

Alternative-3: The considerable reduction of the flood damage will be expected all through the river course, because the river channel to be improved by the first phase has a capacity to carry the 1973 flood which was the second big flood since 1960 with peak water level of EL. 7.88 m at the Candaba gage station, corresponding to about 10-year return period. Furthermore the salinity conditions of the Pampanga River would not be much changed by the improvement works in the first phase, because the excavation of low-water channel is planned only for the materials of embankment.

Consequently, the project implementation by Alternative-3 is proposed from the viewpoint of technical aspect.

4.2.2 Irrigation Project

Implementation of the diversion dam scheme and the pump scheme will be expected to provide greater benefits and effects to the peoples in and around the irrigation development area economically and socially. The results of evaluation and effects for the two alternative schemes are summarized in Table 4.4.

With regard to economic viability, internal rate of return (IRR) is 15.4% for the diversion dam scheme and 15.5% for the pump scheme. These values of IRR indicate that both schemes are economically feasible. The diversion dam scheme will provide the bigger irrigation benefits than the pump scheme through complete year round irrigation for the entire irrigation development area although total construction cost of the diversion dam scheme is about 1.4 times of the pump scheme. As for incremental rice production, the diversion dam scheme will provide 11,000 tons of rice more than the pump scheme. So the diversion dam scheme will play more important role as the rice supply base for Metro Manila than the pump scheme. With respect to employment opportunity, only about 30% of present available labor force are absorbed in farming activities. The projects will create employment opportunity. Incremental employment opportunity to be created by the diversion dam scheme is 1.4 times of the pump scheme. The diversion dam scheme absorbs about 70% of present available labor force and the pump scheme 60%. As far as operation and maintenance cost or irrigation fee is concerned, O&M cost is ₱363/ha for the diversion dam scheme and ₱1,000/ha for the pump scheme. The O&M cost of the diversion dam scheme is almost as same as the present rate of OM cost in NIA national irrigation project by gravity irrigation system. On the other hand the O&M cost for the pump is 1.7 times of the present rate of OM cost in the pump irrigation. The O&M cost or irrigation fee to be charged to the typical farm in the irrigation development area will become ₱545 in the diversion scheme and ₱1,500 in the pump scheme. On the other hand capacity to pay or net reserve of the farm is ₱3,369 and ₱2,150 for the diversion dam scheme and the pump scheme, respectively.

Accordingly balance between capacity to pay and irrigation fee for the typical farm will become P2,824 for the diversion dam scheme and P650 for the pump scheme. Such small profit in the pump scheme will not always offer incentives for the typical farm and there appear some doubts on high recovery rate of collection of irrigation fee in the pump scheme. As regard to water management, the pump scheme will provide irrigation water for only 7,300 ha or 66% of the irrigation service area during dry season and water management in such season will become complicated in terms of rotational systems and so on. Further the pump scheme needs a big amount of energy, about 8.6 MWh per annum for operation under the existing tight conditions of energy supply in the Philippines. The diversion dam will create a reservoir of which maximum reservoir capacity is 28.5 MCM with reservoir area of 2,600 ha. The dam will create potentiality of fisheries production which will become protein sources for local peoples. The submerged areas, 2,600 ha are now mostly under swampy grass land. About 100 ha is paddy field. In the area to be submerged there exist no houses.

The diversion dam will provide technical advantages for future expansion of irrigation area by pump when the return flows from the proposed projects with reservoir will be realized.

It is judged from merits and demerits of the both schemes that the diversion dam scheme will be proposed for the irrigation development area.

Table 2.1 ECONOMIC COST AND BENEFITS FLOW
FOR THE FLOOD CONTROL PROJECT

(Unit: ₱10⁶)

Year	Year in Order	Economic Cost			Economic Benefit			
		Construction Cost	Replacement Cost	O & M Cost	Total	Benefit	Negative Benefit	Total
1983	1	9.0	-	-	9.0	-	-	-
1984	2	60.8	-	-	60.8	-	-	-
1985	3	84.4	-	-	84.4	-	-	-
1986	4	80.8	-	-	80.8	-	-	-
1987	5	80.2	-	-	80.2	-	-	-
1988	6	75.7	-	-	75.7	-	-	-
1989	7	73.2	-	-	73.2	58.4	2.0	56.4
1990	8	73.2	-	-	73.2	58.4	2.0	56.4
1991	9	52.9	-	-	52.9	58.4	2.0	56.4
1992	10	49.6	-	-	49.6	58.4	2.0	56.4
1993	11	-	-	4.0	4.0	91.9	4.4	87.5
1996	14	-	-	4.0	4.0	91.9	4.4	87.5
1997	15	-	-	4.0	4.0	91.9	4.4	87.5
1998	16	-	-	4.0	4.0	91.9	4.4	87.5
2006	24	-	-	4.0	4.0	91.9	4.4	87.5
2007	25	-	7.5	4.0	11.5	91.9	4.4	87.5
2008	26	-	-	4.0	4.0	91.9	4.4	87.5
2016	34	-	-	4.0	4.0	91.9	4.4	87.5
2017	35	-	-	4.0	4.0	91.9	4.4	87.5
2018	36	-	-	4.0	4.0	91.9	4.4	87.5
2026	44	-	-	4.0	4.0	91.9	4.4	87.5
2027	45	-	-	4.0	4.0	91.9	4.4	87.5
2028	46	-	-	4.0	4.0	91.9	4.4	87.5
2032	50	-	-	4.0	4.0	91.9	4.4	87.5

Table 2.2 ECONOMIC COST AND BENEFITS FLOW FOR THE IRRIGATION PROJECT - DIVERSION DAM SCHEME

(Unit: P10⁶)

Year	Year in Order	Economic Cost			Economic Benefit			
		Construction Cost	Replacement Cost	O & M Cost	Total	Benefit	Negative Benefit	Total
1983	1	11.60	-	-	11.60	-	-	-
1984	2	74.90	-	-	74.90	-	-	-
1985	3	74.00	-	-	74.00	-	-	-
1986	4	92.80	-	-	92.80	-	-	-
1987	5	94.10	-	-	94.10	-	-	-
1988	6	5.40	-	4.00	9.40	19.69	2.62	17.07
1989	7	3.40	-	4.00	7.40	39.38	2.62	36.76
1990	8	-	-	4.00	4.00	59.01	2.62	56.39
1991	9	-	-	4.00	4.00	78.76	2.62	76.14
1992	10	-	-	4.00	4.00	98.45	2.62	95.83
1996	14	-	-	4.00	4.00	98.45	2.62	95.83
1997	15	-	4.13	4.00	8.13	98.45	2.62	95.83
1998	16	-	-	4.00	4.00	98.45	2.62	95.83
2006	24	-	-	4.00	4.00	98.45	2.62	95.83
2007	25	-	4.13	4.00	8.13	98.45	2.62	95.83
2008	26	-	-	4.00	4.00	98.45	2.62	95.83
2016	34	-	-	4.00	4.00	98.45	2.62	95.83
2017	35	-	4.13	4.00	8.13	98.45	2.62	95.83
2018	36	-	-	4.00	4.00	98.45	2.62	95.83
2026	44	-	-	4.00	4.00	98.45	2.62	95.83
2027	45	-	4.13	4.00	8.13	98.45	2.62	95.83
2028	46	-	-	4.00	4.00	98.45	2.62	95.83
2032	50	-	-	4.00	4.00	98.45	2.62	95.83

Table 2.3 ECONOMIC COST AND BENEFITS FLOW FOR
THE IRRIGATION PROJECT - PUMP SCHEME

(Unit: P106)

Year	Year in Order	Economic Cost			Economic Benefit			
		Con- struction Cost	Replac- ement Cost	O & M Cost	Total	Benefit	Negative Benefit	Total
1983	1	11.40	-	-	11.40	-	-	-
1984	2	71.90	-	-	71.90	-	-	-
1985	3	84.80	-	-	84.80	-	-	-
1986	4	69.60	-	-	69.60	-	-	-
1987	5	5.30	-	11.00	16.30	15.23	2.46	12.77
1988	6	3.40	-	11.00	14.40	30.46	2.46	28.00
1989	7	-	-	11.00	11.00	45.68	2.46	43.22
1990	8	-	-	11.00	11.00	60.91	2.46	58.45
1991	9	-	-	11.00	11.00	76.14	2.46	73.68
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
1996	13	-	-	11.00	11.00	76.14	2.46	73.68
1997	14	-	4.13	11.00	15.13	76.14	2.46	73.68
1998	15	-	-	11.00	11.00	76.14	2.46	73.68
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
2006	23	-	-	11.00	11.00	76.14	2.46	73.68
2007	24	-	4.13	11.00	15.13	76.14	2.46	73.68
2008	25	-	-	11.00	11.00	76.14	2.46	73.68
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
2010	28	-	-	11.00	11.00	76.14	2.46	73.68
2011	29	-	29.64	11.00	40.64	76.14	2.46	73.68
2012	30	-	-	11.00	11.00	76.14	2.46	73.68
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
2016	33	-	-	11.00	11.00	76.14	2.46	73.68
2017	34	-	4.13	11.00	15.13	76.14	2.46	73.68
2018	35	-	-	11.00	11.00	76.14	2.46	73.68
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
2026	43	-	-	11.00	11.00	76.14	2.46	73.68
2027	44	-	4.13	11.00	15.13	76.14	2.46	73.68
2028	45	-	-	11.00	11.00	76.14	2.46	73.68
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
2032	50	-	-	11.00	11.00	76.14	2.46	73.68

