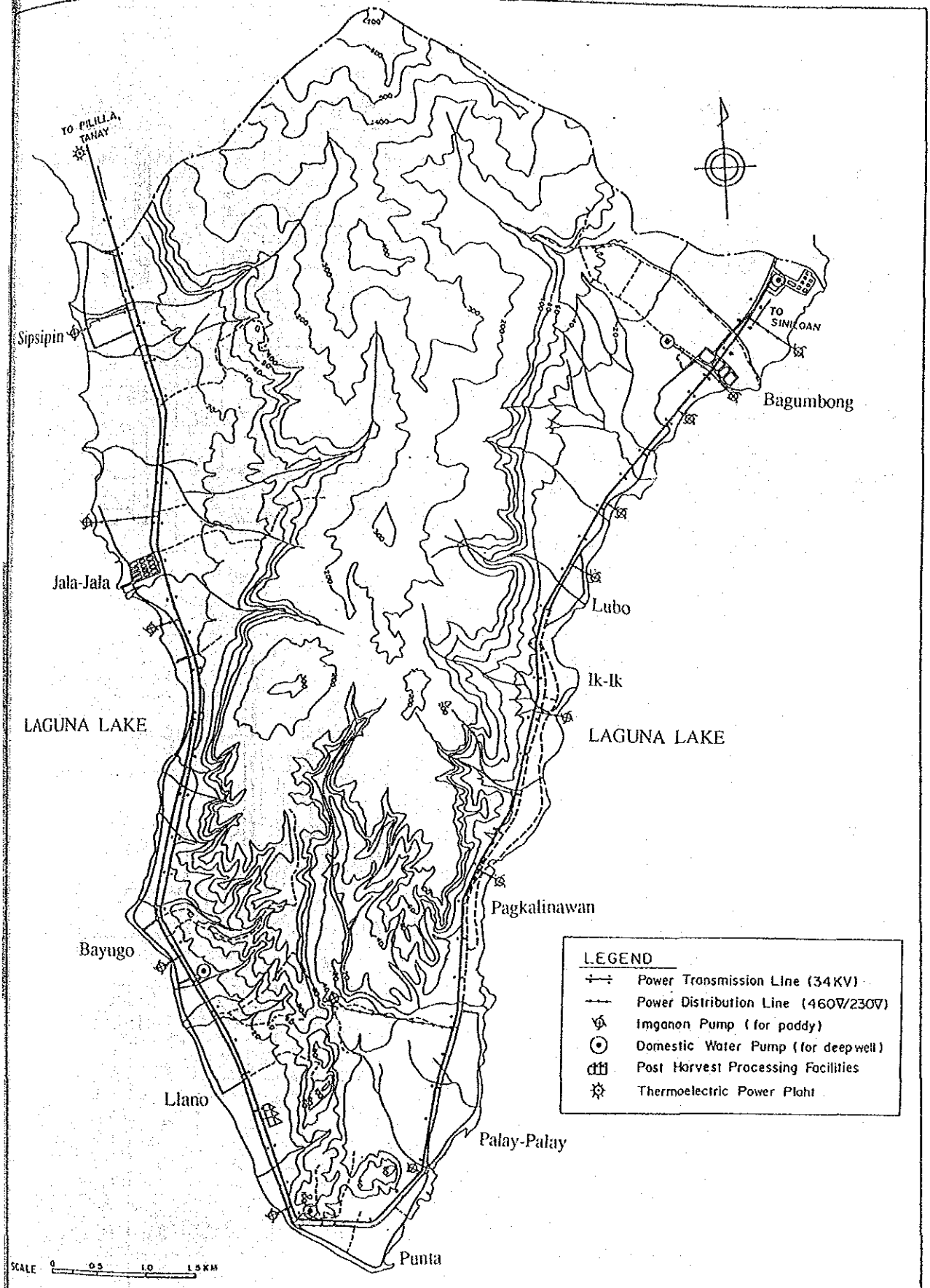

Fig. VII.1.3 Proposed Power Supply System

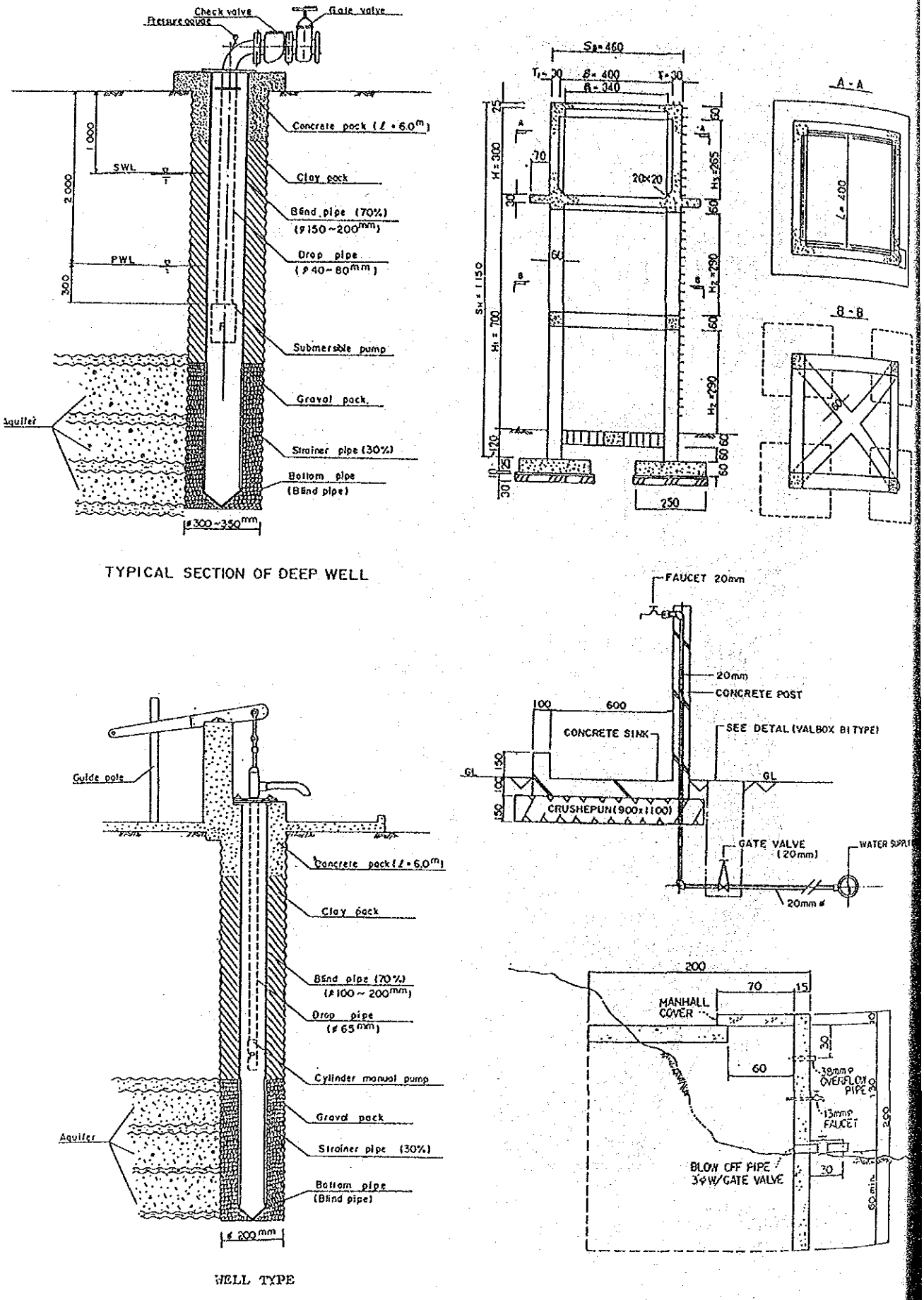

Fig. VII.2.1 Typical Plan of Rural Water Supply Facilities

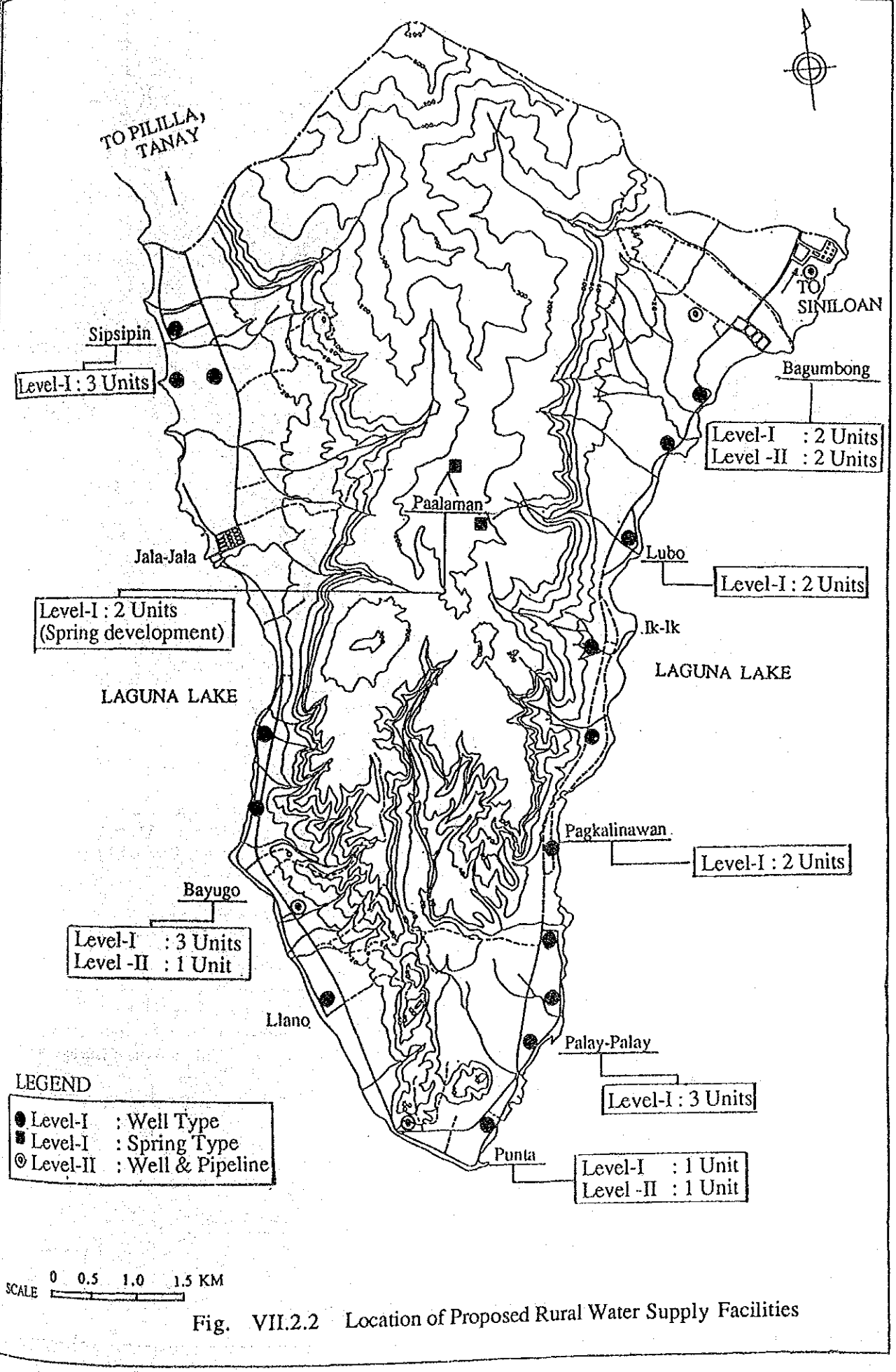

Fig. VII.2.2 Location of Proposed Rural Water Supply Facilities

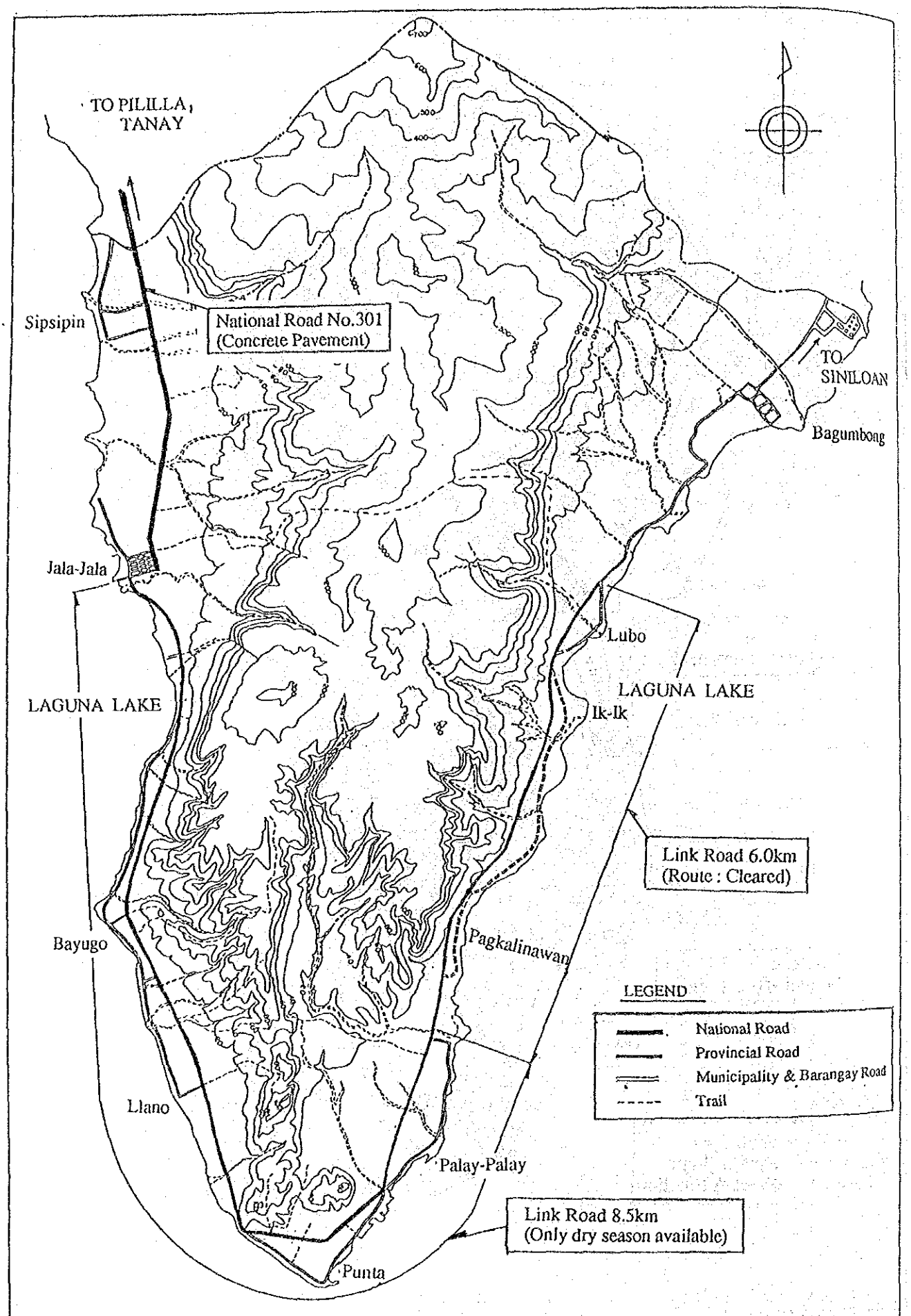

Fig. VII.3.1 Existing Road Network

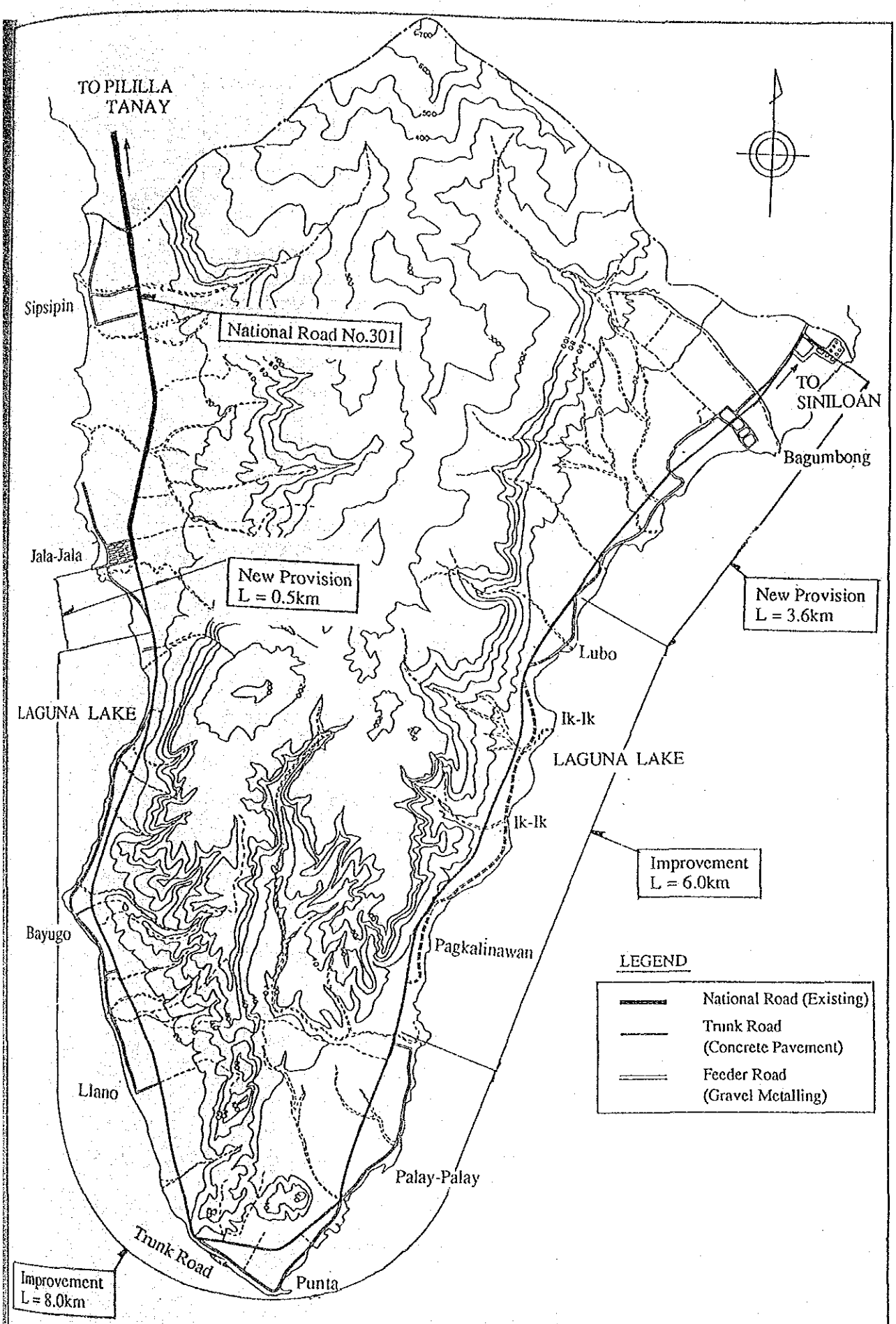

Fig. VII.3.2 Layout of Trunk Road

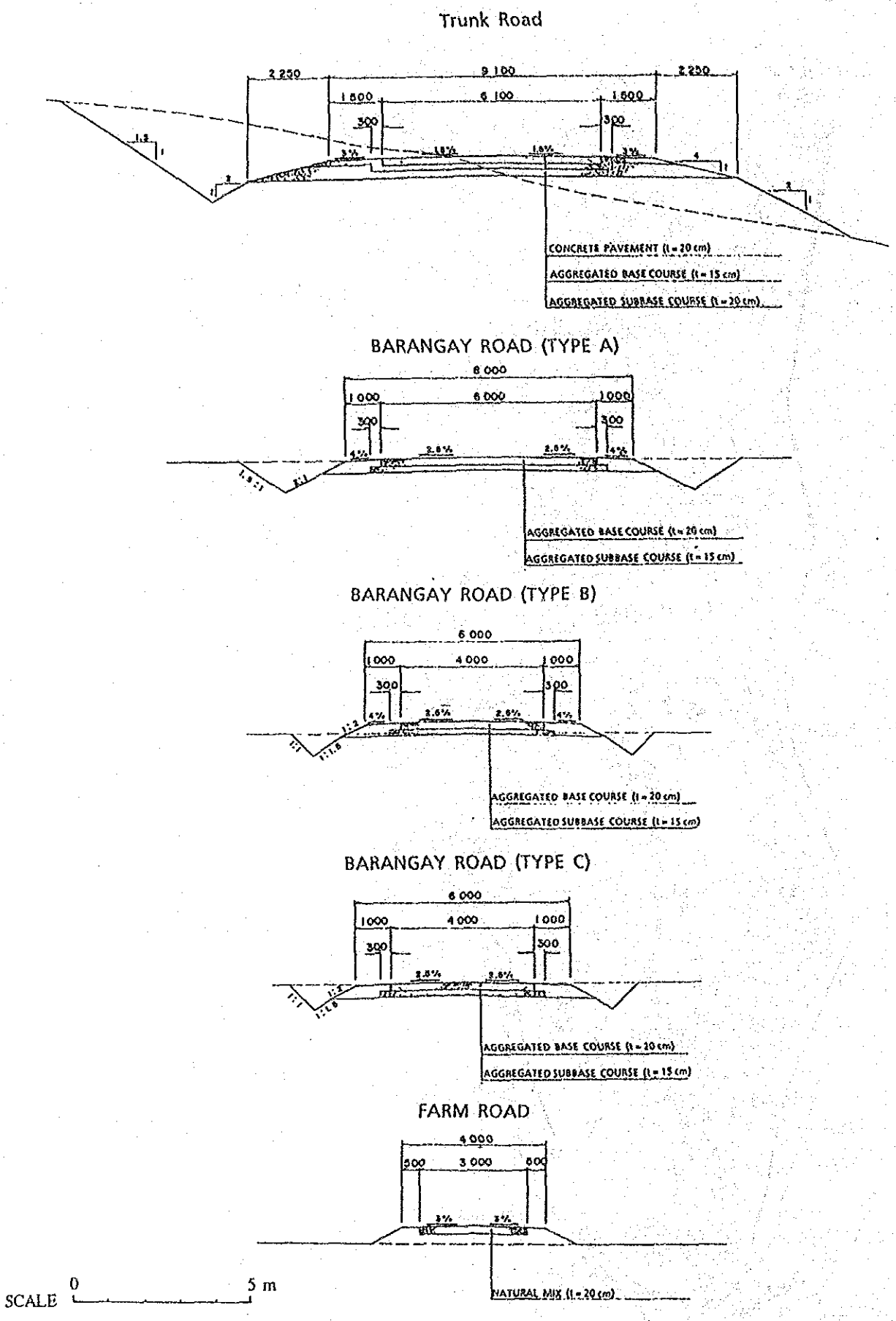

Fig. VII.3.3 Standard Road Sections

ANNEX-VIII

INSTITUTIONAL SUPPORTING SERVICES AND FARMERS' ORGANIZATION

ANNEX- VIII

INSTITUTIONAL SUPPORTING SERVICES AND FARMERS' ORGANIZATION

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ANNEX- VIII. INSTITUTIONAL SUPPORTING SERVICES AND FARMERS' ORGANIZATION

1. INSTITUTIONAL SUPPORTING SERVICES

1.1 General

The agricultural institution and its supporting services shall be the long term public services and provided to the farmer beneficiaries of agrarian reform to an appropriate extent so