SSIDP SAMPLE SUB-PROJECT PROFILE

FILE NO. : 26

Code : E 08 51 018 A	Name : CARAY-CARAY CIS	
Region : VIII	Province : NORTHERN LEYTE	Municipality : NAVAL

Present Status : 1. No Planning, (2) F/S, 3. D/D, 4. Construction, 5. Rehab/Imprv., (6) O/M

IA : CARAY-CARAY IA — Nos. of Members : 78 Households

Technical Assessment (F/S, D/D, Construction, O/M) :

1. General : This sub-project was completed in early 1970s, but no data on F/S, design and construction are available. At present there are 2 brush dams made of cobbles, of which water level is not necessarily sufficient for irrigation of the area. When the present weirs are annually washed away by floods, they are reconstructed by farmers. An improvement of the diversion weir is planned.
2. F/S: Planning for the rehabilitation was finished on 1/50,000 map. Discharge measurement was done using current meter and discharge in dry season was estimated at 1.1 m3/sec.
3. D/D : Design for the rehabilitation is expected to be made.

Agro-Economic Assessment :

1. Both present and target cropping intensities are 200%.
2. Soils and land slope are suitable for paddy cultivation.
3. Average farm size is 1.7 ha.
4. Present paddy yield is 3.6 tons/ha and target yield is 3.75 tons/ha.

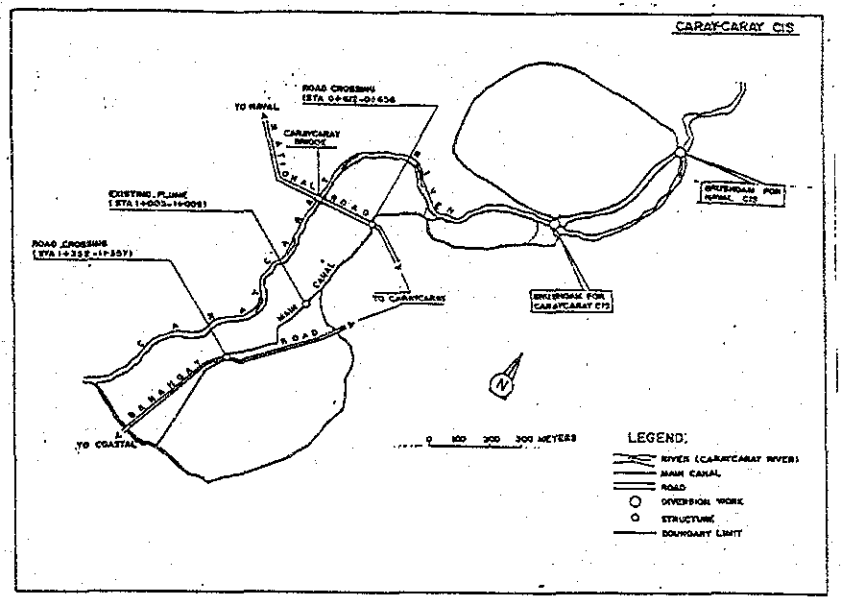
Institutional Assessment :

1. The IA covers about 50% of beneficiaries in the area.
2. Present irrigation fee collection efficiency is 17%.
3. The IA is well maintained and O/M of the irrigation facilities is conducted at a satisfactory level.

Environmental Assessment :

Schistosomiasis is prevalent.

General Layout :



Sub-Project Background :

1. F/S	: early 1970s
2. D/D	: early 1970s
3. Construction	: early 1970s
4. Past Rehab./Imprv	:

Costs Spent for Sub-Project (1,000 Pesos) :

1. Initial Const.	:
2. Past Rehab./Imprv	:

Fund Required for Sub-Project (1,000 Pesos) :

1. New Const.	: (As of 19)
2. Rehab./Imprv.	: 1,500 (As of 1989)
3. Expansion	: (As of 19)

EIRR of Sub-Project as of 1989 : 38 %

Principal Feature of Sub-Project :	Plan	Actual
1. Net Irrigable Area		
- Wet season (ha)	130	72.40
- Dry season (ha)	130	72.40
2. Diversion Weir		
- Material	Concrete/ Ogee type	Cobble/ Brush dam
- Length (m)	70	70
- Height (m)	1.20	1.00
3. Intake		
- Design Discharge (l/s)	322	
4. Main Canals (km)	2.00	
5. Laterals/Sub-Laterals (km)	0.80	
6. Field Ditches (km)	3.00	
7. Main (Project) Drains (km)		
8. Secondary (Farm) Drains (km)		
9. Drainage Ditches (km)		
10. Access Road (km)		
11. Flood Protection Dike (km)		

Remarks :

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SSIDP SAMPLE SUB-PROJECT PROFILE

FILE NO. : 27

Code : E 09 54 040 N	Name : GUIWAN CIS	
Region : IX	Province : ZAMBOANGA DEL SUR	Municipality : ZAMBOANGA CITY

Present Status : 1. No Planning, 2. F/S, ③ D/D, 4. Construction, 5. Rehab/Imprv., ⑥ O/M

IA : GUIWAN FARMERS IA — Nos. of Members : 78 Households

Technical Assessment (F/S, D/D, Construction, O/M) :

1. General : A diversion weir and major irrigation facilities were constructed in 1978 and 1979 by the Bureau of Soils. The weir was damaged by floods and deteriorated. At present it is still functioning but it is not satisfactory level. Therefore, the rehabilitation is required by the IA.
2. F/S : Planning for the rehabilitation was made in 1989. Discharge measurement was conducted by using current meter. Soil survey was also carried out for an assessment of land capability.
3. D/D : Design for the rehabilitation was made in 1989.
4. Outstanding Issues :
   - The water source of this sub-project is proposed to be used for domestic water supply.

Agro-Economic Assessment :

1. Target cropping intensity is 200%.
2. Soils and land slope are suitable for paddy cultivation.
3. Average farm size is 1.5 ha.

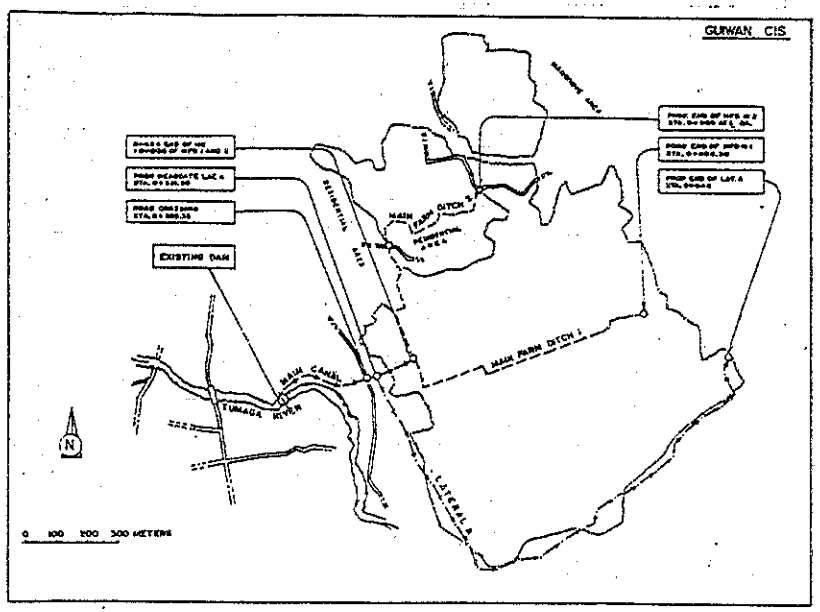
Institutional Assessment :

1. The IA was organized but registration is not yet made.
2. The IA was already given NIA's training.
3. The IA is collecting 75 kg of paddy/ha per season from the members, and is very eager to improve its organization.

Environmental Assessment :

Pollution of irrigation water is observed by farmers since the river runs through urban area.

General Layout :



Sub-Project Background :		
1. F/S	:	---
2. D/D	:	---
3. Construction	:	1978 - 79
4. Past Rehab./Imprv	:	

Costs Spent for Sub-Project (1,000 Pesos) :		
1. Initial Const.	:	
2. Past Rehab./Imprv	:	

Fund Required for Sub-Project (1,000 Pesos) :		
1. New Const.	:	(As of 19)
2. Rehab./Imprv.	:	2,000 (As of 1989)
3. Expansion	:	(As of 19)

EIRR of Sub-Project as of 1989 : 16 %

Principal Feature of Sub-Project :		Plan	Actual
1. Net Irrigable Area			
- Wet season (ha)	:	114	114
- Dry season (ha)	:	114	114
2. Diversion Weir			
- Material	:	Rubble Masonry	Rubble Masonry
- Length (m)	:	20.00	20.00
- Height (m)	:	3.00	3.00
3. Intake			
- Design Discharge (l/s)	:	285	285
4. Main Canals (km)	:	0.50	0.50
5. Laterals/Sub-Laterals (km)	:	2.00	2.00
6. Field Ditches (km)	:	4.00	4.00
7. Main (Project) Drains (km)	:		
8. Secondary (Farm) Drains (km)	:		
9. Drainage Ditches (km)	:		
10. Access Road (km)	:		
11. Service Road (km)	:	0.30	0.30

Remarks :

SSIDP SAMPLE SUB-PROJECT PROFILE

FILE NO. : 28

Code : E 09 54 004 A	Name : VITALI CIP	
Region : IX	Province : ZAMBOANGA DEL SUR	Municipality : ZAMBOANGA CITY
Present Status : 1. No Planning, 2. F/S, (3.)D/D, 4. Construction, 5. Rehab/Imprv., 6. O/M		
IA : ----------	Nos. of Members : --	Households

Technical Assessment (F/S, D/D, Construction, O/M) :

1. F/S : F/S was carried out in 1987. Discharge measurement was done once a month for 1 year by using current meter. Soil survey was also conducted. However, cost estimate and economic evaluation have not been made yet. These works will be made at design stage.
2. D/D : Design for this sub-project is being conducted based on 1/4,000 topo. map.
3. Outstanding Issues :
   - A main canal is estimated at about 12 km due to topographic condition and development cost per ha will be relatively high.

Agro-Economic Assessment :

1. Target cropping intensity is 200%.
2. Soils and land slope are suitable for paddy cultivation.
3. Average farm size seems 1.5 ha.

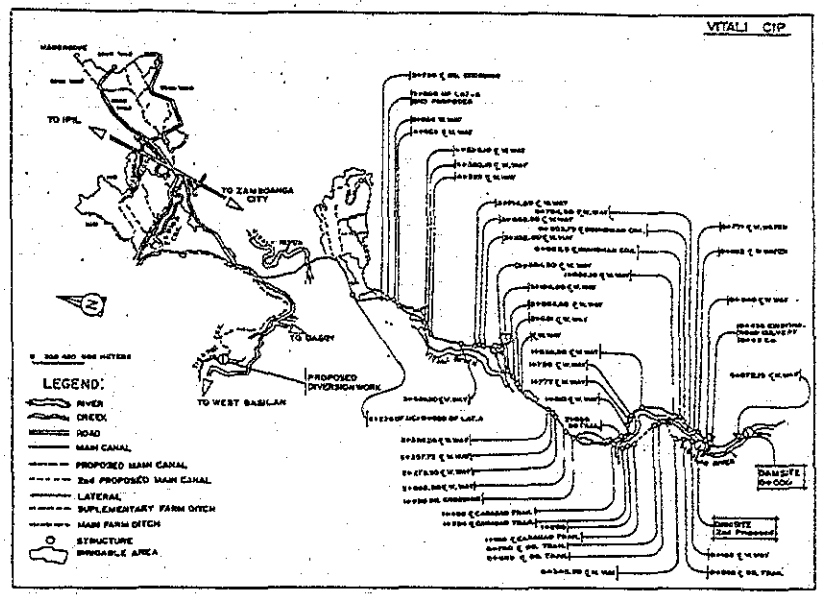
Institutional Assessment :

1. Farmers are organizing an IA and board of directors and interim officers have been appointed.
2. Pre-construction meeting was conducted in October 1990 and it has been found that the farmers are very much interested in this sub-project and are willing to pay the amortization.

Environmental Assessment :

- The implementation of this sub-project wil increase employment opportunity and farm incomes.
- Deforestration in the catchment area is observed.

General Layout :



Sub-Project Background :		
1. F/S	:	1987
2. D/D	:	On-going
3. Construction	:	
4. Past Rehab./Imprv	:	

Costs Spent for Sub-Project (1,000 Pesos) :		
1. Initial Const.	:	
2. Past Rehab./Imprv	:	

Fund Required for Sub-Project (1,000 Pesos) :		
1. New Const.	:	(As of 19)
2. Rehab./Imprv.	:	(As of 19)
3. Expansion	:	(As of 19)

EIRR of Sub-Project as of 19	:	%

Principal Feature of Sub-Project :		Plan	Actual
1. Net Irrigable Area			
- Wet season (ha)	:	166	
- Dry season (ha)	:	166	
2. Diversion Weir			
- Material	:	(Under design)	
- Length (m)	:	"	
- Height (m)	:	"	
3. Intake			
- Design Discharge (l/s)	:	"	
4. Main Canals (km)	:	"	
5. Laterals/Sub-Laterals (km)	:	"	
6. Field Ditches (km)	:	"	
7. Main (Project) Drains (km)	:	---	
8. Secondary (Farm) Drains (km)	:	---	
9. Drainage Ditches (km)	:	---	
10. Access Road (km)	:	---	

Remarks :

SSIDP SAMPLE SUB-PROJECT PROFILE

FILE NO. : 29

Code : E 09 54 021 A | Name : BINAYAN CIP

Region : IX | Province : ZAMBOANGA DEL SUR | Municipality : LABANGAN

Present Status : 1. No Planning, 2. F/S, (3) D/D, 4. Construction, 5. Rehab/Imprv., 6. O/M

IA : BINAYAN IA | Nos. of Members : 57 Households

Technical Assessment (F/S, D/D, Construction, O/M) :

1. General : The irrigation facilities were constructed by FSDC in 1971, using a water pump designed to irrigate 80 ha. However, since farmers could not afford to maintain the pump due to high cost of fuel and oil, farmers gave up this sytem. Finally the irrigation area was 6 ha. In 1980 the farmers built a boulder-made weir but irrigation was made only to the limited area. The farmers desire a complete irrigation facilities under NIA's farmers' participatory program.
2. F/S : Planning was done in early 1990.
3. D/D : Design for irrigation facilities of this sub-project is being conducted based on 1/4,000 topo. map.
4. Outstanding Issues :
   - EIRR of this sub-project has not been estimated yet.

Agro-Economic Assessment :

1. Target cropping intensity is 200%.
2. Soils and land slope are suitable for paddy cultivation.
3. Average farm size is 1.7 ha. There is no landholder with more than 5 ha in this sub-project area.
4. Target paddy yield for dry season is 5 tons/ha which is excessively high.

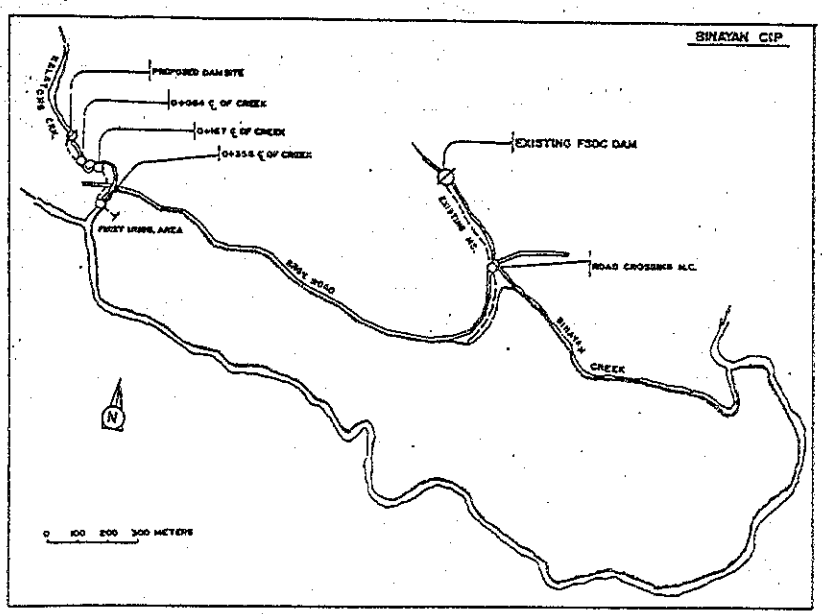
Institutional Assessment :

1. The IA was organized in 1987 but the registration has not been made. The IA is recruiting additional IA members.
2. A series of pre-construction meeting has been conducted by PIO and the IA.
3. The IA is willing to participate in the construction to render the equity.

Environmental Assessment :

An increase in employment opportunities and farm income is highly expected by farmers. No negative impact is anticipated.

General Layout :



Sub-Project Background :

1. F/S	:	1990
2. D/D	:	On-going
3. Construction	:	
4. Past Rehab./Imprv	:	

Costs Spent for Sub-Project (1,000 Pesos) :

1. Initial Const.	:	
2. Past Rehab./Imprv	:	

Fund Required for Sub-Project (1,000 Pesos) :

1. New Const.	:	2,000	(As of 1990)
2. Rehab./Imprv.	:		(As of 19)
3. Expansion	:		(As of 19)

EIRR of Sub-Project as of 19 : %

Principal Feature of Sub-Project :		Plan	Actual
1. Net Irrigable Area			
- Wet season (ha)	:	100	
- Dry season (ha)	:	100	
2. Diversion Weir			
- Material	:	(Under design)	
- Length (m)	:	"	
- Height (m)	:	"	
3. Intake			
- Design Discharge (l/s)	:	"	
4. Main Canals (km)	:	"	
5. Laterals/Sub-Laterals (km)	:	"	
6. Field Ditches (km)	:	"	
7. Main (Project) Drains (km)	:	---	
8. Secondary (Farm) Drains (km)	:	---	
9. Drainage Ditches (km)	:	---	
10. Access Road (km)	:	---	

Remarks :

SSIDP SAMPLE SUB-PROJECT PROFILE

FILE NO. : 30

Code : E 10 61 019 A	Name : LAMPASYAO CIS	
Region : X	Province : MISAMIS ORIENTAL	Municipality : CLAVERIA
Present Status : 1. No Planning, 2. F/S, 3. D/D, 4. Construction, 5. Rehab/Imprv., ⑥O/M		
IA : LAMPASYAO IA		Nos. of Members : 47 Households

Technical Assessment (F/S, D/D, Construction, O/M) :

1. F/S : Planning for irrigation development of this sub-project was made in 1979. Discharge measurement, soil survey and agro-economic survey were conducted. Discharge measurement only had been carried out from 1978 to 1984 by using current meter. No data on F/S report are available at present.
2. D/D : Design for irrigation facilities was completed based on 1/4,000 topo. map in 1980.
3. Construction : The construction was started in 1981 and completed in 1982 under NIA force account base. However, the turn-over to the IA was made in 1989 since the reconciliation was not settled smoothly due to institutional problem.
4. O/M : After the completion, O&M of the facilities are conducted by the IA but there is still room to be improved in the maintenance of canals.
5. Outstanding Issues :
   - Desilting and rehabilitation of irrigation canals seem very necessary for this sub-project.

Agro-Economic Assessment :

1. Both target and present cropping intensities are 200%.
2. Soils and land slope are suitable for paddy cultivation.
3. Average farm size is 1.5 ha.
4. Farmers desire to cultivate diversified crops.

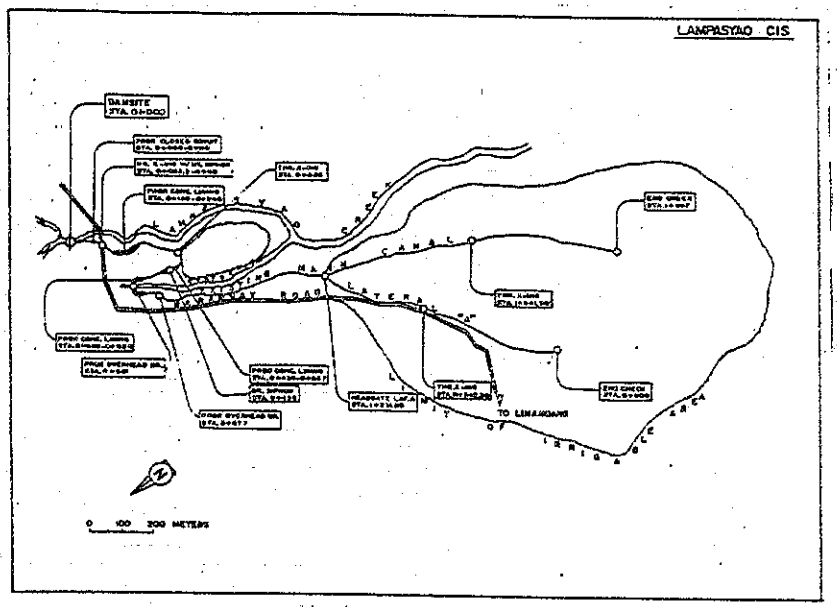
Institutional Assessment :

1. The IA is not strong in its unity. Meeting of IA members is one of problem for the IA.
2. The IA needs the rehabilitation and is willing to pay amortziation.

Environmental Assessment :

Serious deforestration is observed in the area.

General Layout :



Sub-Project Background :		
1. F/S	:	1979
2. D/D	:	1980
3. Construction	:	1981-82
4. Past Rehab./Imprv.	:	1989

Costs Spent for Sub-Project (1,000 Pesos) :		
1. Initial Const.	:	632
2. Past Rehab./Imprv.	:	400

Fund Required for Sub-Project (1,000 Pesos) :		
1. New Const.	:	(As of 19)
2. Rehab./Imprv.	:	(As of 19)
3. Expansion	:	(As of 19)

EIRR of Sub-Project as of 1988 : 13%

Principal Feature of Sub-Project :		Plan	Actual
1. Net Irrigable Area			
- Wet season (ha)	:	70	70
- Dry season (ha)	:	70	70
2. Diversion Weir			
- Material	:	Concrete/ Core-wall type	
- Length (m)	:	10.00	10.00
- Height (m)	:	0.60	0.60
3. Intake			
- Design Discharge (l/s)	:	248	248
4. Main Canals (km)	:	1.81	1.81
5. Laterals/Sub-Laterals (km)	:	0.80	0.80
6. Field Ditches (km)	:		
7. Main (Project) Drains (km)	:		
8. Secondary (Farm) Drains (km)	:		
9. Drainage Ditches (km)	:		
10. Access Road (km)	:		

Remarks :

SSIDP SAMPLE SUB-PROJECT PROFILE

FILE NO. : 31

Code : E 10 61 007 A	Name : LOURDES CIS	
Region : X	Province : MISAMIS ORIENTAL	Municipality : ALUBIJID
Present Status : 1. No Planning, 2. F/S, 3. D/D, 4. Construction, 5. Rehab/Imprv., (6) O/M		
IA : LOURDES FARMERS IA		Nos. of Members : 43 Households

Technical Assessment (F/S, D/D, Construction, O/M) :

1. F/S : Planning for the irrigation development of this sub-project was completed in 1981. Discharge measurement was done by using current meter in 1981 but additional measurement was conducted from 1986 to 1990. At present no data on F/S are available.
2. D/D : Design for irrigation facilities was completed based on 1/4,000 in 1982.
3. Construction : The construction was started in 1983 and completed in 1986. It took three years due to untimely release of funds from central office.
4. Rehabilitation : The rehabilitation for diversion weir, flood protection dike and access road was carried out in 1989.
5. O/M : The irrigation facilities are functioning but the farmers suffer from water shortage in dry season. Maintenance of canals has to be improved by the IA.
6. Outstanding Issues :
   - The water source almost dries up in dry season.
   - In wet season floods occur.

Agro-Economic Assessment :

1. Target cropping intensity was 200% but present intensity is 110% due to water shortage in dry season.
2. Soils and land slope are suitable for paddy cultivation.
3. Average farm size is 1.8 ha.
4. Present paddy yield is 3.75 tons/ha for wet season and 4.25 tons/ha for dry season.

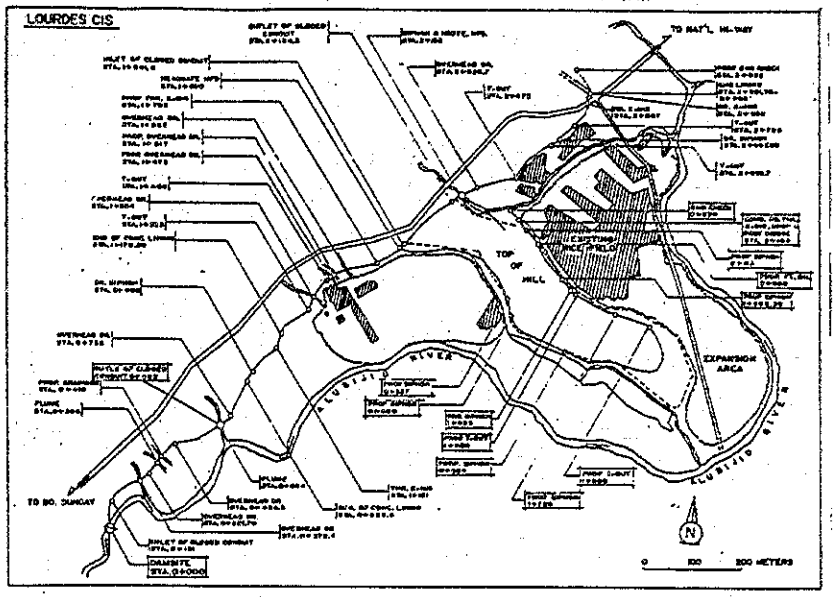
Institutional Assessment :

1. The IA consisting of 43 members, was organized in 1983 and is very viable. Recently there have been 12 potential members in the area.
2. The PIO is monitoring the IA and giving advice and assistance in its O/M activities.

Environmental Assessment :

Farm income has increased since the completion of the irrigation facilities.

