APPENDIX F Irrigation and Drainage

F. 1 Irrigation

F.1 Irrigation

F.1.1 Irrigation Plan

1) Effective Rainfall

It is defined that a portion of the total precipitation becomes available as the crop consumption as well as non-consumptive needs. For pounded crops like rice, effective rainfall can be actually computed by daily soil moisture balance studies, where accounting is done between precipitation, crop water requirement and waterholding capacity of the pond and soils.

According to the results of analysis, the effective rainfall ratio for wet season crops and dry season crops are 57 percent and 47 percent, respectively (Refer to Table F-1-).

2) Irrigation Efficiency

As for estimation of diversion water requirement for paddy cultivation, the following criteria are adopted;

a) Application losses on the form for wet and dry seasons are estimated at 35 percent and 25 percent, respectively,
b) Conveyance losses in the main and lateral canals for the both seasons is calculated at 20 percent, and
c) Operation losses of the whole irrigation system for the both seasons is considered at 10 percent.

On the basis of the above criteria, the overall irrigation efficiency for paddy cultivation is estimated to be 46.8 percent in wet season and 54.0 percent in dry season (Refer to Table F-1-1).

The irrigation efficiency for upland crops is assumed at be 60.0 percent in making reference to the NISIS.

3) Evapotranspiration

The monthly evapotranspiration of crops is estimated by the Penman Method. The basic data such as mean temperature, humidity, wind velocity, cloudiness and so on, observed at San Miguel observatory, Tarlac, are applied for estimation of evapotranspiration. The maximum and minimum evapotranspiration of 6.5 mm/day and 3.9 mm/day were recorded in April and August, respectively (Refer to Table F-1-2).

4) Water Requirement for Land Preparation

Irrigation water is needed for the land preparation such as ploughing, harrowing and land leveling before transplanting when rainfall is not enough. The amount of water requirement for the land preparation (WR) is calculated by the following equation.

$$WR = SW + S1 + S2 + E V + P$$

For the application of the equation, the following assumption is considered;

- A standing water depth (SW) of 50 mm is assumed for transplanting of paddy.

- The thickness of the surface soil is assumed by 100 mm with porous contents of 15 percent. And hence, the amount of water (S1) to saturate the top-soil is estimated at 15 mm (= 100 x 0.15).

- The thickness of the sub-surface layer is assumed by 150 mm with porous contents of 10 percent. And, the water to be at required for saturation of sub-surface soil (S2) is estimated at 15 mm (= 150 x 0.10)

- The land preparation is carried out in June and July for the wet season crops, and in November and December for dry are season crops. During these periods, the evapotranspiration rates (EV) estimated at 4.8 mm/day [= (5.2 + 4.3)/2] for wet season crops and 4.5 mm/day [= 4.5 + 4.5)/2] for dry season crops. A duration of the land preparation is assumed by 20 days before transplanting and supplemental water to the field is needed to protect are soils drying-up from. The percolation (P) is assumed at three (3) millimeters per day. So, the total amount of water of this item is estimated at 160 mm [(4.8 + 3 x 20 = 156 mm, say 160 mm) for the wet season crops and 150 mm [(4.8 + 3) x 20 = 156 mm, say 160 mm] for wet season crops and [(4.5 + 3) x 20 = 150 mm] for dry season crops, respectively.

- The water depth of 240 mm (= 50 + 15 + 15 + 160) is needed for the land preparation of wet season crops, and also 230 mm for dry season crops.

- Water for the land preparation is applied to the field at three (3) times as follows.

Application	Wet Season	Dry Season
First application of water at 20 days before transplanting	95 mm	90 mm
Second application at 10 days before transplanting	95 mm	90 mm
Third application of water at one day before transplanting	50 mm	50 mm

5) Irrigation Return Flow

In considering the location of the irrigable area and irrigation method for paddy cultivation, some amount of return flow irrigation water is expected in the area. There are no available data to estimate the amount of return flow. From the viewpoint of the irrigation efficiency by 46.8 percent to 54.0 percent for paddy, the rate more than 30 percent of the amount of irrigation water will be expected to re-use water for irrigation. For the study, the rate of 30 percent of the amount of the paddy irrigation would be assumed and applied for irrigation planning. In this case, some suitable facilities are required to catch water in the downstream portion of the irrigation system.

6) Irrigation Method

It is expected to apply the rotation irrigation method in the area for effective utilization of available water resources with high cropping intensity.

F.1.2 Proposed Irrigation Acreage

The proposed irrigation acreage can be shown as follows.

- The present paddy cropping acreage for the respective CISs shall be maintained in the future as well.
- The sugarcane fields existing under the CISs of Bamban and Tinang shall be as what they are.
- Discharges of the rivers not flowing through the beneficial areas of BBMP shall be taken by related CISs at their upstream portion preferentially.
- The newly developed water sources like groundwater collecting conduit shall be used for paddy cultivation.
- Irrigation by private-owned pumps in dry season shall keep continued from now on as well.

As a result of water balance computation according to the aforesaid rule with 5-year probability (1982), the maximum water requirements in wet season are 0.5 l/s/ha and those in dry season 1.1 l/s/ha, respectively, in consideration of the effective rainfall. With these figures, however, all of farm land in 19 CISs can be irrigated in wet season, while water shortage will occur to a certain extent as explained below.

For Bamban river, since the downstream area of Sta Rita CIS cannot have any proper water sources to meet the requirements, about 1,285 ha will have to be dependent upon new water sources, although the

areas under the Lucong river can be fully irrigated by existing water sources and those Tinang river and Sapang Balen creek will remain unchanged.

As a result, the irrigable area in dry season will be 62 percent in total, and be 80 percent in case of including the areas irrigable by private-owned pumps. In other words, about 28 percent of 2,722 hectares of the total farm land will have to rely on the water supply by BBMP (Refer to Fig. F-1-2).

F.1.3 Proposed Irrigation Facilities

1) Irrigation Canals

The total length and density of the existing irrigation canals are deemed appropriate for proper irrigation water management. The conveyance capacity of the canals is sufficient with adequate cross-section, except the main canal of the Malonzo CIs, which shall be improved for conveyance capacity increase with total length of 4.8 km for two (2) main canals. However, the lined rate to main canal is 10 percent and if canal soil is sandy, the depth of canal is more than 0.6 meters and canal capacity is more than 0.3 m^3/s, the main canal shall be rehabilitated by concreted linning for prevention of erosion and seepage (Refer to Table F-).

Table F-1-1 Irrigation Efficiency

	Efficiency on account of	Expected range of efficiency values		
		Ponded crops		Upland crops
		Wet season	Dry season	
a)	Seepage loss efficiency (transmission efficiency)			
	i) main canal (unlined)	0.85 to 0.9	0.8 to 0.9	0.8 to 0.9
	ii) lateral (unlined)	0.75 to 0.85	0.7 to 0.8	0.7 to 0.8
b)	Operational efficiency	0.85	0.9 to 0.95	0.9
c)	Field application efficiency	0.80 to 0.85	0.80 to 0.85	0.65 to 0.7
	Overall efficiency	0.85 x 0.75 x 0.85 x 0.80 to 0.9 x 0.85 x 0.85	0.8 x 0.7 x 0.9 x 0.8 to 0.9 x 0.8 x 0.95 x 0.85	0.8 x 0.7 x 0.9 x 0.65 to 0.9 x 0.8 x 0.9 x 0.7
	(Product of all 4 above)			
	Range of efficiency (in percent)	43 to 55%	40 to 58	33 to 45

Table F-1-2 Calculation of Evapotranspiration by Penman Equation

Item	Unit	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Mean Temperature	C	25.1	25.6	26.9	28.5	28.9	28.2	27.5	27.2	27.5	27.1	26.6	25.7
ea	mbar	31.9	32.8	35.5	39.0	39.9	38.3	36.8	36.1	36.8	35.9	34.9	33.0
RH mean	%	78.9	75.2	76.8	71.8	73.2	79.2	88.2	90.5	86.7	83.8	80.6	78.5
ed	mbar	25.2	24.7	27.3	28.0	29.2	30.3	32.5	32.7	31.9	30.1	28.1	25.9
ea - ed	mbar	6.7	8.1	8.2	11.0	10.7	8.0	4.3	3.4	4.9	5.8	6.8	7.1
U_2	km/day	223	218	209	197	182	182	110	156	146	187	228	266
f(u)		0.87	0.86	0.83	0.80	076	0.76	0.57	0.69	0.66	0.77	0.89	0.99
1 - W		0.26	0.25	0.24	0.23	0.23	0.23	0.24	0.24	0.24	0.24	0.24	0.25
(1 - W)·f(u)·(ea-ed)	mm/day	1.5	1.7	1.6	2.0	1.9	1.4	0.6	0.6	0.8	1.1	1.5	1.8
Ra (16 N)	mm/day	12.0	13.3	14.7	15.6	16.0	15.9	15.9	15.7	15.0	13.9	12.4	11.6
n/N		0.62	0.73	0.66	0.74	0.64	0.45	0.43	0.34	0.39	0.51	0.60	0.62
(0.25 + 0.5 n/N)		0.56	0.62	0.58	0.62	0.57	0.48	0.47	0.42	0.45	0.51	0.55	0.56
Rs	mm/day	6.7	8.2	8.5	9.7	9.1	7.6	7.5	6.5	6.8	7.1	6.8	6.5
Rso	mm/day	5.0	6.2	6.4	7.3	6.8	5.7	5.6	5.0	5.1	5.3	5.1	4.9
RTI		15.7	15.8	16.1	16.4	16.5	16.3	16.2	16.1	16.2	16.1	16.0	15.8
f(ed)		0.12	0.12	0.11	0.11	0.10	0.10	0.09	0.09	0.09	0.10	0.11	0.12
Rs/N		0.66	0.75	0.76	0.77	0.66	0.51	0.49	0.41	0.45	0.56	0.64	0.66
Rnl		1.2	1.4	1.2	1.4	1.1	0.8	0.7	0.6	0.7	0.9	1.1	1.3
Rn		3.8	4.8	5.2	5.9	5.7	4.9	4.9	4.4	4.4	4.4	4.0	3.6
W		0.74	0.75	0.76	0.77	0.77	0.77	0.76	0.76	0.76	0.76	0.76	0.75
W·Rn		2.8	3.6	4.0	4.5	4.4	3.8	3.7	3.3	3.3	3.3	3.0	2.7
Eto (c = 1.0)		4.3	5.3	5.6	6.5	6.3	5.2	4.3	3.9	4.1	4.4	4.5	4.5

Table F-1-3 ETcrop of Paddy, Sugarcane and Corn

March	ETo	Paddy				Up Land			
		Wet Season		Dry Season		Sugarcane		Corn	
		Kc	ETcrop	Kc	ETcrop	Kc	KTcrop	Kc	ETcrop
	(mm/day)		(mm/day)		(mm/day)		(mm/day)		(mm/day)
January	4.3	-	-	1.05	4.5	0.9	3.9	1.05	4.5
February	5.3	-	-	0.95	5.0	1.0	5.3	1.05	5.6
March	5.6	-	-	0.95	5.3	1.05	5.9	0.55	3.1
April	6.5	-	-	-	-	1.05	6.8	-	-
May	6.3	-	-	-	-	1.05	6.6	-	-
June	5.2	1.1	5.7	-	-	1.05	5.5	-	-
July	4.3	1.1	4.7	-	-	1.05	4.5	-	-
August	3.9	1.05	4.1	-	-	1.05	4.1	-	-
September	4.1	0.95	3.9	-	-	0.8	3.3	-	-
October	4.4	0.95	4.2	-	-	0.6	2.6	-	-
November	4.5	-	-	1.1	5.0	0.55	2.5	0.45	2.0
December	4.5	-	-	1.1	5.0	0.8	3.6	0.75	3.4

Table F-1-4 Gross Water Requirement for Rice (Case - I)

	Jan.			Feb.			Mar.			Apr.			May			Jun.		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Cropping Pattern			TD	NS									LP			TP		
Kc	1.05 1.05 1.05 1.10 1.10 1.10	0.95 1.05 1.05 1.05 1.10 1.10	0.95 0.95 1.05 1.05 1.10 1.10	0.95 0.95 0.95 1.05 1.05 1.10 1.10	0.95 0.95 0.95 1.05 1.05 1.10 1.10	0.95 0.95 0.95 1.05 1.05 1.10 1.10	0.95 0.95 0.95 1.05 1.05 1.05	0.95 0.95 0.95 1.05 1.05 1.05	0.95 0.95 0.95 1.05 1.05 1.05	0.95 0.95 0.95 0.95	0.95 0.95 0.95 0.95	0.95 0.95 0.95 0.95				1.10	1.10 1.10	1.10 1.10 1.10
Average Kc	1.06	1.06	1.03	1.03	1.03	1.01	1.00	0.99	0.98	0.95	0.95	0.95				1.10	1.10	1.10
L Unit water Req't.(m m) / Area Ratio	90 0.22	90 0.11												95 0.11	95 0.22	95 0.22	95 0.22	95 0.22
L P Water Req't.(m m)	19.8	9.9												10.5	20.9	20.9	20.9	20.9
I Unit water Req't.(m m) / Area Ratio	50 0.11	50 0.11	50 0.11													50 0.11	50 0.11	50 0.11
I P Water Req't.(m m)	5.5	5.5	5.5													5.5	5.5	5.5
G R O. ETo (m m) / Kc / ETo * Kc(m m) / Perco. (m m) / Area Ratio	4.3 1.05 4.5 3.0 0.72	4.3 1.06 4.6 3.0 0.83	4.3 1.05 4.5 3.0 0.94	3.3 1.05 3.5 3.0 0.94	3.3 1.03 3.5 3.0 0.83	3.3 1.01 3.4 3.0 0.72	3.6 1.00 3.6 3.0 0.61	3.5 0.99 3.5 3.0 0.50	3.6 0.98 3.5 3.0 0.39	6.5 0.95 6.2 3.0 0.28	6.5 0.95 6.2 3.0 0.17	6.5 0.95 6.2 3.0 0.06	6.3	6.3	6.3	5.2 1.10 5.7 3.0 0.06	5.2 1.10 5.7 3.0 0.17	5.2 1.10 5.7 3.0 0.28
G R O. Water Req't.(m m)	54.7	65.1	77.6	78.9	70.6	48.4	52.5	42.5	36.5	25.8	15.6	5.5				5.2	14.8	26.6
Total Crop Water Req't.(mm)	80	79	83	80	71	48	53	43	37	26	16	6		11	21	32	41	33
Overall Efficiency (%)	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0		46.8	46.8	46.8	46.8	46.8
Gross Water Req't.(m m)	148	146	154	146	131	89	98	80	69	48	30	11		24	45	68	86	113
Gross Water Req't.(l/s/ha)	1.71	1.69	1.62	1.71	1.52	1.29	1.13	0.93	0.73	0.56	0.35	0.13		0.28	0.47	0.79	1.02	1.31

	Jul.			Aug.			Sept.			Oct.			Nov.			Dec.		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Cropping Pattern						TD	NS				LP		TP					
Kc	1.10 1.10 1.10 1.10	1.05 1.10 1.10 1.10	1.05 1.05 1.10 1.10 1.10	1.05 1.05 1.05 1.10 1.10 1.10	0.95 1.05 1.05 1.10 1.10 1.10	0.95 0.95 1.05 1.05 1.10 1.10	0.95 0.95 0.95 1.05 1.05 1.10 1.10	0.95 0.95 0.95 1.05 1.05 1.05 1.10	0.95 0.95 0.95 1.05 1.05 1.10 1.10	0.95 0.95 1.05 1.05 1.10 1.10	0.95 0.95 1.05 1.05 1.05 1.10	0.95 0.95 0.95 1.05 1.05 1.05	1.10 0.95 0.95	1.10 1.10 0.95 0.95	1.10 1.10 1.10 0.95	1.10 1.10 1.10 1.10	1.05 1.10 1.10 1.10 1.10	1.05 1.05 1.10 1.10 1.10 1.10
Average Kc	1.10	1.09	1.08	1.08	1.06	1.05	1.03	1.03	1.01	1.00	0.99	0.96	0.99	1.03	1.06	1.10	1.09	1.08
L Unit water Req't.(m m) / Area Ratio	95 0.22	95 0.22	95 0.22	95 0.22	95 0.11						90 0.11	90 0.22	90 0.22	90 0.22	90 0.22	90 0.22	90 0.22	90 0.22
L P Water Req't.(m m)	20.9	20.9	20.9	20.9	10.5						9.9	19.8	19.8	19.8	19.8	19.8	19.8	19.8
I Unit water Req't.(m m) / Area Ratio	50 0.11	50 0.11	50 0.11	50 0.11	50 0.11	50 0.11							50 0.11	50 0.11	50 0.11	50 0.11	50 0.11	50 0.11
I P Water Req't.(m m)	5.5	5.5	5.5	5.5	5.5	5.5							5.5	5.5	5.5	5.5	5.5	5.5
G R O. ETo (m m) / Kc / ETo * Kc(m m) / Perco. (m m) / Area Ratio	4.3 1.10 4.7 3.0 0.39	4.3 1.09 4.7 3.0 0.50	4.3 1.08 4.6 3.0 0.61	3.9 1.06 4.1 3.0 0.72	3.9 1.06 4.1 3.0 0.83	3.9 1.05 4.1 3.0 0.94	4.1 1.03 4.2 3.0 0.94	4.1 1.03 4.2 3.0 0.83	4.1 1.01 4.1 3.0 0.72	4.4 1.00 4.4 3.0 0.61	4.4 0.99 4.4 3.0 0.50	4.4 0.96 4.3 3.0 0.39	4.5 0.99 4.5 3.0 0.33	4.3 1.03 4.6 3.0 0.33	4.5 1.06 4.8 3.0 0.33	4.5 1.10 5.0 3.0 0.39	4.5 1.09 4.9 3.0 0.50	4.5 1.08 4.9 3.0 0.61
G R O. Water Req't.(m m)	30.0	38.5	51.0	51.8	58.9	73.4	67.7	59.8	51.1	45.1	37.0	31.3	24.8	25.1	25.7	31.2	39.5	53.0
Total Crop Water Req't.(mm)	56	65	77	78	75	79	68	60	51	45	47	51	50	50	51	57	65	78
Overall Efficiency (%)	46.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8	54.0	54.0	54.0	54.0	54.0	54.0
Gross Water Req't.(m m)	120	139	165	167	160	169	145	128	109	96	100	109	93	93	94	106	120	144
Gross Water Req't.(l/s/ha)	1.39	1.61	1.74	1.93	1.85	1.76	1.68	1.48	1.26	1.11	1.16	1.15	1.08	1.08	1.09	1.23	1.39	1.52

Table F-1-5 Gross Water Requirement for Rice (Case - II)

		Jan.			Feb.			Mar.			Apr.			May			Jun.		
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Cropping Pattern				TD	HA										LP		TP		
Kc		1.05 1.05 1.05 1.10 1.10 1.10	0.95 1.05 1.05 1.05 1.10 1.10	0.95 0.95 1.05 1.05 1.05 1.10	0.95 0.95 0.95 1.05 1.05 1.05	0.95 0.95 0.95 0.95 1.05 1.05	0.95 0.95 0.95 0.95 0.95 1.05	0.95 0.95 0.95	0.95 0.95 0.95	0.95							1.10	1.10 1.10	1.10 1.10 1.10
Average Kc		1.08	1.05	1.03	1.00	0.98	0.98	0.95	0.95	0.95							1.10	1.10	1.10
L	Unit water Reqt.(m m) Area Ratio														95 0.17	95 0.33	95 0.33	95 0.33	95 0.33
P	Water Reqt.(m m)														16.2	31.4	31.4	31.4	31.4
I	Unit water Reqt.(m m) Area Ratio																50 0.17	50 0.17	50 0.17
P	Water Reqt.(m m)																8.5	8.5	8.5
G R O.	ET_o (m m) Kc ET_o * Kc(m m) Perco. (m m) Area Ratio	4.3 1.05 4.6 3.0 1.00	4.3 1.05 4.5 3.0 1.00	4.3 1.03 4.4 3.0 1.00	5.3 1.00 5.3 3.0 0.92	5.3 0.99 5.2 3.0 0.75	5.3 0.98 5.2 3.0 0.58	5.6 0.95 5.3 3.0 0.42	5.6 0.95 5.3 3.0 0.25	5.6 0.95 5.3 3.0 0.08	6.5	6.5	6.5	6.3	6.3	6.3	5.2 1.10 5.7 3.0 0.08	5.2 1.10 5.7 3.0 0.25	5.2 1.10 5.7 3.0 0.42
	Water Reqt.(m m)	76.0	75.0	81.4	76.4	61.3	36.0	34.9	20.8	7.3							7.0	21.8	36.5
Total Crop Water Reqt.(mm)		76	75	81	76	62	38	35	21	7					16	31	47	62	76
Overall Efficiency (%)		54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0					46.8	46.8	46.8	46.8	46.8
Gross Water Reqt.(m m)		141	139	150	141	115	70	65	39	13					34	66	100	132	162
Gross Water Reqt.(l/s/ha)		1.53	1.61	1.56	1.63	1.33	1.01	0.75	0.45	0.14					0.39	0.69	1.16	1.53	1.88

		Jul.			Aug.			Sept.			Oct.			Nov.			Dec.		
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Cropping Pattern							TD	HA				LP		TP					
Kc		1.10 1.10 1.10 1.10	1.05 1.10 1.10 1.10 1.10	1.05 1.05 1.10 1.10 1.10	1.05 1.05 1.05 1.10 1.10 1.10	0.95 1.05 1.05 1.05 1.10 1.10	0.95 0.95 1.05 1.05 1.05 1.10	0.95 0.95 0.95 1.05 1.05 1.05	0.95 0.95 0.95 1.05 1.05 1.05	0.95 0.95 0.95 0.95 1.05 1.05	0.95 0.95 0.95	0.95 0.95 0.95	0.95	1.10	1.10 1.10	1.10 1.10 1.10	1.10 1.10 1.10 1.10	1.05 1.10 1.10 1.10 1.10	1.05 1.05 1.10 1.10 1.10 1.10
Average Kc		1.10	1.09	1.08	1.08	1.05	1.03	1.00	0.99	0.98	0.95	0.95	0.95	1.10	1.10	1.10	1.10	1.09	1.08
L	Unit water Reqt.(m m) Area Ratio	95 0.33	95 0.17									90 0.17	90 0.33	90 0.33	90 0.33	90 0.33	90 0.33	90 0.17	
P	Water Reqt.(m m)	31.4	16.2									15.3	29.7	29.7	29.7	29.7	29.7	15.3	
I	Unit water Reqt.(m m) Area Ratio	50 0.17	50 0.17	50 0.17										50 0.17	50 0.17	50 0.17	50 0.17	50 0.17	50 0.17
P	Water Reqt.(m m)	8.5	8.5	8.5										8.5	8.5	8.5	8.5	8.5	8.5
G R O.	ET_o (m m) Kc ET_o * Kc(m m) Perco. (m m) Area Ratio	4.3 1.10 4.7 3.0 0.58	4.3 1.09 4.7 3.0 0.75	4.3 1.08 4.6 3.0 0.92	3.9 1.08 4.2 3.0 1.00	3.9 1.05 4.1 3.0 1.00	3.9 1.03 4.0 3.0 1.00	4.1 1.00 4.1 3.0 0.92	4.1 0.99 4.1 3.0 0.75	4.1 0.96 4.0 3.0 0.58	4.4 0.95 4.2 3.0 0.42	4.4 0.95 4.2 3.0 0.25	4.4 0.95 4.2 3.0 0.08	4.5 1.10 5.0 3.0 0.08	4.5 1.10 5.0 3.0 0.25	4.5 1.10 5.0 3.0 0.42	4.5 1.10 5.0 3.0 0.58	4.5 1.08 4.9 3.0 0.75	4.5 1.08 4.9 3.0 0.92
	Water Reqt.(m m)	44.7	57.8	76.9	72.0	71.0	77.0	65.3	53.3	40.8	30.2	16.0	6.3	6.4	20.0	33.6	46.4	59.3	79.9
Total Crop Water Reqt.(mm)		65	83	85	72	71	77	65	53	41	30	33	36	45	58	72	85	83	88
Overall Efficiency (%)		46.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8	54.0	54.0	54.0	54.0	54.0	54.0
Gross Water Reqt.(m m)		182	177	182	154	152	165	139	113	88	64	71	77	83	107	133	157	154	163
Gross Water Reqt.(l/s/ha)		2.11	2.05	1.91	1.78	1.76	1.74	1.61	1.31	1.02	0.74	0.82	0.81	0.96	1.24	1.54	1.82	1.78	1.72

Table F-1-6 Gross Water Requirement for Rice (Case - III)

		Jan.			Feb.			Mar.			Apr.			May			Jun.		
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Cropping Pattern				TD	HA										LP		TP		
Kc		1.05 1.05 1.05	0.95 1.05 1.05	0.95 0.95 1.05	0.95 0.95 0.95	0.95 0.95	0.95										1.10	1.10 1.10	1.10 1.10 1.10
Average Kc		1.05	1.02	0.98	0.95	0.95	0.95										1.10	1.10	1.10
L	Unit water Reqt.(m m) Area Ratio														95 0.33	95 0.67	95 0.67	95 0.33	
P	Water Reqt.(m m)														31.4	63.7	63.7	31.4	
I	Unit water Reqt.(m m) Area Ratio																50 0.33	50 0.33	50 0.33
P	Water Reqt.(m m)																16.5	16.5	16.5
G R O.	ET_0 (m m) Kc ET_0 * Kc(m m) Perco. (m m) Area Ratio	4.3 1.05 4.5 3.0 1.00	4.3 1.02 4.4 3.0 1.00	4.3 0.98 4.2 3.0 1.00	5.3 0.95 5.0 3.0 0.83	5.3 0.95 5.0 3.0 0.50	5.3 0.95 5.0 3.0 0.17	5.8	5.8	5.8	6.5	6.5	6.5	6.3	6.3	6.3	5.2 1.10 5.7 3.0 0.17	5.2 1.10 5.7 3.0 0.50	5.2 1.10 5.7 3.0 0.83
	Water Reqt.(m m)	75.0	74.0	78.2	66.4	40.0	10.9										14.8	43.5	72.2
Total Crop Water Reqt.(mm)		75	74	79	66	40	11								31	54	85	91	89
Overall Efficiency (%)		54.0	54.0	54.0	54.0	54.0	54.0								46.8	46.8	46.8	46.8	46.8
Gross Water Reqt.(m m)		139	137	146	122	74	20								66	1376	203	194	190
Gross Water Reqt.(l/s/ha)		1.61	1.59	1.54	1.41	0.86	0.23								0.76	1.44	2.35	2.25	2.20

		Jul.			Aug.			Sept.			Oct.			Nov.			Dec.		
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Cropping Pattern							TD	HA				LP		TP					
Kc		1.10 1.10 1.10	1.05 1.10 1.10	1.05 1.05 1.10	1.05 1.05 1.05	0.95 1.05 1.05	0.95 0.95 1.05	0.95 0.95 0.95	0.95 0.95	0.95				1.10	1.10 1.10	1.10 1.10 1.10	1.10 1.10 1.10	1.05 1.10 1.10	1.05 1.05 1.10
Average Kc		1.10	1.08	1.07	1.05	1.02	0.98	0.95	0.95	0.95				1.10	1.10	1.10	1.10	1.08	1.07
L	Unit water Reqt.(m m) Area Ratio											90 0.33	90 0.67	90 0.67	90 0.33				
P	Water Reqt.(m m)											29.7	60.3	60.3	29.7				
I	Unit water Reqt.(m m) Area Ratio													50 0.33	50 0.33	50 0.33			
P	Water Reqt.(m m)													16.5	16.5	16.5			
G R O.	ET_0 (m m) Kc ET_0 * Kc(m m) Perco. (m m) Area Ratio	4.3 1.10 4.7 3.0 1.00	4.3 1.08 4.6 3.0 1.00	4.3 1.07 4.6 3.0 1.00	3.9 1.05 4.1 3.0 1.00	3.9 1.02 4.0 3.0 1.00	3.9 0.98 3.8 3.0 1.00	4.1 0.95 3.9 3.0 0.83	4.1 0.95 3.9 3.0 0.50	4.1 0.95 3.9 3.0 0.17	4.4	4.4	4.4	4.5 1.10 5.0 3.0 0.17	4.5 1.10 5.0 3.0 0.50	4.5 1.10 5.0 3.0 0.83	4.5 1.10 5.0 3.0 1.00	4.5 1.08 4.9 3.0 1.00	4.5 1.07 4.9 3.0 1.00
	Water Reqt.(m m)	77.0	76.0	83.8	71.0	70.0	74.8	57.3	34.5	11.7				13.8	40.0	86.4	80.0	79.0	85.8
Total Crop Water Reqt.(mm)		77	78	84	71	70	75	57	35	12		30	60	90	86	83	80	79	88
Overall Efficiency (%)		46.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8		54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0
Gross Water Reqt.(m m)		165	162	179	152	150	160	122	75	26		56	111	167	159	154	148	148	159
Gross Water Reqt.(l/s/ha)		1.91	1.88	1.88	1.76	1.74	1.66	1.41	0.87	0.30		0.65	1.17	1.93	1.84	1.78	1.71	1.69	1.67

Table F-1-7 Water Balance Computation (Case - I)

	Jan.			Feb.			Mar.			Apr.			May			Jun.		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Rainfall (V=1/S)	0	0	0	0	0	0	0	0	63	32	5	12	7	8	44	41	110	73
Crop Water Requ. (m m)	80	79	83	68	71	68	53	43	37	26	16	6	-	11	21	32	41	53
Eff. Rainfall (m m)	0	0	0	0	0	0	0	0	37	20	5	6	0	8	21	32	41	48
Crop Irr.Requ.(m m)	80	79	83	80	71	68	53	43	0	0	11	0	0	3	0	0	0	5
Overall Eff. (%)	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	-	48.8	48.8	48.8	48.8	48.8
Gross Irri. Requ. (m m)	148	146	154	148	131	88	98	80	0	0	20	0	-	6	0	0	0	11
" " " (l/s/ha)	1.71	1.69	1.62	1.71	1.51	1.26	1.13	0.93	0	0	0.23	0	-	0.07	0	0	0	0.08
Ave. Water Sour.(m³ /s)	2.89	2.73	2.57	2.40	2.22	2.07	1.92	1.72	2.08	1.58	1.44	1.28	1.15	1.02	1.05	1.01	2.15	1.08
Irrigable Area (ha)	1880	1820	1590	1400	1480	1800	1890	1850	-	-	-	9050	-	-	4576	-	-	-	7870

	Jul.			Aug.			Sept.			Oct.			Nov.			Dec.		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Rainfall (V=1/S)	148	149	119	122	40	83	183	54	150	19	77	2	24	13	0	1	1	3
Crop Water Requ. (m m)	56	65	77	78	75	78	68	60	51	45	47	51	50	50	51	57	65	78
Eff. Rainfall (m m)	34	65	81	78	40	78	68	54	51	19	47	2	24	13	0	1	1	3
Crop Irr.Requ.(m m)	22	0	18	0	35	0	0	6	0	26	0	49	26	37	51	56	64	75
Overall Eff. (%)	46.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8	54.0	54.0	54.0	54.0	54.0
Gross Irri. Requ. (m m)	47	0	34	0	75	0	0	13	0	58	0	105	48	68	94	104	119	139
" " " (l/s/ha)	0.54	0	0.36	0	0.87	0	0	0.15	0	0.65	0	1.10	0.58	0.80	1.08	1.20	1.38	1.46
Ave. Water Sour.(m³ /s)	2.91	3.52	2.40	2.72	2.21	2.52	4.88	2.93	3.88	3.08	3.35	3.27	3.28	3.20	3.08	2.93	2.78	2.83
Irrigable Area (ha)	5390	-	8870	-	2540	-	-	16350	-	4740	-	2870	5820	4000	2830	2440	2010	1800

Table F-1-8 Water Balance Computation (Case - II)

	Jan.			Feb.			Mar.			Apr.			May			Jun.		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Rainfall (V=1/S)	0	0	0	0	0	0	0	0	63	32	5	12	7	8	44	41	110	73
Crop Water Requ. (m m)	78	75	81	78	62	38	35	21	7	-	-	-	-	18	31	47	62	78
Eff. Rainfall (m m)	0	0	0	0	0	0	0	0	7	-	-	-	-	8	31	41	62	66
Crop Irr.Requ.(m m)	78	75	81	78	62	38	35	21	0	-	-	-	-	8	0	6	0	10
Overall Eff. (%)	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	-	-	-	-	48.8	48.8	48.8	48.8	48.8
Gross Irri. Requ. (m m)	141	139	150	141	115	70	65	38	0	-	-	-	-	17	0	13	0	21
" " " (l/s/ha)	1.63	1.61	1.56	1.63	1.33	1.01	0.75	0.45	0	-	-	-	-	0.20	0	0.15	0	0.24
Ave. Water Sour.(m³ /s)	2.89	2.73	2.57	2.40	2.22	2.07	1.91	1.72	2.08	1.50	1.44	1.28	1.15	1.02	1.05	1.01	2.15	1.08
Irrigable Area (ha)	1770	1700	1630	1470	1670	2650	2550	3820	-	-	-	-	-	3100	-	6730	-	4420

	Jul.			Aug.			Sept.			Oct.			Nov.			Dec.		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Rainfall (V=1/S)	148	149	119	122	40	83	183	54	150	19	77	2	24	13	0	1	1	3
Crop Water Requ. (m m)	85	83	85	72	71	77	65	53	41	30	33	36	45	58	72	85	83	88
Eff. Rainfall (m m)	48	83	88	72	40	77	65	52	41	19	33	2	24	13	0	1	1	3
Crop Irr.Requ.(m m)	37	0	17	0	31	0	0	1	0	11	0	34	21	45	72	84	82	85
Overall Eff. (%)	46.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8	54.0	54.0	54.0	54.0	54.0	54.0
Gross Irri. Requ. (m m)	79	0	36	0	66	0	0	2	0	24	0	73	39	83	133	156	152	157
" " " (l/s/ha)	0.91	0	0.38	0	0.76	0	0	0.02	0	0.28	0	0.77	0.45	0.96	1.54	1.61	1.76	1.65
Ave. Water Sour.(m³ /s)	2.91	3.52	2.40	2.72	2.21	2.52	4.88	2.93	3.88	3.08	3.35	3.27	3.28	3.20	3.08	2.93	2.78	2.83
Irrigable Area (ha)	3200	-	1320	-	2010	-	-	-	-	-		4250	7240	3330	2000	1820	1580	1590

Table F-1-9 Water Balance Computation (Case - III)

	Jan.			Feb.			Mar.			Apr.			May			Jun.		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Rainfall (V=1/S)	0	0	0	0	0	0	0	0	63	32	5	12	7	8	44	41	110	73
Crop Water Requ. (m m)	75	74	78	68	40	11	-	-	-	-	-	-	-	31	84	95	91	89
Eff. Rainfall (m m)	0	0	0	0	0	-	-	-	-	-	-	-	-	8	44	41	83	73
Crop Irr.Requ.(m m)	75	74	78	68	40	11	-	-	-	-	-	-	-	23	20	54	8	16
Overall Eff. (%)	54.0	54.0	54.0	54.0	54.0	54.0	-	-	-	-	-	-	-	48.8	48.8	48.8	48.8	48.8
Gross Irri. Requ. (m m)	139	138	144	122	74	20	-	-	-	-	-	-	-	49	43	115	17	34
" " " (l/s/ha)	1.61	1.60	1.54	1.41	0.86	0.23	-	-	-	-	-	-	-	0.57	0.45	1.33	0.20	0.39
Ave. Water Sour.(m³ /s)	2.89	2.73	2.57	2.40	2.22	2.07	1.92	1.72	2.08	1.58	1.44	1.28	1.15	1.02	1.05	1.01	2.15	1.08
Irrigable Area (ha)	1600	1710	1670	1700	2580	7140	-	-	-	-	9050	-	-	1780	2330	760	10750	2720

	Jul.			Aug.			Sept.			Oct.			Nov.			Dec.		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Rainfall (V=1/S)	148	149	119	122	40	83	183	54	150	19	77	2	24	13	0	1	1	3
Crop Water Requ. (m m)	77	78	84	71	70	75	57	35	12	-	30	60	90	86	83	80	78	86
Eff. Rainfall (m m)	52	76	86	71	40	75	57	35	12	-	30	2	24	13	0	1	1	3
Crop Irr.Requ.(m m)	25	0	18	0	30	0	0	0	0	-	0	58	66	73	83	79	76	83
Overall Eff. (%)	46.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8	-	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0
Gross Irri. Requ. (m m)	53	0	38	0	64	0	0	0	0	-	0	107	122	135	154	146	144	153
" " " (l/s/ha)	0.29	0	0.40	0	0.74	0	0	0	0	-	0	1.13	1.41	1.56	1.78	1.69	1.67	1.61
Ave. Water Sour.(m³ /s)	2.91	3.52	2.40	2.72	2.21	2.52	4.88	2.93	3.88	3.08	3.35	3.27	3.28	3.20	3.08	2.93	2.78	2.83
Irrigable Area (ha)	10030	-	6000	-	2930	-	-	-	-	-	-	2890	2310	2050	1730	1740	1860	1830

Table F-1-10 Water Balance of Each CIS

Name of CIS	Irrig. Area	Jan.			Feb.			Mar.			Apr.			May			Jun.			Jul.			Aug.			Sept.			Oct.			Nov.			Dec.		
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
1 Bamban	ha	0.87	0.86	0.84	0.87	0.71	0.54	0.40	0.24	-	-	-	-	-	0.11	-	0.08	-	0.13	0.46	-	0.20	-	0.40	-	-	0.01	-	0.15	-	0.41	0.24	0.51	0.81	0.95	0.84	0.86
	532	2.90	2.75	2.58	2.41	2.24	2.08	1.92	1.73	2.08	1.50	1.44	1.28	1.16	1.01	1.05	1.01	2.15	1.06	2.91	3.52	2.84	2.72	2.21	2.52	4.66	2.93	3.86	3.08	3.35	3.27	3.26	3.19	3.09	2.94	2.79	2.84
	532																																				
2 San Pedro	120	0.20	0.19	0.19	0.20	0.16	0.12	0.09	0.05	-	-	-	-	-	0.02	-	0.02	-	0.02	0.11	-	0.05	-	0.09	-	-	-	-	0.03	-	0.09	0.05	0.12	0.18	0.22	0.21	0.20
	120	1.98	1.84	1.55	1.50	1.45	1.40	1.32	1.24	1.76	1.50	1.44	1.28	1.16	0.93	1.05	1.01	2.15	1.06	2.91	3.52	2.40	2.72	2.21	2.52	4.66	2.93	3.86	3.08	3.35	3.27	3.26	2.93	2.54	2.30	2.06	1.86
3 Malonzo	240	0.39	0.39	0.38	0.39	0.32	0.24	0.18	0.11	-	-	-	-	-	0.05	-	0.04	-	0.06	0.22	-	0.09	-	0.18	-	-	-	-	0.07	-	0.18	0.11	0.23	0.37	0.43	0.42	0.40
	240	1.81	1.86	1.70	1.31	1.26	1.26	1.19	1.14	1.70	1.51	1.45	1.30	1.17	0.91	1.06	1.02	2.16	1.08	2.82	3.54	2.42	2.82	2.47	2.81	5.23	3.42	4.43	3.58	3.73	3.53	3.33	2.89	2.44	2.17	1.92	1.70
4 Bangcu	500	0.82	0.81	0.76	0.82	0.67	0.51	0.38	0.23	-	-	-	-	-	0.10	-	0.08	-	0.12	0.46	-	0.19	-	0.38	-	-	0.01	-	0.14	-	0.39	0.23	0.46	0.77	0.91	0.88	0.83
	500	1.63	1.48	1.38	1.13	1.10	1.13	1.08	1.05	1.63	1.52	1.46	1.30	1.17	0.89	1.06	1.02	2.17	1.08	2.93	3.55	2.43	3.00	2.58	2.94	5.47	3.63	4.46	3.80	3.88	3.84	3.36	2.81	2.35	2.05	1.78	1.55
5 Sunuba Cut-Cut	40	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-	-	-	-	-	-	0.01	-	0.01	-	0.01	0.04	-	0.02	-	0.03	-	-	-	-	0.01	-	0.01	-	0.01	0.01	0.01	0.01	0.01
	8	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.19	0.25	0.28	0.54	0.46	0.52	0.47	0.38	0.24	0.07	0.04	0.02	0.02	0.02	0.02
6 Talabanca	384	0.59	0.59	0.58	0.59	0.48	0.37	0.27	0.16	-	-	-	-	-	0.07	-	0.05	-	0.09	0.33	-	0.14	-	0.28	-	-	0.01	-	0.10	-	0.28	0.16	0.35	0.56	0.66	0.64	0.60
	384	1.01	0.86	0.80	0.51	0.55	0.66	0.67	0.72	1.38	1.52	1.46	1.30	1.17	0.82	1.06	1.02	2.17	1.08	2.93	3.55	2.43	3.01	2.58	2.94	5.47	3.63	4.46	3.80	3.89	3.84	3.36	2.55	1.96	1.51	1.28	1.01
7 Sta Rita	135	0.22	0.22	0.21	0.22	0.18	0.14	0.10	0.06	-	-	-	-	-	0.03	-	0.02	-	0.03	0.12	-	0.05	-	0.10	-	-	-	-	0.04	-	0.10	0.06	0.13	0.21	0.24	0.24	0.22
	135	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.48	0.48	0.48	0.48	0.48	0.48
8 Marita	100	0.16	0.16	0.16	0.16	0.13	0.10	0.08	0.04	-	-	-	-	-	0.02	-	0.02	-	0.02	0.08	-	0.04	-	0.08	-	-	-	-	0.02	-	0.08	0.05	0.10	0.15	0.18	0.18	0.17
	100	0.27	0.27	0.26	0.27	0.31	0.35	0.39	0.43	0.49	0.49	0.49	0.49	0.57	0.54	0.57	0.55	0.57	0.54	0.45	0.57	0.52	0.57	0.47	0.57	0.57	0.57	0.57	0.53	0.57	0.47	0.43	0.36	0.25	0.25	0.25	0.27
9 San Martin	280	0.39	0.39	0.38	0.39	0.32	0.24	0.18	0.11	-	-	-	-	-	0.06	-	0.04	-	0.07	0.25	-	0.11	-	0.21	-	-	-	-	0.08	-	0.18	0.11	0.23	0.37	0.43	0.42	0.40
	240	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.56	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.49	0.49	0.49	0.49	0.49	0.49
10 Baluto	740	0.93	0.82	0.90	0.93	0.78	0.58	0.43	0.26	-	-	-	-	-	0.15	-	0.11	-	0.18	0.67	-	0.28	-	0.56	-	-	0.01	-	0.21	-	0.44	0.26	0.55	0.85	1.03	1.00	0.94
	570	1.04	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.04	1.08	1.08	1.08	1.08	1.20	1.24	1.24	1.25	1.26	1.28	1.28	1.37	2.20	2.55	2.89	4.08	3.68	3.87	3.73	3.14	2.50	1.39	1.16	1.07	1.06	1.04	1.04
11 Lilibangan	ha	0.22	-	0.09	-	0.18	-	-	-	-	0.07	-	0.18	0.11	0.23	0.37	0.43	0.42	0.40	0.39	0.38	0.38	0.39	0.32	0.24	0.18	0.11	-	-	-	-	-	0.05	-	0.04	-	0.06
	240	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.55	0.55	0.55	0.55	0.55	0.55
	240																																				
12 San Bartolome	350	0.32	-	0.13	-	0.27	-	-	-	-	0.10	-	0.08	0.05	0.12	0.18	0.22	0.21	0.20	0.20	0.19	0.19	0.20	0.16	0.12	0.09	0.05	-	-	-	-	-	0.07	-	0.05	-	0.08
	120	0.08	0.08	0.11	0.95	1.25	1.41	2.73	2.35	2.63	2.40	1.84	1.35	0.34	0.18	0.18	0.17	0.17	0.17	0.19	0.18	0.17	0.17	0.16	0.14	0.13	0.11	0.08	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.06
13 San Isidro	450	0.41	-	0.17	-	0.34	-	-	0.01	-	0.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.09	-	0.07	-	0.11
	0	0.06	0.08	0.11	1.01	1.35	1.49	2.87	2.48	2.77	2.48	1.94	1.38	0.37	0.13	0.04	0.03	0.01	0.01	0.01	-	-	-	-	-	-	-	0.01	0.08	0.06	0.05	0.05	-	0.04	0.04	0.05	0.06
14 Lucong	2,000	1.82	-	0.78	-	1.52	-	-	0.04	-	0.56	-	0.92	0.54	1.15	1.85	2.17	2.11	1.98	1.86	1.83	1.80	1.96	1.80	1.21	0.90	0.54	-	-	-	-	-	0.40	-	0.30	-	0.45
	1,200	1.73	2.08	1.49	2.88	3.08	3.43	8.53	5.02	5.95	5.17	4.51	3.80	2.31	2.03	2.33	2.33	2.21	2.09	2.25	2.14	2.04	1.95	1.76	1.57	1.40	1.19	1.25	0.92	0.88	0.79	0.71	0.69	0.64	0.82	1.26	0.88
15 Mamo	468	0.43	-	0.18	-	0.36	-	-	0.01	-	0.13	-	0.36	0.21	0.45	0.72	0.85	0.82	0.77	0.78	0.75	0.74	0.76	0.62	0.47	0.35	0.21	-	-	-	-	-	0.09	-	0.07	-	0.11
	468	1.97	2.37	1.83	5.93	7.15	7.91	15.2	12.5	14.3	12.8	10.4	7.51	3.40	1.98	1.25	1.34	0.76	0.56	0.98	0.89	0.82	0.73	0.66	0.66	0.66	0.67	0.85	1.11	1.06	0.85	0.88	0.49	0.78	0.75	1.46	0.86
16 Tirang	250	0.23	-	0.10	-	0.19	-	-	-	-	0.07	-	0.08	0.05	0.10	0.15	0.18	0.18	0.17	0.16	0.16	0.16	0.16	0.13	0.10	0.08	0.05	-	-	-	-	-	0.05	-	0.04	-	0.06
	100	0.07	0.08	0.09	0.82	1.11	1.22	2.35	2.03	2.27	2.07	1.59	1.06	0.29	0.15	0.14	0.15	0.15	0.15	0.17	0.17	0.16	0.16	0.14	0.13	0.11	0.10	0.07	0.05	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.05
17 Sto Rosario	200	0.18	-	0.08	-	0.15	-	-	-	-	0.06	-	0.08	0.05	0.10	0.15	0.18	0.18	0.17	0.18	0.16	0.16	0.16	0.13	0.10	0.08	0.05	-	-	-	-	-	0.04	-	0.03	-	0.05
	100	0.15	0.17	0.20	1.81	2.44	2.88	5.19	4.48	5.01	4.57	3.50	2.34	0.65	0.29	0.23	0.24	0.24	0.24	0.25	0.25	0.24	0.24	0.22	0.19	0.18	0.15	0.11	0.11	0.11	0.10	0.09	0.06	0.08	0.08	0.05	0.11
18 Sta Monica	300	0.27	-	0.11	-	0.23	-	-	-	-	0.08	-	0.12	0.07	0.14	0.23	0.27	0.26	0.25	0.24	0.24	0.24	0.24	0.20	0.15	0.11	0.07	-	-	-	-	-	0.06	-	0.05	-	0.07
	100	0.15	0.18	0.21	1.83	2.59	2.85	5.52	4.76	5.33	4.85	3.72	2.25	0.69	0.23	0.21	0.24	0.23	0.22	0.24	0.24	0.23	0.25	0.22	0.14	0.16	0.15	0.09	0.12	0.11	0.10	0.09	0.06	0.08	0.08	0.06	0.12
19 Calulum	80	0.07	-	0.03	-	0.06	-	-	-	-	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02	-	0.01	-	0.02
	0	-	-	0.01	0.04	0.07	0.08	0.15	0.13	0.14	0.13	0.10	0.07	0.02	0.01	0.01	0.01	0.01	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table F-1-11 Dimension of Diversion Dam and Check-Gate

No	Name of C.I.S.	Type	Lenght of Weir	High of Weir	Size of Gate	Con. Year	Rwmark
1	Bamban	Brush Dam	- m	- m	m * set	-	To be Improved
2	San Pedro	do	-	-	-	-	do
3	Malonzo No. 1	do	-	-	-	-	do
	Malonzo No. 2	do	-	-	-	-	do
4	Bangcu	do	-	-	-	-	do
5	Susuba Cut-Cut	Check-Gate	2.7	3.0	1.5*1.5*2	?	do
6	Telabanca No. 1	Brush Dam	-	-	-	-	do
	Telabanca No. 2	do	-	-	-	-	do
	Telabanca No. 3	do	-	-	-	-	do
7	Sta. Rita	Div. Dam	12.6	4.0	1.6*2.5*6	'65	G.C.C.
8	Marita	Brush-Dam	-	-	-	-	do
9	San Martin No. 1	do	-	-	-	-	do
	San Martin No. 2	do	-	-	-	-	do
	San Martin No. 3	do	-	-	-	-	do
	San Martin No. 4	do	-	-	-	-	do
10	Baluto No. 1	Check-Gate	12.7	0.9	1.7*0.5*2	'81	-
					1.0*0.9*1		
	Baluto No. 2	do	15.6	1.1	1.7*0.6*2	'81	-
					1.7*1.1*1	-	
11	Lilibangan	Brush Dam	-	-	-		G.C.C.
12	San Bartolome No.1	Div. Dam	9.8	0.7	-	'78	To be Improved
	San Bartolome No.2	Div. Dam	28.3	0.7	-	'70	do
13	San Isidro	-	-	-	-		-
14	Lucong	Div. Dam	36.0	4.0	36.0*0.8	'52	To be Improved
15	Magao No. 1	Div. Dam	19.3	2.2	1.5*0.6*8	'45	-
	Magao No. 2	Div. Dam	11.5	1.0	1.7*1.0*5	'45	-
16	Tinang	Div. Dam	21.0	8.0	10.0*3.0*2	'29	To be Improved
17	Sto. Rosario	Div. Dam	36.3	4.2	1.8*1.0*10	?	do
18	Sta. Monica	Div. Dam	16.4	2.0	14.0*1.0	?	do
					2.0*1.0		
19	Caluluan	Check-Gate	2.0	1.5	-	?	To be Improved