as to successfully bring up self-reliant farmers in early stage after the agrarian reform program. Thus, to study the institutional supporting services, careful attention was paid the following points.

- Constraints and/or unfavorable circumstances under the current execution of the objective services.

- Reinforcement plan to be formulated by the concerned local government

1.2 Present Setting and Activities of the Rural Inatitution

1.2.1 Agricultural Institution and Supporting Activities

Agricultural supporting services are undertaken by the concerned provincial government. The supporting facilities for promotion of the agricultural production as well as rural development program have been established sufficiently at the provincial level. In reality, however, the institutional supporting facilities and staff assignment at municipal level are not yet sufficient for meeting the rural requirement.

At the municipal level, the DA has three regular agricultural production technologists and four casuals. Their main function is to assist farmers in improving institutional and farm management practices through disseminating agricultural information and transfer of farm technologies. They also organize credit and multipurpose cooperatives, farmers associations and other related organizations. Besides these activities relating to farming, they also assist the farm households in home management and youth development.

The municipal agrarian reform office, on the other hand, assists the farmers in tenure development through a process of registration and documentation follow-ups of prospective farmer beneficiaries included in the land transfer operations. At present, the municipal manpower of DAR consists of only three agrarian reform technologists, one statistician, a clerk and the municipal agrarian reform officer as head.

Other institutions in the municipality directly or indirectly working on the development of the farmers' welfare include the representatives from the Department of Local

