8.33 Monitoring and Evaluation of IAs

Monitoring and evaluation remains to be an essential component of the institutional development of IAs. With this, the weaknesses, strengths and potentials of the IAs can be thoroughly evaluated and hence, corresponding measures can be determined. The following can help further strengthen the monitoring and evaluation of IAs:

(1) Define clearly the areas or sectors to be given emphasis and the criteria to be assessed; and

(2) Involve directly the IAs in various aspects of the monitoring and evaluation activities as well as provide for multi-sectoral insights in the evaluation process.

8.34 Generation of Equity and Collection of Amortization Fee

NIA's current policies on equity generation and collection of amortization fees are quite adequate. However, these areas still remain to be among the most common major problems of the IAs. To help ease this financial burden, the following measures are recommended:

(1) Ensure that a great portion, if not all the equity contribution, shall be in terms of labor input by the IAs;

(2) Corollary, make sure that at least the minimum wage requirement is observed and that the equity share to be deducted from the wage is not too large as to make the net daily income less attractive to the farmers;

(3) When the amortization problem is attributed to natural calamities and the IA requests for loan readjustment, immediately provide a new feasible repayment scheme taking into consideration both the IA's financial capability and NIA's budgetary standing; and

(4) In the long-run, consider the possibility of adopting a "combined incentive and penalty system" in the collection of amortization fee by providing discount on early or timely payment and penalty on late or non-payment.

8.35 Collection of Operation and Maintenance Fee

Like equity generation and amortization repayment, collection of operation and maintenance fee is also a major constraint besetting the IAs. To ease this problem, the following suggestions are offered:

(1) Conduct an intensive information campaign for O&M fee collection by means of reminders during regular IA meetings, individual notices to farmers containing details of amount due and, if possible, by radio broadcasts before and after the harvest seasons;

(2) Require the collectors to prepare their respective quotas and provide appropriate incentives based on collection performance; and

(3) For a perennially delinquent IA member, let the irrigation superintendent and/or other higher IA officials do the collection;

(4) Adopt an incentive scheme for advanced and timely payment of O&M dues and apply the penalty system only after all the persuasive type of measures failed.

8.36 Visions for IAs in the Future

The Study foresees bright prospects for the IAs with the successful implementation of SSIDP. The IAs shall not be forever staying in the O&M stage of communal irrigation development. Once they have attained a stable status under this stage, they will have no alternative but to go forward. In this case, the IAs are expected to undergo several stages of cooperative development. The speed by which they shall undergo these phases depends however on their resources and capabilities. The future prospective stages of cooperative development of the IAs are briefly discussed below:

Phase	Main Activity/Status
O&M Stage (1st to 2nd year)	Operation and maintenance of irrigation farm facilities
Pre-Cooperative Phase (3rd to 4th year)	Operation of a simple type of income generating activity like palay or inputs trading but no cooperative training yet
Cooperative Development Phase:	
Early Development Stage (5th to 7th year)	Operation of two or more income generating projects; undergone cooperative training and registered as a cooperative
Full Cooperative Stage (8th to 10th year)	Operation of medium to large-scale agro-based business ventures like rice mill operation and commercial livestock raising; undergone advanced cooperative training
Advanced Cooperative Stage (11th to 14th year)	Operation of large-scale agro-base processing and marketing ventures; federated with others IAs
Highly Advanced Cooperative Stage (15th to 20th year)	Multiple operation of business establishments; production of highly diversified exportable crops; and import/export and bank operation.

Cost Estimate for Institutional Development

8.37 The following components are considered in the cost estimates for institutional development:

(1) Institutional activities of IDOs for organization of IAs and training of IAs' member for proper operation and maintenance of the irrigation systems,

(2) Training of technical and administrative staff of RIOs/PIOs, and

(3) Construction and rehabilitation of office buildings and procurement of equipment and vehicles for RIOs/PIOs.

8.38 The SSIDP will be implemented with the farmers participatory approach. The institutional activities of IDOs who directly link NIA with IAs (item (1) above) always go with the construction of SSIDP. In this sense, the costs required for such activities are included in the cost estimates for the 10 year development plan as one of the major cost items (refer to Chapter X).