Table 2.4 DISBURSEMENT SCHEDULE OF ECONOMIC COST FOR THE FLOOD CONTROL PROJECT

Item	(Unit: P10 ⁶)											
	Total	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	
I. Civil Work												
- Embankment	61.6	-	9.2	15.4	15.4	15.4	6.2	-	-	-	-	-
- Excavation	253.9	-	20.1	25.2	25.2	20.1	25.3	38.3	38.3	30.7	30.7	
- Outlet Culvert	32.9	-	3.2	10.0	8.2	8.2	3.3	-	-	-	-	
- Revetment	2.9	-	-	-	-	-	-	-	0.7	1.5	0.7	
- Bridge	9.4	-	-	-	-	-	1.9	1.8	1.9	1.9	1.9	
- Others	113.7	-	11.1	13.5	14.0	9.1	17.8	17.6	16.8	6.8	7.0	
- Sub-total	474.4	-	43.6	64.1	62.8	52.8	54.5	57.7	57.7	40.9	40.3	
II. Compensation	50.8	0.3	7.2	7.5	5.6	8.8	7.5	4.6	4.6	3.5	1.2	
III. Contingency	78.5	0.7	7.6	10.4	10.0	9.8	9.3	9.0	9.0	6.6	6.1	
IV. Engineering Cost	36.1	8.0	2.4	2.4	2.4	8.8	4.4	1.9	1.9	1.9	2.0	
V. Total	639.8	9.0	60.8	84.4	80.8	80.2	75.7	73.2	73.2	52.9	49.6	

Table 2.5 DISBURSEMENT SCHEDULE OF ECONOMIC COST FOR
THE IRRIGATION PROJECT - DIVERSION DAM SCHEME

Item	(Unit: P106)								
	Total	1983	1984	1985	1986	1987	1988	1989	
I. Diversion Dam	131.67	-	24.96	20.87	39.42	46.42	-	-	-
II. Irrigation Facilities	51.28	-	9.41	17.55	17.57	6.75	-	-	-
III. Drainage Facilities	62.42	-	17.29	17.11	16.08	11.94	-	-	-
IV. Farm Roads	11.20	-	1.24	2.51	2.51	4.94	-	-	-
V. On Farm Development	12.51	-	-	-	-	4.87	4.66	2.98	-
VI. O & M Facilities	8.04	-	3.94	-	-	4.10	-	-	-
VII. Engineering Cost	34.40	10.49	8.61	6.57	5.62	3.11	-	-	-
Sub-total	311.52	10.49	65.45	64.61	81.20	82.13	4.66	2.98	-
VIII. Physical Contingency	44.68	1.11	9.45	9.39	11.60	11.97	0.74	0.42	-
Total	356.20	11.60	74.90	74.00	92.80	94.10	5.40	3.40	-

Table 2.6 DISBURSEMENT SCHEDULE OF ECONOMIC COST FOR
THE IRRIGATION PROJECT - PUMP SCHEME

Item	(Unit: P106)						
	Total	1983	1984	1985	1986	1987	1988
I. Pump Station	52.78	-	17.34	16.89	18.55	-	-
II. Irrigation Facilities	47.77	-	11.35	27.14	9.28	-	-
III. Drainage Facilities	59.62	-	20.94	22.40	16.38	-	-
IV. Farm Roads	10.89	-	1.07	4.08	5.74	-	-
V. On Farm Development	12.51	-	-	-	4.87	4.66	2.98
VI. O & M Facilities	8.04	-	3.94	-	4.10	-	-
VII. Engineering Cost	26.60	10.30	8.27	4.92	3.11	-	-
Sub-total	218.21	10.30	62.91	75.33	62.03	4.66	2.98
VIII. Physical Contingency	28.19	1.10	8.99	9.47	7.57	0.64	0.42
Total	246.40	11.40	71.90	84.80	69.60	5.30	3.40

Table 2.7 SENSITIVITY TEST

Assumptions	Irrigation Project		Flood Control Project
	Diversion Dam Scheme	Pump Scheme	
i) Base estimate	15.4	15.5 ^{/1}	10.8
ii) Cost: + 10%	14.4	14.2	9.9
iii) Cost: + 20%	13.4	13.1	9.1
iv) Benefit: - 10%	14.2	14.1	9.7
v) Benefit: - 20%	13.0	12.6	8.7
vi) Cost + 20% & benefit - 20%	11.2	10.4	7.2
vii) Production delayed by 1 year	14.0	13.8	-
viii) Benefit - 10% & production delayed by 1 year	13.0	12.6	-
ix) O & M cost estimated by the use of power rate of the NPC	-	16.2	-

^{/1}: O & M cost is estimated by the use of power rate of the Pampanga Electric Cooperative II.

Table 3.1 DISBURSEMENT SCHEDULE OF CONSTRUCTION COST FOR THE IRRIGATION PROJECT - DIVERSION DAM SCHEME

Item	1983		1984		1985		1986		1987		1988		1989											
	FC	LC	FC	LC	FC	LC	FC	LC	FC	LC	FC	LC	FC	LC										
1. Division Dam	86.00	63.97	149.97	-	-	12.56	15.96	28.52	12.16	11.69	23.85	30.52	14.24	44.76	30.76	22.08	52.84	-	-	-	-			
2. Irrigation Facilities	25.19	33.40	58.59	-	-	4.59	6.16	10.75	8.66	11.39	20.05	8.67	11.40	20.07	3.27	4.45	7.72	-	-	-	-			
3. Drainage Facilities	28.44	42.88	71.32	-	-	7.88	11.87	19.75	7.80	11.75	19.55	7.32	11.05	19.37	5.44	8.21	13.65	-	-	-	-			
4. Farm Roads	6.15	6.64	12.79	-	-	0.65	0.77	1.42	1.31	1.55	2.86	1.31	1.55	2.86	2.88	2.77	5.65	-	-	-	-			
5. On Farm Development	0.65	13.64	14.29	-	-	-	-	-	-	-	-	-	-	-	0.44	5.12	5.56	0.21	5.12	5.33	-	3.40	3.40	
6. O&M Facilities	4.10	4.50	8.60	-	-	-	-	4.50	-	-	-	-	-	-	4.10	-	4.10	-	-	-	-	-	-	
7. Land Aquisition	-	33.00	33.00	-	5.00	5.00	-	10.00	10.00	-	10.00	10.00	-	8.00	8.00	-	-	-	-	-	-	-	-	
8. Engineering Services	22.10	12.30	34.40	7.50	2.99	10.49	6.05	2.56	8.61	4.15	2.42	6.57	3.30	2.32	5.62	1.10	2.01	3.11	-	-	-	-	-	
Sub-total	172.63	210.33	382.96	7.50	7.99	15.49	31.73	51.82	83.55	34.08	48.80	82.88	51.12	48.56	99.68	47.99	44.64	92.63	0.21	5.12	5.33	-	3.40	3.40
9. Physical Contingency	19.17	30.37	49.54	0.80	1.01	1.81	4.47	7.68	12.15	4.92	7.20	12.12	4.18	6.84	11.02	4.71	6.36	11.07	0.09	0.78	0.87	-	0.50	0.50
Total	191.8	240.7	432.5	8.3	7.0	17.3	36.2	59.5	95.7	39.0	56.0	95.0	55.3	55.4	110.7	52.7	51.0	103.7	0.3	5.9	6.2	-	3.9	3.9
10. Price Contingency	64.7	130.9	195.6	1.1	1.9	3.0	7.5	19.7	27.2	11.2	26.0	37.2	20.5	33.8	54.3	24.2	39.4	63.6	0.2	5.6	5.8	-	4.5	4.5
Grand Total	256.5	371.6	628.1	9.4	10.9	20.3	43.7	79.2	122.9	50.2	82.0	132.0	75.8	89.2	165.0	76.9	90.4	167.3	0.5	11.5	12.0	-	8.4	8.4