Governments, Trade and Industry, Social Welfare and Development and Health. These institutions cater their respective services to the farming population in terms of local barangay government supervisions, livelihood programs, calamity assistance and health services.

Other than the above, Meralco Foundation Inc. (MFI) has established in Bayugo area, the Agricultural and Aquacultural Extension Center (AAEC) including the function of agricultural extension, home economy extension, demonstration farm and operation and management of fish nursery pond. However, both facilities and technical staff still remain short to meet the requirement. The present organization and staffing of the AAEC of MFI is summarized in Fig.VIII 1.1.

Related institutions outside the municipality but will influence agri cultural development in the study area include the following:

1. Bureau of Plant Industry (BPI)
2. Bureau of Soils (BS)
3. Philippines Rice Research Institute (PRRI)
4. Philippines Coconut Authority (PCA)
5. University of the Philippines at Los Bannõs (UPLB)
6. Philippines Council for Agricultural Research and Resources Development (PCARRD)

1.2.2 Rural Institution and Taxation

The existing rural institutions in the study area consist of formal and semi-formal organizations with different objectives or goals. Some of these goals have either economic, social and/or political motives. Other institutions act as executive bodies especially those belonging to the government.

The private rural institutions include those engaged in the promotion of rural well-being among members while those from the government include those assisting the residents or rural people in such promotion in general. There are 32 farmers organizations with a total membership of about 2,419. This is brokendown into 7 Samahang Nayons with 1,040 members, 7 farmers associations with 544 members, 14 irrigators association with 578 members and 4 cooperatives with 257 members (Table VIII 1.1). Usually, the membership of one association or cooperative overlaps with each other. Thus, a farmer may have two to three memberships in most cases.