8.39 The items (2) and (3), are indirect requirements for implementation of SSIDP. Therefore, the costs estimates for these requirements are not included in the the 10 year development program, and are separately estimated as given in the following:

8.40 Cost required for Training of PIOs/RIOs staff

The cost required for field staff training is estimated at approximately ₱ 32million on a preliminary base as shown below:

(Unit: ₱ million)

	Training Course	Cost
(1)	Project Preparation	3
(2)	Project Construction/O&M	5
(3)	Institutional Development/IA	13
(4)	Others	4
	Sub-total	25
(5)	Price contingencies (4.4% per annum)	7
	Total	32

8.41 Cost required for Building and Equipment

The estimated costs for the building and equipment are ₱1,377 million in total as shown in Table 8-03 and are summarized below:

(Unit: ₱ million)

(1)	Building	61
(2)	Procurement	(1,098)
	1) Office equipment	8
	2) Survey equipment	41
	3) Const. equip. & vehicles	1,049
	Sub-total	1,158
(3)	Price Contingencies (4.4% per annum)	218
	Total	1,377

8.42 Annual Fund Requirement

The annual fund requirements for the strengthening of PIOs/RIOs are as follows (for details, refer to Annex-E):

Items	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Total
Training program	5	5	5	5	5	-	-	-	-	-	25
Building	61	-	-	-	-	-	-	-	-	-	61
Procurement	495	205	319	45	24	10	-	-	-	-	1,098
Price contingencies	77	39	78	15	10	6	-	-	-	-	225
Total	638	249	402	65	39	16	-	-	-	-	1,409

CHAPTER IX FRAMEWORK OF MASTER PLAN

Prospective Components of Master Plan

9.01 The Study is intended to provide the framework plan for overall communal irrigation development (for 50-500 ha range) which shall be reflected in the NIA Corporate Plan in the future, focussing on:

(1) 10 year development program which shall comprise:

- national development targets,
- strategies to attain the target,
- annual implementation schedule, and
- financial requirement for implementation.

(2) Program for strengthening and improvement of RIOs/PIOs through:

- establishment of the regional/provincial development target ,
- improvement of physical facilities and equipment,
- organizational improvement of PIOs in relation with RIOs/CO,
- improvement of working conditions for giving an incentive to PIEs,
- provision of necessary training programs for staff of PIOs, and
- establishment of monitoring and evaluation system.

(3) Program for institutional development of IAs for:

- strengthening of "farmers participatory approach" in implementation process of communal irrigation development,
- improvement of operation and maintenance by the IAs, and
- improvement of collection rate for CIS amortization.

(institutional strengthening of IAs is largely contingent on the capability and availability of IDOs at the project sites.)

Framework of 10 Year Development Plan

9.02 NIA's Development Target for CISs/CIPs (1990-2000)

Decisive factor for the 10 year development program will be the long-term national/ regional/provincial development target. NIA set forth the development target for 1990-2000 in the Corporate Plan, in which a total of 816,400 ha (new development: 420,700 ha, rehabilitation: 395,700 ha) is given as an official target for the communal irrigation development, inclusive of CARP-IC (see Table 9-01):

(Unit: 1,000 ha)

	New Development	Rehabilitation	Total
NIS/NIP	334.0	836.9	1,170.9
CIS/CIP	420.7	395.7	816.4
Total	754.7	1,232.6	1,987.3

The NIA's long-term development target is determined, particularly through the studies on (1) future demand and supply of rice, and (2) necessity of support services for promotion of CARP.

9.03 Supply and Demand Situations of Rice (1990)

Paddy production in the Philippines is approximately 9.46 million tons in total with an average unit yield of 2.83 tons/ha over the total paddy cultivation area of 3.34 million ha. Rice production is estimated at 5.65 million tons per annum, applying the average milling recovery of 66% and seeds/feeds/wastes of 9.5%. Demand for rice in the country is about 5.93 million tons, assuming that the total population is about 60.48 million and per capita consumption is 98.12 kg. The country is short of about 0.28 million tons of rice as of 1990.