Remarks: FC: Foreign Currency
LC: Local Currency

Table 3.2 DISBURSEMENT SCHEDULE OF CONSTRUCTION COST
FOR THE IRRIGATION PROJECT - PUMP SCHEME

Item	Total		1983		1984		1985		1986		1987		1988				
	FC	LC	FC	LC	FC	LC	FC	LC	FC	LC	FC	LC	FC	LC			
															Total	Total	Total
1. Pump Station	39.01	18.24	57.27	-	-	10.55	9.27	19.82	13.93	3.84	17.77	14.53	5.13	19.66	-	-	
2. Irrigation Facilities	23.57	31.02	54.59	-	-	5.61	7.36	12.97	13.54	17.48	31.02	4.42	6.18	10.60	-	-	
3. Drainage Facilities	27.15	40.98	68.13	-	-	9.55	14.38	23.93	10.16	15.32	25.48	7.44	11.28	18.72	-	-	
4. Farm Roads	5.97	6.47	12.44	-	-	0.56	0.66	1.22	2.14	2.52	4.66	3.27	3.29	6.56	-	-	
5. On Farm Development	0.65	13.64	14.29	-	-	-	-	-	-	-	-	0.43	5.13	5.56	0.22	5.11	
6. O&M Facilities	4.10	4.50	8.60	-	-	-	4.50	4.50	-	-	-	4.10	-	4.10	-	-	
7. Land Acquisition	-	20.50	20.50	-	2.50	2.50	-	10.00	10.00	8.00	-	-	-	-	-	-	
8. Engineering Services	17.80	8.80	26.60	7.50	2.80	10.30	5.62	2.65	8.27	3.12	1.80	4.92	1.55	3.11	-	-	
Sub-total	118.25	144.15	262.40	7.50	5.30	12.80	31.89	48.82	80.71	42.89	48.96	91.85	35.75	32.56	68.31	0.22	5.11
9. Physical Contingency	13.75	21.25	35.00	0.80	0.70	1.50	4.51	7.18	11.69	4.71	7.24	11.95	3.65	4.84	8.49	0.08	0.79
Total	132.00	165.40	297.40	8.30	6.00	14.30	36.40	56.00	92.40	47.60	56.20	107.80	39.40	37.40	76.80	0.30	5.90
10. Price Contingency	37.0	77.1	114.1	1.1	1.3	2.4	7.6	18.5	26.1	13.6	26.1	39.7	14.6	22.9	37.5	0.1	4.6
Grand Total	169.0	242.5	411.5	9.4	7.3	16.7	44.0	74.5	118.5	61.2	82.3	143.5	54.0	60.3	114.3	0.4	10.5

Remarks: FC: Foreign Currency
LC: Local Currency

Table 3.3 CASH FLOW STATEMENT FOR THE IRRIGATION PROJECT - DIVERSION DAM SCHEME CASE 1 & 2

(Unit: P10⁶)

Year in Order	Capital Cost		Loan Repayment ^{/3}		Cash Outflow		Cash Inflow					Total	Balance	
	F. C. /1	L. C. /2	Interest	Principal	O & M Cost	Replacement	Reimbursement for Irrigation Fee	Total	Construction Fund	Revenue /5	Government Subsidy			
1983	9.40	10.90	-	-	-	-	-	20.30	9.40	10.90	-	-	20.30	0
1984	43.70	79.20	0.33	-	-	-	-	123.23	43.70	79.20	-	0.33	123.23	0
1985	50.20	82.00	1.86	-	-	-	-	134.06	50.20	82.00	-	1.86	134.06	0
1986	75.80	89.20	3.62	-	-	-	-	168.62	75.80	89.20	-	3.62	168.62	0
1987	76.90	90.40	6.27	-	-	-	-	173.57	76.90	90.40	-	6.27	173.57	0
1988	0.50	11.50	8.96	-	-	-	-	25.36	0.50	11.50	4.00	9.36	25.36	0
1989	-	8.40	8.98	0.49	4.00	-	-	22.27	-	8.40	4.00	9.87	22.27	0
1990	-	-	8.96	2.79	4.00	-	-	16.15	-	-	4.00	12.15	16.15	0
1991	-	-	8.86	5.44	4.00	-	-	18.70	-	-	4.00	14.70	18.70	0
1992	-	-	8.67	9.43	4.00	-	-	22.50	-	-	4.00	18.50	22.50	0
1993	-	-	8.34	13.47	4.00	-	-	26.21	-	-	4.00	22.21	26.21	0
1994	-	-	7.87	13.50	4.00	-	-	25.77	-	-	4.00	21.77	25.77	0
1995	-	-	7.40	13.50	4.00	-	-	25.30	-	-	4.00	21.37	25.37	0
1996	-	-	6.93	13.50	4.00	-	-	24.83	-	-	4.00	20.83	24.83	0
1997	-	-	6.45	13.50	4.00	6.89	-	31.24	-	-	4.00	27.24	31.24	0
1998	-	-	5.98	13.50	4.00	-	-	23.88	-	-	4.00	19.88	23.88	0
1999	-	-	5.51	13.50	4.00	-	-	23.41	-	-	4.00	19.41	23.41	0
2000	-	-	5.04	13.50	4.00	-	-	22.94	-	-	4.00	18.94	22.94	0
2001	-	-	4.56	13.50	4.00	-	-	22.46	-	-	4.00	18.46	22.46	0
2002	-	-	4.09	13.50	4.00	-	-	21.99	-	-	4.00	17.99	21.99	0
2003	-	-	3.62	13.50	4.00	-	-	21.52	-	-	4.00	17.52	21.52	0
2004	-	-	3.15	13.50	4.00	-	-	21.05	-	-	4.00	17.05	21.05	0
2005	-	-	2.67	13.50	4.00	-	-	20.57	-	-	4.00	16.57	20.57	0
2006	-	-	2.20	13.50	4.00	-	-	20.10	-	-	4.00	16.10	20.10	0
2007	-	-	1.73	13.50	4.00	6.89	-	26.52	-	-	4.00	22.52	26.52	0
2008	-	-	1.26	13.01	4.00	-	-	18.67	-	-	4.00	14.67	18.67	0
2009	-	-	0.80	10.71	4.00	-	-	15.91	-	-	4.00	11.91	15.91	0
2010	-	-	0.43	8.06	4.00	-	-	12.89	-	-	4.00	8.89	12.89	0
2011	-	-	0.14	4.07	4.00	-	-	8.61	-	-	4.00	4.61	8.61	0
2012	-	-	-	0.03	4.00	50.12	-	54.55	-	-	4.00	50.55	54.55	0
2013	-	-	-	-	4.00	-	-	4.40	-	-	4.00	0.40	4.40	0

/1: Foreign Currency Portion

/2: Local Currency Portion

/3: Interest: 3.5%

Grace period: 6 years

Repayment period including grace period: 25 years

/4: 10% of irrigation

/5: Revenue from irrigation fee to be collected from farmer is estimated as follows:

Case 1: 11,000 ha x 5 ca./ha x P72.75/ca. = P4,000,000

Case 2: 0 & M cost P4,000,000 (P3,641 ha)

Table 3.4 CASH FLOW STATEMENT FOR THE IRRIGATION PROJECT - DIVERSION DAM SCHEME CASE 3

(Unit: P10⁶)

Year in Order	Cash Outflow		Reimbursement for Irrigation Fee ^{/4}	Replacement	O & M Cost	Loan Repayment ^{/3} Interest	Capital Cost ^{/2}		Cash Inflow			Balance
	F. C. /1	L. C. /2					F. C. /1	L. C. /2	Construction Fund Revenue ^{/5}	Government Subsidy	Total	
1983	9.40	10.90	-	-	-	-	9.40	10.90	-	-	20.30	0
1984	43.70	79.20	-	-	-	0.33	43.70	79.20	-	0.33	123.23	0
1985	50.20	82.00	-	-	-	1.86	50.20	82.00	-	1.86	134.06	0
1986	75.80	89.20	-	-	-	3.62	75.80	89.20	-	3.62	168.62	0
1987	76.90	90.40	-	-	-	6.27	76.90	90.40	-	6.27	173.57	0
1988	0.50	11.50	-	-	4.00	8.96	0.50	11.50	19.65	-	19.65	4.72
1989	-	8.40	0.49	4.00	4.00	8.98	-	8.40	19.65	-	19.65	28.05
1990	-	-	2.79	4.00	4.00	8.96	-	-	19.65	-	19.65	19.65
1991	-	-	5.44	4.00	4.00	8.85	-	-	19.65	0.62	20.27	0
1992	-	-	9.43	4.00	4.00	8.67	-	-	19.65	4.42	24.07	0
1993	-	-	13.47	4.00	4.00	8.34	-	-	19.65	8.13	27.78	0
1994	-	-	13.50	4.00	4.00	7.87	-	-	19.65	7.69	27.34	0
1995	-	-	13.50	4.00	4.00	7.40	-	-	19.65	7.22	26.87	0
1996	-	-	13.50	4.00	4.00	6.93	-	-	19.65	6.75	26.40	0
1997	-	-	13.50	4.00	4.00	6.45	-	-	19.65	13.16	32.81	0
1998	-	-	13.50	4.00	4.00	5.98	-	-	19.65	5.80	25.45	0
1999	-	-	13.50	4.00	4.00	5.51	-	-	19.65	5.33	24.98	0
2000	-	-	13.50	4.00	4.00	5.04	-	-	19.65	4.86	24.51	0
2001	-	-	13.50	4.00	4.00	4.56	-	-	19.65	4.38	24.03	0
2002	-	-	13.50	4.00	4.00	4.09	-	-	19.65	3.91	23.56	0
2003	-	-	13.50	4.00	4.00	3.62	-	-	19.65	3.44	23.09	0
2004	-	-	13.50	4.00	4.00	3.15	-	-	19.65	2.97	22.62	0
2005	-	-	13.50	4.00	4.00	2.67	-	-	19.65	2.49	22.14	0
2006	-	-	13.50	4.00	4.00	2.20	-	-	19.65	2.02	21.67	0
2007	-	-	13.50	4.00	4.00	1.73	-	-	19.65	1.54	21.19	0
2008	-	-	13.01	4.00	4.00	1.26	-	-	19.65	1.06	20.71	0
2009	-	-	10.71	4.00	4.00	0.80	-	-	19.65	0.59	20.24	0
2010	-	-	8.06	4.00	4.00	0.43	-	-	19.65	-	19.65	2.17
2011	-	-	4.07	4.00	4.00	0.14	-	-	19.65	-	19.65	5.19
2012	-	-	0.03	4.00	4.00	-	-	-	19.65	-	19.65	9.47
2013	-	-	-	4.00	4.00	-	-	-	19.65	36.47	56.12	0
			1.97	-	-	-	-	-	-	-	19.65	13.68