The major institutions assisting the farmers in the study area consist of DA and DAR. Their municipal offices are headed by Municipal Agriculture Officer (MAO) and the Municipal Agrarian Reform Officer, respectively. At the municipal level, the DA has three regular agricultural production technologists and four casuals (usually paid by provincial

government). Their main function is to assist farmers in improving institutional and farm management practices through disseminating agricultural information and transfer of farm technologies. They also organize credit and multipurpose cooperatives, farmers associations and other related organizations. Besides these activities relating to farming, they also assist the farm households in home management and youth development.

The Municipal Agrarian Reform Office, on the other hand, assists the farmers in tenure development through a process of registration and documentation follow-ups of prospective farmer beneficiaries included in the land transfer operations. Support activities for the welfare development of the farmer beneficiaries are still negligible in terms of support services. At the farm level, assistance to farmers was carried out mainly by the personnel of the Department of Agriculture. At present, the municipal manpower of the DAR consists of only three agrarian reform technologists, one statistician, a clerk and the municipal agrarian reform officer as head.

The sources of revenue of the municipality are derived from taxes, charges and fees paid by residents, businessman and other people doing business activities in the area. Based on the assessed value of properties (real estate, dwelling and improvements), the municipal treasury collects one percent basic tax and one percent special education fund (SEF) from the tax payers.

1.2.3 Financial and Insurance Services

As for the financial service structures, there was bank at Jala-Jala, previously but has closed the shop due to less profitable business. Other private sources of credit have to be tapped by farmers and non-farmers alike to finance their farming and other economic activities at present.

The present source of credit for farmers in the area includes the cooperatives, sari-sari stores, and private individuals (relatives and friends). Of four cooperatives established, three cooperatives are active in granting loans to a limited extent. These are Jala-Jala (Poblacion) Multipurpose Cooperative, the Sipsipin Credit Cooperative and Bagumbong Multipurpose Cooperative. The Jala-Jala Multipurpose cooperative averaged about ₱18,750.00 per month of loans granted to borrowers with a total net income of ₱1,933.65 per month during a nine-month period of operation (Table VIII 1.2). The operation of the cooperatives appears well managed with the able guidance of the municipal agricultural Office. Memberhsip includes farmers and government employees. Besides credit extended to members, the cooperative with a modest capital of about ₱5,000.00 also started a consumer good store for the patronage of both members. For a seven-month period of operation, the net income has gradually increased from ₱53.24 to ₱331.01 (Table VIII 1.3).

Sipsipin Credit Cooperative has about 115 active members started in 1984. It collects a membership fee of ₱20.00 and an initial capital share of ₱400.00. The total capital share per member is ₱1,250.00. At present (1989) the total capital is estimated at ₱135,000.00 for

which a member can borrow for a business loan of ₱1,000.00 for a period of one week with interest of 2% per day. A member could also borrow for farmer's loan amounting to 2 times his fixed deposit for a four-month period at current interest rates of rural banks (12% per annum). Thru the years, this cooperative has helped a lot its members and now, is striking to change the scope of operation into a multi-purpose cooperative.

Many farmers and non-farmers who have a demand a large amount of loan used/or use sources outside the study area most especially those located at Tanay, Ruzal. These include the Branch of Philippine and Bank, Tanay Rural Bank, United Savings Bank, First Savings and Loan Bank, Capitol City Development Bank. Minor Lending Investment and the Tanay Market Vendors, Credit and Commercial Development Corporation Inc. These sources are readily accessible to the study area.

The use of insurance services by the farmers especially for crops is not common in the area. However, a national crop insurance corporation operating nationwide was already established by the Government as a semi-government entity. Paddy and corn farmers could avail of their service thru the nearest branch office in the province. Other insurance companies that are operating in Rizal Province are not usually engaged in agricultural insurance but in life or other form of insurance.

1.3 Reinforcement Plan of Agricultural Institution

The basic facilities and fundamental functions regarding the agricultural supporting services stated above have been established and regularized by the Government. Necessary staffing and budgetary arrangement for extending the specific services have already been prepared at the province level. Therefore, in line with the implementation of the objective development, the following institutional supporting system shall be organize so far as to adequately function for the subjected project.

- Agricultural and home management technology extension services,
- Supply of qualified seeds of paddy as well as seedlings for fruit trees
- Steady supply of farm inputs
- Technical training services to farmers in operation and maintenance of farm machinery, irrgation pumps, rice mill and other machinery and equipment which will be introduced under the project implementation
- Logistic and/or administrative assistance especially in procurement of spare-parts of machinery and equipment
- Assistance and guidance services to farmers in operation and management of farmers coopertive societies and those related communal works,

- Assistance to farmers in post harvest activities including information services for marketing of agricultural production.

- Farmers credits services

Among the institutional supporting services, the technical matters, such as extension services, training and guidance, etc. will be taken as one of the fundamental function of the Rural Development Center which will be explained hereunder. Logistic and/or administrative matters will be functioning into the local government in close coordination with the institutional organization in Rizal province.

The farmers' credit services have been regularized through CARP based financial service network. The Philippione Land Bank is the prime institution on this matter. Recently, the Bank has established the Provincial Branch in Tanay city near to the study area. Thus, the financial assistance of the government will be taken through this Branch.

2 Establishment Plan of Rural Development Center

2.1 Necessity of Rural Development Center

Establishment of the Rural Development Center is one of the essential measures for reinforcement of agricultural supporting and rural institution services.

- The basic facilities and fundamental functions regarding the supporting services have been established and regularized by the Government. Necessary staffing and budgetary arrangement for extending the services have also been ready at the provincial level.