Table F-1-12 Dimension of Intake

N o	Name of Intake	Type	Section	Discharge	Con. Year	Remark
				CuM/S		
(1)	Bamban	Open	5.0 x 1.5	2.54	-	-
(2)	San Pedro	-do-	3.0 x 1.0	-	-	-
(3)	Malonzo No. 1	Culvert	36"RCP x 2	-	-	To be Improved
	Malonzo No 2	-do-	36"RCP x 2	-	-	do
(4)	Bangcu	-do-	36"RCP	-	-	-
(5)	Susuba Left	Open	1.5 x 0.06	0.06	-	-
	Susuba Right	-do-	1.5 x 0.5	0.06	-	-
	Telabanca No. 1	Culvert	36"RCP x 2	0.39	-	-
(6)	Telabanca No. 2	-do-	-do-	0.09	-	-
	Telabanca No. 3	-do-	-do-	0.17	-	-
(7)	Sta. Rita	-do-	24"R.C.P.	0.22	-	-
(8)	Marita	-do-	36"R.C.P.	0.21	-	-
(9)	San Martin No. 1	-do-	36"R.C.P.	0.20	-	-
	San Martin No. 2	-do-	36"R.C.P.	0.12	-	-
	San Martin No. 3	-do-	36"R.C.P.	0.18	-	-
	San Martin No. 4	-do-	30"R.C.P.	0.15	-	-
(10)	Baluto No. 1	-do-	24"R.C.P.	0.61	1981	-
	Baluto No. 2	-do-	24"R.C.P.	0.13	1981	-
(11)	Lilibangan	-do-	24"R.C.P.	0.33	-	-
(12)	San Bartolome No.1	Culvert	1.0 x 0.9			-
			R.C. Box	0.35	-	
	San Bartolome No.2	-do-	0.85 x 0.7x2			-
			R.C. Box	0.40	-	
(13)	San Isidro	-	-	-	-	-
(14)	Lucong	Open	36"RCP x 4	3.38	-	-
(15)	Magao No. 1	Culvert	36"R.C.P.	0.68	-	-
	Magao No. 2	-do-	30"R.C.P.	0.30	-	-
(16)	Tinang Left	-do-	24"R.C.P.	-	-	-
	Tinang Right	-do-	24"R.C.P.	-	-	-
(17)	Sto. Rosario Left	-do-	24"R.C.P.	0.32	-	-
	Sto. Rosario Right	-do-	24"R.C.P.	0.15	-	-
(18)	Sta. Monica	-do-	?	0.95	-	-
(19)	Caluluan Left	-do-	24"R.C.P.	0.14	-	-
	Caluluan Right	-do-	24"R.C.P.	0.09	-	-

Table F-1-13 Dimension of Irrigation Canal

No.	Name of Canal	Lined			Un-Lined			Length of To be Improved
		Length	Section	Discharge	Length	Section	Discharge	
		m	m x m	m³/s	m	m x m	m³/s	m
1.	Bauban							
	Main C. # 1	200	2.1x1.2	2.54	6,380	2.1x1.2	2.54	6,380
	Main C. # 2	-	-	-	5,900	1.1x0.8	0.71	4,400
2.	San Pedro							
	Main C.	-	-	-	4,400	1.5x0.8	0.29	-
3.	Malonzo							
	Main C. # 1	-	-	-	1,900	1.0x0.5	0.16	1,900
	Main C. # 2	-	-	-	2,880	1.5x1.0	0.28	2,880
	Lat. A	-	-	-	920	-	-	-
4.	Mangcu							
	Main C.	-	-	-	3,500	1.5x1.0	1.79	2,900
5.	Susuba							
	R. Main C.	-	-	-	800	0.5x0.6	0.06	-
	L. Main C.	-	-	-	1,020	0.4x0.6	0.06	-
6.	Telabanca							
	Main C. # 1	-	-	-	1,820	0.8x0.7	0.52	1,080
	Main C. # 2	-	-	-	1,628	0.5x0.6	0.13	-
	Main C. # 3	-	-	-	2,100	0.8x0.7	0.25	-
	Lat. 1-A	-	-	-	440	0.4x0.6	0.03	-
	Lat. 1-B	-	-	-	200	0.3x0.5	0.03	-
	Lat. 1-C	-	-	-	620	0.9x0.7	0.29	-
	Lat. 3-A	-	-	-	280	0.4x0.6	0.03	-
7.	Sta. Rita							
	Main C.	1,265	0.7x0.8	0.33	565	0.7x0.6	0.21	-
	Lat. A	-	-	-	752	0.7x0.6	0.11	-
	Lat. A-1	-	-	-	494	0.3x0.4	0.02	-
8.	Marita							
	Main C.	40	0.7x0.6	0.21	2,820	0.7x0.6	0.21	-
	Lat. A	-	-	-	800	0.6x0.6	0.07	-
9.	San Martin							
	Main C. # 1	-	-	-	1,008	0.6x0.7	0.20	-
	Main C. # 2	-	-	-	1,800	0.7x0.6	0.12	-
	Main C. # 3	-	-	-	2,080	0.6x0.6	0.18	-
	Main C. # 4	-	-	-	1,660	0.9x0.7	0.15	-
10.	Baluto.							
	Main C.	1,880	1.6x1.0	0.80	2,360	0.6x0.6	0.06	1,880
	Bayabas M.C.	-	-	-	3,480	0.7x0.6	0.13	-
	Papaya M. C.	-	-	-	1,760	0.6x0.6	0.18	-
	Lat.A	-	-	-	700	0.4x0.6	0.06	-
	Lat. B	-	-	-	2,080	0.9x0.7	0.17	-
	Lat. B-1	-	-	-	1,000	0.4x0.6	0.06	-
	Lat. B-2	-	-	-	600	0.4x0.5	0.04	-
11.	Lilibangan							
	Main C.	-	-	-	2,460	1.3x0.6	0.33	-
	Lat. A	-	-	-	2,380	0.7x0.6	0.12	-
12.	San Bartolome							
	Main C. # 1	-	-	-	1,428	1.3x0.9	0.39	160
	Main C. # 2	-	-	-	1,200	1.3x0.9	0.44	170
	Lat. A	-	-	-	1,820	1.0x0.7	0.21	-
	Lat. A-1	-	-	-	1,120	0.8x0.7	0.24	-
	Lat. A-2	-	-	-	300	0.8x .7	0.11	-
13.	San Isidro							
	Main C.	-	-	-	2,740	0.8x0.4	0.17	1,000
14.	Lucong							
	Main C.	4,600	3.0x1.7	3.38	5,670	1.8x0.9	1.33	5,870
	Lat. A	2,680	2.0x1.1	1.08	2,320	1.0x0.7	0.32	-
	A-1	-	-	-	1,500	1.1x0.8	0.26	-
	A-2	-	-	-	1,720	0.6x0.6	0.20	-
	A-3	-	-	-	1,850	0.9x0.7	0.25	-
	A-3a	-	-	-	2,080	0.6x0.6	0.16	-
	Lat. B	-	-	-	1,780	0.8x0.7	0.22	-
	C	-	-	-	2,060	0.5x0.6	0.11	-
	D	-	-	-	3,420	1.4x0.8	0.47	-
	D-1	-	-	-	436	0.7x0.6	0.10	-
	E	-	-	-	2,020	0.4x0.6	0.14	-
	F	-	-	-	360	0.7x0.6	0.17	-
	G	-	-	-	1,060	0.6x0.7	0.25	-
15.	Magao							
	Main C.# 1	-	-	-	3,740	1.7x1.0	0.68	1,430
	Main C.# 2	-	-	-	1,400	1.2x0.8	0.30	-
	Main C.# 3	-	-	-	980	0.7x0.6	0.15	-
	Lat. 1-A	-	-	-	1,380	0.7x0.6	0.08	-
	1-B	-	-	-	2,000	1.2x0.8	0.30	-
	Lat. 2-A	-	-	-	480	0.6x0.6	0.06	-
	2-B	-	-	-	840	0.7x0.6	0.08	-
	Lat. 2-C	-	-	-	840	0.4x0.5	0.03	-
16.	Tinang							
	Main C. Right	-	-	-	4,400	1.2x0.8	0.58	2,120
	Main C. Left	-	-	-	3,300	1.0x0.7	0.44	1,050
17.	Sto. Rosario							
	Main C. Right	560	0.4x0.8	0.32	1,660	0.6x0.7	0.10	-
	Main C. Left	820	0.4x0.7	0.15	580	0.7x0.8	0.13	-
	Lat. A	-	-	-	740	0.6x0.7	0.09	-
	Lat. B	-	-	-	1,860	0.4x0.6	0.07	-
18.	Sta. Monica							
	Main C. # 1	760	1.5x1.0	1.20	1,361	1.1x1.0	0.45	-
	Main C. # 2	-	-	-	4,490	1.4x1.2	0.92	3,500
	Lat. A	-	-	-	3,028	1.0x1.0	0.44	-
19.	Caluluan							
	Main C. Right	-	-	-	-	-	-	-
	Main C. Left	-	-	-	-	-	-	-
	Total							
	Main C.	10,125			88,390			38,520
	Lat. C.	2,680			46,060			-

Table F-1-14 Dimension of Proposed Irrigation Pump for Rice

No	name of CIS	Potential Area	Present (Dry season)			Proposed (Dry season)				Total Pump
			C I S	Pump	Pump	C I S		Pump		
						Rice	Div.Cr	Rice	Number	
		has	has	has	unit	has	has	has	Unit	Unit
1	Bamban	1,051	532	—	8	532	—	—	—	8
2	San Pedro	120	120	—	50	120	—	—	—	50
3	Malonzo	240	240	—	—	240	—	—	—	—
4	Bangcu	700	500	—	5	500	—	—	—	5
5	Susuba Cut-cut	40	8	—	2	8	—	—	—	2
6	Telabanca	389	364	—	1	364	25	—	—	1
7	Sta Rita	135	60	20	15	135	—	—	—	15
8	Marita	100	30	35	4	100	—	—	—	4
9	San Martin	280	30	50	20	240	40	—	—	20
10	Baluto	740	—	320	96	570	170	—	—	96
11	Lilibangan	240	90	110	15	240	—	—		15
12	San Bartolome	375	120	140	52	120	90	25	15	67
13	San Isidro	635	—	330	188	—	120	185	54	242
14	Lucong	2,250	1,200	190	50	1,200	400	460	143	193
15	Magao	620	468	152	12	468	—	98	22	34
16	Tinang	850	100	—	4	100	—	—	—	4
17	Sto. Rosario	200	100	50	30	100	50	50	12	42
18	Sta. Monica	740	150	590	100	150	—	190	25	125
19	Caluluan	80	—	45	50	—	35	—	—	50
	T o t a l	9,785	4,112	2,032	702	5,187	930	1,008	271	973

Table F-1-15 Discharge of Collecting Conduit

1) Wet Season

Diameter D (m m)	Depth H (m)	Coefficient K (m/s)	Water Pressure Po (t/m^2)	Unit Discharge Q (m^3/s/km)
600	1.80	$1x10^{-4}$	0	0.46
800	1.90	$1x10^{-4}$	0	0.53
1,000	2.00	$1x10^{-4}$	0	0.61
1,200	2.10	$1x10^{-4}$	0	0.68

2) Dry Season

Diameter D (m m)	Depth H' (m)	Coefficient K (m/s)	Water Pressure Po (t/m^2)	Unit Discharge Q (m^3/s/km)
600	1.30	$1x10^{-4}$	0	0.38
800	1.40	$1x10^{-4}$	0	0.45
1,000	1.50	$1x10^{-4}$	0	0.53
1,200	1.60	$1x10^{-4}$	0	0.60

Table F-1-16 Dimension of Proposed Groundwater Collecting Conduit

Name of CIS	Season	Collecting Conduit			Feeder Canal		Irri.	Water
		Diameter	Length	Disch.	Slope	Length	Area	Requ.
		m m	m	m^3/s		m	ha	m^3/s
Sta. Rita + Marita	Wet	600	250	0.12		500 + 500		
		800	250	0.14				
		1,000	500	0.31				
		Total	1,000	0.57	1/1500	1,000	235	0.50
	Dry	600	250	0.10		500 + 500		
		800	250	0.12				
		1,000	500	0.27				
		Total	1,000	0.49	1/1500	1,000	235	0.43
San Martin	Wet	600	150	0.07		800 + 1,500		
		800	200	0.11				
		1,000	650	0.40				
		Total	1,000	0.58	1/1500	2,300	240	0.51
	Dry	600	150	0.06		800 + 1,500		
		800	200	0.09				
		1,000	650	0.34				
		Total	1,000	0.49	1/1500	2,300	240	0.44
Lilibangan	Wet	600	150	0.07				
		800	200	0.11				
		1,000	600	0.37				
		Total	950	0.55	1/1500	1,000	240	0.51
	Dry	600	150	0.06				
		800	200	0.09				
		1,000	600	0.32				
		Total	950	0.47	1/1500	1,000	240	0.44
Baluto	Wet	600	200	0.10				
		800	250	0.14				
		1,000	1,550	0.96				
		Total	2,000	1.20	1/1500	700	570	1.20
	Dry	600	200	0.09				
		800	250	0.12				
		1,000	1,550	0.82				
		Total	2,000	1.03	1/1500	700	570	1.03

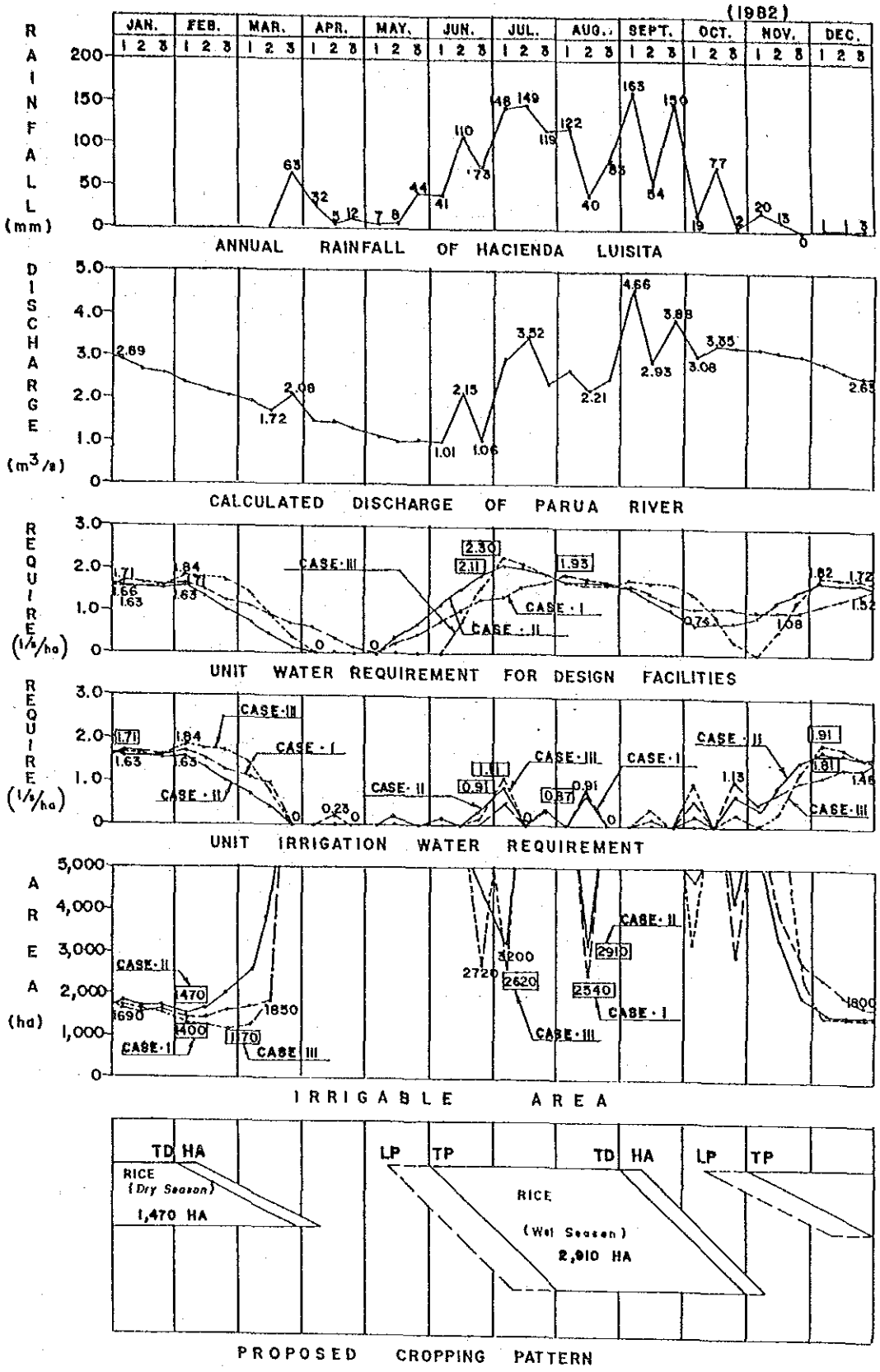


Figure F-1-1 Irrigable Area

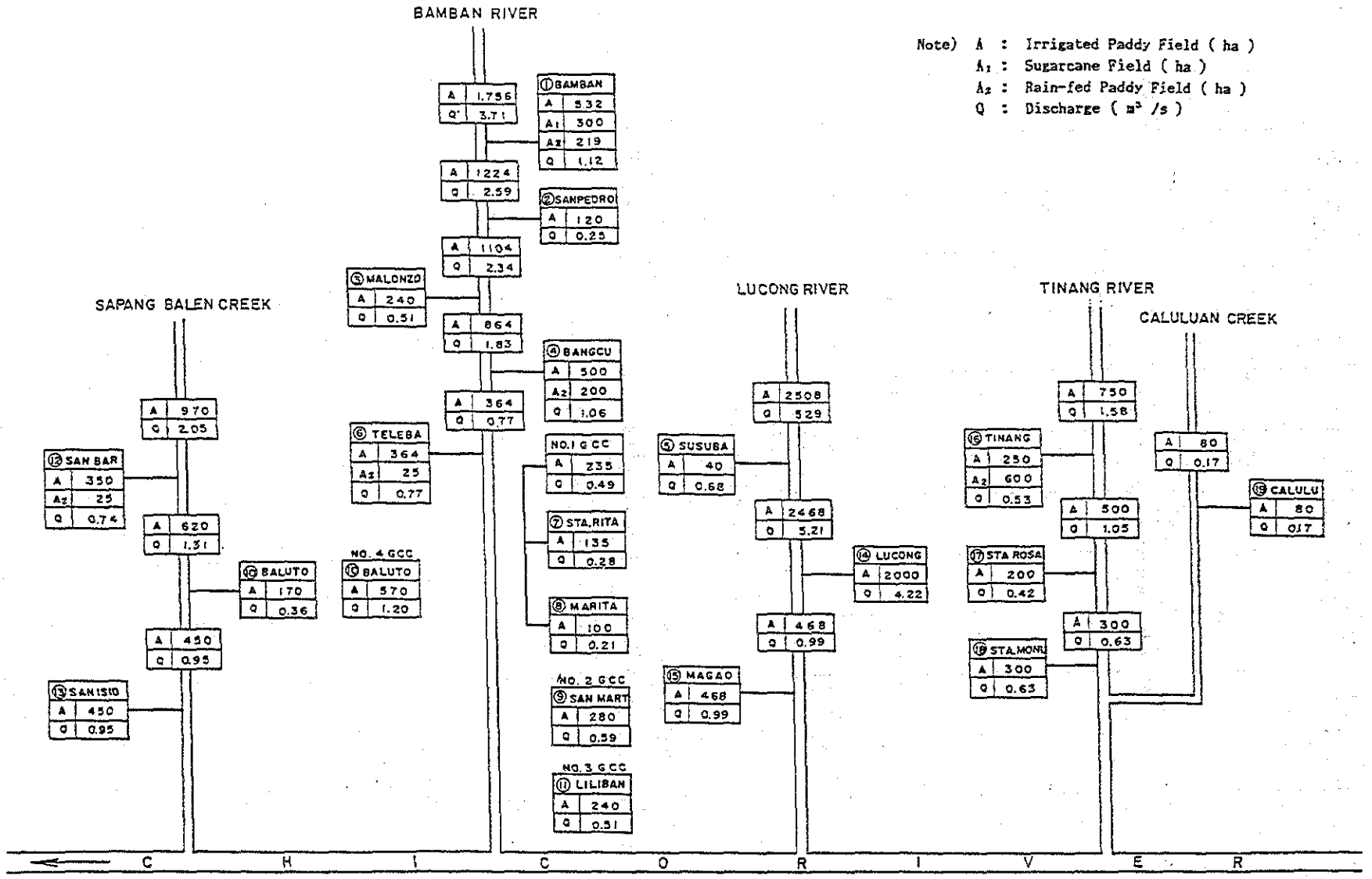


Figure F-1-2 Proposed Irrigation Diagram (Wet Season)

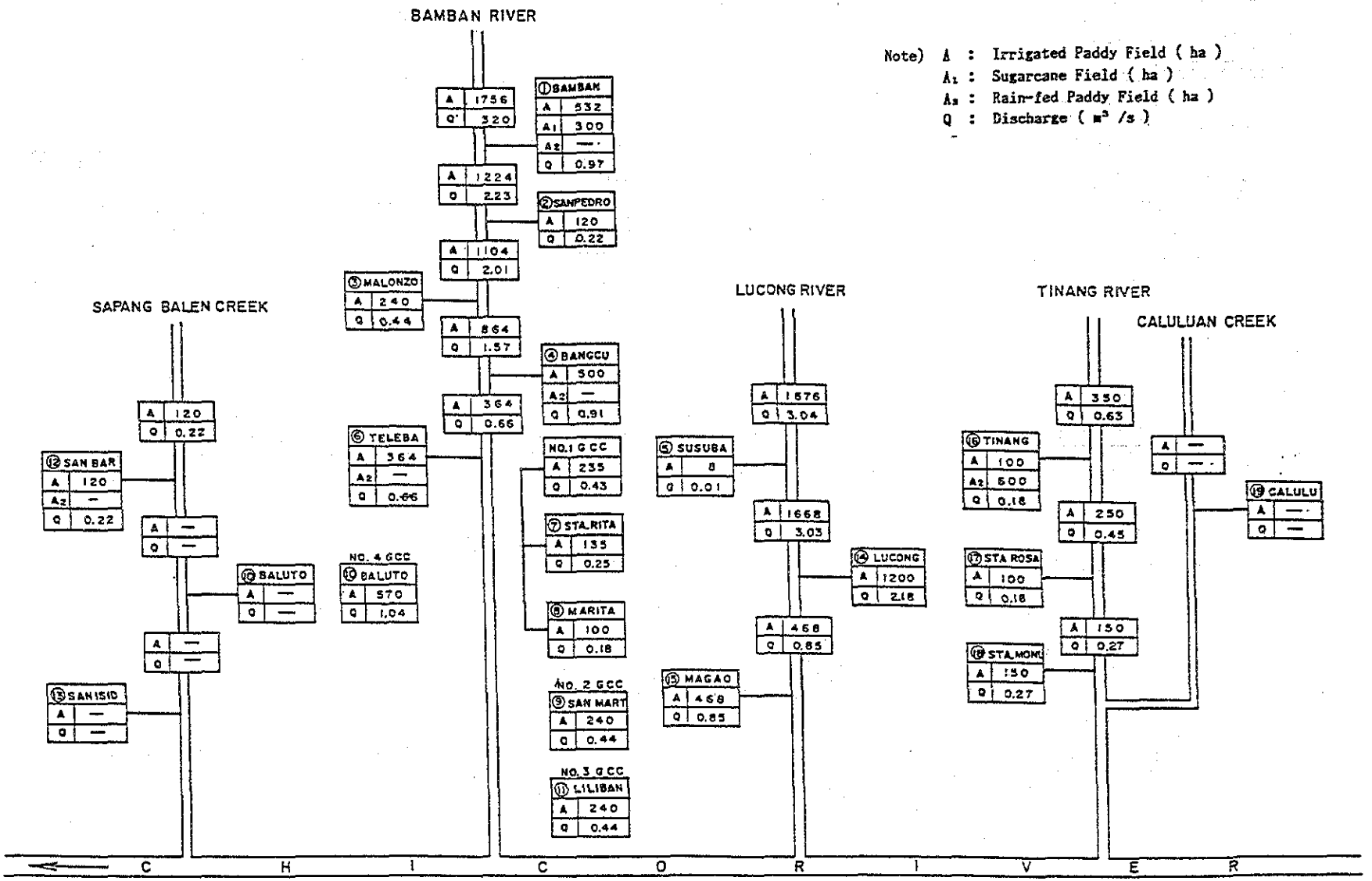


Figure F-1-3 Proposed Irrigation Diagram (Dry Season)

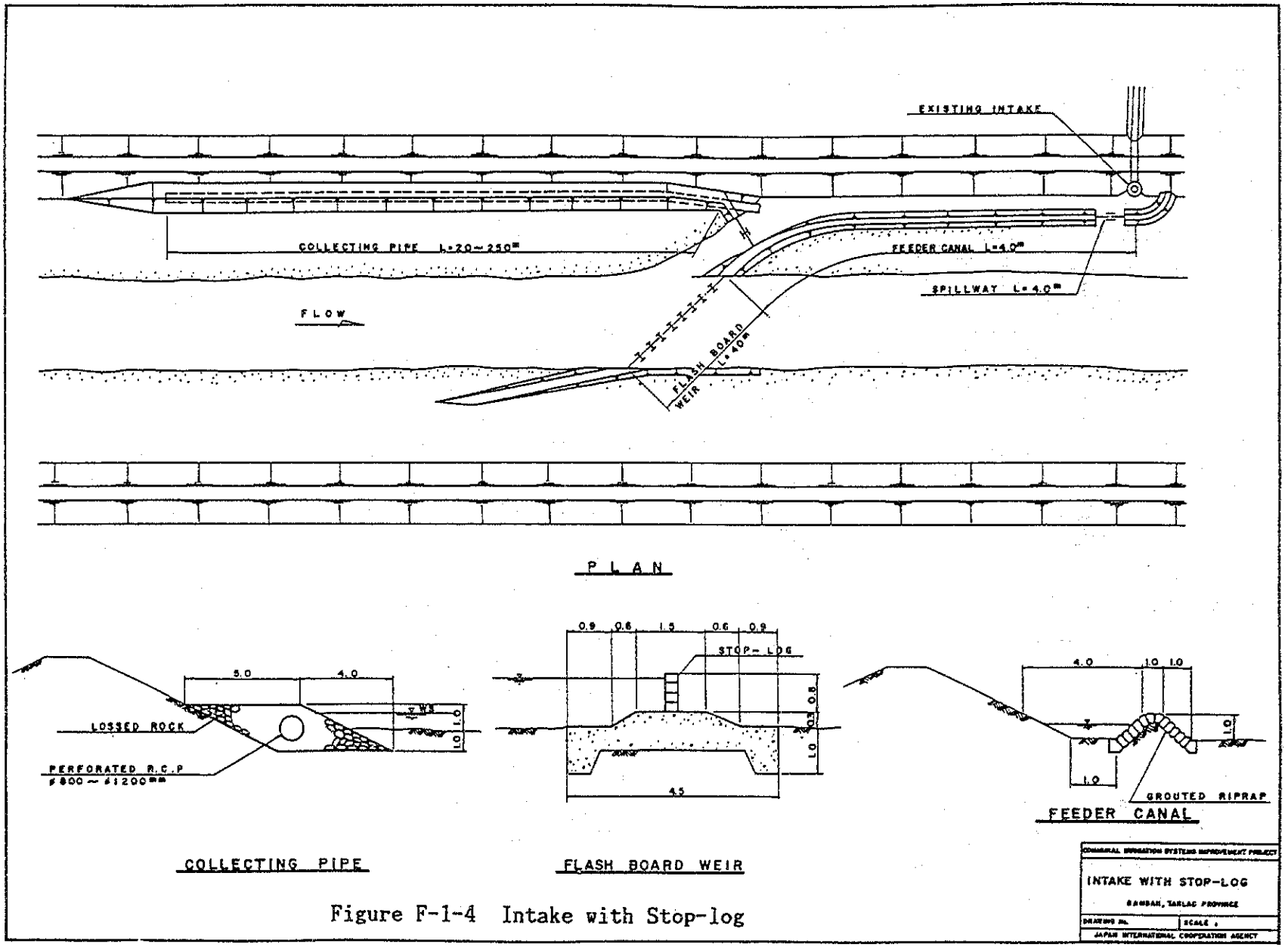


Figure F-1-4 Intake with Stop-log

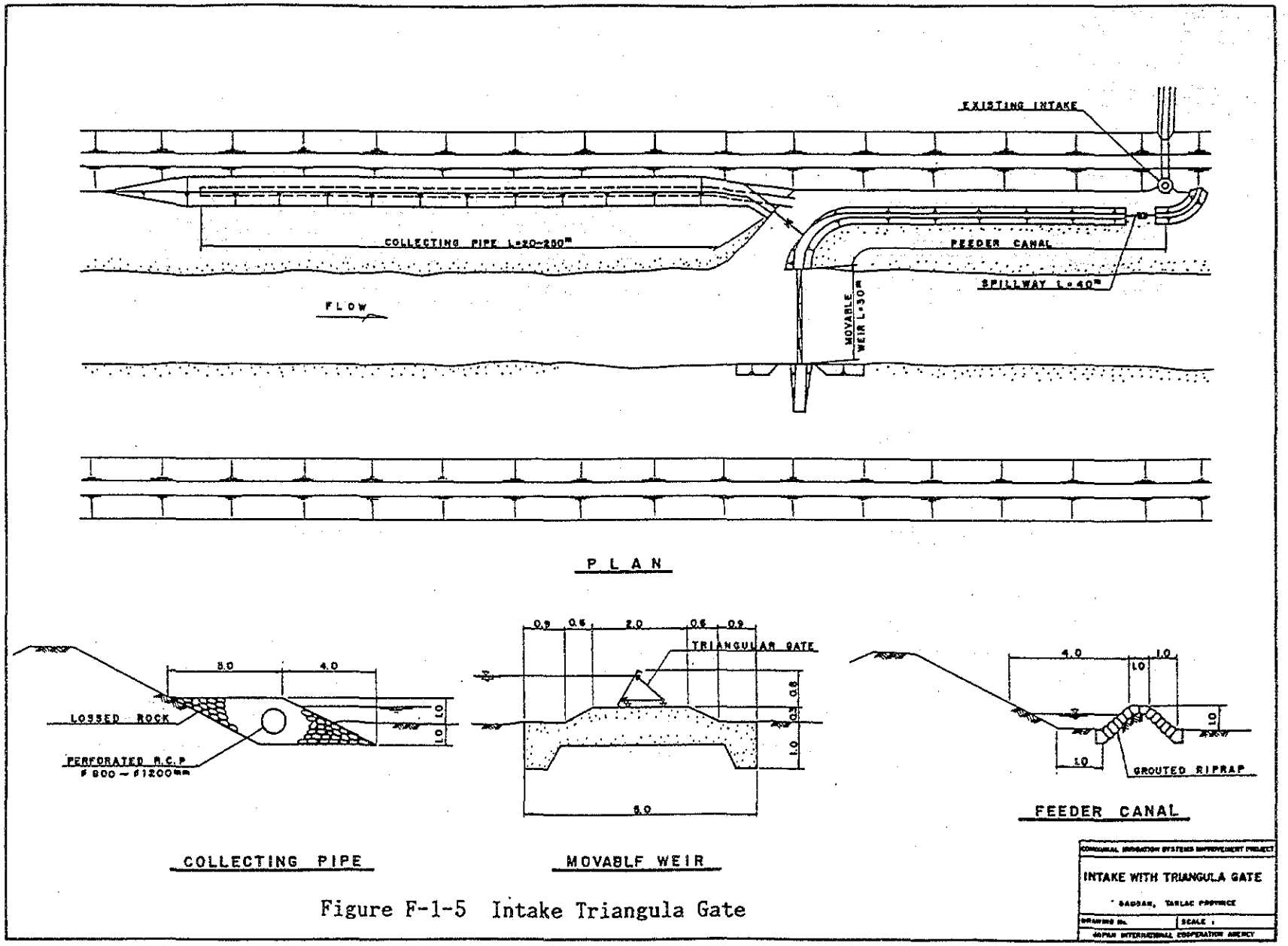
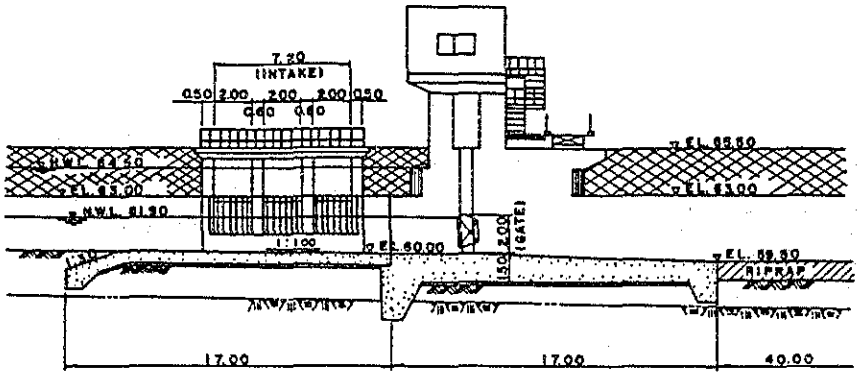
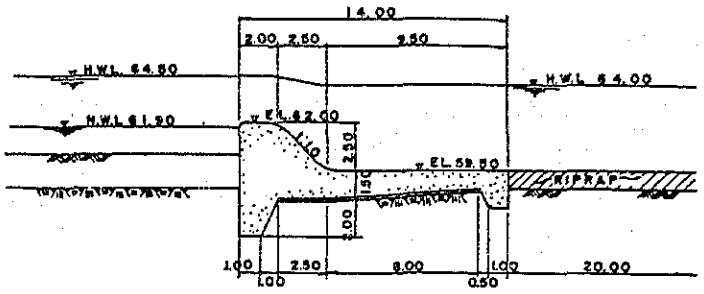


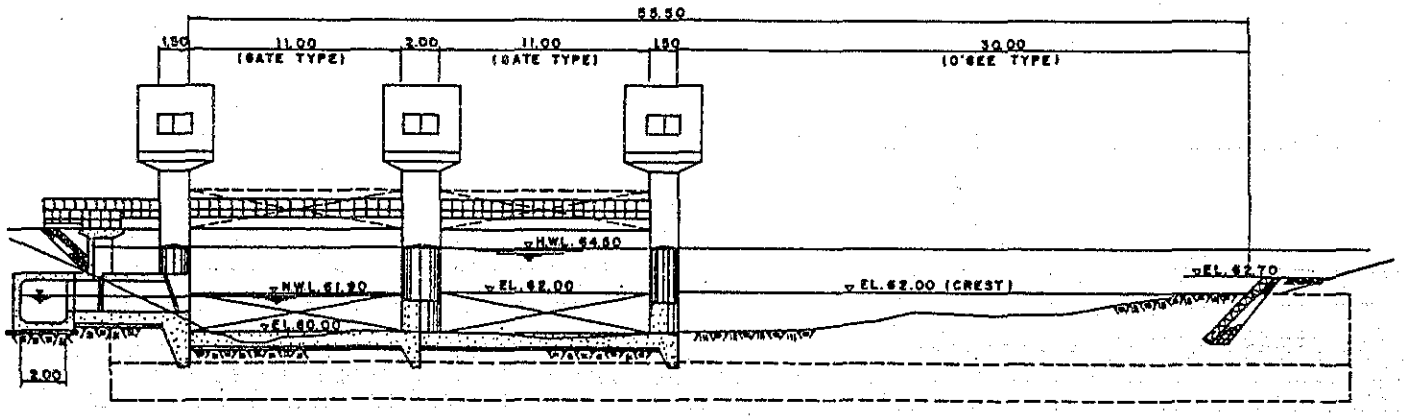
Figure F-1-5 Intake Triangula Gate



SECTION A-A
(SCOURING SLUICE)



SECTION B-B
(O'GEE WEIR)

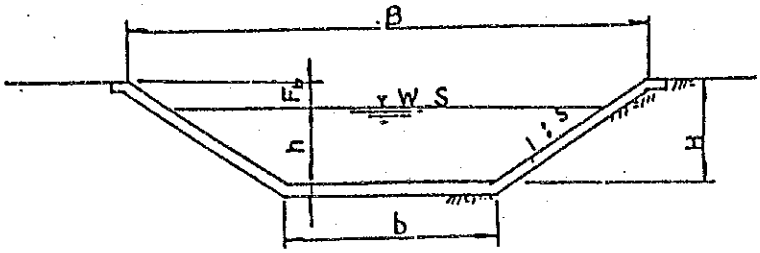


PROFILE OF BAMBAN DIVERSION DAM

Figure F-1-6 Unifed Diversion Dam

0 5.00 10.00 M

COMMUNAL IRRIGATION SYSTEMS IMPROVEMENT PROJECT
UNIFED DIVERSION DAM
BAMBAN, TARLAC PROVINCE
DRAWING No. | SCALE :
JAPAN INTERNATIONAL COOPERATION AGENCY



	TYPE-I	TYPE-II	TYPE-III	TYPE-IV	TYPE-V	TYPE-VI
TYPE	UNLINED	LINED	LINED	LINED	LINED	BENCH
Q(m³/s)	0.20	0.45	0.65	1.00	1.50	3.10
b (m)	0.70	0.80	1.00	1.00	1.30	2.20
B (m)	2.20	2.60	2.95	3.25	3.70	2.20
h (m)	0.35	0.40	0.45	0.55	0.60	1.00
Fb(m)	0.15	0.20	0.20	0.20	0.20	0.30
H (m)	0.50	0.60	0.65	0.75	0.80	1.30
S	1 : 1.5	1 : 1.5	1 : 1.5	1 : 1.5	1 : 1.5	1 : 0

Figure F-1-7 Typical Section of Irrigation Canal

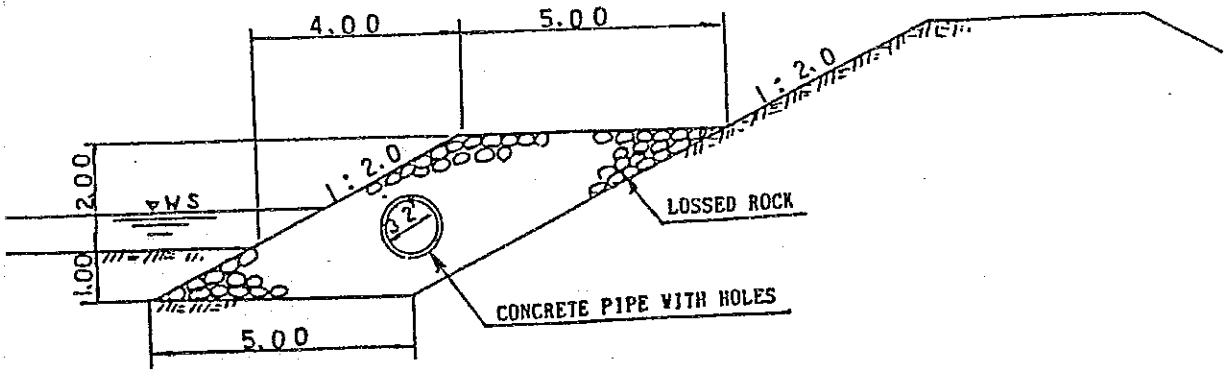


Figure F-1-8 Typical Section of Collecting Pipe

Figure F-1-9 Layout of Bamban CIS

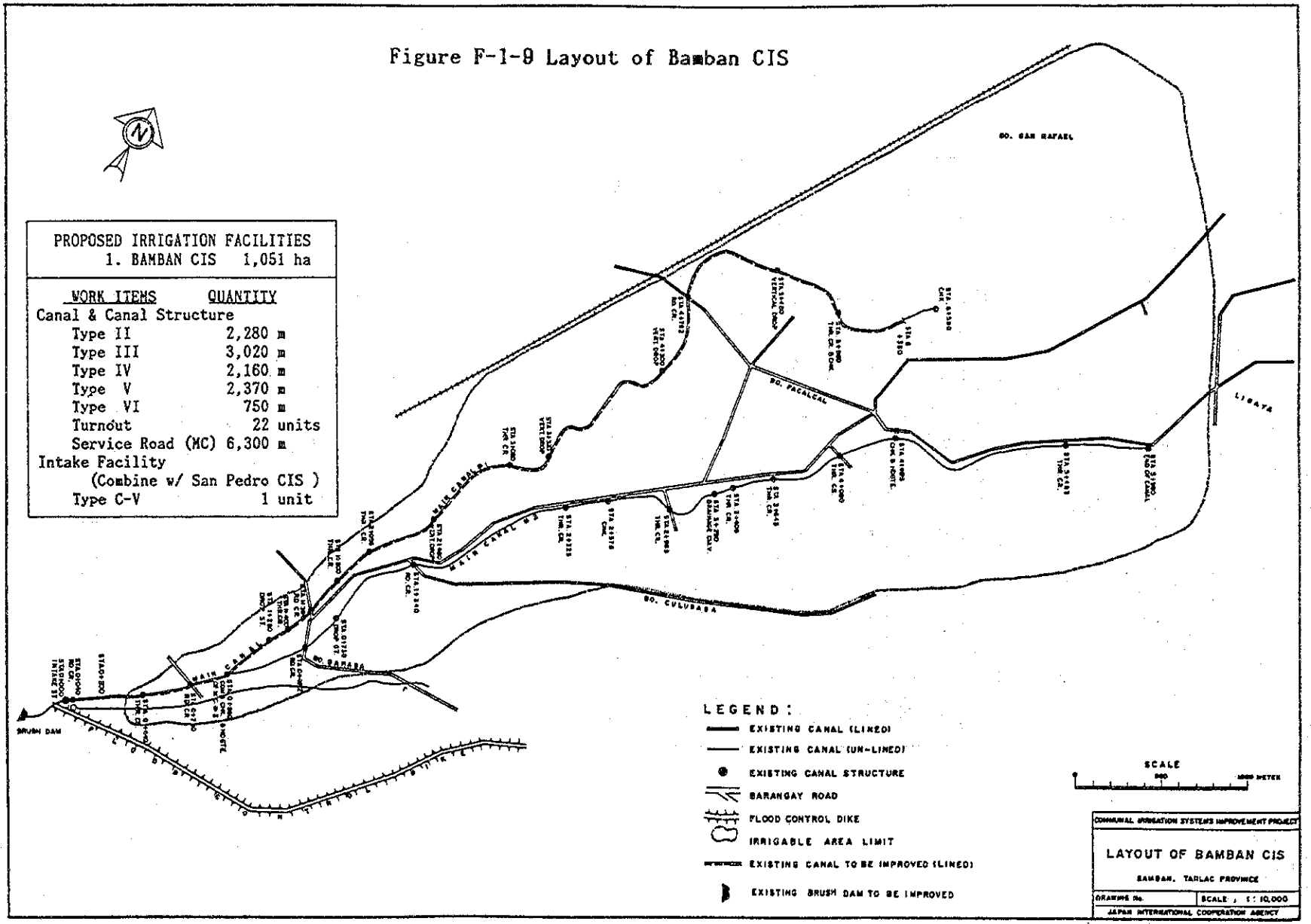
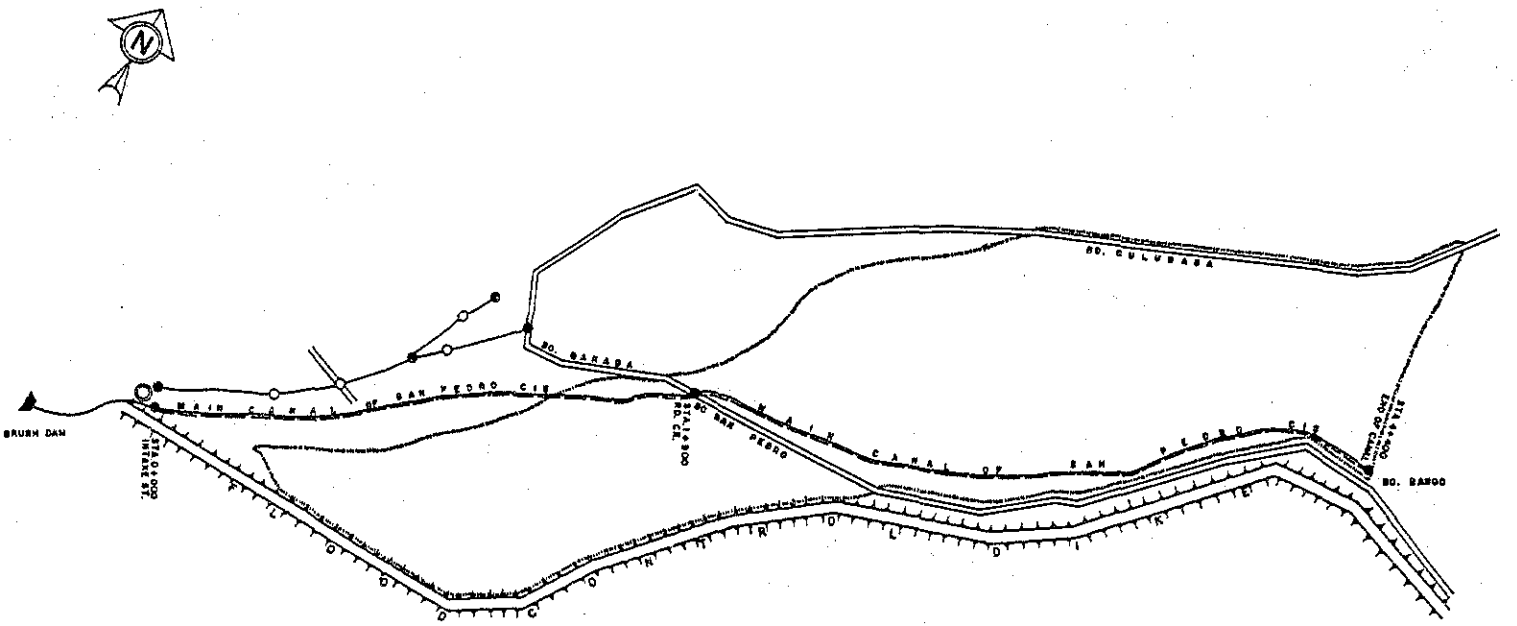


Figure F-1-10 Layout of San Pedro CIS



PROPOSED IRRIGATION FACILITIES 2. SAN PEDRO CIS 120 ha	
WORK ITEMS	QUANTITY
Canal & Canal Structure	
Turnout	7 unit
Service Road (MC)	2,200 m
Intake Facility	
Included in Bamban CIS	

LEGEND :

- EXISTING CANAL (UN-LINED)
- EXISTING CANAL STRUCTURE
- BARANGAY ROAD
- FLOOD CONTROL DIKE
- IRRIGABLE AREA LIMIT
- EXISTING CANAL TO BE IMPROVED (LINED)
- EXISTING BRUSH DAM TO BE IMPROVED

SCALE 500 1000 METER

COMMUNAL IRRIGATION SYSTEMS IMPROVEMENT PROJECT

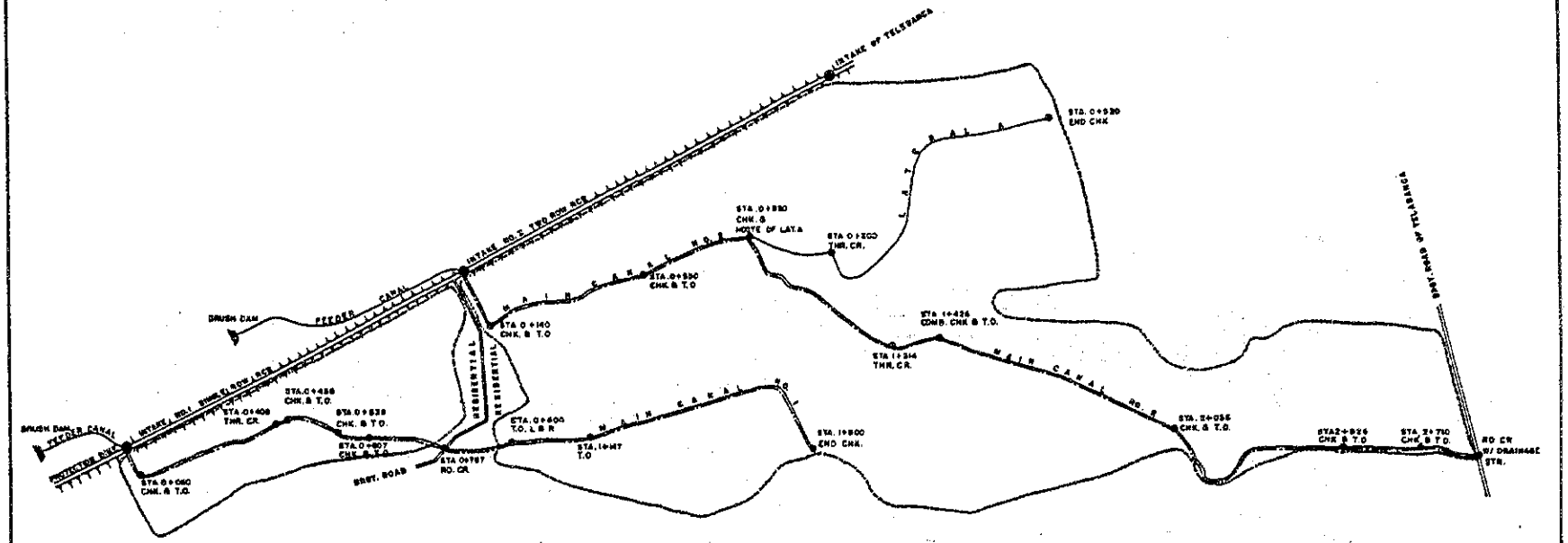
LAYOUT OF SAN PEDRO CIS

BAMBAN, TARLAC PROVINCE

DRAWING No. | SCALE : 1 : 8,000

JAPAN INTERNATIONAL COOPERATION AGENCY

Figure F-1-11 Layout of Malonzo CIS



PROPOSED IRRIGATION FACILITIES 3. MALONZO CIS 240 ha	
WORK ITEM	QUANTITY
Canal & Canal Structure	
Type I.	4,780 m
Turnout	11 units
Service Road (MC)	2,400 m
Service Road (LC)	500 m
Intake Facility	
Type C-I	1 unit
Type C-II	1 unit

LEGEND:

- EXISTING CANAL (UN-LINED)
- EXISTING CANAL STRUCTURE
- RESIDENTIAL AREA
- BARANGAY ROAD
- IRRIGABLE AREA LIMIT
- FLOOD CONTROL DIKE
- EXISTING CANAL TO BE IMPROVED (UN-LINED)
- EXISTING BRUSH DAM TO BE IMPROVED

SCALE

COMMUNAL IRRIGATION SYSTEMS IMPROVEMENT PROJECT

LAYOUT OF MALONZO CIS

BAMBAN, TARLAC PROVINCE

DRAWING No. | SCALE : 1 : 5,000

JAPAN INTERNATIONAL COOPERATION AGENCY

Figure F-1-12 Layout of Bangcu CIS

PROPOSED IRRIGATION FACILITIES 4. BANGCU CIS 700 ha	
WORK ITEMS	QUANTITY
Canal & Canal Structure	
Type II	550 m
Type III	600 m
Type IV	600 m
Type V	1,150 m
Turnout	6 units
Service Road (MC)	1,800 m
Intake Facility	
Type C-IV	1 unit