General Layout :



Sub-Project Background :

1. F/S	:	1981
2. D/D	:	1982
3. Construction	:	1983-86
4. Past Rehab./Imprv.	:	1989

Costs Spent for Sub-Project (1,000 Pesos) :

1. Initial Const.	:	1,275
2. Past Rehab./Imprv.	:	2,251

Fund Required for Sub-Project (1,000 Pesos) :

1. New Const.	:	(As of 19)
2. Rehab./Imprv.	:	(As of 19)
3. Expansion	:	(As of 19)

EIRR of Sub-Project as of 1989 : 26%

Principal Feature of Sub-Project :		Plan	Actual
1. Net Irrigable Area			
- Wet season (ha)	:	102	102
- Dry season (ha)	:	102	10
2. Diversion Weir			
- Material	:	Rubble Masonry	
- Length (m)	:	18.00	18.00
- Height (m)	:	0.50	0.50
3. Intake			
- Design Discharge (l/s)	:	260	260
4. Main Canals (km)	:	3.05	3.05
5. Laterals/Sub-Laterals (km)	:	1.16	1.16
6. Field Ditches (km)	:		
7. Main (Project) Drains (km)	:		
8. Secondary (Farm) Drains (km)	:		
9. Drainage Ditches (km)	:		
10. Access Road (km)	:	0.80	0.80
11. Flood Protection Dike (km)	:	0.05	0.05

Remarks :

F - 31

SSIDP SAMPLE SUB-PROJECT PROFILE

FILE NO. : 32

Code : N 10 61 006 A	Name : FARMBUGAS CIP	
Region : X	Province : MISAMIS ORIENTAL	Municipality : CLAVERIA
Present Status : 1. No Planning, 2. F/S, (3) D/D, 4. Construction, 5. Rehab/Imprv., 6. O/M		
IA : LAMPASYAO IA		Nos. of Members : 47 Households

Technical Assessment (F/S, D/D, Construction, O/M) :

1. F/S : Planning for irrigation development of this sub-project was made in 1989. Discharge measurement was done once a month for 1 year. Soil survey and agro-economic survey were also conducted.
2. D/D : Design for irrigation facilities was done based on 1/4,000 topo. map in 1989. A core-wall type weir was design. Development cost per ha of P 17,230 seems relatively high because of topographic condition around the weir and intake site.
3. Construction : Early commencement of the construction is very much expected by the IA.
4. Outstanding Issues :
   - The area is a rolling terrain.

Agro-Economic Assessment :

1. Target cropping intensity is 200%.
2. Soils are suitable and land slope is marginally suitable for paddy cultivation.
3. Average farm size is 1.4 ha.

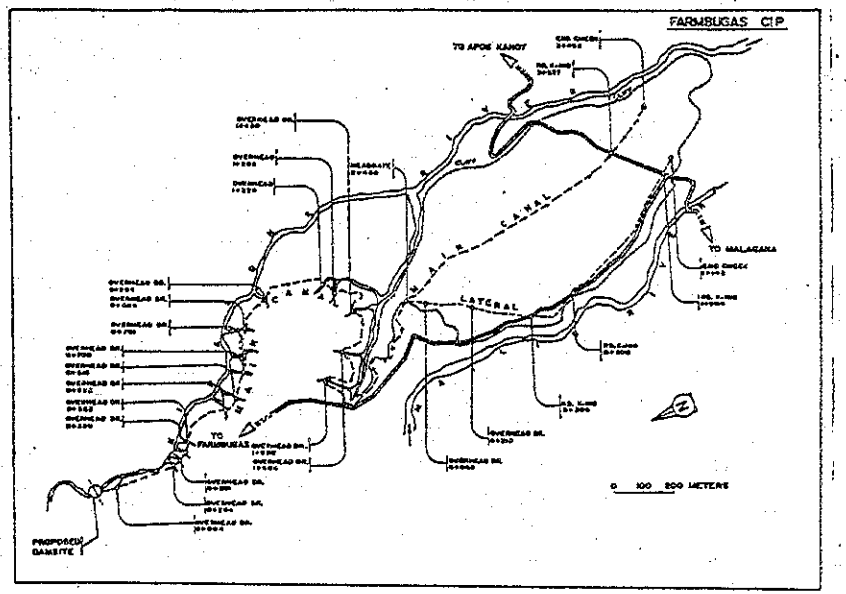
Institutional Assessment :

1. The IA was organized in 1990 but the registration has not been made.
2. The IA members agree to comply with NIA's requirements of loan amortization.
3. There are some squatters in the area. The IA plans to vacate the lands after the commencement of the construction.

Environmental Assessment :

Increase im employment opportunities and farm income is expected.

General Layout :



Sub-Project Background :

1. F/S	:	1989
2. D/D	:	1990
3. Construction	:	
4. Past Rehab./Imprv.	:	

Costs Spent for Sub-Project (1,000 Pesos) :

1. Initial Const.	:	
2. Past Rehab./Imprv.	:	

Fund Required for Sub-Project (1,000 Pesos) :

1. New Const.	:	1,120 (As of 1990)
2. Rehab./Imprv.	:	(As of 19)
3. Expansion	:	(As of 19)

EIRR of Sub-Project as of 1989 : 42 %

Principal Feature of Sub-Project :		Plan	Actual
1. Net Irrigable Area			
- Wet season (ha)	:	65	
- Dry season (ha)	:	65	
2. Diversion Weir			
- Material	:	Concrete/ Core-wall type	
- Length (m)	:	13.00	
- Height (m)	:	0.80	
3. Intake			
- Design Discharge (l/s)	:	84.50	
4. Main Canals (km)	:	3.49	
5. Laterals/Sub-Laterals (km)	:	1.14	
6. Field Ditches (km)	:	1.60	
7. Main (Project) Drains (km)	:		
8. Secondary (Farm) Drains (km)	:		
9. Drainage Ditches (km)	:		
10. Access Road (km)	:		

Remarks :

SSIDP SAMPLE SUB-PROJECT PROFILE

FILE NO. : 33

Code : E 10 61 020 A	Name : MAT-I 2 CIS	
Region : X	Province : MISAMIS ORIENTAL	Municipality : CLAVERIA
Present Status : 1. No Planning, ②F/S, 3. D/D, 4. Construction, 5. Rehab/Imprv., ⑥O/M		
IA : —	Nos. of Members : ---	Households

Technical Assessment (F/S, D/D, Construction, O/M) :

1. General : This is a dole-out project. No data on F/S, design and construction of existing facilities are available at present. The existing irrigation system has no diversion weir and water is taken by an intake. The intake and canals are almost silted and the existing facilities scarcely functions. An entire rehabilitation of the facilities and construction of a diversion weir are needed.
2. F/S : Planning for the rehabilitation was made in 1990. Discharge measurement has been carried out once a month from 1981 to 1984 and for 1 year in 1989.
3. D/D : Early commencement of design for the rehabilitation is expected by the IA.
4. O/M : The existing facilities hardly function.
4. Outstanding Issues :
   - Serious silting is observed.

Agro-Economic Assessment :

1. Both target and present cropping intensities are 200%.
2. Soils and land slope are suitable for paddy cultivation.
3. Average farm size seems about 1.5 ha.
4. Present paddy yield is 2.3 tons/ha and target yield is 3.9 tons/ha.
5. EIRR of 62% has to be examined.

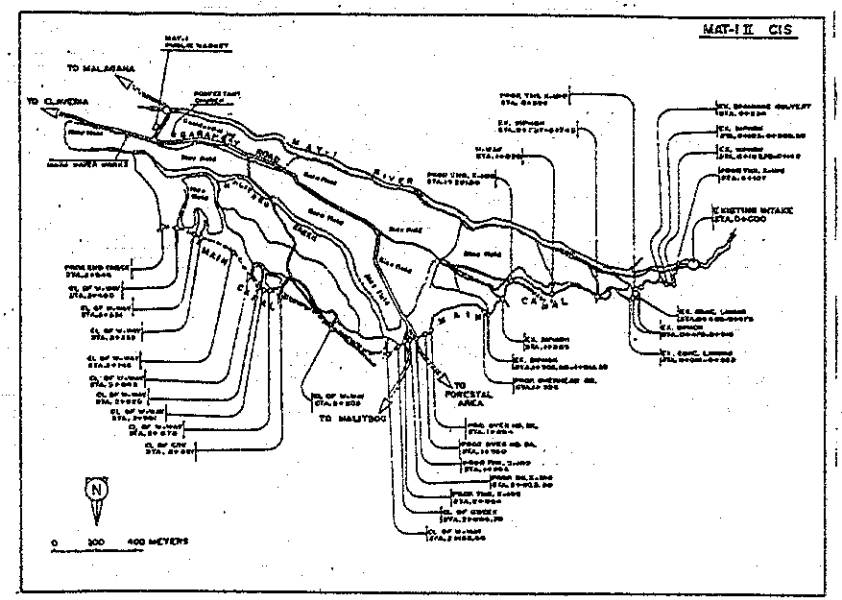
Institutional Assessment :

1. The IA has not been organized. Since there are 20 prospective members, the IA has to be organized s
2. Farmers want to learn improved farming practice of paddy. Cooperation of DA is very necessary.

Environmental Assessment :

Increase in farm incomes is highly expected by farmers.

General Layout :



Sub-Project Background :

1. F/S	:	
2. D/D	:	
3. Construction	:	No data
4. Past Rehab./Imprv.	:	

Costs Spent for Sub-Project (1,000 Pesos) :

1. Initial Const.	:
2. Past Rehab./Imprv.	:

Fund Required for Sub-Project (1,000 Pesos) :

1. New Const.	: 1,060	(As of 1990)
2. Rehab./Imprv.	:	(As of 19)
3. Expansion	:	(As of 19)

EIRR of Sub-Project as of 1990 : 62 %

Principal Feature of Sub-Project :	Plan	Actual
1. Net Irrigable Area		
- Wet season (ha)	65	About 10
- Dry season (ha)	65	About 10
2. Diversion Weir	(Not yet designed)	(Intake Only)
- Material	"	—
- Length (m)	"	—
- Height (m)	"	—
3. Intake		
- Design Discharge (l/s)	97.50	
4. Main Canals (km)	3.55	
5. Laterals/Sub-Laterals (km)	1.50	
6. Field Ditches (km)	2.00	
7. Main (Project) Drains (km)		
8. Secondary (Farm) Drains (km)		
9. Drainage Ditches (km)		
10. Access Road (km)		

Remarks :

SSIDP SAMPLE SUB-PROJECT PROFILE

FILE NO. : 34

Code : E 11 67 010 A	Name : LINOAN CIS	
Region : XI	Province : DAVAO DEL NORTE	Municipality : MONTEVISTA
Present Status : 1. No Planning, 2. F/S, 3. D/D, 4. Construction, 5. Rehab/Imprv., (6.)O/M		
IA : LINOAN COMMUNAL IA		Nos. of Members : 46 Households

Technical Assessment (F/S, D/D, Construction, O/M) :

1. F/S : Planning for irrigation development of this sub-project was conducted in 1975. Discharge measurement and soil survey were finished. Planned area was 200 ha but actually irrigated area is about 83 ha in wet season and 59 ha in dry season.
2. D/D : Design for irrigation facilities of this sub-project was made in 1975. Topographic, canal route and river surveys were conducted.
3. Construction : The construction was carried out from 1976 and 1977 under NIA force account base.
4. O/M : The constructed irrigation facilities were turned over to the IA in 1977. The IA has operated and maintained those facilities since then.
5. Outstanding Issues :
   - Water shortage in dry season is serious problem. Even though the rehabilitation is made, water shortage will be serious problem.

Agro-Economic Assessment :

1. Present cropping intensity is 171% and target intensity was 200%.
2. Soils and land slope are suitable for paddy cultivation.
3. Average farm size is 1.2 ha.
4. Present paddy yield is 4 tons/ha and 3.75 tons/ha for wet and dry seasons, respectively.

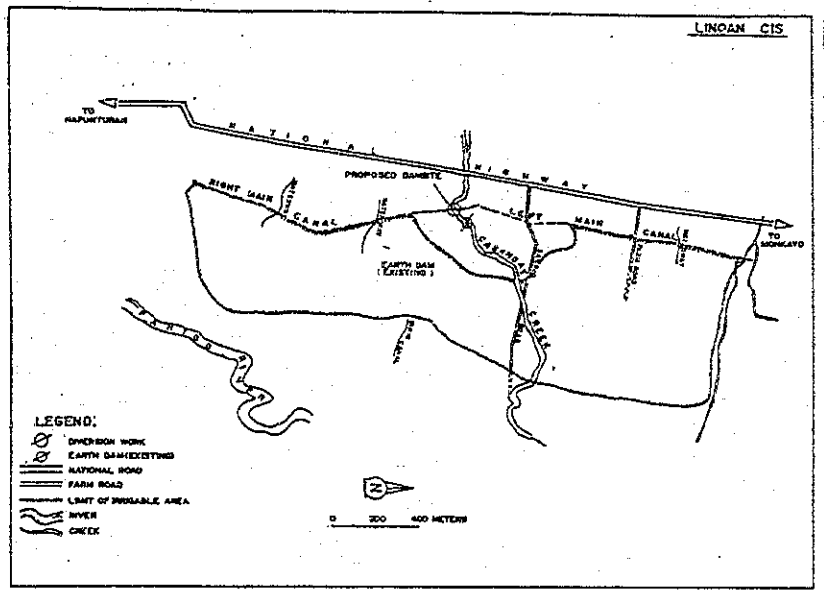
Institutional Assessment :

1. The IA is very viable.
2. O&M activities by the IA are satisfactorily conducted.
3. Institutional constraint lies in collection of amortization and O&M fees.
4. The IA wishes the rehabilitation of irrigation facilities.

Environmental Assessment :

- Employment opportunities and farm incomes have increased.
- Illegal logging in the watershed is found.

General Layout :



Sub-Project Background :

1. F/S	:	1975
2. D/D	:	1975
3. Construction	:	1976-77
4. Past Rehab./Imprv.	:	1989

Costs Spent for Sub-Project (1,000 Pesos) :

1. Initial Const.	:	158
2. Past Rehab./Imprv.	:	1,173

Fund Required for Sub-Project (1,000 Pesos) :

1. New Const.	:	(As of 19)
2. Rehab./Imprv.	:	(As of 19)
3. Expansion	:	(As of 19)

EIRR of Sub-Project as of 1988 : 17 %

Principal Feature of Sub-Project :		Plan	Actual
1. Net Irrigable Area			
- Wet season (ha)	:	200	82.60
- Dry season (ha)	:	200	58.60
2. Diversion Weir			
- Material	:	Concrete/ Checkgate	Concrete/ Checkgate
- Length (m)	:	6.00	6.00
- Height (m)	:	1.50	1.50
3. Intake			
- Design Discharge (l/s)	:	300	85
4. Main Canals (km)	:	3.29	3.00
5. Laterals/Sub-Laterals (km)	:	---	---
6. Field Ditches (km)	:	2.00	2.00
7. Main (Project) Drains (km)	:		
8. Secondary (Farm) Drains (km)	:		
9. Drainage Ditches (km)	:		
10. Access Road (km)	:		

Remarks :

SSIDP SAMPLE SUB-PROJECT PROFILE

FILE NO. : 35

Code : E 11 67 012 A	Name : DAUNAN CIS	
Region : XI	Province : DAVAO DEL NORTE	Municipality : MONTEVISTA
Present Status : 1. No Planning, 2. F/S, 3. D/D, 4. Construction, 5. Rehab/Imprv., ⑥O/M		
IA : DAUMAN IA		Nos. of Members : 25 Households

Technical Assessment (F/S, D/D, Construction, O/M) :

1. F/S : Planning for irrigation development of 150 ha was conducted in 1983. Discharge measurement was done once a month for 1 year. Soil survey and agro-economic survey were also carried out.
2. D/D : Design for irrigation development of 150 ha was made in 1983 based on 1/4,000 topo. map. Topographic, canal route and river surveys were conducted.
3. Construction : The construction was started in 1983 and completed in 1986 under NIA force account base.
4. O/M : The constructed facilities were turned over to the IA in 1986. The IA has operated and maintained those facilities since then.
5. Outstanding Issues :
   - Due to water shortage in dry season, irrigation area has decreased from 150 ha to 57 ha. Even though the rehabilitation is undertaken, water shortage in dry season will remain.

Agro-Economic Assessment :

1. Both target and present cropping intensities are 200%, while actually irrigated area decreases from 150 ha in F/S to 57 ha.
2. Soils and land slope are suitable for paddy cultivation.
3. Average farm size is 1.67 ha.
4. Present paddy yield is 4 tons/ha and 3.75 tons/ha for wet and dry season, respectively.

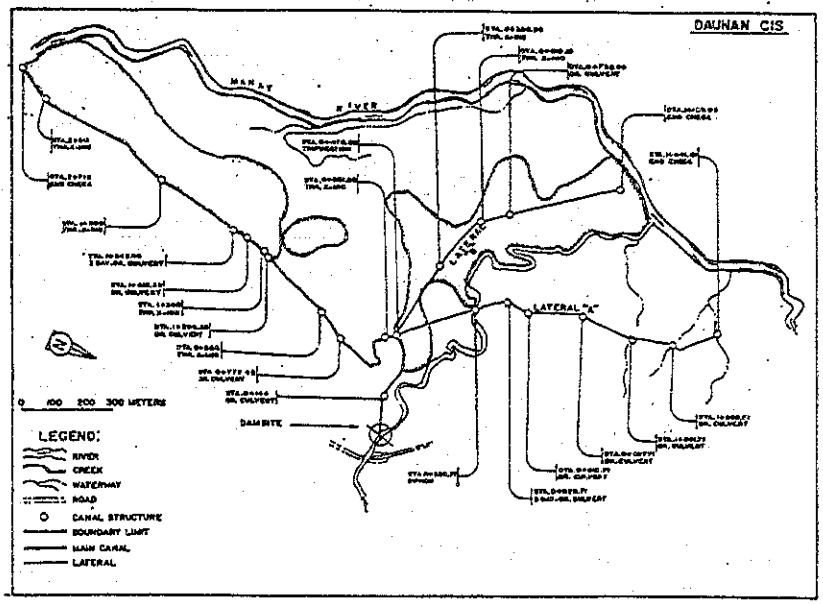
Institutional Assessment :

1. The IA is very viable.
2. O&M activities by the IA are conducted at a satisfactory level.
3. There is a problem in collection of amortization and O&M fees.
4. The IA desires early implementation of the rehabilitation.

Environmental Assessment :

- Owing to the sub-project, employment opportunities and farm incomes have increased.
- Illegal logging in the watershed is found.

General Layout :



Sub-Project Background :		
1. F/S	:	1983
2. D/D	:	1983
3. Construction	:	1983-86
4. Past Rehab./Imprv.	:	1989

Costs Spent for Sub-Project (1,000 Pesos) :		
1. Initial Const.	:	1,001
2. Past Rehab./Imprv.	:	606

Fund Required for Sub-Project (1,000 Pesos) :		
1. New Const.	:	(As of 19)
2. Rehab./Imprv.	:	(As of 19)
3. Expansion	:	(As of 19)

EIRR of Sub-Project as of 1989 : 17 %

Principal Feature of Sub-Project :		Plan	Actual
1. Net Irrigable Area			
- Wet season (ha)	:	150	57
- Dry season (ha)	:	150	57
2. Diversion Weir			
- Material	:	Concrete/ Checkgate	Concrete/ Checkgate
- Length (m)	:	20.15	20.15
- Height (m)	:	1.60	1.60
3. Intake			
- Design Discharge (l/s)	:	275	120
4. Main Canals (km)	:	2.71	2.71
5. Laterals/Sub-Laterals (km)	:	1.19	1.19
6. Field Ditches (km)	:	8.40	8.00
7. Main (Project) Drains (km)	:		
8. Secondary (Farm) Drains (km)	:		
9. Drainage Ditches (km)	:		
10. Access Road (km)	:		

Remarks :

SSIDP SAMPLE SUB-PROJECT PROFILE

FILE NO. : 36

Code : E 12 70 020 A	Name : BALILI CIS	
Region : XII	Province : LANAO DEL NORTE	Municipality : KAPATAGAN
Present Status : 1. No Planning, 2. F/S, 3. D/D, ④Construction, 5. Rehab/Imprv., 6. O/M		
IA : BALILI DONGGO-AN IA		Nos. of Members : 179 Households

Technical Assessment (F/S, D/D, Construction, O/M) :

1. F/S: Planning for irrigation development of this sub-project was made in 1987. Discharge measurement was conducted once a month for 1 year by using a current meter. Soil survey and agro-economic survey were also conducted.
2. D/D: Design for irrigation facilities was carried out based on 1/4,000 topo. map in 1987. Owing to abundant water in the river and favorable topographic condition of the river at the intake site, no diversion weir was designed.
3. Construction : The construction was started in 1987 and is scheduled to be completed within 1990.
4. Outstanding Issues :
   - Drainage improvement and flood protection works have to be considered.

Agro-Economic Assessment :

1. Target cropping intensity is 200%.
2. Soils and land slope are suitable for paddy cultivation.
3. Average farm size is 1.2 ha.
4. Target paddy yield is 3.5 tons/ha while present yield is 2 tons/ha.

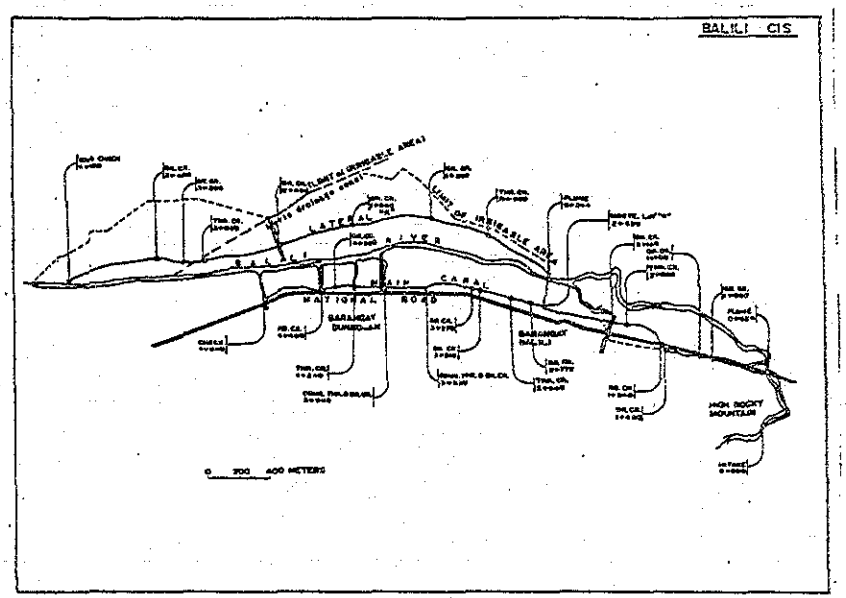
Institutional Assessment :

1. The IA was established in 1989, and a set of officers, committees and sector groups are already determined. The IA seems viable.
2. The turn-over of the facilities is scheduled in December, 1990.
3. There is an insurgency problem in and around the area.

Environmental Assessment :

Increase in employment opportunities and farm incomes is expected.

General Layout :



Sub-Project Background :

1. F/S	:	1987
2. D/D	:	1987
3. Construction	:	On-going
4. Past Rehab./Imprv.	:	

Costs Spent for Sub-Project (1,000 Pesos) :

1. Initial Const.	:	
2. Past Rehab./Imprv.	:	

Fund Required for Sub-Project (1,000 Pesos) :

1. New Const.	:	4,680 (As of 1990)
2. Rehab./Imprv.	:	(As of 19)
3. Expansion	:	(As of 19)

EIRR of Sub-Project as of 1988 : 25 %

Principal Feature of Sub-Project :		Plan	Actual
1. Net Irrigable Area			
- Wet season (ha)	:	220	
- Dry season (ha)	:	220	
2. Diversion Weir		Intake only	
- Material	:	—	
- Length (m)	:	—	
- Height (m)	:	—	
3. Intake			
- Design Discharge (l/s)	:	400	
4. Main Canals (km)	:	4.84	
5. Laterals/Sub-Laterals (km)	:	4.30	
6. Field Ditches (km)	:	2.00	
7. Main (Project) Drains (km)	:		
8. Secondary (Farm) Drains (km)	:		
9. Drainage Ditches (km)	:	1.50	
10. Access Road (km)	:		
11. Flood Protection Dike (km)	:		

Remarks :

SSIDP SAMPLE SUB-PROJECT PROFILE

FILE NO. : 37

Code : E 12 70 010 A	Name : WATERFALLS CIS	
Region : XII	Province : LANAO DEL NORTE	Municipality : KAPATAGAN
Present Status : 1. No Planning, 2. F/S, 3. D/D, 4. Construction, 5. Rehab/Imprv., ⑥O/M		
IA : WATERFALLS IA		Nos. of Members : 40 Households

Technical Assessment (F/S, D/D, Construction, O/M) :

1. F/S: Planning for irrigation development was completed in 1984. Discharge measurement was done once a month from 1982 to 1988. Soil survey and agro-economic survey were also conducted.
2. D/D : Design for the facilities was made based on 1/4,000 topo. map in 1985.
3. Construction : The construction was started in 1985 and completed in 1987. In 1988 the rehabilitation of main canal was conducted.
4. O/M : The irrigation facilities are functioning but seepage from the canals and structures is a problem. O&M are relatively good.
5. Outstanding Issues :
   - Irrigation area has decreased from 80 ha to 50 ha in wet and dry seasons mainly due to seepage of canals.
   - The rehabilitation of existing unlined canals and construction of a cut and cover in main canal are required by the IA.

Agro-Economic Assessment :

1. Both target and present cropping intensities are 200%.
2. Soils and land slope are suitable for paddy cultivation.
3. Average farm size is 2 ha.
4. Present paddy yield is 4.5 tons/ha which is relatively high.
5. Virus disease (called tungro) is a major problem in the area. Countermeasures against this disease are needed.

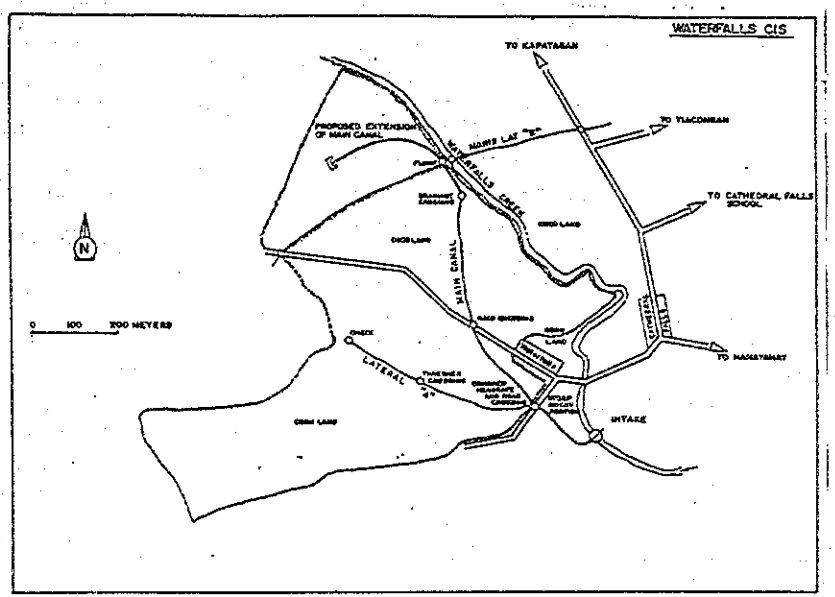
Institutional Assessment :

1. In 1988, the IA did not pay its amortization fee though the IA collected it from members. The IA spent the collected money for additional construction of flume in the system.
2. Rehabilitation of the existing facilities is needed by the IA. A close communicaiton between the IA and PIO seems necesary for successful implementation of this sub-project.

Environmental Assessment :

Deforestration and soil erosion are observed in the catchment area of the river.