- As reported in ANNEX-IV AND V, the present conditions of agricultural and rural institutional activities , including extension services, guidance and training services, supply service on farm inputs, etc. are still inadequate. Those facilities and staffing are short to meet the requirement in the rural area, accordingly.

- Recently, MERALCO Foundation Inc. has established the Agric. Aquacultural Development Center in the study area, and started to extend his services in technical extension and home management technology. However, this facility is also short to meet the rural requirement.

To effectively promote and successfully achieve the integrated rural development project, it is essential to motivate farmers' insentive. An intensive guidance and supporting services in improvement of production structure will also be required in the study area. In reality, however, reinforcement schedule of the institutional function is still far behind the goal which has been conceived in the current medium term rural development plan. Thus, in due consideration of the present progress of said rural development plan, it is proposed to

establish the Rural Development Center so far as to be functioning the intensive supporting services to the local farmers.

2.2 Establishment Plan of the Rural Development Center

The Rural Development Center hereby conceived is the institutional structure at the municipal level and has the public service function, such as agricultural extension, home management technology extension, training and guidance services, etc. As for the farmers credit services, the Philippines Land Bank is now under preparation of the nationwide service network. Thus, the function in such financial assistance is excluded from the function. The principle functions of the Center and facilities to be prepared in the Center are as follows:

Principle Function of Rural Development Center

Existing Function and Facilities	Function Necessary to Reinforce	Function Newly Established
Extension Services:		
-	- Crop Cultivation Technology Services	- Demonstration Farm - Seed Farm and Seeds Distribution System
-	- Livestock Production Technology Services (Veterinary Clinic)	-
- Aquacultural Technology Services (Fish Pond)	-	-
-	- Home Management Technology Services	-
Technical Guidance and Training Services:		
-	-	- Farm Mechanization Technology (O/M Services) (Workshop)
-	-	- Post Harvest Activities Technology (O/M Services) (Rice Mill)
-	-	- O/M Services in Irrigation Pump and Related Facilities
Education and Guidance Services:		
- Adult Education Program	-	-
- Women Education Program	-	-
- Cottage Industry Technology Transfer Program	-	-

Other than the above, such facilities as workshop for farm machinery, rice mill complex and warehouse for farm input supply, etc. will be installed as the basic facilities for promotion and assistance in structural amendment and reinforcement of the agricultural production in the study area. It is no doubt, these facilities shall belong to the farmers cooperative. However, since farmer beneficiaries have no ability in both technical and financial services for operating these facilities at the initial development stage, O/M services of these facilities are expected to be undertaken by the Center. Through this O/M service of the Center, farmers shall get intensive training for skill. Whenever the training of the farmers

will achieve successfully, these facilities will transfer to the agricultural cooperative. Major function and responsibilities on organizational activities of both Rural Development Center and Agricultural Cooperative is illustrated in Fig. VIII 2.1.

2.3 Operation and Management of Rural Development Center

The Rural Development Center will be, at the construction stage, established as one of the essential function of the Jala-Jala Integrated Rural Development Project Office, and commence the supporting services to the farmers. While, after completion of the construction works, the Center will continue the technical services though his services will also be reduced according to the achievement of transfer of facilities to the farmers' cooperatives. The operational organization and proposed staffing are as summarized in Fig. VIII.2.2. The principle concept for operation and management of the Center is as follows:

- Participation of the CARP Coordinating Agencies:
  - = Technical training and transfer of technology in respect to O/M of basic facilities, such as warehouse and procurement of farm inputs, rice mill , workshop, etc.
  - = Technical extension services covering crop production, livestock, aquaculture, etc.

- Joint Operation among the Government and Non-Government Organization
  - = Technology transfer especially in home management , cottage and/or family work for the off-farm season, etc.
  - = adult and women education, etc.

The financial requirement for the Center operation is as follow:

- Financial Assistance from the Government (for only initial stage of development)

Staff Salary	P1,908,000
Maintenance Cost, incl. Power, light,etc.	P240,000
Vehicle, etc.	P100,000
Office Expenditure	P180,000
Miscellaneous	P65,000
Total	P2,493,000

- Operation and maintenance cost and/or the running cost of the basic facilities of warehouse, rice mill , workshop, etc. will be fully contributed by farmer beneficiaries. The annual requirement of the running cost is as estimated below:

Cost Items	Warehouse	Rice Mill	Workshop
Labour Charges	₱44,800	₱480,000	₱112,200
Power, Light, etc	1,000	350,000	5,000
O/M cost	250	180,000	10,000
Depreciation Cost	300	100,000	15,000
Miscellaneous	200	55,000	5,000
Total	₱47,050	₱1,165,000	₱147,200

Due amount to be paid by farmers for each utilization is estimated based on the annual cost requirement stated above.

- Store fee: ₱47,050 / 250 ton fertilizer/season = ₱0.18/Kg fertilizer (₱9.0/50Kg)
- Rice milling fee: ₱1,165,000 / 9,500 ton/year = ₱0.12/Kg paddy
- Repairing fee: ₱174,200 / 2,110 hrs = P80/hr work

2.4 Facility of Rural Development Center

The Rural development Center will be established preferably within the facility yard of Agric. Aquaculture Development Center of MERALCO Foundation Inc. in Llano area. The major facilities to be constructed are as listed below:

Facility of Rural Development Center

Proposed Facilities	Technical Features
Rural Development Center Office	Reinforced concrete, two story, including - Office - Lecture Room - Practice Room - Library, etc.
Dormitory: for Senior Staff	Reinforced concrete, bungalow type (3LDK)
for Junior Staff	Reinforced concrete, two story (1LK/unit)
Deep Well and Water Supply System	
Garage and Workshop	Steel frame with precast , concrete floor, over-head crane
Warehouse	Steel frame with precast, concrete floor including office space