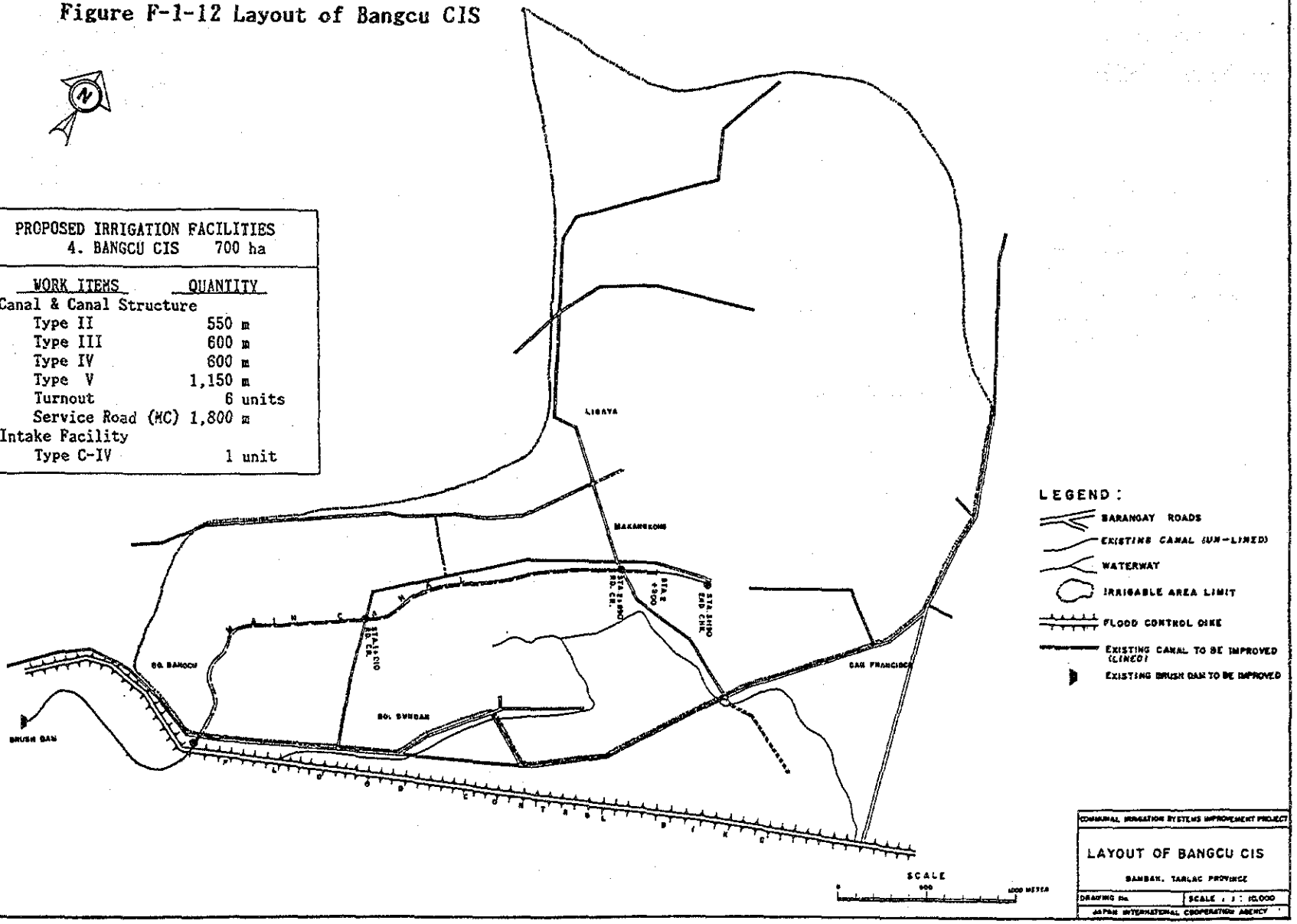
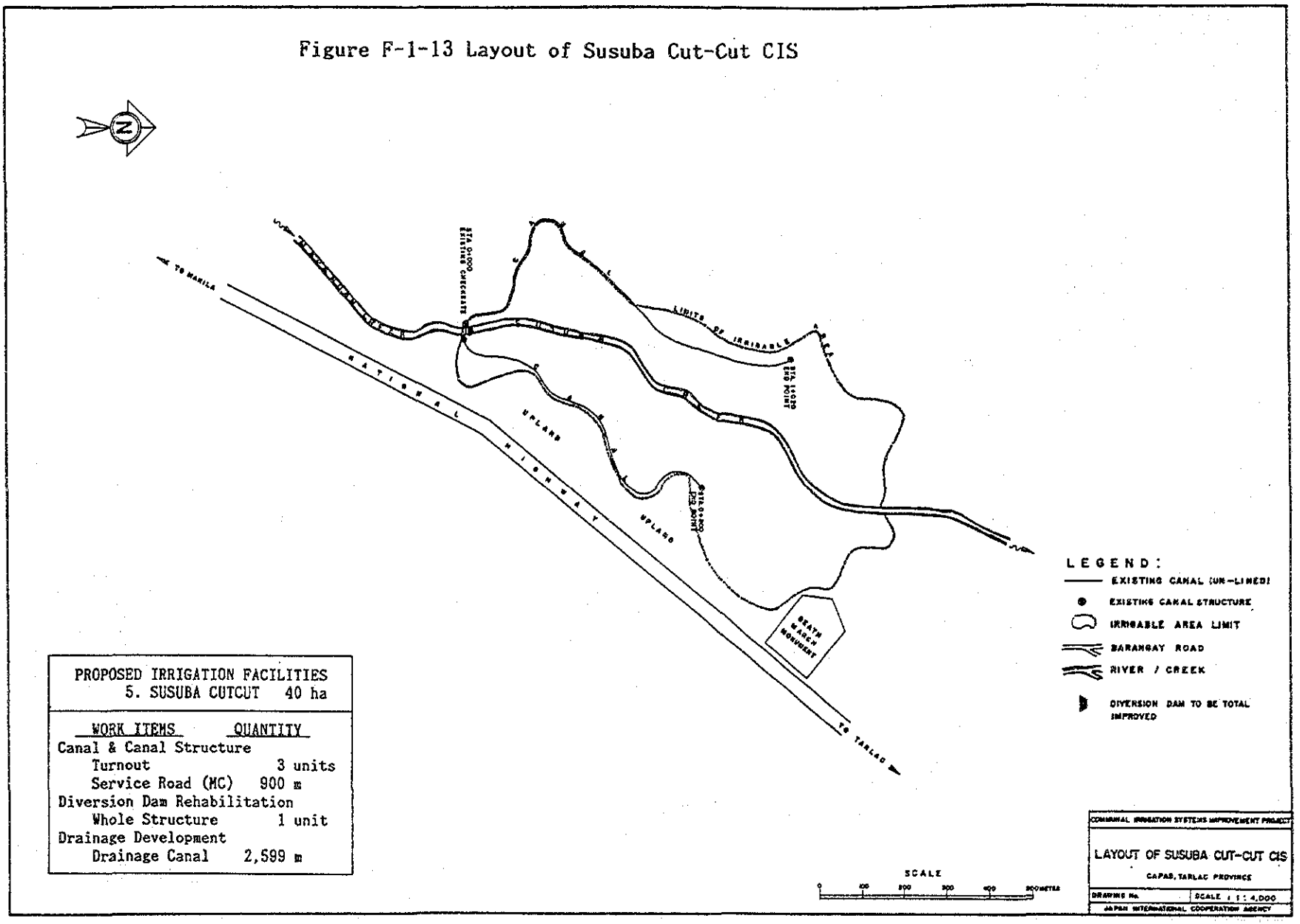


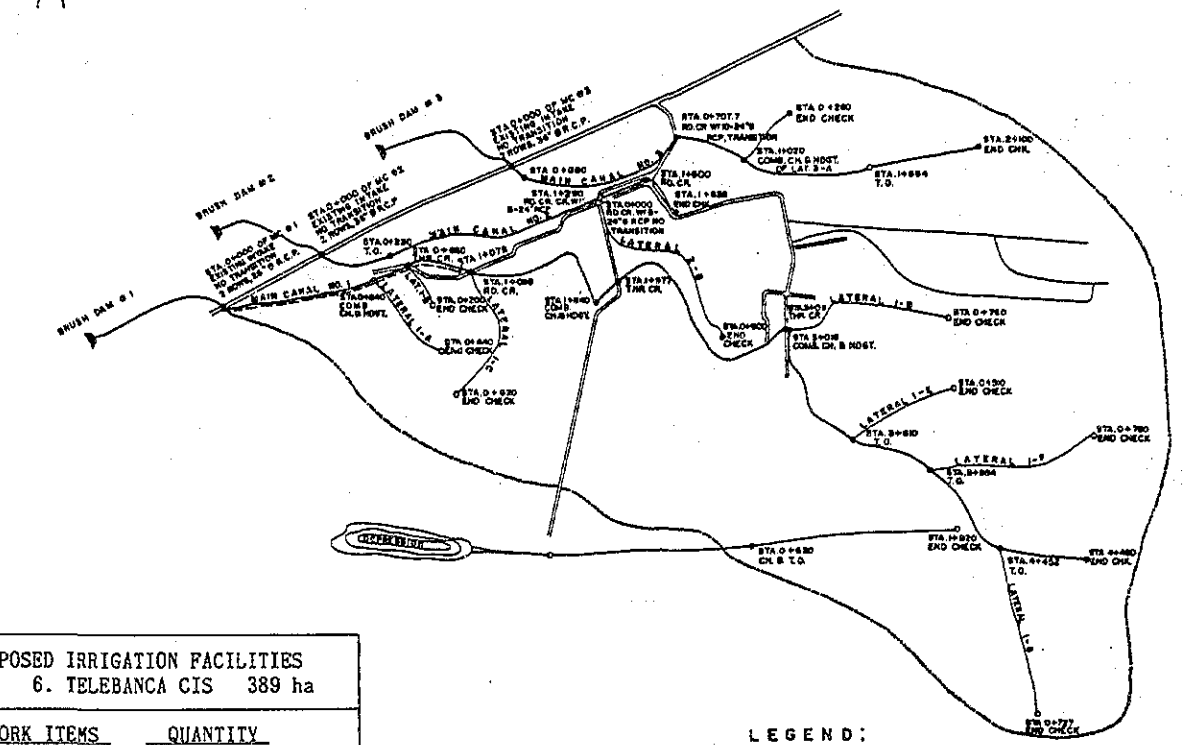
Figure F-1-13 Layout of Susuba Cut-Cut CIS



PROPOSED IRRIGATION FACILITIES
5. SUSUBA CUTCUT 40 ha

WORK ITEMS	QUANTITY
Canal & Canal Structure	
Turnout	3 units
Service Road (MC)	900 m
Diversion Dam Rehabilitation	
Whole Structure	1 unit
Drainage Development	
Drainage Canal	2,599 m

Figure F-1-14 Layout of Telabanca CIS



PROPOSED IRRIGATION FACILITIES 6. TELEBANCA CIS 389 ha	
WORK ITEMS	QUANTITY
Canal & Canal Structure	
Type II	1,080 m
Turnout	21 units
Service Road (MC)	2,800 m
Service Road (LC)	800 m
Intake Facility	
Type C-I	1 unit
Type C-II	1 unit
Type C-III	1 unit

LEGEND:

- EXISTING CANAL (UN-LINED)
- EXISTING CANAL STRUCTURE
- IRRIGABLE AREA LIMIT
- BARANGAY ROAD
- RIVER / CREEK
- FLOOD CONTROL DIKE
- EXISTING CANAL TO BE IMPROVED (LINED)
- BRUSH DAM TO BE IMPROVED

SCALE 0 300 1000 METER

COMMUNAL IRRIGATION SYSTEMS IMPROVEMENT PROJECT

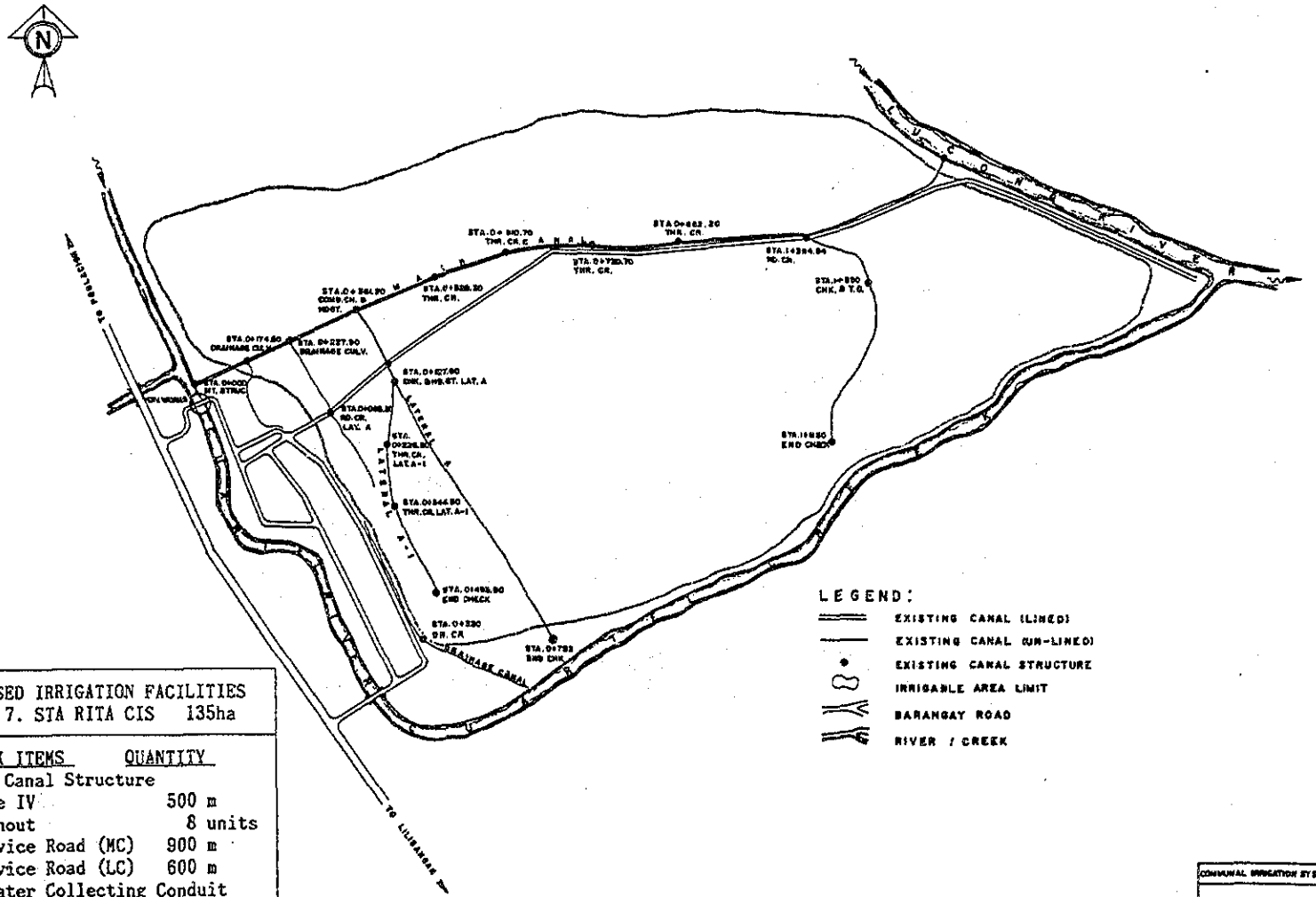
LAYOUT OF TELABANCA CIS

CONCEPCION, TARLAC PROVINCE

DRAWING No. | SCALE 1 : 10,000

JAPAN INTERNATIONAL COOPERATION AGENCY

Figure F-1-15 Layout of Sta Rita CIS



PROPOSED IRRIGATION FACILITIES 7. STA RITA CIS 135ha	
WORK ITEMS	QUANTITY
Canal & Canal Structure	
Type IV	500 m
Turnout	8 units
Service Road (MC)	900 m
Service Road (LC)	600 m
Groundwater Collecting Conduit	
Type GC-I(Combine w/ Marita CIS)	
RCP ∮ 24" ~40"	1,000 m
Corrugated Pipe	500 m

COMMUNAL IRRIGATION SYSTEMS IMPROVEMENT PROJECT

LAYOUT OF STA RITA CIS

CONCEPCION, TARLAC PROVINCE

DRAWING No. | SCALE : 1:4,000

JAPAN INTERNATIONAL COOPERATION AGENCY

Figure F-1-16 Layout of Marita CIS

PROPOSED IRRIGATION FACILITIES 8. MARITA CIS 100 ha	
WORK ITEMS	QUANTITY
Canal & Canal Structure	
Type II	370 m
Type III	530 m
Turnout	7 units
Service Road (MC)	1,600 m
Groundwater Collecting Conduit	
Type GC-I(Combine w/ Sta Rita CIS)	

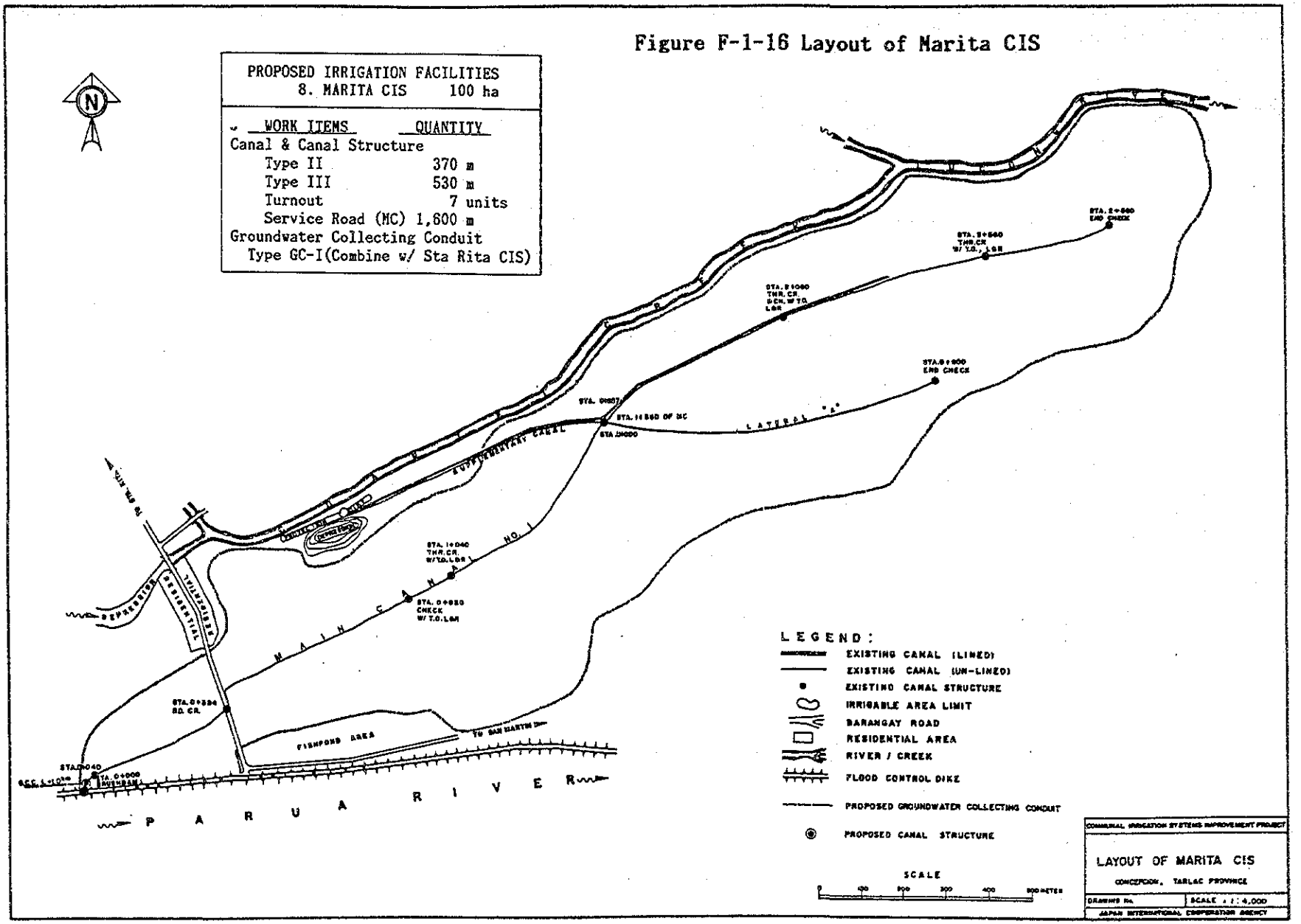
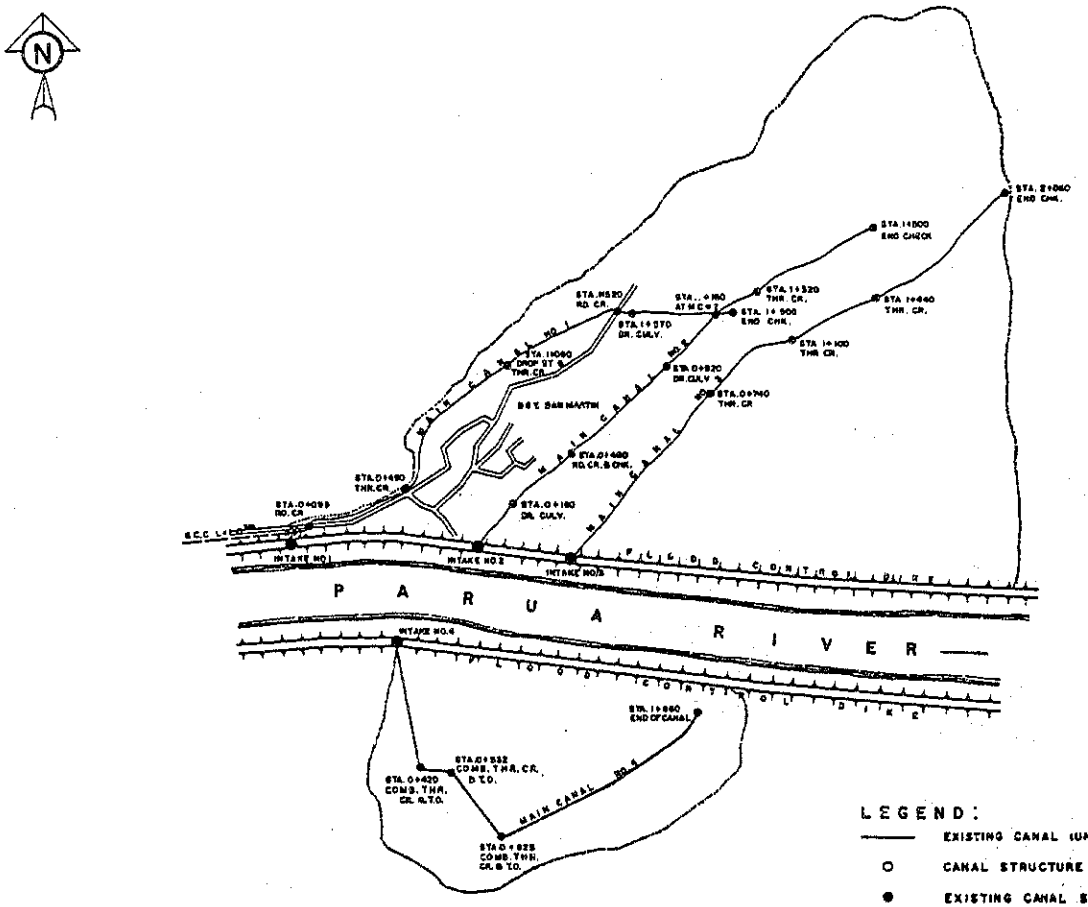


Figure F-1-17 Layout of San Martin CIS



PROPOSED IRRIGATION FACILITIES
9. SAN MARTIN CIS 280 ha

WORK ITEMS	QUANTITY
Canal & Canal Structure	
Type II	1,500 m
Turnout	13 units
Service Road (MC)	3,700 m
Groundwater Collecting Conduit	
Type GC-II	
RCP ϕ 24" ~40"	1,000 m
Corrugated Pipe	800 m

LEGEND:

- EXISTING CANAL (UN-LINED)
- CANAL STRUCTURE
- EXISTING CANAL STRUCTURE
- FLOOD CONTROL DIKE
- BARANGAY ROAD
- RIVER / CREEK
- IRRIGABLE AREA LIMIT
- PROPOSED GROUNDWATER COLLECTING CONDUIT
- PROPOSED CANAL STRUCTURE

SCALE 500 1000 METER

COMMUNAL IRRIGATION SYSTEMS IMPROVEMENT PROJECT

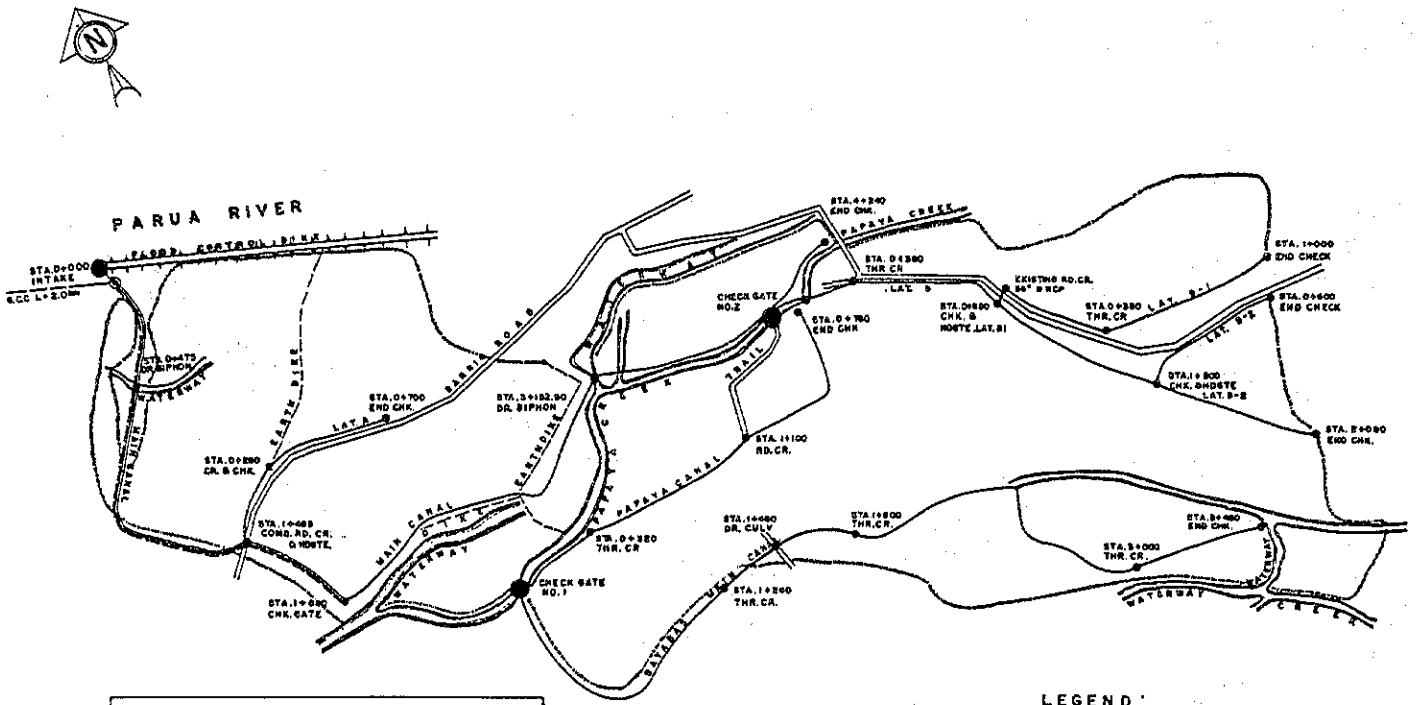
LAYOUT OF SAN MARTIN CIS

CONCEPCION, TARLAC PROVINCE

DRAWING No. | SCALE : 1 : 8,000

JAPAN INTERNATIONAL COOPERATION AGENCY

Figure F-1-18 Layout of Baluto CIS



PROPOSED IRRIGATION FACILITIES 10. BALUTO CIS 740 ha	
WORK ITEMS	QUANTITY
Canal & Canal Structure	
Type III	390 m
Type IV	1,490 m
Type V	500 m
Turnout	29 units
Service Road (MC)	4,200 m
Service Road (LC)	2,500 m
Groundwater Collecting Conduit	
Type GC-I	
RCP ϕ 24" ~40"	1,000 m
Corrugated Pipe	500 m

LEGEND:

- EXISTING CANAL (LINED)
- EXISTING CANAL (UN-LINED)
- EXISTING CANAL STRUCTURE
- IRRIGABLE AREA LIMIT
- BARANGAY ROAD
- RIVER / CREEK
- FLOOD CONTROL DIKE
- PROPOSED GROUNDWATER COLLECTING CONDUIT
- CANAL TO BE IMPROVED (LINED)
- PROPOSED CANAL STRUCTURE

SCALE 0 100 200 300 400 500 METER

COMMUNAL IRRIGATION SYSTEMS IMPROVEMENT PROJECT

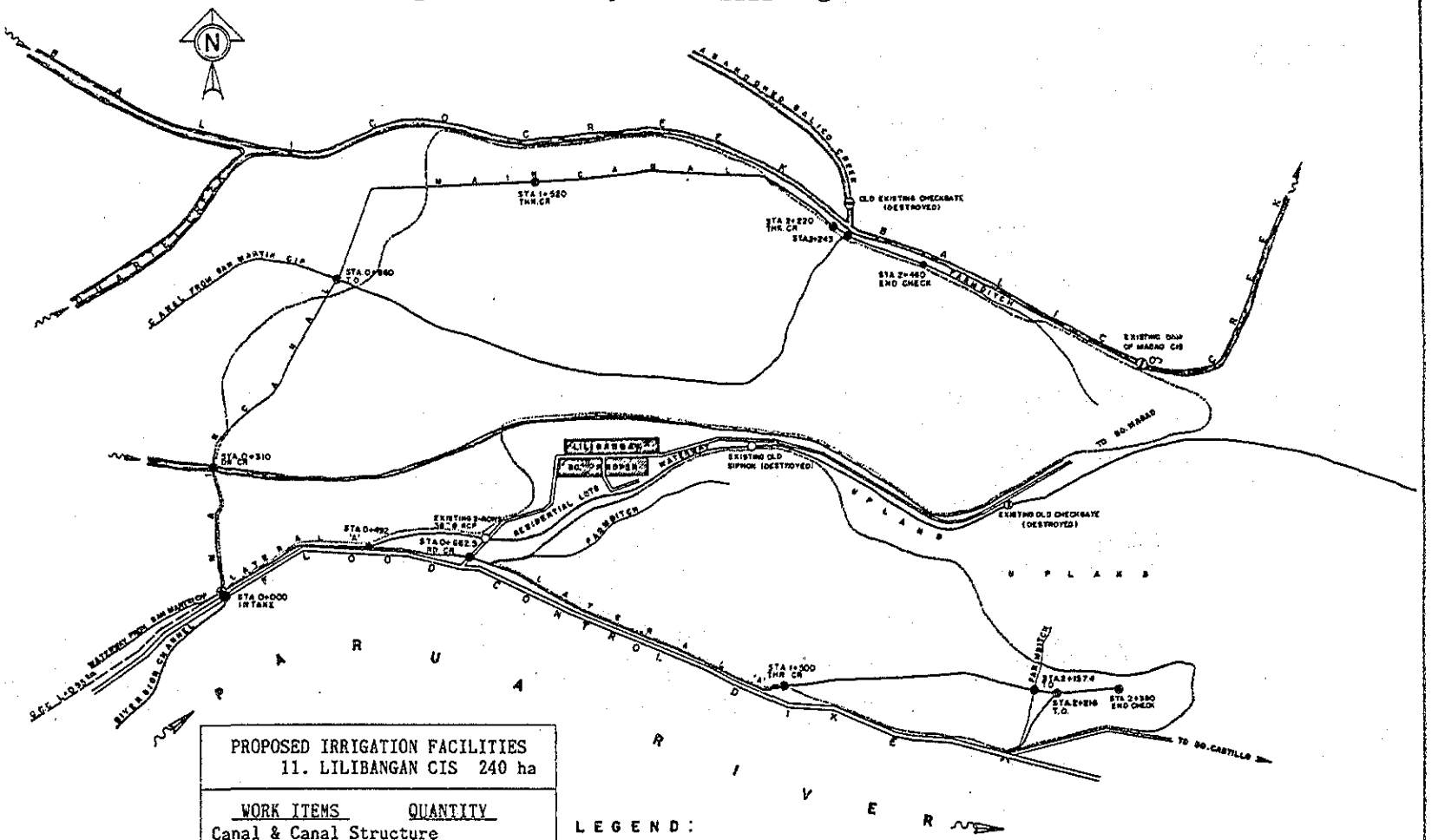
LAYOUT OF BALUTO CIS

CONCEPCION, TARLAC PROVINCE

DRAWING No. | SCALE : 1 : 4,000

JAPAN INTERNATIONAL COOPERATION AGENCY

Figure F-1-19 Layout of Lilibangan CIS



PROPOSED IRRIGATION FACILITIES
11. LILIBANGAN CIS 240 ha

WORK ITEMS	QUANTITY
Canal & Canal Structure	
Turnout	11 units
Service Road (MC)	1,200 m
Service Road (LC)	1,200 m
Groundwater Collecting Conduit	
Type GC-IV	
RCP ϕ 24" ~40"	950 m
Corrugated Pipe	1,000 m

LEGEND:
- EXISTING CANAL (UN-LINED)
- EXISTING CANAL STRUCTURE
- BARANGAY ROAD
- RIVER/CREEK
- RESIDENTIAL AREA
- IRRIGABLE AREA LIMIT
- FLOOD CONTROL DIKE
- PROPOSED GROUNDWATER COLLECTING CONDUIT
- PROPOSED CANAL STRUCTURE

SCALE 0 100 200 300 400 500METER

COMMUNAL IRRIGATION SYSTEMS IMPROVEMENT PROJECT
LAYOUT OF LILIBANGAN CIS
CONCEPCION, TARLAC PROVINCE
DRAWING No. | SCALE : 1 : 5,000
JAPAN INTERNATIONAL COOPERATION AGENCY

Figure F-1-20 Layout of San Bartolome CIS

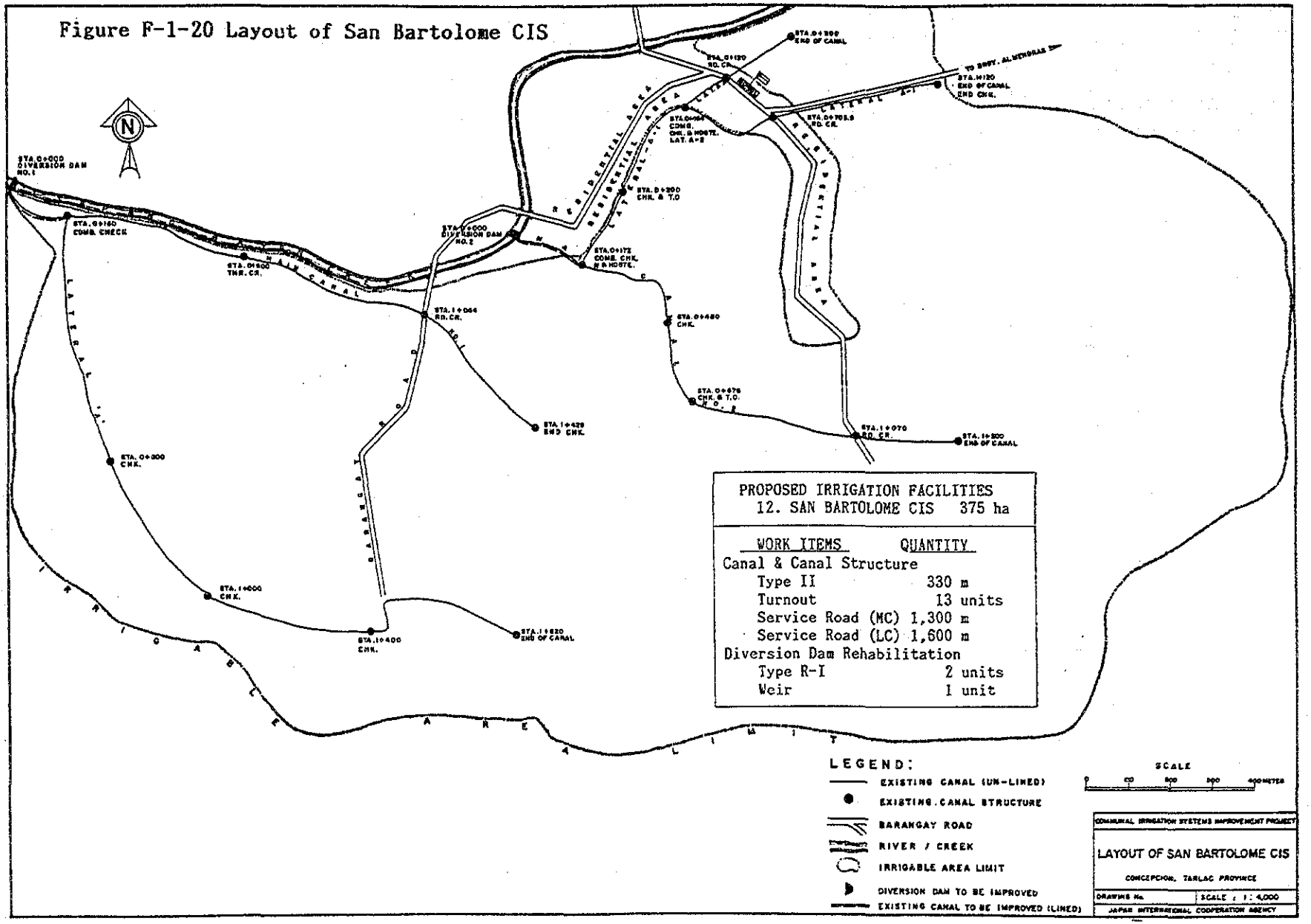


Figure F-1-21 Layout of San Isidro CIS

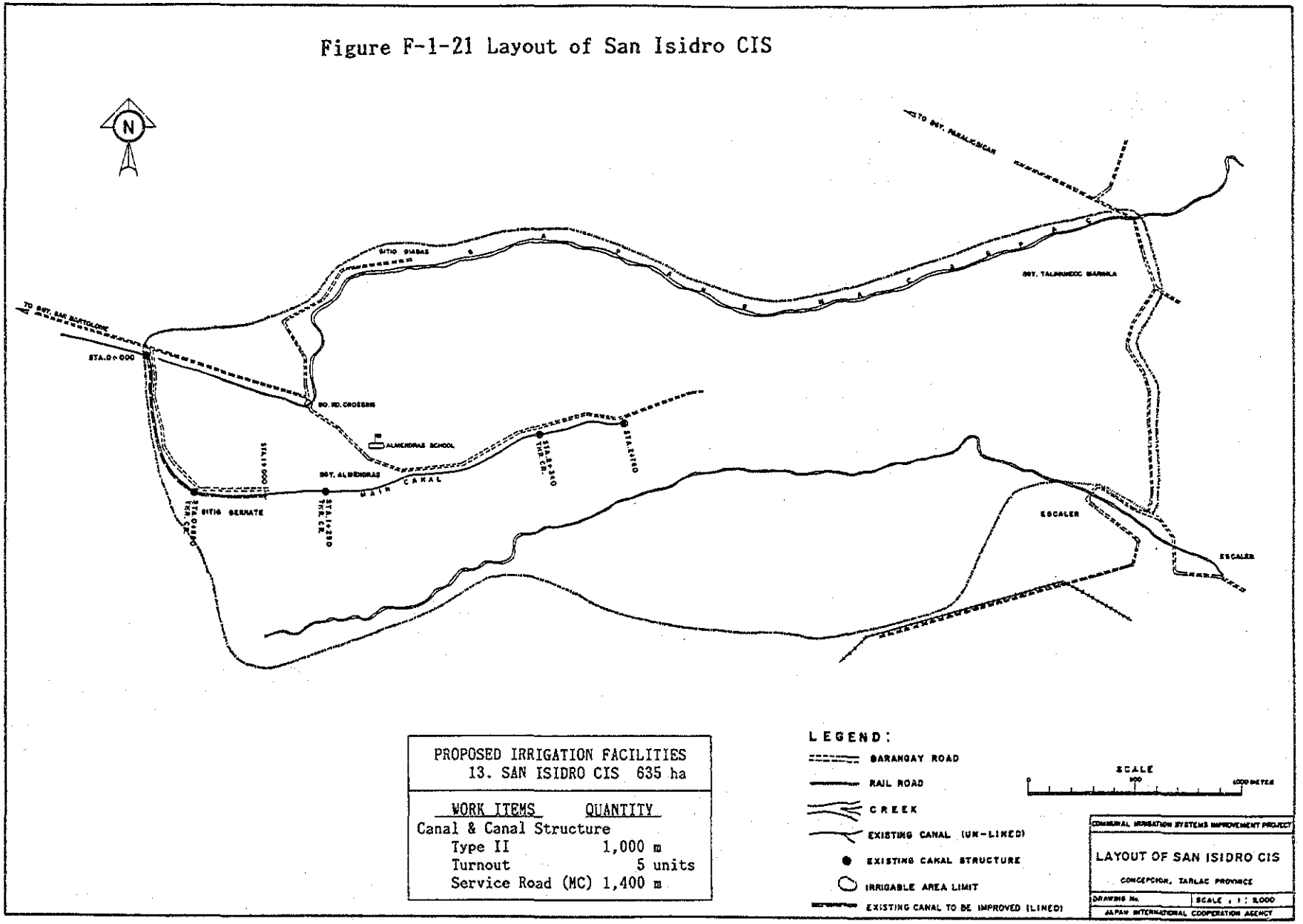


Figure F-1-22 Layout of Lucong CIS

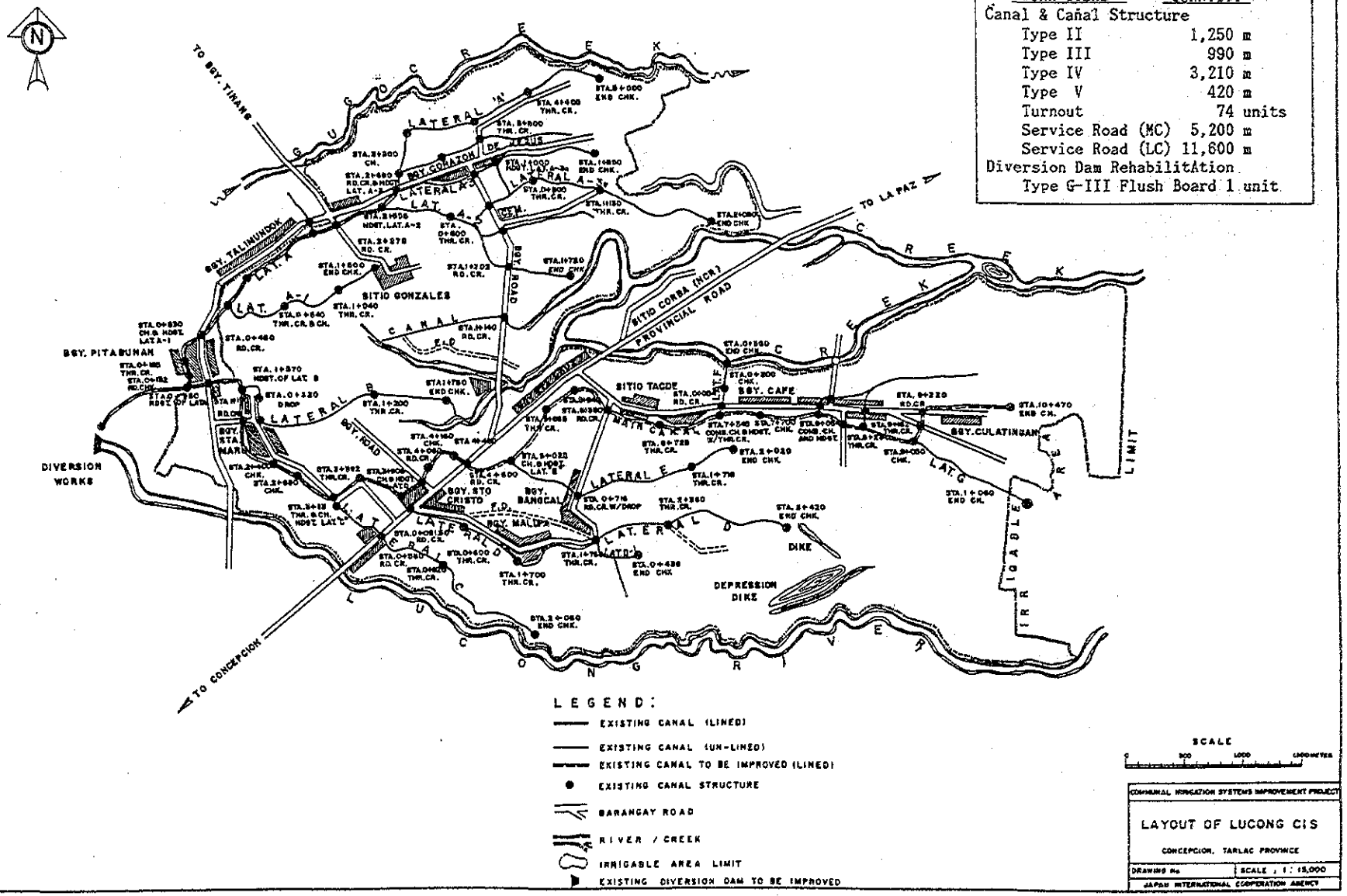


Figure F-1-23 Layout of Magao CIS

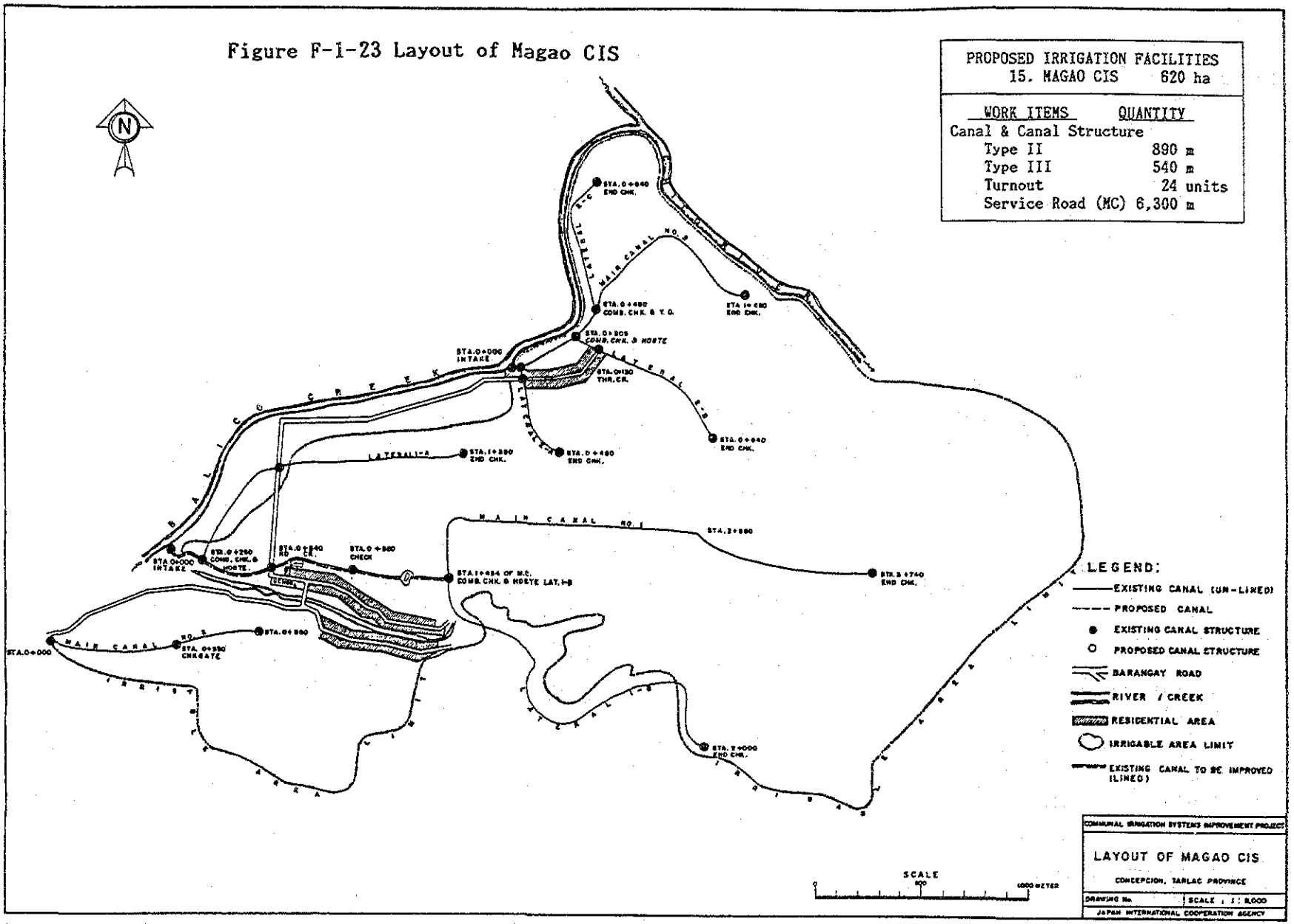
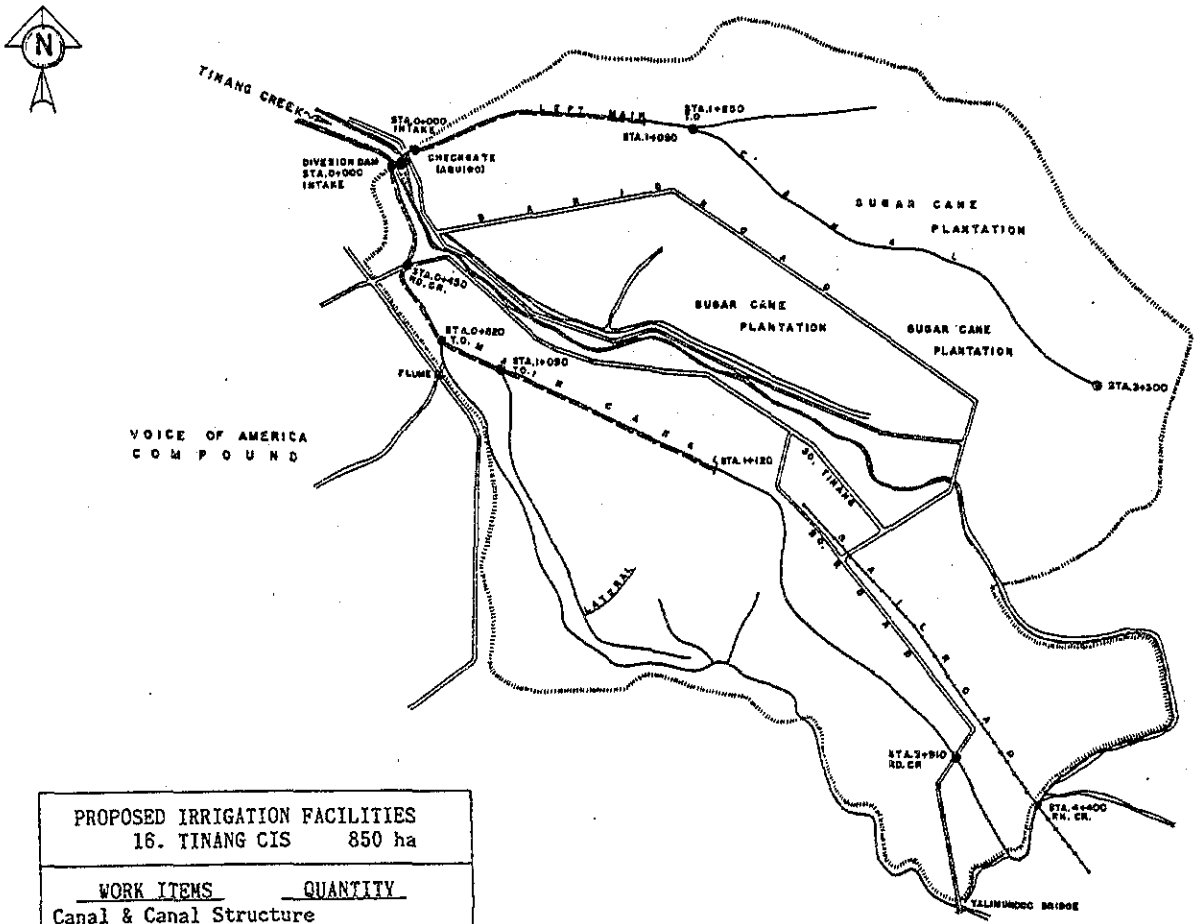