/1: Foreign Currency Portion

/2: Local Currency Portion

/3: Interest: 3.5%

Grace period: 6 years

Repayment period including grace period: 25 years

/4: 10% of irrigation fee

/5: Irrigation fee to be collected from farmer is estimated as follows:

$$\frac{\text{Total amount of loan repayment} + 0 \text{ \& M cost} = 2391,180,000}{25 \text{ years}} + \frac{4,000,000}{25 \text{ years}} = 95,650,000 \text{ (P1,786/ha)}$$

Table 3.5 CASH FLOW STATEMENT FOR THE IRRIGATION PROJECT - PUMP SCHEME CASE 1

(Unit: P10⁶)

Year	Year in Order	Cash Outflow				Cash Inflow				Total	Balance		
		Capital Cost		Loan Repayment ³	O & M Cost	Replacement	Retribution for Irrigation Fee ⁴	Construction Fund				Revenue ⁵	Government Subsidy
		F. C. / 1	L. C. / 2					F. C. / 1	L. C. / 2				
1983	1	9.40	7.30	-	-	-	-	9.40	7.30	-	-	16.70	0
1984	2	44.00	74.50	-	-	-	-	44.00	74.50	-	0.33	118.83	0
1985	3	61.20	82.30	1.87	-	-	-	61.20	82.30	-	1.87	145.37	0
1986	4	54.00	60.30	4.01	-	-	-	54.00	60.30	-	4.01	118.31	0
1987	5	0.40	10.50	5.90	11.00	-	-	0.40	10.50	5.06	12.35	28.31	0
1988	6	-	7.60	5.92	11.00	-	-	-	7.60	5.06	12.37	25.03	0
1989	7	-	-	5.92	11.00	0.49	-	-	-	5.06	12.86	17.92	0
1990	8	-	-	5.90	11.00	2.81	-	-	-	5.06	15.16	20.22	0
1991	9	-	-	5.80	11.00	6.03	-	-	-	5.06	18.28	23.34	0
1992	10	-	-	5.59	11.00	8.87	-	-	-	5.06	20.91	25.97	0
1993	11	-	-	5.28	11.00	8.89	-	-	-	5.06	20.62	25.68	0
1994	12	-	-	4.97	11.00	8.89	-	-	-	5.06	20.31	25.37	0
1995	13	-	-	4.66	11.00	8.89	-	-	-	5.06	20.00	25.05	0
1996	14	-	-	4.34	11.00	8.89	4.72	-	-	5.06	24.40	29.46	0
1997	15	-	-	4.03	11.00	8.89	-	-	-	5.06	19.37	24.43	0
1998	16	-	-	3.72	11.00	8.89	-	-	-	5.06	19.06	24.12	0
1999	17	-	-	3.41	11.00	8.89	-	-	-	5.06	18.75	23.81	0
2000	18	-	-	3.10	11.00	8.89	-	-	-	5.06	18.44	23.50	0
2001	19	-	-	2.79	11.00	8.89	-	-	-	5.06	18.13	23.19	0
2002	20	-	-	2.48	11.00	8.89	-	-	-	5.06	17.82	22.88	0
2003	21	-	-	2.17	11.00	8.89	-	-	-	5.06	17.51	22.57	0
2004	22	-	-	1.86	11.00	8.89	-	-	-	5.06	17.20	22.26	0
2005	23	-	-	1.54	11.00	8.89	-	-	-	5.06	16.88	21.94	0
2006	24	-	-	1.23	11.00	8.89	4.72	-	-	5.06	21.29	26.35	0
2007	25	-	-	0.92	11.00	8.89	-	-	-	5.06	16.26	21.32	0
2008	26	-	-	0.61	11.00	8.40	-	-	-	5.06	15.46	20.52	0
2009	27	-	-	0.32	11.00	6.08	-	-	-	5.06	12.85	17.91	0
2010	28	-	-	0.10	11.00	2.86	-	-	-	5.06	9.41	14.47	0
2011	29	-	-	-	11.00	0.02	32.03	-	-	5.06	38.50	43.56	0
2012	30	-	-	-	11.00	-	-	-	-	5.06	6.45	11.51	0

/1: Foreign Currency Portion
 /2: Local Currency Portion
 /3: Interest: 3.5%
 Grace period: 6 years
 Repayment period including grace period: 25 years
 /4: 10% of irrigation fee
 /5: Irrigation fee from farmer
 (3 ca./ha x 11,000 ha + 5 ca./ha x 7,300 ha) x P72.75/ca. = P5,060,000

Table 3.6 CASH FLOW STATEMENT FOR THE IRRIGATION PROJECT - PUMP SCHEME CASE 2

(Unit: P106)

Year in Order	Cash Outflow		Cash Inflow					Total	Balance		
	Capital Cost	Loan Repayment ^{/3}	O & M	Reimbursement for Irrigation Fee ^{/4}	Replacement	Construction Fund	Revenue ^{/5}			Government Subsidy	
	F. C. /1	L. C. /2	Interest	Principal	Cost	F. C. /1	L. C. /2				
1983	9.40	7.30	-	-	-	9.40	7.30	-	-	16.70	0
1984	44.00	74.50	0.33	-	-	44.00	74.50	-	0.33	118.83	0
1985	61.20	82.30	1.87	-	-	61.20	82.30	-	1.87	145.37	0
1986	54.00	60.30	4.01	-	-	54.00	60.30	-	4.01	118.31	0
1987	0.40	10.50	5.90	-	-	0.40	10.50	11.00	7.00	28.90	0
1988	-	7.60	5.92	-	-	-	7.60	11.00	7.02	25.62	0
1989	-	-	0.49	-	-	-	-	11.00	7.51	18.51	0
1990	-	-	5.90	2.81	-	-	-	11.00	7.81	20.81	0
1991	-	-	5.80	6.03	-	-	-	11.00	12.93	23.93	0
1992	-	-	5.59	8.87	-	-	-	11.00	15.56	26.56	0
1993	-	-	5.28	8.89	-	-	-	11.00	15.27	26.27	0
1994	-	-	4.97	8.89	-	-	-	11.00	14.96	25.96	0
1995	-	-	4.66	8.89	-	-	-	11.00	14.65	25.65	0
1996	-	-	4.34	8.89	-	-	-	11.00	14.02	25.02	0
1997	-	-	4.03	8.89	-	4.72	-	11.00	13.71	24.71	0
1998	-	-	3.72	8.89	-	-	-	11.00	13.40	24.40	0
1999	-	-	3.41	8.89	-	-	-	11.00	13.09	24.09	0
2000	-	-	3.10	8.89	-	-	-	11.00	12.78	23.78	0
2001	-	-	2.79	8.89	-	-	-	11.00	12.47	23.47	0
2002	-	-	2.48	8.89	-	-	-	11.00	12.16	23.16	0
2003	-	-	2.17	8.89	-	-	-	11.00	11.85	22.85	0
2004	-	-	1.86	8.89	-	-	-	11.00	11.53	22.53	0
2005	-	-	1.54	8.89	-	-	-	11.00	11.22	22.22	0
2006	-	-	1.23	8.89	-	-	-	11.00	10.91	21.91	0
2007	-	-	0.92	8.89	-	-	-	11.00	10.60	21.60	0
2008	-	-	0.61	8.40	-	-	-	11.00	10.29	21.29	0
2009	-	-	0.32	6.08	-	-	-	11.00	9.98	20.98	0
2010	-	-	0.10	2.86	-	-	-	11.00	9.67	20.67	0
2011	-	-	-	0.02	-	32.03	-	11.00	33.16	44.15	0
2012	-	-	-	-	-	-	-	11.00	1.10	12.10	0

/1: Foreign Currency Portion
 /2: Local Currency Portion
 /3: Interest: 3.5%
 Grace period: 6 years
 Repayment period including grace period: 25 years
 /4: 10% of irrigation fee
 /5: Revenue from irrigation fee = O & M cost P11,000,000 (P1,000/ha)

Table 3.7 CASH FLOW STATEMENT FOR THE IRRIGATION PROJECT - PUMP SCHEME CASE 3

(Unit: P10⁶)