General Layout :



Sub-Project Background :

1. F/S	:	1984
2. D/D	:	1985
3. Construction	:	1985-87
4. Past Rehab./Imprv.	:	1988

Costs Spent for Sub-Project (1,000 Pesos) :

1. Initial Const.	:	1,431
2. Past Rehab./Imprv.	:	Incl. in above

Fund Required for Sub-Project (1,000 Pesos) :

1. New Const.	:	(As of 19)
2. Rehab./Imprv.	:	1,200 (As of 1990)
3. Expansion	:	(As of 19)

EIRR of Sub-Project as of 1989 : 42 %

Principal Feature of Sub-Project :

	Plan	Actual
1. Net Irrigable Area		
- Wet season (ha)	80	50
- Dry season (ha)	80	50
2. Diversion Weir	Intake only	
- Material	------	----
- Length (m)	------	----
- Height (m)	------	----
3. Intake		
- Design Discharge (l/s)	110	110
4. Main Canals (km)	0.53	0.53
5. Laterals/Sub-Laterals (km)	0.70	0.71
6. Field Ditches (km)		
7. Main (Project) Drains (km)		
8. Secondary (Farm) Drains (km)		
9. Drainage Ditches (km)	0.60	0.60
10. Access Road (km)		

Remarks :

SSIDP SAMPLE SUB-PROJECT PROFILE

FILE NO. : 38

Code : E 12 70 017 A | Name : LIMUAG CIS

Region : XII | Province : LANAO DEL NORTE | Municipality : BAROY

Present Status : 1. No Planning, 2. F/S, 3. D/D, 4. Construction, 5. Rehab/Imprv., (6.)O/M

IA : LIMUAG IA | Nos. of Members : 145 Households

Technical Assessment (F/S, D/D, Construction, O/M) :

1. F/S : Planning for irrigation development of this sub-project was done in 1986. Discharge measurement was carried out for 2 years from 1978 to 1980. Soil survey and agro-economic survey were also conducted.
2. D/D : Design for the irrigation facilities was done based on 1/4,000 topo. map in 1986.
3. Construction : The construction was started in 1987 and completed in 1989 under NIA force account base.
4. O/M : O&M of the facilities are successfully carried out by the IA and the facilities are func-
5. Outstanding Issues :
   - Irrigation area has decreased from 250 ha to 100 ha mainly due to water shortage and seepage from canals. Canal lining is required instead of existing unlined canals.

Agro-Economic Assessment :

1. Target cropping inetnsity is 200% but present intensity is anticipated to be 150% due to seasonal water shortage and canal seepage.
2. Soils and land slope are suitable for paddy cultivation.
3. Average farm size is 1.4 ha.
4. The turn-over was made in May 1990. The first cropping is being carried out. Paddy yield is expected to increase from 2.2 tons/ha to 3.5 tons/ha.

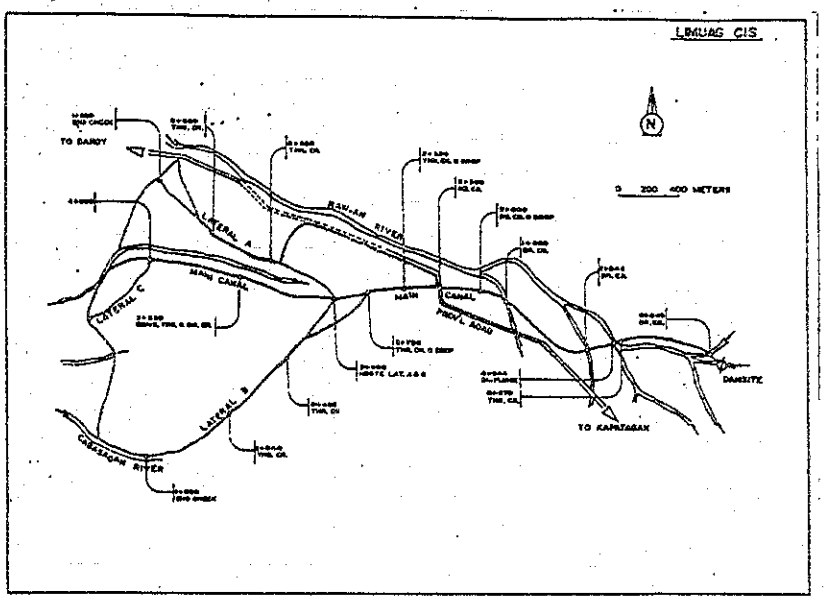
Institutional Assessment :

1. There is a feud generated by unfair water distribution between 142 and 3 of the IA members.
2. O/M of the IA is being carefully monitored by the PIO since this O/M is the first trial after the turn-over.

Environmental Assessment :

Increase in farm income is very much expected by the IA members.

General Layout :



Sub-Project Background :

1. F/S	:	1986
2. D/D	:	1986
3. Construction	:	1987-89
4. Past Rehab./Imprv.	:	

Costs Spent for Sub-Project (1,000 Pesos) :

1. Initial Const.	:	2,460
2. Past Rehab./Imprv.	:	

Fund Required for Sub-Project (1,000 Pesos) :

1. New Const.	:	(As of 199)
2. Rehab./Imprv.	:	1,500 (As of 1990)
3. Expansion	:	(As of 19)

EIRR of Sub-Project as of 1988 : 23 %

Principal Feature of Sub-Project :

	Plan	Actual
1. Net Irrigable Area		
- Wet season (ha)	200	200
- Dry season (ha)	200	100
2. Diversion Weir		
- Material	Rubble Masonry	Rubble Masonry
- Length (m)	23.70	23.70
- Height (m)	3.30	3.30
3. Intake		
- Design Discharge (l/s)		
4. Main Canals (km)	3.96	
5. Laterals/Sub-Laterals (km)	1.65	
6. Field Ditches (km)	4.00	1.50
7. Main (Project) Drains (km)		
8. Secondary (Farm) Drains (km)		
9. Drainage Ditches (km)	1.50	1.50
10. Access Road (km)		

Remarks :

ANNEX G

PRE-FEASIBILITY STUDIES ON REPRESENTATIVE SAMPLE SUB-PROJECTS

ANNEX G-1

FIELD INSPECTION OF REPRESENTATIVE SAMPLE SUB-PROJECTS

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ANNEX G-1 FIELD INSPECTION OF REPRESENTATIVE SAMPLE SUB-PROJECTS

Objectives and Work Procedures

1.01 Objectives

The pre-feasibility studies on 10 representative sample sub-projects were carried out with the following objectives:

(1) To supplement and/or improve the computerized database,

(2) To prepare the prospective development plans and preliminary designs as the models for the representative categories of sub-projects, and

(3) To collect the supplementary data for the institutional studies on strengthening of RIO/PIO and improvement of IAs' activities.

1.02 Work Procedures

A work flow of the pre-feasibility study is shown in Fig. G1-01.

1.03 Selection of Representative Sample Sub-projects

Twenty (20) representative sample sub-projects listed in Table G1-01 were selected under Phase-I Study, considering the following conditions;

(1) The sample sub-projects should satisfy the following for CISs;
- Designed irrigable area is adequate,
- Amortizing system,
- Rehabilitation works of diversion weir and main canals are needed, and
- Construction works were completed before 1986.

(2) The sample sub-projects should satisfy the following for CIPs;
- Designed irrigable area is adequate, and
- Basic studies have been completed.

(3) The sample sub-projects should represent most of the categories classified by the development scales and topographic conditions.

(4) The sample sub-projects should not be included in the candidate sub-projects for implementation under CIDP-I and -II.

(5) The sample sub-projects should be located in the following provinces (considering the peace and order conditions and accessibility to the sites);

- Nueva Ecija	- Rizal	- Quezon
- Tarlac	- Cavite	- Cebu
- Zambales	- Batangas	- Northern Leyte
- Pampanga	- Palawan	
- Bulacan	- Iloilo	

1.04 The following 10 sub-projects were finally selected among the pre-selected 20 sub-projects through the discussion with NIA, and investigated as the representative sample sub-projects for the pre-feasibility studies. The locations are indicated on Fig. G1-02.

No.	Province	Name of Sub-projects	Designed Irrigable Area (ha)
CISs for Rehabilitation/Improvement			
1.	Quezon	Tumbaga CIS	121
2.	Iloilo	Bayunan CIS	220
3.	Iloilo	De La Paz CIS*	89
4.	Cebu	Tag-Amakan CIS	51
5.	Northern Leyte	Macupa CIS	448
6.	Northern Leyte	Caray-Caray CIS*	130
CIPs for New Development			
7.	Quezon	Kinatihan CIP	100
8.	Cavite	Pacheco CIP	172
9.	Iloilo	Bairan CIP	64
10.	Northern Leyte	Maragondong CIP	320

* : substituted from the originally listed sub-projects due to the current peace and order conditions

Field Inspections for Pre-feasibility Studies

1.05 The pre-feasibility studies are composed of the following major works :

(1) Data collection (topographic maps and available documents prepared by NIA),
(2) Preliminary studies on collected data,
(3) Additional data collection and field reconnaissance,
(4) Review and studies of the existing documents,
(5) Formulation of development plans,
(6) Institutional studies of IAs and RIOs/PIOs
(7) Preparation of preliminary design for project facilities,
(8) Cost and benefit analysis,
(9) Project evaluation, and
(10) Data arrangement to supplement and/or improve the database for master planning.

1.06 Topographic maps (scale: 1/4,000) and other existing available data were collected before the field reconnaissance. The basic data and development plans were preliminarily studied in order to check the lacking data for the studies and to prepare the check list for the field investigation. The results of the original inventory survey coupled with the additional inventory survey were fully utilized for the pre-feasibility studies.

1.07 The field inspections were made in a couple of days at each of the selected sub-project sites with an emphasis on the following:

(1) Topographic conditions and river systems,
(2) Existing irrigation facilities (for CISs),
(3) Proposed diversion damsites (for CIPs),
(4) Agricultural conditions (cropping pattern, farming practices and yields),
(5) Agricultural support services,
(6) Activities of PIOs and IAs,
(7) Socio-economic conditions (income level, progress of CARP), and
(8) Environmental issues.

1.08 Interviews were also conducted with the representative IA members as well as the PIO's staff to obtain the necessary data and information regarding agricultural and institutional aspects. The following data were also collected from the respective PIOs and other government agencies:

(1) Topographic maps scaled 1/4,000 (revised and/or updated),
(2) General layouts of irrigation systems,
(3) Meteoro-hydrological data (rainfall and other climatic data, catchment area at intake, records of discharge measurement, etc.)
(4) Soil maps and land capability classification maps,
(5) Cropping pattern and crop production records,
(6) Agro-economic data (farm size, production costs, marketing and average farm budget),
(7) Institutional data (status of agricultural support services, activities of IA, collection rate of amortization fee, etc.),
(8) Availability of construction equipment in PIOs, and
(9) Construction materials and costs.

Analysis of Field Inspections

1.09 The existing development plans were reviewed in terms of the following aspects:

(1) Assessment of proposed cropping pattern,
(2) Analysis of available water resources and irrigation water requirements,
(3) Study on designed irrigable area in the wet and dry seasons,
(4) Study on irrigation and drainage canal networks,
(5) Preliminary designs of major facilities,
(6) Cost estimates,
(7) Study on agricultural development plan,
(8) Estimates of the expected project benefits,
(9) Study on institutional activities of PIOs and IAs, and
(10) Project evaluation.

1.10 In principle, the development plans in the feasibility study reports prepared by NIA are accepted as far as there is no technical problem because these plans have been formulated through discussions between IA and NIA. This is the basic strategy for the implementation of communal irrigation development.

1.11 Irrigation Development Plan

In the NIA's F/S reports, a double cropping of paddy is proposed as the future cropping pattern for all of ten sample sub-projects. Based on this pattern, diversion water requirements were estimated on a monthly basis. The designed irrigable area was assessed by the water balance study between river discharge and the estimated water requirements.

1.12 Preliminary Design of Major Facilities

The development plan of the project facilities is also formulated in the NIA's F/S report. Preliminary designs were made for the major project facilities such as diversion works and major canals, with reference to the existing design prepared by NIA.

1.13 Development Costs

The direct construction costs were calculated based on the work quantities thus estimated and unit costs which were estimated on the basis of the following data:

(1) Basic prices of materials and labor wages in each PIO,
(2) Sample unit prices of major construction works in each PIO,
(3) Sample calculation of unit prices in Leyte and Iloilo PIOs, and
(4) Recent cost estimate for National Irrigation Project by NIA Central Office.

Above data of (1) and (2) were collected from PIOs and the filled-out questionnaires for the additional inventory survey. Other indirect costs were estimated in accordance with NIA's standards.

1.14 Irrigation Benefits

The irrigation benefits are defined as the differences of net crop production values between future with and without project conditions, and are calculated according to the following equation:

Net crop production values
= {(paddy unit yield x economic farm gate prices) - production cost /ha }
x annual cultivated area

Irrigation benefit

= net crop production values (under future with-project conditions)
- net crop production values (under future without-project conditions)

Basic data and information required for the above calculation were collected from the field investigation.

1.15 Anticipated Unit Yield of Crops

The anticipated unit yields of crops were estimated based on the following conditions:

(1) Due to no effect observed by the rehabilitation on the increase in crop yields within actually irrigated areas, irrigation effect on the increase in crop yield of CISs can be attained only for newly irrigated areas by the rehabilitation works, which is under rainfed condition at present. While, irrigation effect on the increase in crop yield of CIPs are expected through the construction of irrigation facilities.

(2) Therefore, proposed and present irrigated paddy yields both for CISs and CIPs were projected by applying average present paddy yield actually attained in the CISs in related provinces under normal irrigated condition obtained from inventory survey.

1.16 Production Cost

Production costs of paddy and corn for the representative sample sub-projects were estimated through the crop budget analysis in the F/S reports prepared by PIOs in related provinces and field inspection conducted by JICA Team in 1991. The prospective economic prices of TSP, Urea and potassium were estimated based on the World Bank document on "Project Prospects for Major Primary Commodities, 1988-2000". Farm labor wage was estimated by applying the shadow exchange rate of 0.6 to financial one. While, economic price of seed was assumed to be the same as financial retail price. The results of the crop budget analysis shows that average share of the production cost is 40% of gross production value both for with and without project conditions (CISs/CIPs).

1.17 Farm Gate Prices of Farm Products

The prospective economic prices of paddy and corn were estimated based on the World Bank Document on "Price Prospects for Major Primary Commodities, 1988-2000". The average prices of paddy and corn are 6.00 pesos/kg and 5.20 pesos/kg, respectively.

1.18 Economic Cost

The financial cost data (CISs/CIPs) were converted to the economic costs by deducting of transfer payment such as contract tax, duty, subsidy and interest and further applying shadow price rates of 1.25 for foreign currency portion, 0.6 for

unskilled labor and 1.0 for other local costs. Percentage of foreign, local and labor portion, and custom duties for the representative sample sub-project were estimated based on the preliminary design and cost estimation. As a result, conversion factor of 0.8 was preliminary determined for the estimation of economic construction cost. The economic annual operation and maintenance cost was preliminary estimated at 2% of economic construction costs both for CISs and CIPs.

1.19 Economic Internal Rate of Return (EIRR)

The economic internal rates of return were calculated on the basis of the estimated cost and benefit data mentioned above. The basic assumptions for calculation of EIRR are as follows:

(1) Construction will be completed within 2 years;
(2) Build-up period will be 3 years (full benefit will be attained within 3 years after construction works is completed.); and
(3) Project economic life will be 50 years.

1.20 The initial results of the field inspections and studies were fully utilized for cross-checking and supplement of the inventoried data to improve and/or reinforce the computerized database; in particular, the studies provided the standard data for the irrigable area, dimension of facilities, project costs, benefits and EIRR.

Results of Pre-Feasibility Study

1.21 Results of pre-feasibility studies on sample sub-projects are individually explained in Chapter G-2. Major features of ten sample sub-projects are briefly described hereinafter.

1.22 Irrigable Area and Cropping Intensity

Sub-projects	Presently Irrigated Area (ha)		Designed Irrigable Area (ha)		Proposed Cropping Intensity
	Wet	Dry	Wet	Dry	
1. Tumbaga CIS	121	121	121	121	200%
2. Kinatihan CIP	0	0	100	100	200%
3. Pacheco CIP	0	0	172	77	145%
4. Bayunan CIS	38	38	220	110	150%
5. De La Paz CIS	38	30	89	59	166%
6. Bairan CIP	15	15	64	64	200%
7. Tag-Amakan CIS	13	13	51	51	200%
8. Macupa CIS	0	0	448	448	200%
9. Caray-Caray CIS	55	55	130	130	200%
10. Maragondong CIP	0	0	320	320	200%

The studies on water resources and topographic conditions indicate that all CISs and CIPs have much potential for the irrigation development. Major constraints for the present low irrigation intensity are attributable to deterioration and/or lack of proper irrigation facilities.

1.23 Facility Plan and Designs

The following irrigation and drainage facilities are constructed in CISs and/or proposed to be constructed in CIPs:

Facilities	Nos. of Sub-projects with Facility		
	CISs	CIPs	Total
1. Diversion Works	6	4	10
Ogee type	6	3	9
Checkgate Type	1	1	2
2. Diversion Canal	3	3	6
3. Main Canal	6	4	10
4. Lateral	5	4	9
5. Farm ditches	6	4	10
6. Drainage Canals	0	1	1
7. Access Road	4	3	7

1.24 Ogee and checkgate types of the diversion works are designed in due consideration of flood water level and the required intake water level. Major dimensions of the diversion works are shown below:

Sub-Projects	Designed Irrigable Area (ha)	Diversion Works		
		Length (m)	Height (m)	Type
1. Tumbaga CIS	121	10.0	0.8	Ogee (Main)
		16.0	0.55	Ogee (Supplement)
2. Kinatihan CIP	100	30.5	2.5	Ogee
3. Pacheco CIP	172	3.3	1.9	Checkgate
4. Bayunan CIS	90	26.0	0.95	Ogee (Intake II)
	130	19.0	1.0	Ogee (Intake IV)
5. De La Paz CIS	89	13.0	1.5	Ogee (Main)
		8.7	1.5	Checkgate (Supplement)
6. Bairan CIP	64	15.0	1.2	Ogee
7. Tag-Amakan CIS	51	80.0	0.8	Ogee
8. Macupa CIS	448	60.0	1.0	Ogee
9. Caray-Caray CIS	130	20.0	0.8	Ogee
10. Maragondong CIP	320	10.0	1.0	Ogee

1.25 The irrigation canals are classified into diversion channel (DC), main canal (MC), lateral (LAT) and farm ditch. Lengths of such categorized canals are summarized as follows:

Sub-Projects	Designed Irrigable Area (ha)	Major Canals					Field Ditches	
		Length (m)				Density	Density	
		DC	MC	LAT	Total	(m/ha)	Length(m)	(m/ha)
1. Tumbaga CIS	121	25,80	2,170	1,480	6,230	51	1,780	15
2. Kinatihan CIP	100	2,078	2,102	1,360	5,540	55	2,360	24
3. Pacheco CIP	172	3,420	2,080	4,400	9,900	58	4,340	25
4. Bayunan CIS	220	0	4,910	0	4,910	22	3,400	15
5. De La Paz CIS	89	0	3,920	2,720	6,640	75	1,020	11
6. Bairan CIP	64	0	2,200	900	3,100	48	2,900	45
7. Tag-Amakan CIS	89	0	3,720	2,720	6,640	75	1,020	11
8. Macupa CIS	448	865	2,135	7,680	10,680	24	24,510	55
9. Caray-Caray CIS	130	0	2,500	800	3,300	25	3,000	23
10. Maragondong CIP	320	700	6,800	2,400	9,900	31	11,300	35

Average canal densities are 37 m/ha for the major canals and 33 m/ha for the farm ditches.

1.25 The drainage canals are not always provided in CISs for the following reasons:

(1) Natural streams in the project area are utilized as drainage canals, and
(2) Farmers in the project area are not willing to lose some areas for the construction of the drainage canals because their present farms sizes are small.

1.26 Project Costs

Sub-Projects	Chargeable Costs		Non-Chargeable Costs		Project Cost	
	Amount (₱1,000)	Per ha (₱)	Amount (₱1,000)	Per ha (₱)	Amount (₱1,000)	Per ha (₱)
1. Tumbaga CIS	335	2,770	80	660	415	3,430
2. Kinatihan CIP	5,786	57,860	1,420	14,200	7,206	72,060
3. Pacheco CIP	11,349	67,140	2,451	14,250	14,000	81,390
4. Bayunan CIS	2,928	13,310	827	3,760	3,755	17,070
5. De La Paz CIS	689	7,740	165	1,850	854	9,590
6. Bairan CIP	4,066	63,530	1,071	16,740	5,137	80,270
7. Tag-Amakan CIS	1,564	30,670	1,024	20,080	2,588	50,750
8. Macupa CIS	7,012	15,650	1,031	2,300	8,043	17,950
9. Caray-Caray CIS	2,084	16,030	797	6,130	2,881	22,160
10. Maragondong CIP	4,939	15,430	1,200	3,750	6,139	19,200

The chargeable costs of all the representative sub-projects are less than the ceiling amounts stipulated in the minimum selection criteria, which are ₱ 70,000/ha for CIPs and ₱ 35,000/ha for CISs. The non-chargeable costs account for about 22% of the total project costs on the average.

1.27 Project Benefit and EIRR

The calculated project benefits of the representative sample sub-projects are summarized as follows:

Sub-Projects	Net Production Value Without Project (₱ 1,000)	Net Production Value With Project (₱ 1,000)	Incremental Benefit (₱ 1,000)	Annual Benefit per ha (pesos/ha)
1. Tumbaga CIS	4,104	4,238	134	1,107
2. Kinatihan CIP	515	2,440	1,925	19,250
3. Pacheco CIP	791	2,219	1,428	8,302
4. Bayunan CIS	2,569	4,402	1,833	8,332
5. De La Paz CIS	1,227	1,716	489	5,494
6. Bairan CIP	791	1,425	634	9,906
7. Tag-Amakan CIS	286	893	607	11,902
8. Macupa CIS	6,242	10,623	4,381	9,779
9. Caray-Caray CIS	2,335	3,624	1,289	9,915
10. Maragondong CIP	3,408	7,604	4,196	13,113

1.28 The re-calculated EIRRs of the representative sample sub-projects are as follows:

Sub-Projects	EIRR (%)	Sample Projects	EIRR(%)
1. Tumbaga CIS	26	6. Bairan CIP	11
2. Kinatihan CIP	23	7. Tag-Amakan CIS	20
3. Pacheco CIP	10	8. Macupa CIS	40
4. Bayunan CIS	36	9. Caray-Caray CIS	34
5. De La Paz CIS	41	10. Maragondong CIP	47

The EIRR values widely vary between 10% and 47% with an average of 33% for CISs and 23% for CIPs, respectively. The representative sample sub-projects are judged economically feasible.

1.29 Institutional Activities of IAs

The following IAs correspond to the representative sample sub-projects for the pre-feasibility studies:

Sub-Projects	Name of IAs	Year Established	Present Numbers of IAS
1. Tumbaga CIS	Tumbaga I	-	111
2. Kinatihan CIP	Kinatihan-Cabay	1985	49
3. Pacheco CIP	Pacheco Communal	1990	93
4. Bayunan CIS	Bayunan Valley	1976	76
5. De La Paz CIS	Malakas	1977	26
6. Bairan CIP	Malayuan-Barrido Integrated	(Under-preparation)	(32*)
7. Tag-Amakan CIS	Tag-Amakan	1981	23
8. Macupa CIS	Macupa	1978	187
9. Caray-Caray CIS	Caray-Caray (Dam I & II)	1977	67
10. Maragondong CIP	Maragondong	1984	67

*: Potential numbers

1.30 The IAs have already submitted to NIA official requests of the rehabilitation endorsed by the local government units and the IAs have expressed their willingness to pay for the project equity and O&M expenses.

1.31 Environmental Impacts

Environmental issues on the ten sub-projects are summarized below :

Sub-projects	Water Pollution	Deforesta-tion	Soil Erosion	Sedimen-tation	Schistoso-miasis
1. Tumbaga CIS	N	S	L	N	N
2. Kinatihan CIP	L	S	S	F	N
3. Pacheco CIP	L	L	L	F	N
4. Bayunan CIS	F	F	F	F	L
5. De La Paz CIS	F	F	F	F	L
6. Bairan CIP	L	F	F	F	N
7. Tag-Amakan CIS	L	F	L	F	N
8. Macupa CIS	L	L	F	F	N
9. Caray-Caray CIS	L	S	L	S	N
10. Maragondong CIP	N	L	L	F	N

S : Serious F : Fair L : Little N : No

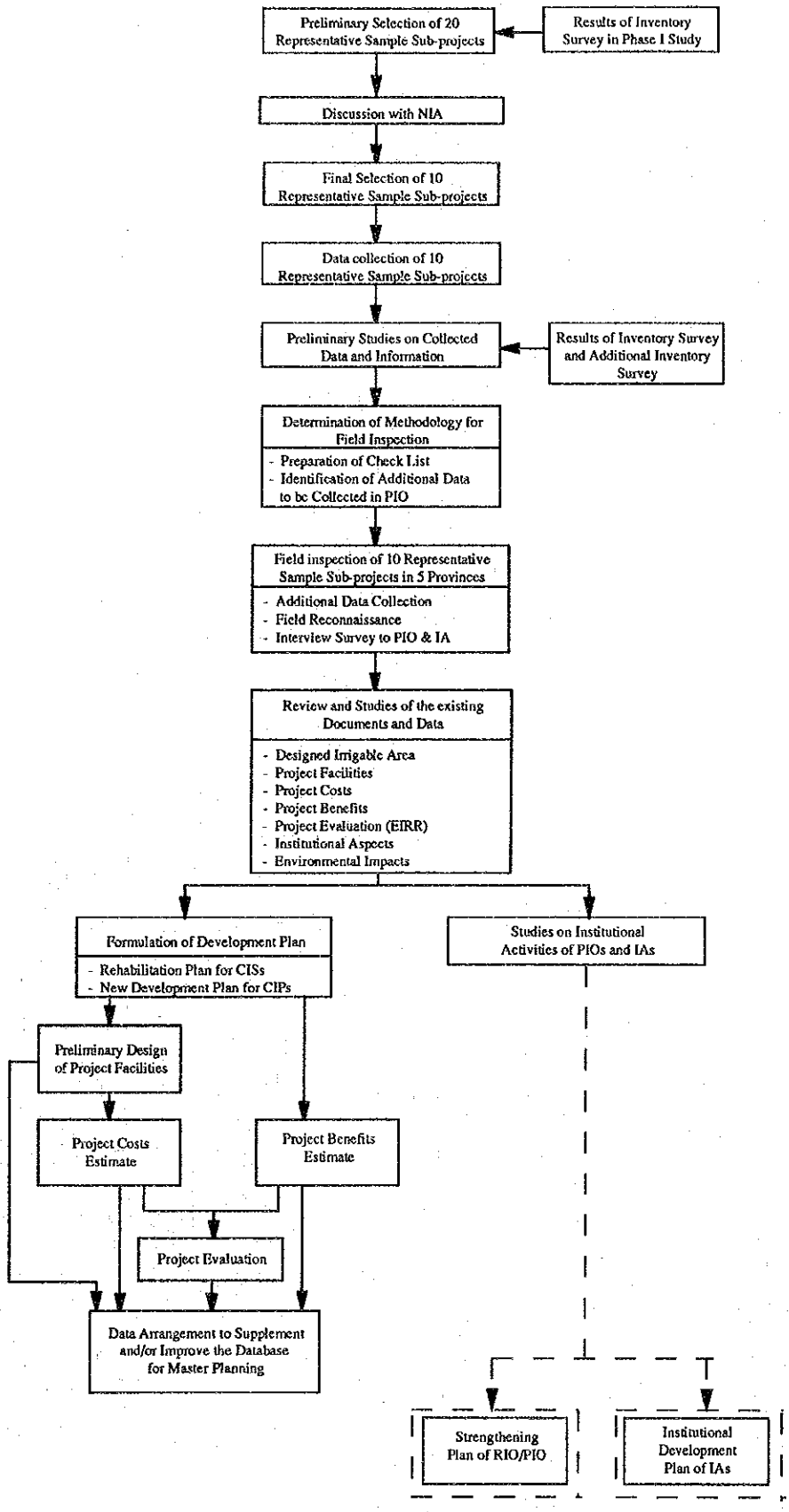
Deforestation is major environmental issue in three sample sub-projects. Since the sub-projects are small in size, no serious environmental impacts are generally expected. On the contrary, improved rural welfare with higher living standard will be visible with the irrigation development as the favorable environmental impacts.