Figure F-1-24 Layout of Tinang CIS



LEGEND:

- EXISTING CANAL (UN-LINED)
- EXISTING CANAL STRUCTURE
- BARANGAY ROAD
- RIVER / CREEK
- IRRIGABLE AREA LIMIT
- DIVERSION DAM TO BE IMPROVED
- EXISTING CANAL TO BE IMPROVED (LINED)

PROPOSED IRRIGATION FACILITIES 16. TINANG CIS 850 ha	
WORK ITEMS	QUANTITY
Canal & Canal Structure	
Type II	3,170 m
Turnout	17 units
Service Road (MC)	3,900 m
Diversion Dam Rehabilitation	
Type G-II	1 unit
Type R-II	1 unit

SCALE
0 500 1000 METER

COMMUNAL IRRIGATION SYSTEMS IMPROVEMENT PROJECT

LAYOUT OF TINANG CIS

CONCEPCION, TARLAC PROVINCE

DRAWING No. | SCALE : 1 : 10,000

JAPAN INTERNATIONAL COOPERATION AGENCY

Figure F-1-25 Layout of Sto. Rosario CIS

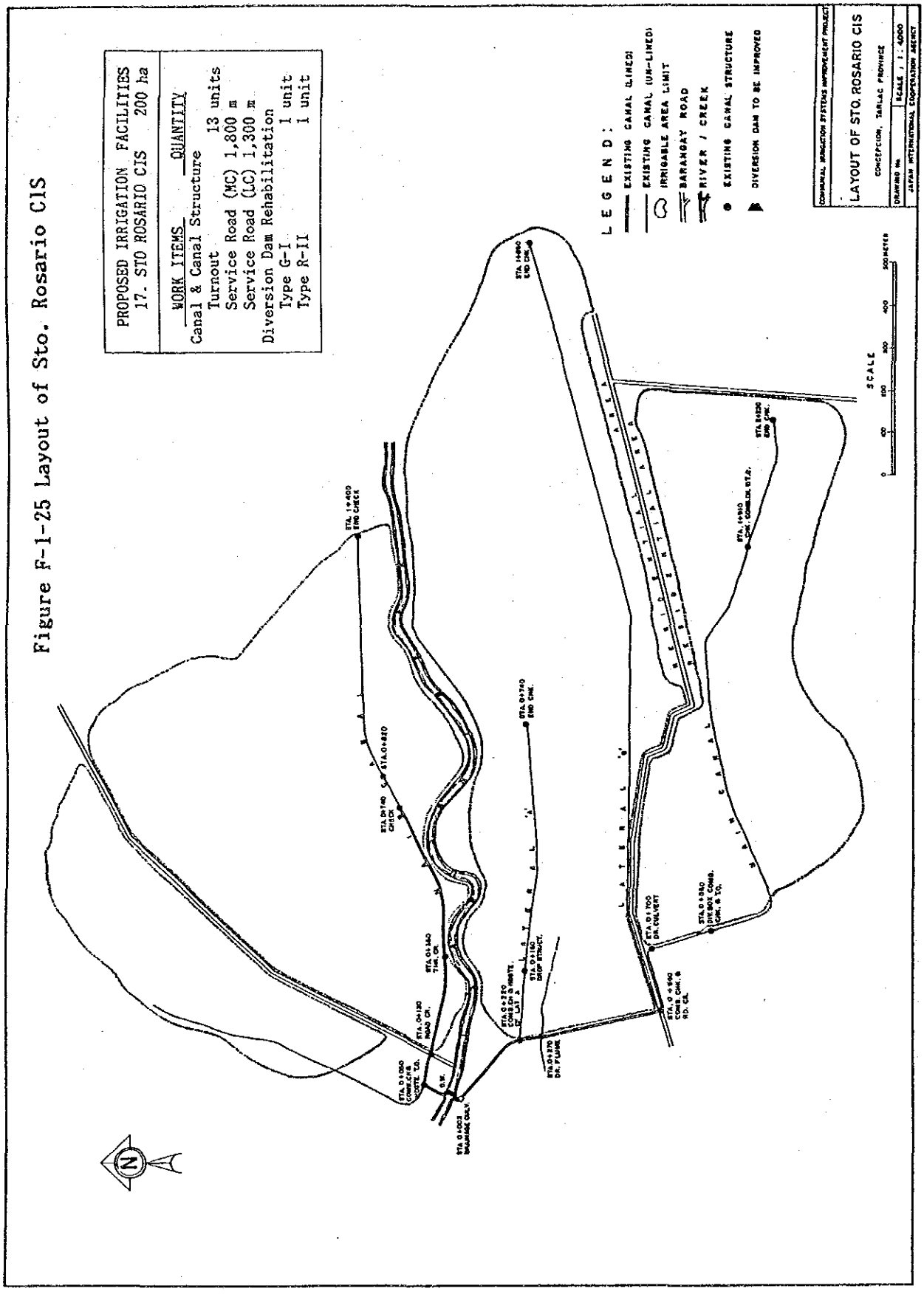


Figure F-1-26 Layout of Sta. Monica CIS

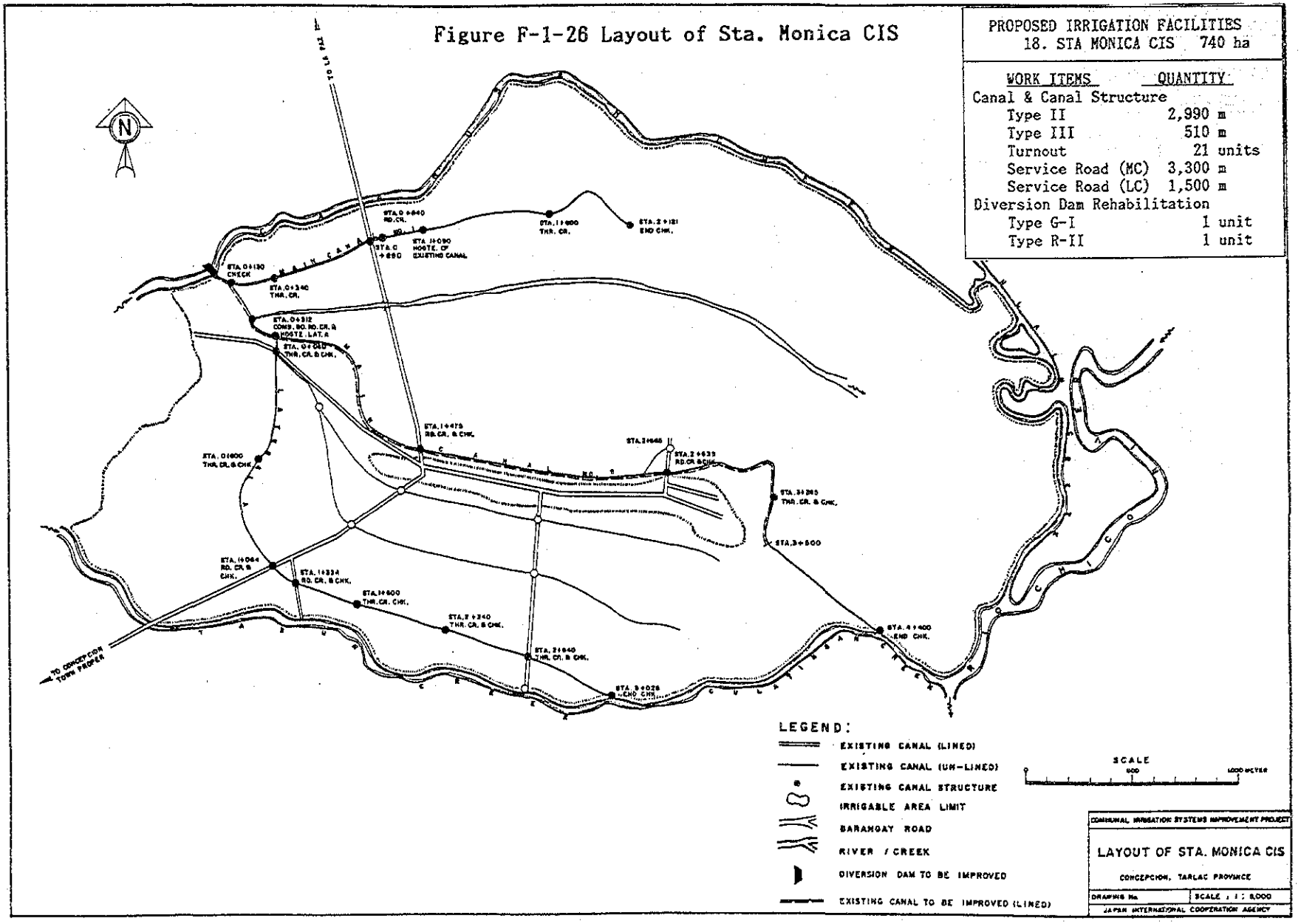
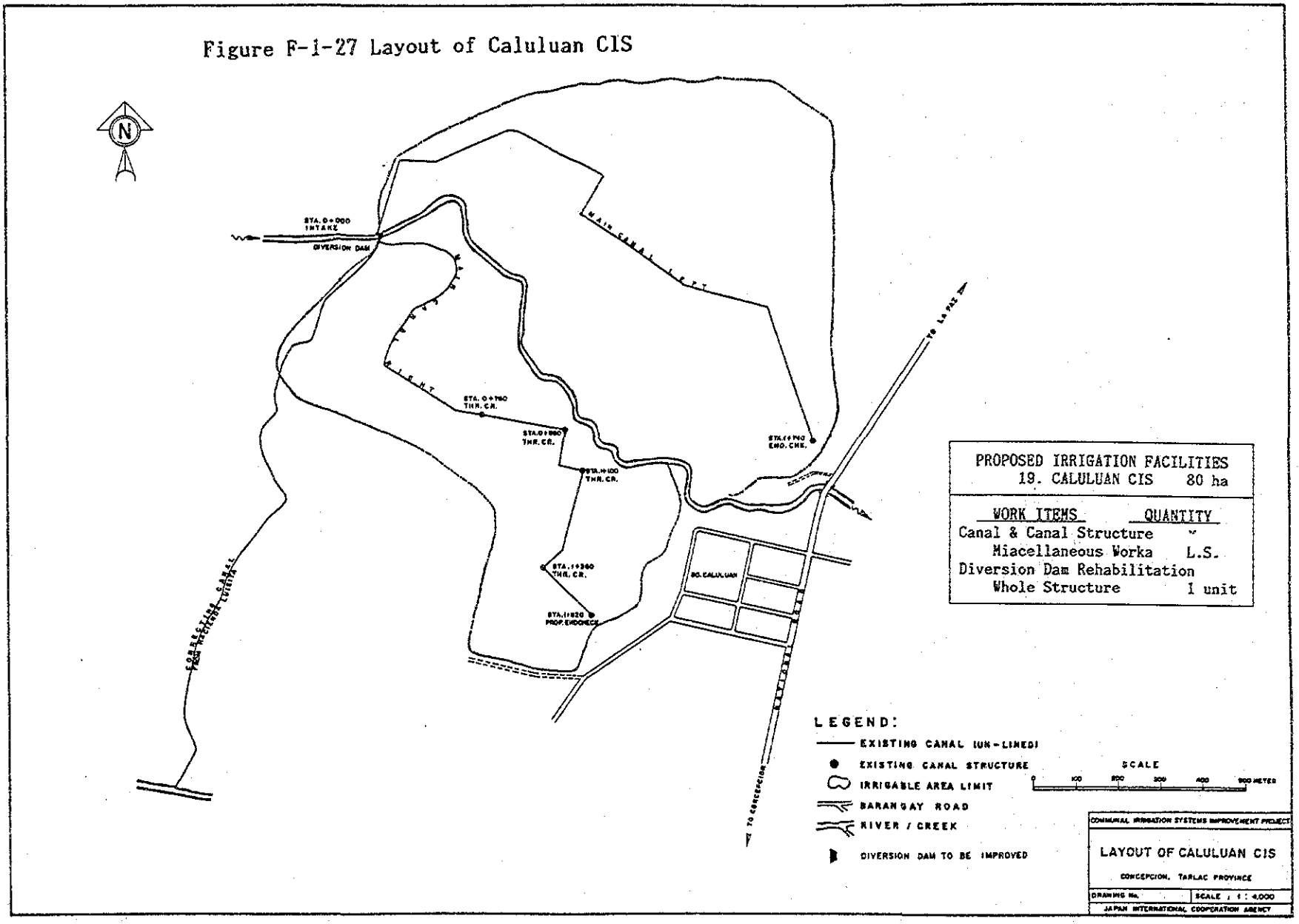
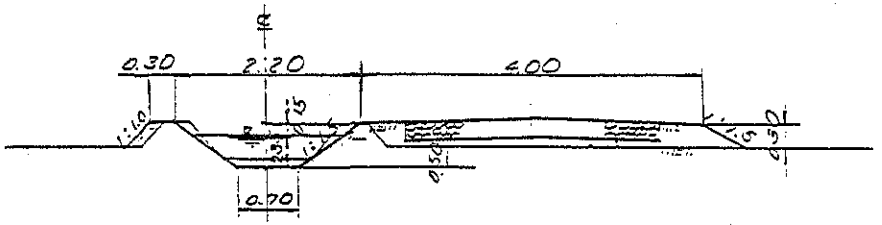
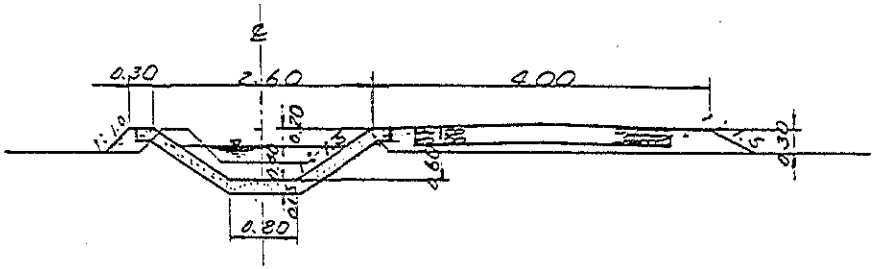


Figure F-1-27 Layout of Caluluan CIS

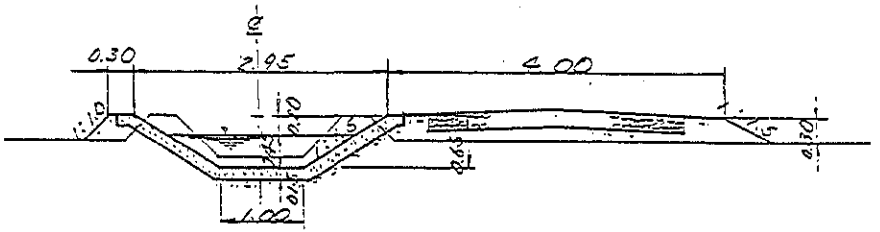




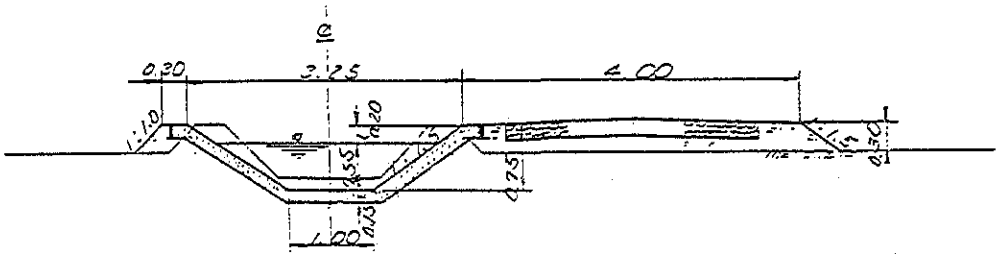
TYPE-I (Q = 0.3 m³ / s)



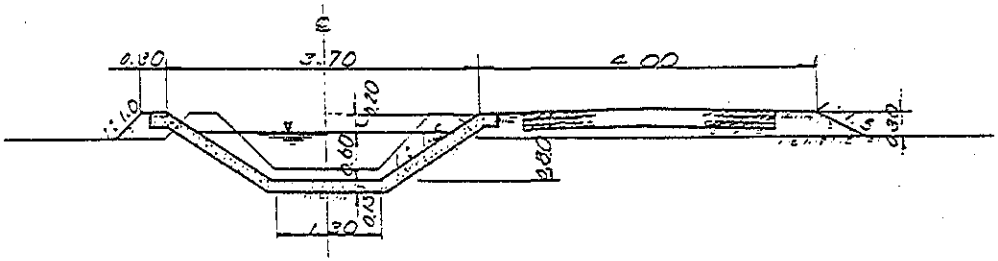
TYPE-II (Q = 0.4 m³ / s)



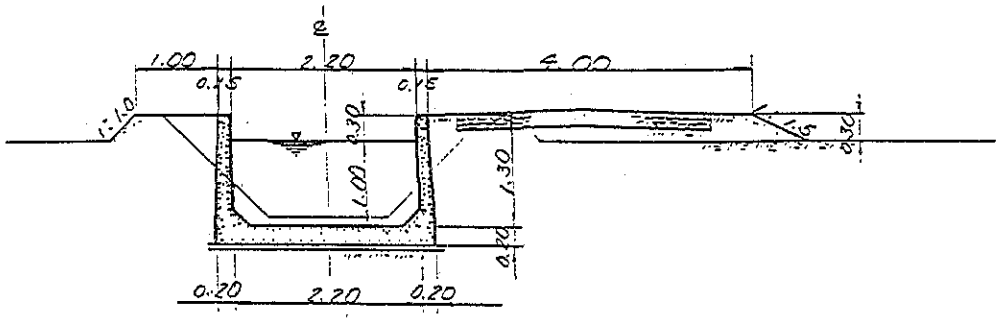
TYPE-III (Q = 0.9 m³ / s)



TYPE-IV (Q = 1.2 m³ / s)



TYPE- V (Q = 2.1 m³ / s)



TYPE-VI (Q = 3.2 m³ / s)

Figure F-1-28 Typical Section of Irrigation Canal

APPENDIX G Rural Infrastructure

G.1 General

G.1.1 Provincial Profile

Tarlac, one of the six provinces in Region III, is situated in the Central Plains of Luzon with a total area of 305,345 has. and a population of 799,356. The province is surrounded by the province of Nueva Ecija in the East, Pangasinan in the North, Zambales in the West and Pampanga in the South.

Tarlac is located deep within the vast granary of the Philippines, almost equidistant to both Manila and Baguio so that it is favorably located at the crossroad of Commerce and Trade. This favorable location is further enhanced by first class highways from all compass points. Fast, de luxe and regular overland motor transportation are available.

The province has 17 towns and 509 barangays connected with vast road network including feeder roads to the barangays and towns.

The province has two state colleges; Tarlac College of Technology at Tarlac, Tarlac, and Tarlac College of Agriculture at Camiling, Tarlac, which offer secondary, technical, vocational, collegiate courses and graduate studies. There are 32 public school districts, 450 primary and elementary schools, 46 barangay high schools and the Tarlac National High School. There are 29 private schools, six of which offer collegiate, secondary, elementary and pre-elementary courses. Literacy rate is 82 %.

For the betterment of health care delivery of the province, medical and health services are provided with 21 hospitals, 28 rural health units, 138 barangay health stations and other health care services.

Communication facilities are the Philippine Long Distance Telephone Company, the Government-Owned Telecommunications, private telegraph companies; print media - Tarlac Monitor, Inquirer, Sunday Mail, and radio network DZTC and DWXT-FM. The local government also maintain the LECS at the provincial Capitol with connections to all municipalities.

Power is provided by Tarelco I covering the northern towns and part of Nueva Ecija; Tarelco II in the south; and Tarlac Electric Company in the capital town. Local water supply is provided by LWUA or DPWH with artesian wells including private jetmatic and hand pumps.

A new 300.70 meters concrete bridge linking the poblacion of Tarlac with barangays San Isidro and Tibag, Tarlac has just been completed, while the Balog-Balog dam construction at western Tarlac is in progress.

Planned and nearing to start construction is the multi-million specialized hospital in Tarlac, Tarlac which will attend to heart, lung, kidney and other patients.

G.1.2 Governmental Organizations Related to Social Infrastructure

Governmental organizations in charge of planning, development and maintenance of social infrastructure are various in national, provincial and municipal level. Those organizations are summarized in Table G-1-1.

Table G-1-1 List of Governmental Organizations

Social Infrastructure	Category	Governmental Organization	Remarks
Roads and Bridges	National	DPWH	National
	Provincial	PPDO	Provincial
	Municipality	MPDO	Municipal
	Barangay	DPWH	National
Transportation		Land Transportation Office	Provincial
		MPDO	Municipal
Power Supply	Northern Part	Tarelco I	Cooperatives
	Tarlac Municipality	Tarlac Enterprises, Inc.	Private
	Southern Part	Tarelco II	Cooperatives
	National	NPC	National
Water Supply	Level I	DPWH	National
	Level II	LWUA	"
	Level III	"	"
Health		Provincial Hospital	Provincial
		District Hospital	Municipal
		MPDO	"
Education		DECS	National
		MPDO	Municipal
Communication	Telephone	PLDT	Private
	Postal Service	Provincial Post Office	Provincial
		MPDO	Municipal
Housing		NHA	National
		MPDO	Municipal
Industry		PPDO	Provincial
		MPDO	Municipal

Note : PPDO --- Provincial Planning and Development Office
MPDO --- Municipal Planning and Develpoment Office

G.1.3 Summarized Profile of Rural Infrastructure

The Profile of rural infrastructure in the study area is summerized in the Table G-1-2 and Figure G-1-1.

In addition, findings on the CIS reconnaisance survey are also summerized in Table G-1-3.

Table G-1-2 Barangay-wise Condition of Rural Infrastructure

NO.	CIS	Barangay	Land Area (ha)	Popul-ation	House-hold	Road			Rural Infrastructure																
						Barangay R'd			Water Supply		Elec.	Transportation			Education			Health		Communication		Housing		
						①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	⑲
1	Bamban	La Paz	215	3,037	471	65	2.7	1.25	67		79	58	3	2	-	-	-	1.3	3	1	0	8	70	22
		San Pedro	1,075	1,799	302	95	2.3	0.21	78		77	25	-	-	35	39	a	1.7	3	0	0	19	44	37
		Culubasa	860	207	31	-	6.0	0.70	40		-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Pacalcal	1,256	1,080	158	-	3.5	0.28	63		57	-	-	-	30	40	a	0.93	-	0	0	-	-	-
		Dela Cruz	174	2,604	369	-	8.0	4.60	51		54	45	8	3	34	29	c	0.38	3	0	0	22	58	20
		Anupul	327	4,403	655	88	9.0	2.75	72		59	215	10	15	30	37	b	0.68	12	3	0	52	22	25
		Banaba	46	5,231	754	92	1.0	2.17	64		74	45	7	37	41	40	c	0.19	8	1	0	60	25	15
		San Roque	97	2,330	362	-	2.5	2.58	65		70	-	-	-	-	-	-	0.34	-	0	0	-	-	-
		San Rafael	103	489	62	-	2.0	1.94	66		43	-	-	-	26	39	a	2.04	-	0	0	-	-	-
			4,153				31.0	0.88																
2	San Pedro	San Pedro	1,075	1,799	302	95	2.3	0.21	78		77	25	-	-	35	39	a	1.67	3	0	0	19	45	36
		Culubasa	860	207	31	-	6.0	0.70	40		-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Pacalcal	1,256	1,080	158	-	3.5	0.28	63		57	-	-	-	30	40	a	0.93	-	0	0	-	-	-
			3,191				11.8	0.37																
3	Malonzo	Malonzo	861	815	200		8.0	0.93	53		-	11	2	-	-	-	-	-	-	0	0	60	18	22
			861				8.0	0.93																
4	Baugou	Baugou	118	211	31	-	2.0	1.75	32	-	-	-	-	-	55	44	a	-	-	0	0	-	-	-
		Dungan	200	650	73	95	9.2	4.60	-		-	24	-	-	29	58	b	1.54	4	0	0	22	32	46
		Culubasa	860	207	31	-	6.0	0.70	40		-	-	-	-	-	-	-	-	-	-	-	-	-	-
		San Francisco	646	8,100	466	60	2.0	0.31			80	130	12	3	40	50	b	0.12	4	50	-	28	29	47
			1,820				19.2	1.93																
5	Susuba Cut-cut	Cut-cut I	709	3,990	682	100	8.0	0.56	75		61	45	10	-	31	29	b	-	4	10	-	29	43	28
		Cut-cut II	650	2,254	332	100	8.3	0.66	72		94	4	-	-	31	29	b	-	-	-	-	10	30	60
		Pacalcal	1,256	1,080	158	-	3.5	0.28	63		57	-	-	-	30	40	a	0.93	-	0	0	-	-	-
			2,615				11.8	0.45																
6	Telebanca	Telebanca	285	2,181	510	100	15.4	5.40	50		59	57	5	0	47	47	b	0.86	4	0	0	59	9	32
			285				15.4	5.40																
7	Sta. Rita	Sta. Rita	392	6,000	690	70	3.6	0.92	68		79	145	25	12	35	33	-	0.16	4	8	0	62	15	23
			392					0.92																
8	Marita	Sta. Rita	392	6,000	690	70	3.5	0.92	68		79	145	25	12	35	33	-	0.16	4	8	0	62	15	23
		San Martin	400	1,060	163	100	4.7	1.18	85		52	36	1	-	25	29	-	0.0	4	0	0	37	32	31
			792				8.3	1.05																
9	San Martin	San Martin	400	1,060	163	100	4.7	1.18	65		52	36	1	-	25	29	-	0.0	4	0	0	37	32	31
			400				4.7	1.18																
10	Baluto	Baluto	778	4,260	710	-	9.8	1.26	-		0	-	-	-	42	38	b	-	-	0	0	-	-	-
		Calluis Gueco	250	849	130	100	2.5	1.0	90	×	-	7	4	1	37	55	-	0	1	0	0	30	30	40
		San Antonio	360	2,525	520	100	5.2	1.44	60	×	66	15	5	2	47	46	b	0.40	4	0	0	10	5	85
			1,388				17.5	1.26																
11	Magao	Magao	1,030	1,320	220	100	8.3	0.81	60		0	8	7	-	43	48	b	0	4	0	0	10	17	73
			1,030				8.3	0.81																
12	San Bartolome	San Bartolome	402	1,080	207	100	3.0	0.75	70		57	9	-	1	28	31	-	-	-	0	0	30	30	50
			402				3.0	0.75																
13	San Isidro	San Isidro	556	2,246	600	-	8.5	1.53	-		-	-	-	-	35	32	b	-	-	-	-	-	-	-
			556				8.5	1.53																
14	Lucong	Sta. Maria	305	900	70	100	4.5	1.48	70	×	53	214	3	-	29	29	b	-	-	0	0	40	29	31
		Pitabunan	305	1,130	231	100	4.3	1.41	60	-	51	33	2	-	35	32	c	0.88	4	0	0	25	13	62
		Sto. Cristo	150	836	137	-	2.0	1.33	-	-	92	-	-	-	33	33	c	-	-	0	0	-	-	-
		Malupa	320	1,190	202	100	3.6	0.94	70		67	81	3	-	35	42	b	0.84	8	0	0	46	7	47
		Corazon de Jesu	600	1,276	231	100	7.0	1.17	66		97	30	4	-	-	-	-	0.78	4	0	0	25	12	63
		Sta. Cruz	610	3,491	57	-	2.3	0.38	60		70	55	10	-	47	34	c	-	-	0	0	43	43	14
		Cafe	700	2,587	390	100	6.6	0.94	80		-	70	5	-	-	-	b	0.0	4	0	0	20	55	25
		Culatingan	800	2,651	315	100	6.7	0.88	85		0	87	3	2	93	46	c	0.0	8	0	0	44	44	12
		San Miguel	350	1,639	264	100	9.5	2.71	90		63	67	2	-	-	61	b	0.61	4	0	0	60	30	10
			8,140				85.9	1.11																
15	Cilibangan	Cilibangan	300	647	115	-	1.6	0.53	-		0	-	-	-	27	40	a	-	-	0	0	-	-	-
			300				1.6	0.53																
16	Tinang	Tinang	919	2,780	530	70	9.3	1.01	88		85	30	12	25	60	39	b	0.35	4	0	0	48	22	30
			919				9.3	1.01																
17	Sta. Monica	Sta. Monica	1,025	4,090	625	75	10.3	1.00	87	×	79	135	4	1	55	40	b	0.0	1	0	0	4	79	18
			1,025					1.00																
18	Sto. Rosario	Sto. Rosario	200	1,246	157	65	4.3	2.13	90		50	-	-	-	-	-	a	-	4	0	0	51	10	39
		Pacalung	200	1,120	157	100	3.7	1.85	85		93	52	4	-	-	-	c	0.0	1	0	0	6	73	16
		Corazon de Jesu	600	1,276	231	100	7.0	1.17	80		67	81	3	-	35	42	b	0.78	8	0	0	46	7	47
			1,000				15.0	1.50																
19	Coluluan	Coluluan	250	3,199	457	75	2.5	1.00	85		80	70	15	3	-	-	b	0.31	1	0	0	15	21	64
		Parufong	200	1,120	157	100	3.7	1.85	43		43	52	4	-	-	-	c	0.0	1	0	0	6	78	16
			450				6.2	1.38																

Note: ① *Unpaved Length (%)*
② Total Length (m)
③ Road Density (Km/ Km²)
④ Service Ratio (Individual Well)
⑤ Water Quality
⑥ Coverage (%)
⑦ Number of Motorcycle, Trycycle
⑧ *Number of Jeepney*
⑨ Number of Sedan, Truck
⑩ Classroom-Student Ratio
⑪ Teacher-Student Ratio
⑫ Condition of School Building
⑬ Rate of Rural Health Unit (per 1,000)
⑭ Times of Medical Person Visited a Month
⑮ Number of Telephone
⑯ Number of Postal Service
⑰ Concrete Built House Ratio (%)
⑱ *Wooden Built House Ratio (%)*
⑲ Nippa Built House Ratio (%)

Table G-1-3 (1) Findings on CISs Reconnaisance Survey (1/2)

CIS	(1) Bamban	(2) San Pedro	(3) Malonzo	(4) Bangcu	(5) Susuba (Cut-Cut)
Barangay	Sto. Nino	San Pedro	Malonso	Bangcu	Susuba
Interviewed	CIS President	Barangay Captain	Farmer	Barangay Captain	Barangay Captain
Road	Concrete in barangay proper Gravel in farm	Gravel in both barangay proper and farm	Gravel in both barangay proper and farm Takes 30 min. to farms	Gravel in both barangay proper and farm	Gravel in both barangay proper and farm National road
Transportation	Tricycle Jeepney	Tricycle Jeepney	Tricycle Jeepney Weapon truck	Tricycle Hand tractor	Tricycle Jeepney
Communication	No telephone No post	No telephone No post	No telephone No post	No telephone No post	No telephone No post
Electricity	Mostly electrified	Mostly electrified	No electricity Battery is used for lightening, TV	Mostly electrified	Some are not electrified
Water Supply	Individual shallow well with manual or jetmatic pump	Individual shallow well with manual pump 20 feet deep	Shallow well with manual pump	Shallow well with manual pump	Shallow well with manual pump 20 feet deep
Education	1 elementary school	1 elementary school 10 classrooms 10 teachers	An elementary school was abandoned due to flood	No school	1 elementary school 1 primary
Health	Health station A midwife is stationed	Health station A midwife is stationed	The health station was abandoned due to flood	No health station	No health station Midwife once a week
Housing	Concrete block Wooden Some are bamboo made	Concrete block Wooden Some are bamboo made	Mostly bamboo made	Concrete block Wooden Bamboo	Concrete block Bamboo
Recreational Area	School yard	School yard	None	None	Basketball court
Inconvenience	(1) Barangay Road (2) Secondary School	(1) Barangay Road (2) Secondary School	(1) Barangay Road (2) Electricity (3) School	(1) Barangay Road	(1) Barangay Road (2) Barangay Hall

CIS	(6) Telebanca	(7) Sta. Rita | (8) Marita	(9) San Martin	(10) Baluto
Barangay	Telebanca	Santa Rita	San Martin	Baluto
Interviewed	Barangay Captain	Barangay Captain	CIS President	Farmer
Road	Gravel in both barangay and farm	Gravel in both barangay and farm Provincial road is under construction	Gravel in both barangay proper and farm	Gravel in both barangay proper and farm
Transportation	Tricycle Jeepney	Tricycle Jeepney Weapon truck	Tricycle 30 min. to municipality	Jeepney Weapon truck
Communication	No telephone No post	No telephone No post	No telephone No post	No telephone No post
Electricity	Mostly electrified	Mostly electrified LPG, Wood for cooking	Mostly electrified	Mostly electrified (cut once a month)
Water Supply	Shallow well with manual pump	Concepcion Water District Shallow with manual pump	Shallow well with manual or jetmatic pump	Shallow well with manual pump Water contains some iron
Education	2 elementary schools	1 elementary school 21 teachers; 800 pupils	1 elementary school 8 teachers; 320 pupils	1 elementary school
Health	No health station Doctor; thrice a week	Health station with midwife Doctor; twice a month	Health station Midwife; once a week Doctor; once a month	Health station Midwife; twice a week
Housing	Wooden Bamboo	Mostly concrete block	Concrete block Wooden	Concrete block Wooden
Recreational Area	School yard	None	School yard	None
Inconvenience	(1) Barangay Road (2) Health Center	(1) Playground (2) Health Center	(1) Road (2) Health center	(1) Barangay Road (2) Health Center

Table G-1-3 (2) Findings on CISs Reconnaisance Survey (2/2)

CIS	(11) Magao	(12) San Bartolome	(13) San Isidro	(14) Lucong	(15) Lilibangan
Barangay	Magao	San Bartolome	San Isidro	Santa Cruz	Lilibangan
Interviewed	CIS President	Barangay Captain	Barangay Council	CIS Board Member	Barangay Captain
Road	Gravel in both barangay and farm	Gravel in both barangay and farm	Gravel in both barangay and farm Flooded in rainy season	Concrete in barangay Provincial road is under construction	Gravel in barangay proper
Transportation	Tricycle Jeepney 45 min. to municipality	Jeepney Weapon truck One hour to municipality	Jeepney Weapon truck	Tricycle Jeepney 15 min. to farm	Tricycle Jeepney 20-30 min. to municipality
Communication	No telephone No post	No telephone No post	No telephone No post	No telephone No post	No telephone No post
Electricity	Not electrified Battery is used	Mostly electrified	Mostly electrified Interrupted by rain	Mostly electrified	Not electrified Battery is used
Water Supply	Shallow well with manual pump	Shallow well with manual pump	Shallow well with manual pump	Shallow well with manual pump	Shallow well with manual pump Water is sometimes rusty
Education	Elementary school 14 teachers; 500 pupils	1 elementary school 7 teachers; 250 pupils	Elementary school 12 teachers; 400 pupils	Elementary school 15 teachers; 500 pupils	1 elementary school 3 teachers; 60 pupils
Health	Health station Midwife; once a week	Health station Midwife; once a week	Health station Midwife; once a week	Health station Midwife is stationed	Health center Midwife; once a week Doctor; once a week
Housing	Concrete block Bamboo	Concrete block Wooden	Concrete block Wooden	Concrete block Wooden	Concrete block Bamboo
Recreational Area	None	None	Basketball court	School yard	None
Inconvenience	(1) Barangay Road (2) Electricity	(1) Barangay Road (2) Bridge	(1) Barangay Road (2) School	(1) Barangay Road	(1) Barangay Road (2) School

CIS	(16) Tinang	(17) Sto. Rosario	(18) Sta. Monica	(19) Caluluan
Barangay	Tinang	Magunting	Sta. Monica	Caluluan
Interviewed	Barangay Council	Barangay Captain	Barangay Captain	Barangay Council
Road	Gravel in barangay proper	Gravel in barangay proper	Barangay proper is under construction	Barangay proper is under construction
Transportation	Tricycle	Tricycle Jeepney	Tricycle 15 min. to municipality	Tricycle Jeepney
Communication	No telephone No post	No telephone No post	No telephone No post	No telephone No post
Electricity	Mostly electrified Voltage is low every night	Mostly electrified	Mostly electrified	Mostly electrified
Water Supply	Shallow well with manual pump Rusty; small worms	Shallow well with manual or jetmatic pump 40 feet deep	Shallow well with pump or jetmatic	Shallow well with manual and jetmatic pump
Education	Elementary school 12 teachers; 400 pupils	1 elementary school 7 teachers	Elementary school 22 teachers; 700 pupils	Elementary school High school
Health	Temporary health station Midwife; once a week	Health station Midwife; once a week	Health station Doctor; once a month	Health station Midwife is stationed
Housing	Concrete block Wooden Bamboo	Concrete block Wooden Bamboo	Concrete block Wooden Bamboo	Concrete block Wooden Bamboo
Recreational Area	None	School yard	School yard	None
Inconvenience	(1) Barangay Road (2) School	(1) Barangay Road (2) School	(1) Water supply system (2) Secondary school	(1) Water supply

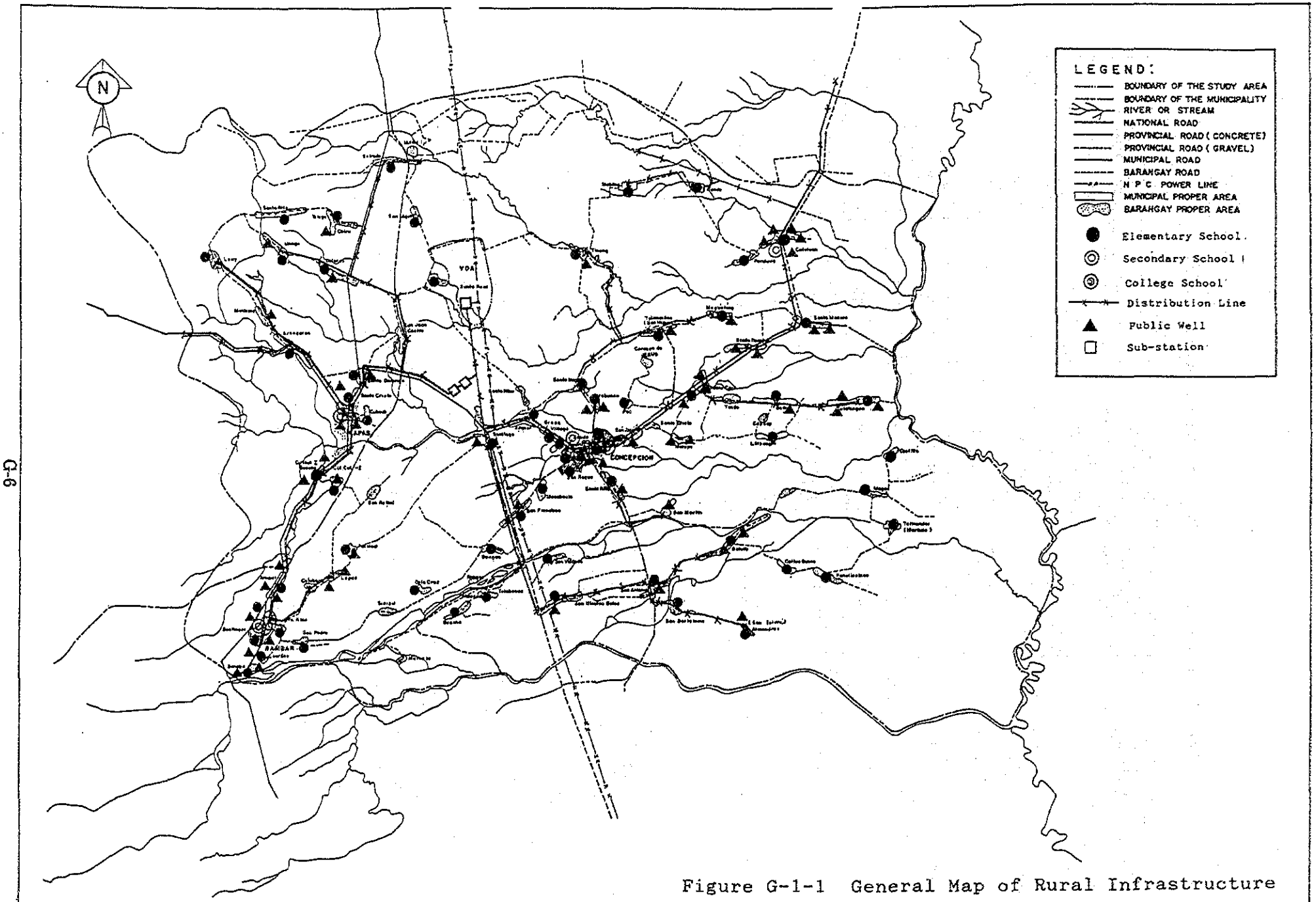


Figure G-1-1 General Map of Rural Infrastructure

G.2 Rural Road

Table G-2-1 Existing Road Length by Pavement as of 1989

Unit : km.

Typeof Road	TOTAL PAVEMENT				
	Length	Concrete	Asphalt	Gravel	Ecxth
1. National Road	210.944km.	97.358km.	83.312km.	30.724km.	
2. Provincial Road	552.190km.	90.713km.	134.765km.	300.386km.	26.326km.
3. Municipal Road	110.460km.	17.023km.	48.464km.	44.973km.	
4. Barangay Road	2,742.114km.	9.223km.	44.124km.	2,688.767km.	
Total	3,615.708km.	214.317km.	310.665km.	3,064.400km.	26.326

Table G-2-2 Length of Existing Bridges by Construction Type

CATEGORY	CONCRETE	STEEL	BAILEY	TIMBER	OTHERS	TOTAL
1. National	1,808.00	69.000	-	-	-	1,877.000L.M.
2. Provincial	1,232.75	-	-	70.000	-	1,302.850L.M.
3. Municipal	-	-	-	-	-	-
4. Barangay	135.500	-	93.000	234.500	-	463.000L.M.
Total	3,176.250	69.000	93.000	304.500		4,642.850L.M.