Year	Year in Order	Cash Outflow			Cash Inflow			Total	Balance
		Capital Cost	Loan Repayment ^{/3}	O & M	Construction Fund	Revenue ^{/5}	Government Subsidy		
		F. C. / 1	Principle	Cost	F. C. / 1	L. C. / 2		Total	
1983	1	9.40	-	-	9.40	7.30	-	16.70	0
1984	2	44.00	0.33	-	44.00	74.50	-	118.83	0
1985	3	61.20	1.87	-	61.20	82.30	-	145.37	0
1986	4	54.00	4.01	-	54.00	60.30	-	118.31	0
1987	5	0.40	5.90	11.00	0.40	10.50	21.31	32.21	2.28
1988	6	-	5.92	11.00	-	7.60	21.31	28.91	2.26
1989	7	-	5.92	11.00	-	-	21.31	21.31	1.77
1990	8	-	5.90	11.00	-	-	21.31	21.84	0
1991	9	-	5.80	11.00	-	-	21.31	3.65	0
1992	10	-	5.59	11.00	-	-	21.31	6.28	0
1993	11	-	5.28	11.00	-	-	21.31	27.59	0
1994	12	-	4.97	11.00	-	-	21.31	27.30	0
1995	13	-	4.66	11.00	-	-	21.31	5.99	0
1996	14	-	4.34	11.00	-	-	21.31	26.68	0
1997	15	-	4.03	11.00	4.72	-	21.31	31.08	0
1998	16	-	3.72	11.00	-	-	21.31	26.05	0
1999	17	-	3.41	11.00	-	-	21.31	25.74	0
2000	18	-	3.10	11.00	-	-	21.31	25.43	0
2001	19	-	2.79	11.00	-	-	21.31	25.12	0
2002	20	-	2.48	11.00	-	-	21.31	24.81	0
2003	21	-	2.17	11.00	-	-	21.31	24.50	0
2004	22	-	1.86	11.00	-	-	21.31	24.19	0
2005	23	-	1.54	11.00	-	-	21.31	23.88	0
2006	24	-	1.23	11.00	-	-	21.31	23.56	0
2007	25	-	0.92	11.00	4.72	-	21.31	27.97	0
2008	26	-	0.61	11.00	-	-	21.31	22.94	0
2009	27	-	0.32	11.00	-	-	21.31	22.14	0
2010	28	-	0.10	11.00	-	-	21.31	19.53	1.78
2011	29	-	-	11.00	32.03	-	21.31	21.31	5.22
2012	30	-	-	11.00	-	-	21.31	45.18	0
								21.31	8.18

/1: Foreign Currency Portion

/2: Local Currency Portion

/3: Interest: 3.5%

Grace period: 6 years

Repayment period including grace period: 25 years

/4: 10% of irrigation fee

/5: Revenue from irrigation fee to be collected from farmer is estimated as follows:

$$\frac{\text{Total amount of loan repayment}}{25 \text{ years (1987 - 2011)}} + 0 \text{ \& M cost} = \frac{P257,680,000}{25 \text{ years}} + P11,000,000$$

$$= P21,310,000 \text{ (P1,937/ha)}$$

Table 3.8(1) DISBURSEMENT SCHEDULE OF CONSTRUCTION COST FOR THE FLOOD CONTROL PROJECT

Item	Total		1983		1984		1985		1986		1987				
	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.			
	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total			
1. Land Acquisition and Compensation	-	143.50	143.50	-	3.95	3.95	-	19.75	19.75	-	15.80	15.80	-	24.75	24.75
2. Civil Work	314.60	195.88	510.48	-	-	-	29.38	20.41	49.79	38.30	29.50	67.80	37.19	27.95	65.14
- Preparation	17.86	11.08	28.94	-	-	-	3.10	2.34	5.44	1.78	1.34	3.12	1.33	1.01	2.34
- Embankment	38.67	38.57	77.24	-	-	-	5.80	5.79	11.59	9.67	9.64	19.31	9.67	9.64	19.31
- Excavation	191.63	71.46	263.09	-	-	-	14.79	5.52	20.31	18.49	6.89	25.38	18.49	6.89	25.38
- Outlet	13.26	24.40	37.66	-	-	-	1.32	2.44	3.76	3.98	7.32	11.30	3.32	6.10	9.42
- Revetment	0.27	3.04	3.31	-	-	-	-	-	-	-	-	-	-	-	-
- Bridge	9.19	10.82	20.01	-	-	-	-	-	-	-	-	-	-	-	-
- Other	2.80	11.20	14.00	-	-	-	0.30	1.24	1.54	0.31	1.23	1.54	0.31	1.23	1.54
- Miscellaneous	40.92	25.31	66.23	-	-	-	4.07	3.08	7.15	4.07	3.08	7.15	4.07	3.08	7.15
3. Engineering and Administration	21.73	23.34	45.07	4.25	5.40	9.65	1.28	1.62	2.90	1.27	1.62	2.89	1.27	1.62	2.89
Sub-Total	336.33	362.72	699.05	4.25	9.35	13.60	30.66	41.78	72.44	39.57	50.87	90.44	38.46	45.37	83.83
4. Physical Contingency	47.09	50.76	97.85	-	0.59	0.59	4.40	6.01	10.41	5.71	7.35	13.06	5.51	6.53	12.04
Total	383.42	413.48	796.90	4.25	9.94	14.19	35.06	47.79	82.85	45.28	58.22	103.50	43.97	51.90	95.87
5. Price Contingency	215.8	358.8	574.6	0.6	2.1	2.7	7.3	15.8	23.1	13.0	27.0	40.0	16.3	31.7	48.0
Grand-total	599.22	772.28	1,371.50	4.85	12.04	16.89	42.36	63.59	105.95	58.28	85.22	143.50	60.27	83.60	143.87

Remarks: FC : Foreign Currency
LC : Local Currency

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Table 3.8(2) DISBURSEMENT SCHEDULE OF CONSTRUCTION COST FOR THE FLOOD CONTROL PROJECT

Item	1988			1989			1990			1991			1992		
	F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.	L.C.	Total
	(Unit: P10 ⁶)														
1. Land Acquisition and Compensation	-	-	20.80	-	12.90	12.90	-	12.90	12.90	-	9.67	9.67	-	3.23	3.23
2. Civil Work	37.56	23.29	60.85	40.19	20.25	60.44	39.80	20.80	60.60	29.39	13.95	43.34	29.31	13.16	42.47
- Preparation	4.48	2.54	7.02	1.80	0.87	2.67	1.35	0.66	2.01	1.35	0.66	2.01	1.34	0.65	1.99
- Embankment	3.86	3.86	7.72	-	-	-	-	-	-	-	-	-	-	-	-
- Excavation	19.15	7.15	26.30	29.42	10.97	40.39	29.42	10.97	40.39	23.54	8.78	32.32	23.54	8.77	32.31
- Outlet	1.32	2.44	3.76	-	-	-	-	-	-	-	-	-	-	-	-
- Revetment	-	-	-	-	-	-	0.07	0.76	0.83	0.13	1.52	1.65	0.07	0.76	0.83
- Bridge	-	-	-	4.60	5.41	10.01	4.59	5.41	10.00	-	-	-	-	-	-
- Other	0.57	2.24	2.81	0.25	1.01	1.26	0.25	1.01	1.26	0.25	1.01	1.26	0.25	1.00	1.25
- Miscellaneous	8.18	5.06	13.24	4.12	1.99	6.11	4.12	1.99	6.11	4.12	1.98	6.10	4.11	1.98	6.09
3. Engineering and Administration	2.62	2.82	5.44	1.33	1.21	2.54	1.33	1.21	2.54	1.33	1.21	2.54	1.33	1.20	2.53
Sub-total	40.18	46.91	87.09	41.52	34.36	75.88	41.13	34.91	76.04	30.72	24.83	55.55	30.64	17.59	48.23
4. Physical Contingency	5.68	6.57	12.25	6.04	4.95	10.99	5.98	5.04	11.02	4.43	3.53	7.96	4.35	2.41	6.76
Total	45.86	53.48	99.34	47.56	39.31	86.87	47.11	39.95	87.06	35.15	28.36	63.51	34.99	20.00	54.99
5. Price Contingency	25.4	50.8	76.2	31.2	45.0	76.2	35.9	54.3	90.2	30.8	45.2	76.0	35.0	37.1	72.1
Grand-total	71.26	104.28	175.54	78.76	84.31	163.07	83.01	94.25	177.26	65.95	73.56	139.51	69.99	57.10	127.09

Remarks: FC : Foreign Currency
LC : Local Currency

Table 3.9 CASH FLOW STATEMENT FOR THE FLOOD CONTROL PROJECT

(Unit: P10⁶)