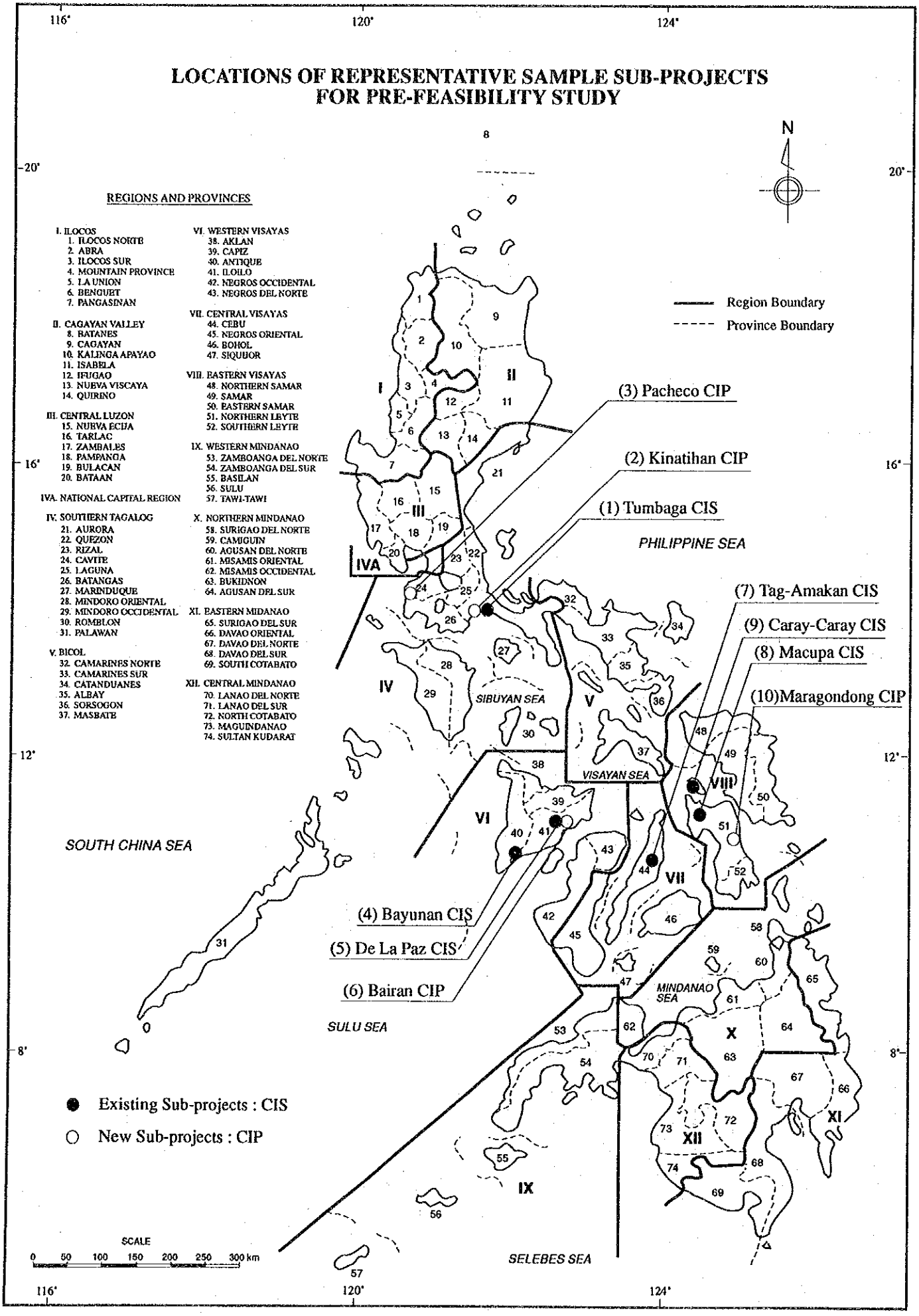
SELECTED REPRESENTATIVE SAMPLE SUB-PROJECTS

No.	Province	Name of sub-projects	Municipality	Designed irrigable area (ha)	Topography	Priority group
CISs for Rehabilitation/Improvement						
1	Quezon	Pili-Tumbaga	Sariaya	121	Alluvial Plain	C
2	Palawan	Pulot	Brooke's Point	400	Valley	A
3	Iloilo	Bayunan*	San Joaguin	170	Hilly/Terrace	B
4	Iloilo	Camiros	Anilao	60	Alluvial Plain	A
5	Iloilo	Tigbanaba*	Igbaras	120	Hilly/Terrace	C
6	Cebu	Tag-Amakan	Asturias	51	Valley	A
7	Cebu	Owak-San Isidro*	Asturias/Balamban	480	Valley	A
8	Northern Leyte	Hambabalud	Jaro	150	Alluvial Plain	A
9	Northern Leyte	Hacupa*	Leyte	450	Alluvial Plain	C
10	Northern Leyte	Sta. Fe*	Sta.Fe	162	Alluvial Plain	C
CIPs for New Development						
1	Quezon	Kinatihan*	Candelaria	100	Alluvial Plain	B
2	Cavite	Sapang	Ternate	50	Alluvial Plain	B
3	Cavite	Layong Mabilog*	Maragondon	60	Valley	B
4	Cavite	Pacheco*	Magallanes	200	Valley	B
5	Palawan	Kulandanum-Iwahig	Bataraza	500	Valley	B
6	Palawan	Tarusan	Bataraza	150	Alluvial Plain	B
7	Iloilo	Bairan	Ajuy	64	Alluvial Plain	A
8	Cebu	Cabadiangan*	Compostela	200	Valley	B
9	Northern Leyte	Maragondong*	Dagami	400	Valley	A
10	Northern Leyte	Rizal	Babatngon	100	Alluvial Plain	B

* : Representative sample sub-projects recommended by the JICA Study Team

WORK FLOW OF PRE-FEASIBILITY STUDY




LOCATIONS OF REPRESENTATIVE SAMPLE SUB-PROJECTS
FOR PRE-FEASIBILITY STUDY
N
116°
120°
124°
20°
16°
12°
8°
REGIONS AND PROVINCES
I. ILOCOS
1. ILOCOS NORTE
2. ABRA
3. ILOCOS SUR
4. MOUNTAIN PROVINCE
5. LA UNION
6. BENGUET
7. PANGASINAN
II. CAGAYAN VALLEY
8. BATANES
9. CAGAYAN
10. KALINGA APAYAO
11. ISABELA
12. IFUGAO
13. NUEVA VISCAYA
14. QUIRINO
III. CENTRAL LUZON
15. NUEVA ECIJA
16. TARLAC
17. ZAMBALES
18. PAMPANGA
19. BULACAN
20. BATAAN
IVA. NATIONAL CAPITAL REGION
IV. SOUTHERN TAGALOG
21. AURORA
22. QUEZON
23. RIZAL
24. CAVITE
25. LAGUNA
26. BATANGAS
27. MARINDUQUE
28. MINDORO ORIENTAL
29. MINDORO OCCIDENTAL
30. ROMBLON
31. PALAWAN
V. BICOL
32. CAMARINES NORTE
33. CAMARINES SUR
34. CATANDUANES
35. ALBAY
36. SORSOGON
37. MASBATE
VI. WESTERN VISAYAS
38. AKLAN
39. CAPIZ
40. ANTIQUE
41. ILOILO
42. NEGROS OCCIDENTAL
43. NEGROS DEL NORTE
VII. CENTRAL VISAYAS
44. CEBU
45. NEGROS ORIENTAL
46. BOHOL
47. SIQUIJOR
VIII. EASTERN VISAYAS
48. NORTHERN SAMAR
49. SAMAR
50. EASTERN SAMAR
51. NORTHERN LEYTE
52. SOUTHERN LEYTE
IX. WESTERN MINDANAO
53. ZAMBOANGA DEL NORTE
54. ZAMBOANGA DEL SUR
55. BASILAN
56. SULU
57. TAWI-TAWI
X. NORTHERN MINDANAO
58. SURIGAO DEL NORTE
59. CAMIGUIN
60. AGUSAN DEL NORTE
61. MISAMIS ORIENTAL
62. MISAMIS OCCIDENTAL
63. BUKIDNON
64. AGUSAN DEL SUR
XI. EASTERN MINDANAO
65. SURIGAO DEL SUR
66. DAVAO ORIENTAL
67. DAVAO DEL NORTE
68. DAVAO DEL SUR
69. SOUTH COTABATO
XII. CENTRAL MINDANAO
70. LANAO DEL NORTE
71. LANAO DEL SUR
72. NORTH COTABATO
73. MAGUINDANAO
74. SULTAN KUDARAT
Region Boundary
Province Boundary
(3) Pacheco CIP
(2) Kinatihan CIP
(1) Tumbaga CIS
(7) Tag-Amakan CIS
(9) Caray-Caray CIS
(8) Macupa CIS
(10)Maragondong CIP
(4) Bayunan CIS
(5) De La Paz CIS
(6) Bairan CIP
PHILIPPINE SEA
SIBUYAN SEA
VISAYAN SEA
SOUTH CHINA SEA
SULU SEA
MINDANAO SEA
SELEBES SEA
I
II
III
IVA
IV
V
VI
VII
VIII
IX
X
XI
XII
Existing Sub-projects : CIS
New Sub-projects : CIP
SCALE
0 50 100 150 200 250 300 km

ANNEX G-2

PRE-FASIBILITY STUDIES ON INDIVIDUAL SAMPLE SUB-PROJECTS

Table of Contents

ANNEX G-2 (1) TUMBAGA CIS(121ha)

Background

1.01 Tumbaga CIS having a net irrigation area of 121 ha is located in Municipality of Sariaya in Quezon Province (See the attached General Layout). The Pili-Tumbaga Irrigator's Association constructed a diversion weir across the Sadyaya river in 1976. Later the service area of the Pili area could not be irrigated and excluded from the original service area. The farmers in the Pili area who were not benefitted pulled-out from the association. Thus the name of the CIS was changed to Tumbaga CIS.

1.02 The NIA improved this diversion weir in 1986. Another intake structure was also constructed on the Keanuang river to use this river discharge as supplementary sources of water. Since the above rehabilitation, the system has been well operated. However the IA of Tumbaga CIS has requested to rehabilitate the irrigation facilities for sustaining the proper water distribution and present cropping intensity. With this request, the Quezon PIO carried out the feasibility study and the preliminary design in 1987. As of August 1991, however, the implementation of this rehabilitation project is not endorsed for CIDIP funding.

The Project Area

1.03 Natural Conditions

The project area in the alluvial plain generally slopes down from north to south with average land slope of 0.033. Soil type of irrigation area is clay loam. The climate of the project area is Type-II which is characterized by no dry season with very pronounced maximum rain period from September to December. The mean annual rainfall is 1,984 mm, and average monthly rainfall is shown below :

(Unit : mm)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
89	60	43	55	90	161	185	199	226	336	305	235	1,984

1.04 Tumbaga CIS is irrigated by the Sadyaya river as the main source and the Keanuang, Mamala and Tumbaga rivers as the supplementary sources. The catchment area of the Sadyaya river is 14 km^2 at the diversion weir site, and monthly river discharge at this site is shown below :

(Unit : l/s)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave
140	197	67	86	141	252	187	121	137	205	186	147	156

1.05 Agriculture

The total farm household in the Tumbaga CIS is 111, comprising 577 in population. The double cropping of paddy a year is prevailing in the Tumbaga CIS area. HYV of IR 62 and IR 72 are commonly cultivated by transplanting method. The wet season paddy is planted in June and harvested in October. The dry season paddy is planted from November to December, and harvested from March to April. Present cropping intensity is calculated at 200 percent. Average unit yield of irrigated paddy is estimated at 4.3 ton/ha and 5.5 ton/ha for wet and dry season respectively. The total production of paddy is estimated at about 1,125 tons per annum. Average farm size in the Tumbaga CIS is 1.1 ha per a farm household. The present farm economy is examined for a farm household with the average farm size as follows:

Gross farm income	
Annual paddy production (ton)	10.23
Farmgate price (₱/ton)	5,500
Gross income (₱)	56,265
Production cost (₱)	23,199
Net farm income (₱)	33,066

Major constraints for agricultural development in the Tumbaga CIS area are as follows:

1) Insufficient post harvest facilities such as rice mill, drying floor, thresher and warehouses,
2) Insufficient farm credit services,
3) Insufficient agricultural extension services, and
4) Low selling price of paddy.

1.06 Existing Irrigation and Drainage System

Irrigation facilities were constructed to irrigate the Tumbaga CIS service area by utilizing the water resources of the Sadyaya, Keanuang and so on. The water of the Sadyaya river is diverted to the Keanuang river through a diversion dam and main canal. The irrigation water diverted to the Keanuang river is again taken into the

main canal by an intake structure and boulder dam (See the attached General Layout). The general features of the irrigation facilities are summarized below:

1) Sadyaya Diversion Dam

Type	:	Concrete Ogee
Length of Weir	:	10 m
Height of Weir	:	0.8 m
Intake Discharge	:	0.145 cms

2) Keanuang Intake Structure

Type	:	Checkgate(One Slide Gate)
Intake Discharge	:	0.145 cms

3) Main Canal

Sadyaya Diversion Dam to Keanuang River	:	1,408 m
Keanuang River Portion	:	1,172 m
Keanuang Intake to End	:	2,170 m
Total	:	4,750 m
Related Structures	:	24 nos

4) Lateral Canal

Length	:	1,940 m
Related Structures	:	3 nos

5) Field Ditches-Length : 1,780 m

1.07 The Sadyaya diversion dam is well maintained and no rehabilitation works has been required except the protection works for left bank of the Sadyaya river at the downstream of the diversion dam. The Keanuang intake structure with a boulder dam and the irrigation canals with their related structures are also well maintained, but the rehabilitation of these facilities is required for more effective water distribution. The drainage canal is not constructed in the Tumbaga CIS. Natural river courses in and around the area are used as the drainage canals.

1.08 Irrigator's Association (IA)

Tumbaga-I IA has been organized for the operation and maintenance of the Tumbaga CIS. Present members of the IA are 111 farmers, and 75 percent of the members is active. The tenurial status of IA's member is as follows:

1)	Owner Operator	:	21
2)	Amortizing Owner(CARP)	:	72
3)	Leaseholder	:	18
	Total	:	111

The IA has already submitted to NIA an official request of the rehabilitation endorsed by the local government units.

Irrigation Development Plan

1.09 Irrigation Water Requirements and Water Balance

Proposed cropping pattern is a double cropping of paddy with 200% intensity. Based on this pattern, diversion water requirements are estimated on a monthly basis as follow:

(Unit : l/sec/ha)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.90	1.19	0.52	0	-	0	0.29	0.24	0	0	0	0

1.10 In order to verify the adequacy of designed irrigable area, a water balance between the river discharge and estimated diversion water requirements is made on a monthly basis as follow:

Month	Sadyaya River Discharge (MCM)	Diversion Water Requirement (MCM)	Balance (MCM)
Jan	0.337	0.291	+0.046
Feb	0.429	0.349	+0.080
Mar	0.160	0.169	-0.009
Apr	0.200	0	+0.200
May	0.340	0	+0.340
Jun	0.588	0	+0.588
Jul	0.451	0.094	+0.357
Aug	0.292	0.014	+0.278
Sep	0.320	0	+0.320
Oct	0.494	0	+0.494
Nov	0.434	0	+0.434
Dec	0.355	0	+0.355

As a result of the water balance study, the Sadyaya river discharge is judged insufficient to irrigate the designed irrigable area of 121 ha. In order to supplement the deficit, the discharges of the Keanuang, Mamala and Tumbaga rivers are

proposed to be utilized as the supplemental water resources since these river discharges are sufficient to supplement the deficit.

1.11 Rehabilitation Plan

The following rehabilitation works are required for sustaining proper water distribution and present cropping intensity.

1) Sadyaya Diversion Dam

   To construct protection works for the left bank of the Sadyaya river in the downstream of the diversion dam

2) Keanuang Intake Structure (See the attached design drawing)

   To improve existing boulder dam into permanent diversion weir with the following general features;

   -Type : Ogee, concrete core covered with grouted riprap
   -Length of weir : 16 m
   -Height of weir : 0.55 m

3) Main Canal

   To extend the existing canal ;

   -Length of extension : 370 m
   -Nos. of structures : 2 nos.

4) Field Ditches

   To construct a new main farm ditch;

   -Length of ditch : 800 m
   -Nos. of structure : 1 no.

1.12 Project Cost

The project costs for the above rehabilitation works are estimated below:

Items	Cost (₱1,000)
1) Diversion Dam	245
1-1 Protection work for Sadyaya div.dam	25
1-2 Keanuang diversion dam	221
2) Main Canal	71
3) Field Ditch	18
Total Direct Cost	335
4) G.E.S.A.(12% of Direct Cost)	40.2
5) Contingency (12% of Direct Cost)	40.2
Total	415.4

Project Justification

1.13 Economic Internal Rate of Return

EIRR is calculated from the following economic benefits and costs :

Annual Incremental Benefits (₱1,000)	
-Net value under without project condition	4,104
-Net value under with project condition	4,238
-Incremental benefit	134
Economic Costs (₱1,000)	
-Total project cost	332
-Annual O & M cost	7
-Total cost	339

The EIRR of Tumbaga CIS is estimated at 26 %.

1.14 Farm Budget Analysis

Farm budget analysis is made in order to assess the capacity of the IA members to pay the amortization fee for the chargeable cost of the rehabilitation works and the operation and maintenance fee required. The farm budget is examined for a farmer with the average farm size as follows:

Items	Without Project(1.1 ha)	With Project(1.1 ha)
Farm income (₱)	56,265	59,290
Production cost (₱)	23,199	26,074
(Amortization fee (₱))	110	278
(Annual O&M fee (₱))	300	385
Net reserve (₱)	33,066	33,216

1.15 Socio-economic Impacts

A much improved social life-style and living standard of the community is expected with the advent of the irrigation system. No adverse effect by the project has yet been recorded.

1.16 Peace and Order Assessment

Peace and order situations in this region have almost been stable. However, sporadic incidence of insurgencies has been recorded in some remote places.

Conclusions and Recommendations

1.17 The farmers in the Tumbaga CIS get much benefits from irrigation farming. However they desire more effective irrigation practices. The proposed rehabilitation project is expected to achieve proper water management and sustain present cropping intensity.

1.18 Measurement of the river discharge is very important for the system irrigated by several water sources in order to establish proper water management. Gauging stations should be provided at the intake sites of the Sadyaya and Keanuang rivers. For a more effective O&M, the following improvement works are proposed:

1) Construction of access road to the Sadyaya diversion dam, and
2) Construction of farm roads along the main canal.

1.19 The detailed design works for the proposed Keanuang diversion weir should be carried out in consideration of the followings:

1) Foundation treatment of the weir,
2) Flood protection works of the river banks, and
3) Flood control facilities of the weir.

PRE-FEASIBILITY SUMMARY DATA (1/10) | SUB-PROJECT: TUMBAGA CIS | PROVINCE: QUEZON

GENERAL

Name of Sub-project:	TUMBAGA CIS
Proposed Service Area:	121 ha
Region:	IV
Province:	Quezon
Municipality:	Sariaya
Type of SSIDP:	
Topographic Condition:	Alluvial Plain
Availablity of F/S report:	Yes prepared in 1987
Necessity of Rehabilitation:	Yes
Recent Rehabilitation	No
Funding Source:	Not arranged yet
Availability of topo-map(1/4,000):	No
engineering designs:	Yes (preliminary design)

EXISTING IRRIGATION/DRAINAGE FACILITIES

Diversion Dam:	1) Ogee : L = 10m, H = 0.8m 2) Boulder dam & intake
Diversion Channnel:	-
Main/Lateral Canal:	6.69 km
Field Diches:	1.78 km
Project /Farm Drain:	No
Access Road:	No
Service Road:	No
Flood Protection Dike:	No
Project Building:	No
Related Structures:	
Drop:	6 Nos
Siphon:	3 Nos
Road crossing:	2 Nos
Others:	16 Nos
Type of Diversion Dam:	-
Lining of main/lateral canal:	183 m

SOCIO-ECONOMIC DATA

Population:	577	Availability of	
Nos. of Household:	111	water supply:	No
Average Size of Household	5.2	power supply:	Yes
Nos. of Farm Household:	111	rice mill:	No
Nos. of Farm Beneficiaries:	111	storage facilities:	No

Agrarian Reform:	%
Area cultivated by owner operators and CARP amortizing owners:	84
Area still eligible for re-distribution:	16
Area listed under CARP:	100

SOIL CONDITION

Soil Type:	Ibaan Silty Clay Loam
Land Classification	1R

METEOROLOGY/HYDROLOGY

Climatic Type: II | Annual Rainfall: 1,984 mm

Monthly Rainfall (unit:mm)

Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
89	60	43	55	90	161	185	199	226	336	305	235	1,984

Water Sources: Sadvaya river | Catchment Area: 13,955 sq.km (at diversion point)

River discharge: (unit:l/sec.)

Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Ave.
140	197	67	86	141	252	187	121	137	205	186	147	156

IRRIGATION DEVELOPMENT PLAN

Designed Irrigable Area:	Wet: 121 ha	Dry: 121 ha
Proposed Irrigation Intensity:	200 %	(wet + dry) / wet x 100
% of Area Restoration (CIS):	0 %	(Area restored / Service area) x 100
Diversion Water Requirement:	145 l/sec	
Farm Water Requirement:	0.6 l/sec/ha	
Drainage Water Requirement:	- l/se/ha	

PROPOSED PROJECT WORKS

Irrigation/Drainage Facilities	New Construction	Rehabilitation
Diversion Dam		Yes, Ogee, L = 16m, H = 0.55 m
Diversion Channel		No
Earth Canal		-
Lined Canal		-
Main/Lateral Canal		Yes, 370m, 2 turnouts
Earth Canal		-
Lined Canal		-
Field Ditches		Yes, 1 turnout
Project/Farm Drains		No
Service Road		No
Access Road		No
Flood Protection Dike		No
Project Building		No
Other Facilities		No

PROJECT COST

Chargeable Cost			Non-Chargeable Cost		
Diversion Works	P	246,000	Flood Dike		-
Main/LateralCanals	P	71,000	Access Road		-
On-farm Facilities	P	18,000	Overheads	P	80,400
Others	P	-			
Total	P	335,000	Total	P	80,400
Per ha	P	2,770	Per ha	P	660
Total Project Cost (Financial):		Total P	415,400	Per ha P	3,430

PROJECT BENEFITS

Cropped Area without Project (ha)

	Irrigated			Rainfed			Total		
	Wet	Dry	Total	Wet	Dry	Total	Wet	Dry	Total
Paddy	121	121	242	0	0	0	121	121	242
Corn/Others	0	0	0	0	0	0	0	0	0
Total	121	121	242	0	0	0	121	121	242

Cropped Area with Project (ha)

	Irrigated			Rainfed			Total		
	Wet	Dry	Total	Wet	Dry	Total	Wet	Dry	Total
Paddy	121	121	242	0	0	0	121	121	242
Corn/Others	0	0	0	0	0	0	0	0	0
Total	121	121	242	0	0	0	121	121	242

Annual Net Production Values without Project (Px1,000)

	Paddy	Corn/Others	Total
Production (ton)	1,125	\-	1,125
Farmgate Price (P/ton)	5,577	\-	5,577
Gross Value P x 1,000	6,274	\-	6,274
Production Cost	2,170	\-	2,170
Net Value P x 1,000	4,104	\-	4,104

Annual Net Production Values with Project (Px1,000)

	Paddy	Corn/Others	Total
Production (ton)	1,186	\-	1,186
Farmgate Price (P/ton)	5,577	\-	5,577
Gross Value(P '000)	6,614	\-	6,614
Production Cost(P '000)	2,376	\-	2,376
Net Value(P '000)	4,238	\-	4,238

PROJECT JUSTIFICATION

Total Economic Cost (P1,000):	P 332
Annual Net Incremental Benefits (P1,000):	P 134
Annual O&M Cost (P1,000):	P 7
Project Life	50 years
Benefit Build-up Period	3 years
Economic Internal Rate of Return (EIRR)	26 %

FARM ECONOMY

Farm Size	Nos.	%	Average Farm Size:	1.1 ha
<1.0	56	50	Annual Net Farm Income:	
1.0-2.0	42	38	without Project:	P 33,066
>2.0	13	12	with Project:	P 33,216
Total	111	100	Net Incremental Farm Income:	P 150

STATUS OF IA

IA organized:	Yes
Name of IA:	Tumbaga I
Date registered:	-
Nos. of IA Members:	111
IA Loan (x P1,000):	481

ENVIRONMENTAL ISSUES

Water pollution:	no
Deforestation:	serious
Soil erosion:	little
Sedimentation:	no
Schistosomiasis:	no