Table G-2-3 Existing Road Length by Construction Materials (Unit: m)

Note : As of 1989
Sources : DPWH, PEO, MPDO

Road Type	Total Length	Pavement			
		Concrete	Asphalt	Gravel	Earth
A. National					
. Capas	11,000	2,900	8,000	100	-
. Bamban	5,050	-	5,050	-	-
. Concepcion	-	-	-	-	-
B. Provincial					
. Capas	19,465	6,348	9,176	3,941	-
. Bamban	16,022	-	3,979	12,043	-
. Concepcion	55,669	15,371	1,218	39,080	-
C. Municipal					
. Capas	40,646	-	32,646	8,000	-
. Bamban	14,265	500	1,500	4,500	7,765
. Concepcion	19,000	14,000	-	3,000	2,000
D. Barangay					
. Capas	155,080	-	-	70,006	85,074
. Bamban	130,160	750	300	31,660	97,450
. Concepcion	258,213	3,000	25,000	191,213	39,000

Table G-2-4 Road Density

Municipality	Total Road Length (a) (km.)	Total Land Area (b) (sq. km.)	Population (c)	Road Density (a)/(b)	(a)/(c)
. Capas	226.191	440.000	46,523	0.514	4.862
. Bamban	165.353	133.100	33,000	1.242	5.011
. Concepcion	332.882	245.700	110,946	1.355	3.000

Source : DPWH

Figure G-2-1 Typical Cross Section of Provincial Road

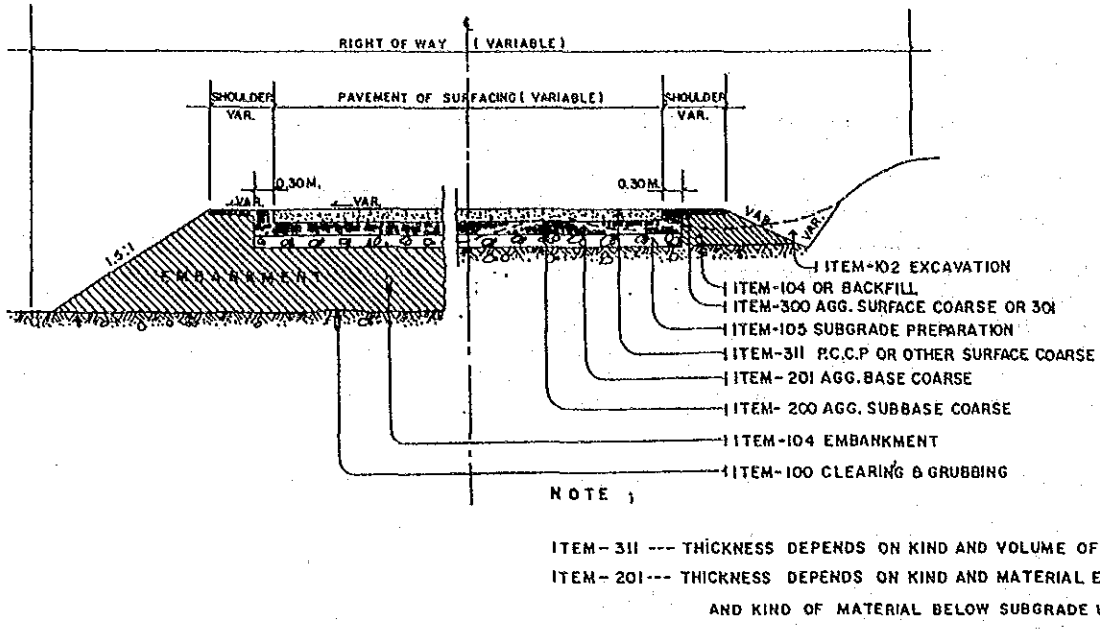
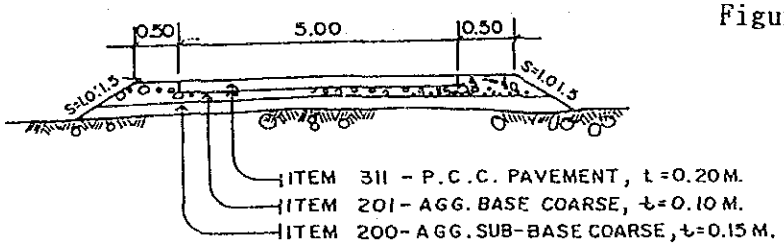


Figure G-2-2 Typical Cross Section of Barangay Road (1)

CONCRETING



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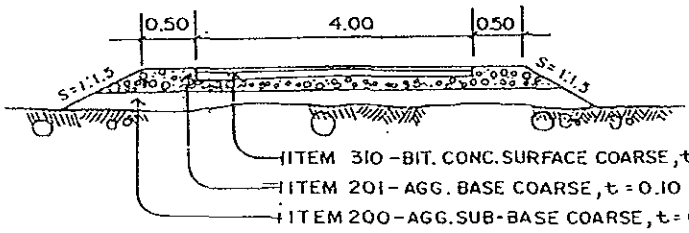
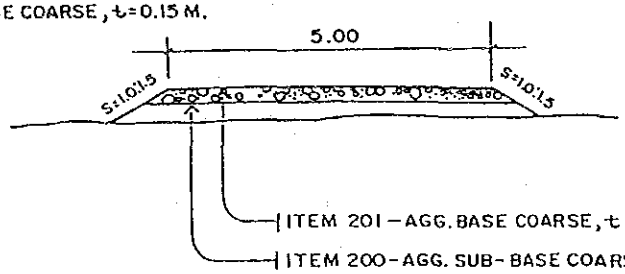


Figure G-2-3 Typical Cross Section of Barangay Road (2)

GRAVELLING I.I



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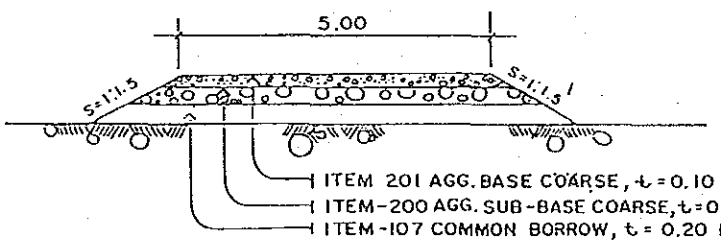


Table G-2-5 Barangay Road Status (Bamban)

No.	Road	Barangay	Length (km)	Status	Remarks
Ba-1	Banaba-Malonzo	Malonzo	4.00	1	0.143 km-concreted
2	Malonzo	"	4.00	4	
3	Pinandaguilan	De la Cruz	7.00	4	
4	Sitio Masulib	"	1.00	5	
5	Road 2	"	1.00	5	
6	" 3	"	0.30	5	
7	" 5	"	0.40	5	
8	Road 1	San Roque	1.50	4	
9	" 2	"	1.00	4	
10	Road 1	Pacalcal	0.50	4	
11	" 2	"	1.00	1	0.143 km-concreted
12	" 3	"	2.00	4	
13	Road 1	San Pedro	0.40	3	
14	" 2	"	0.40	4	
15	" 3	"	0.60	4	
16	" 4	"	0.30	4	
17	" 5	"	0.60	4	
18	Anupul-Malibutlibut I	Anupul	6.00	5	
19	Old Anupul	"	1.00	1	0.173 km-concreted
20	Malibutlibut II	"	1.00	5	
21	Buelo Rd.	"	1.00	4	
22	Sitio Masulib Rd.	Bangcu	1.00	5	
23	Sitio Luyus Rd.	"	1.00	5	
24	Banaba Rd.	Banaba	1.00	4	
25	Main Culubasa	Culubasa	4.00	1	0.143 km-concreted
26	Quematen-Daanlag	"	2.00	5	
27	Road 1	La Paz	0.30	4	
28	" 2	"	0.30	4	
29	" 4	"	0.40	4	
30	Road 1	San Rafael	2.00	1	0.50 km-concreted

Table G-2-6 Barabgay Road Status (Capas)

No.	Road	Barangay	Length (km)	Status	Remarks
Ca-1	Brgy. Rd.	Cut-cut I	1.00	1	
2	Fdr. Rd. I	"	1.00	4	
3	Fdr. Rd. II	"	1.00	4	
4	Fdr. Rd. III	"	1.00	4	
5	Susuba Rd.	Cut-cut II	0.60	4	
6	Liglasan St.	"	0.40	1	
7	Sta. Lucia St.	"	0.16	1	
8	Brgy. Matadero	Sto. Domingo	0.11	1	
9	Road 1	"	1.00	4	
10	" 2	"	0.30	4	
11	" 4	"	0.35	4	
12	Dulong St.	Lawy	0.30	1	
13	San Felipe St.	"	0.30	4	
14	Abagatan St.	"	0.30	3	
15	Yalung St.	"	0.30	3	
16	Guzman St.	"	0.30	4	
17	Marcos St.	"	0.30	4	
18	Farm to Market Rd.	"	1.00	4	
19	Road 4	"	0.50	3	
20	Feeder Rd.	Maniago	0.80	3	
21	Estrada-Sta. Rita	Estrada	3.00	3	
22	Farm to Market Rd.	"	0.60	4	
23	Brgy. Rd. 1	Dolores	3.00	4	
24	" " 2	"	0.05	4	
25	Brgy. Rd. 1	Sta. Rita	1.00	3	
26	" " 5	"	1.00	2	
27	Farm to Market Rd.	"	1.50	4	
28	Road 1	"	1.00	3	
29	Talaga-Sta. Rita	"	0.50	1	

Note: (Status)
1 - Concreting completed
2 - Concreting on-going
3 - Concreting planned (Plan up to 1998)
4 - Nothing done
5 - Very bad condition

Table G-2-7 (1) Barangay Road Status (Concepcion)

No.	Road	Barangay	Length (km)	Status	Remarks
Co-1	Road 1	Tinang	1.50	6	
2	" 2	"	3.00	6	
3	" 3	"	0.30	6	
4	" 4	"	2.00	6	
5	Tinang to UDA Road	"	1.50	5	
6	Taliaundoc-Tinang Road	"	1.00	5	
7	Parulong Road	Parulong	1.00	3	
8	Parulong Street	"	3.00	2	
9	Pando-Parulong Rd.	"	2.00	4	
10	Parulong Rd. I	"	0.15	3	
11	" II	"	0.25	3	
12	" III	"	0.30	3	
13	Maligaya Road	Caluluan	1.50	6	
14	Alitap-tap Rd.	"	0.30	2	
15	Maningning "	"	0.15	4	
16	Kayuanngi "	"	0.25	2	
17	Kapayapan "	"	0.30	4	
18	Culatingan-Sta. Monica	Sta. Monica	1.30	5	
19	Tabun Rd.	"	2.00	6	
20	Feeder Road	"	2.00	5	
21	Road 1	"	1.43	6	
22	" 2	"	0.20	6	
23	" 3	"	4.00	1	
24	Borja St.	"	0.65	6	
25	Tumana Rd.	Corazon de Jesus	0.50	3	
26	Pao Rd.	"	0.80	1	150 m. concreted
27	Taliaundoc Rd.	"	2.00	6	
28	Lourdes Rd.	"	1.00	6	
29	Pasajes Rd.	"	1.00	4	
30	Pando-Corazon de Jesus Rd.	"	1.00	5	
31	Road 1	Pando	0.25	6	
32	" 2	"	0.24	6	
33	" 3	"	0.26	6	
34	" 4	"	0.25	5	
35	" 5	"	0.36	6	
36	" 6	"	0.25	2	112 m. concreted
37	" 7	"	0.45	5	
38	Pando-Mabilog Rd.	"	1.50	6	
39	Brgy. Rd. 1	Mabilog	0.25	6	
40	" " 2	"	0.25	6	
41	" " 3	"	0.30	6	
42	" " 4	"	0.26	6	
43	" " 5	"	0.27	6	
44	" " 6	"	0.20	6	
45	" " 7	"	0.32	6	
46	Brgy. Rd. 1	Perang	0.25	4	
47	" " 8	"	0.93	4	
48	" " 7	"	1.00	6	
49	" " 4	"	0.59	4	
50	" " 5	"	0.25	4	
51	" " 6	"	0.25	4	
52	Pleridel Rd.	Sta. Maria	2.00	6	
53	Brgy. Rd. 1	"	0.68	6	
54	" " 2	"	0.81	6	
55	" " 3	"	0.81	6	
56	" " 4	"	0.89	6	
57	" " 5	"	0.89	6	
58	San Jose-Sta. Maria Rd.	"	1.00	6	
59	Road 1	Pitabunan	1.50	6	
60	" 2	"	0.50	6	
61	" 3	"	0.50	6	
62	" 4	"	0.50	6	
63	" 5	"	1.00	6	
64	" 6	"	0.15	6	
65	" 7	"	0.15	6	

Table G-2-7 (2) Barangay Road Status (Concepcion)

No.	Road	Barangay	Length (km)	Status	Remarks
66	Sto. Rosario Rd.	Sto. Rosario	2.34	3	
67	Road 1	"	0.92	1	
68	" 2	"	1.00	6	
69	Taliaundoc Rd.	Taliaundoc	2.00	3	
70	Brgy. Rd.	"	2.00	6	
71	" " 2	"	2.50	6	
72	" " 3	"	1.50	6	
73	Sitio Gonzales Rd.	"	1.50	6	
74	Rd.II-Taliaundoc-Mariala	"	0.20	5	
75	Pao Road	Pao	0.70	1	
76	Tacde Road	Sta. Cruz	1.50	1	
77	Calle Cobra	"	0.50	6	
78	Sta. Cruz-Brgy. Rd.	"	0.30	6	
79	Road 1	Sta. Rosa	0.40	5	
80	" 4	"	1.10	5	
81	" 6	"	1.20	6	
82	" 7	"	1.00	6	
83	Hermosa Rd.	Cafe	1.00	6	
84	Fare Rd.	"	1.00	6	
85	Cafe-Culatingan	Culatingan	2.00	3	
86	Road 1	"	0.72	6	
87	" 2	"	0.50	5	
88	Culatingan-San Jose	"	1.50	5	
89	Plaridel	Magao	2.00	5	
90	Brgy. Rd. 2	"	0.81	6	
91	" " 3	"	0.81	6	
92	Magao Rd.	"	1.50	6	
93	Magao-Balutu	"	0.10	5	
94	Sitio Capcap	"	0.90	5	
95	Magao-Castillo	"	4.01	5	
96	Magao-Baluto	"	0.90	5	
97	Main Sta. Rita Rd.	Sta. Rita	2.35	1	
98	Brgy. Rd. 1	"	0.42	5	
99	" " 2	"	0.12	5	
100	" " 3	"	0.25	5	
101	" " 4	"	0.50	5	
102	Rosal St.	Castillo	0.15	5	
103	Rosal St. II	"	0.30	5	
104	Sampaguita St. I	"	0.30	5	
105	" " II	"	0.20	5	
106	" " III	"	0.20	5	
107	Gumamela St. I	"	0.55	5	
108	" " II	"	0.20	5	
109	Brgy. Road I	"	0.30	5	
110	" " II	"	0.18	5	
111	Gomez St.	"	0.95	5	
112	Road 1	San Martin	0.90	1/6	
113	" 2	"	0.15	5	
114	" 3	"	0.15	5	
115	" 4	"	0.05	5	
116	" 5	"	0.15	5	
117	" 6	"	0.18	5	
118	" 7	"	1.15	5	
119	" 8	"	0.80	5	
120	Fdr. Rd. 1	"	1.15	5	
121	Brgy. Rd. 1	Lilibangan	1.05	5	
122	" " 2	"	0.50	5	
123	San Francisco-Cobra Rd.	San Francisco	0.70	1	
124	Main Road	San Vicente	2.00	1	
125	Brgy. Rd. 1	"	0.30	6	
126	" " 2	"	0.30	6	
127	" " 3	"	0.20	6	
128	Baluto Rd.	Ratuto	3.40	5	
129	Dague	"	2.40	5	
130	Calius	"	1.75	5	
131	Castillo	"	2.00	5	
132	Lilibangan Rd.	"	1.00	5	
133	Taliaundoc-Mariala Rd.	Mariala	1.11	5	
134	Sitio Mapacu Rd.	"	0.90	5	
135	Brgy. Rd. 1	"	0.75	5	
136	Barangay Road	Panalicsican	1.89	5	
137	Proper Rd.	San Antonio	1.50	4	
138	San Nicolas-Balas Rd.	"	2.00	3	
139	San Bartolome Rd.	"	0.50	4	
140	Sitio Balas-Lucio Rd.	"	1.20	4	
141	Mother Road	San Bartolome	0.50	5	
142	Brgy. Road	"	2.00	5	
143	Sitio Rural Rd.	"	0.50	5	
144	Brgy. Rd. 1	San Nicolas Balas	2.00	1	
145	" " 2	"	1.50	6	350 m. asphalt
146	" " 3	"	1.00	5	
147	" " 4	"	2.00	5	
148	" " 5	"	0.40	6	
149	" " 6	"	2.00	5	
150	" " 7	"	0.20	6	
151	" " 8	"	1.00	5	
152	San Bartolome Rd.	San Isidro	1.00	5	
153	Brgy. Rd. 1	"	1.00	5	
154	" " 2	"	0.80	5	
155	Sitio Apunan Rd.	"	0.50	5	
156	Sitio Bernarte Rd.	"	1.00	5	
157	Sitio Bayabas Rd.	"	2.00	5	
158	Almendras Rd.	"	2.00	5	
159	Tal. Centro Rd.	Talebanca	0.20	6	
160	Kahalo Rd.	"	1.60	5	
161	Libutao-Malupa Rd.	"	3.45	6	
162	Malupa-Mariala Rd.	"	1.80	6	
163	Road 2	"	1.50	6	
164	" 4	"	0.80	6	
165	" 6	"	4.50	5	

Note : (Status)
1 - Concreting completed
2 - Concreting on going
3 - Concreting planned (Plan up to 1998)
4 - Nothing done
5 - Very bad condition
6 - gravelling, improving

Table G-2-8 Results of Traffic Volume Survey (Dry Season)

Destination	Motorcycle/Tricycle			Jeepney/Bus			Truck/Dump Truck			Sedan/Jeepney			Total
	1st	2nd	Ave.	1st	2nd	Ave.	1st	2nd	Ave.	1st	2nd	Ave.	
1. Santo Domingo													
To Capas	271	250	261	355	407	381	210	217	214	251	239	245	1,100
To Concepcion	282	256	269	348	375	362	211	225	218	228	240	230	1,079
2. Santiago													
To Magalang	539	655	597	113	39	76	121	107	114	185	136	161	947
To Concepcion	263	676	470	338	79	209	175	78	127	217	99	158	963
3. Santa Rita													
To San Antonio	1,002	1,261	1,132	194	174	184	111	157	134	205	117	161	1,611
To Concepcion	1,162	1,283	1,223	106	109	108	109	134	122	128	99	114	1,565
4. Santa Cruz													
To Talimundoc	183	221	202	15	15	15	13	11	12	35	27	31	260
To Concepcion	181	124	153	16	12	15	10	11	11	31	23	27	205
5. Santa Monica													
To Caluluan	253	259	256	22	25	24	19	13	16	34	44	39	335
To Concepcion	276	300	288	19	30	25	20	22	21	43	54	49	382

Note : 1st day ... conducted on February 15, 1990 (7:00 AM - 7:00 PM)
2nd day ... conducted on February 16, 1990 (7:00 AM - 7:00 PM)

Table G-2-9 Results of Traffic Volume Survey (Rainy Season)

Destination	Motorcycle/Tricycle			Jeepney/Bus			Truck/Dump Truck			Sedan/Jeepney			Total
	1st	2nd	Ave.	1st	2nd	Ave.	1st	2nd	Ave.	1st	2nd	Ave.	
1. Santo Domingo													
To Capas	323	299	311	424	360	392	124	209	166	320	249	284	1,153
To Concepcion	309	285	297	413	341	377	143	183	163	297	236	266	1,103
2. Santiago													
To Magalang	629	680	654	82	112	97	87	87	87	145	138	141	979
To Concepcion	346	389	367	499	337	418	94	112	103	246	270	258	1,146
3. Santa Rita													
To San Antonio	1,864	1,253	1,158	72	82	77	73	76	74	100	92	96	1,405
To Concepcion	1,023	1,269	1,146	76	73	74	67	65	66	102	93	97	1,383
4. Santa Cruz													
To Talimundoc	211	195	203	7	7	7	5	12	8	22	24	23	241
To Concepcion	210	185	197	7	10	8	6	16	11	26	20	23	239
5. Santa Monica													
To Caluluan	186	225	205	11	15	13	4	10	7	38	32	35	260
To Concepcion	178	245	211	7	9	8	12	10	11	23	33	28	258

Note : 1st day ... conducted on September 25, 1989 (7:00 AM - 7:00 PM)
2nd day ... conducted on September 26, 1989 (7:00 AM - 7:00 PM)

Table G-2-10 Traffic Volume Projection

Rute	1995	2000	2010
1. Capas-Concepcion	1,390	1,700	2,510
2. Concepcion-Lapas	330	400	600
3. Concepcion-Talimundoc	310	370	550
4. Santa Rita-San Antonio	1,770	2,160	3,190
5. Santiago-Magalang	1,270	1,540	2,280

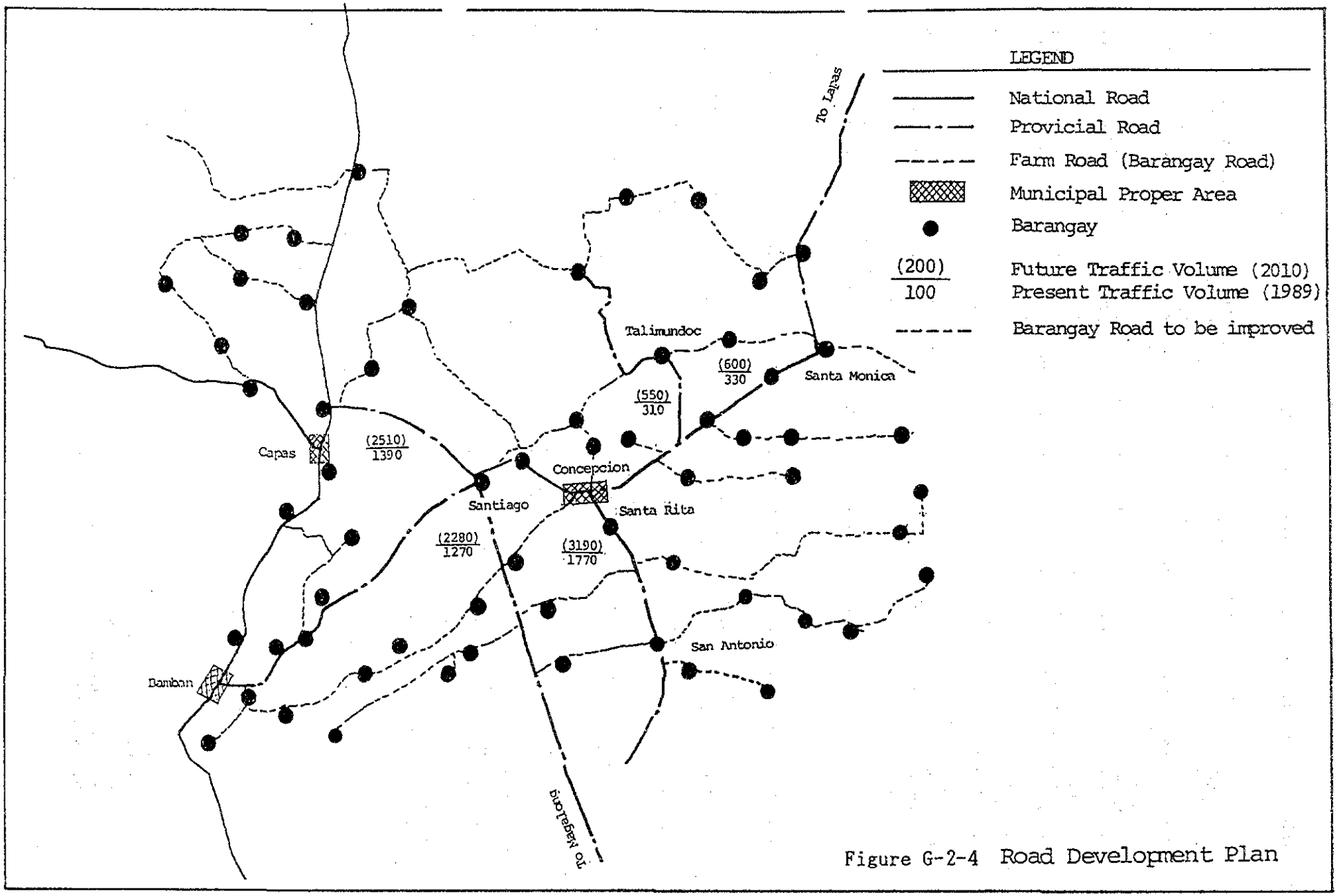


Figure G-2-4 Road Development Plan

G.3 Social Infrastructure

Table G-3-1 Number of Households Served by Type of Water System

Source : HPDO

Municipality	No. of Households	Type of Water Supply			
		Waterworks System	Deep Wells	Shallow Wells	Spring or Others
. Capas	8,587	-	484	7,592	137
. Bamban	5,337	139	9	3,191	37
. Concepcion	14,622	808	23	5,586	4,127

Table G-3-2 Water Supply Status of Municipalities

	Concepcion			Bamban			Capas		
	1990	2000	2010	1985	1990	2000	1985	1990	2000
1. Population	21,019	28,978	37,583	20,651	24,151	30,983	8,696	18,340	27,704
2. Service Ratio(%)	82	93	100	70	75	83	67	87	94
3. Per capita(ℓ/d/capita)	120	170	200	90	106	210	150	135	140
4. Water Deamand(m^3/m)	2,524	4,843	7,484	1,882	2,571	6,480	1,289	2,481	3,863
5. Water Source	5Deep Wells			4Deep Wells			4Deep Wells		
6. Service Connection	1,900	3,600	5,600	2,069	2,755	4,586	1,380	2,390	4,635

Table G-3-3 Well Water Quality Test by the Study Team

Location	E.C	PH	Temp	Remarks
San Martin spring	175	6.7	30.5	Near Intake 2
Bamban s/w	245	6.3	29.0	
Lillibangan s/w	450	6.1	29.0	Sulfuric smell
Tinang s/w	820	6.4	29.0	
Marita s/w	500	7.0	29.0	
Magao d/w	125	6.5	29.0	Artesian
Sta.Rosario d/w	560	7.2	28.5	
Matalusad d/w	640	7.8	30.0	Artesian, Sulf.

Table G-3-4 Well Water Quality Test by DPWH

Item	Unit	Capas	Bamban	Concepcion
1. Location		G.S.P	Pazasa	Alfonso
2. Physcal				
1) Colour (units)		0	0	0
2) Turbidity (FTU)		60	30	0
3) Odor		Odorless	Odorless	Odorless
4) Temperature (C°)		37	36	29
3. Chamical				
1) Acidity	mg/ℓ	0	0	0
2) Alkalinity	〃	65	90	85
3) Chloride	〃	5	7.5	22.5
4) Total Chlorine	〃	0.45	0.4	0.35
5) Total Hoduess	〃	60	50	100
6) PH	〃	-	-	-
7) Total Iron	〃	0	0.1	0
8) Hanganese	〃	0	0	0
9) Nitrogen, NH4	〃	0	0	0
10) Nitrogen, Nitrate	〃	17	23	6
11) 〃 〃	〃	0.06	0.03	0
12) Sulfate(SO4)	〃	10	20	0
13) Electric Conductivity		-	-	-

Table G-3-5 Summary of Sector Targets

CATEGORIES (1988-1992)	FIRST STAGE (1988-1992)	SECOND STAGE (1993-2000)
WATER SUPPLY		
Metro Manila		
Other Urban Areas		
Construction		
Piped Systems (L-II/III)	450	654
Repair/Rehab.	250	350
Rural Areas		
Construction		
Piped Systems (L-II/III)	933	794
Point Sources (L-I)	87,146	13,340
Repair/Rehabilitation	21,620	21,500
Replacement		9,500

(WATER SUPPLY TARGETS)

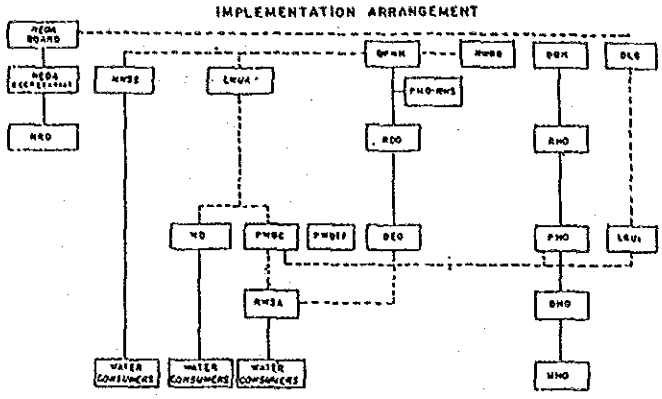
CATEGORIES	1988-1992						1993-2000	TOTAL 1988-2000
	1988	1989	1990	1991	1992	Sub-Total		
A.RURAL AREAS								
1.POINT SOURCES	10,392	16,238	27,119	30,302	24,820	108,771	44,340	153,111
Construction	7,828	14,576	20,796	24,433	19,518	87,151	13,340	100,491
Shallow Well	4,381	7,901	10,831	11,825	9,520	44,458	5,070	49,528
Deep Well	2,767	5,337	8,357	10,820	8,550	35,831	7,200	43,031
Spring Dev.	405	1,068	1,393	1,788	1,448	6,102	1,070	7,177
Others	270	270	215	-	-	755	-	755
Repair/Rehab.	2,564	1,662	6,323	5,769	5,320	21,620	21,500	43,120
Replacement	-	-	-	-	-	-	9,500	9,500
2.PIPED SYSTEMS (L-II/III)	131	204	110	262	226	933	794	1,727
B.OTHER URBAN AREAS								
PIPED SYSTEMS (L-II/III)	84	105	165	184	162	700	1,004	1,704
1.Construction	34	55	115	134	112	450	654	1,104
2.Repair/ Rehabilitation	50	50	50	50	50	250	350	600

Table G-3-6 Groundwater Development Plan

Description	Existing	On-going		1990		1991		1992	
		S/W	D/W	S/W	D/W	S/W	D/W	S/W	D/W
1. Capas	30	9	2	6	8	6	8	6	7
2. Bamban	24	15	4	7	8	8	8	4	8
3. Concepcion	60	15	5	4	15	12	14	9	14

Figure G-3-1 Water Supply Implementation Arrangement

Source: DPWH 1988



DPWH Department of Public Works & Highways.
MWSS - Metropolitan Waterworks & Sewerage Authority
LWUA - Local Water Utilities Administration
WD - Water District
RDO - Regional Directors Office
DEO - District Engineer's Office
DOH - Department of Health
RHO - Rural Health Office
PHO - Provincial Health Office
PWDC - Provincial Waterworks Development corporation
RWSA - Rural Waterworks Sanitation Corporation
DLG - Department of Local Government
LG - Local Government (Provincial & Municipal Government)

Table G-3-7 Electric Cooperative in Tarlac Province (1985)

Name	Power Source	No. of Connections	Number of Consumers Residential	Commercial	Industrial	Others	Total
Tarelco I	NPC	36,382	34,335	1,487	104	456	36,382
Tarelco II	NPC	22,316	20,836	1,287	33	160	22,316
Tarlac Enterprises Incorporated	NPC	19,229	18,067	990	17	155	19,229

Source : Electric Cooperatives

Table G-3-8 Status of Energization

District	No. of Barangay	No. of Household	Membership Total	%	Consumership Total	%	Energization Total	%
Capas	19	8,751	6,464	73	6,456	73	18	94
Bamban	15	4,591	4,011	87	3,907	85	12	80
Concepcion	45	14,127	10,040	71	9,816	69	39	86

Note : As of 1989
Source : Tarelco II

Table G-3-9 Consumer Level of Electricity

(Unit : Kwh/Cons/Mo.)

District	Residential	Small Commercial	Large Commercial	Power/ Industrial	Irrigation	Public Institutional	Street Light
Capas	38	159	-	3,321	-	246	28.5
Bamban	59	155	6,055	3,716	-	68	18.3
Concepcion	37	126	6,055	3,444	-	251	19.7

Note : As of 1989
Source : Tarelco II

Table G-3-10 Statistical Report of Electric Cooperatives

Description	Tarelco II
. Registration date of Coop.	June, 1981
. Date of First Energization	*Take-over System*
. Cooperative Office	Capas, Tarlac
. Membership	27,719
. Total Amount of Loan	P 102,659,487
. Total Release (as of 5/31/89)	P 45,214,274
. Annual meeting (temp. suspended)	March
. Status of Energization	
- No. of municipalities covered	5
- No. of barangays covered	119
- No. of barangays energized	105
- House connection ; potential	38,804
; actual	26,838
. General Statistics	
- Generated, Purchased	1,975,838 Kwh/mo.
- Sold	1,540,110 Kwh/mo.
- Gross Revenue	P / mo.
- Peak Load	6,500 Kw
Power Plant	
- Self Generating Diesel	
- Sub - station	2-5 MVA Station
- Distribution Line	

Source : Tarlac Electric Cooperative II
Capas, Tarlac

Table G-3-11 Average Monthly Electric Use

Description	Tarelco II	
	(1,000 KWH)	No. of Connections
Residential	1,068.59	24,044
Commercial	235.14	1,477
Industrial	201.66	50
Public	32.60	151
Street Lights	21.94	58
Others	1.11	4
Total	1,561.04	25,784

Table G-3-12 Load Forecast by TARELCO II

Year	Tarelco II (KW)	Remarks
1988	6,000	
1989	6,500	
1990	7,000	
1995	9,500	
2000	12,000	
2005	14,500	
2010	17,500	

Source : Tarlac Electric Cooperative II
Capas, Tarlac

Table G-3-13 Vital Statistics

Category	Rate
Crude Birth Rate	29.57/1,000 pop.
Crude Death Rate	7.11/1,000 pop.
Infant Mortality Rate	32.80/1,000 LB
Maternal Mortality Rate	0.38/1,000 LB

Source : Tarlac Provincial Hospital
Tarlac, Tarlac

Table G-3-14 Leading Causes of Mortality (1988)

Source : Provincial Hospital Tarlac, Tarlac

A. Cause of Death	Number of Death	Rate/1,000
1. Cardiovascular Diseases	1,578	197.4
2. Pneumonia, all type	1,011	126.5
3. PTB	409	51.1
4. Cancer, all type	360	45.0
5. Respiratory Distress Syndrome	152	19.0
6. Septicemia, all causes	123	15.4
7. Diarrheal diseases	100	12.5
8. Violent accidents	95	11.8
9. Severe Malnutrition	77	9.6
10. Genito Urinary Tract disease	61	7.6

B. Diseases	Number of Cases	Rate/1,000
1. Upper Respiratory Tract	59,507	7444.4
2. Intestinal Parasitism	21,354	2671.4
3. Diarrheal diseases	20,281	2537.2
4. Influenza	16,964	2122.2
5. Bronchitis	12,971	1622.6
6. Hypertension	7,771	972.2
7. Anemia	5,945	743.7
8. Pneumonia, all type	5,786	723.8
9. Gastritis	4,854	607.2
10. PTB	4,781	598.1

Table G-3-15 Health Resources

Description	Number
A. Hospital	21
- Government	5
. Tarlac Prov. Hosp.	1
. Army Station Hosp.	1
. Medicare Hosp.	1
. District Hosp.	2
. Total bed	365
- Private	16
. Total bed	371
B. Rural Health Units	28
. Government - Owned	18
. Puericulture Center	3
. Barangay Hall	4
. Municipal Bldg.	3
- Barangay Health Stations	138
. Government - Owned	37
. Community - Owned	101
- Social Hygiene Clinic	1
- Maria Clara Chest Center	1
- Malaria Control Unit	1
- Microscopy Centers	14
C. Manpower	
. Health Service	2
. Technical Staff	20
. Public Health Services	355
. Medical and Hospital Services	295
. Chest Center	14
. Social Hygiene	3
. Leprosy	2
. Malaria Control Service	10

Source : Tarlac Provincial Hospital
Tarlac, Tarlac

Table G-3-16 Medical and Health Care Services

Note : Rs of 1989
Source : MPDO

Medical Service/Personnel	Municipality			Total
	Capas	Bamban	Concepcion	
A. Health Institution				
1) Hospital (Public)	-	-	1	1
" (Private)	-	-	-	0
Total Beds	-	-	25	25
2) Private Clinics			-	
Medical	4	3	7	14
Dental	2	4	7	13
3) Main Health Center	3	1	3	7
4) Barangay Health Station	10	5	13	28
5) Family Planning Center	1	6	-	7
6) Nutrition Center/Daycare	15	12	-	27
B. Medical Personnel				
1) Doctor	8	8	17	33
2) Nurse	3	2	9	14
3) Midwife	14	16	33	63
4) Dentist	3	1	2	6
5) Medical Technologist	2	-	3	5
6) Sanitary Inspector	2	1	2	5
7) Nutritionist	-	-	1	1
8) Others	14	13	-	27

Table G-3-17 Total Enrollment by School Level in Tarlac Province

Schools	No. of Enrollment			Enrollment Rates	Nos. of Teachers	No. of Classroom	Teacher to Student	Classroom to Student
	Male	Female	Total					
A.Elementary School								
· Public	68347	65633	133980	15.77	4249	3780	1:32	1:36
· Private	4933	3307	7736	5.8	236	185	1:33	1:42
B.Secondary School								
· Public	18924	18190	37114	10.20	973	521	1:38	1:72
· Private	11523	11926	23449	6.25	539	445	1:44	1:53

Table G-3-18 Total Enrollment by School Level in the Study Area

Description	No. of Schools	Total Enrollment	No. of Teachers	No. of Classrooms	Teacher-Student Ratio	Classroom-Student Ratio
A. Public Elementary						
. Capas East	11	4,363	122	101	1 : 36	1 : 43
. Capas west	15	5,330	126	109	1 : 42	1 : 48
. Bamban	14	5,749	152	129	1 : 37	1 : 44
. Concepcion East	12	4,676	119	108	1 : 39	1 : 43
. Concepcion North	14	5,288	139	128	1 : 48	1 : 41
. Concepcion South	10	3,378	108	06	1 : 31	1 : 39
. Concepcion West	17	4,661	125	130	1 : 37	1 : 36
B. Private Elementary						
. Capas	1	524	15	12	1 : 34	1 : 43
. Bamban	-	-	-	-	-	-
. Concepcion	1	783	32	14	1 : 24	1 : 55
C. Secondary						
. Capas	4	4,135	94	64	1 : 43	1 : 64
. Bamban	2	2,439	54	44	1 : 45	1 : 55
. Concepcion	3	5,603	143	75	1 : 39	1 : 74

Note : As of 1989
Sources : DECS and MPDO

Table G-3-19 Telecommunication Services,Facilities,Personnel in Tarlac Province as of 1989 (Source: MPDO)

Service/Facilities	Number	Personnal	Number
A. Postal			
1. Post Office	23	1. District Postal Inspection	1
2. Mail/Box	4	2. Postmaster	22
3. Mail Bags		3. Letter Carriers	138
4. Money Order Machine	none	4. Teller	5
5. Motored Machine	6	5. Mail Sorter	27
6. Scale for Parcel	15	6. Clerk	
7. Scale for Letters	23	Sr. Clerk-7	
8. Typewriter	14	ClerkII-3	10
9. Adding Machine	12	7. Utility(Laborer)	17
10. Safety Vault	24		
11. Motorcycle			
B. Telegraph			
1. Telegraph Office	16	1. Telegraph Operator	19
2. Telegraph Vehicle		2. Messenger	7
C. Telephone			
1. Telephone		1. Operator	

Table G-3-20 Telecommunication Services,Facilities,Personnel in the Study Area as of 1989 (Source: MPDO)

Description	Municipality		
Services/Facilities	Capas	Bamban	Concepcion
A. Postal			
1) Post office	1	1	1
2) Mail box	1	1	1
3) Mail bags	3	20	-
4) Money Order Machine	-	-	1
5) Metered Machine	-	-	1
6) Scale for letters	1	1	1
7) Scale for parcels	1	-	1
8) Typewriter	-	1	1
9) Adding Machine	-	1	-
10) Safety Vault	1	1	1
11) Motorcycles	4	5	-
B. Telegraph			
1) Telegraph office	1	1	1
2) Telegraph vehicles	-	-	1
C. Telephone			
1) Telephone	150	40	379
Personnel			
A. Postal			
1) District Post Inspector	-	1	-
2) Postmaster	1	1	1
3) Letter Carriers	7	6	-
4) Teller	-	-	1
5) Mail Sporter	2	1	1
6) Clerk	1	-	-
7) Utility	-	1	-
B. Telegraph			
1) Telegraph Operator	1	1	1
2) Messenger	-	-	-
C. Telephone			
1) Operator	1	-	-

Table G-3-21 List of Registered Motor Vehicles in Tarlac Province as of 1989

As of January ot December '88

Type of Motor Vehicles	Number	Type of Motor Vehicles	Number
MV Classification:		MV Classification:	
PRIGATE:		FOR HIRE	
Light Car	1,489	Truck Heavy	21
Midium Car	507	Utility Vehicle	548
Heavy Car	38	Truck Bus	474
Utility Vehicle	4,147	Tryole-MCH	4,096
Truck Heavy	1,302		
Truck Bus	50		
Motorcycle-MC	1,733		
Trailer Light-TRL	129		
Trailer Midium-TRH	11		
Trailer Heavy-TRH	9		

Table G-3-22 Number of Vehicles Registered in the Municipality (Source: MPDO)

Type of Vehicle	Municipality			Total
	Capas	Bamban	Concepcion	
. Bus	-	-	3	3
. Truck	79	48	47	166
. Sedan	76	50	89	215
. Jeepney	242	300	122	664
. Tricycle	267	208	858	1325
. Motorcycle	-	80	317	397

Source : MPDO

Table G-3-23 Number of Dwelling Units by Type of Construction Material (1989)

Type of Construction * Materials					Others:	
	Single House	Duplex	Apts./ACC	Comm/Agri/laders	Barong-Barong	Total
(PROVINCE OF TARLAC)	116,874	828	862	317	593	119,453

Table G-3-24 Type of Housing Structure as of 1989 (Source: MPDO)

Type of Construction Materials	Type of Structure					
	Single	Duplex	Apts/Ace	Comm/Agrt Ladders	Barong Barong	Total
A. Capas						
1) Concrete	3,032	122	44	0	0	3,198
2) Semi-Concrete	1,767	0	0	0	0	1,767
3) Wood/Mixed Materials	3,114	0	0	0	0	3,114
4) Nipa, Bamboo & Light Materials	0	0	0	0	177	177
B. Bamban						
1) Concrete	689	5	2	15	56	767
2) Semi-Concrete	1,020	8	3	20	227	1,278
3) Wood/Mixed Materials	1,300	2	1	8	478	1,789
4) Nipa, Bamboo & Light Materials	950	0	0	10	318	1,278
C. Concepcion						
1) Concrete	1,315	322	318	0	0	1,955
2) Semi-Concrete	2,154	218	820	0	0	3,192
3) Wood/Mixed Materials	4,130	519	203	5,600	1,005	11,463
4) Nipa, Bamboo & Light Materials	1,419	109	77	4,505	1,617	7,727

Note : As of 1989
Source : MPDO

G.4 Investment Program and Development Plan

Table G-4-1 Annual Investment Program, CY 1990
Municipality of Bamban

No.	NAME OF PROJECT	DESCRIPTION	LOCATION	FUNDING SOURCES	TOTAL AMOUNT
1.	Bamban Public Market	Remedial and Remaining works	Bamban	ESFS	6,547,950
2.	Road Project A. Poblacion Road 1) E. Sibal St. 2) Punsalan St. 3) Manipon St. 4) Burgos St. 5) Juan Luna St. B. Barangay Road 1) La Paz-Pacalcal	Construction	Bamban	ESFS	7,000,000
3.	Barangay Road Project	Construction	Bamban	NALGU	800,000
4.	Repair & Maintenance of Municipal Road	Construction	Bamban	NALGU	48,000
5.	Marcos Bridge	Concreting	Anupul	BALGU	140,000
6.	Mauricio Bridge	Concreting	Anupul	"	100,600
7.	Malinta Bridge	Concreting	San Roque	"	120,000
8.	Malikot-likot Bridge	Concreting	San Roque	"	110,000
9.	Lunac-Mainang Bridge	Concreting	San Nicolas	"	110,000
10.	Multi-purpose pavement 1) Sibal Road 2) Arcilla Road 3) C.P Arcilla Road 4) J.P. Laurel Road 5) San Rafael Road 6) Pag-asa Road 7) De los Reyes Road	Concreting	Bamban La Paz San Pedro Lourdes De la Cruz San Rafael Anupul San Roque	DPWH	2,000,000

Table G-4-2 Annual Investment Program, CY 1990
Municipality of Concepcion

No.	NAME OF PROJECT	LOCATION	FUNDING SOURCES	TOTAL AMOUNT
1.	Repair of 3 Classroom Building	Marimla	DPWH	42,560
2.	-do-	San Isidro	DPWH	33,994
3.	-do-	San Jose	DPWH	40,000
4.	Construction of Multi-purpose Pavement	Pando	NALGU	150,000
5.	-do-	San Martin	"	150,000
6.	-do-	Sta. Monica	"	200,000
7.	-do-	San Agustin	"	200,000
8.	-do-	Talimundoc	"	150,000
9.	-do-	San Nicolas Balas	LGDF	79,867
10.	Construction of Multi-purpose Center	San Nicolas Balas Caluluan Sta. Monica	" " "	174,344
11.	Repair of comfort room (Mayor's Office)	San Nicolas	"	29,998
12.	Computer training program for OSY	Public Market	"	100,000
13.	Installation of Communication Systems	Concepcion	"	120,000
14.	Re-planning of Town plan & zoning ord.	Concepcion	"	30,000
15.	Repair of roofing of the Public Market	Concepcion	"	90,000
16.	Conversion of PH 2nd flr. to Training Ctr.	Concepcion	"	38,610
17.	Management Tool	Concepcion	"	150,000

Table G-4-3 Annual Investment Program, CY 1990
Municipality of Capas

No.	PROJECT TITLE/ DETAILED DESCRIPTION	LOCATION OF PROJECT	IMPLEMENTING AGENCY	SOURCES OF FUNDING	UNIT	TARGET DATE TO COMPLETE THE PROJECT	TARGET DATE 1990	PROJECT COST (P1,000)
1.	R.N. 917 - Maintenance of Municipal road	Poblacion	LGU	GOP	km.	5.4 (1989)	5.4	38
2.	MMI - Maintenance of Barangay roads	19 brgys.	LGU	GOP	km.	122 (1989)	122	1,000
3.	Concreting of Poblacion roads and Drainage system	Poblacion	Provincial	GOP	km.	3.3 (1989)	-	12,500
4.	Concreting of Brgy. O'Donnell road network & Drainage system	O'Donnell	Provincial/ DPWH	GOP	km.	3 (1989)	-	6,000
5.	Concreting of Aranguren-Lawy road	Aranguren Hantapig	Provincial/ DPWH	GOP	km.	4.5 (1989)	-	7,000
6.	Concreting or asphalting of Pascuala road	Sto. Rosario	Provincial/ DPWH	GOP	km.	2 (1989)	-	3,000
7.	Construction of Sapang Naragul bridge	Sto. Rosario	Provincial/ DPWH	GOP	lm.	30 (1989)	-	3,500
8.	Rip-rapping of Sumuba creek	Cut-cut I	Provincial/ DPWH	GOP	1-unit	1 (1989)	-	1,000
9.	Concreting of Tambo road	Sto. Domingo II	Provincial/ DPWH	GOP	km.	1.5 (1989)	-	3,500
10.	Construction of Justice Building hall	Mun. Ground Sto. Domingo II	Provincial/ DPWH	GOP	bldg.	2 (1989)	-	1,000
11.	Construction of Multi-agency building	Mun. Ground Sto. Domingo II	Provincial/ DPWH	GOP	bldg.	1 (1989)	-	500
12.	Concreting of Sta. Lucia road network and Drainage system	Sta. Lucia	Provincial/ DPWH	GOP	km.	4 (1989)	-	6,000
13.	Concreting of Sta. Lucia road network and Drainage system	Lawy	Provincial/ DPWH	GOP	lm.	3 (1989)	-	4,800
14.	Capas Water Supply system	Poblacion	LWUA/LGU	FS/LWUA Loan Grant	brgy.	6 (1989)	-	10,000
15.	Capas Slaughterhouse	Cut-cut-I	ESF/LGU	ESF Loan Grant	bldg.	1 (1989)	-	3,500
16.	Asphalting of Sta. Juliana road network and Drainage system	Sta. Juliana	Provincial/ DPWH	GOP	km.	2.8	2.8	3,000
17.	Construction of Barangay Health Centers	12 brgys.	Provincial/ DPWH	GOP	bldg. centers	12	12	2,400
18.	Construction of Capas Public Market Drainage Outfall	Cubcub	ESF/DPWH/ LGU	ESF	lm.	100	100	300
19.	Construction of Capas Municipal Technical & Vocational High Sch.	Mun. Ground Sto. Domingo II	Provincial/ DPWH	GOP	rooms	18	18	2,000
20.	Construction of Capas Communal Irrigation system	Sto. Rosario	DPWH/ESF	GOP/ESF	86 sq. kms.dam	86 sq. kms.dam	30	24,000
21.	Asphalting of Estrada road network and Drainage system	Estrada	Provincial/ DPWH	GOP	km.	2	2	4,500
22.	Lawy Communal Irrigation system	Lawy	DPWH/NIA	GOP	sq.kms.	30	30	5,000
23.	Capas Elementary and High School building	Selected brgys.	DPWH/ Provincial	GOP	3 rooms	10	10	3,000
24.	Industrial Arts Building	Selected brgys.	DPWH/ Provincial	GOP	bldgs.	7	7	2,100
25.	Home Economics Building	Selected brgys.	DPWH/ Provincial	GOP	bldgs.	6	6	1,800
26.	Construction of Bueno bridge	Bueno	DPWH	GOP	lm.			60,000
27.	Construction of Sta. Lucia-Aeriones bridge	Sta. Lucia	DPWH	GOP	lm.			10,000

NOTES :
- It is presumed that should projects intended for current year (1989) are not implemented, they are to be carried over for 1990.
- Projects are numbered according to priority.

Table G-4-4 Improvement Status of Provincial Roads

No.	Road Location	Improvement Status
1.	Santo Domingo-Santiago-Concepcion	Concreting completed
2.	Concepcion - Sta. Monica	"
3.	Sta. Monica - Lapaz	Concreting on going
4.	Sto. Cristo - Corazon de Jesus	Concreting completed
5.	Corazon de Jesus - San Miguel	Concreting planned
6.	Santiago - San Nicolas Balas	Concreting completed
7.	Concepcion - Sta. Rita	"
8.	Sta. Rita - San Bartolome	Concreting planned
9.	Sto. Nino - La Paz	"
10.	La Paz - Santiago	"

Table G-4-5 Improvement Status of Multi-purpose Pavement

Municipality	Barangay	Amount	Status
Bamban	Banaba	200,000	1
	Malonzo	100,000	"
	Culubasa	200,000	"
	Pacalcal	150,000	"
	San Pedro	200,000	"
	Sto. Nino	150,000	"
	Anupul	150,000	"
	San Nicolas	850,000	"
	La Paz	-	2
	Lourdes	-	"
	San Rafael	-	"
	Dela Cruz	-	"
Capas	Estrada	160,000	1
	Lawy	24,000	"
	Dolores	24,000	"
	Manlapig	24,000	"
	Manga	24,000	"
	Cub-cub	24,000	"
Concepcion	Minane	110,000	1
	Lilibangan	110,000	"
	San Agustin	110,000	"
	Parang	119,000	"
	San Nicolas Balas	-	"
	Baluto	-	"
	Malupa	-	"
	Caluluan	-	"
	Sta. Monica	-	"
	San Miguel	-	"
	Pao	-	"
	Sta. Rita	-	"
	San Vicente	-	"
	Pando	150,000	2
	San Martin	150,000	"
	Tal. Marimla	150,000	"
	San Nicolas Balas	80,000	"

Notes :
1 - Completed
2 - On-going

For the other barangays not listed above, Multi-purpose pavement is planning in the near future.

Table G-4-6 Development Plan for Barangay Road

(Unit : Km)

Priority	Location of Barangay Road	Length	Remarks	
1	Provincial Road - San Vicente - San Nicolas Balas	3.3	Phase I	
2	San Antonio - Baluto	2.1	Sub-Total	
3	Baluto - Calius Gueco	2.8		8.2
4	San Ishidoro - San Bartolome - San Antonio	3.3		
5	Calius Guesco - Panalicsican	1.1		
6	Panalicsican - Talimundoc Marimula	5.5		
7	Panalicsican - Castillo	2.8		
8	Provincial Road - Telebanca - Malonso	1.8		
9	Malonso - Banaba	0.9		
10	Malonso - Malonzo	4.4	Phase II	
11	Sto. Nino - San Pedro - Bangcu	6.8		
12	Bangcu - Dungan - Provincial Road	2.5		
13	Santa Rita - San Martin - Lilibangan	6.6		
14	Lilibangan - Magao	1.8		
15	Magao - Cap Cap	3.6	Sub-Total	
16	Tinang - Mabilog	3.6		44.7
	Total Length	52.9		

Table G-4-7 Development Plan for Farm-to-Market Road

(Unit : Km)

NO.	Barangay	Length	Remarks	
1	Baluto	0.5	Phase I	
2	San Baltolome	1		
3	San Ishidoro	6.5		
4	Castillo	1		
5	Telebanca	3.9		
6	Malonso	0.5		
7	Banaba	0.5		
8	San Pedro	1.1		
9	De la Cruz	2		
10	Bangcu	2		
11	Culubasa	2		
12	La Pas	0.5		
13	San Rafael	1		
14	Pacalcal	1.7		
15	Sta. Rita	1.1		
16	San Martin	3.5	Phase II	
17	Lilibangan	0.5		
18	Magao	3.6		
19	Tinang	5		
20	San Miguel	3		
21	Caluluan	1.2		
22	Sta. Monica	2.2		
23	Sta. Cruz	0.5		
24	Sta. Rosa	1.8		
25	Cafe	1		
26	Calatingan	1.2		
27	Sto. Rosario	1.9		
28	Sta.Maria	2.3		
29	Pitabunan	2.1	Sub-Total	
30	Corazon de Juses	2.8		57.4
	Total Length	57.9		

APPENDIX H Agriculture

Table H-1 Rice: Average of Planted and Harvested Area in Tarlac Province May, 1984 to April, 1989

Month	Planted Hectares	%	Harvested Hectares	%
January	3,257	3.3	458	0.5
February	1,918	1.9	16,133	17.6
March	744	0.8	8,408	9.2
April	845	0.9	3,257	3.6
May	3,112	3.2	1,369	1.5
June	17,729	18.0	683	0.7
July	25,642	26.1	742	0.8
August	17,815	18.1	3,111	3.4
September	2,337	2.4	17,729	19.4
October	459	0.5	21,855	23.9
November	16,133	16.4	15,790	17.2
December	8,408	8.5	2,046	2.2
Total	98,399	100.0	91,583	100.0

Source:DA PAO, Tarlac.