Year	Year in Order	Capital Cost		Cash Outflow		O & M Cost	Replacement	Construction Fund		Cash Inflow		Balance	
		F.C./L.C./Z	L.C./Z	Loan Repayment/3	Interest			Principal	F.C.	L.C.	Revenue		Government Subsidy
1993	1	4.85	12.04	-	-	-	-	4.85	12.04	-	-	16.89	0
1994	2	42.36	63.59	0.17	-	-	-	42.36	63.59	-	0.17	106.12	0
1995	3	58.28	85.22	1.65	-	-	-	58.28	85.22	-	1.65	145.15	0
1996	4	60.27	83.60	3.69	-	-	-	60.27	83.60	-	3.69	147.56	0
1987	5	64.49	114.33	5.80	-	-	-	64.49	114.33	-	5.80	184.62	0
1988	6	71.26	104.28	8.06	-	-	-	71.26	104.28	-	8.06	183.60	0
1989	7	78.76	84.31	10.55	0.26	-	-	78.76	84.31	-	10.81	173.88	0
1990	8	83.01	94.25	13.30	2.48	-	-	83.01	94.25	-	15.78	193.04	0
1991	9	65.95	73.56	16.12	5.55	-	-	65.95	73.56	-	21.67	161.18	0
1992	10	69.99	57.10	18.23	8.72	-	-	69.99	57.10	-	26.95	154.04	0
1993	11	-	-	20.38	12.12	4.00	-	-	-	-	36.50	36.50	0
1994	12	-	-	19.95	15.87	4.00	-	-	-	-	39.82	39.82	0
1995	13	-	-	19.40	20.01	4.00	-	-	-	-	43.41	43.41	0
1996	14	-	-	18.70	24.38	4.00	-	-	-	-	47.08	47.08	0
1997	15	-	-	17.84	27.85	4.00	-	-	-	-	49.69	49.69	0
1998	16	-	-	16.87	31.54	4.00	-	-	-	-	52.41	52.41	0
1999	17	-	-	15.77	31.54	4.00	-	-	-	-	51.31	51.31	0
2000	18	-	-	14.66	31.54	4.00	-	-	-	-	50.20	50.20	0
2001	19	-	-	13.56	31.54	4.00	-	-	-	-	49.10	49.10	0
2002	20	-	-	12.45	31.54	4.00	-	-	-	-	47.99	47.99	0
2003	21	-	-	11.35	31.54	4.00	-	-	-	-	46.89	46.89	0
2004	22	-	-	10.25	31.54	4.00	-	-	-	-	45.79	45.79	0
2005	23	-	-	9.14	31.54	4.00	-	-	-	-	44.68	44.68	0
2006	24	-	-	8.04	31.54	4.00	-	-	-	-	43.58	43.58	0
2007	25	-	-	6.93	31.54	4.00	-	-	-	-	42.47	42.47	0
2008	26	-	-	5.83	31.28	4.00	7.50	-	-	-	41.11	41.11	0
2009	27	-	-	4.74	29.05	4.00	-	-	-	-	37.79	37.79	0
2010	28	-	-	3.72	25.99	4.00	-	-	-	-	33.71	33.71	0
2011	29	-	-	2.81	22.81	4.00	-	-	-	-	29.62	29.62	0
2012	30	-	-	2.01	19.42	4.00	-	-	-	-	25.43	25.43	0
2013	31	-	-	1.33	15.67	4.00	-	-	-	-	21.00	21.00	0
2014	32	-	-	0.78	11.52	4.00	-	-	-	-	16.30	16.30	0
2015	33	-	-	0.38	7.15	4.00	-	-	-	-	11.53	11.53	0
2016	34	-	-	0.13	3.68	4.00	-	-	-	-	7.81	7.81	0
2017	35	-	-	0.00	-	4.00	-	-	-	-	4.00	4.00	0

71 : Foreign currency

72 : Local Currency

73 : Interest: 3.5%

Grace period: 6 years

Repayment period including grace period: 25 years.

Table 4.1 SEASONAL LABOUR REQUIREMENT

(Unit: 1,000 man-days)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
<u>A) Present Condition</u>	<u>73</u>	<u>72</u>	<u>50</u>	<u>35</u>	<u>26</u>	<u>102</u>	<u>154</u>	<u>140</u>	<u>97</u>	<u>161</u>	<u>195</u>	<u>145</u>	<u>1,250</u>
1) Paddy/Diversified Crop (Rainfed) - 2,300 ha	1	3	1	-	-	22	38	42	17	21	27	24	196
2) Paddy/Diversified Crop (Irrigated) - 4,000 ha	2	6	3	-	-	39	67	76	33	44	56	50	376
3) Paddy Only (Irrigated) - 2,900 ha	31	44	21	-	-	-	-	-	34	60	50	24	264
4) Paddy/Paddy (Irrigated) - 2,300 ha	39	19	25	35	26	41	49	22	13	36	62	47	414
<u>B) With Project</u>													
I) <u>Diversion Dam Scheme</u>	<u>168</u>	<u>112</u>	<u>246</u>	<u>182</u>	<u>112</u>	<u>358</u>	<u>252</u>	<u>168</u>	<u>115</u>	<u>338</u>	<u>376</u>	<u>323</u>	<u>2,750</u>
1) Wet Season Paddy - 11,000 ha	-	-	-	-	112	358	252	168	115	282	88	-	1,375
2) Dry Season Paddy - 11,000 ha	168	112	246	182	-	-	-	-	-	56	288	323	1,375
II) <u>Pump Scheme</u>	<u>126</u>	<u>99</u>	<u>119</u>	<u>183</u>	<u>56</u>	<u>288</u>	<u>323</u>	<u>168</u>	<u>114</u>	<u>252</u>	<u>337</u>	<u>247</u>	<u>2,312</u>
1) Wet Season Paddy - 11,000 ha	-	-	-	-	56	288	323	168	112	246	182	-	1,375
2) Dry Season Paddy - 7,300 ha	119	95	119	183	-	-	-	-	-	-	152	245	913
3) Diversion Crop - 400 ha	7	4	-	-	-	-	-	-	2	6	3	2	24
<u>C) Increment</u>													
1) Diversion Dam Scheme (I-A)	95	40	196	147	86	256	98	28	18	177	181	178	1,500
2) Pump Scheme (II-A)	53	27	69	148	30	186	169	28	17	91	142	102	1,062

Table 4.2 DISTANCE AND AFFECTED PERIOD OF SEAWATER INTRUSION ON PAMPANGA RIVER
(AVERAGE 1968 - 1978)

Channel Condition	Discharge Condition					
	Present			Diversion Dam Scheme/1		
	Intruded Distance (km)	Affected Period (day)	Intruded Distance (km)	Affected Period (day)	Intruded Distance (km)	Affected Period (day)
<u>1. At Channel Bottom</u>						
a. Existing Channel	22.7	145	28.9	156	27.4	155
b. Improved Channel/3 (Basic Plan)	29.6	163	32.7	173	32.0	173
c. Improved Channel/4 (Stepwise Plan)	26.9	157	30.5	169	30.2	165
d. Improved Channel/5 (First Phase, Stepwise Plan)	24.6	153	29.1	167	28.0	165
<u>2. At 1 m Below Water Surface</u>						
a. Existing Channel	1.3	138	2.3	155	2.0	150
b. Improved Channel (Basic Plan)	2.5	149	3.4	161	3.1	162
c. Improved Channel (Stepwise Plan)	2.2	146	3.2	161	2.9	159
d. Improved Channel (First Phase, Stepwise Plan)	1.8	146	2.8	159	2.5	158

Remarks: /1: Diversion dam scheme of irrigation project
 /2: Pump scheme of irrigation project
 /3: Improved channel by basic flood control plan with 100-yr design flood
 /4: Improved channel by stepwise flood control plan with 20-yr design flood
 /5: Improved channel by first phase stepwise plan corresponding 10-yr flood