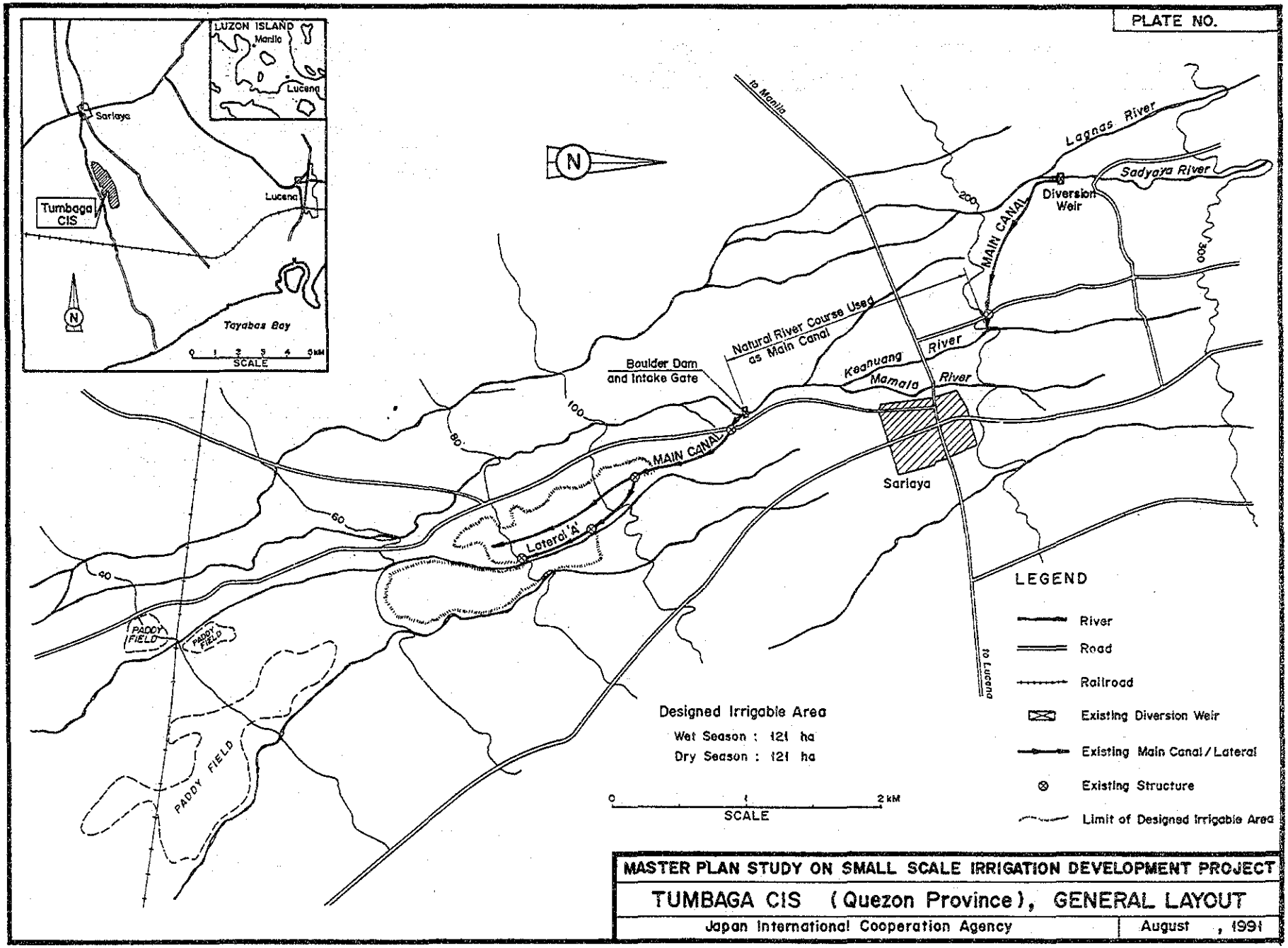
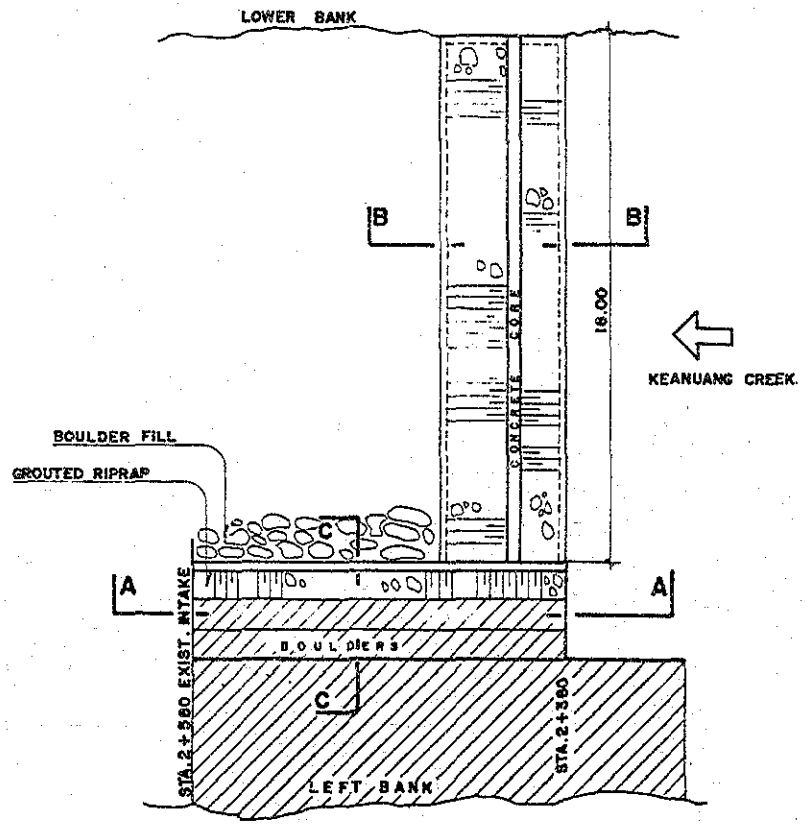
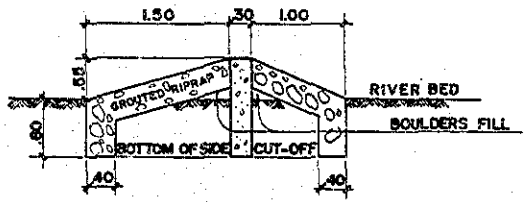


PLATE NO.
LUZON ISLAND
Manila
Lucena
Sariaya
Tumbaga CIS
Lucena
Tayabas Bay
0 1 2 3 4 5KM
SCALE
N
to Manila
Lagnas River
Sadyaya River
Diversion Weir
MAIN CANAL
200
300
Natural River Course Used as Main Canal
Boulder Dam and Intake Gate
Keanuang River
Mamala River
100
80
60
40
MAIN CANAL
Lateral 'A'
Sariaya
PADDY FIELD
PADDY FIELD
PADDY FIELD
to Lucena
LEGEND
River
Road
Railroad
Existing Diversion Weir
Existing Main Canal / Lateral
Existing Structure
Limit of Designed Irrigable Area
Designed Irrigable Area
Wet Season : 121 ha
Dry Season : 121 ha
0 1 2KM
SCALE
MASTER PLAN STUDY ON SMALL SCALE IRRIGATION DEVELOPMENT PROJECT
TUMBAGA CIS (Quezon Province), GENERAL LAYOUT
Japan International Cooperation Agency
August , 1991

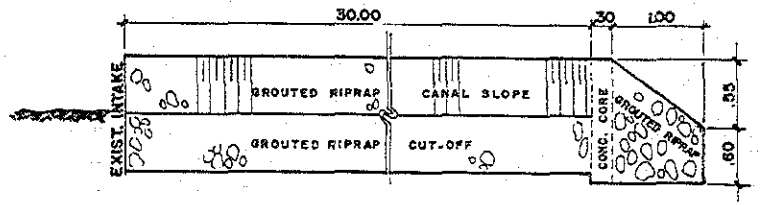
PLATE NO.



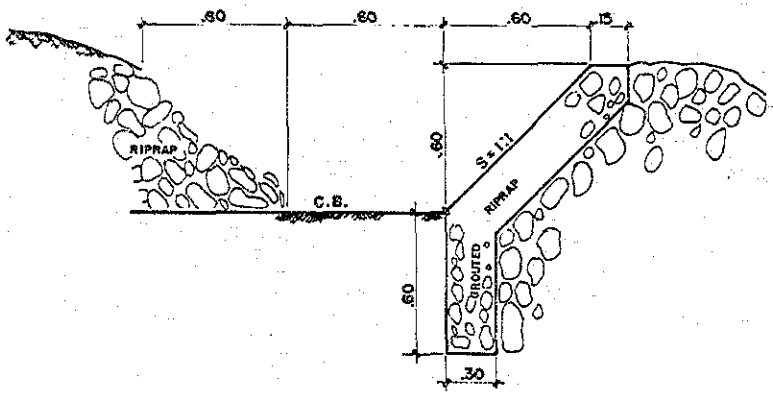
PLAN



SECTION B-B



SECTION A-A



SECTION C-C

MASTER PLAN STUDY ON SMALL SCALE IRRIGATION DEVELOPMENT PROJECT	
TUMBAGA CIS (Quezon Province), IMPROVEMENT PLAN OF BOULDER DAM	
Japan International Cooperation Agency	October , 1991

ANNEX G-2 (2) KINATIHAN CIP (100ha)

Background

2.01 Kinatihan CIP is a new project located in Municipality of Candelaria, Quezon Province(See the attached General Layout). The proposed area to be generated is 100 ha. At present there are a few existing irrigation facilities in the area but most of the farmers are depending only on rainfall for agricultural production.

2.02 The source of water supply for the proposed project is the Masin river with a drainage area of 39 km^2 at the proposed diversion weir site. At the upstream of the proposed diversion weir, there is an irrigation area of about 85 ha with a water right and a private diversion weir. The NIA wants to rehabilitate the diversion weir, but the owner does not agree because it is turned over to the farmers and it becomes the property of them. The farmers are very much eager to have a diversion weir because the owner of the private dam charges them with very high irrigation fees. The farmers have strongly requested NIA to construct a diversion weir about 400 m downstream from the private dam so that they can utilize the excess water for their irrigation.

2.03 Feasibility study on this project was completed in 1989 by NIA. Since there is a right-of-way problem along the diversion works and a main canal route, the implementation of this project has been postponed for further review of the project plans.

The Project Area

2.04 Natural Conditions

The topography of the potential irrigable area is flat in 90% of the area and rolling or hilly in 10% of the area. The highest and lowest irrigable area are EL.48.50 m and EL.40.50 m, respectively. The average slope of the project area is about 0.53 percent and the type of soil is clay loam. The climate of the project area is Type-II which is characterized by no dry season with very pronounced maximum rain period from September to December. The mean annual rainfall is 2,048 mm, and average monthly rainfall is shown below :

(Unit : mm)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
89	60	42	54	90	160	184	198	295	336	305	235	2,048

2.05 Monthly discharge of the Masin river at the proposed diversion dam site is shown below :

(Unit : l/s)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave
197	133	234	177	248	441	448	482	296	742	673	519	383

2.06 Agriculture

The total farm household in the Kinatihan CIP is 49, comprising 265 in population. Paddy cultivation under rainfed condition is prevailing in the Kinatihan CIP area. HYV of IR 66 is commonly cultivated by transplanting method. The wet season paddy is planted in June to July and harvested in November to December. Present cropping intensity is calculated at 100 percent. Average unit yield of rainfed paddy is estimated at 1.8 ton/ha. The total production of paddy is estimated at about 180 tons per annum. Average farm size in the Kinatihan CIP is 2.0 ha per a farm household. Analysis of present farm economy is examined for a farm household with average farm size as follows:

Gross farm income	
Annual paddy production (ton)	3.60
Farmgate price (₱/ton)	5,500
Gross income (₱)	19,800
Production cost (₱)	11,341
Net farm income (₱)	8,459

Major constraints for agricultural development in the Kinatihan CIP area are as follows:

1) Unstable paddy production due to no irrigation facilities,
2) Insufficient post harvest facilities such as rice mill, drying floor, thresher and warehouses,
3) Insufficient farm credit services,
4) Insufficient agricultural extension services,
5) Low selling price of paddy, and

6) Lack of farm to market road.

2.07 Existing Irrigation and Drainage System

The farmers constructed the following irrigation facilities to utilize the existing water sources of the natural rivers in the project area.

1)	Lateral canal, Length	:	1,360 m
2)	Field ditch, Length	:	2,360 m
3)	Checkgate	:	3 nos

2.08 Irrigator's Association (IA)

Kinatihan-Cabay IA has already been organized in the project area. Present number of IA members is 49, and 35 percent of the members is active. The tenurial status of IA's member is as follows:

1)	Owner Operator	:	13
2)	Share Tenant	:	36
	Total	:	49

The farmers' petition endorsed by the local government units has already been submitted to NIA.

Irrigation Development Plan

2.09 Irrigation Water Requirements and Water Balance

Proposed cropping pattern is a double cropping of paddy with 200% intensity. Based on this pattern, diversion water requirements are estimated on a monthly basis as follow:

(Unit : l/sec/ha)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.78	1.14	1.45	0.53	-	0	0	0	0	0	0	0

2.10 In order to cross-check the adequacy of designed irrigable area, a water balance between the river discharge and estimated diversion water requirements is made on a monthly basis as follow:

Month	Sadyaya River Discharge (MCM)	Diversion Water Requirement (MCM)	Balance (MCM)
Jan	0.474	0.209	+0.265
Feb	0.289	0.276	+0.013
Mar	0.563	0.388	+0.175
Apr	0.412	0.138	+0.274
May	0.597	0	+0.597
Jun	1.028	0	+1.028
Jul	1.079	0	+1.079
Aug	1.161	0	+1.161
Sep	0.690	0	+0.690
Oct	1.788	0	+1.788
Nov	1.569	0	+1.569
Dec	1.250	0	+1.250

As a result of the water balance study, the Masin river discharge is judged adequate to irrigate the designed irrigable area of 100 ha in both wet and dry seasons.

2.11 Project Works

The proposed works for the project are the construction of diversion works, canal structures, canalization and irrigation terminal facilities. As for the canalization of diversion canal, it is proposed to construct cut and cover(flume type canal) of about 2 km length from the proposed diversion weir to the head gate of the Lagnas RIS because of the topographic conditions. The improvement of drainage canal of the Lagnas RIS is proposed to utilize it as a part of diversion canal for Kinatihan CIP. The general features of the project works are summarized below:

1) Masin Diversion Dam(See design drawing)
   - -Type : Ogee, Rubble Masonry covered by Concrete
   - -Length of Weir : 30.5 m
   - -Height of Weir : 2.5 m
   - -Intake Discharge : 0.145 cms
2) Diversion Canal
   - -Length : 2,078 m
     - (Cut and Cover) : 1,749 m
     - (Existing Creek) : 329 m
   - -Structures
     - Proposed : 7 nos
     - Existing : 1 no

3) Main canal

-Length : 2,078 m

-Structures

Proposed : 1 no

Existing : 1 no

4) Lateral Canal(Existing : No Rehabilitation)

-Length : 1,360 m

-Structures : 1 no

5) Field Ditches-Length : 2,360 m

6) Access Road to Masin Diversion Dam : 500 m

2.12 Project Cost

The project costs for the above project works are estimated below:

Items	Cost (₱1,000)
1) Diversion Dam	4,202
2) Main and Lateral Canals	1,445
3) On-farm Facilities	124
4) Others(Project Office)	15
5) Access Road	25
Total Direct Cost	5,811
6) G.E.S.A.(12% of Direct Cost)	697.32
7) Contingency (12% of Direct Cost)	697.32
Total	7,205.64

Project Justification

2.13 Economic Internal Rate of Return

EIRR is calculated from the following economic benefits and costs:

Annual Incremental Benefits (₱1,000)	
-Net value under without project condition	515
-Net value under with project condition	2,440
-Incremental benefit	1,925
Economic Costs (₱1,000)	
-Total project cost	5,765
-Annual O & M cost	115
-Total cost	5,880

The EIRR of Kinatihan CIP is estimated at 23 %.

2.14 Farm Budget Analysis

Farm budget analysis is made in order to assess the capacity to pay the amortization fee for the chargeable cost of the project and the operation and maintenance fee required. The farm budget is examined for a farmer with the average farm size as follows:

Items	Without Project(2.0 ha)	With Project(2.0 ha)
Farm income (₱)	19,800	81,400
Production cost (₱)	11,341	40,810
(Amortization fee (₱))	0	2,082
(Annual O&M fee (₱))	0	600
Net reserve (₱)	8,459	40,590

2.15 Socio-economic Impacts

A much improved social life-style and living standard of the community is visible with the advent of the irrigation system. Deforestation and soil erosion are pointed out as negative environmental impacts by the implementation of the project.

2.16 Peace and Order Assessment

Peace and order situation in this region has almost been stable. However, sporadic incidence of insurgencies has been recorded in some remote places.

Conclusions and Recommendations

2.17 The farmers in the project area are suffering from low farm income and the economic condition of the farmers is at subsistence level. The implementation of this project is expected to contribute to improve the farmers' living standard.

2.18 The detailed design works for the proposed Masin diversion weir should be carried out in consideration of the following;

1) Foundation treatment of the weir,
2) Flood protection works of the river banks, and
3) Flood control facilities of the weir.

PRE-FEASIBILITY SUMMARY DATA (2/10) — SUB-PROJECT: KINATIHAN CIP — PROVINCE: QUEZON

GENERAL

Name of Sub-project:	KINATIHAN CIP
Proposed Service Area:	100 ha
Region:	IV
Province:	Quezon
Municipality:	Candelaria
Type of SSIDP:	
Topographic Condition:	Alluvial Plain
Availablity of F/S report:	Yes prepared in 1989
Necessity of Rehabilitation:	No
Recent Rehabilitation	No
Funding Source:	Not arranged yet
Availability of topo-map(1/4,000):	Yes (Not complete)
engineering designs:	Yes (Not complete)

EXISTING IRRIGATION/DRAINAGE FACILITIES

Diversion Dam:	No
Diversion Channnel:	No
Main/Lateral Canal:	1.36 km of Lateral
Field Diches:	2.36 km
Project /Farm Drain:	No
Access Road:	No
Service Road:	No
Flood Protection Dike:	No
Project Building:	No
Other Facilities :	
Pumps:	-
Siphon:	-
Aqueduct:	-
Bridge:	-
Headgate/checkgate:	3 Nos.
Type of Diversion Dam:	
Lining of main/lateral canal:	

SOCIO-ECONOMIC DATA

Population:	265	Availability of	
Nos. of Household:	49	water supply:	No
Average Size of Household	5.4	power supply:	Yes
Nos. of Farm Household:	49	rice mill:	No
Nos. of Farm Beneficiaries:	49	storage facilities:	No

Agrarian Reform:	%
Area cultivated by owner operators and CARP amortizing owners:	26
Area still eligible for re-distribution:	74
Area listed under CARP:	100

SOIL CONDITION

Soil Type:	Ibaan Silty Clay Loam
Land Classification	1R

METEOROLOGY/HYDROLOGY

Climatic Type: II — Annual Rainfall: 2,048 mm

Monthly Rainfall (unit:mm)

Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
89	60	42	54	90	160	184	198	295	336	305	235	2,048

Water Sources: Masin river — Catchment Area: 39 sq.km (at diversion point)

River discharge: (unit:l/sec.)

Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Ave.
197	133	234	177	248	441	448	482	296	742	673	519	383

IRRIGATION DEVELOPMENT PLAN

Designed Irrigable Area:	Wet: 100 ha	Dry: 100 ha
Proposed Irrigation Intensity:	200 %	(wet + dry) / wet x 100
% of Area Restoration (CIS):	- %	(Area restored / Service area) x 100
Diversion Water Requirement:	145 l/sec	
Farm Water Requirement:	0.72 l/sec/ha	
Drainage Water Requirement:	- l/se/ha	

PROPOSED PROJECT WORKS

Irrigation/Drainage Facilities	New Construction	Rehabilitation
Diversion Dam	Yes, Ogee, L = 30.5m, H = 2.5 m	
Diversion Channel	2.078 km	
Earth Canal	-	
Lined Canal	-	
Main/Lateral Canal	3.462 km	
Earth Canal	-	
Lined Canal	-	
Field Ditches	2.36 km	
Project/Farm Drains	-	
Service Road	-	
Access Road	0.5 km	
Flood Protection Dike	-	
Project Building	IA building	
Other Facilities	-	

PROJECT COST

Chargeable Cost			Non-Chargeable Cost		
Diversion Works	P	4,202,000	Flood Dike		-
Main/LateralCanals	P	1,445,000	Access Road	P	25,000
On-farm Facilities	P	124,000	Overheads	P	1,394,640
Others	P	15,000			
Total	P	5,786,000	Total	P	1,419,640
Per ha	P	57,860	Per ha	P	14,200
Total Project Cost (Financial):	Total P	7,205,640	Per ha P		72,060

PROJECT BENEFITS

Cropped Area without Project (ha)

	Irrigated			Rainfed			Total		
	Wet	Dry	Total	Wet	Dry	Total	Wet	Dry	Total
Paddy	0	0	0	100	0	100	100	0	100
Corn/Others	0	0	0	0	0	0	0	0	0
Total	0	0	0	100	0	100	100	0	100

Cropped Area with Project (ha)

	Irrigated			Rainfed			Total		
	Wet	Dry	Total	Wet	Dry	Total	Wet	Dry	Total
Paddy	100	100	200	100	100	200	200	200	400
Corn/Others	0	0	0	0	0	0	0	0	0
Total	100	100	200	100	100	200	200	200	400

Annual Net Production Values without Project (Px1,000)

	Paddy	Corn/Others	Total
Production (ton)	180	\-	180
Framgate Price (P/ton)	5,577	\-	5,577
Gross Value(P '000)	1,004	\-	1,004
Production Cost(P '000)	489	\-	489
Net Value(P '000)	515	\-	515

Annual Net Production Values with Project (Px1,000)

	Paddy	Corn/Others	Total
Production (ton)	740	\-	740
Framgate Price (P/ton)	5,577	\-	5,577
Gross Value P x 1,000	4,127	\-	4,127
Production Cost	1,687	\-	1,687
Net Value	2,440	\-	2,440

PROJECT JUSTIFICATION

Total Economic Cost (P1,000):	P 5,765
Annual Net Incremental Benefits (P1,000):	P 1,925
Annual O&M Cost (P1,000):	P 115
Project Life	50 years
Benefit Build-up Period	3 years
Economic Internal Rate of Return (EIRR)	23 %

FARM ECONOMY

Farm Size	Nos.	%	Average Farm Size:		2.0 ha
<1.0	16	33	Annual Net Farm Income:		
1.0-2.0	15	31	without Project:	P	8,459
>2.0	18	36	with Project:	P	40,590
Total	49	100	Net Incremental Farm Income:	P	32,131

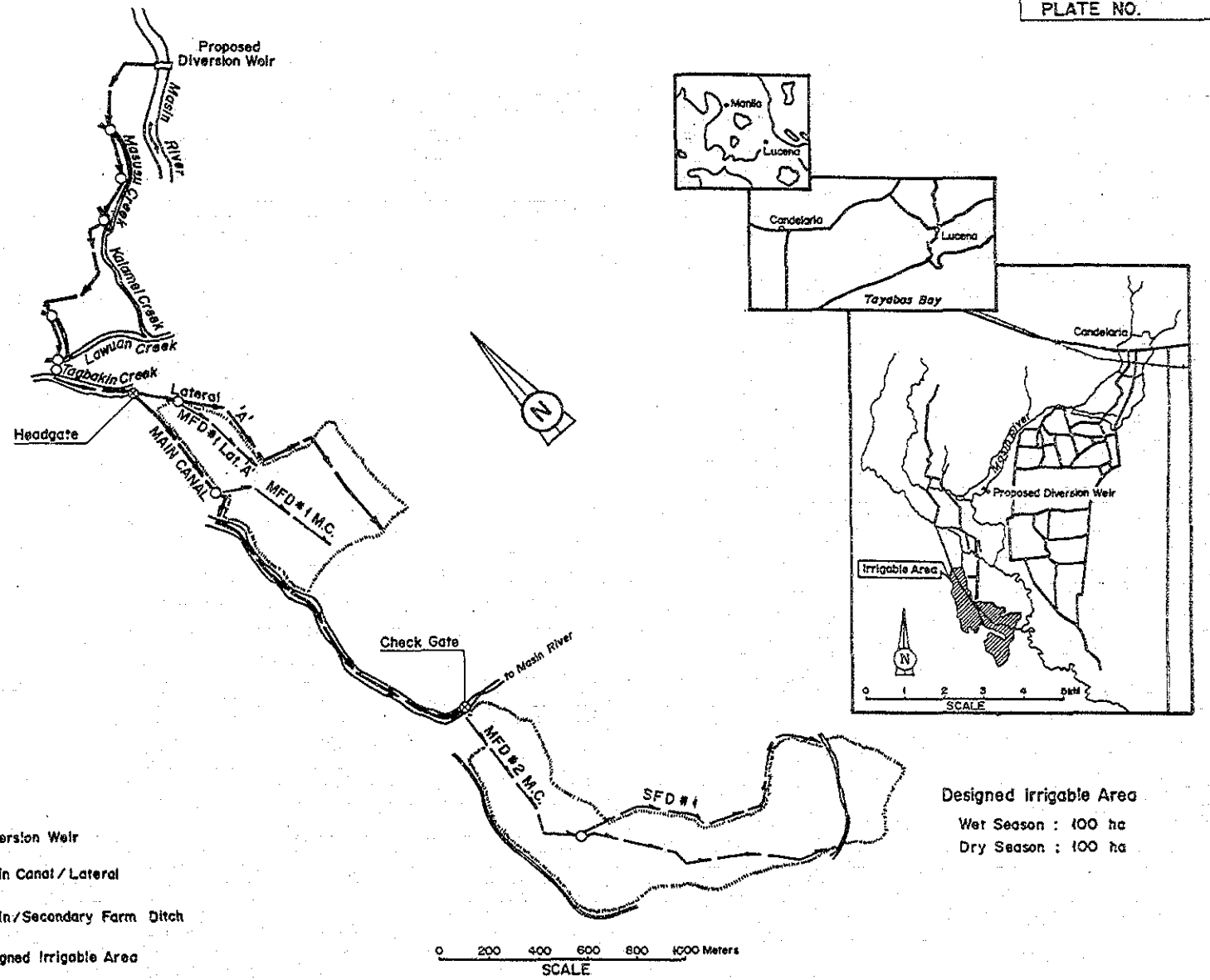
STATUS OF IA

IA organized:	Yes
Name of IA:	Kinatihan-Cabay
Date registered:	Nov. 23, 1987
Nos. of IA Menbers:	49
IA Loan (x P1,000):	-

ENVIRONMENTAL ISSUES

Water pollution:	little
Deforestation:	serious
Soil erosion:	serious
Sedimentation:	fair
Schistosomiasis:	no

PLATE NO.