Table H-2 Regions with the Highest Volume of Production by Crops (1985-1987)

Crops	Regions 1st	2nd	3rd
Vegetables:			
Ampalaya	S. Tagalog	C. Visayas	Ilocos
Cabbage	Ilocos	S. Mindanao	C. Luzon
Calabasa	S. Tagalog	Cagayan Valley	Bicol
Chayote	Ilocos	S. Tagalog	N.Mindanao
Eggplant	Ilocos	S. Tagalog	C. Luzon
Garlic	Ilocos	S. Tagalog	C. Luzon
Ginger	W. Visayas	S. Mindanao	S. Tagalog
Green Onion	S. Mindanao	C. Mindanao	C. Vsayas
Green Leafy Vegetables	Bicol	W. Visayas	Ilocos
Habichuelas	Ilocos	Cagayan Valley	N.Mindanao
Mustard	Ilocos	S. Tagalog	C. Luzon
Onion	C. Luzon	Ilocos	S. Tagalog
Patola	S. Tagalog	W. Visayas	Ilocos
Pechay	Bicol	S. Tagalog	Ilocos
Pepino	Ilocos	S. Tagalog	S. Mindanao
Pepper (red)	Ilocos	S. Tagalog	E. Visayas
Radish	S. Mindanao	S. Tagalog	W. Visayas
Tomatoes	Ilocos	S. Tagalog	C. Luzon
Upo	S. Tagalog	W. Mindanao	C. Luzon
Other Vegetables:			
Beans and Peas	Ilocos	C. Luzon	S. Mindanao
Dry Beans and Others	C. Luzon	Cagayan Valley	Ilocos
Mongo	Ilocos	C. Luzon	N. Visayas
Soy Beans	S. Mindanao	N. Mindanao	C. Mindanao
Sitao	C. Luzon	Ilocos	S. Tagalog
Root Crops:			
Camote	Bicol	E. Visayas	C. Visayas
Cassava	C. Mindanao	W. Mindanao	Bicol
Gabi	E. Visayas	C. Visayas	N. Mindanao
Irish Potato	Ilocos	N. Mindanao	S. Mindanao
Pao Galiang	E. Visayas	C. Visayas	N. Mindanao
Tugui	Ilocos	S. Tagalog	Bicol
Ubi	C. Visayas	N. Mindanao	W. Visayas
Other Crops:			
Corn	S. Mindanao	C. Mindanao	Cagayan Valley
Yellow			
White			
Sweet			
Watermelon	Cagayan Valley	Ilocos	W. Visayas
Peanuts	Cagayan Valley	Ilocos	S. Tagalog

Source: DA Bureau of Agricultural Statistics.
Philippine Agribusiness Factbook & Directory, 1989-90

Table H-3 Summary of Production Volume & Area Harvested by Province, Tarlac, 1989

Crops	Production Metric Tons	Area Hectares
Vegetables (Summary)		
Ampalaya	1,512.0	126.0
Cabbage	140.0	10.0
Calabasa	1,920.0	128.0
Chayote	-	-
Eggplant	2,640.0	240.0
Garlic	250.0	25.0
Ginger	250.0	25.0
Green Onion	225.0	25.0
Green Leafy Vegetables	1,080.0	120.0
Habichelas	-	-
Mustard	225.0	25.0
Onion	275.0	25.0
Patola	100.0	10.0
Pechay	90.0	10.0
Pepino	140.0	10.0
Pepper	90.0	10.0
Radish	350.0	25.0
Tometoes	4,675.0	425.0
Upo	150.0	15.0
Other Vegetables		
Beans and Peas	22.5	15.0
Dry Beans and Others	67.5	45.0
Mongo	1,143.0	635.0
Soy Beans	125.0	50.0
Sitao	375.0	250.0
Root Crops		
Camote	34,686.0	1,927.0
Cassava	900.0	45.0
Gabi	210.0	15.0
Irish Potato	120.0	10.0
Pao Galiang	-	-
Tugui	-	-
Yam Bean (Ubi)	240.0	15.0
Other Crops		
Corn	17,409.0	4,598.0
Yellow	5,013.0	1,114.0
White	1,616.0	404.0
Sweet	10,780.0	3,080.0
Watermelon	950.0	50.0
Peanuts	873.0	485.0

Source: DA PAO, Tarlac

Table H-4 Cultivation System of Rice by CIS

	Particulars	Wet Season %	Dry Season %	Average %
1.	Variety			
	High Yield Variety	100.0	99.5	99.8
	Traditional Variety	0.0	0.5	0.3
2.	Cultivation System			
2.1.	Method of Raising & Seedling			
	Wet Bed	87.4	48.4	67.9
	Dry Bed	0.0	0.0	0.0
	Direct Seeding	12.6	51.6	32.1
2.2.	Transplanting			
	Straight Row	0.0	0.0	0.0
	Random	100.0	100.0	100.0
2.3.	Land Preparation			
2.3.1.	Method			
	Mechanized	26.3	26.3	26.3
	Conventional	15.8	21.1	18.5
	Both	57.9	52.6	55.3
2.3.2.	Number of Plowing			
	Once	63.1	57.9	60.5
	Twice	31.6	31.6	31.6
	More than 3 times	5.3	10.5	7.9
2.3.3.	Number of Harrowing			
	Once	15.8	15.8	15.8
	Twice	52.6	42.1	47.4
	More than 3 times	31.6	42.1	36.9
3.	Fertilization			
	Basal	21.1	21.1	21.1
	Side Dressing	94.7	89.5	92.1
	Top Dressing	57.9	63.2	60.6
4.	Weeding Practices			
4.1.	Method			
	Manual	42.8	55.1	52.2
	Chemical	31.9	30.8	30.8
	No Weeding	25.3	14.1	17.0
4.2	Frequency			
	Once	90.3	94.8	93.9
	Twice	9.7	5.2	6.1
5	Pest Control			
5.1	Method			
	Preventive	47.4	47.4	47.4
	Curative	5.3	5.3	5.3
	Both	36.8	36.8	36.8
	None	10.5	10.5	10.5
5.2	Frequency & Timing			
	First (30 DAT)	100.0	100.0	100.0
	Second (45 DAT)	100.0	100.0	100.0
	Third (60 DAT)	57.9	63.2	60.6
	Fourth (75 DAT)	36.8	42.1	39.5
6.	Harvesting (Source of Labor)			
	Family	10.5	10.5	10.5
	Hired	68.4	68.4	68.4
	Both	21.1	21.1	21.1
7.	Threshing			
	Manual	0.0	0.0	0.0
	Mechanical	100.0	100.0	100.0

Source: Survey conducted by the consultant. *
* Interview with the president of each CISs.

Table H-5 Present Farming Practices (Mungo)

1) Variety	- Pagasa series (IPB)
2) Growing period	- 60 to 70 days
3) Planting season (dry)	- November - December
4) Cultural Management	
a. Land Preparation	- Zero tillage and sometimes one plowing
b. Seed Treament	- None
c. Rhizodium Inoculation	- None
d. Planting	- The mungbean seeds are broadcast few days before or after the rice is harvested or also while the soil is still moist. This requires about 8 to 12 gantas (19 to 29 kgm) of seeds per hectare. A peg-tooth sometimes passed once to dislodge seeds that may have landed on the rice stubbles.
e. Fertilization	- Nil
f. Water management	- Nil
g. Weeding	- Nil
h. Insect pests control	- Nil
i. Disease control	- Nil
5) Harvesting and Post harvest	
a. Harvesting	- Harvesting are done when the pods turn black and leaves ends to yellow and defoliate by hand picking of the matured pods 2 to 3 times.
b. Threshing	- The harvested pods are dried in the sun until brittle. Drying in mats, "sawali" and sometimes nylon fish nets. Pods are threshed manually by foot or by beating the pods by any woods available.
c. Drying	- The seeds are further dried by sundrying 1 to 2 days of semi to continous sun drying before farmers stored their produce.
d. Storage	- Dried seeds are free from impurities before puting them to storage. Seeds are cleaned by passing in sieve or by winnowing with the use of bilao.
5) Marketing	- The farmers usually sell the bulk of their produce to agents and keep some for home use or seed purposes. Buyers usually produce the beans from the farm, or the farmers bring them to the markets.

Source: DA PAO Tarlac.
DA MAO Concepcion, Bamban & Capas.
Interview data from president of each CISs.

Table H-6 Paddy Production per Hectare (CIS Area)

CIS AREA

No.	Name of CIS	Area (has.) Wet Season	Area (has.) Dry Season	Range of Yield(MT.) Wet Season	Range of Yield(MT.) Dry Season
1	BAMBAN *	751	532	2.50 - 3.50	2.50 - 3.50
2	SAN PEDRO	120	120	3.50 - 4.00	4.00 - 4.50
3	MALONZO	179	240	2.00 - 2.50	3.00 - 3.50
4	BANGCOU *	700	500	3.50 - 4.00	4.00 - 4.50
5	SUSUBA	40	8	2.50 - 3.50	2.50 - 3.50
6	TELEBANCA *	389	364	2.50 - 3.50	3.50 - 4.00
7	STA. RITA	115	80	3.75 - 4.25	4.25 - 4.75
8	MARITA	100	65	3.50 - 4.00	4.25 - 4.75
9	SAN MARTIN	240	80	3.50 - 4.00	4.00 - 4.50
10	BALUTO	600	320	4.00 - 4.50	4.00 - 5.00
11	LILIBANGAN	240	200	4.25 - 4.75	4.50 - 5.50
12	SAN BARTOLOME	350	260	3.50 - 4.00	4.50 - 5.00
13	SAN ISIDRO	450	330	3.50 - 4.00	4.00 - 4.50
14	LUCONG	2000	1390	3.75 - 4.25	4.00 - 4.25
15	MAGAO	468	620	3.50 - 4.00	4.00 - 5.00
16	TINANG	250	100	4.00 - 4.50	4.25 - 4.75
17	STO. ROSARIO	150	150	4.00 - 4.50	4.50 - 5.00
18	STA. MONICA	300	740	3.50 - 4.00	4.25 - 4.75
19	CALULUAN	80	45	3.75 - 4.25	2.50 - 3.50

Note:Interview data from president of each CISs.
* Yeild of rainfed paddy is 2.00 MT.

Table H-7 Imports of Selected Agricultural Products (1985-1988)

Commodity	Description	Volume :metric tons 1985	1986	1987	1988
Cereals & Cereal Preparation					
Maize (Corn)	Unmilled	281177	159	55814	25132
Vegetables & Fruit					
Beans (red)	Dried	303	60	0	278
Beans (white)	Dried	260	813	1733	1351
Beans, Mongo (Green or Yellow)	Dried	1049	11248	6891	8571
Corn	Prepared or preserved	301	443	790	1300
Mushrooms	Dehydrated or Evaporated	0.3	1.1	0.5	8.5
Mushrooms	Dried	1.2	1.3	6	1.3
Mushrooms	Prepared or preserved	65.1	67.4	73.4	130.8
Parsley	Dehydrated or Evaporated	0.204	0.244	-	1.76
Peanuts	Roasted	4.8	15.5	142.4	53.9
Tomatoes	Prepared or preserved	651	68	26	56
Anis seeds	Ground, in Bulk Containers	0.23	1.19	0.22	1.49
Anis seeds	Unground, in Bulk Conteiner	19.2	9.57	18.43	17.62
Coriander seeds	Ground, in Bulk Containers	1.98	4.04	3.41	1.64
Coriander seeds	Unground, in Bulk Conteiner	9.23	0.5	13.95	12.03
Nutmeg and Mace	Ground, in Buik Containers	0.59	2.35	5.81	8.85
Nutmeg and Mace	Unground, in Bulk Conteiner	6.58	2.21	5.86	3.75

Source:1988 Foreign Trade Statistics of The Philippines, NSO.
Philippine Agribusiness Factbook & Directory, 89/90.

Table H-8 Agri-Institutional Extension Personnel

-STUDY AREA-

Agency/Office	Extension Personnel (EP)	Number	Area EP Ratio *	Farmer EP Ratio **
1. Department of Agriculture (DA)	1.1 Municipal Officer	3	8,652ha/person	3,667farmer/person
	1.2 Plant Pest Control worker	3	8,652ha/person	3,667farmer/person
	1.3 Agricultural Prod'n. Technologist	32	811ha/person	344farmer/person
2. Land Bank of the Philippines (LDP)	2.1 Estate Dev't. Coordinator	5	5,191ha/person	2,200farmer/person
	2.2 Field Representative	9	2,884ha/person	1,222farmer/person
3. Rural Banks (RB's)	3.1 Credit Technician	8	3,244ha/person	1,375farmer/person
4. Department of Agrarian Reform (DAR)	4.1 Agrarian Reform Technician	3	8,652ha/person	3,667farmer/person
5. Cooperative Rural Bank of Tarlac (CRBT)	5.1 Credit Technician	3	8,652ha/person	3,667farmer/person
6. National Irrigation Administration (NIA)	6.1 Irrigation Tech.	2	12,978ha/person	5,500farmer/person
	6.2 Watermaster	2	12,978ha/person	5,500farmer/person
	6.3 Irrig. Community Organizer (Incl. Irrig. Organization Worker)	12	2,163ha/person	917farmer/person

Source:Agencies and Offices mentioned in the table.

* Computed based on the service area of 25,956 hectares.

**Computed based on the total numbers of farmers of 11,000.

Table H-9 Researches Undertaken by UP(IPB) and LBNCRDC

CROPS	UP (IPB) 1	UP (IPB) 2	LBNCR&DC 1	LBNCR&DC 2
A. Crucifers				
1. Cabbage	x			
2. Chinese Cabbage	y	**	y	**
3. Petchay	x			
4. Radish	x			
5. Cauliflower	x		x	
6. Mustard			x	
B. Solanaceous				
1. Eggplant	x		x	
2. Pepper				
Hot	x		x	
Sweet	x		x	
3. Tomato	y	**	y	**
4. Sweet Potato	x		y	**
C. Traditional Cucurbits				
1. Cucumber	x			
2. Watermelon	x	*		*
3. Muskmelon	x			
D. Indigenous Cucurbits				
1. Ampalaya	x			
2. Kalabasa	x			
3. Patola	x			
4. Upo	x			
E. Vegetable Legumes				
1. Cowpea	x			
2. Sitao				
Bush	x			
Pole	x			
3. Hyacinth Bean (Batao)			x	
4. Pigeon Pea (Kadyos)				
5. Winged Bean	x			
6. Snap Bean (Habichuelas)	x			
7. Garden Pea (Sitcharo)	x			
8. Mungbean	y	*	y	*
9. Sword Bean			x	
10. Jack Bean			x	
11. Soy Bean	y	**	y	**
12. Peanut	y	*		
F. Bulb Crops				
1. Onion	x			
2. Garlic	x			
G. Others				
1. Carrots	x			
2. Okra	x			
H. Cereals				
1. Corn				
Yellow	y	**		
White (Lagkitan)	y			
Sweet	y			
Makapuno				
2. Sorghum	y	**		

Note:

1/- UP (IPB)- University of the Philippine Institute of Plant Breeding
LBNCR&DC - Los Banos National Crop Research and Development Center

x - Research undertaken on Varietal Improvement, Yield Trial, Production of Breeder and Foundation Seeds, Evaluation for Pest and Disease resistance.

Y - Major research on Production of Breeder and Foundation Seeds, Varietal Improvement and Yield Trials.

* - Propose dry season crop to be grown if soil condition permits.

** - Propose dry season crop to be grown if their is ready market (Contract Buyer).

Source: Annual Report on Research Projects, Los Banos National Crop Research and Development Center, 1989.
Institute of Plant Breeding UP Los Banos, Laguna.

Table H-10 Number of Livestock
-STUDY AREA-

Municipality	Carabao	Cattle	Goat	Swine	Duck	Chicken
Bamban	1,822	322	742	9,477	9,170	25,677
Capas	874	4,016	2,749	1,434	2,541	3,110
Concepcion	5,041	2,798	1,906	14,372	211,198	48,118
Total	8,520	9,999	6,209	25,851	223,734	78,322

Source: MAO (Bamban, Capas & Concepcion)

Table H-11 Alternative Labors Utilization

CASE I, LABORS WITH PROJECT UNDER THREE MONTHS PLANTING LAG

Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Family	63200	23200	26400	19200	28800	74400	78400	67200	47200	80800	121600	89600
Hired	67200	36800	60000	54400	49600	112800	120000	84800	36000	108000	182400	128000
Total F & H	130400	60000	86400	73600	78400	187200	198400	152000	83200	188800	304000	217600

CASE II, LABORS WITH PROJECT UNDER TWO MONTHS PLANTING LAG

Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Family	36800	34400	27200	8800	19200	80000	76000	63200	23200	50400	112800	92000
Hired	8000	56000	84000	30400	73600	184000	116000	8000	61600	165600	216800	116000
Total F & H	44800	90400	111200	39200	92800	264000	192000	71200	84800	216000	329600	208000

Source:Consultants' estimate using following data,
:NIA, Tarlac PAO.

Table H-1212 Paddy Production in Region III
Jan.-Dec. 1988

Month	Area Harvested Hectares	Production M.T.	Yield per Hectares M.T.
January	11,264	40,631	3.6
February	24,203	106,268	4.4
March	27,686	125,283	4.5
April	50,063	227,159	4.5
May	57,579	294,197	5.1
June	7,491	35,013	4.7
July	2,168	9,741	4.5
August	5,047	21,960	4.4
September	45,238	179,622	4.0
Octobar	93,169	200,991	2.2
November	136,341	235,892	1.7
December	64,114	102,003	1.6

Source:DA Provincial Agricultural Office, Tarlac

Table H-13 Target of Rice Planted Area
[RICE CROP] May 1988 to April 1989

(Unit:Hectares)

Month	Municipality Bamban	%	Capas	%	Concepcion	%	Total	%
May	247	12	123	6	803	7	1173	8
Jun.	255	12	687	27	5738	53	6680	43
Jul.	650	31	1290	51	3842	36	5782	38
Aug.	481	23	405	16	395	4	1281	8
Sept.	241	11		0		0	241	2
Oct.	226	11		0		0	226	1
(W.S.)*	2100	100	2505	100	10778	100	15383	100
Nov.	1975	100	953	56	9550	94	12478	90
Dec.		0		0	400	4	400	3
Jan.		0	753	44	209	2	962	7
Feb.		0		0		0	0	0
Mar.		0		0		0	0	0
Apr.		0		0		0	0	0
(D.S.)*	1975	100	1706	100	10159	100	13840	100

* W.S.:Wet Season Total, D.S.:Dry Season Total
Source:Planning Unit of PAO, Tarlac

Table H-14 Proposed Farming Practices of Palay

1) Varieties	IR series (IR 36, 60, 66, 72, etc.)
2) Growth period	110 days
3) Planting	
Planting method	Transplanting
Amount of seed	60 kg. per hectare for planting area
Area of nursery bed	1/20 - 1/25 of planting area
Nursery period	15 - 20 days
Planting density	30 cm x 15 cm, 3 seedlings/hill
Planting depth	3 cm from the surface
4) Land preparation	One time of plowing, two times of harrowing and one time of puddling
5) Fertilization	
Application amount	
Nursery bed	N: 2 kg/ha of planting area
Paddy	N: 73 kg/ha for wet season paddy 96 kg/ha for dry season paddy P_2O_5: 28 kg/ha K_2O : 28 kg/ha
Time of application	
Basic dressing	Puddling/transplanting time N: 25% of total amount P_2O_5 and K_2O: 100%
1st top dressing	Two weeks after transplanting N: 25 %
2nd top dressing	Late period of young panicle formation stage N: 25 %
3rd top dressing	Three to four weeks before harvesting N: 25 %
6) Weeding	
Manual	Two times at about four weeks and eight weeks after transplanting
Herbicides	10 kg/ha
7) Control of pests and diseases	3 L/ha
8) Harvesting	Manual harvesting by sickle

Table H-15 Proposed Farming Practices of Mungo

1) Varieties
   Pag-asa series (IPB) and MG series (AVRDC)
2) Growth period
   60 to 70 days
3) Planting
   Planting method
   row hill
   Amount of seed
   20 kg/ha
   Planting density
   50 cm between furrows and 25 cm between hills
4) Land preparation
   One time of plowing, two times of harrowing and one time of furrowing
5) Fertilization
   Application amount
   N: 66 kg/ha
   P205: 21 kg/ha
   K20 : 21 kg/ha
   Time of application
   Basic dressing
   100% of the fertilizer
6) Weeding
   Manual
   Three weeks after germination
   Herbicides
   Pre-emergencia, 1 kg/ha of Treflan EC or 3 kg/ha of Aniban EC
7) Control of pests and
   diseases
   3 L/ha
   3-5 days after emengence during seedling stage.
   Early vegetative stage 15-18 days after seeding.
   Pre-flowering stage.
   When about 10-15% pods are already formed.
8) Harvesting
   Manual harveting (hand picking of matured pods)
9) Water management
   During periods of high solar radiation and evapo-tranpiration

Table H-16 Proposed Farming Practices of Corn

1) Varieties
   HYV and improved UPCA (IPB) and PHIL series
2) Growth period
   Green corn : 70- 75 days
   Grains : 95-110 days
3) Planting
   Planting method
   drill
   Amount of seed
   20 kg/ha
   Planting density
   75 cm between rows and 20 cm between hills.
4) Land preparation
   One time of plowing, two times of harrowing and one time of furrowing
5) Fertilization
   Application amount
   N: 95 kg/ha
   P205: 28 kg/ha
   K20 : 28 kg/ha
   Time of application
   Basic dressing(Planting time)
   N:50% of total amount, P205 and K20:100%
   Top dressing(four weeks after germination; the crop is knee-high)
   N:50% of total amount
6) Weeding
   Manual
   Four weeks after germination(hilling up at knee high; 40-60 cm)
   Herbicides
   Pre-emergence(if the weeds are mainly grass species; aguingay, paragrass), 3 kg/ha of Atrazine
7) Control of pests and diseases
   3 L/ha (whorling stage and silking stage: for preventive measure - apply directly into the whorl 30 days after germination)
8) Harvesting
   Manual harveting by removing the complet cobs
   Green corn is harvested 18-22 days after silking or about 65-80 days depending on the variety and season of planting.
9) Water management
   Four weeks after germination, silking stage and soft dough stage.

Table H-17 Cropping Intensity and Yield of Palay in CISs Area

No.	Name of CIS	Present Intensity	Present Yield Annual	Wet Season	Dry Season
1	BAMBAN	B	C	C	C
2	SAN PEDRO	A	B	B	B
3	MALONZO	B	C	C	C
4	BANGCOU	B	B	B	B
5	SUSUBA	C	C	C	C
6	TELEBANCA	A	C	C	C
7	STA. RITA	B	A	B	A
8	MARITA	B	A	B	A
9	SAN MARTIN	C	B	B	B
10	BALUTO	B	A	A	A
11	LILIBANGAN	A	A	A	A
12	SAN BARTOLOME	B	A	B	A
13	SAN ISIDRO	B	B	B	B
14	LUCONG	B	B	B	B
15	MAGAO	B	B	B	A
16	TINANG	C	A	A	A
17	STO. ROSARIO	A	A	A	A
18	STA. MONICA	C	B	B	A
19	CALULUAN	B	C	B	C

Note:Level - A;high, B:mean, C:low

Table H-18 Selection of Preferred Area for Development

No.	CIS	Area	Improvement Yield	Quality	Stability	Number of Improvement Items ○	△
1	Bamban		△			-	1
2	San Pedro		△			-	1
3	Malonzo		△			-	1
4	Bangcou					-	-
5	Susuba					-	-
6	Telebanca		○			1	-
7	Sta. Rita	△			○	1	1
8	Marita	△			○	1	1
9	San Martin	△				-	1
10	Baluto	△		○	○	2	1
11	Lilibangan			○	○	2	-
12	San Bartolome	*			○	1	-
13	San Isidro	*				-	-
14	Lucong					-	-
15	Magao	*			○	1	-
16	Tinang	*		○	○	2	-
17	Sto. Rosario			○	○	2	-
18	Sta. Monica	*			○	1	-
19	Caluluan	*	△			-	1

Remarks:
○:Having potentials for big improvement.
△:Having potentials for some improvement.

* Physically, there is few room for increase in double cropping area. Refer to item 4.4 & 5.3.

Result:Preferred area for development.

1. Area where it is needed to increase cropping area are Sta.Rita, Marita, San Martin and Baluto.
2. Area where it is needed to increase yield are Telebanca, Bamban, San Pedro, Malonzo and Caluluan.
3. Area where it is needed enhance the quality after harvest are Baluto, Lilibangan, Tinang and Sta. Monica.
4. Area where it is needed to promote stable production for seed are Sta. Rita, Marita, Baluto, Lilibangan, San Bartolome, Magao, Tinang, Sto. Rosario and Sta. Monica.

Table H-19 Prospective Farmers & Farms for Development of Demonstration Farm

1. Farmers must have at least 2.5 to 5.0 hectares of gravity irrigated land.
2. Near to farm to market road.
3. With water pump to supply the water need during dry season (Optional).
4. Trusted and willing to follow the modern technology required by the Department of Agriculture and NIA's crop program.
5. Farmers must be a Land Owner/CLT and an actual tiller.

Prospective Demonstration Farmers:

I. Municipality of Concepcion.

CIS	Name	Barangay	Area Hectares	
1. Lucong	- Rolando Inocencio	Pitabunan	2.5	
	- Atelano Ayson *	Pitabunan	3.0	
	- Jaunto Porlucas *	Cafe	4.0	
2. Telabanca	- Bienvenido Feliciano *	Telabanca	3.5	
3. Sta. Rita	- Bienvenido Sanchez *	Sta. Rita	3.0	
4. Marita	- Luis Manalo	Sta. Rita	3.0	
5. San Martin	- Maximo Yumul	San Martin	2.5	
6. Baluto	- Florito Quiambao	Baluto	3.0	
	- Anyano Yumol *	Baluto	5.0	
	- Bernardino Sigua	Baluto	3.5	
7. Lilibangan	- Proceso Quiambao *	Lilibangan	3.0	
8. San Bartolome	- Eulogio Lacson	San Bartolome	5.0	
9. San Isidro	- Pacifico Punzalan *	San Isidro	4.0	
10. Magao	- Antonio Sagun	Magao	3.0	
11. Tinang	- Ramon Diamzon *	Tinang	3.0	
12. Sto. Rosario	- Lucrecia Catacutan *	Sto. Rosario	4.0	
13. Sta. Monica	- Alejandro Macalino	Sta. Monica	2.5	
	- Vegus Gamundoy	Sta. Monica	5.0	
	- Jesus Gamundoy	Sta. Monica	5.0	
14. Caluluan	- Benjamin Lenon	Caluluan	3.0	(1.5)
	Bienvenido Hipolito			(1.5)

II. Municipality of Bamban.

CIS	Name	Barangay	Area Hectares	
1. San Pedro	- Pablo Legazpi	San Pedro	2.5	
2. Bamban	- Mariano Muldong	Culubasa	3.0	
3. Bangcu	- Benigno Aguilar *	Bangcu	3.0	
4. Bamban	- Alfredo Manipon *	Pacalcal	2.5	
5. Bamban	- Orlando Cura	La Paz	3.0	(1.5)
	Pepito Sibal			(1.5)
6. Bamban	- Marcelo Caluya	Bamban	4.0	(1.0)
	Jose Victoria			(1.5)
	Ruben Santos			(1.5)
7. Bamban	- Artemio Sibal	Dela Cruz	2.5	
8. Malonzo	- Fernando Mallari	Malonzo	3.5	

III. Municipality of Capas.

CIS	Name	Barangay	Area Has.
1. Susuba	- Alfonso Santiago	Cut-Cut I	5.0
2. Susuba	- Ruben David	Cut-Cut I	2.5

Note: These farmers are recommended by the Municipal Agricultural Officer in the municipality and the President of their respective CISs.
* Selected farmers by consultants.

Figure H-1 Rice: Average of Planted and Harvested Area in Tarlac Province May, 1984 to April, 1989

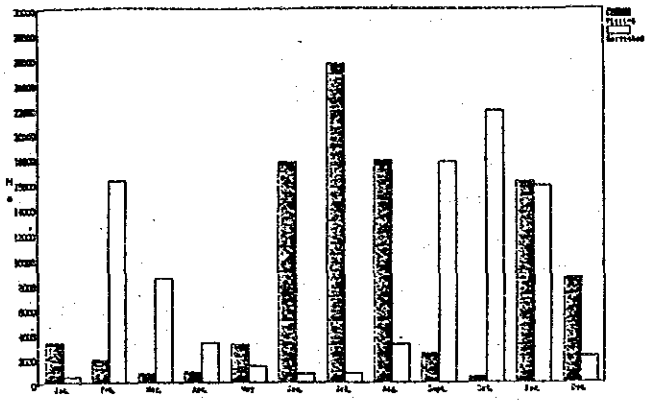
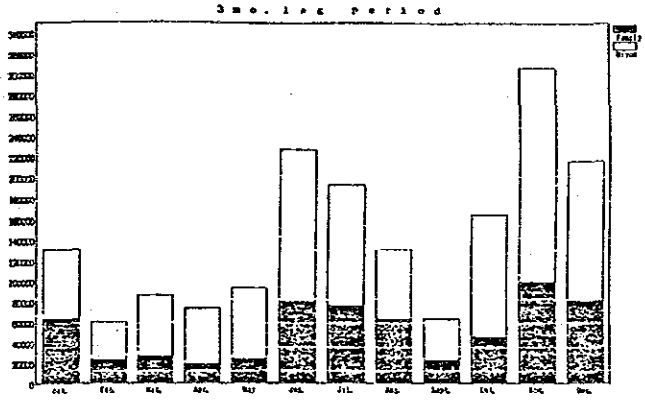


Figure H-2 Alternative Labors Utilization

CASE I, LABORS WITH PROJECT UNDER THREE MONTHS PLANTING LAG



CASE II, LABORS WITH PROJECT UNDER TWO MONTHS PLANTING LAG

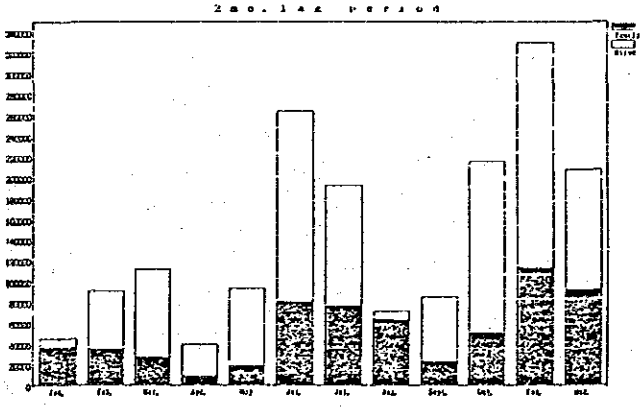
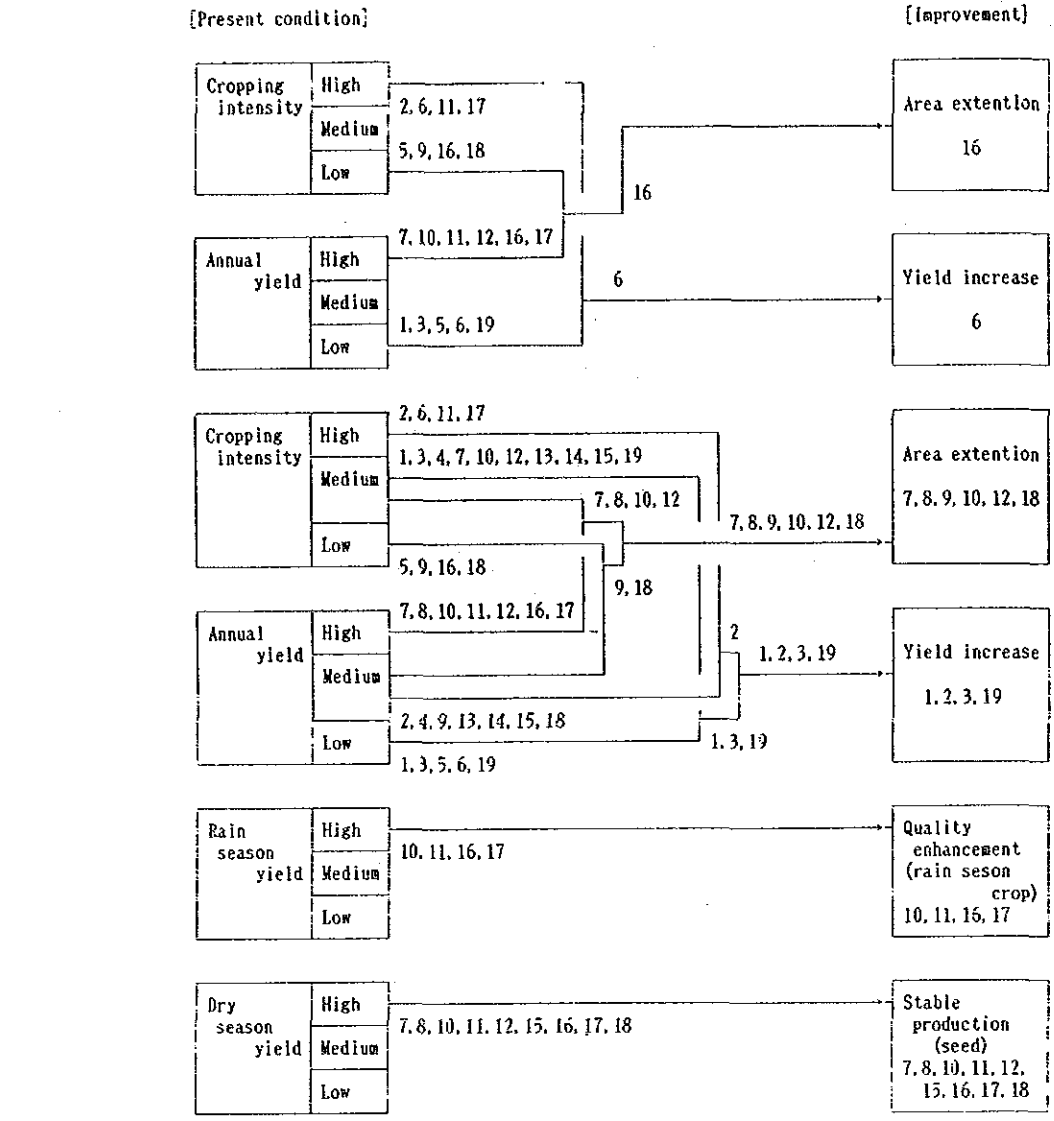
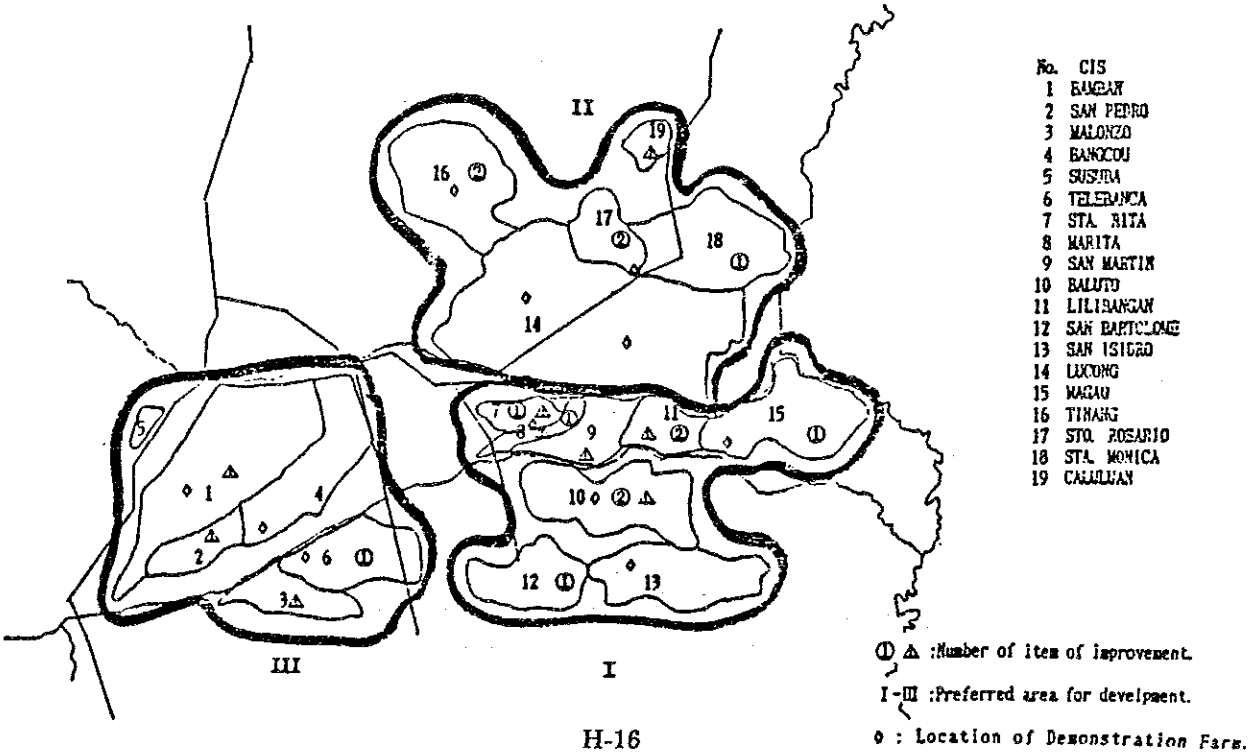


Figure H-3 Selection of Preferred Area for Development





APPENDIX J Post-Harvest and Marketing

J.1 PRESENT CONDITION

J.2 PROPOSED DEVELOPMENT

J.1 PRESENT CONDITION

APPENDIX J.1.1 Post Harvest Facilities belonging to Government Sector in Project Area

Facilities	*)In Project Area	**)Project Backyard Area
(1)Warehouse	1(50,000bags)	9(385,000bags)
(2)Rice Mill	1(3.5 MT/HR)	3(9 MT/HR)
(3)Dryer	1(160bags/bin)	5(8.5 MT/batch & 4 MT/HR)
(4)Grader	-	2(10 MT/HR)
(5)Thresher	-	1(1 MT/HR)
(6)Corn Sheller	-	1(1 MT/HR)
(7)Parboiling Plant	1(2 MT/HR)	-

Note : *)Concepcion
**)Aguso and La Paz
MT/HR = metric ton per hour

Sources : Tarlac Provincial Office/National Food Authority

APPENDIX J.1.2 Post Harvest Facilities belonging to Private Sector in Project Area

Facilities	(A) *)CIS Area	(B) Outside CIS Area	(C) = (A) + (B) **)Project Area
(1)Carabao	3,853 heads	3,845 heads	7,698 heads
(2)2-Wheel Tractor	352 units	599 units	951 units
(3)4-Wheel Tractor	58 units	59 units	117 units
(4)Thresher	150 units	299 units	449 units
(5)Mechanical Dryer	4 units	-	4 units
(6)Concrete Yard	30 yards	38 yards	68 yards
(7)Warehouse	19 houses	69 houses	88 houses
(8)Rice Mill	39 units	64 units	103 units
(9)Irrigation Pump	702 units	1,027 units	1,729 units

Note : *)=Total 19 CISs in Project Area
**)=Total 74 Barangays in Project Area

Sources : Survey by Project Study Team

APPENDIX J.1.3 Population Rate of Farm Machinery and Post Harvest Facilities in Project Area

Equipment	per Farm Household			per Hectare		
	(A) CIS Area	(B) Outside CIS Area	(C)=(A)+(B) Project Area	(D) CIS Area	(E) Outside CIS Area	(F)=(D)+(E) Project Area
(1) Carabao	0.93 head	0.55 head	0.69 head	0.41 head	0.28 head	0.33 head
(2) 2-Wheel Tractor	0.09 unit	0.09 unit	0.09 unit	0.04 unit	0.05 unit	0.04 unit
(3) 4-Wheel Tractor	0.02 unit	0.02 unit	0.02 unit	0.01 unit	0.01 unit	0.01 unit
(4) Portable Thresher	0.04 unit	0.05 unit	0.05 unit	0.02 unit	0.03 unit	0.03 unit
(5) Mechanical Dryer	0.01 unit	-	0.00 unit	0.00 unit	-	0.00 unit
(6) Concrete Yard	0.01 unit	0.01 unit	0.01 unit	0.01 unit	0.01 unit	0.01 unit
(7) Warehouse	0.01 house	0.01 house	0.01 house	0.01 house	0.01 house	0.01 house
(8) Rice Mill	0.01 unit	0.01 unit	0.01 unit	0.01 unit	0.01 unit	0.01 unit
(9) Water Pump	0.16 unit	0.16 unit	0.17 unit	0.08 unit	0.10 unit	0.09 unit

Note : 4,174 farm households in CIS area and 7,071 ones in outside CIS area for equipment (1), (2) and (3). 3,980 in CIS area and 6,425 in outside CIS area excluding sugar cane farmers for the remaind equipment.

Sources : Survey by Project Study Team

APPENDIX J.1.4 Input of Machinery Power and Capacity in Project Area

Equipment	(A) CIS Area	(B) Outside CIS Area	(C) Total Area
(1) 2-Wheel Tractor	0.30ps/ha	0.35ps/ha	0.33ps/ha
(2) 4-Wheel Tractor	0.37ps/ha	0.38ps/ha	0.37ps/ha
(3) Portable Thresher	1,125ton/day	2,213ton/day	3,338ton/day
(4) Mechanical Dryer	16ton/batch	-	16ton/batch
(5) Concrete Yard	72ton/batch	91ton/batch	163ton/batch
(6) Warehouse	2,765ton/batch	36,023ton/batch	38,788ton/batch
(7) Rice Mill	19.5ton/hr	32.5ton/hr	52ton/hr

Sources : Survey by Project Study Team

APPENDIX J.1.5 Inventry of Post Harvest Facilities by CIS in Project Area (1)

Name of CIS	Carabao (head)	Tractor					Portable Thresher		Rice Mill			
		2-Wheel		4-Wheel			Unit	Capacity (Cavans/day)	Kiskisan		Semi-Cono	
		Unit	Total hp	Unit	Total hp	Use			Unit	Capacity (Cavans/Hr)	Unit	Capacity (Cavans/Hr)
Bamban												
① Bamban CIS	280	5	62.5	3	225.0	3F	1	70	0	0	0	0
② San Pedro CIS	50	3	37.5	*1	(no operation)		4	400	0	0	1	15
③ Malonzo CIS	75	7	35.0	0	0	-	2	400	0	0	2	30
④ Bangcu CIS	58	10	125.0	0	0	-	5	375	0	0	0	0
Sub-Total	463	25	260.0	3	225.0	3F	12	1,245	0	0	3	45
Capas												
⑤ Susuba CIS	250	5	50.0	4	280.0	4F&P	3	240	0	0	2	30
Concepcion												
① Telebance CIS	181	15	101.3	0	0	-	12	1,800	1	15	4	60
② Sta. Rite CIS	70	5	35.0	6	390.0	2F,4P	4	400	0	0	0	0
③ Marite CIS	22	2	17.0	1	80.0	1F&P	1	150	0	0	0	0
④ San Martin CIS	110	7	49.0	5	325.0	5P	6	600	0	0	0	0
⑤ Baluto CIS	200	30	210.0	6	480.0	6F&P	10	2,250	0	0	2	30
⑥ Magao CIS	250	20	160.0	0	0	-	8	800	2	30	1	15
⑦ San Bartolome CIS	300	10	95.0	1	455.0	3F,4P	6	2,100	0	0	1	25
⑧ San Isidro CIS	500	20	160.0	1	455.0	7F&P	12	4,800	0	0	0	0
⑨ Lucong CIS	675	100	700.0	2	130.0	2P	40	4,000	0	0	15	225
⑩ Lilibengen CIS	232	25	175.0	0	0	-	4	400	0	0	0	0
① Tiaong CIS	500	12	132.0	6	405.0	6F&P	12	1,200	1	15	1	15
② Sto. Rosario CIS	20	6	42.0	3	210.0	3F&P	5	400	0	0	0	0
③ Sta. Monica CIS	50	50	375.0	5	337.5	5F&P	9	720	0	0	1	15
④ Caluluan CIS	30	20	150.0	3	195.0	3F&P	6	1,080	3	45	2	30
Sub-Total	3,140	322	2,401.3	51	3,462.5	5F,15P &31F&P	135	20,700	7	105	27	415
Grand Total	3,853	352	2,711.3	58	3,967.5	8F,15P &35F&P	150	22,185	7	105	32	490

Note : * F = Farming & P = Pulling Thresher in Tractor Use.

** Capacity means total of all units.

- to be continued -

APPENDIX J.1.5 Inventry of Post Harvest Facilities by CIS in Project Area (2)

Name of CIS	Dryer		Warehouse	Water Pump		
	Concrete Yard	Mechanical		Unit	Inch	Hp
Baaban						
① Baaban CIS	0	0	0	8	4"	10~15
② San Pedro CIS	1	0	1(350 bags)	50	4"	10~15
③ Malonzo CIS	1(120 ㎡)	0	0	-	4"	6
④ Bangcu CIS	0	0	0	5	5"	10~15
Sub-Total	2	0	1(350 bags)	63	4"&5"	-
Capas						
⑤ Susuba CIS	0	0	0	2	4"	6~10
Concepcion						
⑥ Telabanca CIS	2(600 ㎡)	0	0	1	4"	6.5~7
⑦ Sta. Rita CIS	4	0	3(3,000 bags)	15		
⑧ Marita CIS	1(300 ㎡)	0	0	4	4"	8.5
⑨ San Martin CIS	5	0	2(1,000 bags)	20	4"	6~10
⑩ Baluto CIS	3(900 ㎡)	0	0	96	4"	6~8
⑪ Magao CIS	2(1,750 ㎡)	0	0	12	4"	6~10
⑫ San Bartolome CIS	2(725 ㎡)	0	0	52	4"	8~11
⑬ San Isidro CIS	1(3,000 ㎡)	0	10(15,000bags)	188	4"	7~9
⑭ Lucong CIS	5	4	2(27,540 bags)	50	4"	7~8
⑮ Lilibangan CIS	0	0	0	15	4"	6~10
⑯ Tineng CIS	0	0	0	4	-	-
⑰ Sto. Roserio CIS	0	0	0	30	4"	6~8
⑱ Sta. Monica CIS	0	0	1(8,400 bags)	100	4"	7~10
⑲ Caluluan CIS	3(2,340 ㎡)	0	0	50	4"	7~8
Sub-Total	28	4	18(54,940 bags)	637	4"	-
Grand Total	30	4	19(55,290 bags)	702	4"&5"	-

Sources : Survey by Project Study Team

APPENDIX J.1.6 Inventry of Post Harvest Facilities by Barangay in Project Area (1)

Effective at September, 1989

Barangay	Carabao	Tractor		Thresher		Dryer		Rice Mill			Warehouse	Water Pump
		2-Wheel	4-Wheel	Portable	McCormic	Solar	Mechanical	Kiskisan	Semi-Cono	Cono		
Bamban												
1. Anupul	185	4	0	3	0	3	0	0	1	0	2(45,000bags)	1
2. Banaba	72	3	0	3	0	2	0	0	2	0	0	0
3. Bangeu	105	2	0	1	0	1	0	0	0	0	0	0
4. Culubasa	40	6	0	4	0	2	0	0	0	0	0	4
5. Dela Cruz	110	2	0	0	0	2	0	0	0	0	0	0
6. La Paz	5	2	0	3	0	2	0	0	1	0	3(24,000bags)	1
7. Lourdes	200	1	0	1	0	2	0	0	1	0	2(27,000bags)	1
8. Malonzo	100	8	0	3	0	1	0	0	0	0	0	0
9. Pacaleal	78	7	0	1	0	1	0	0	0	0	0	5
10. San Nicolas	420	1	0	0	0	1	0	0	0	0	0	1
11. San Rafael	299	1	0	1	0	1	0	0	0	0	0	6
12. San Roque	108	0	1	2	0	2	0	0	0	0	1(24,000bags)	1
13. San Pedro	30	3	0	4	0	2	0	0	2	0	1(6,000bags)	1
14. San Vicente	70	0	0	1	0	2	0	0	0	0	0	1
15. Sto. Nino	70	0	0	0	0	1	0	0	0	0	0	0
Sub-Total	1,892	40	1	27	0	25	0	0	7	0	9(126,000bags)	22
Capas												
1. Sta. Rita	80	19	0	7	0	1	0	0	0	0	0	12
2. Estrada	88	25	2	11	0	1	0	0	0	0	1(50cavans)	11
3. Talaga	50	5	2	3	0	1	0	1	0	0	1(300cavans)	15
4. Aranguren	45	3	2	53	0	1	0	1	0	0	0	11
5. Manga	22	6	0	1	0	1	0	0	0	0	0	7
6. Sto. Domingo II	80	6	0	3	0	1	0	0	0	0	2(100cavans)	15
7. Cutcut II	52	17	4	10	0	1	0	10	0	0	0	10
8. Sto. Rosario	38	2	1	7	0	1	0	2	0	0	0	11
9. Dolores	65	10	0	8	0	1	0	2	0	0	0	11
10. Maniapiz	14	15	8	10	0	1	0	3	0	0	0	11
11. Cutcut I	50	4	4	9	0	1	0	4	0	0	0	9
12. Lawy	250	31	13	22	0	1	0	4	0	0	1(100cavans)	12
13. Cubcub	25	3	0	3	0	1	0	0	0	0	0	3
14. Sto. Domingo I	15	0	0	0	0	1	0	0	0	0	0	2
Sub-Total	874	146	41	147	0	14	0	27	0	0	5(550cavans)	140
Concepcion												
1. Alfonso	100	7	1	3	0	0	0	0	0	1	1(500)	15
2. Green Village	68	8	0	2	0	0	0	0	0	0	0	14
3. San Jose	44	8	2	6	0	1	0	0	4	5	4(3,500cavans)	5
4. Tinang	230	0	0	0	0	1	0	0	0	0	0	0
5. Pitabunan	100	13	0	6	0	1	0	1	1	0	2(2,500)	8
6. Parulong	63	15	0	3	0	0	0	0	0	0	0	25
7. Caluluan	76	43	5	15	0	1	0	4	0	0	4(6,000)	73
8. Magao	250	15	7	6	0	0	0	0	0	3	0	0
9. San Martin	32	6	4	4	0	1	0	0	0	0	0	26
10. Sta. Cruz	191	51	5	11	0	1	0	1	0	0	4(3,500)	81
11. Lilibangan	107	10	0	5	0	1	0	0	0	0	0	25

- to be continued -

APPENDIX J.1.6 Inventry of Post Harvest Facilities by Barangay in Project Area (2)

Effective at September, 1989

Barangay	Carabao	Tractor		Thresher		Dryer		Rice Mill			Warehouse	Water Pump
		2-Wheel	4-Wheel	Portable	McCormic	Solar	Mechanical	Kiskisan	Semi-Cono	Cono		
12. Sto. Rosario	50	20	2	4	0	1	0	1	0	0	1(500)	30
13. Sto. Cristo	23	27	3	6	0	1	0	0	0	0	1(500)	31
14. Sta. Monica	170	52	9	12	0	1	0	2	0	4	4(3.000)	130
15. Dungan	57	3	0	3	0	1	0	0	0	0	0	0
16. San Francisco	174	34	5	14	0	1	0	2	0	0	5(2.500)	60
17. Minane	20	2	2	14	0	1	0	2	0	0	7(270.000)	4
18. Panalicsican	20	4	0	0	0	0	0	0	0	0	0	30
19. Talimundoc-Mariala	60	3	0	2	0	0	0	1	0	0	0	83
20. San Isidro	400	18	0	19	0	1	0	0	0	0	10(8.500cavans)	200
21. Malupa	65	5	1	4	1	0	0	0	0	0	0	120
22. Culatingan	30	50	6	8	0	1	0	0	0	0	1(2.000)	185
23. Cafe	90	40	1	9	1	1	0	4	0	0	0	93
24. Corazon de Jesus	35	15	1	4	0	1	0	2	0	0	1(500)	10
25. Talimundoc-San Miguel	130	31	0	9	0	1	4	1	0	0	1(1.000)	29
26. Sta. Maria	20	8	3	1	0	0	0	1	0	0	0	4
27. Santiago	246	34	3	11	0	1	0	2	0	0	2(1.000)	26
28. San Agustin	200	6	4	6	0	0	0	1	0	0	0	10
29. Sta. Rita	200	16	8	9	0	1	0	0	0	3	9(6.000)	20
30. San Bartolome	150	7	7	8	0	1	0	1	0	0	2(2.000)	60
31. San. Antonio	120	13	3	4	0	1	0	4	0	0	0	95
32. San Juan	150	7	0	7	0	0	0	0	0	0	0	12
33. Dutung A Yatas	52	7	0	5	2	1	0	0	0	0	1(100.000)	5
34. Sto. Nilo	150	6	1	5	0	0	0	0	0	0	1(400)	20
35. Telabanca	150	10	0	9	0	1	0	4	0	0	0	10
36. San Nicolas Balas	45	32	3	10	0	1	0	2	0	0	6(3.000)	25
37. San Vicente	50	4	0	0	0	0	0	0	0	0	0	3
38. Castillo	0	0	0	0	0	1	0	0	0	0	0	0
39. Baluto	225	60	8	10	0	1	0	1	0	0	1(2.000cavans)	120
40. Calius Gueco	53	10	5	5	0	0	0	1	0	0	0	43
41. Sta. Rosa	420	31	0	9	0	1	0	1	0	0	0	31
42. Pando	6	1	0	0	0	0	0	0	0	0	0	1
43. Parang	30	1	0	1	0	0	0	0	0	0	0	2
44. Mabilog	30	0	0	0	0	0	0	0	0	0	0	0
45.)San Nicolas (Pob.)	?	32	3	2	0	1	0	2	0	0	6(230.000)	25
Sub-Total	4.932	765	102	271	4	29	4	9	45	15	74(649.200)	1.794
Grand-Total	7.698	951	144	445	4	68	4	36	52	16	88(775.150)	1.956

)Downtown Barangay area composed of Minane and San Nicolas.