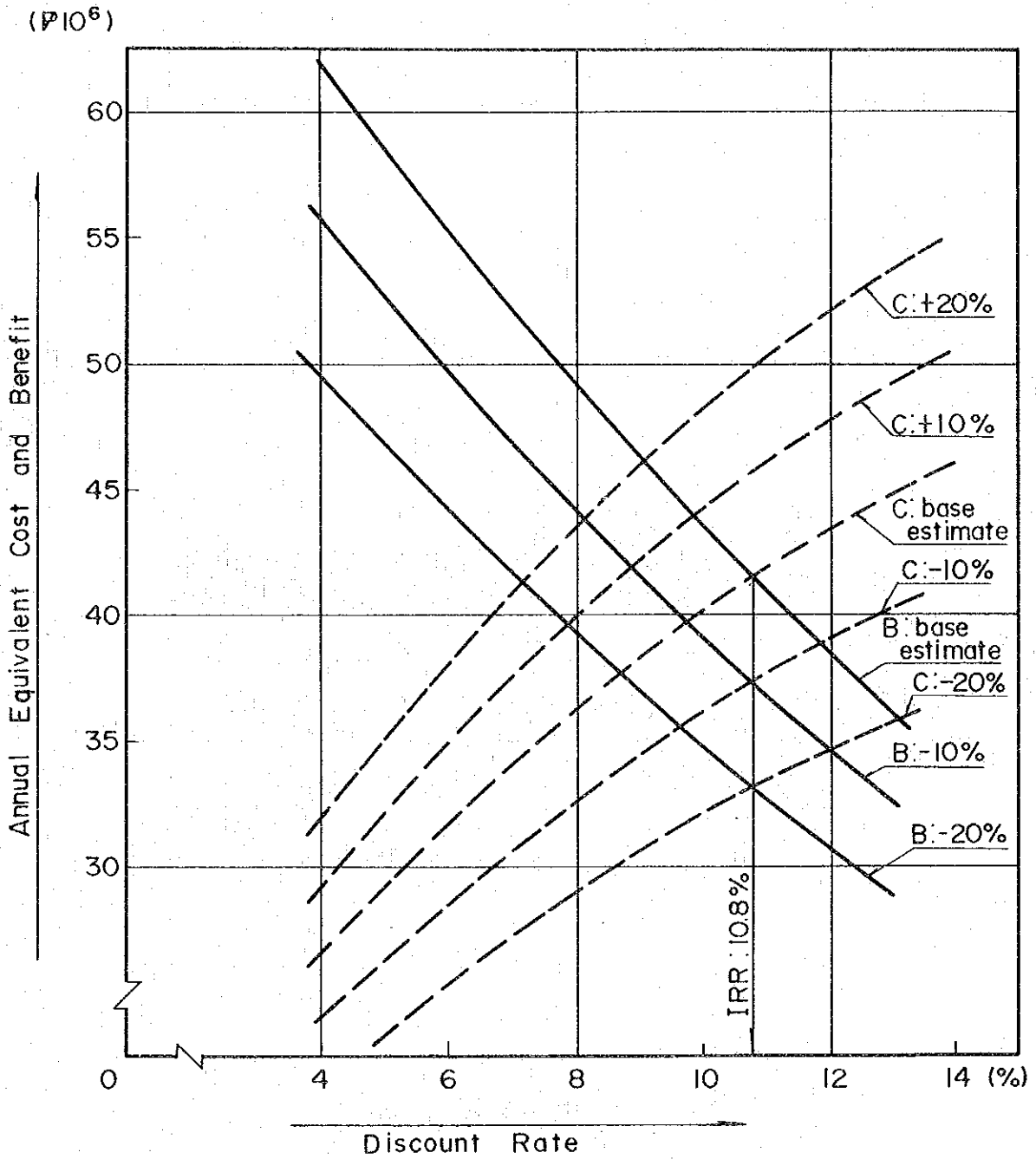
Table 4.3 SUMMARY OF EVALUATION AND EFFECTS ON THE FLOOD CONTROL PROJECT
(STEPWISE PLAN WITH 20 YEAR DESIGN FLOOD)

Alternative	Construction Cost			Stretch to be Improved		Effect		
	Local Currency (P106)	Foreign Currency (P106)	Total (P106)	Stretch	Length (km)	Increase in Inund. Area (103 ha)	Increase of Paddy Prod. (103 t)	Decrease in House Inund. (nos)
Alternative-1								
First Phase	225.0	191.6	416.6	Candaba-Sulipan	18	4.7	5.0	4,500
Second Phase	188.5	191.8	380.3	Sulipan-Manila Bay	22	14.0	2.9	8,900
Whole	413.5	383.4	796.9	Candaba-Manila Bay	40	18.7	7.9	13,400
Alternative-2								
First Phase	188.5	191.8	380.3	Sulipan-Manila Bay	22	14.4	3.9	8,900
Second Phase	225.0	191.6	416.6	Candaba-Sulipan	18	4.3	4.0	4,500
Whole	413.5	383.4	796.9	Candaba-Manila Bay	40	18.7	7.9	13,400
Alternative-3								
First Phase	240.8	190.6	431.4	Candaba-Manila Bay	40	18.2	5.0	10,400
Second Phase	172.7	192.8	365.5	-do-	40	0.5	2.9	3,000
Whole	413.5	383.4	796.9	-do-	40	18.7	7.9	13,400

Table 4.4 SUMMARY OF EVALUATION AND EFFECTS ON THE IRRIGATION PROJECT

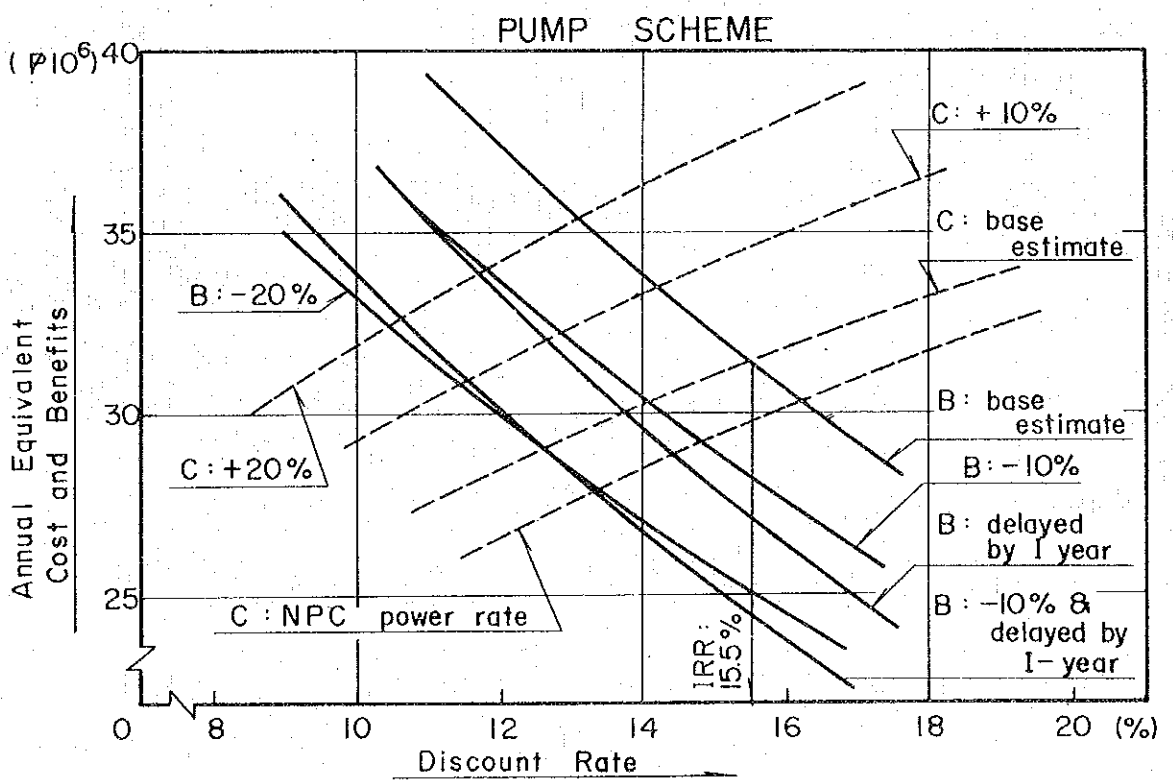
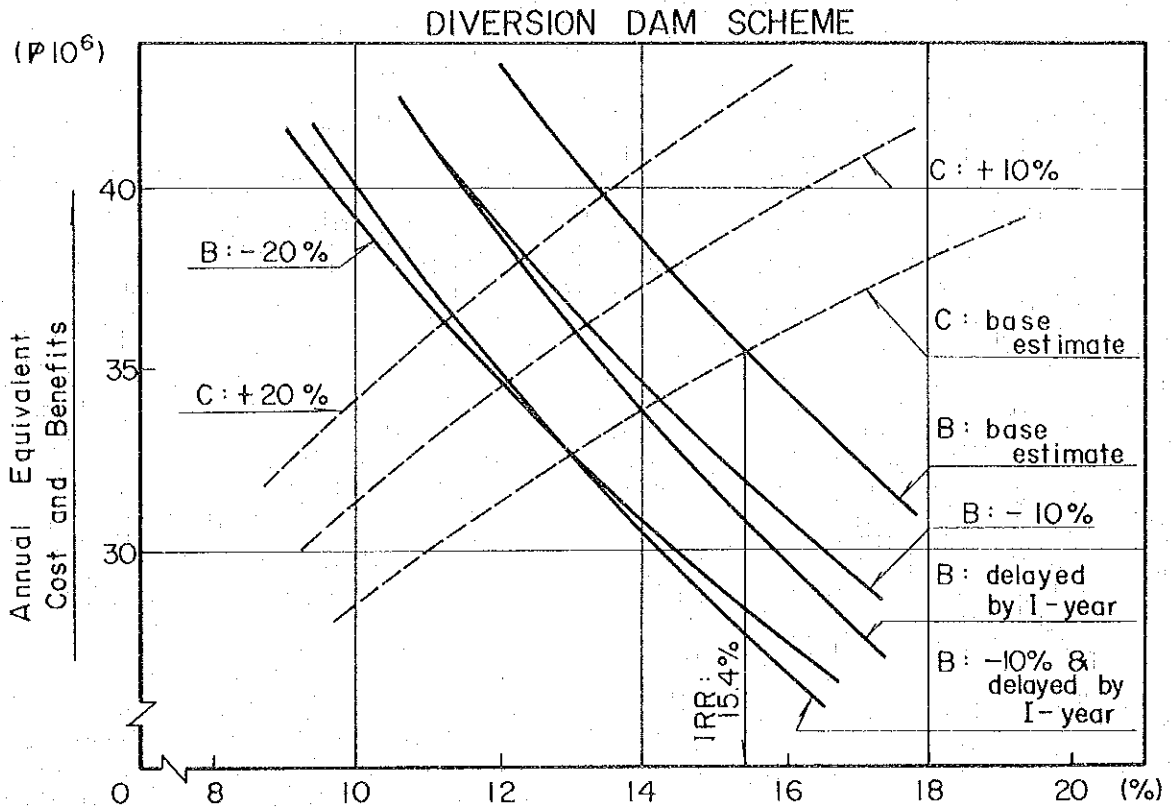
	Diversion Dam Scheme	Pump Scheme
1. Internal Rate of Return (%)	15.4	15.5
2. Irrigation Benefit (P10 ⁶)	98.4	76.1
3. Construction Cost (P10 ⁶)		
- Economic	356.2	246.4
- Financial	432.5	297.4
4. Annual O & M Cost (P10 ⁶)	4.0	11.0
5. Irrigation Service Area (ha)		
- Wet Season	11,000	7,300
- Dry Season	11,000	11,000
6. Annual Incremental Rice Production (ton)	47,000	36,000
7. Employment Opportunity (10 ⁶ man-days)		
- Construction Period	1.9	1.4
- Annual Increase Due to Farm Activities	1.5	1.1
8. Incremental Net Reserve for Typical Farm (P/household)	3,369	2,150
9. Irrigation Fee (P/household)	545	1,500
10. Balance between 8 and 9 (P/household)	2,824	650
11. Potentiality for Fisheries Development	to be expected	-
12. Paddy Field to be Submerged (ha)	100	0