2.5 Space for Construction of Center Facilities

Requirement of the land space for construction of the facilities for the Rural Development Center is as follows:

- Building for Center Office.....	3,600 m2
- Domitories for the Staff..... ...	4,300 m2
- Garage and Workshop.....	2,600 m2
- Rice Mill and Related Facilities.....	6,000 m2
- Warehouse.....	2,500 m2
Total	19,000 m2

As for construction of the Center facilities, the yard area of the existing Agric-Aquacultural Development Center of MERALCO Foundation Inc. (MFI) will have a wide enough spaces. Besides, the location of this Center area is considered to be advantageous for extending the objective services evenly for both Jala-Jala and Bagumbong areas.

Since other alternative land area has been distributed to the local farmers and acquisition of those land is considered to be difficult due to limited arable land in this study area, it is recommended that DAR shall negotiate with MFI and acqire the land in the existing Center yard for establishing the proposed Rural Development Center. The layout of the proposed Center is illustrated in Fig. VIII.2.3 as attached hereto.

The demonstration farm and seed and/or nursery farm will be prepared by use of the private farm owned by the farmer beneficiaries.

3. FARMERS' ORGANIZATION

3.1. General

To successfully implement the rural development and to ensure the highest effect and impact of its development, active participation of the local farmers is one of the indispensable conditions. And in this context, it is essential to educate those farmers and to enable them to understand how they maintain the socio-economic infrastructure to be developed. The farmers shall also understand how they have the responsibility and /or duties on amotizing the infrastructure as well as the facilities to be provided thru the project implementation, such as the land charges, water charges and other fees for O/M of joint utilities.

The organization of farmers' cooperative society is the basement for the agricultural cum rural development and doing economic activities, effectively and satisfactorily. This cooperative society will include such function as water users' association, irrigators'

association, farm mechanization, crop production and marketing or post-harvesting service facilities, cooperative shop, etc.

With paying attention to the above points, the existing farmers organization as well as constraints or problems prevailing on those operation cum management are studied carefully

3.2 Present Situation of Farmer's organization

3.2.1 Inventory of Farmers' Organization

In the study area, four types of farmers cooperative societies had been organized at the barangay bases under promotion of the previous government. There are 32 farmers cooperatives societies, i.e. 7 farmers associations, 4 multi-purpose cooperatives, 14 irrigators' associations and 7 pre-cooperatives (Samahang Nayong). In general, most of these cooperatives societies are not so active due to the lack of funds, and insufficient guidance and facilities. The membership of the above cooperative societies overlapped with each others. Thus, a farmer has two to three memberships in most case. The cooperative societies in each barangay are as summarized below:

Inventory of Farmers Cooperative Societies

Barangay	Samahan Nayon	Farmers' Association	Multi-Purpose Cooperative	Irrigation Association	Total
Sipsipin	1	-	1	4	6
Jala-Jala I	-	1	1	2	4
Jala-Jala II	1	-	-	1	2
Jala-Jala III	-	1	-	1	2
Bayugo	2	1	1	-	3
Punta	1	-	-	-	1
Palay-Palay	1	1	-	-	2
Pagkarinawan	1	1	1	-	3
Lubo	-	1	1	1	3
Bagumbong	-	1	1	5	7
Paalaman	-	-	-	-	-
Total	7	7	6	14	34

The membership of each cooperative society is as follows:

Samahan Nayon	Farmers' Association	Multi-Purpose Cooperative	Irrigation Association	Total
1,040	544	257	578	2,419

3.2.2 Activity of Cooperative Societies

Under the guidance of Bureau of Cooperative in DA, the farmers association and multi-purpose cooperative had been organized aiming to maintain joint liability on farmers credit as well as mutual assistance on agricultural production. As already explained in the preceding section 3.2.1, the multi-purpose cooperatives are now undertaking the credit services within the cooperative by establishment of the special fund of the membership. Tyhe farmers association should have the function for playing the joint operation of crop production and then shipping the diversified crop. These function are, however, still not regularized yet so far.

Irrigation Association has a function to maintain the irrigation facilities under the technical supervision of NIA. In the regular operation, the member of Acossiation hold the discussion and decide the cropping schedule and watering schedule prior to commencement of the cropping. Cleaning of canal as well as repairing of related facilities are also made by communal work of the members. The water tender who is appointed within the Association monitors the progress of farming operation as well as water distribution for irrigation services according to the said operation schedule. Irrigation fee and associationfee are collected by the collector who is appointed and/or directly employed by the association members.

In general speaking, the farmers' cooperative societies are in most cases inactive due to low insentive in cooperative services, as a result delinquent of member fee, non-participation to the communal work, etc were appeared to a significant extent.

3.3 Reinforcement Plan of Farmers Cooperative Society

3.3.1 Essential Objectives

As stated in the preceding chapters, the arable land in this area is limited to small, and then, the land holding size after agrarian reform is as small as 1.0 ha/household on the average. Thus, to uplift the farm economy and to stabilize farmers' livelihood, intensification cum diversification of agricultural production are essential schedule. Accordingly, improvement of the marketing structures and organize the joint operation system are urgently needed so as to maintain profitable marketing of such increased production, efficiently and successfully.

The agricultural cooperative hereby conceived is established as the basal structure for efficient operation and management of the agricultural production and then post-harvesting activities.