Sources : Survey by Project Study Team

APPENDIX J.1.7 Number of Thresher Units, Capacities and Amount of Capitalization by Municipality For the Year 1988

Municipality	No. of Units		Capacity		Fuel used						Capitalization
	Throw-in	Hold-on	Throw-in	Hold-on	Throw-in			Hold-on			
					G	D	E	G	D	E	
Anao	0	0	0	0	0	0	0	0	0	0	P 0
Baaban	1	0	5	0	0	1	0	0	0	0	22.000
Canling	7	0	125	0	0	7	0	0	0	0	154.000
Capas	0	0	0	0	0	0	0	0	0	0	887.856
Concepcion	7	0	35	0	0	7	0	0	0	0	0
Gerona	17	1	85	5	0	17	0	0	1	0	140.000
La Paz	0	0	0	0	0	0	0	0	0	0	365.000
Mayantoc	5	0	76	0	0	5	0	0	0	0	0
Moncada	1	0	20	0	0	1	0	0	0	0	150.000
Paniqui	0	0	0	0	0	0	0	0	0	0	20.000
Pura	0	0	0	0	0	0	0	0	0	0	0
Ramos	0	0	0	0	0	0	0	0	0	0	0
San Clerente	1	0	25	0	0	1	0	0	0	0	20.000
San Manuel	3	0	56	0	0	3	0	0	0	0	105.000
Sta. Ignacia	12	0	60	0	0	12	0	0	0	0	295.000
Tarlac	6	0	88	0	0	6	0	0	0	0	248.000
Victoria	2	0	10	0	0	2	0	0	0	0	67.000
Grand-Total	62	1	585	5	0	62	0	0	1	0	1,596.000

Note : Capacity = Cavans/hour, G = Gasoline, D = Diesel, E = Electric, Sources : Provincial Office/Tarlac/NFA

APPENDIX J.1.8 Number of Dryers/Transportation Equipment and Capitalization by Municipality For the Year 1988

Capacity Unit : bag/50kg

Municipality	Mechanical Dryers					Transportation Equipment				
	No. of Units	Fuel Used	Grains Handled	Capacity in Bags	No. of Operators	Truck			Jeep	
						Units	Fuel	Capacity	Units	Capacity
Anao	0	-	-	0	0	0	-	0	0	0
Baaban	0	-	-	0	0	0	-	0	0	0
Canling	1	Electric	Paddy/Rice	500	14	39	Diesel	15,800	0	0
Capas	0	-	-	0	3	6	Diesel	2,400	0	0
Concepcion	4	Kerosene	Paddy	560	12	25	Diesel	10,500	*1	50
Gerona	0	-	-	0	4	10	Diesel	4,150	0	0
La Paz	0	-	-	0	5	10	Diesel	4,200	0	0
Mayantoc	0	-	-	0	4	8	Diesel	3,200	0	0
Moncada	0	-	-	0	5	18	Diesel	7,200	0	0
Paniqui	0	-	-	0	2	9	Diesel	3,600	0	0
Pura	0	-	-	0	1	1	Diesel	250	0	0
Ramos	0	-	-	0	1	1	Diesel	250	0	0
San Clemente	0	-	-	0	1	1	Diesel	350	0	0
San Manuel	0	-	-	0	0	0		0	0	0
Sta. Ignacia	0	-	-	0	4	5	Diesel	2,000	0	0
Tarlac	0	-	-	0	17	84	Diesel	35,800	**1	30
Victoria	0	-	-	0	3	5	Diesel	2,050	0	0
Grand-Total	5	-	-	1,060	76	222	Diesel	91,750	2	80

Sources : Provincial Office/Tarlac/NFA, Note : * Weapon Carrier/Diesel, ** Jeep/Diesel

APPENDIX J.1.9 Number of Millers, Mills, Total Milling Capacity and Amount of Capitalization by Municipality For the Year 1988

Municipality	No. of Millers		Number of Units and Capacity								Capitalization
	Rice Millers	Corn Millers	Cono		Kiskisan		Rubber Roll		Impact		
			Units	Capacity	Units	Capacity	Units	Capacity	Units	Capacity	
Anao	3	0	1	8	2	10	0	0	0	0	P 106.000
Bamban	7	0	3	20	4	26	0	0	0	0	185.000
Capas	44	0	40	591.36	8	38	4	88.3	2	13.4	2.621.500
Capas	16	0	10	85	7	28	1	6	0	0	887.856
Concepcion	30	0	25	366.83	5	25	2	20.2	0	0	1.982.250
Gerona	26	0	5	53.5	20	99	1	10	0	0	854.650
La Paz	17	0	7	79.25	9	51.2	3	27	0	0	800.600
Mayantoc	13	0	9	107.6	4	20	1	6	0	0	984.500
Moncada	13	0	9	188.5	3	14.6	6	78.6	0	0	891.500
Paniqui	10	0	7	47	1	5	6	116	0	0	1.486.000
Pura	6	0	1	8	3	27.5	2	25	1	10	240.000
Ramos	8	0	4	40.33	3	14	4	32	0	0	345.750
San Clemente	9	0	8	56.6	0	0	1	5	0	0	295.100
San Manuel	4	0	1	5	3	15	1	8	0	0	230.000
Sta. Ignacia	20	0	5	59.7	10	48	6	54	0	0	678.560
Tarlac	41	1	32	642.21	7	36	5	34.5	0	0	3.872.500
Victoria	13	0	11	98	9	54	3	15	0	0	575.000
Grand-Total	280	1	178	456.88	98	511.3	46	525.6	3	23.4	16.836.166

Note : Capacity = Cavans/hour, Sources : Tarlac Provincial Office/NFA

APPENDIX J.1.10 Number of Warehousemen, Warehouses/Storage Capacities and Amount of Capitalization by Municipality For the Year 1988

Municipality	No. of Warehousemen	Conventional No of Units		Storage Space	No. of Units and Capacity as to the Kinds of Grains handled				Capitalization
		Bonded	Non-Bonded		Paddy/Rice		Others		
					Units	Capacity	Units	Capacity	
Anao	0	0	0	0	0	0 bags	0	0	P 0
Bamban	1	0	1	0	1	1.000	0	0	30.000
Capas	27	9	15	6	29	661.668	1	11.575	7.250.500
Capas	4	1	4	0	5	46.130	0	0	250.000
Concepcion	14	6	6	2	14	356.837	0	0	2.600.500
Gerona	1	0	1	0	1	10.000	0	0	60.000
La Paz	6	3	2	2	7	223.870	0	0	1.230.000
Mayantoc	4	1	3	1	5	48.635	0	0	860.000
Moncada	5	2	2	1	5	238.680	0	0	4.600.000
Paniqui	3	1	1	1	3	195.939	0	0	3.800.000
Pura	1	0	0	1	1	2.500	0	0	50.000
Ramos	0	0	0	0	0	0	0	0	0
San Clemente	2	1	1	0	2	23.810	0	0	72.900
San Manuel	1	0	0	1	1	2.500	0	0	25.000
Sta. Ignacia	11	1	2	8	11	36.680	0	0	513.781
Tarlac	21	10	11	1	20	843.987	2	24.800	6.500.600
Victoria	6	0	7	1	8	116.540	0	0	598.000
Grand-Total	107	35	56	25	113	2.808.976	3	36.375	28.441.281

Note : Unit : bag/50kg, Storage Space = Small Warehouse, Sources : Tarlac Provincial Office/NFA

APPENDIX J.1.11 Number of Rice Retailers/Wholesalers and Amount of Capitalization by Municipality For the Year 1988

Municipality	No. of Retailers	No. of Wholesalers	Capitalization	
			Retailers	Wholesalers
Anao	2	6	P 18,000	P 65,000
Bamban	31	10	240,000	145,000
Capas	104	55	1,540,000	4,770,000
Capas	69	37	289,000	882,000
Concepcion	92	69	645,000	3,062,000
Gerona	61	27	480,000	510,000
La Paz	45	27	480,000	705,000
Mayantoc	10	14	65,000	801,250
Moncada	35	18	425,000	2,807,000
Paniqui	52	17	330,000	1,330,000
Pura	19	4	139,000	40,000
Ramos	7	7	51,400	145,000
San Clemente	9	12	63,447	163,447
San Manuel	26	9	160,000	205,000
Sta. Ignacia	29	22	305,000	520,000
Tarlac	273	83	1,951,200	6,200,000
Victoria	29	13	183,100	750,000
Grand-Total	893	430	7,357,147	23,100,697

Sources : Tarlac Provincial Office/NFA

APPENDIX J.1.12 Number of Licensees/Registered Applicants as to the Different Classifications For the Year 1988

Municipality	Status of Applicatnts as to			Applicants as to Number of Lines		Applicants as to forms of Business Organization				Applicants as to Grains Handled		
	New	Renew	Total	Single	Multi	Single	PART	Corp	Coop/assn	Rice/Corn	Flour	Feed
Anao	1	6	7	5	2	7	0	0	0	7	0	0
Bamban	6	34	40	29	11	40	0	0	0	37	2	1
Capas	36	129	165	111	54	161	1	2	1	155	8	2
Capas	34	70	104	77	27	104	0	0	0	97	6	1
Concepcion	24	119	143	89	54	139	0	2	2	135	5	3
Gerona	35	85	120	94	26	120	0	0	0	111	7	2
La Paz	19	44	63	43	20	63	0	0	0	59	3	1
Mayantoc	2	26	28	14	14	28	0	0	0	28	0	0
Moncada	10	45	55	38	18	53	0	1	1	47	4	4
Paniqui	12	59	71	53	18	70	0	1	0	60	9	2
Pura	2	21	23	16	7	23	0	0	0	23	0	0
Ramos	1	16	17	13	4	17	0	0	0	15	2	0
San Clemente	1	16	17	6	11	15	0	0	2	15	1	1
San Manuel	10	19	29	17	12	29	0	0	0	28	0	1
Sta. Ignacia	11	48	59	36	23	59	0	0	0	53	4	2
Tarlac	140	273	413	335	78	403	2	7	1	367	27	19
Victoria	4	42	46	27	19	46	0	0	0	42	2	2
Grand-Total	348	1,052	1,400	1,002	398	1,377	3	13	7	1,279	30	41

Sources : Tarlac Provincial Office/NFA

APPENDIX J.1.13 Number of Poultry/Hog Raisers and Total Consumption by Municipality For the Year 1988

Municipality	No. of Units	Number of Units As To Population					Total Consumption in kilogram (Grain)
		Poultry/Hogs	Hogs	CKL	CKB	FTH	
Anao	0	0	0	0	0	0	0
Baaban	1	0	1	0	0	3,181	42,500
	Brookside Farms, Anupul, Control No.0369-1-01259, Owner : Mr. Robert No						
Canlling	3	0	3	0	0	2,542	27,500
Capas	1	1	0	0	25,000	200	15,000
	Baron Farms, Sto. Rosario, Contro No.0369-1-01279, Owner : Mr. Deogracias Baron						
Concepcion	4	1	3	500	0	10,850	90,500
	Sariling Atin Poultry, L. Cortez Street, Control No. 0369-1-00494,Owner : Mr. Augusto Valdez						
	Concepcion Farms, Control No.0369-1-00901, Owner : Mr. Alfredo Dy						
Gerona	1	0	1	0	0	45	175
La Paz	1	1	0	0	0	80	150
Mayantoc	2	0	2	0	0	250	6,250
Moncada	3	2	1	0	52,000	0	48,250
Paniqui	3	1	2	0	45,000	160	38,500
Pura	0	0	0	0	0	0	0
Ramos	0	0	0	0	0	0	0
San Clemente	1	0	1	0	0	300	600
San Manuel	3	1	2	0	15,000	145	5,500
Sta. Ignacia	2	1	1	0	11,500	250	7,500
Tarlac	24	6	18	0	86,000	15,452	150,050
Victoria	2	1	1	0	1,000	1,500	12,250
Grand-Total	51	15	36	500	235,500	34,955	444,725

Note : CKL=Chicken Laying Heads, CKB=Chicken Big Heads, FTH=Fattening Hog Heads, Sources : Tarlac/NFA

APPENDIX J.1.14 Number of Bakeries/Registered Institutions and Consumption by Municipality For the Year 1988

Municipality	No. of Bakeries	No. of Ovens	Bakeries					Restaurant/Carinderia/ Canteen/Kitchennette	
			Fuel Used			†Total Daily Capacity	†Average Weekly Consumption	Unit	††Rice Consumption
			Gas	Brick	Electric				
Anao	0	0	0	0	0	0	0	0	0
Baaban	2	2	0	2	0	4	28	0	0
Canlling	8	9	1	8	0	62	434	22	1,250
Capas	3	3	2	1	0	11	77	2	100
Concepcion	6	8	3	5	0	44	308	1	100
Gerona	6	7	0	7	0	55	385	6	300
La Paz	3	6	1	4	1	25	175	1	100
Mayantoc	0	0	0	0	0	0	0	3	150
Moncada	4	4	1	3	0	24	168	0	0
Paniqui	6	6	2	4	0	42	294	0	0
Pura	0	0	0	0	0	0	0	0	0
Ramos	2	2	2	0	0	4	28	0	0
San Clemente	1	1	0	1	0	5	35	0	0
San Manuel	0	0	0	0	0	0	0	0	0
Sta. Ignacia	4	4	0	4	0	16	112	0	0
Tarlac	21	23	2	19	2	129	903	†††32	2,400
Victoria	2	2	1	1	0	10	70	0	0
Grand-Total	68	77	15	59	3	431	3,017	67	4,400

Sources : Tarlac Provincial Office/NFA, Note : †In bags of 25 kgs ††In Kgs †††Of which 2 are Non-Filipino

APPENDIX J.1.15 Number of Processors/Manufacturers and Consumption by Municipality For the Year 1988

Municipality	No. of Persons	Rice Products		Noodles		Flour Mills		Siopao		Feed		Others	
		Unit	Consumption	Unit	Rice Consumption	Unit	Consumption	Unit	Consumption	Unit	Consumption	Unit	Consumption
Anao	0	0	0	0	0	0	0	0	0	0	0	0	0
Banban	0	0	0	0	0	0	0	0	0	0	0	0	0
Camiling	0	0	0	0	0	0	0	0	0	0	0	0	0
Capas	3	2	400kls	1	200kls	0	0	0	0	0	0	0	0
Concepcion	0	0	0	0	0	0	0	0	0	0	0	0	0
Gerona	1	0	0	1	200kls	0	0	0	0	0	0	0	0
La Paz	0	0	0	0	0	0	0	0	0	0	0	0	0
Mayantoc	0	0	0	0	0	0	0	0	0	0	0	0	0
Moncada	1	0	0	1	150kls	0	0	0	0	0	0	0	0
Paniqui	0	0	0	0	0	0	0	0	0	0	0	0	0
Pura	0	0	0	0	0	0	0	0	0	0	0	0	0
Ramos	0	0	0	0	0	0	0	0	0	0	0	0	0
San Clemente	0	0	0	0	0	0	0	0	0	0	0	0	0
San Manuel	0	0	0	0	0	0	0	0	0	0	0	0	0
Sta. Ignacia	0	0	0	0	0	0	0	0	0	0	0	0	0
Tarlac	16	7	1,400kls	5	800kls	1	2,000kls	1	50kls	1	25,000kls	3	500kls
Victoria	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand-Total	21	9	1,800kls	8	1,350kls	1	2,000kls	1	50kls	1	25,000kls	3	500kls

Sources : Tarlac Provincial Office/NFA

APPENDIX J.1.16 Present Terms of Contract Farming (1)

Data Source	Land Preparation	Threshing	Milling
①Lucong CIS	P800/ha plus lunch (1 plowing + 2 harrowings)	7% of total cavans of paddy threshed	P0.35/kg
②San Martin CIS	P640/ha by carabao	7% of total cavans of paddy threshed	P0.35/kg
③Magao CIS	P1,200/ha by Hand Tractor (1 plowing + 2 harrowing) P700/ha by 4-Wheel Tractor (only 1 plowing) P70/day by carabao with operator	7% of total cavans of paddy threshed	P0.35/kg
④Marita CIS	P100/day by carabao P700/ha by Hand Tractor (1 plowing + 2 harrowing) P700/ha by 4-Wheel Tractor (only 1 plowing)	7% of total cavans of paddy threshed	P0.35/kg
⑤Baluto CIS	P70/day by carabao	7% of total cavans of paddy	P0.40/kg

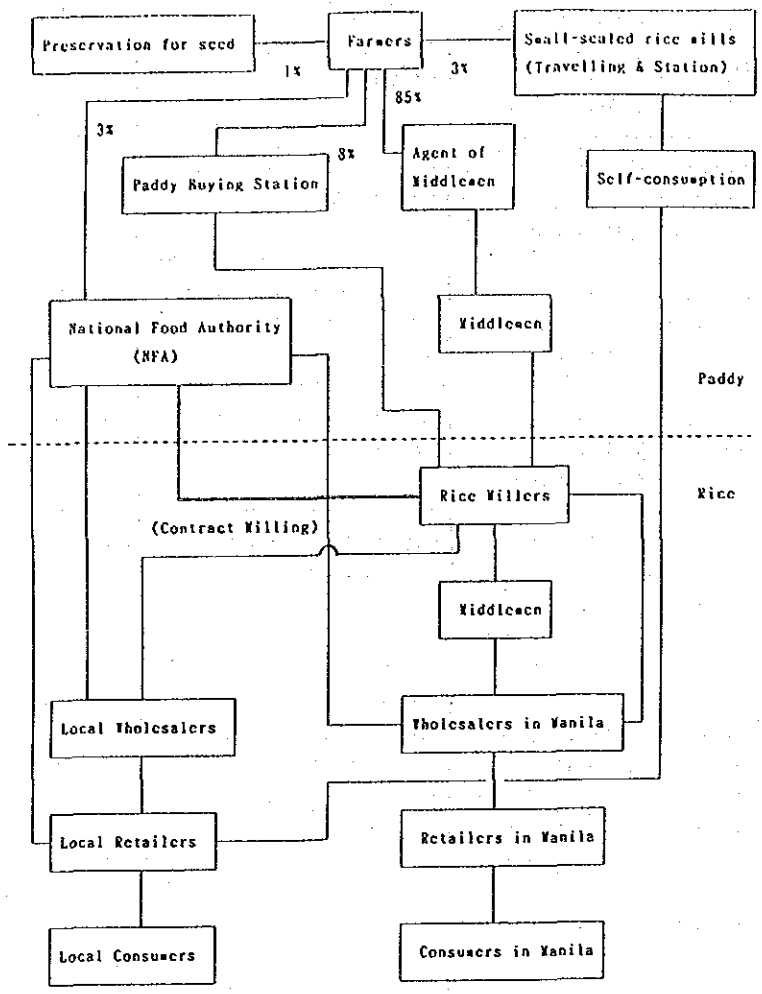
- to be continued -

APPENDIX J.1.16 Present Terms of Contract Farming (2)

Data Source	Land Preparation	Threshing	Milling
	P650/ha by Hand Tractor P600/ha by 4-Wheel Tractor	threshed	
③San Bartolome CIS	P70/day by carabao P850/ha by Hand Tractor P550/ha by 4-Wheel Tractor	7% of total cavans of paddy threshed	P0.35-0.45/kg, Bran P2.00/kg
⑤Telebanca CIS	P70/day by carabao P640/ha by Hand Tractor P700/ha by 4-Wheel Tractor	7.5% of total cavans of wet paddy and 7% of dry paddy threshed	P0.35/kg
③Caluluan CIS	P60/day by carabao P800/ha by Hand Tractor P700/ha by 4-Wheel Tractor	7% of total cavans of paddy threshed	P0.35/kg
③Tinang Cooperative	P500/ha by Hand Tractor (only harrowing, previous plowing by carabao)	6.5% of total cavans of paddy threshed	P0.35/kg
③Sto Rosario CIS	P1,200/ha by Hand Tractor (ready to transplant) Cabecilla @ P400/ha for contract transplanting by 25-30 persons/ha and total 4 ha can be completed within 1 day	7.5% of total cavans of paddy threshed Harvesting & threshing @ 4 ha/day by 20-30 persons & 10 : 1 sharing (10 cavans to owner & 1 cavan to harvester)	P0.40/kg by traveling rice mill (all season)
⑤Sta Monica CIS	P700/ha by Hand Tractor (ready to transplant)	7.0% of total cavans of paddy threshed	P0.35/kg by traveling mill, P1.5/kg - bran or milled rice
③Cut-Cut I CIS	P480/ha	7.0% of total cavans of paddy threshed	P11.00/50kg
③Basban CIS	P1,800/ha by Hand Tractor	8.0% of total cavans of paddy threshed	P0.40/kg
③San Pedro CIS	P1,200/ha by combination of carabao and Hand Tractor	8.0% of total cavans of paddy threshed	P0.35/kg
③Bangeu CIS	P1,000/ha	8.0% of total cavans of paddy threshed	P0.35/kg
③Mr. Leonardo Saraiento (travel miller)			P0.40/kg in cash P6.00/kg in white rice P0.60/kg in bran
③Malonso CIS	P90/day by carabao P1,052/ha by Hand Tractor	3.0% of total cavans of paddy threshed	
③San Isidro CIS	P70/day by carabao w/o food P500/ha by Hand Tractor (ready for transplanting) P300/ha by 4-Wheel Tractor	7.0% of total cavans of paddy threshed	

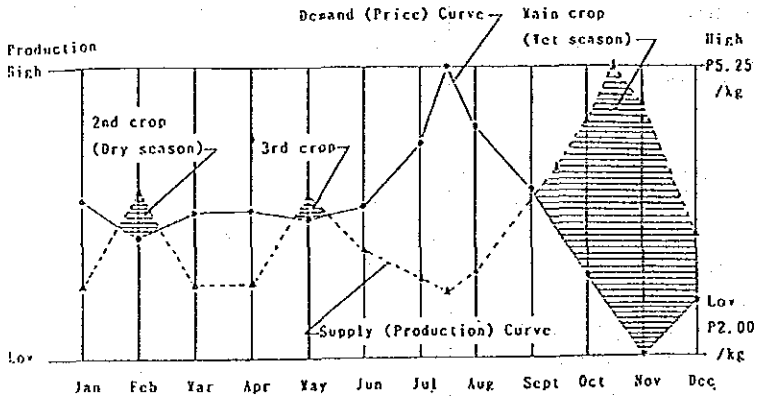
Sources : Survey by Project Study Team

APPENDIX J.1.17 Rice Marketing Channel in Southern Tarlac



Sources : Survey by Project Study Team

APPENDIX J.1.18 Annual Price Fluctuation of Paddy in Southern Tarlac (1989/1990)



Sources : Survey by Project Study Team

APPENDIX J.1.19 Current Paddy Farmgate Price (1988/1989)

Unit : Peso/kg

Source of Information	Dry Season			Wet Season		
	Low	Average	High	Low	Average	High
1.Concepcion Cid Warehouse (NFA)	3.40 (1988) & 4.20 (1989)					
2.Lucong CIS	3.60		4.00	2.00		2.80
3.Sta Rita CIS		4.50			3.80	
4.San Martin CIS		4.50			4.10	
5.Lilibangan CIS		4.50			3.70	
6.Magao CIS		4.50			3.20	
7.Marita CIS		3.30			2.00	
8.Baluto CIS		4.00			3.80	
9.San Bartolome CIS		4.00			3.00	
10.Telebanca CIS		4.40			3.90	
11.Caluluan CIS		5.00			4.00	
12.Tinang Cooperative		4.80			3.50	
13.Sto Rosario CIS		3.50			2.00	
14.Sta Monica CIS		4.00			1.80	
15.Cut-Cut I CIS		3.60		1.00		1.40
16.Bamban CIS		3.70			2.60	
17.San Pedro CIS		4.00			3.20	
18.Bangeu CIS	4.00		4.50	2.80		2.90
19.Malonso CIS	3.50				2.50	
20.San Isidoro CIS	4.10				3.00	
21.Lilia T. Agaloos (Retailer/La Paz)				Dry		4.70
				Skin dry		4.00
				Wet		3.20
22.S.P. Gen. Merchandise				20% MC(IR-60)		3.70
				14% MC(IR-60)		5.00

Sources : Survey by Project Study Team

APPENDIX J.1.20 Wholesale and Retail Price of Rice

Unit : Peso/kg

1. Wholesale price ...5 sampling stations at Nueva Ecija

	Palay special		Rice special		Rice ordinary	
	Low	High	Low	High	Low	High
Aug/1988	3.60	4.40	6.00	7.10	6.00	6.40
Sept/1988	3.40	4.20	6.00	7.40	6.00	6.80
Oct/1988	2.70	3.50	6.00	7.80	5.60	6.80
Nov/1988	3.00	3.50	6.00	7.50	ND	
Dec/1988	3.10	4.50	6.00	7.00	ND	
Jan/1989	3.50	4.70	6.40	7.80	ND	
Feb/1989	3.50	4.60	6.80	7.50	ND	
Mar/1989	3.60	4.60	6.00	8.40	ND	
Apr/1989	4.00	5.00	6.00	8.90	ND	
May/1989	3.40	4.85	6.80	8.70	ND	
Jun/1989	3.80	5.10	6.70	9.30	ND	
Jul/1989	3.90	5.50	8.70	9.00	6.80	7.40
Aug/1989	4.80	5.80	8.80	11.80	7.50	9.00

2. Retail Price (Special Rice-monthly average)

	Metro Manila	Cabanatuan
Aug/1988	7.81	ND
Sept/1988	7.97	ND
Oct/1988	7.89	ND
Nov/1988	7.93	ND
Dec/1988	8.06	ND
Jan/1989	ND	ND
Feb/1989	ND	ND
Mar/1989	ND	ND
Apr/1989	ND	ND
May/1989	ND	ND
Jun/1989	ND	ND
Jul/1989	ND	ND
Aug/1989	ND	ND

Note : ND = No description

Sources : The Bureau of Agricultural Statistics, DA

APPENDIX J.1.21 Current Retail Price of White Rice in Southern Tarlac

Effective at September, 1989

Retailer	Grade	Price(Peso/kg)
A & C/Concepcion	Tag-Tag Camiling (+Laon)	11.00
	IR-60 (+Laon)	9.70
	IR-60 (+Laon)	9.50
	IR-32 (+Laon)	9.30
	IR-66L (+Laon)	9.00
	IR-64L (+Laon)	8.50
	Bran (++Mata)	4.50
	Bran (+++Darak)	2.20
Baaban Merchandise/Baaban	1st class	10.00
	2nd class	9.75
	3rd class	9.00
	4th class	8.75
	5th class	8.50
S.P. Gen Merchandise/Capas	Glutinous	15.00
	Complete	9.00
	NFA 100% broken Thai rice	6.50
	Bran mixed with broken rice	4.00
	Bran (+++Darak)	3.00
	Mongo	18.00
	Conditioned (mixed with corn, soybean and barley)	8.75
	Starter	7.75
	Corn gril	7.75

Note : + = old
++ = fine bran
+++ = coarse bran

Sources : Survey by Project Study Team

APPENDIX J.1.22 Estimated Price Breakdown of Rice in Project Area

Description	Peso/kilo (Paddy)		Peso/Cavan (Paddy)	
	Wet Season	Dry Season	Wet Season	Dry Season
A. Farmer				
①Production Cost	2.39	2.12	119.45	105.99
Land Preparation	0.17-0.31		8.27-15.49	
Transplanting	0.11		5.17	
Harvesting	0.19	0.18	9.23	8.64
Threshing	0.15	0.14	7.11	6.65
Sun Drying	0.02		1.00	
Other Input	1.61-1.75	1.36-1.50	80.50-87.50	68.00-75.00
②Gross Return	▲0.39-1.71	1.18-2.88	▲19.45-85.55	59.01-144.01
③Farmgate Price	2.00-4.10	3.30-5.00	100-205	165-250
B. Rice Miller				
④Transportation Cost	0.13-0.20		6.50-10.00	
Field-Road	0.03-0.04		1.50- 2.00	
Road-Farmer's yard	0.04-0.06		2.00- 3.00	
Farmer's Yard-Miller	0.06-0.10		3.00- 5.00	
⑤Rice Miller's Buying Price	2.13-4.30	3.43-5.20	106.5-216	171.5-260
⑥Process Cost	4.46-4.58		223-229	
Sun Drying	0.02		1.00	
(Finish Drying)				
Unloading	0.007		0.35	
Drying	0.006		0.30	
Loading	0.007		0.35	
Other Process Cost	4.44-4.56		222-228	
⑦Gross Return	1.12-4.72 (Rice)		56-236 (Rice)	
⑧Wholesale Price	5.60-9.30 (Rice)		280-590 (Rice)	
C. Retailer				
⑨Transportation Cost	0.06-0.10 (Rice)		3-5 (Rice)	
⑩Gross Return	1.60-2.84 (Rice)		80-142 (Rice)	
⑪Retail Price	8.50-11.00(Rice)		425-550 (Rice)	

Sources : Survey by Project Study Team

APPENDIX J. 1. 23 Current Price of Main Agricultural Input (1)

Information Sources	Seed (Peso/cavan-46kg /Exgodown)	Fertilizer (Peso/bag-50kg/ Exgodown-Concepcion)	Insecticide/ Pesticide (Peso/quart)	Equipsent (Peso/unit)	Others
①Lucong CIS	300 from Seed Grower				
②Nagao CIS	300 from Seed Grower	Urea 200 Compound 245	250	Hand Tractor 30,000	
③Marita CIS	300 from Seed Grower	21-0-0 135 46-0-0 195 14-14-14 245	255	Second Hand Engine 13,500 Transmission 8,500	
④Baluto CIS	Certified 315 Registered 345 from Seed Grower	21-0-0 105 Urea 200 Compound 245 16-20-0 248	220		
⑤San Bartolome CIS	300 from Seed Grower	Urea 210 16-20-0 230 14-14-14 245	220		
⑥Telebanca CIS	340 from Seed Grower	Urea 240 Compound 240	230		Electricity : P1.78/KWH. Min. Month P17.00/private
⑦Caluluan CIS	300 from Seed Grower	Urea 195 Compound 245	220		
⑧Tinang Cooperative	350 from Seed Grower & BPI	0-0-60 195 Urea 220 16-20-0 245	Thiodan 175 Cyabos 380 Folidol 175 Azodrin 175 Diagran 250		
⑨Sto Rosario CIS	P 1.50/kg	Urea 210 Trans Cost 4	Folidol 180 Azodrin 180 Diagran 240	Hand Tractor 31,000 w/attachment & trailer	
⑩Sta Monica CIS	P 6.00/kg from Seed Grower	Urea 215 16-20-0 245 14-14-14 255 Trans Cost 5	Nuvacron 160 Bionex 160	Thresher 18,000('83) Hand Tractor 25,000 ('83)	
⑪Cut-Cut I CIS	330 from Seed Grower	Urea 170 21-0-0 130 14-14-14 220	Furadan 170 Thiodan 130		

- to be continued -

APPENDix J.1.23 Current Price of Main Agricultural Input (2)

Information Sources	Seed (Peso/cavan-46kg /Exgodown)	Fertilizer (Peso/bag-50kg/ Exgodown-Concepcion)	Insecticide/ Pesticide (Peso/quart)	Equipment (Peso/unit)	Others
①Banban CIS	380 from Private	46-0-0 250 14 x 3 330 16-20-0 150 21-0-0 180 0-0-60 250	Liquid 150 Brodan 170 Thiodan 170 Papaest 170 Cyabos 600		
②San Pedro CIS	330 from Private	Urea 217 (Viking) Urea 197 (Seiko)	14 x 3 245 Azodrin 250 2-4D 150 Cyabos 250		
③Bangeu CIS	300 from Private	14 x 3 310 Urea 210 21-0-0 200	Caabush 250 2-4D 250 Furadan 190		
④Malonso CIS	350 from Local Growers	46-0-0 250 14-14-14 270	Brodan 240 Cyabos 350 Dimecron 200		
⑤San Isidoro CIS	300 from Seed Grower	Urea 210 18-14-14 260 21-0-0 130	250		
⑥Tarlac Gas Stand	Gasoline P3.88/lit, Gasoline (Regular) P5.60-5.97/lit Kerosene P3.87/lit, Diesel P3.81/lit(Manila)-P3.86/lit (Tarlac)				
⑦Concepcion Seed Growers Cooperative	Rice : Good P5.10/kg, Certified P5.70/kg, Registered P6.40/kg, Foundation P7.00/kg Corn : Certified P13.50/kg, Registered P15.00/kg, Foundation P16.00/kg, Hybrid P33.00/kg Sorghum : Certified P13.50/kg, Registered P15.00/kg, Foundation P16.00/kg, Hybrid P33.00/kg Mungo : P19.00/kg Peanut : P23.00/kg Soybean : P19.00/kg				
⑧D & E Seeds	IR-36 P350/bag-44kg, IR-60 340, IR-70 344, IR-72 320, IR-74 340				

Sources : Survey by Project Study Team

APPENDIX J. 1. 24 Current Price of Farm Machinery and Implement (1)

Machinery/Implement	Retail Price (Peso)	Remarks
1. 4-Wheel Tractor		
Kubota 11 ps	85,000	B6000, 4WD, with rotary
25 ps	± 375,910	
34 ps	± 509,422	
77 ps	889,280	
88 ps	912,800	
96 ps	1,140,800	
Ford 4000	180,000	without any attachment
Disc Plow	65,000	
Rotary	85,000	
2. Hand Tractor		
Seacon	9,500	with cage wheel, disc plow and rake
Engine 7 ps	26,000	
Complete Set	35,500	
Trailer	5,500	1/2 ton
Kato	8,000-9,000	without engine
Trailer	6,000	1/2 ton
Rubber tire	2,500	
Complete Set	29,500	with 10 ps gasoline engine, cage wheel, disk plow & harrow
Tramat KPT-86	± 11,860	with cage wheel, rake, disk plow
Engine	± 34,300	
Complete Set	± 46,160	
Trailer	± 20,000	
3. Farm Engine		
Lombardini 11 ps	25,000	
14 ps	28,000	
16 ps	35,000	
Kubota 11 ps	24,000	AR-650
12 ps	28,000	AR-750
5.0 ps	24,000	diesel
Mitsubishi 5.5 ps	21,000	diesel
Kawasaki 10.0 ps	13,000	gasoline
4. Sprayer		
Fonton	6,500	Knapsack, with engine, Italy
5. Reaper		
Kubota A-120	58,000	
6. Thresher		
Seacon 40 cavans/hr	35,000	Local made
Engine 15.5 ps	50,000	Japanese made
Engine 12.0 ps	40,000	Japanese made
Champion 40-60 cavans/hr	31,500	without 10.5 ps diesel, 14 ps gasoline or 16 ps diesel engine
Tramat 600-900kg/hr	± 22,915	without 7 ps engine
1,500-2,171kg/hr	± 31,640	without 10-16 ps engine
1,500-2,171kg/hr	± 35,000	standard type, without engine
Kubota engine	± 49,100	10-16 ps diesel
Rice/corn 800-1,250kg/hr	± 24,980	without 7 ps engine
Corn 3,000-4,000kg/hr	± 33,640	without 10 ps engine
Corn 3,500-5,000kg/hr	± 37,500	without 10-16 ps engine

- to be continued -

APPENDIX J. 1. 24 Current Price of Farm Machinery and Implement (2)

Machinery/Implement	Retail Price (Peso)	Remarks
7. Mechanical Dryer		
Padescor 4TPH	960,000	plus 10~15% installation cost
6TPH	1,200,000	plus 10~15% installation cost
8TPH	1,600,000	plus 10~15% installation cost
10TPH	1,800,000	plus 10~15% installation cost
8. Rice Mill		
Kaneko 15~18 cavans/hr	55,000	KRM-500
Engine 13~15	58,000	
Kaneko 650~750/hr	48,000	Mark-II
Engine 24 ps	64,000	
Kaneko 1.2~1.3ton/hr	120,000	Twin Polisher, 27.5~32.5 ps
Kaneko 1.6~2.0 ton/hr	160,000	Triple Polisher, 47.5 ps
Fix	79,000	without 15 ps engine, Taiwan
Tramat 600~800kg/hr	70,000	without 15~18 ps engine
9. Rubber Roll		
3"	215	
4"	392	
6"	426	
10. Pump		
Tramat 2"	14,000	made in Japan
3"	23,000	made in Japan
4"	31,000	made in Japan
3 x 3"	3,000	made in Taiwan
Volute Pump	2,500	made in Taiwan

Note : * means special discount price for governmental business in compliance with the following procedures :-

a. Farm machine should be tested through Agricultural Machinery Testing and Evaluation Center (AMTEC) at university of the Philippines at Los Banos College, Laguna 3720, Philippines.

b. Price should be approved by the Agricultural Machinery Distributors/Manufacturers Accreditation Committee (AMDMAC).

Sources : Survey by Project Study Team

APPENDIX J.1.25 Comparison Trial of Handling Cost of Paddy between NFA (Quedan) and Private Trader

Cost	NFA	Private	Remarks
1. Transporting	P 3.00/bag	P 1.00/bag	
2. Bag	P 2.00/bag	P 2.00/bag	P 6.00/bag/3 times
3. Handling	P 0.70/bag	P 0.70/bag	P 0.35/time
4. Shrinkage	P 2.88/bag	P 2.88/bag	
5. Interest	P11.70/bag	P11.70/bag	
6. Bnond insurance	P 0.00/bag	P 2.00/bag	
7. Miscellaneous	P 0.50/bag	P 0.50/bag	
Total	P20.78/bag	P20.78/bag	

Sources : Tarlac Provincial Office/QCFD

APPENDIX J.1.26 Shrinkage Allowance Estimates for Rough Rice and Corn in Ambient Storage

Storage Period (Month)	Shrinkage Allowance (%)	
	Paddy	Corn
1	0.98	0.06
2	1.08	0.36
3	1.18	0.66
4	1.28	0.96
5	1.38	1.26
6	1.48	1.56
7	1.58	1.86
8	1.68	2.15
9	1.78	2.76
10	1.88	2.76
11	1.98	3.06
12	2.08	3.36
13	2.18	3.66
14	2.28	3.96
15	2.38	4.26
16	2.48	4.56
17	2.58	4.85
18	2.68	5.16
19	2.78	5.46
20	2.88	5.76
21	2.98	6.06
22	3.08	6.26
23	3.18	6.66

Sources : NFA Memorandum No.131, 1989

APPENDIX J.1.27 Cooperatives granted Loans through RICH in Southern Tarlac

Proponent	Description	Loan Amount (Peso Mil)
People's Livelihood Foundation, Inc. (Capas)	Post-harvest facilities & agri-products	12.2
Corazon de Jesus Multi-Purpose Cooperatives, Inc. (Concepcion)	Post-harvest facilities & agri-products	2.5
Farmers Multi-Purpose Livelihood Foundation (San Francisco)	Agri-crops production &	0.8
Total		15.5

Sources : "Doing Business in Tarlac" Lingkod Tarlac Foundation, The Province of Tarlac

APPENDIX J.1.28 Current Banking Credit System and Interest to Small Farmers

Information Sources	Bank	Creditable Amount	Bank Interest
①Sta Rita CIS	LBP		1%/M to SLT
②Magao CIS	LBP	P3.750/ha-rice	1%/M for 6 M
		P3.000/ha-Eggplant	Penalty 15%
	PL		40% - 4 M
③Marita CIS	LBP		1.5%/M
	PL		5.0%/M
④Baluto CIS	LBP		12 M
	PL		5%/M
⑤San Bartolome CIS	Only PL		15%/4 M
⑥Telebanca CIS	RB		4%/4 M
	PL		5%/M
⑦Caluluan CIS	RB		1.33%/M - 6 M
	PL		6.25%/M - 4 M
⑧Tinang Cooperative	LBP	P3.750/ha-rice	12%/12 M
		P9,000/ha-sugarcane	
⑨Sto Rosario CIS	RB		6%/6 M
⑩Sta Monica CIS	RB		18%/6 M
⑪Cut-Cut I CIS	RB		12%/12 M
⑫Banban CIS	PL	P6.000-7.000/ha	3%/M
⑬San Pedro CIS	Only PL	P100/12.5kg paddy	
⑭Bangcu CIS	LBP	P2.500/ha	15%/12 M
	PL	P1.500/ha	30%/3 M

Note : LBP = The Land Bank of Philippines
PL = Private Lenderer
RB = Rural Bank
M = Month(s)

Sources : Survey by Project Study Team

APPENDIX J.1.29 Rice Post Production Losses

Operation	All Philippines		Estimated Losses in Southern Tarlac
	Range of Losses	Mean Loss	
(1) Harvesting	1 - 3% (De Padua) 3.35% (Ruiz) 2 - 4% (NFAC)	2.0%	2.0% (1.0%)
(2) Threshing	2 - 6% (De Padua) 5.8 - 8.6% (Mangaoang) 3 - 5% (NFAC)	4.0%	3.0% (2.0%)
(3) Handling	2 - 7% (De Padua) 2 - 7% (PCARRD) 9 - 20% (NFAC)	4.5%	4.5% (2.5%)
(4) Drying	1 - 5% (De Padua) 1 - 5% (PCARRD)	3.0%	3.0% (2.0%)
(5) Storage	2 - 6% (De Padua) 2 - 6% (PCARRD) 1 - 3% (NFAC)	4.0%	4.0% (3.0%)
(6) Milling	2 - 10% (De Padua) 2 - 8% (NFAC)	6.0%	6.0% (4.0%)
Total	10 - 37% (De Padua)	23.5%	22.5% (14.5%)

Note : De Padua = Professor Dante De Padua, UPLB. NFAC = the National Food and Agricultural Council. PCARRD = the Philippine Council for Agriculture, Forestry and Resources Research and Development

Sources : Cabigan, A.S. Rice Post-Production Losses and its Impact on Food Supply. Lecture on Food Availability. U. College of Home Economics, 9. February 1982.

* Estimated by Project Study Team and figures in ( ) indicate expectable losses to be sustained through execution of post-harvest and marketing facilities improvement progras.

APPENDIX J.1.30 Percent Grain Loss in Alternate Post Production Systems, Nueva Ecija

Operation	Post-Production System						
	I	II	III	IV	Ya	Yb	Yc
Harvesting to Threshing	23	24	18	15	13	23	21
Threshing to Drying	6	5	3	6	5	8	1
Total Loss	29	29	21	21	18	31	22

Note : I = Manual threshing & solar drying
II = Manual threshing & mechanical drying
III = Mechanical threshing & solar drying
IV = Mechanical threshing & drying
Ya = Harvest 5 days before maturity
Yb = Harvest at maturity
Yc = Harvest 5 days after maturity

Sources : IRRI Paper No. 76-3AE

APPENDIX J.1.31 Quality Characteristics for Milled Rice from Alternative Post Production Systems

System	Quality Characteristics (%)			
	Head Rice	Broken Rice	Milling Recovery	
			Brown Rice	Milled Rice
①Manual threshing and solar drying	77.4	20.2	63.0	59.3
②Manual threshing and mechanical drying	84.5	14.1	67.4	63.4
③Mechanical Threshing and solar drying	90.6	81.8	70.5	65.6
④Mechanical threshing and drying	89.9	9.2	68.4	64.4

Sources : IRRI Paper No. 76-3AE

APPENDIX J.1.32 Yield Effect of Axial-Flow Thresher

Area	Threshing Method	Physical Grain Loss (% of Yield)
Central Luzon	Axial-Flow Thresher	1.10
	Threshing Frame	2.40
Bicol	Axial-Flow Thresher	0.48
	Threshing Frame	1.56
	Flail or Stick	1.20
Laguna	Axial Flow-Thresher	1.60
	Hand Beating	7.34
	Portable Axial-Flow Thresher	1.34
Iloilo	Portable Axial-Flow Thresher	1.34

Source : IRRI Research Paper Series No. 120

APPENDIX J.1.33 Criteria prescribed by the Philippine Grades and Standards for Paddy and Milled Rice

Moisture Content The amount of water held by the grain. Moisture content is usually expressed as a mass of water per unit mass of wet grains (wet weight basis) or mass of water per unit mass of dry grains (dry weight basis). Moisture content wet weight basis, which is usually used in trade and industry, was used in this study.
Foreign Material All impurities other than rice which include weed seeds, straw, chaff, stalks, stone, sand, dirt, etc.
Other Varieties Rice kernels of varieties other than the one being analyzed.
Cracked Kernels Kernels that have seed coats cracked by mechanical means or by drying too rapidly with excessive heat.
Damaged Kernels Kernels or pieces of kernels of rice which are distinctly discolored or damaged by water, insects, heat, or any other means.
Fermented Kernels Yellowish milled rice due to fermentation or heat.
Chalky and Immature Kernels Kernels that are undeveloped, shrivelled, and with 50% or more white portion. The chalky spots may be referred to as white belly white core, or white back depending on the location of chalk on the kernel.
Red Kernels Kernels with any degree of redness. The red seed coat (pericarp) is usually a firmly adhering bran.
Head Rice Whole kernels and those not less than 3/4 of the size of a whole kernel.
Brokens Milled rice smaller than head rice but larger than brewer's rice or binlid.
Brewer's Rice or Binlid Portions of a kernel that will pass through a 4/64 sieve (1.587 mm).