9.04 Supply and Demand Forecast of Rice (2000)

The situation will go from bad to worse with years, unless special measures will be taken. The future supply and demand is forecasted for the year of 2000, assuming that the past trends for the production and consumption of rice will continue and the population will increase as projected on the basis of the 1990 census. The demand and supply of rice for 2000 are compared with those for 1990 as follows:

Demand and Supply Forecast for 2000
(without NIA Corporate Plan)

		1990	2000
Population	(million)	60.48	74.35
Rice Supply	(million tons)	5.65	5.73
Rice Demand	(million tons)	5.93	7.62
Surplus/Demand	(million tons)	-0.28	-1.89

9.05 NIA's Target and Increasing Demand of Rice

The NIA's development target for 1990-2000 will improve the supply and demand situations. NIA projected the supply and demand in 2000 as in the following, assuming that the development target mentioned in Para. 9.02 will be realized:

Demand and Supply Forecast for 2000
(with NIA Corporate Plan)

		1990	2000
Population	(million)	60.48	74.35
Rice Supply	(million tons)	5.65	8.13
Rice Demand	(million tons)	5.93	7.62
Surplus/Demand	(million tons)	-0.28	0.51

9.06 It is expected that NIA will provide the irrigation infrastructures to increase the rice productions from 5.65 million to 8.13 million tons per annum. Judging from the rice supply and demand projections, the NIA's efforts to realize the target would be needed and appreciated.

9.07 Development Target for SSIDP

The SSIDP covers about 70% of total CISs (existing systems) in area. It means that SSIDP is expected to contribute 70% against the above target of 816,400 ha (new development: 420,700 ha, rehabilitation: 395,700 ha), or about 571,000 ha in total (new development: 294,000 ha, rehabilitation: 277,000 ha).

9.08 Potential Candidate Sub-Projects against Development Target

The inventoried sub-projects are classified into the following three (3) priority groups as discussed in Chapter VII:

"A" Group:	sub-projects to be implemented	(CIS/CIP)
"B" Group:	sub-projects to be re-studied	(CIS/CIP)
"C" Group:	sub-projects to be newly investigated	(CIS/CIP)
Excluded from the Study:	no rehabilitation works are required	(CIS)

9.09 The number of the sub-projects finally listed as a result of the priority grouping process is 2,857 in total (CIP: 1,466, CIS: 1,391) which have a total irrigable area of 413,200 ha (CIP: 211,700 ha, CIS: 201,500 ha) as shown below:

Group	Nos. of sub-projects			Irrigable area (ha)		
	CIS	CIP	Total	CIS	CIP	Total
"A" Group	313	146	459	49,000	21,800	70,800
"B" Group	450	58	508	62,800	8,000	70,800
"C" Group	628	1,262	1,890	89,700	181,900	271,600
Sub-total	1,391	1,466	2,857	201,500	211,700	413,200
Excluded from the Study	1,032	0	1,032	150,300	0	150,300
Total	2,423	1,466	3,889	351,800	211,700	563,500

9.10 Development Target and Total Irrigable Area of Inventoried Sub-projects

The development target for SSIDP is compared with the total irrigable area of the candidate sub-project for the master plan:

	Development Target for SSIDP (1)	Total Irrigable Area of Candidate Sub-projects (2)	Deficit (1)-(2)
CIP	290,000	211,700	78,300
CIS	280,000	201,600	78,400
Total	570,000	413,300	156,700

Shortage of the candidate sub-projects is obvious against the expected development target for SSIDP. However, in case of CISs, there will be a sufficient number of the CIS sub-projects to catch up with the target, because 1,032 sub-projects with a total area of 150,300 ha which do not require the rehabilitation works at present and are tentatively excluded from the master plan, may be included in future, probably in the latter part of the master plan period. In case of CIPs, more candidate sub-projects will have to be identified.

9.11 Provincial Development Target

In the master plan, the provincial program to promote the identification of the potential new sub-projects will be included to catch up with the targets. The potential sub-projects to be identified during the master plan period, are referred to as "D" group sub-projects.

9.12 The provincial development target is determined by using the allocation formula given in Table 9-02. The calculated provincial targets are given in Table 9-03

(CIPs) and Table 9-04 (CISs). The provincial targets are compared with the total irrigable areas of the presently-listed sub-projects in each province. In case that the provincial target is larger than the total irrigable area, PIO will have to identify the the "D" group sub-project to meet the provincial target and the difference between the two will be the target area of "D" group. In case that the provincial target is equal to or smaller than the total irrigable area, PIO will not have to identify the "D" group sub-project to meet the provincial target. Among 74 provinces, 49 provinces will need to identify the "D" group sub-projects as shown in Tables 9-05 (CIPs) and Table 9-06 (CISs).