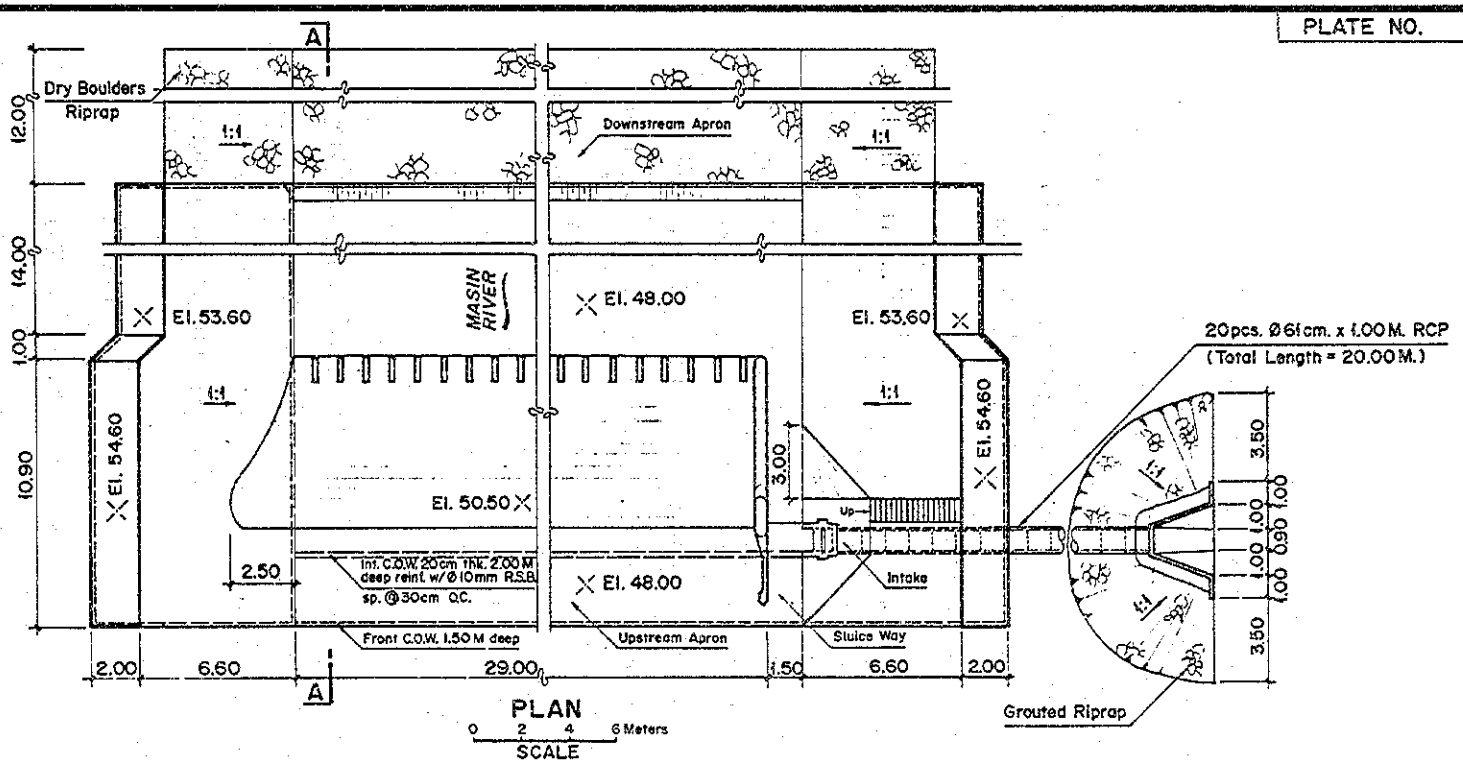
Designed Irrigable Area
Wet Season : 100 ha
Dry Season : 100 ha

MASTER PLAN STUDY ON SMALL SCALE IRRIGATION DEVELOPMENT PROJECT

KINATIHAN CIP (Quezon Province), GENERAL LAYOUT

Japan International Cooperation Agency | August , 1991

PLATE NO.



PLAN

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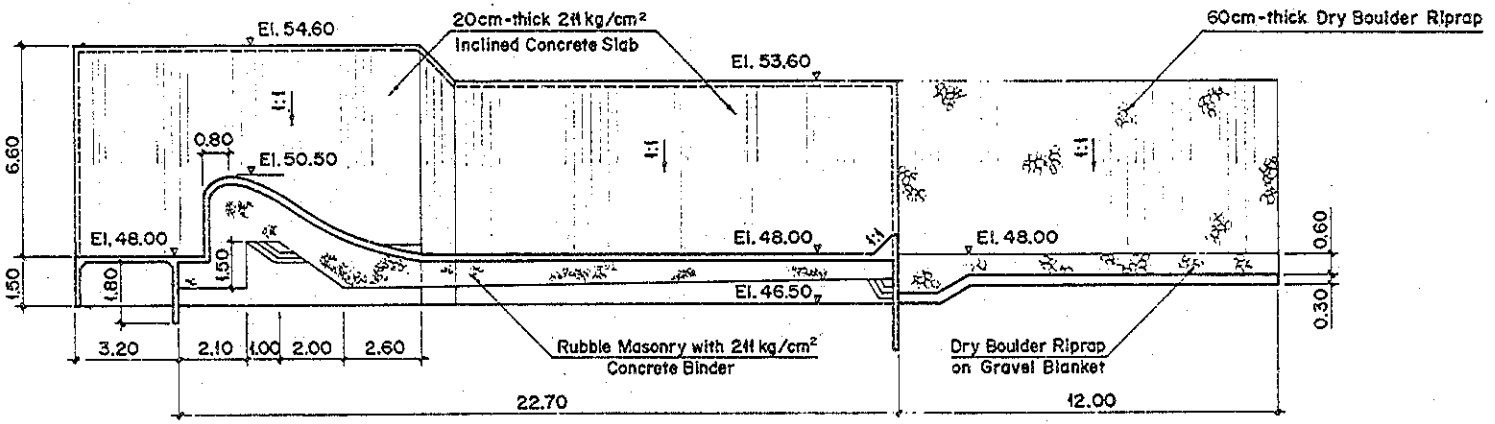
SCALE



SECTION A-A

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SCALE

MASTER PLAN STUDY ON SMALL SCALE IRRIGATION DEVELOPMENT PROJECT

KINATIHAN CIP (Quezon Province), DIVERSION WEIR

Japan International Cooperation Agency | October , 1991

ANNEX G-2 (3) PACHECO CIP (172ha)

Background

3.01 Pacheco CIP is located in Barangay Pacheco, Municipality of Magallanes in Cavite Province which is 15 km away from Trece Martires (See the attached General Layout). The potential irrigable area which covers 213 ha was formerly a ranch area until it was sold to a certain family who turned it to an agricultural estate. At present the area is being cultivated by 93 farmers who are already organized into an Irrigators Association. The farmers who are also potential CARP beneficiaries plant upland paddy, corn, pineapples and vegetables under rainfed condition.

3.02 Feasibility study on the Pacheco CIP was completed in 1990, and the detailed design of the project facilities was also prepared in 1991 by NIA. This project was scheduled to be implemented from 1991 under CARP-IC program, but due to funding limitations it was not given priority and was not given assurance of the implementation. Ninety five percent of the total population in barangay Pacheco depend on farming and all of them hope that only the irrigation can improve poor economic situation.

The Project Area

3.03 Natural Conditions

The topography of the potential irrigable area is hilly and terrace. The average slope of the project area is about 3 percent and the soil type is clay loam. The climate of the project area is Type-I which is characterized by two pronounced seasons of wet and dry. The mean annual rainfall is 2,605 mm, and average monthly rainfall is shown below :

(Unit : mm)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
17	9	8	24	2450	382	523	599	377	176	194	45	2,605

3.04 The Tigbi river is the water source for the proposed project. The catchment area of the Tigbi river is 8 km^2 at the proposed intake site, and monthly river discharge at this site is shown in the tables below:

(Unit : l/s)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave
350	180	170	493	5,053	7,737	10,585	12,127	7,628	3,533	3,928	925	4,394

3.05 Agriculture

The total farm household in the Pacheco CIP is 97, comprising 553 in population. Paddy cultivation under rainfed condition is prevailing in the Pacheco CIP area. Major crops cultivated are upland rice of local varieties followed by corn and mongo. The wet season upland paddy is planted in June and harvested in November. Present cropping intensity is calculated at 122 percent. Average unit yield of upland paddy, mongo and corn are estimated at 1.5 ton/ha, 0.1 ton/ha and 0.6 ton/ha, respectively. The total production of paddy is estimated at about 230 tons per annum. Average farm size in the Pacheco CIP is 1.8 ha per a farm household. The present farm economy is examined for a farm household with the average farm size as follows:

Gross farm income	
Annual crop production (ton)	2.47
Farmgate price (₱/ton)	4,500
Gross income (₱)	11,124
Production cost (₱)	6,585
Net farm income (₱)	4,539

Major constraints for agricultural development in the Pacheco CIP area are as follows:

1) Low farm income,
2) No utilization of certified seed,
3) Insufficient agricultural extension services, and
4) No farm credit services.

3.06 Irrigator's Association (IA)

Pacheco Communal IA was organized in April 1990. Present members of the IA are 93 farmers, and hundred percent of the members is active. The tenurial status of IA's member is as follows:

1)	Leaseholder	:	12
2)	Share Tenant	:	81
	Total	:	93

The farmers' petition endorsed by the local government units has already been submitted to NIA.

Irrigation Development Plan

3.07 Irrigation Water Requirements and Water Balance

Proposed cropping pattern is a double cropping of paddy with 145% intensity, composed of 100%(172 ha) in wet season and 45%(77 ha) in dry season. Based on this cropping pattern, diversion water requirements are estimated on a monthly basis as follow:

(Unit : l/sec/ha)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.10	1.53	1.77	1.36	-	0	0	0	0	0.08	0	0.22

3.08 In order to verify the adequacy of designed irrigable area, a water balance between the river discharge and estimated diversion water requirements is made on a monthly basis as follow:

Month	Sadyaya River Discharge (MCM)	Diversion Water Requirement (MCM)	Balance (MCM)
Jan	0.750	0.226	+0.524
Feb	0.348	0.283	+0.065
Mar	0.364	0.363	+0.001
Apr	1.024	0.270	+0.754
May	10.827	0	+10.827
Jun	16.042	0	+16.042
Jul	22.677	0	+22.677
Aug	25.979	0	+25.979
Sep	15.816	0	+15.816
Oct	7.611	0.043	+7.568
Nov	8.147	0	+8.147
Dec	1.192	0.118	+1.074

As a result of the water balance study, the Tigbi river discharge is judged adequate to irrigate the designed irrigable area of 172 ha in wet and 77 ha in dry season.

3.09 Project Works

The irrigation development is the most important program to support the CARP beneficiary farmers in the project area. The project will provide perennial irrigation water through the construction of the following irrigation facilities:

1) Checkgate Type Intake Structure(See design drawing)
   - -Width of Checkgate : 3.3 m
   - -Height of Checkgate : 1.9 m
   - -Intake Discharge : 0.391 cms
2) Diversion Canal
   - -Length : 3,420 m
     - Earth Canal : 557 m
     - Lined Canal : 2,683 m
   - -Structures : 14 nos
3) Main canal
   - -Length : 2,080 m
     - Earth Canal : 714 m
     - Lined Canal : 1,366 m
   - -Structures : 8 no
4) Lateral Canals
   - -Numbers of Lateral : 3 nos
   - -Length : 4,400 m
   - -Structures : 5 no
5) Field Ditches-Length : 4,340 m

3.10 Project Cost

The project costs for the above project works are estimated below:

Items	Cost (₱1,000)
1) Intake Structure	226.762
2) Main and Lateral Canals	11,205.651
3) On-farm Facilities	16.378
4) Others(Project Office)	60
5) Access Road	60
Total Direct Cost	11,608.791
6) ROW	40
7) Procurement Cost of Const.Equipment	160
8 G.E.S.A.(12% of Direct Cost)	1,417.055
9) Contingency (6.6% of Direct Cost)	774.154
Total	14,000

Project Justification

3.11 Economic Internal Rate of Return

EIRR is calculated from the following economic benefits and costs :

Annual Incremental Benefits (₱1,000)	
-Net value under without project condition	791
-Net value under with project condition	2,219
-Incremental benefit	1,428
Economic Costs (₱1,000)	
-Total project cost	9,938
-Annual O & M cost	199
-Total cost	10,137

The EIRR of Pacheco CIP is estimated at 10 %.

3.12 Farm Budget Analysis

Farm budget analysis is made in order to assess the capacity to pay the amortization fee for the chargeable cost of the project and the operation and maintenance fee required. The farm budget is examined for a farmer with the average farm size as follows:

Items	Without Project(1.8 ha)	With Project(1.8 ha)
Farm income (₱)	11,124	33,899
Production cost (₱)	6,585	20,831
(Amortization fee (₱))	0	1,209
(Annual O&M fee (₱))	0	300
Net reserve (₱)	4,539	13,068

3.13 Socio-economic Impacts

Expected impacts of the project are introduction of high yielding paddy and modern technology. Given an assured irrigation water, the farmers are willing to plant high yielding paddy varieties instead of traditional ones. These, coupled with modern farming technology will result in an increased production that will definitely have an effect on the standard of living of the people.

3.14 One of the major problems for the farmers in the project area is shortage of the water. At present, only two artesian wells are being used by the whole population. The use

of irrigation system as a water supply even for irrigating their backyard gardens will help in the development of the community. No adverse effect is expected by the project.

3.15 Peace and Order Assessment

Barangay Pacheco is one of the most peaceful barangays in Magallanes. This may be because of its small population. The Chief of Police and other peace and order keeping units conduct regular barangay visits and dialogue with barangay officials. Unlike in other places, barangay officials in Pacheco are mostly senior residents who are respected in the place. There is no sign of insurgent elements within or around the locality.

Conclusions and Recommendations

3.16 The farmers in the project area are suffering from low farm income and the economic condition of the farmers is at subsistence level. The implementation of this project is expected to contribute to improve the farmers' living standard.

3.17 The water resources of the Tigbi river is not enough to achieve 200% of cropping intensity for the double cropping of paddy. However, if the upland crops are introduced in the project area, cropping intensity of 200% can be achieved. It is necessary to carry out more detailed study on agricultural development.

PRE-FEASIBILITY SUMMARY DATA (3/10) | SUB-PROJECT: PACHECO CIP | PROVINCE: CAVITE

GENERAL

Name of Sub-project:	PACHECO CIP
Proposed Service Area:	172 ha
Region:	IV
Province:	Cavite
Municipality:	Magallanes
Type of SSIDP:	
Topographic Condition:	Hilly/Terrace
Availablity of F/S report:	Yes prepared in 1990
Necessity of Rehabilitation:	No
Recent Rehabilitation	No
Funding Source:	CARP - IC
Availability of topo-map(1/4,000):	Yes
engineering designs:	Yes prepared in 1991

EXISTING IRRIGATION/DRAINAGE FACILITIES

Diversion Dam:	No
Diversion Channel:	No
Main/Lateral Canal:	No
Field Diches:	No
Project /Farm Drain:	No
Access Road:	No
Service Road:	No
Flood Protection Dike:	No
Project Building:	No
Other Facilities :	
Pumps:	
Siphon:	
Aqueduct:	
Bridge:	
Type of Diversion Dam:	-
Lining of main/lateral canal:	-

SOCIO-ECONOMIC DATA

Population:	553	Availability of	
Nos. of Household:	97	water supply:	No
Average Size of Household	5.7	power supply:	Yes
Nos. of Farm Household:	97	rice mill:	No
Nos. of arm Beneficiaries:	97	storage facilities:	No

Agrarian Reform:	%
Area cultivated by owner operators and CARP amortizing owners:	0
Area still eligible for re-distribution:	100
Area listed under CARP:	100

SOIL CONDITION

Soil Type:	Magallanes Clay Loam
Land Classification	1R

METEOROLOGY/HYDROLOGY

Climatic Type: I | Annual Rainfall: 2,606 mm

Monthly Rainfall (unit:mm)

Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
17	9	8	24	250	382	523	599	377	176	194	46	2,605

Water Sources: Tigbi river | Catchment Area: 8 sq.km (at diversion point)

River discharge: (unit:l/sec.)

Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Ave.
350	180	170	493	5,053	7,737	10,585	12,127	7,628	3,553	3,928	925	4,394

IRRIGATION DEVELOPMENT PLAN

Designed Irrigable Area:	Wet: 172 ha	Dry: 77 ha
Proposed Irrigation Intensity:	145 %	(wet + dry) / wet x 100
% of Area Restoration (CIS):	- %	(Area restored / Service area) x 100
Diversion Water Requirement:	391 l/sec	
Farm Water Requirement:	0.91 l/sec/ha	
Drainage Water Requirement:	- l/se/ha	

PROPOSED PROJECT WORKS

Irrigation/Drainage Facilities	New Construction	Rehabilitation
Diversion Dam	Checkgate Type, W = 3.3m, H = 1.9 m	
Diversion Channel	3.42 km	
Earth Canal	0.557 km	
Lined Canal	2.683 km	
Main/Lateral Canal	6.48 km	
Earth Canal	4.954 km	
Lined Canal	1.526 km	
Field Ditches	4.34 km	
Project/Farm Drains	-	
Service Road	-	
Access Road	3.0 km	
Flood Protection Dike	-	
Project Building	1A building	
Other Facilities		
Procurement of Const. Eqpt.		
Concrete Mixer	2 Nos.	
Pump (φ100)	1 Nos.	

PROJECT COST

Chargeable Cost			Non-Chargeable Cost		
Diversion Works	P	266,762	Flood Dike		-
Main/LateralCanals	P	11,222,029	Access Road	P	60,000
On-farm Facilities	P		Overheads	P	2,191,209
Others	P	60,000	ROW	P	40,000
			Equipment	P	160,000
Total	P	11,548,791	Total	P	2,451,209
Per ha	P	67,140	Per ha	P	14,250
Total Project Cost (Financial):		Total P	14,000,000	Per ha P	81,390

PROJECT BENEFITS

Cropped Area without Project (ha)

	Irrigated			Rainfed			Total		
	Wet	Dry	Total	Wet	Dry	Total	Wet	Dry	Total
Paddy	0	0	0	122	0	122	122	0	122
Corn/Others	0	0	0	50	38	88	50	38	88
Total	0	0	0	172	38	210	172	38	210

Cropped Area with Project (ha)

	Irrigated			Rainfed			Total		
	Wet	Dry	Total	Wet	Dry	Total	Wet	Dry	Total
Paddy	172	77	249	0	0	0	172	77	249
Corn/Others	0	0	0	0	0	0	0	0	0
Total	172	77	249	0	0	0	172	77	249

Annual Net Production Values without Project (Px1,000)

	Paddy	Corn/Others	Total
Production (ton)	230	47	277
Farmgate Price (P/ton)	5,577	\-	-
Gross Value(P '000)	1,244	223	1,467
Production Cost(P '000)	589	87	676
Net Value(P '000)	655	136	791

Annual Net Production Values with Project (Px1,000)

	Paddy	Corn/Others	Total
Production (ton)	718	\-	718
Farmgate Price (P/ton)	5,577	\-	5,577
Gross Value P x 1,000	4,005	\-	4,005
Production Cost	1,786	\-	1,786
Net Value	2,219	\-	2,219

PROJECT JUSTIFICATION

Total Economic Cost (P1,000):	P 9,938
Annual Net Incremental Benefits (P1,000):	P 1,428
Annual O&M Cost (P1,000):	P 199
Project Life	50 years
Benefit Build-up Period	3 years
Economic Internal Rate of Return (EIRR)	10 %

FARM ECONOMY

Farm Size	Nos.	%	Average Farm Size:		1.8 ha
<1.0	21	22	Annual Net Farm Income:		
1.0-2.0	43	44	without Project:	P	4,539
>2.0	33	34	with Project:	P	13,068
Total	97	100	Net Incremental Farm Income:	P	8,529

STATUS OF IA

IA organized:	Yes
Name of IA:	Pacheco Communal
Date registered:	July 30, 1990
Nos. of IA Menbers:	93
IA Loan (x P1,000):	-

ENVIRONMENTAL ISSUES

Water pollution:	little
Deforestation:	little
Soil erosion:	little
Sedimentation:	fair
Schistosomiasis:	no

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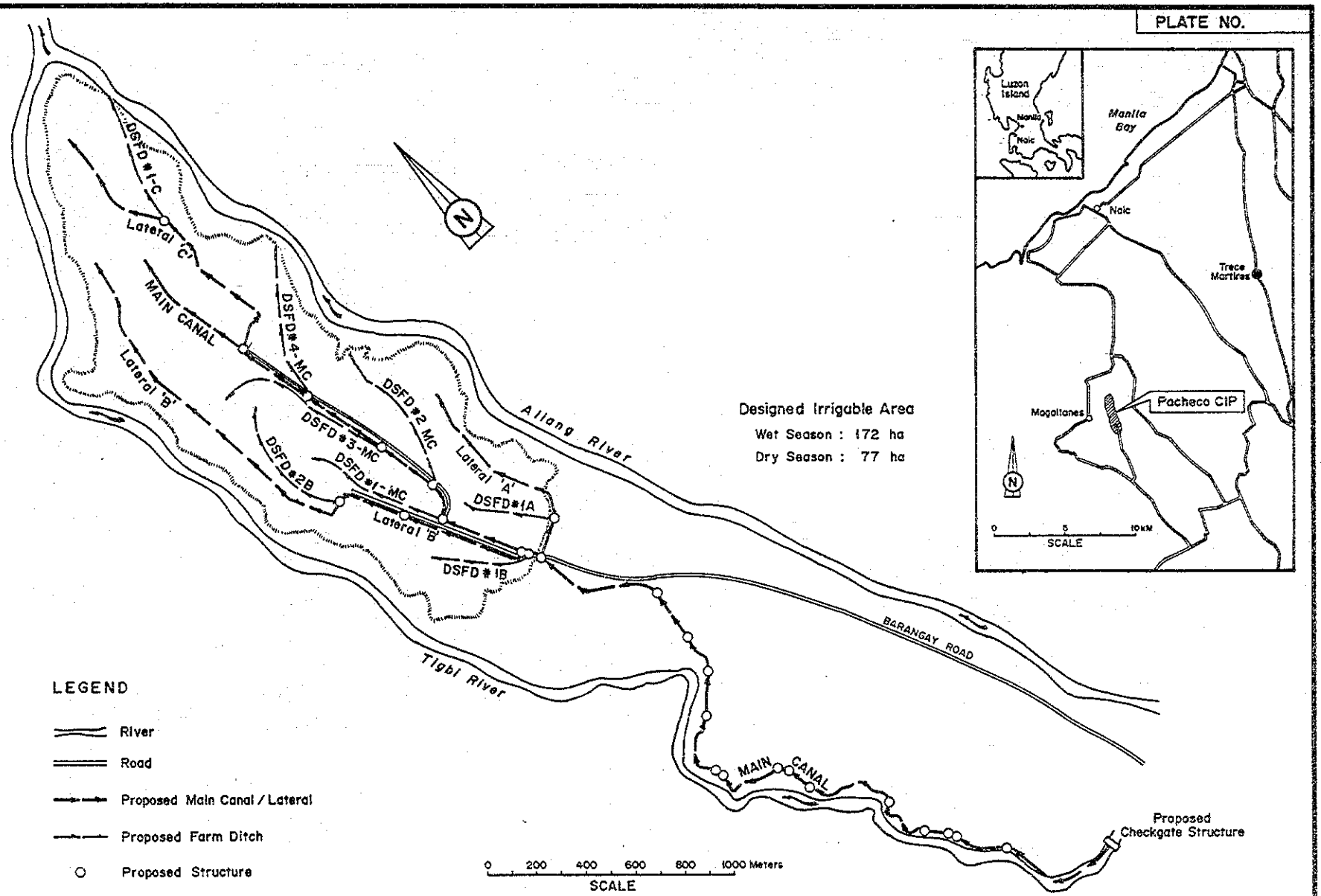
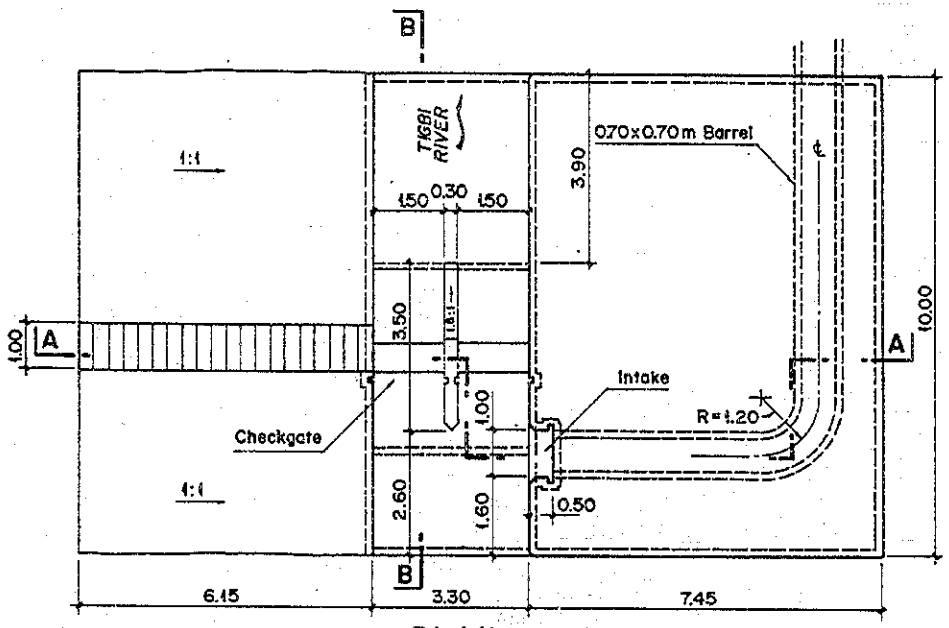


MASTER PLAN STUDY ON SMALL SCALE IRRIGATION DEVELOPMENT PROJECT

PACHECO CIP (Cavite Province), GENERAL LAYOUT

Japan International Cooperation Agency | August , 1991

PLATE NO.