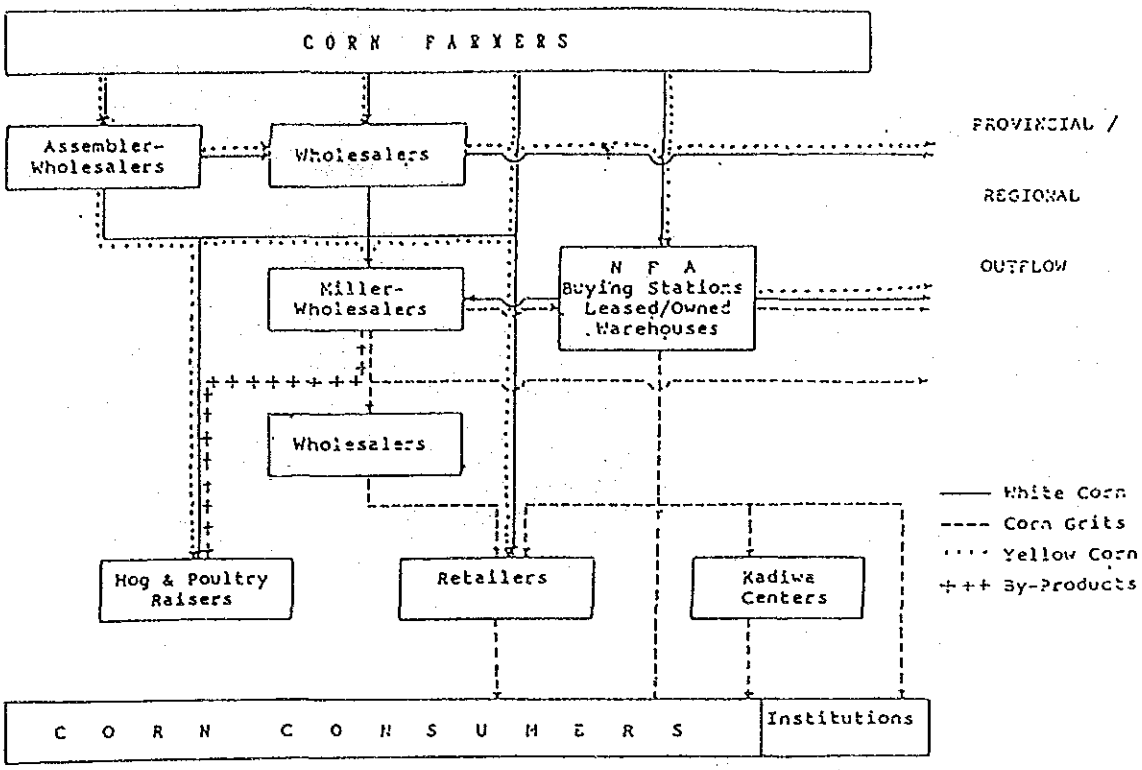
Sources : NFA

APPENDIX J.1.34 Standard Grade Requirements for Philippine Milled Rice

Item	Premium Grade (%)	Grade 1 (%)	Grade 2 (%)	Grade 3 (%)
Head Rice	95 min	85 min	75 min	65 min
Brokens	4 max	12 max	20 max	28 max
Brewer's Rice	1 max	3 max	5 max	7 max
Yellow and Damaged	0.5 max	1 max	2 max	4 max
Chalky and Immature	2 max	4 max	6 max	8 max
Paddy (no./100g)	none	1 max	2 max	3 max
Other Varieties	2 max	4 max	6 max	8 max
Red Kernels	none	0.5 max	1.0 max	1.5 max
Foreign Matter	none	0.25 max	0.5 max	1 max
Moisture Content	not greater than 14%			

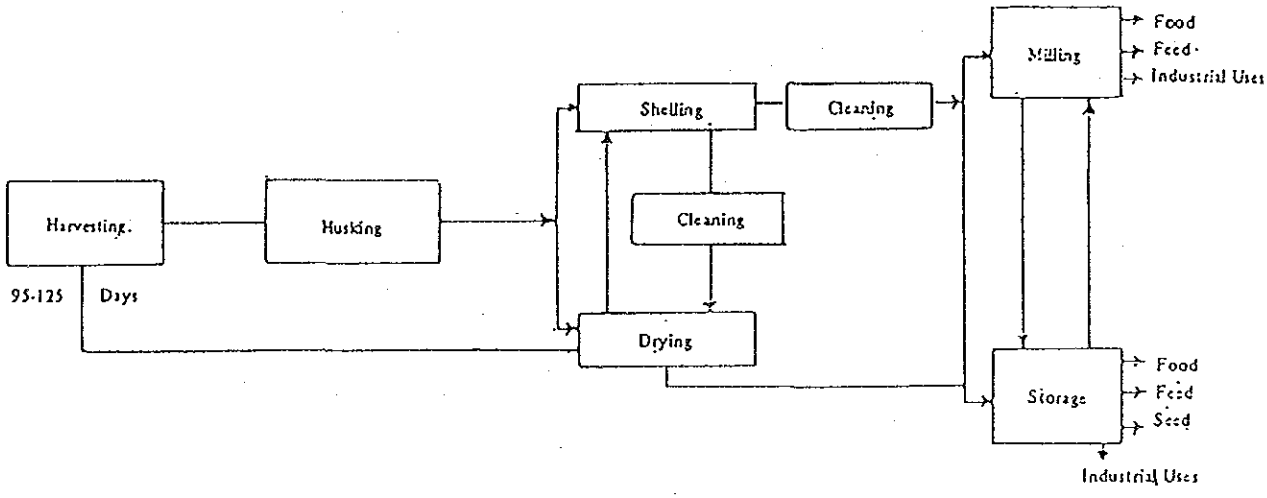
Sources : NFA

APPENDIX J.1.35 Corn Marketing Channels in Philippines



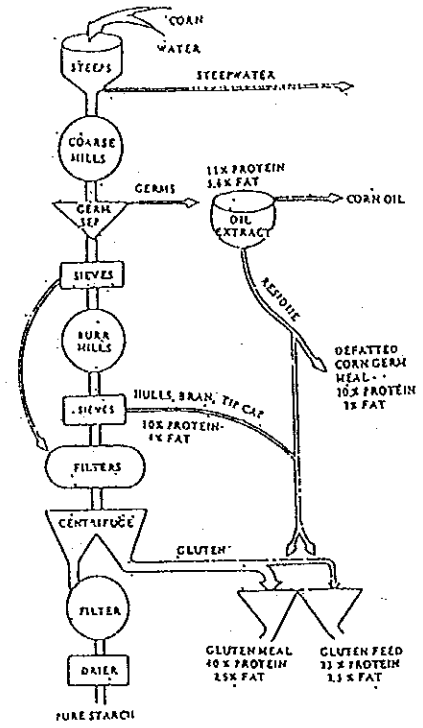
Source : Executive Summary of the IFY Project, NFA

APPENDIX J.1.36 Flow Process of Commercial Corn Grain Production



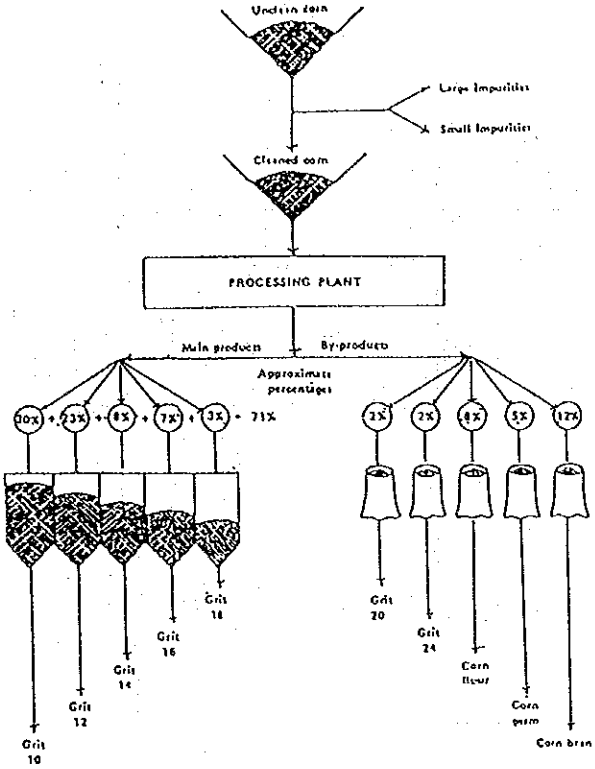
Source : "Corn", Technology and Livelihood Resource Center, 1987

APPENDIX J. 1. 37 Wet Corn Milling Process



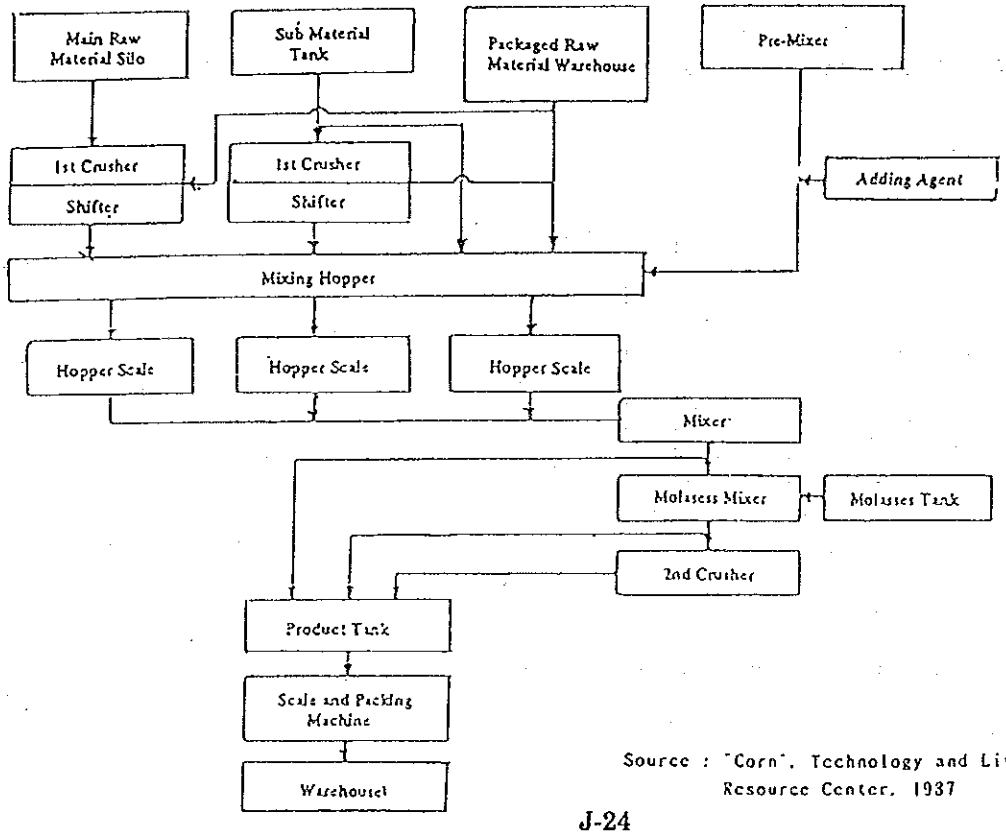
Source : "Corn", Technology and Livelihood Resource Center, 1987

APPENDIX J. 1. 38 Products of dry Corn Mill in the Philippines



Source : "Corn Production in the Philippines"
Gabriel A. Tabinga and Arsenio O. Gaini

APPENDIX J. 1. 39 Manufacturing Process for Feeds



Source : "Corn", Technology and Livelihood Resource Center, 1987

APPENDIX J. 1. 40 Standard of Corn Grits

This standard specification for Philippine Corn Grits was promulgated under a fixed designation PTS (Philippine Trade Standard) No. 047-03, 1973 on January 21, 1974.

Classification and Grading

Corn grits shall be classified into three kinds:

1. White corn grits which may include not more than five percent of corn grits of other color.
2. Yellow corn grits which may include not more than five percent corn grits of other color.
3. Mixed corn grits which consist of corn grits of various colors that do not meet the color requirements for either white or yellow corn grits.

Corn grits shall be graded and designated according to the respective grade requirements as shown in Table 1.

Each grade of corn grits shall be classified with the size of the sieve used:

1. Corn grits No. 8 — grits should not pass mesh sieve Nos. 10, 12, 14 and 16.
2. Corn grits No. 10 — grits should not pass mesh sieve Nos. 12, 14 and 16.
3. Corn grits No. 12 — grits should not pass mesh sieve Nos. 14 and 16.
4. Corn grits No. 14 — grits should not pass mesh sieve No. 16
5. Corn grits No. 16 — grits should pass sieve No. 16.

Table 1. Standard grade requirements for corn grits.

Grade	Moisture content % (Max)	Fermented and damaged grit % (Max)	Foreign matter % (Max)	Grits of other color % (Max)	Grits of other sizes % (Max)
Premium	14	Trace	Trace	Trace	1
1	14	0.5	0.5	0.5	4
2	14	1.0	0.75	1.5	7
3	14	2.0	1.0	3.0	10
4	14	3.0	2.0	5.0	13

Sizes of Mesh Sieve

Nos. 8 -	2.362 - 2.884 mm (0.093 - 0.114 in)
10 -	1.651 - 2.257 mm (0.065 - 0.089 in)
12 -	1.397 - 1.896 mm (0.055 - 0.075 in)
14 -	1.168 - 1.614 mm (0.046 - 0.064 in)
16 -	0.991 - 1.412 mm (0.039 - 0.056 in)

General Requirements

1. Corn grits shall be clean, free from unpleasant odor, molds, living and dead insects and mothballs.
2. The unit of trading shall be by weight expressed in the metric system.

Inspection

1. Request for inspection and certification of standard of corn grits shall be filed by the millers with the Bureau of Standards or any provincial branch office of the bureau.

Sampling

1. Of the total number of bags, 10 percent should be sampled but in no case should the number of bags sampled be less than five bags.
2. Each probe or handful of sample drawn is called the primary sample. The combined primary sample is called composite sample. When a composite sample has been properly reduced, it is called the submitted sample. A sample obtained from the submitted sample is called working sample.
3. The submitted sample should carry the following information:
   a. Name and address of owner
   b. Variety
   c. Lot number
   d. Number of bags in the lot
   e. Crop year and date of milling
   f. Date of sampling
   g. Number of inspector

Packing and Marking

1. Packing — Corn grits shall be packed in new or used hessian cloth bag, jute, gunny or plastic sacks without patches. Each sack shall only weigh 50 kg to protect it from transportation and handling hazards. Smaller packages may be allowed provided the net weight shall only be 1, 2, 5 and 10 kg.
2. Marking — Each container shall be properly labelled with the following information:
   1. Name and address of miller
   2. Kind, class and grade
   3. Net weight in kilograms (kg)

Definition of Terms

For the purpose of this standard, the following definitions shall apply:

1. Corn grains — shelled corn of either dent or flint varieties.
2. Corn grits — milled corn grains where the outer covering and germs have been removed.
3. Varieties — any varietal group according to color such as yellow or white.
4. Other colors — corn grains of different colors under consideration.
5. Heat-damaged grits — pieces of corn grits which have been materially discolored and damaged by external heat or as a result of heating caused by fermentation.
6. Moisture content — the water present in the corn grits determined by any device or method equivalent to the basic air-over method.
7. Foreign matter — impurities such as stones, sand dirt, etc., which are mixed with corn grits.
8. "Tiktik" or Fines — fine powder produced during the corn milling process.
9. "Tahup" or Bran — coarse powder from outer covering of the corn grain produced during the milling process.
10. "Sungo" or Germ — germ of the grain removed during the determination process.
11. Sieve — mesh wires with square holes.

Appendix J.1.41 Demand of Certified Seed in Project Area

Description	(A) CISs Area	(B) Outside CISs Area	(A) + (B) Project Area
Rice Planting Area (ha)	13,449	14,587	28,036
Potential Demand of Certified Seed Cavan (metric ton)	20,174 (908)	21,880 (984)	42,054 (1,892)

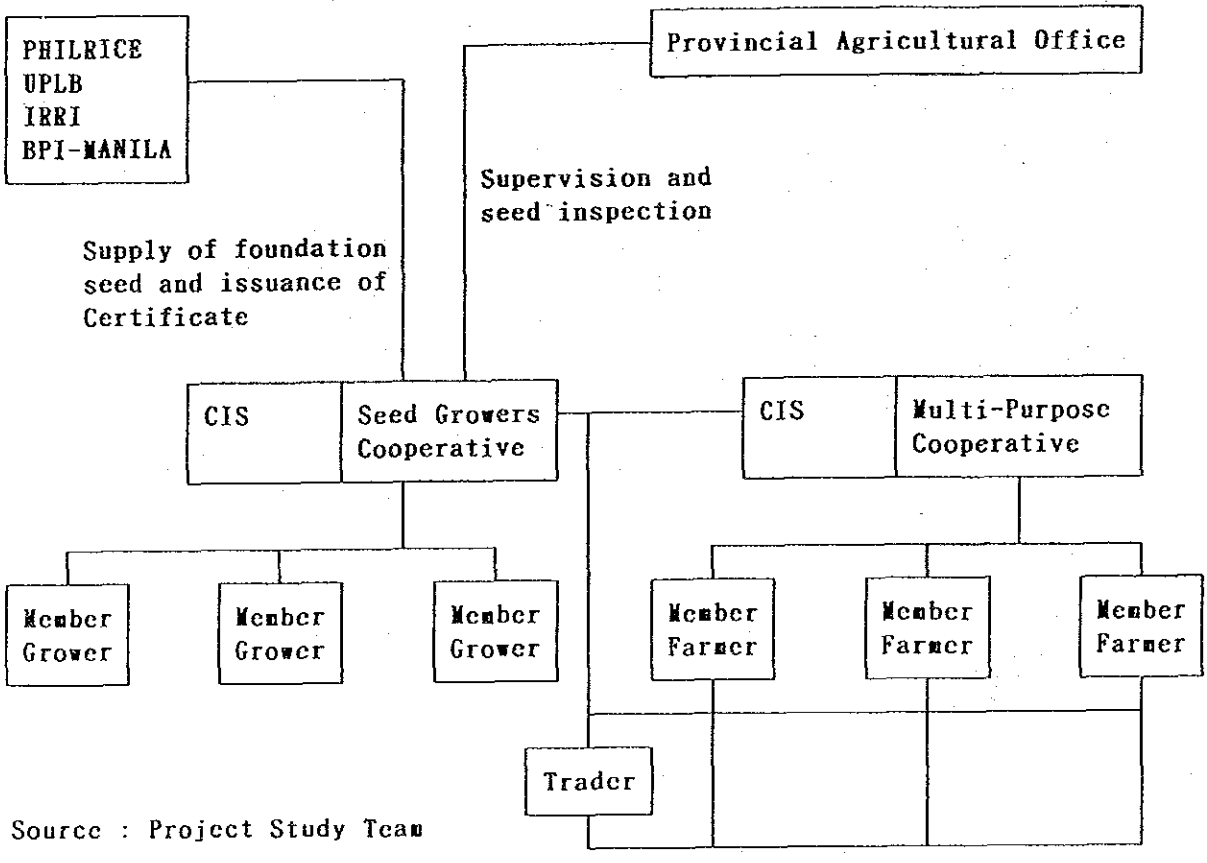
Sources : Provincial Office of the DA

APPENDIX J.1.42 Price of Seed guided by the Government

Seed	Buying Price		Selling Price	
	Per kilo	Per Cavan	Per kilo	Per Cavan
Foundation Seed	9.44	425.00	9.77	440.00
Registered Seed	8.66	390.00	9.00	405.00
Certified Seed	8.00	360.00	8.32	395.00

Sources : Provincial Office of the DA

APPENDIX J.1.43 Seed Marketing Channel in Southern Tarlac



Source : Project Study Team

APPENDIX J.1.44 Current Progress of Agricultural Organization in Project Area (1)

Barangay			Progress of CIS				Progress of Multi-Purpose Cooperative			
Name	No. of house-holds	No. of popul'tn	Name (No. of members)	Agric'l area (ha)	Rice harvesting area (ha/year)	Rice Prod'tn (t/year)	Name	No. of members	Covered area (ha)	Common Property
Bamban										
1 Bangcu	31	211	Bangcu (80)	100	1,200 (700)	4,400 (2,275)			277	1.0 ha
2 Culubasa	31	207					Culubasa	46		
3 Banaba	754	5,231								
4 Anupul	655	4,403								
5 Dela Cruz	369	2,640	Bamban (500)	151	1,283 (761)	3,630 (2,034)				1.5 ha
6 La Paz	471	3,037								
7 San Rafael	62	489								
8 San Roque	362	2,330								
9 Pacalcal	158	1,080								
10 San Pedro	302	1,799	San Pedro (195)	120	240 (120)	960 (950)				
11 Lourdes	674	4,428								
12 Sto Nino	170	758								
13 Malonzo	200	815	Malozo (150)	240	419 (179)	1,183 (403)	Malozo	45	150	
14 San Nicolas	746	5,161								
Sub-Total	4,985	32,589	(835)	1,811	1,859 (999)	6,543 (5,662)		91	427	
Capas										
1 Cutcut I	682	3,990	Susuba	40	48	144				
2 Cutcut II	332	2,254	Cutucut (66)		(40)	(120)				
3 Sta Rita	174	1,116								
4 Estrada	188	1,239								
5 Talaga	367	2,065								
6 Aranguren	540	3,068							8,500	2 ha land, Warehouse, Dryers, Rice mills, Tractors & Trucks
7 Nanga	141	863					Peoples' Livelihood Foundation	6 Mun. 77 Bay 3,889		
8 Cuboub	330	1,011								
9 Dolores	364	2,099								
10 Mantapig	232	1,392								
11 Sto Rosario	438	2,043								
12 Lawy	817	4,681					Lawy	91	867	
13 Sto Domingo I	211	1,270					Sto Domingo	50	210	250 sq.m
14 Sto Domingo II	454	2,892								
Sub-Total	5,160	30,883	(66)	40	48 (40)	144 (120)		141	1,067	
Concepcion										
1 Tinang	530	1,780	Tinang (159)	850	350 (250)	1,513 (1,063)	Tinang	132	237	1.0 ha
2 Magao	220	1,320	Magao (152)	620	1,088 (468)	4,545 (1,755)	Magao	41	123	0.5 ha
3 Sta Rita	690	6,000	Sta Rita (43)	115	195 (115)	820 (460)				Available of 2 ha land
			Marita (41)	100	100 (100)	375 (375)				
4 San Martin	163	1,060	San Martin (95)	240	320 (240)	1,240 (900)				
5 Lilibangan	115	647	Lilibangan (116)	240	480 (240)	2,280 (1,080)				
6 Talisundoc-Mariscula	210	1,470					Talisundoc Mariala	56	165	
7 Caluluan	457	3,199	Caluluan (34)	80	125 (80)	455 (320)	Caluluan	120	360	400 sq.m
8 Sto Rosario	157	1,240	Sto Rosario (102)	150	300 (150)	1,351 (638)	Concecion Integrated	200	2,300	1 ha land, 300 sq.m warehouse, 4 dryes

- to be continued -

APPENDIX J.1. 44 Current Progress of Agricultural Organization in Project Area (2)

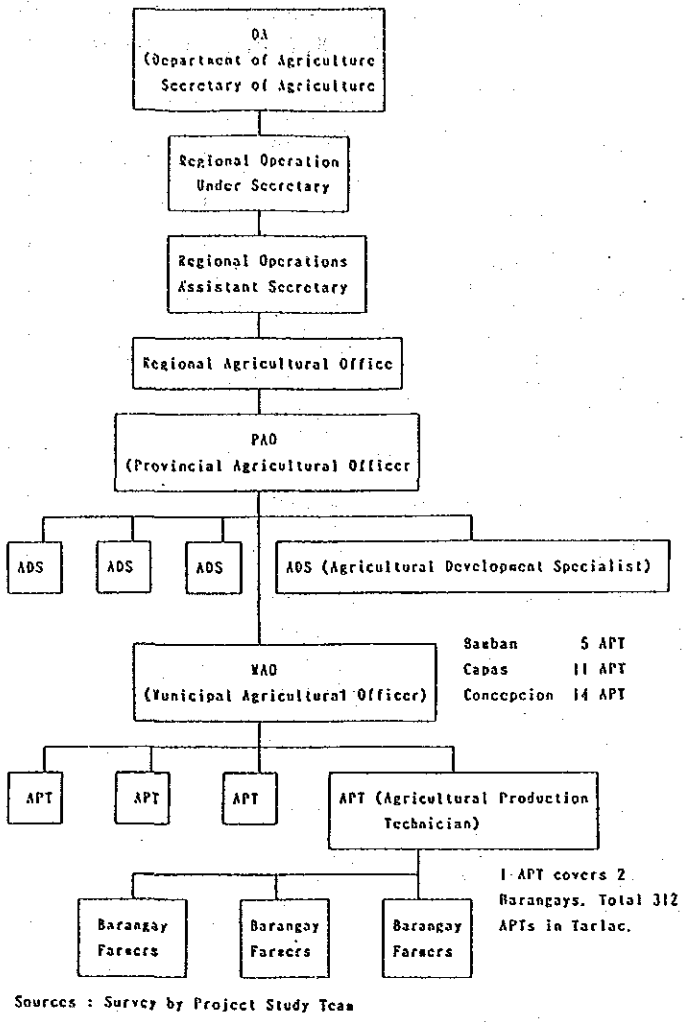
Barangay			Progress of CIS				Progress of Multi-Purpose Cooperative			
Name	No. of household	No. of popul'tn	Name (No. of members)	Agric'l area (ha)	Rice harvesting area (ha/year)	Rice Prod'tn (t/year)	Name	No. of members	Covered area (ha)	Common Property
9 Corazon de Jesus	231	1.276							54	
10 Sta Cruz	57	3.491					Sta Cruz	44		
11 Cafe	340	2.587								
12 Culatingan	315	2.651								
13 Malupa	202	1.150	Lucong	2.000	3.200	12.980				
14 Pitabunan	231	1.130	(720)		(2.000)	(8.000)			363	600 sq.m land
15 Talisundoc-San Miguel	264	1.639					Talisundoc San Miguel	131		warehouse, 1 unit thresher, 0.5 ton scale
16 Sta Maria	70	900								
17 Sto Rosario	137	836								
18 Minane	410	3.691							216	1.000 sq.m land, 1
19 Sta Monica	600	4.090	Sta Monica (193)	740	1.040 (300)	4.455 (1.125)	Sta Monica	72		warehouse, 1 thresher, 0.5 ton scale
20 San Isidro	600	2.246	San Isidro (235)	450	700 (450)	3.091 (1.688)				
21 Penalicsican	200	200								
22 Grn Village	270	1.250								
23 Parang	350	2.130								
24 Alfonso	655	3.930								
25 Bungan	73	850	Bangcu							
26 San Francisco	466	8.100								
27 Santiago	562	2.722							231	
28 San Agustin	587	3.600					Murcia	77		
29 San Jose	1.188	1.841								
30 San Bartolos	207	1.040	San Bartolome(64)	350	610 (350)	2.548 (1.313)			240	
31 Castillo	337	1.832					Castillo	80	246	
32 San Juan	550	3.600					San Juan	82		
33 Dutung A Matas	250	1.383								1.0 ha
34 Sto Nino	260	2.000								
35 Telabanca	510	2.181	Telabanca (121)	389	753 (389)	2.507 (1.142)				
36 San Nicolas Belas	346	5.000								
37 San Vicente	60	758								
38 San Antonio	520	2.526								
39 Baluto	710	4.260	Baluto	600	920	3.990	Baluto	71	213	1.5 ha
40 Galius Gueco	130	849	(120)		(600)	(2.550)	G. Gueco	54	162	
41 Sta Rosa	420	2.520					Sta Rosa	64	180	
42 Pando	60	1.560								
43 Mabilog	350	1.746								
44 San Nicolas	800	8.000								
45 Parulong	157	1.120								
Sub-Tota	10.015	107.240	(2.195)	6.924	10.261 (5.732)	42.150 (22.409)	14	1.223	5.090	
Total	26.285	174.562	(3.096)	8.024	12.168 (6.771)	48.837 (25.657)	18	1.456	6.584	

APPENDIX J.1.45 Commercial Rice Traders and Millers in Project Area

Business Name	Location	Rice Mill Input Capacity (Cavan/hr)	Warehouse Capacity
Bamban			
1 Carolina Esceto	La Paz	5	
2 Agang's Ricemill	La Paz	9	
3 Florante Cojuanco	Bamban	18.33	
4 Sison Kiskisan	La Paz	5	
5 Ricardo Diaz	Bamban	7	
6 Violanto de Leon	Pob. Bamban	8	
7 Lomat	San Nicolas	5	
8 Jun-Es & Son Kiskisan	Anupul	6	
Capas			
1 Gloria's Capas Ricemill	Cub-Cub		9,641㎡, 20,000 bags
2 People's Rice Dealer	Poblacion		5,894㎡, 50,874 bags
3 St. Jude Mart/Bakery	Poblacion		100㎡, 10,000 bags
4 Ermillis Nacu	Dolores	4	
5 Oscar Sonze	Patling	5	
6 Jerry's Mini-Cono	Talaga	5	
7 Armando Espinosa	Lawy	5	
8 Remedios Samson	Dolores	5	
9 Arnel Tanglao	Lawy	8	
10 Aide Montemayor	O'Donnel	4	
11 Honesto Sibal	O'Donnel	3	
12 George Pamintuan	Manlapig	5	
13 Mangucra Kiskisan	Lawy	5	
14 Dela Cruz Kiskisan	Manlapig	5	
15 Vital-Bonus Semi-Cono	Sta. Lucia	8	
Concepcion			
1 J. Sotto Ricemill	Concepcion	30	4,685㎡, 24,500 bags
2 Sunshine Ricemill	Sta. Rita	20	2,308㎡, 17,525 bags
3 SJ Golden Grains	San Juan	10	
4 Goodwill Ricemill	Padpad	21	8,654㎡, 74,997 bags
	San Jose		
5 Marcial Lacson	San Antonio	5	
6 OCC Ricemill	Minane	25	4,524㎡, 35,815 bags
7 Alfredo Avena	San Jose	5	
8 Gerardo Tayag	Concepcion	27	3,305㎡, 25,232 bags
9 Corazon Ortis Luis	Sta. Monica	5	
10 Santos Sem-Cono	San Jose	6	
11 Jaime Hipolito	Yangco	5	
12 Tito's Trading	San Jose		7,202㎡, 38,864 bags
13 Filipina Ricemill Inc.	Sta. Rita		1,599㎡, 11,872 bags
14 Benjamin Trading Ricemill	Concepcion		9,435㎡, 66,790 bags
15 Sapang Palay Dealer	Concepcion		480㎡, 4,800 bags
16 Gamboa Rice Trading	Concepcion		600㎡, 5,000 bags
17 Ong Rice & Palay Dealer	Concepcion		600㎡, 5,000 bags
18 Encrenciana Guevarra	Concepcion	5	
19 Antonio Padilla	Concepcion	5	
20 Vinnies' Ricemill	Concepcion	14.2	6,048㎡, 20,000 bags

Source : Survey by Project Study Team

APPENDIX J.1.46 Organizational Structure for Extension Services



Sources : Survey by Project Study Team

APPENDIX J.1.47 Existing Agro Industry in Project Area

Agro Industry	*)Project Area	**)Project Back-Yard Area	Tarlac Province
(1) Ice Plant	2	1	5
(2) Rice Mill	53	58	280
(3) Corn Mill	0	0	1
(4) Sugar Mill	0	1	2
(5) Poultry Raiser	2	6	15
(6) Hog Raiser	5	19	44
(7) Bakery	11	24	68
(8) Rice Wholesaler	116	110	430
(9) Rice Retailer	192	318	893
(10)Rice Noodle Maker	1	5	8
(11)Rice Flour Mill	0	1	1
(12)Siopao Maker	0	1	1
(13)Feed Mill	0	1	1
(14)Other Rice Products Maker	2	10	12

Note : *) = Bamban, Capas and Concepcion municipality
**) = Tarlac and La Paz Municipality

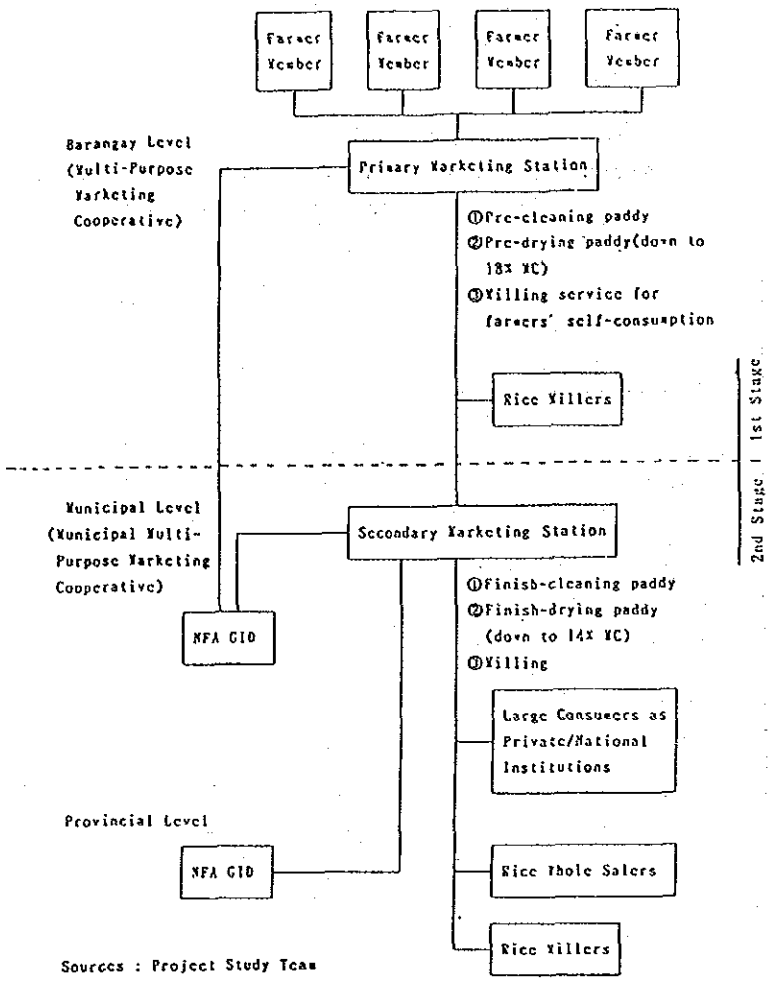
Sources : Municipal Office, Procincial Government, the NFA and Lingkod Tarlac Foundation, Inc.

APPENDIX J.1.48 Labor Requirement for Post Harvest Operations

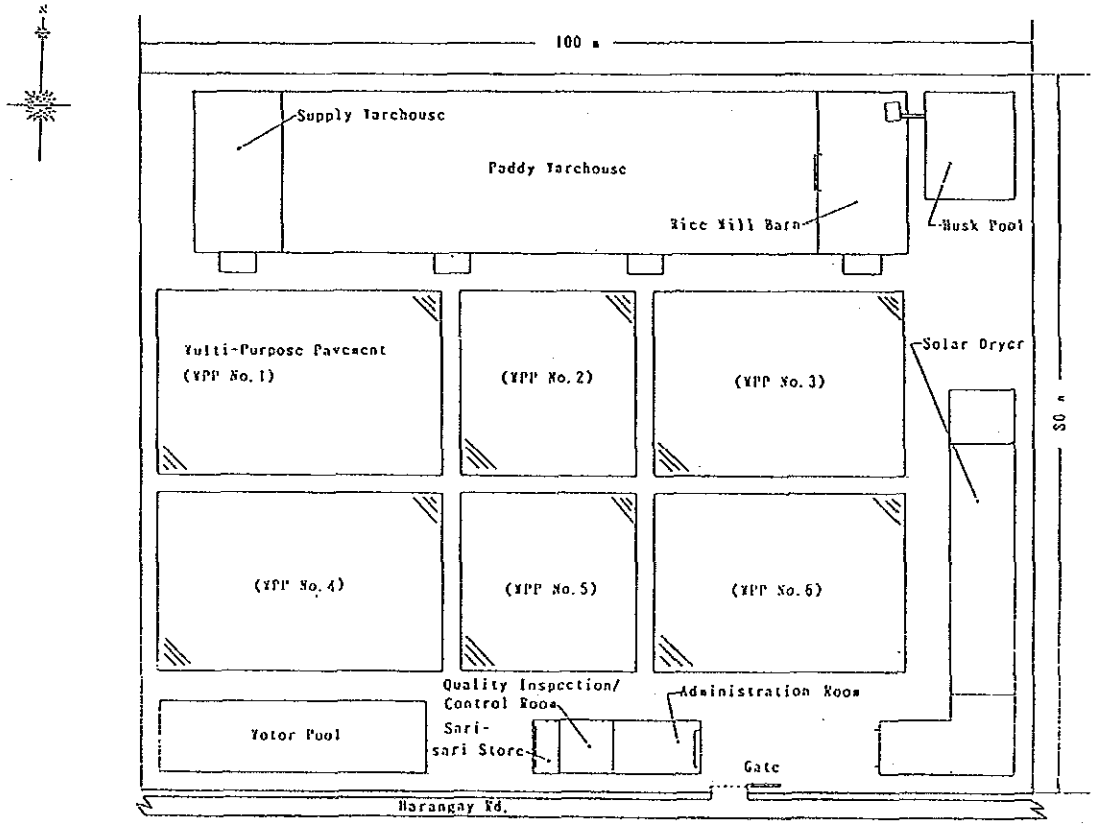
Operation	Labor Requirement (m-h)	
	Per Hectare	Per Ton
Harvesting	108	35
Handling	83	27
Bundling	24	9
Hauling	34	9
Stacking	25	9
Threshing	36	11
Threshing	31	10
Hauling	5	1
Drying	20	7
Spreading	9	2
Stirring	1	1
Collecting/Bagging	9	3
Weighing	1	1
All Operations	287	80

Sources : IRRI Paper No. 77-01

APPENDIX J.2.1 Proposed Rice Marketing Channel



APPENDIX J.2.2 Layout Plan of Primary Marketing Station



Source : Project Study Team

APPENDIX J.2.3 Expected Return through Marketing Improvement Program (Potential in 1989/1990)

Description	19 CISs Area	Project Area
A. Basic Condition (ton/year)		
1. Paddy Production		
(1) Wet Season	27,889	58,149
(2) Dry Season	24,775	40,429
(3) Total (1) + (2)	52,464	98,578
2. Estimated Self-Consumption of Paddy (1	3,508	29,966
3. Marketable Surplus (1.(3) - 2.)	48,956	68,612
B. Expected Return (Million Peso)		
(1) Quantitative Loss (1.(3)) x 22.5% x 1,000 kg x P 3.9/kg (2	46.0 (11,804 ton/year)	86.5 (22,180 ton/year)
(2) Qualitative Loss (1.(3)) x 1,000 kg x P 0.9/kg (3	47.2	88.7
(3) Saving of Threshing Fee (1.(3)) x 3% (4 x x 1,000 kg x P 3.9/kg	6.1	11.5
(4) Saving of Paddy Transportation Cost (3. x 1,000 kg) ÷ 60 kg x P 2.00/sack (5	2.0	2.7
(5) Saving of Milling Fee 2. x Milling Recovery (60%) x P 0.15/kg (6	0.3	2.7
(6) Saving of Milling Recovery 2. - (Paddy Volume in case of Milling Recovery 65%) x 1,000 kg x P 3.9/kg	1.3	11.1
Total	102.9	203.2

Remarks : 1) No. of related population x white rice volume per year x milling recovery ;
19 CISs Area = 20,434 persons x 103 kg/capita-year-white rice ÷ 60% ÷ 1,000 kg = 3,508 ton/year,
Project Area = 174,562 persons x 103 kg/capita-year-white rice ÷ 60% ÷ 1,000 kg = 29,966 ton/year
2) Mean paddy price in wet season = P 3.50/kg
Mean paddy price in dry season = P 4.50/kg
Mean paddy price in all season = P 3.90/kg
3) Value reported by Quedan Guarantee Fund Board
4) Expected reduction of Threshing Fee :
Present 7% - Expected 4% = 3%
5) Expected reduction of transportation cost :
Present P 4.00/sack - Expected P 2.00/sack = P 2.00/sack
6) Expected reduction of milling fee :
(Present P 0.35/kg-white rice) - (Expected reduction P 0.20/kg-white rice) = P 0.15/kg-white rice

Source : Survey by Project Study Team

APPENDIX J.2.4 Expected Return through Marketing Improvement Program (Target in 1989/1990)

Description	19 CISs Area	Project Area
A. Basic Condition (ton/year)		
1. Paddy Production		
(1) Wet Season	835	2,550
(2) Dry Season	360	1,440
(3) Total (1) + (2)	1,195	3,990
2. Estimated Self-Consumption of Paddy	125	116
3. Marketable Surplus [1.(3)] - 2.	1,070	3,874
B. Expected Return ('000 peso)		
1. Quantitative Loss	489	1,643
2. Qualitative Loss	1,011	3,376
3. Saving of Threshing Fee	170	569
4. Saving of Transportation Cost	40	146
5. Saving of Milling Fee	11	10
6. Saving of Milling Recovery	43	43
Total	1,764	5,787

Remarks : B.1. Targetable losses to be sustained through the program : Harvesting 1%, Threshing 2.0%, Handling 2.5%, Drying 2.0%, Storage 3.0% and total 10.5%.
B.2. Net production (Gross production - Remained 12% posy harvest loss) x P 0.90/kg

Source : Survey by Project Study Team

APPENDIX J.2.5 Expected Return through Primary Marketing Station (1989/1990)

	Description	PPMS No.1	PPMS No.2	PMS No.3	PMS No.4	PMS No.5
Potential	A. Basic Condition (ton/year)					
	1. Paddy Production					
	(1) Wet Season	835	2,550	2,034	900	1,142
	(2) Dry Season	360	1,440	1,596	340	1,365
	(3) Total [(1) + (2)]	1,195	3,990	3,630	1,240	2,527
	2. Estimated Self-Consumption of Paddy	125	116	581	160	89
	3. Marketable Paddy	1,070	3,874	3,049	1,134	2,418
	B. Expected Return ('000 Peso)					
	(1) Quantitative Loss	1,049	3,501	3,185	1,088	2,200
	(2) Qualitative Loss	1,076	3,391	3,267	1,116	2,256
	(3) Saving of Threshing Fee	140	467	425	145	293
	(4) Saving of Transportation Cost	43	155	122	45	97
	(5) Saving of Milling Fee	11	10	52	10	8
	(6) Saving of Milling Recovery	35	35	176	31	27
	Total	2,319	7,724	7,051	2,404	4,881
Target	A. Basic Condition (ton/year)					
	1. Paddy Production					
	(1) Wet Season	835	2,550	2,034	1,063	1,142
	(2) Dry Season	360	1,440	1,596	450	1,355
	(3) Total [(1) + (2)]	1,195	3,990	3,630	1,513	2,507
	2. Estimated Self-Consumption of Paddy	125	116	581	143	89
	3. Marketable Paddy	1,070	3,874	3,049	1,370	2,418
	B. Expected Return ('000 Peso)					
	(1) Quantitative Loss	489	1,643	1,486	620	1,027
	(2) Qualitative Loss	945	3,160	2,875	1,198	1,986
	(3) Saving of Threshing Fee	170	569	518	216	357
	(4) Saving of Transportation Cost	40	146	115	52	91
	(5) Saving of Milling Fee	11	10	52	13	8
	(6) Saving of Milling Recovery	43	43	216	53	34
	Total	1,699	5,571	5,262	2,152	3,503

Remarks : B.(1) : Targetable losses to be sustained through the program.
Harvesting 1%, Threshing 2.0%, Handling 2.5%, Drying 2.0%, Storage 3.0% and total 10.5%.
B.(2) : Net production (Gross production - Remained 12% posy harvest loss) x P 0.90/kg.
B.(3) : Net volume to be threshed (Gross production - Remained 1% harvesting loss) x 3% x P 4.80/kg.
B.(4) : Marketable volume (Net production - Self-consumption) x P 2.00/sack.
B.(5) : Self-consumption x P 0.15/kg.
B.(6) : X = (No. of members' population x 103 kg/capita-year-white rice) x 60% milling recovery.
Y = (No. of members' population x 103 kg/capita-year-white rice) x 65% milling recovery.
Saving volume of paddy (X - Y) x P 4.80/kg.

Note : PPMS No.1 = Sta Rita & Narita CIS, PPMS No.2 = Baluto CIS, PMS No.3 = Bamban CIS, PMS No.4 = Tinang CIS, PMS No.5 = Tolabanca CIS

Source : Project Study Team

APPENDIX J.2.6 Proposed Development Plan for Farm Mechanization and Marketing Improvement

Program	Top Priority	2nd Priority	3rd Priority
(1) Market Access Improvement Program	Establishing Primary Marketing Stations		Establishing Secondary Marketing Stations
	Establishing Pilot Primary Marketing Stations	Completing Network of Primary Marketing Stations	Establishing Pilot Secondary Marketing Stations / Completing Network of Secondary Marketing Stations
(2) Farm Mechanization Development Program		Mechanization of Land Preparation	
			Mechanization of Harvesting
			Mechanization of Transplanting
(3) Income Generating Activity Program		Input Purchasing in Group	
		Contract Threshing & Milling	
(4) Agro Industry Development Program			Development of Agro Industry

Sources : Project Study Team

APPENDIX J.2.7 Equipment and Facility required for Primary Marketing Station (1)

Serial No.	Equipment/Facility	Quantity	Standard
A.	Housing/Civil works		
A-1	Administration house annexed with quality control room and Sari-Sari store	1 house	Administration : 6 m x 10 m = 60㎡ Inspection : 6 m x 6 m = 36㎡ Sari-sari : 6 m x 3 m = 18㎡ Total : 81㎡
A-2	Paddy warehouse with ventilated fan annexed with rice mill barn and supply warehouse	1 house	Total 1,440 ㎡, single story
A-2.1	Paddy warehouse	1 house	18 m x 60 m = 1,080 ㎡, single story
(1)	Iron materials	1 lot	
(2)	Roof & wall	1 lot	Roof : Folded sheet
(3)	Steel door	4 sets	OP painting
(4)	Roof fan	4 sets	
(5)	Electric materials	1 lot	
A-2.2	Rice mill barn	1 house	18 m x 10 m = 180 ㎡, single story
(1)	Iron materials	1 lot	
(2)	Roof and wall	1 lot	Roof : Folded sheet
(3)	Steel door	1 set	OP painting
(4)	Roof fan	1 set	
(5)	Electric materials	1 lot	
A-2.3	Supply warehouse	1 house	18 m x 10 m = 180 ㎡, single story
(1)	Iron materials	1 lot	
(2)	Roof and wall	1 lot	Roof : Folded sheet
(3)	Steel door	1 set	OP painting
(4)	Roof fan	1 set	
(5)	Electric materials	1 lot	
A-3	Green house	1 house	Total 357.6 ㎡, single story
(1)	Iron materials	1 lot	
(2)	Aluminum materials	1 lot	
(3)	Covering materials	1 lot	
(4)	Steel door	1 lot	
(5)	Tool and spare parts	1 lot	
A-4	Multi-purpose pavement	1 yard	Total 3,000 ㎡
A-5	Motor pool	1 shed	8 m x 33 m = 264㎡, single story
B.	Equipment		
B-1	4-wheel tractor with attachment	2 sets	
B-1.1	4-wheel tractor	2 units	4WD, 70 ps, diesel, with front bumper weights
B-1.2	Disc harrow	2 units	Tandem type, working width 285 ~ 304 cm
B-1.3	Disc plow	2 units	4 discs
B-1.4	Rear grader	2 units	Working width 244 cm
B-1.5	Swamp wheel	2 pairs	
B-1.6	Trailer	2 units	5 ton
B-1.7	Front loader	1 unit	800 kg, with bucket
B-2	Power tiller with attachment	2 sets	
B-2.1	Power tiller	2 units	10 ps, diesel, with rubber wheels
B-2.2	Disc plow	2 units	2 discs
B-2.3	Rake	2 units	
B-2.4	Paddy wheel	2 pairs	
B-2.5	Trailer	2 units	1,500 kg
B-3	Portable thresher (Corn sheller)	3 units	Axial flow, 300 cavans/day, with 10 ~ 16 ps diesel engine
B-4	Portable pre-dryer	1 unit	5 ton/hr

- to be continued

APPENDIX J.2.7 Equipment and Facility required for Primary Marketing Station (2)

Serial No.	Equipment/Facility	Quantity	Standard
B-5	Solar dryer	1 set	45 ton/batch
B-5.1	Receiving hopper	2 units	Holding capacity 600 kg
B-5.2	Bucket elevator	3 units	15 ton/hr
B-5.3	Pre-cleaner	1 unit	15 ton/hr
B-5.4	Hopper scale	1 unit	Tipping capacity 100 kg
B-5.5	Compressor	1 unit	
B-5.6	Control panel for receiving	1 unit	
B-5.7	Stirring device	1 unit	
B-5.8	Drying chamber	5 units	3.6 m x 4.8 m
B-5.9	Intake section	1 unit	
B-5.10	Discharge section	1 unit	
B-5.11	Suction fan with duct	5 units	Limited load fan, 3 cu.m/sec
B-5.12	Burner	2 units	Gun type, 58,000 kcal/hr
B-5.13	Bucket elevator	2 units	6 ton/hr
B-5.14	Fuel tank	2 units	
B-5.15	Rail	1 lot	
B-5.16	Control tank	1 unit	3.6 ton
B-5.17	Control panel	1 unit	
B-6	Semi-cono rice mill	1 set	
B-6.1	Rice milling unit	1 unit	10 cavans/hr
B-6.2	Stand-by engine	1 unit	20 ps, diesel
B-7	Cargo truck	2 units	4 ton, 2 x 4, diesel
B-8	Quality inspection & control equipment	1 lot	
B-8.1	Trier	2 units	ϕ12 mm x 300 mm
B-8.2	Moisture meter	2 units	10 ~ 30%
B-8.3	Sample pan	20 pieces	Plastic, round
B-8.4	Testing husker	1 unit	50 kg/hr
B-8.5	Testing separater	1 unit	600 g/time
B-8.6	Testing mill	1 unit	Batch friction type
B-8.7	Handy magnifier	2 units	3 X, 100 mm
B-8.8	Hygrothermograph	1 unit	
B-9	Platform scale	2 units	100 kg, with caster wheel
B-10	Station support equipment	1 lot	
B-10.1	Portable conveyor	1 unit	Belt length 10 m
B-10.2	Gunny sack	20,000 pcs	Hemp made
B-10.3	Typewriter	1 unit	English
B-10.4	Electric calculater	2 units	Desk top type
B-10.5	Machine tool set	1 lot	
B-10.5.1	Hand hacksaw	1 unit	
B-10.5.2	Chisel and punch set	1 set	
B-10.5.3	File set	1 set	
B-10.5.4	Copper hammer set	1 set	
B-10.5.5	Ball peen hammer set	1 set	
B-10.5.6	Combination plier set	1 set	
B-10.5.7	Straight rule	1 piece	
B-10.5.8	Square	1 piece	
B-10.5.9	Driver set	1 set	
B-10.5.10	Oil stone	1 piece	
B-10.5.11	Adjustable wrench set	1 set	
B-10.5.12	Open double end wrench set	1 set	
B-10.5.13	Socket wrench set	1 set	
B-10.5.14	Wire brush	1 piece	
B-10.5.15	Scraper	1 piece	
B-10.6	Electric tool set	1 lot	
B-10.6.1	Multi-purpose electric circuit tester	1 unit	
B-10.6.2	Cutting plier set	1 set	

- to be continued -

APPENDIX J.2.7 Equipment and Facility required for Primary Marketing Station (3)

Serial No.	Equipment/Facility	Quantity	Standard
B-10.6.3	Long nose plier	1 piece	
B-10.6.4	Cutting nipper set	1 set	
B-10.6.5	Spark testing high tension screw driver set	1 set	
B-10.6.6	Electric soldering iron	1 unit	
B-10.6.7	Plastic hammer set	1 set	
B-10.6.8	Insulating tape	10 rolls	
B-10.6.9	Insulated plastic handle screw driver set	1 set	
B-10.7	Carpenter's tool set	1 lot	
B-10.7.1	Nail hammer	1 set	
B-10.7.2	Hand saw	1 piece	
B-10.7.3	Nail extractor	1 piece	
B-10.7.4	Straight rule	1 piece	
B-10.7.5	Tape rule	1 piece	
B-10.7.6	Power saw	1 unit	
B-10.7.7	Power plane	1 unit	
B-10.7.8	Screw driver set	1 set	
B-10.7.9	Try square	1 piece	
B-10.7.10	Carpenter's drill set	1 set	
B-10.7.11	Wood chisel set	1 set	
B-10.7.12	Wood marking gauge	1 piece	
B-10.7.13	Ratchet bit brace and bits set	1 set	
B-10.7.14	C-clamp set	1 set	
B-10.7.15	Slip joint combination plier	1 piece	
B-10.7.16	Bench plane	1 piece	
B-10.7.17	Tool box	1 piece	
B-10.8	Table with chair	4 units	
B-10.9	Cabinet	5 units	Steel made
B-10.10	Fork lift	1 unit	1.5 ton, diesel
B-10.11	Wooden pallet	1,000 pcs	Double-faced
C.	Maintenance Equipment for Irrigation System		
C-1	Excavator	1 unit	SAE 0.04 m³, 12ps diesel
C-2	Concrete mixer	1 unit	One bagger, 3ps gasoline
C-3	Brush cutter	1 unit	1.2ps, gasoline

Source : Project Study Team

APPENDIX J.2.8 Equipment and Facilities required for Seed Marketing Station

Serial No.	Equipment/Facility	Quantity	Standard
A.	Housing/Civil works		
A-1	Seed warehouse annexed with administration, processing room and supply warehouse	1 house	Seed warehouse : 270 m² Processing room : 180 m² Suppry warehouse : 180 m² Quality control : 36 m² Administration : 60 m² Total : 726 m²
A-2	Multi-purpose pavement	1 yard	750 m²
A-3	Motor pool	1 shed	60 m²
B.	Equipment		
B-1	4-wheel tractor with front bucket	1 unit	4WD, 70 ps, diesel
B-2	Seed thresher	1 unit	Portable, 300 cavans/day, engine driven
B-3	Seed dryer	1 unit	Re-circulation type
B-4	Air-screen cleaner	1 lot	1.5 ton/hr-output
B-4.1	Receiving hopper	1 unit	
B-4.2	Bucket elevator	1 unit	
B-4.3	Air-screen cleaner	1 unit	1.5 ton/hr-output
B-4.4	Bucket elevator	1 unit	
B-4.5	Gravity separator	1 unit	1.5 ton/hr-intake
B-4.6	Bucket elevator	1 unit	
B-4.7	Gravity separator	1 unit	1.5 ton/hr-intake
B-4.8	Bucket elevator	1 unit	
B-4.9	Control tank	1 unit	
B-5	Mist sprayer	1 unit	
B-6	Platform scale	2 units	0.5 ton
B-7	Cargo truck	1 unit	4 ton
B-8	Forklift	1 unit	1.5 ton
B-9	Seed inspection and control equipment	1 lot	Moisture meter, trier, blower, etc.
B-10	Station support equipment	1 lot	Pallet, bags, chemicals, etc.

Sources : Project Study Team

APPENDIX J.2.9 Machinery and Equipment required for Post Harvest Technology Demonstration Farm

Serial No.	Equipment	Quantity/farm	Standard
1.	Manual weeder	2 units	Double gang
2.	Hand sprayer	2 units	
3.	Power sprayer	1 unit	
4.	Reaper	1 unit	1.2 m reaping width
5.	Moisture meter	1 unit	Portable type
6.	Handy megaphone	2 units	Battery type

Sources : Project Study Team