9.13 Strategies to Attain the Development Target

In order to attain the development target, all of the inventoried sub-projects ("A", "B" and "C" groups) will be included in the 10 year development program, irrespective of readiness for implementation. The program will also indicate the provincial target areas for identification of the "D" group sub-projects. The development program for "A", "B", "C" and "D" groups will be prepared at the provincial level, including the time schedule and fund requirement for the investigation, studies and engineering designs of "B", "C" and "D" groups. The conceptual strategies to attain the development target is illustrated on the next page.

9.14 The development target for SSIDP is based on the NIA's target for communal irrigation development . The NIA's target for 1990-2000 is about 2.6 times larger for CIPs and 1.9 times for CISs, compared to the actual accomplishment during the last decade 1980-1989 (Table 9-07 to be referred). The development target is rather ambitious. The following, among others, will be required to attain the target:

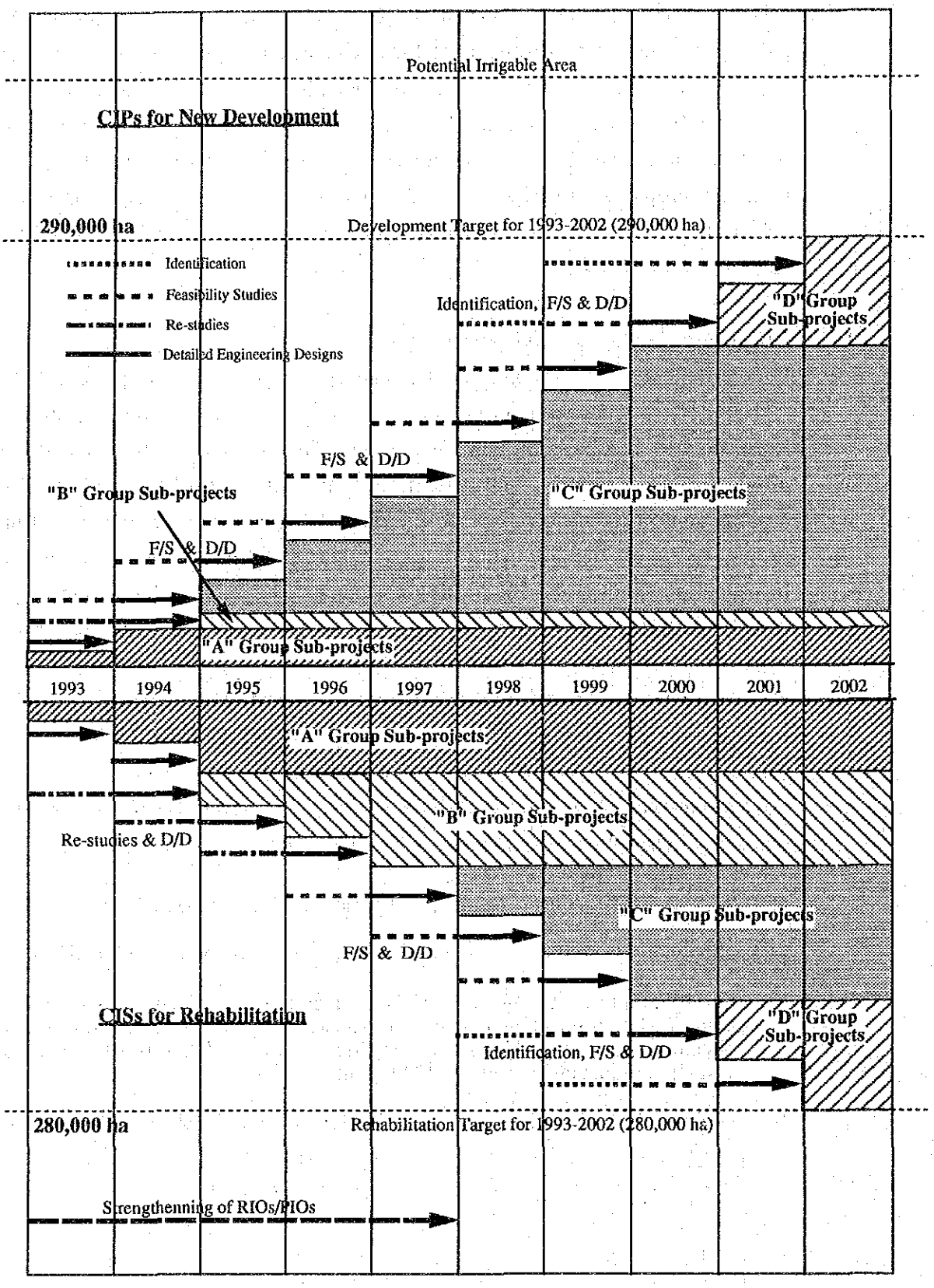
(1) Preparation of realistic development program at the provincial level,