Fig. 2.1 INTERNAL RATE OF RETURN
FOR THE FLOOD CONTROL PROJECT



Remarks : C - Cost , B - Benefit

Fig. 2.2 INTERNAL RATE OF RETURN FOR IRRIGATION PROJECT



Remarks : C - Cost , B - Benefit

Fig. 4.1 SEASONAL LABOR REQUIREMENT

(1,000 man-days)

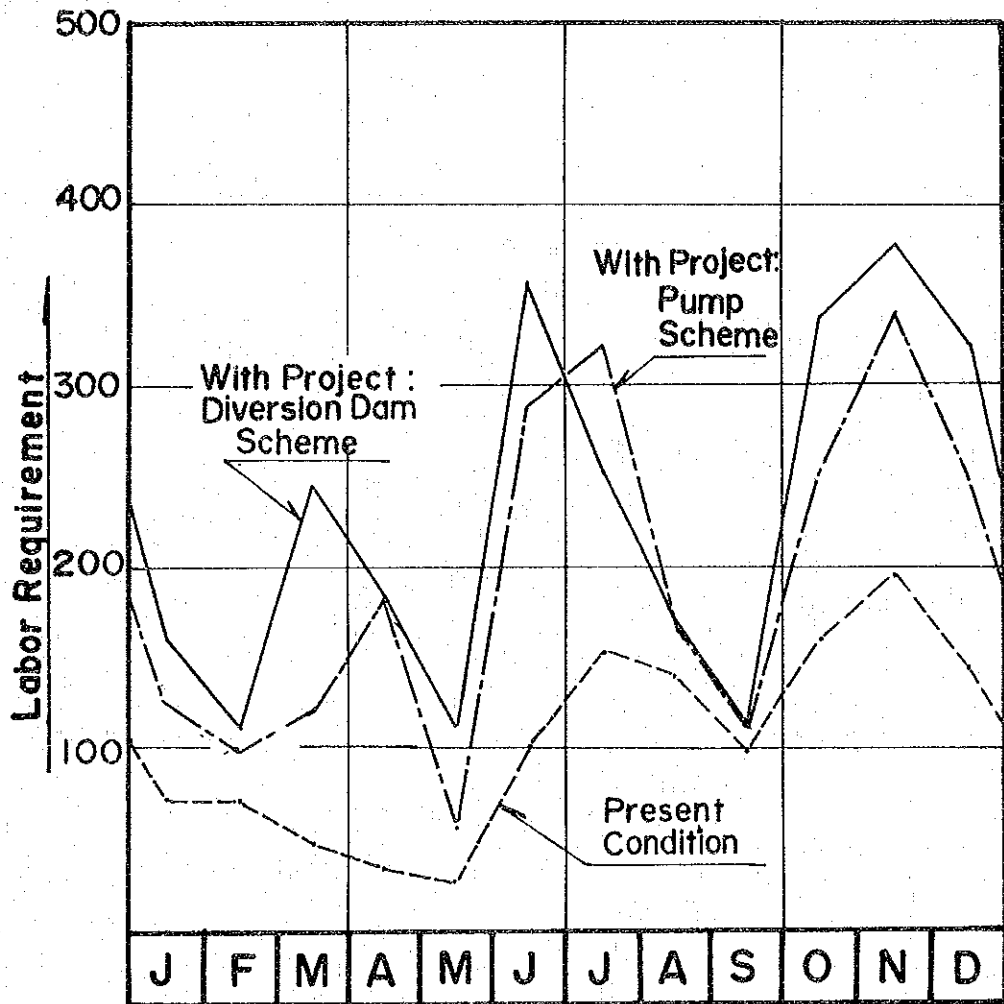
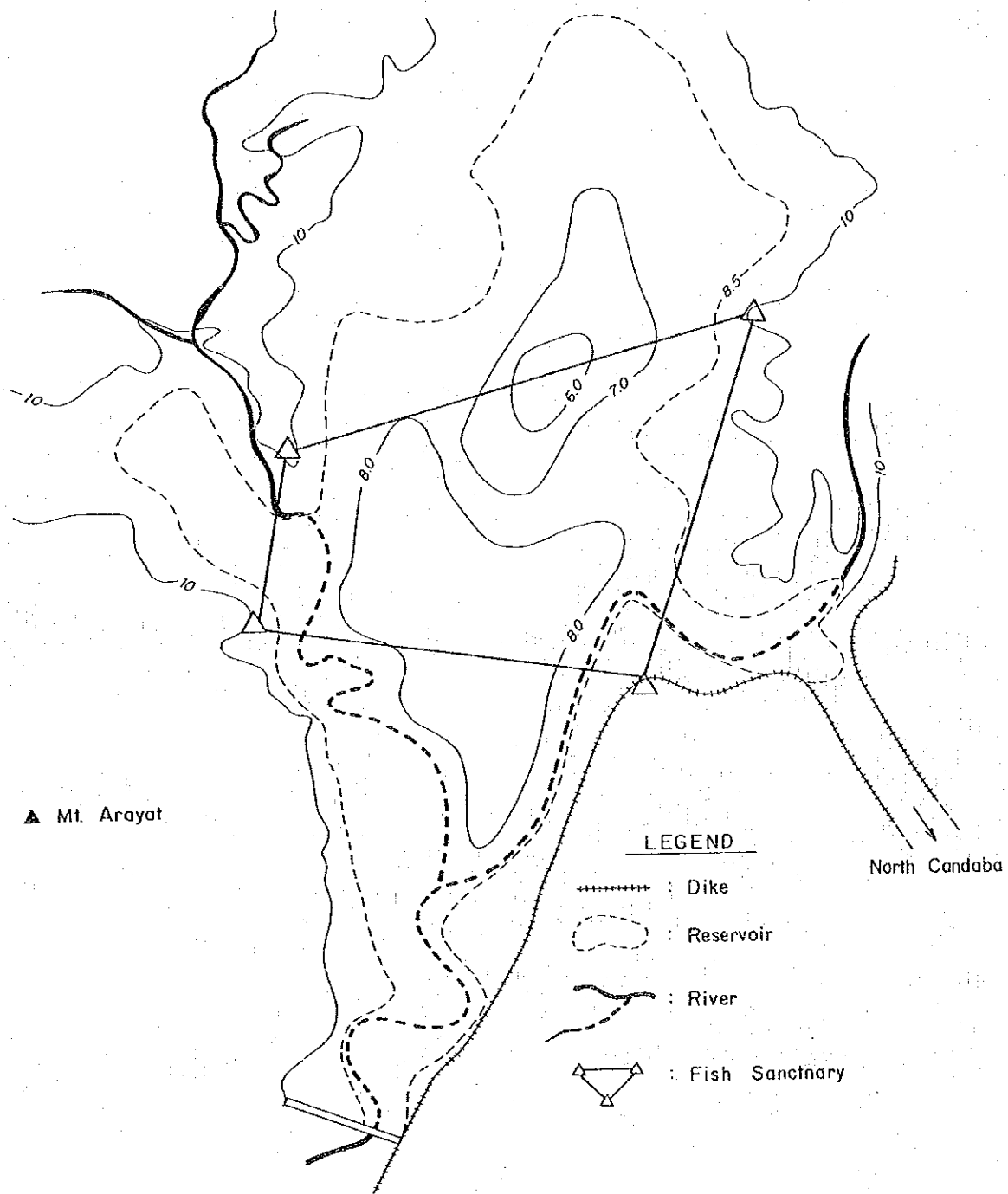


Fig. 4.2 RECOMMENDED AREA FOR YEAR ROUND FISH SANCTUARY IN DIVERSION DAM RESERVOIR



JICA