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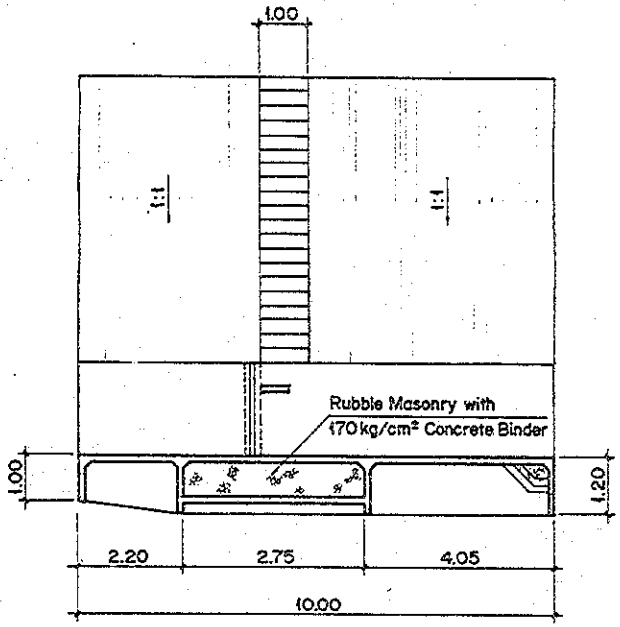

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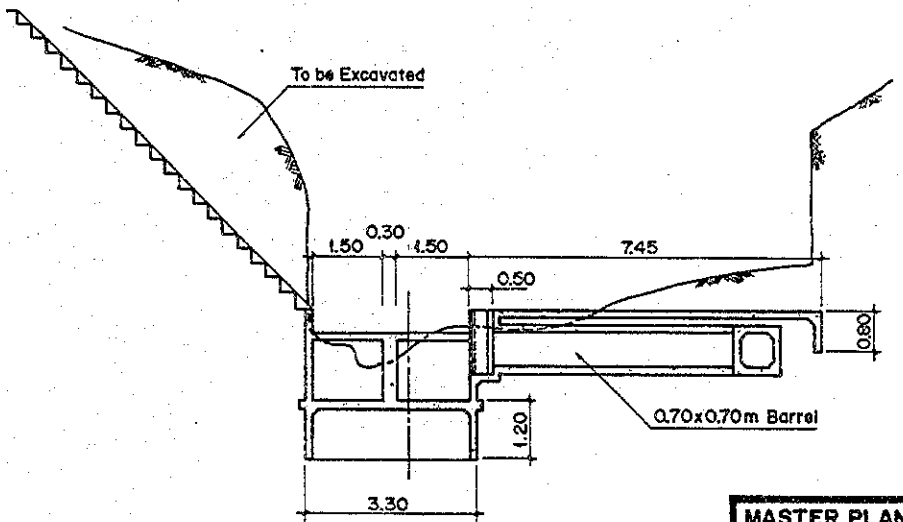


SECTION A-A

0 1 2 3 4 5 Meters
SCALE

MASTER PLAN STUDY ON SMALL SCALE IRRIGATION DEVELOPMENT PROJECT

PACHECO CIP (Cavite Province), DIVERSION WEIR

Japan International Cooperation Agency | October , 1991

ANNEX G-2 (4) BAYUNAN CIS (220ha)

Background

4.01 Bayunan CIS having a net irrigation area of 310 ha is located in Municipality of San Joaquin in Iloilo Province. Bayunan CIS is divided to three sub-systems which are individually irrigated by three existing intake structures. Three intakes named I (one), II (two) and III (three) from upstream to downstream were constructed with brush dams in 1976. However, these brush dams were immediately damaged by seasonal floods. During the absence of irrigation, the farmers in the intake I sub-system withdrew from the Irrigators Association. At present, the farmers in the intake I and II sub-systems are active for the Bayunan Valley IA.

4.02 Designed irrigable areas for three sub-systems are as follows:

Intake I	:	90 ha
Intake II	:	90 ha
Intake III	:	130 ha

The rehabilitation works are proposed only for the areas irrigated by Intake II and III, which are 220 ha in total. (See the attached General layout.)

4.03 The intakes II and III were rehabilitated twice , in 1983 and 1986. In spite of these rehabilitation works, the intake structures were again damaged by the flood, and most of the area can not be irrigated. The Bayunan Valley IA requested NIA to improve these intake structures into more stable and permanent structures. The feasibility study on the rehabilitation project of Bayunan CIS was prepared in 1990 by Iloilo PIO of NIA.

The Project Area

4.04 Natural Conditions

The project area is located in a hilly land with average land slope of 1.05. Soil type of irrigation area is clay loam.The climate of the project area is Type-I which is characterized by two pronounced seasons of wet and dry. The mean annual rainfall is 2,061 mm, and average monthly rainfall is shown below :

(Unit : mm)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
60	28	31	46	106	261	323	353	295	289	185	84	2,061

4.05 The Bayunan river is the water source for the Bayunan CIS. Monthly discharge of the Bayunan river at the intake II site is shown below :

(Unit : l/s)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave
176	136	121	93	242	1,257	1,386	3,479	2,555	2,466	1,392	1,022	1,194

4.06 Agriculture

The total number of farm households in the Bayunan CIS is 137, comprising 740 in population. Paddy cultivation is prevailing in the Bayunan CIS area. Out of 220 ha, 38 ha is under irrigated condition both in the wet and dry seasons. Remaining 182 ha is under rainfed condition. HYV of IR 56 is commonly cultivated by broadcasting. The wet season paddy is planted in May to June and harvested in September to October. The dry season paddy is planted in October and harvested in March. Present cropping intensity is calculated at 117 percent. Average unit yield of irrigated paddy is estimated at 3.9 ton/ha in wet season and 3.7 ton/ha in dry season and that of rainfed paddy is estimated at 2.5 ton/ha. The total production of paddy is estimated at about 744 tons per annum. Average farm size in the Bayunan CIS is 1.61 ha per a farm household. The present farm economy is examined for a farm household with the average farm size as follows:

Gross farm income	
Annual crop production (ton)	5.38
Farmgate price (₱/ton)	5,700
Gross income (₱)	30,649
Production cost (₱)	12,777
Net farm income (₱)	17,872

Major constraints for agricultural development in the Bayunan CIS area are as follows:

1) Unstable irrigation water supply,
2) Insufficient farm credit services, and
3) No utilization of certified seed.

4.07 Existing Irrigation and Drainage System

The existing irrigation facilities for 220 ha of service area in the Bayunan CIS are two intake structures, two main canals and related structures. Most of these facilities are under deteriorating condition and hence do not function well. The general features of the irrigation facilities are summarized below:

1)	Intake II		
	Type of Weir	:	Ogee,boulder dam with surfaced by concrete
	Length of Weir	:	26 m
	Height of Weir	:	0.95 m
	Intake Discharge	:	0.07 cms
2)	Intake III		
	Type of Weir	:	Ogee,boulder dam with surfaced
	by concrete		
	Length of Weir	:	19 m
	Height of Weir	:	1 m
	Intake Discharge	:	0.10 cms
3)	Main Canals		
	Intake II Area	:	2,550 m
	Intake III Area	:	1,830 m
	Total	:	4,380 m
	Related Structures	:	12 nos

4.08 The existing weirs for both intakes II and III have been seriously damaged. The intakes function only to take water into canals. It is necessary to rehabilitate these structures in order to control the intake water level and amount of water required for irrigation. The head reach of the main canal can only convey the irrigation water to the field. The middle and end reaches of the main canal do not function due to the deteriorations of structures. The drainage canal is not constructed in the Bayunan CIS. Natural river courses in and around the area are used as the drainage canals.

4.09 Irrigator's Association (IA)

Bayunan Valley IA has been organized for the operation and maintenance of the Bayunan CIS. Present members of the IA are 76 farmers, and 53 percent of the member is active. The tenurial status of IA's member is as follows:

1)	Owner Operator	:	19
2)	Part-Owner	:	21
3)	Share Tenant	:	36
	Total	:	76

The farmers' petition endorsed by the local government units has already been submitted to NIA.

Irrigation Development Plan

4.10 Irrigation Water Requirements and Water Balance

Proposed cropping pattern is a double cropping of paddy with 150% intensity, composed of 100% (220 ha) in wet season and 50% (110 ha) in dry season. Based on this cropping pattern,diversion water requirements are estimated on a monthly basis as follow:

(Unit : l/sec/ha)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.03	0.36	0	0	0.70	0.75	0	0	0	0.29	0.79	0.92

4.11 In order to check the adequacy of designed irrigable area, a water balance between the river discharge and estimated diversion water requirements is made on a monthly basis as follow:

Month	Sadyaya River Discharge (MCM)	Diversion Water Requirement (MCM)	Balance (MCM)
Jan	0.474	0.413	+0.061
Feb	0.330	0.132	+0.198
Mar	0.236	0	+0.236
Apr	0.243	0	+0.243
May	0.649	0.583	+0.066
Jun	3.258	0.608	+2.650
Jul	3.714	0	+3.714
Aug	9.319	0	+9.319
Sep	6.624	0	+6.624
Oct	6.606	0	+6.606
Nov	3.609	0.121	+3.488
Dec	2.738	0.383	+2.355

As a result of the water balance study, the Bayunan river discharge is judged adequate to irrigate the designed irrigable area of 220 ha in wet and 110 ha in dry season.

4.12 Rehabilitation Plan

The following rehabilitation works are required for restoration of irrigation area and achievement of the proper water distribution.

1) Intake II(See the attached design drawing)
   - -Type of Weir : Ogee, Rubble Masonry surfaced by Concrete
   - -Length of Weir : 26 m
   - -Height of Weir : 0.95 m
   - -Intake Discharge : 0.07 cms
2) Intake III(See the attached design drawing)
   - -Type of Weir : Ogee, Rubble Masonry surfaced by Concrete
   - -Length of Weir : 19 m
   - -Height of Weir : 1.0 m
   - -Intake Discharge : 0.10 cms
3) Main Canal
   - -Length to be rehabilitated : 4,380 m
   - -Length of extension : 530 m
   - -Structures to be rehabilitated : 12 nos.
   - -Nos. of structures : 3 nos.
4) Field Ditches
   - -Length of ditch : 3,400 m
   - -Nos. of structure : 6 nos.

4.13 Project Cost

The project costs for the above rehabilitation works are estimated below:

Items	Cost (₱1,000)
1) Diversion Dam	1,339
1-1 Intake II	664
1-2 Intake III	675
2) Main Canal	1,403
2-1 Intake II	733
2-2 Intake III	670
3) Field Ditch	136
4) Others(Project Office)	50
5) Access Road	100
5-1 Intake II	40
5-2 Intake III	60
Total Direct Cost	3,028
6) G.E.S.A.(12% of Direct Cost)	363.36
7) Contingency (12% of Direct Cost)	363.36
Total	3,754.72

Project Justification

4.14 Economic Internal Rate of Return

EIRR is calculated from the following economic benefits and costs :

Annual Incremental Benefits (₱1,000)	
-Net value under without project condition	2,569
-Net value under with project condition	4,402
-Incremental benefit	1,833
Economic Costs (₱1,000)	
-Total project cost	3,004
-Annual O & M cost	60
-Total cost	3,064

The EIRR of Bayunan CIS is estimated at 36 %.

4.15 Farm Budget Analysis

Farm budget analysis is made in order to assess the capacity to pay the amortization fee for the chargeable cost of the rehabilitation works and the operation and

maintenance fee required. The farm budget is examined for a farmer with the average farm size as follows:

Items	Without Project(1.61 ha)	With Project(1.61 ha)
Farm income (₱)	30,649	52,873
Production cost (₱)	12,777	22,298
(Amortization fee (₱))	64	386
(Annual O&M fee (₱))	94	564
Net reserve (₱)	17,872	30,575

4.16 Socio-economic Impacts

A much improved social life-style and living standard of the community is visible with the advent of the irrigation system. No adverse effect by the project has yet been recorded.

4.17 Peace and Order Assessment

The local community is generally peaceful. There is no presence or signs of insurgency within or about the service area and its locality.

Conclusions and Recommendations

4.18 The farmers in the Bayunan CIS are suffering from the deficit of irrigation water due to the deterioration of intake facilities. In order to restore the irrigation service area, rehabilitation is most important and urgent for the Bayunan CIS. If the facilities are not rehabilitated, the present conditions of the facilities become worse.

4.19 The detailed design works for the proposed diversion weirs should be carried out in consideration of the following:

1) Foundation treatment of the weir,
2) Flood protection works of the river banks, and
3) Flood control facilities of the weir.

PRE-FEASIBILITY SUMMARY DATA (4/10) — SUB-PROJECT: BAYUNAN CIS — PROVINCE: ILOILO

GENERAL

Name of Sub-project:	BAYUNAN CIS
Proposed Service Area:	220 ha

Region:	VI
Province:	Iloilo
Municipality:	San Joaquin

Type of SSIDP:		
Topographic Condition:	Hilly	
Availablity of F/S report:	Yes	prepared in 1989
Necessity of Rehabilitation:	Yes	
Recent Rehabilitation	No	
Funding Source:	Not arranged yet	
Availability of		
topo-map(1/4,000):	Yes	prepared in 1990
engineering designs:	Yes	(Not complete)

EXISTING IRRIGATION/DRAINAGE FACILITIES

Diversion Dam:	Yes (3 Div. Dam)Partly damaged
Diversion Channnel:	No
Main/Lateral Canal:	Yes 4.38 km
Field Dicthes:	No
Project /Farm Drain:	No
Access Road:	No
Service Road:	No
Flood Protection Dike:	No
Project Building:	No
Other Facilities :	-
Pumps:	
Siphon:	
Aqueduct:	
Bridge:	
Type of Diversion Dam:	Ogee
Lining of main/lateral canal:	No

SOCIO-ECONOMIC DATA

Population:	740	Availability of	
Nos. of Household:	137	water supply:	No
Average Size of Household	5.4	power supply:	Yes
Nos. of Farm Household:	137	rice mill:	Yes
Nos. of Farm Beneficiaries:	137	storage facilities:	Yes

Agrarian Reform:	%
Area cultivated by owner operators and CARP amortizing owners:	39
Area still eligible for re-distribution:	61
Area listed under CARP:	85

SOIL CONDITION

Soil Type:	Alimodian Clay Loam
Land Classification	1R

METEOROLOGY/HYDROLOGY

Climatic Type: I — Annual Rainfall: 2,061 mm

Monthly Rainfall (unit:mm)

Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
60	28	31	46	106	261	323	353	295	289	185	84	2,061

Water Sources: Bayunan river — Catchment Area: 8.86 sq.km (at diversion point)

River discharge: (unit:l/sec.)

Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Ave.
176	136	121	93	242	1,257	1,386	3,479	2,555	2,466	1,392	1,022	1,194

IRRIGATION DEVELOPMENT PLAN

Designed Irrigable Area:	Wet: 220 ha	Dry: 110 ha
Proposed Irrigation Intensity:	150 %	(wet + dry) / wet x 100
% of Area Restoration (CIS):	83 %	(Area restored / Service area) x 100
Diversion Water Requirement:	Intake II : 70 l/sec	Intake III : 100 l/sec
Farm Water Requirement:	0.51 l/sec/ha	
Drainage Water Requirement:	- l/se/ha	

PROPOSED PROJECT WORKS

Irrigation/Drainage Facilities	New Construction	Rehabilitation
Diversion Dam		Yes, Partly rehabilitation
Diversion Channel		No
Earth Canal		-
Lined Canal		-
Main/Lateral Canal		Yes 4.91 km
Earth Canal		Yes
Lined Canal		No
Field Ditches		Yes 3.4 km
Project/Farm Drains		No
Service Road		No
Access Road		Yes 0.5 km
Flood Protection Dike		No
Project Building		Yes IA building
Other Facilities		No

PROJECT COST

Chargeable Cost			Non-Chargeable Cost		
Diversion Works	P	1,339,000	Flood Dike		-
Main/LateralCanals	P	1,403,000	Access Road	P	100,000
On-farm Facilities	P	136,000	Overheads	P	726,720
Others	P	50,000			
Total	P	2,928,000	Total	P	826,720
Per ha	P	13,310	Per ha	P	3,760
Total Project Cost (Financial):		Total P 3,754,720	Per ha P		17,070

PROJECT BENEFITS

Cropped Area without Project (ha)

	Irrigated			Rainfed			Total		
	Wet	Dry	Total	Wet	Dry	Total	Wet	Dry	Total
Paddy	38	38	76	182	0	182	220	38	258
Corn/Others	0	0	0	0	0	0	0	0	0
Total	38	38	76	182	0	182	220	38	258

Cropped Area with Project (ha)

	Irrigated			Rainfed			Total		
	Wet	Dry	Total	Wet	Dry	Total	Wet	Dry	Total
Paddy	220	110	330	0	0	0	220	110	330
Corn/Others	0	0	0	0	0	0	0	0	0
Total	220	110	330	0	0	0	220	110	330

Annual Net Production Values without Project (Px1,000)

	Paddy	Corn/Others	Total
Production (ton)	744	\-	744
Farmgate Price (P/ton)	5,732	\-	5,732
Gross Value P x 1,000	4,264	\-	4,264
Production Cost	1,695	\-	1,695
Net Value P x 1,000	2,569	\-	2,569

Annual Net Production Values with Project (Px1,000)

	Paddy	Corn/Others	Total
Production (ton)	1,265	\-	1,265
Farmgate Price (P/ton)	5,732	\-	5,732
Gross Value(P '000)	7,251	\-	7,251
Production Cost(P '000)	2,849	\-	2,849
Net Value(P '000)	4,402	\-	4,402

PROJECT JUSTIFICATION

Total Economic Cost (P1,000):	P 3,004
Annual Net Incremental Benefits (P1,000):	P 1,833
Annual O&M Cost (P1,000):	P 60
Project Life	50 years
Benefit Build-up Period	3 years
Economic Internal Rate of Return (EIRR)	36 %

FARM ECONOMY

Farm Size	Nos.	%	Average Farm Size:	1.61 ha	
<1.0	0	0	Annual Net Farm Income:		
1.0-2.0	110	80	without Project:	P	17,872
>2.0	27	20	with Project:	P	30,575
Total	137	100	Net Incremental Farm Income:	P	12,703

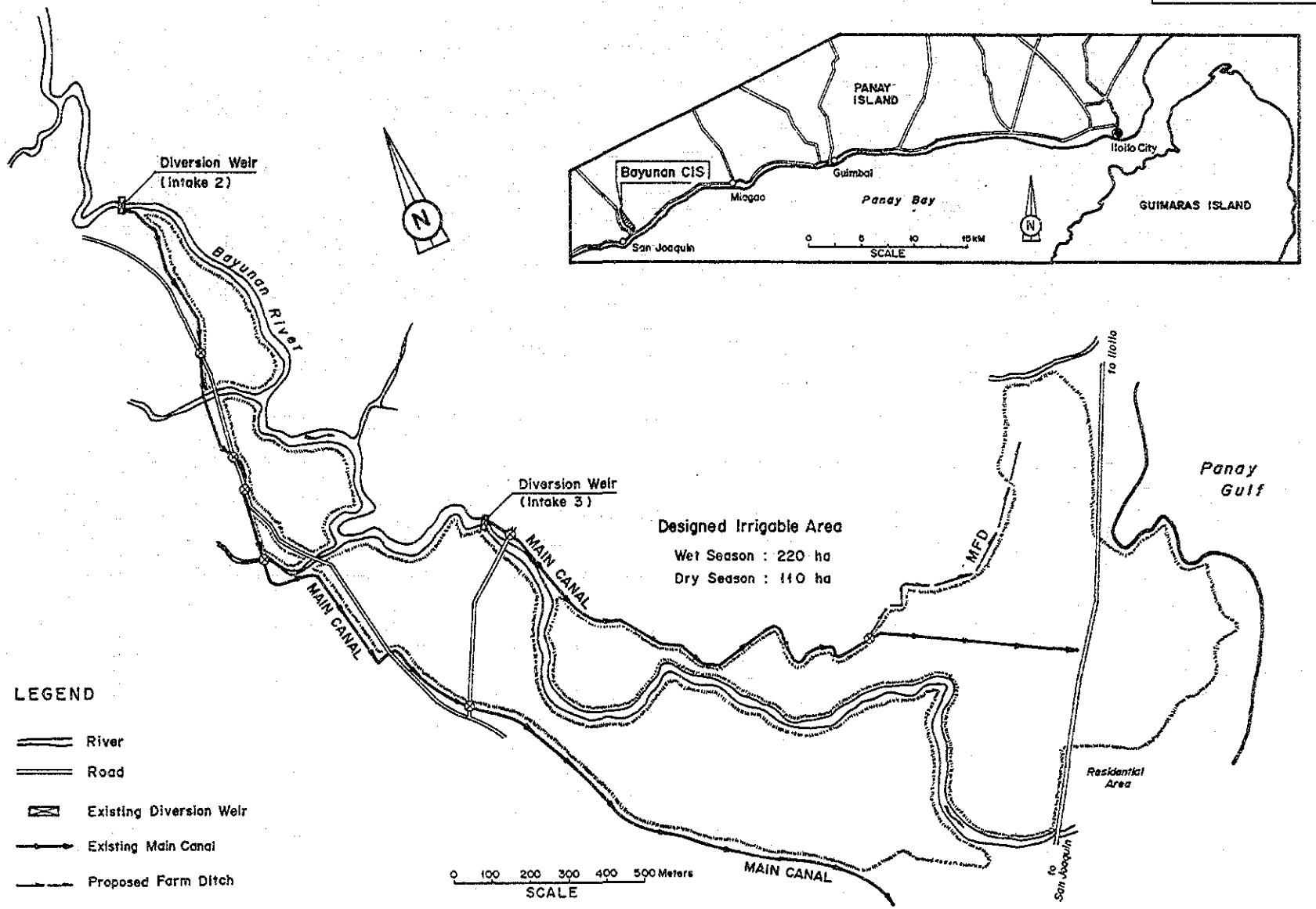
STATUS OF IA

IA organized:	Yes
Name of IA:	Bayunan Valley
Date registered:	July 25, 1984
Nos. of IA Members:	76
IA Loan (x P1,000):	2,057

ENVIRONMENTAL ISSUES

Water pollution:	fair
Deforestation:	fair
Soil erosion:	fair
Sedimentation:	fair
Schistosomiasis:	little

PLATE NO.



MASTER PLAN STUDY ON SMALL SCALE IRRIGATION DEVELOPMENT PROJECT

BAYUNAN CIS (Iloilo Province), GENERAL LAYOUT

Japan International Cooperation Agency | August , 1991

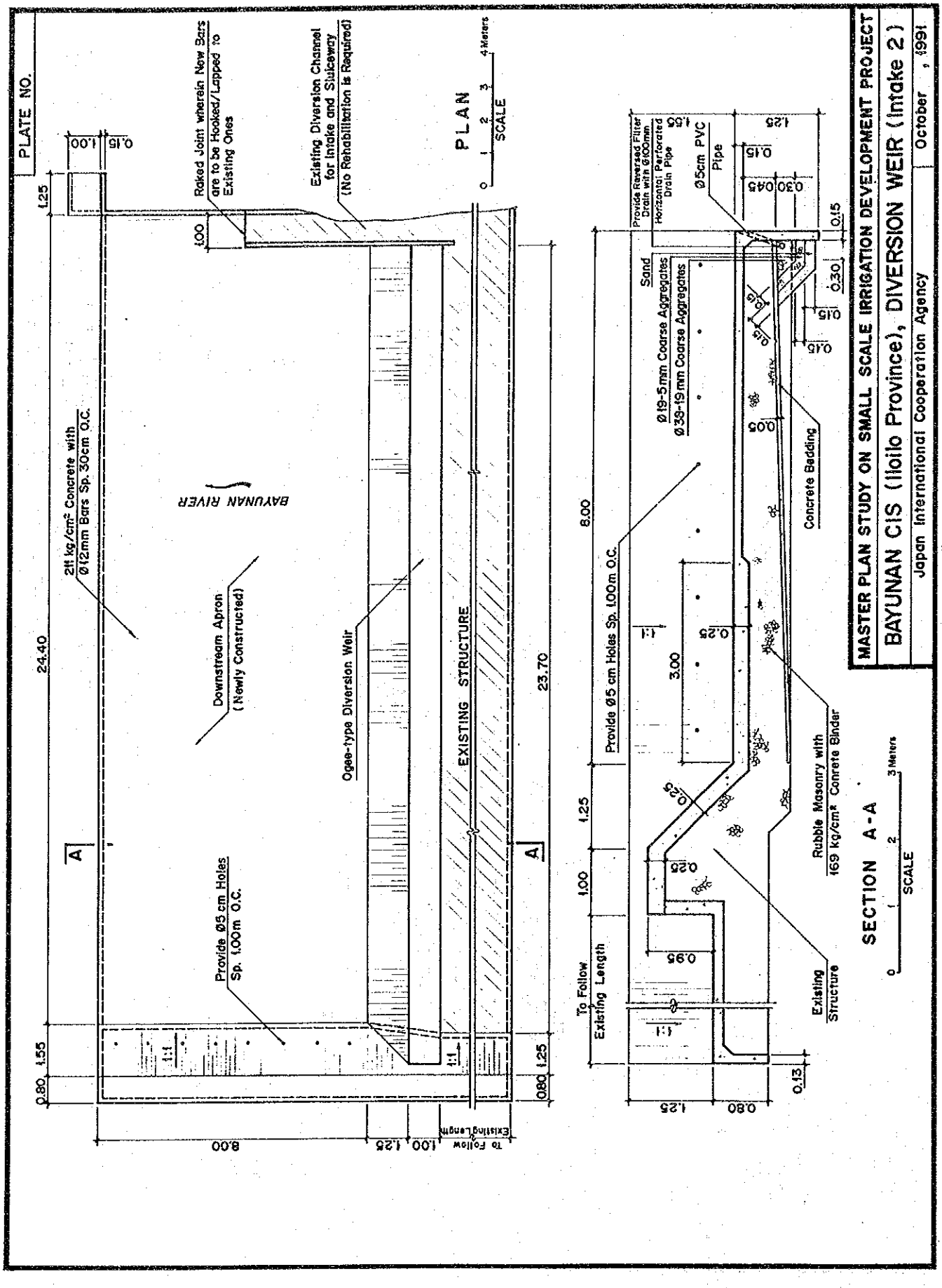
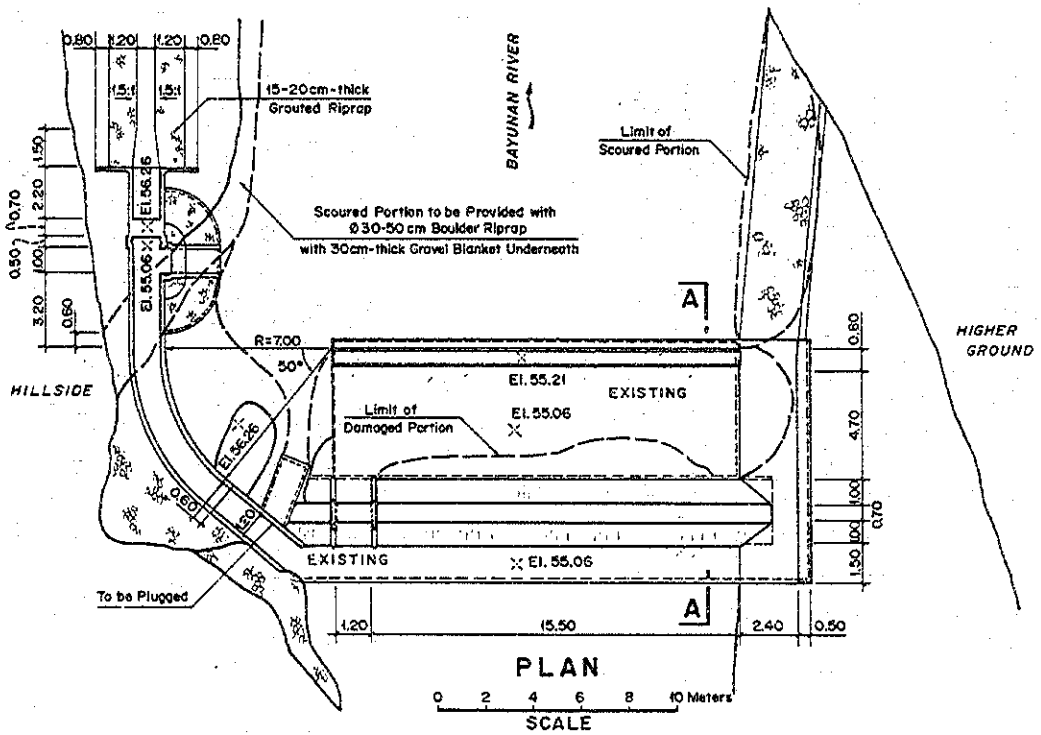
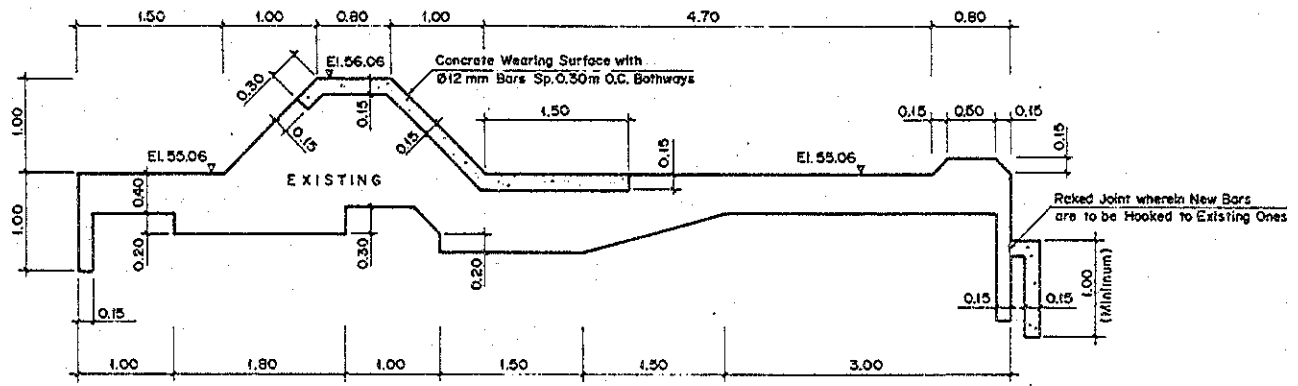


PLATE NO.
PLAN
SCALE
Raked Joint wherein New Bars are to be Hooked/Lapped to Existing Ones
Existing Diversion Channel for Intake and Sluiceway (No Rehabilitation is Required)
BAYUNAN RIVER
Downstream Apron (Newly Constructed)
Ogee-type Diversion Weir
EXISTING STRUCTURE
Provide Ø5 cm Holes Sp. 1.00m O.C.
To Follow Existing Length
SECTION A-A
Provide Reversed Filter Drain with Ø400mm Horizontal Perforated Drain Pipe
Ø5cm PVC Pipe
Sand
Ø19-5mm Coarse Aggregates
Ø33-19 mm Coarse Aggregates
Concrete Bedding
Rubble Masonry with 169 kg/cm² Concrete Binder
Existing Structure
MASTER PLAN STUDY ON SMALL SCALE IRRIGATION DEVELOPMENT PROJECT
BAYUNAN CIS (Iloilo Province), DIVERSION WEIR (Intake 2)
Japan International Cooperation Agency
October , 1991

PLATE NO.