(2) Strengthening and improvement of implementing capability of PIOs/RIOs,

(3) Improvement of administrative and managerial capacity of NIA, including introduction of the computerized database system particularly for evaluation of the proposed sub-projects, preparation of annual development program, effective financial control and PBMS, and

(4) Arrangement of funding sources for implementation of development program.

CONCEPTUAL STRATEGIES TO ATTAIN THE TARGET



Strengthening of RIOs and PIOs

9.15 The implementing capability of the field offices, particularly the PIOs, shall be strengthened by focusing assistance on the three basic areas; namely, (1) personnel complement and organizational improvement, (2) facilities and logistics support and (3) funding. The first two factors are heavily dependent on the third one. An adequate and timely presence of these factors combined with a strong political will and absence of natural disturbances will help ensure the successful implementation of the 10 year development program.

9.16 The Study offers the following initial recommendations :

Personnel

(1) Fill-up vacant technical positions in PIOs like engineers, economists, and institutional development officers and irrigation technicians based on urgent requirements; give utmost priority to the recruitment of those NIA personnel who have been temporarily laid-off;

(2) Upgrade the salaries of permanent staff personnel according to the government's salary standardization program;

(3) Provide a more attractive compensation package to project contractual personnel and other temporary employees like project-in-charges and IDOs;

(4) Upgrade training program and provide a more balance allocation of training slots between RIOs and PIOs based on their current training status and needs.

Organizational/Operational

(5) Ensure a better coordination of activities and cultivate more rapport among project preparation staff (engineer, economists), project-in-charge (construction) and IDOs;

(6) Gradually increase the participation or authority of the PIOs/RIOs in the bidding and packaging of the sub-project and other activities relative to project implementation;

(7) Provide periodical adjustment in the limit of authority of the PIEs to procure spare parts for equipment and vehicles based on current market prices;

Facilities and Logistics

(8) Furnish the PIOs with more survey and construction equipment and vehicles, and rehabilitate or construct the office buildings, workshops and garages to meet the increasing work volume;

(9) Conduct a periodical inventory of facilities, equipment and vehicles in order to keep abreast of their current status and priority needs for repair/replacement;

(10) Give attention to proper O&M of such facilities, equipment and vehicles.

Funding

(11) Given limited fund allocation, adopt a workable phasing of construction activities but without sacrificing structural quality;

(12) Seek other sources of temporary financing for project construction activities (until DBM's fund allocation is actually released) like the NIA's Corporate Fund, government and private commercial banks and non-government organizations so as to commence construction work from January to June which is the ideal construction period and be assured of adequate supply of construction materials;

(13) Establish a regular seed fund for investigation and survey of proposed projects which would be replenished once project funds are available for continuity of such activities; and

(14) Minimize the part of project funds (between 20% to 30%) that is regularly allocated for budgetary reserve fund, management fees and general overhead surcharges and instead, provide more allotment directly to project construction works.

9.17 Institutional Strengthening of Central Office/NIA

The institutional strengthening of the RIOs and PIOs should be complemented with similar capability building at the NIA/C.O.to further ensure the successful implementation of SSIDP. In this regard, the Study has the following suggestions:

(1) Strongly pursue the establishment of a Communal Irrigation Department which shall over-see the planning, implementation, and O&M (including continuous inventory) of CISs and CIPs;

(2) Provide this department with an adequate number of qualified (academic and experience-wise) and appropriately trained staff personnel; and

(3) Establish a computerized database system for CISs and CIPs at the central office which, in the long-run, shall be hooked up with the RIOs and PIOs.

Institutional Development of IAs

9.18 The capability of the IAs to participate in the project implementation shall be strengthened by focusing also on the personnel/organizational, facilities and logistics and funding aspects. The institutional strengthening of IAs is largely contingent on the capability and availability of IDOs in the project areas.

9.19 Suggestions on this aspect are as follows :

Personnel/Organizational

(1) Give continuous emphasis on the uniqueness of a CID project vis-a-vis other government projects; i.e., its participatory approach, self-liquidating or non dole-out mechanism and timeliness in relation with the poverty alleviation and economy measures of the Philippine government;

(2) Avoid over-dependency of IAs on the IDOs and/or prevent the tendency of IDOs to provide "baby-treatment" to the IAs; encourage the IAs to handle a bigger share of the task or responsibility of any given project activity once some capability on their part is already identified;

(3) Assess IA's weaknesses, strengths and potentials in so far as their management and operational capabilities are concerned and provide appropriate training correspondingly.

Facilities and Logistics / Funding

(4) In line with the self-improvement policy, encourage IAs to procure, on a gradual and priority need basis, basic facilities and logistics for their operation, taking into consideration their own financial resources and available funding assistance; and

(5) Provide access to other government and private agencies/institutions that could provide technical, financial and other forms of assistance.

CHAPTER X IMPLEMENTATION SCHEDULE AND COST ESTIMATES

Implementation Schedule of 10 Year Development Program

10.01 Basic Concept for Implementation Schedule

The implementation schedule of the 10 year development program is prepared under the following basic concept:

(1) The implementation schedule shall cover 10 years from 1993 to 2002;

(2) The NIA Corporate Plan gives the 10 year development target for the CISs/CIPs. The existing SSIDP corresponds to about 70% of the CISs in terms of total net irrigable area. The development target of SSIDP is therefore fixed at about 70% of the targets for CISs/CIPs;

(3) The SSIDP is a kind of CISs/CIPs and therefore shall be implemented under the present institutional framework and implementation procedures for the communal irrigation development;

(4) The 10 year development program shall be implemented on the provincial basis; and

(5) The implementation of SSIDP shall be accompanied with strengthening and improvement programs for PIOs/RIOs as well as for IAs. Administrative and managerial capacity of the NIA central office shall also be improved for smooth implementation of the master plan.

10.02 Implementation Schedule of 10 Year development Program

The implementation schedule is prepared on the provincial basis under the following conditions (see the figure on the next page):

(1) Development priority of sub-projects shall be given in the order of "A", "B", "C" and "D" groups until a total area of these sub-projects meet the provincial target area;

(2) "A" group sub-projects shall be constructed as many as possible during the first 5 years ;