MASTER PLAN STUDY ON SMALL SCALE IRRIGATION DEVELOPMENT PROJECT

BAYUNAN CIS (Iloilo Province), DIVERSION WEIR (Intake 3)

Japan International Cooperation Agency | October , 1991

ANNEX G-2 (5) DE LA PAZ CIS (89ha)

Background

5.01 De La Paz CIS located in Municipality of Banate, Iloilo Province was constructed in 1977 as a tie-up project between the NIA and FSDC(See the attached General Layout). The project was designed to irrigate 89ha. Presently the system can only serve about 38ha with 18 farmer beneficiaries. The farmers of this irrigation system were first organized as an association by the FSDC in line with the construction of the project.

5.02 The present water source for the De La Paz CIS is the Tubodo creek, tributary of the Managuyapa creek. To utilize this water source, a diversion dam was constructed on the creek. However this water source is not enough to irrigate the designed irrigable area of 89ha. To supply the additional irrigation water from the Managuyapa creek, an augmentation dam is proposed to be constructed on the creek. The feasibility study on the rehabilitation project of De La Paz CIS was prepared in 1989 by Iloilo PIO of NIA.

The Project Area

5.03 Natural Conditions

The project area is located in alluvial plain. Soil type of irrigation area is barotac loam.The climate of the project area is Type-III which is characterized by no very pronounced seasons with relatively dry from January to May and wet during the rest of the year. The mean annual rainfall is 606 mm, and average monthly rainfall is shown below :

(Unit : mm)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
74	33	31	33	112	155	189	164	185	186	164	98	1,420

5.04 De La Paz CIS has two water resources which are the Tubodo river as a main source and the Managuyapa river as a secondary. Monthly discharges of the both rivers at the intake site is shown below :

Monthly Discharge of Tubodo River

(Unit : l/s)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave
28	13	12	12	42	59	72	62	70	69	62	37	45

Monthly Discharge of Managuyapa River

(Unit : l/s)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave
143	64	61	64	217	301	366	318	360	352	319	189	230

5.05 Agriculture

The total number of farm households in the De La Paz CIS is 45, comprising 252 in population. Paddy cultivation is prevailing in the De La Paz CIS area. Out of 89 ha, 38 ha is under irrigated condition in wet season while 30 ha is irrigated in the dry season. Remaining 51 ha is under rainfed condition. HYV of IR 36 and 64 are commonly cultivated by broadcasting. The wet season paddy is planted in May to June and harvested in September to October. The dry season paddy is planted in October and harvested in March. Present cropping intensity is calculated at 134 percent. Average unit yield of irrigated paddy is estimated at 3.0 ton/ha in wet season and 2.9 ton/ha in dry season and that of rainfed paddy is estimated at 2.8 ton/ha. The total production of paddy is estimated at about 344 tons per annum. Average farm size in the De La Paz CIS is 2.0 ha per a farm household. The present farm economy is examined for a farm household with the average farm size as follows:

Gross farm income	
Annual crop production (ton)	7.71
Farmgate price (₱/ton)	5,700
Gross Value (₱)	43,964
Production cost (₱)	19,272
Net farm income (₱)	24,692

Major constraints of agricultural development in the De La Paz CIS area are as follows:

1) Lack of funds for farm inputs,
2) Shortage of agricultural labour,
3) High hired labour charge,

4) Insufficient post harvest facilities such as concrete floor, warehouse, farm to marketing road,
5) Insufficient farm inputs distribution systems, and
6) Insufficient extension services.

5.06 Existing Irrigation and Drainage System

The existing irrigation facilities in the De La Paz CIS are a diversion dam, a main canal and two lateral canals. Most of these facilities function well. As for the diversion dam, the structure itself is well maintained. However the upstream river banks are damaged by flood because the spillway of weir dose not have enough capacity to flow the flood discharge. The general features of the irrigation facilities are summarized below:

1)	Diversion Dam		
	Type of Weir	:	Ogee type concrete dam
	Length of Weir	:	13 m
	Height of Weir	:	2.9 m
2)	Main Canals		
	Length	:	3,600 m
	Nos of Structures	:	7 nos
3)	Lateral Canals		
	Nos of Lateral	:	2 nos
	Length	:	1,600 m

5.07 Irrigator's Association (IA)

Malakas IA has been organized for the operation and maintenance of the De La Paz CIS. Present members of the IA are 26 farmers, and 70 percent of the member is active. The tenurial status of IA's member is as follows:

1)	Owner Operator	:	6
2)	Amortizing Owner(CARP)	:	8
3)	Share Tenant	:	12
	Total	:	26

The farmers' petition endorsed by the local government units has already been submitted to NIA.

Irrigation Development Plan

5.08 Irrigation Water Requirements and Water Balance

Proposed cropping pattern is a double cropping of paddy with 166% intensity, composed of 100%(89 ha) in wet season and 66%(59 ha) in dry season. The service area by the water sources are proposed as follow.

Water Source	Wet Season	Dry Season
Tubodo River	33 ha	25 ha
Managuyapa River	56 ha	34 ha
Total	89 ha	59 ha

Based on this cropping pattern,diversion water requirements are estimated on a monthly basis as follow:

(Unit : l/sec/ha)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.99	0.34	-	-	0.62	1.60	0.61	0.72	0.27	0.62	0.72	0.77

5.09 In order to cross-check the adequacy of designed irrigable area, a water balance between the river discharge and estimated diversion water requirements is made on a monthly basis as follow:

(Unit : MCM)

Month	River Discharge			Div. Water Req'ts			Balance
	Tubodo	Managu-yapa	Total (1)	Tubodo	Managu-yapa	Total (2)	(1)-(2)
Jan	0.075	0.331	0.406	0.067	0.090	0.157	+0.249
Feb	0.030	0.125	0.155	0.021	0.028	0.049	+0.106
Mar							
Apr							
May	0.114	0.468	0.582	0.055	0.093	0.148	+0.434
Jun	0.153	0.629	0.782	0.137	0.233	0.370	+0.412
Jul	0.192	0.789	0.981	0.054	0.092	0.146	+0.835
Aug	0.167	0.686	0.853	0.063	0.108	0.171	+0.682
Sep	0.182	0.750	0.932	0.023	0.039	0.062	+0.870
Oct	0.185	0.759	0.944	0.041	0.056	0.097	+0.847
Nov	0.162	0.665	0.827	0.047	0.064	0.111	+0.716
Dec	0.099	0.408	0.507	0.052	0.070	0.122	+0.385

As a result of the water balance study, the river discharges is judged adequate to irrigate the designed irrigable area of 89 ha in wet and 59 ha in dry season.

5.10 Improvement Plan

The following additional irrigation facilities are required for restoration of irrigation area and achievement of the proper water distribution.

1) Augmentation Dam

Type	:	Checkgate Type
Width of Checkgate	:	10 m
Height of Checkgate	:	2.3 m

2) Augmentation Canal

Length of Canal	:	352 m
Nos of Structures	:	3 nos

3) Lateral Canal(Sub-lateral A-1)

Length of Canal	:	1,126 m
Nos. of structures	:	7 nos.

5.11 Project Cost

The project costs for the above improvement works are estimated below:

	Items	Cost (₱1,000)
1)	Augment Dam	460
2)	Augment Canal	22
3)	Lateral Canal A-1	72
4)	Others(Project Office)	135
	Total Direct Cost	689
5)	G.E.S.A.(12% of Direct Cost)	82.5
6)	Contingency (12% of Direct Cost)	82.5
	Total	854

Project Justification

5.12 Economic Internal Rate of Return

EIRR is calculated from the following economic benefits and costs :

Annual Incremental Benefits (₱1,000)	
-Net value under without project condition	1,227
-Net value under with project condition	1,716
-Incremental benefit	489

Economic Costs (₱1,000)	
-Total project cost	683
-Annual O & M cost	14
-Total cost	697

The EIRR of De La Paz CIS is estimated at 41 %.

5.13 Farm Budget Analysis

Farm budget analysis is made in order to assess the capacity to pay the amortization fee for the chargeable cost of the rehabilitation works and the operation and maintenance fee required. The farm budget is examined for a farmer with the average farm size as follows:

Items	Without Project(2.0 ha)	With Project(2.0 ha)
Farm income (₱)	43,964	61,503
Production cost (₱)	19,272	29,978
(Amortization fee (₱))	118	278
(Annual O&M fee (₱))	298	700
Net reserve (₱)	24,692	31,525

5.14 Socio-economic Impacts

A much improved social life-style and living standard of the community is expected with the advent of the irrigation system. No adverse effect of the project has yet been recorded.

5.15 Peace and Order Assessment

This community is very much accessible by land and peace keeping force is always present. This accounts for the peaceful situation in the area.

Conclusions and Recommendations

5.16 The Managuyapa creek has enough water source to supplement the irrigation water to De La Paz CIS area where the farmers are suffering from water deficit. The construction of the augmentation dam is essential to develop whole area of this CIS.

5.17 The proposed checkgate structure should be designed through the following detailed studies:

1) Analysis of bearing capacity at proposed dam axis based on the results of geological investigation.
2) Flood analysis including estimate of probable flood discharge and back water calculation.

PRE-FEASIBILITY SUMMARY DATA (5/10) | SUB-PROJECT: DE LA PAZ CIS | PROVINCE: ILOILO

GENERAL

Name of Sub-project:	DE LA PAZ CIS
Proposed Service Area:	89 ha

Region:	VI
Province:	Iloilo
Municipality:	Banate

Type of SSIDP:	
Topographic Condition:	Alluvial Plain
Availablity of F/S report:	Yes (1989)
Necessity of Rehabilitation:	Yes
Recent Rehabilitation	1987
Funding Source:	
Availability of	
topo-map(1/4,000):	Yes
engineering designs:	Yes

EXISTING IRRIGATION/DRAINAGE FACILITIES

Diversion Dam:	Yes
Diversion Channnel:	No
Main/Lateral Canal:	Yes (L = 5,200 m)
Field Diches:	Yes
Project /Farm Drain:	No
Access Road:	No
Service Road:	No
Flood Protection Dike:	No
Project Building:	No
Other Facilities :	No
Pumps:	
Siphon:	
Aqueduct:	
Bridge:	
Type of Diversion Dam:	Ogee type
Lining of main/lateral canal:	No

SOCIO-ECONOMIC DATA

Population:	252	Availability of	
Nos. of Household:	45	water supply:	Yes
Average Size of Household	5.6	power supply:	No
Nos. of Farm Household:	45	rice mill:	Yes
Nos. of Farm Beneficiaries:	45	storage facilities:	No

Agrarian Reform:	%
Area cultivated by owner operators and CARP amortizing owners:	54
Area still eligible for re-distribution:	46
Area listed under CARP:	90

SOIL CONDITION

Soil Type:	Barotac Loam
Land Classification	1R

METEOROLOGY/HYDROLOGY

Climatic Type: III | Annual Rainfall: 1,420 mm

Monthly Rainfall (unit:mm)

Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
74	33	31	33	112	155	189	164	185	182	164	98	1,420

Water Sources: Managupaya Creek | Catchment Area: 6.5 sq.km (at diversion point)

River discharge: (Supplemental water is taken from Tubodo creek). (unit:l/sec.)

Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Ave.
115	52	49	51	175	243	294	256	290	283	256	152	185

IRRIGATION DEVELOPMENT PLAN

Designed Irrigable Area:	Wet: 89 ha	Dry: 59 ha
Proposed Irrigation Intensity:	166 %	(wet + dry) / wet x 100
% of Area Restoration (CIS):	57 %	(Area restored / Service area) x 100
Diversion Water Requirement:	1.55 l/sec	
Farm Water Requirement:	0.78 l/sec/ha	
Drainage Water Requirement:	- l/sc/ha	

PROPOSED PROJECT WORKS

Irrigation/Drainage Facilities	New Construction	Rehabilitation
Diversion Dam		New augmentation weir & intake
Diversion Channel		
Earth Canal		
Lined Canal		
Main/Lateral Canal		New augmentation canal
Earth Canal		(concrete L = 320 m)
Lined Canal		& Lateral (L = 1,120 m)
Field Ditches		
Project/Farm Darins		
Service Road		
Access Road		
Flood Protection Dike		
Project Building		
Other Facilities		

PROJECT COST

Chargeable Cost			Non-Chargeable Cost		
Diversion Works	P	460,000	Flood Dike		-
Main/LateralCanals	P	94,000	Access Road		-
On-farm Facilities	P	-	Overheads	P	165,000
Others	P	135,000			
Total	P	689,000	Total	P	165,000
Per ha	P	7,740	Per ha	P	1,850
Total Project Cost (Financial):	Total P	854,000	Per ha P		9,590

PROJECT BENEFITS

Cropped Area without Project (ha)

	Irrigated			Rainfed			Total		
	Wet	Dry	Total	Wet	Dry	Total	Wet	Dry	Total
Paddy	38	30	68	51	0	51	89	30	119
Corn/Others	0	0	0	0	0	0	0	0	0
Total	38	30	68	51	0	51	89	30	119

Cropped Area with Project (ha)

	Irrigated			Rainfed			Total		
	Wet	Dry	Total	Wet	Dry	Total	Wet	Dry	Total
Paddy	89	59	148	0	0	0	89	59	148
Corn/Others	0	0	0	0	0	0	0	0	0
Total	89	59	148	0	0	0	89	59	148

Annual Net Production Values without Project (Px1,000)

	Paddy	Corn/Others	Total
Production (ton)	344	\\-	344
Farmgate Price (P/ton)	5,732	\\-	5,732
Gross Value P x 1,000	1,972	\\-	1,972
Production Cost	745	\\-	745
Net Value P x 1,000	1,227	\\-	1,227

Annual Net Production Values with Project (Px1,000)

	Paddy	Corn/Others	Total
Production (ton)	480	\\-	480
Farmgate Price (P/ton)	5,732	\\-	5,732
Gross Value(P '000)	2,752	\\-	2,752
Production Cost(P '000)	1,036	\\-	1,036
Net Value(P '000)	1,716	\\-	1,716

PROJECT JUSTIFICATION

Total Economic Cost (P1,000):	P 683
Annual Net Incremental Benefits (P1,000):	P 489
Annual O&M Cost (P1,000):	P 14
Project Life	50 years
Benefit Build-up Period	3 years
Economic Internal Rate of Return (EIRR)	41 %

FARM ECONOMY

Farm Size	Nos.	%	Average Farm Size:	2.0 ha	
<1.0	0	0	Annual Net Farm Income:		
1.0-2.0	27	60	without Project:	P	24,692
>2.0	18	40	with Project:	P	31,525
Total	45	100	Net Incremental Farm Income:	P	6,833

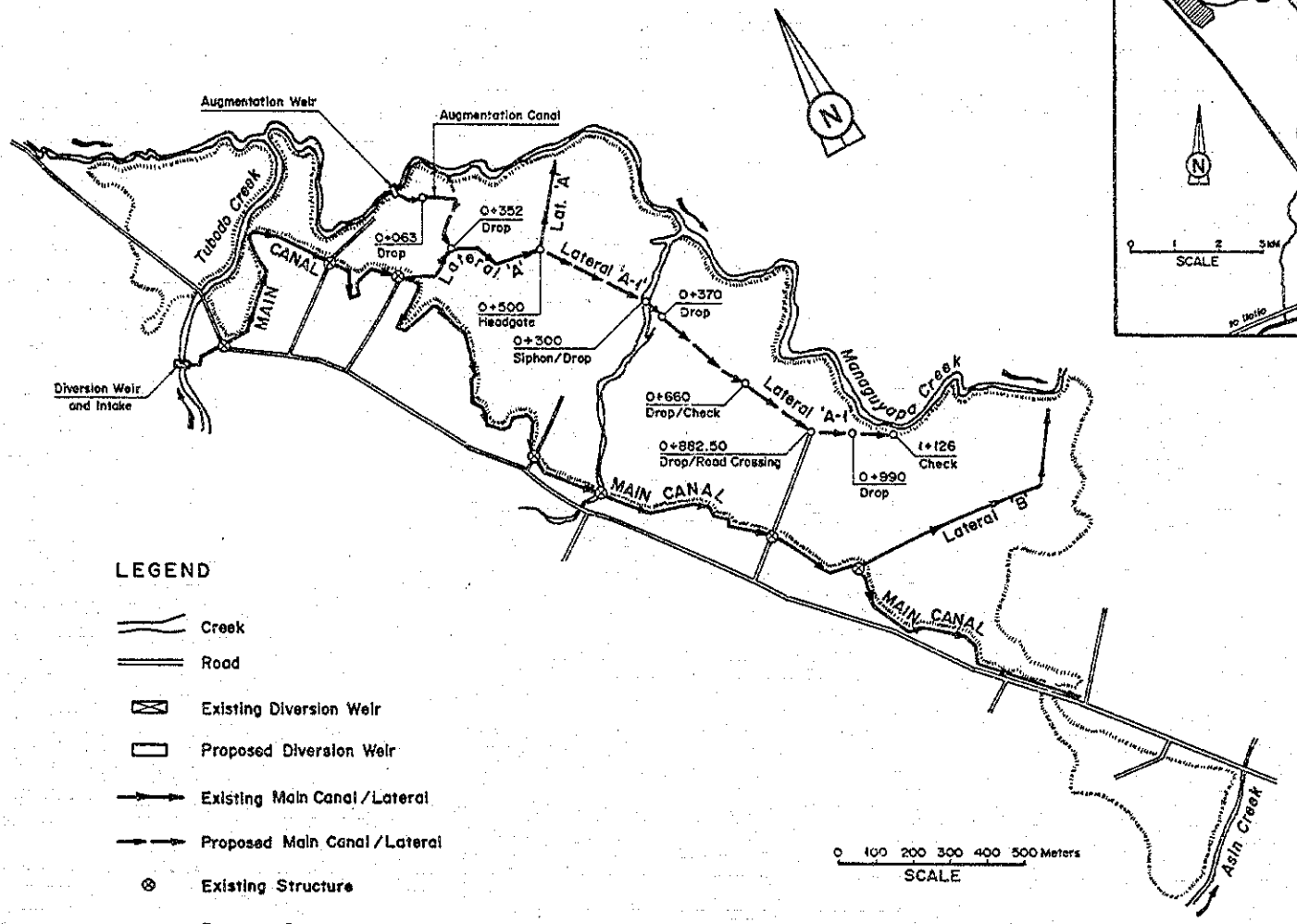
STATUS OF IA

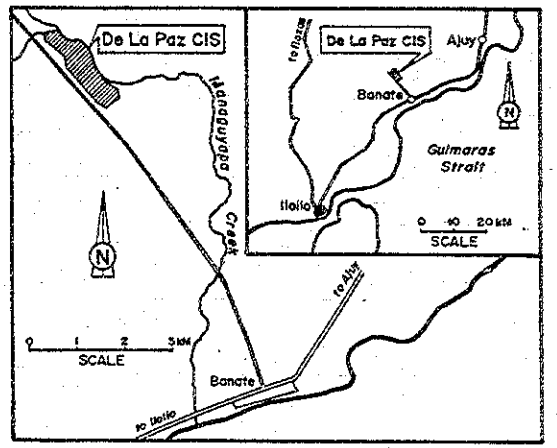
IA organized:	Yes
Name of IA:	Malakas
Date registered:	July 28, 1977
Nos. of IA Menbers:	26
IA Loan (x P1,000):	332

ENVIRONMENTAL ISSUES

Water pollution:	fair
Deforestation:	fair
Soil erosion:	fair
Sedimentation:	fair
Schistosomiasis:	little

PLATE NO.





LEGEND

- Creek
- Road
- Existing Diversion Weir
- Proposed Diversion Weir
- Existing Main Canal / Lateral
- Proposed Main Canal / Lateral
- Existing Structure
- Proposed Structure
- Limit of Designed Irrigable Area

Designed Irrigable Area

Wet Season : 89 ha

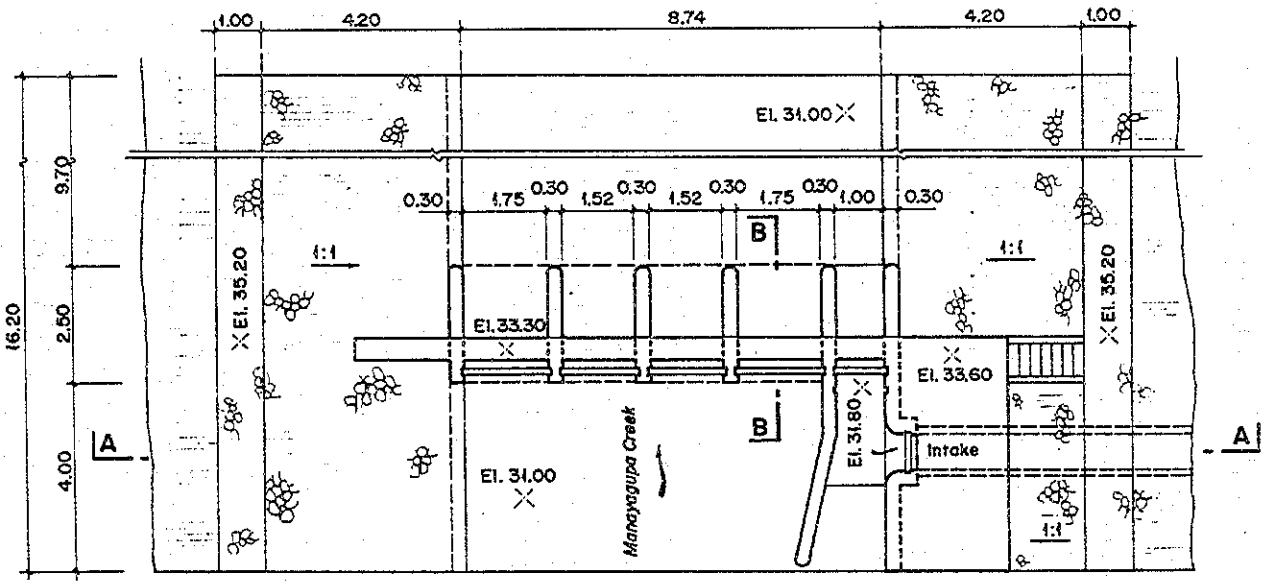
Dry Season : 59 ha

MASTER PLAN STUDY ON SMALL SCALE IRRIGATION DEVELOPMENT PROJECT

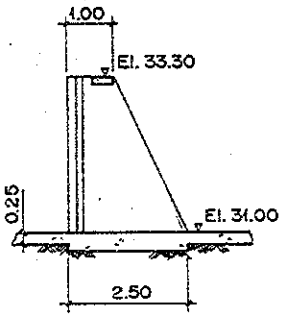
DE LA PAZ CIS (Iloilo Province), GENERAL LAYOUT

Japan International Cooperation Agency | August , 1991

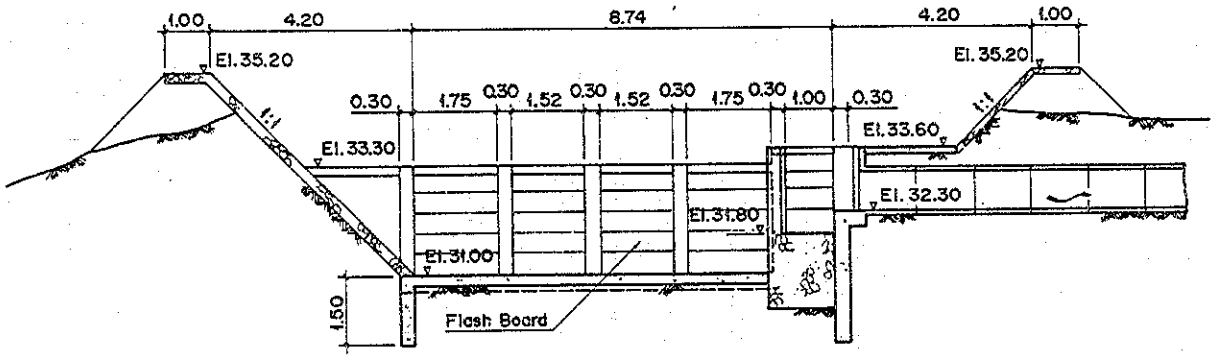
PLATE NO.



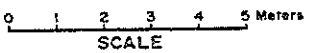
PLAN



SECTION B-B



SECTION A-A



MASTER PLAN STUDY ON SMALL SCALE IRRIGATION DEVELOPMENT PROJECT

DE LA PAZ CIS (Iloilo Province), AUGMENTATION WEIR

Japan International Cooperation Agency | October , 1991