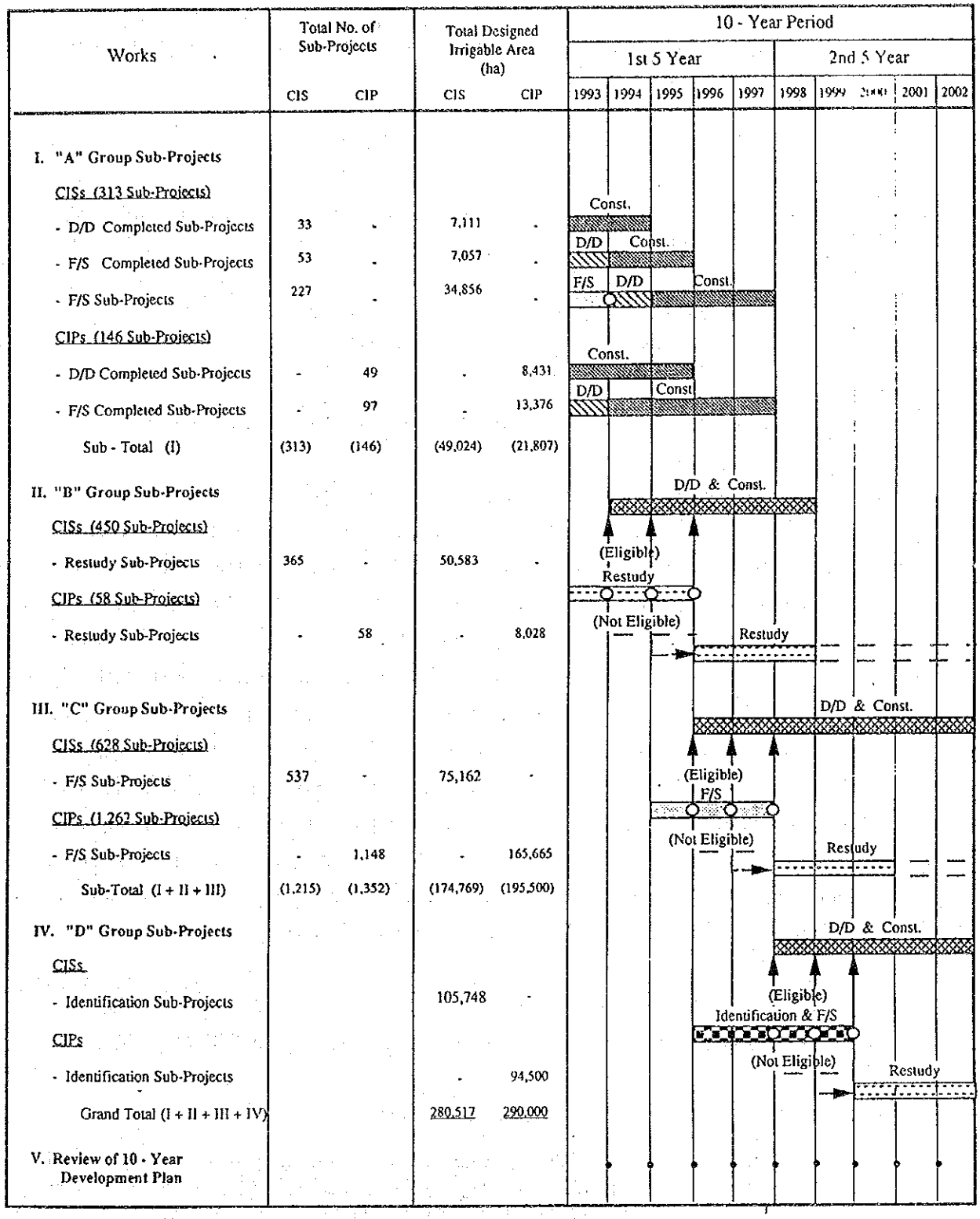
(3) The "B" group sub-projects shall be re-studied, and after the re-study, only qualified ones are to be implemented;

(4) For sub-projects which have not been fully studied yet ("C" group), feasibility studies (F/S) shall be carried out, and after these studies, only qualified ones are to be implemented;

(5) The above re-studies and feasibility studies shall be conducted as many as possible during the first 5 years;

GENERAL CONCEPT OF IMPLEMENTATION SCHEDULE

Works	Total No. of Sub-Projects		Total Designed Irrigable Area (ha)	
	CIS	CIP	CIS	CIP
I. "A" Group Sub-Projects				
CISs (313 Sub-Projects)				
- D/D Completed Sub-Projects	33	-	7,111	-
- F/S Completed Sub-Projects	53	-	7,057	-
- F/S Sub-Projects	227	-	34,856	-
CIPs (146 Sub-Projects)				
- D/D Completed Sub-Projects	-	49	-	8,431
- F/S Completed Sub-Projects	-	97	-	13,376
Sub - Total (I)	(313)	(146)	(49,024)	(21,807)
II. "B" Group Sub-Projects				
CISs (450 Sub-Projects)				
- Restudy Sub-Projects	365	-	50,583	-
CIPs (58 Sub-Projects)				
- Restudy Sub-Projects	-	58	-	8,028
III. "C" Group Sub-Projects				
CISs (628 Sub-Projects)				
- F/S Sub-Projects	537	-	75,162	-
CIPs (1,262 Sub-Projects)				
- F/S Sub-Projects	-	1,148	-	165,665
Sub-Total (I + II + III)	(1,215)	(1,352)	(174,769)	(195,500)
IV. "D" Group Sub-Projects				
CISs				
- Identification Sub-Projects			105,748	-
CIPs				
- Identification Sub-Projects			-	94,500
Grand Total (I + II + III + IV)			280,517	290,000
V. Review of 10 - Year Development Plan				



LEGEND :

- : Identification & F/S
- : F/S
- : Restudy
- : Evaluation of Sub-Project
- : D/D
- : Construction / Rehabilitation
- : D/D & Construction

(6) Periods for feasibility study or re-study, detailed design, and construction shall be as follows (these works shall be continuously carried out without any suspension);

Feasibility study/re-study	:	1 year
Detailed design	:	1 year
Construction	:	2 years

(7) Institutional activities shall start from the detailed design stage and ends at the fifth year from the commencement as follows; and

Detailed design stage	:	1 year
Construction stage	:	2 years
O/M stage	:	2 years
Total	:	5 years

(8) The implementation schedule shall be annually reviewed and revised.

10.03 Provincial Development Targets and Grouping of Sub-projects

NIA figures out the development target only at the national level; therefore, the national development target was allocated to each province, considering the potential irrigable areas at the provincial level (refer to Table 9-02). The allocated provincial development targets should be conform with the total areas of the inventoried sub-projects at the provincial level. However, the provincial target areas are virtually different from the total area of the inventoried sub-projects; therefore, minor adjustment was made in area and number of the "B", "C" and "D" sub-projects at the provincial level to meet the allocated provincial development targets; in case that a total area of the sub-projects is less than the provincial development target, a shortage of the area is covered by the "D" group sub-projects, and on the other, in case that the total area exceeds the development target, an excess of the area is deducted from "B" and/or "C" sub-projects, as shown below:

Provincial development target (ha)	: PDT
Total irrigable area of the inventoried sub-projects ("A", "B" and "C")	: TIA

PDT = TIA	:	No adjustment is required;
PDT > TIA	:	The "D" sub-projects are required to meet the provincial development target (PDT). The "D" sub-projects will cover the area of (PDT - TIA); and
PDT < TIA	:	The difference in area (TIA - PDT) is deducted from the total irrigable areas of "B" and/or "C" sub-projects to meet the provincial development target (PDT).

10.04 Adjusted Provincial Development Target

The adjusted development target of the 10 year development program is as follows:

(Unit: nos of sub-projects)

Group	CISs		CIPs		Total	
"A"	313	(16%)	146	(7%)	459	(11%)
"B"	365	(18%)	58	(3%)	423	(10%)
"C"	537	(27%)	1,148	(44%)	1,685	(43%)
"D"	760	(39%)	710	(34%)	1,470	(36%)
Total	1,975	(100%)	2,062	(100%)	4,037	(100%)

(Unit: ha)

Group	CISs		CIPs		Total	
"A"	49,024	(17%)	21,807	(7%)	70,831	(12%)
"B"	50,583	(18%)	8,028	(3%)	58,611	(10%)
"C"	75,162	(27%)	165,665	(57%)	240,827	(43%)
"D"	105,748	(38%)	94,500	(33%)	200,248	(35%)
Total	280,517	(100%)	290,000	(100%)	570,517	(100%)

10.05 Provincial Implementation Schedules

The provincial implementation schedules are prepared on the basis of the allocated provincial development targets, considering the implementing capability of each PIO. The implementation schedules of the 10 year development programs for 74 provinces, coupled with the annual fund requirements, are given in Annex-I.

10.06 Annual Development Schedule

Annual development targets of the 10 year development program at national level is summarized below (for details, see Tables 10-01 to 02):

(unit : ha)

Year	"A" Group			10 Year Program		
	CISs	CIPs	Total	CIS	CIP	Total
1993	3,232	3,658	6,890	3,232	3,658	6,890
1994	6,710	8,691	15,401	6,710	8,691	15,401
1995	13,201	6,736	19,937	23,060	23,005	46,065
1996	13,802	2,214	16,016	38,353	37,192	75,545
1997	5,912	508	6,420	38,508	38,369	76,877
1998	2,509	0	2,509	38,947	38,392	77,339
1999	1,441	0	1,441	38,225	39,734	77,959
2000	1,381	0	1,381	37,937	42,394	80,331
2001	794	0	794	37,269	40,023	77,292
2002	42	0	42	18,276	18,542	36,818
Total	49,024	21,807	70,831	280,517	290,000	570,517

10.07 Implementation Schedule for Institutional Development

The 10 year development program will be implemented by the PIOs under supervision of the respective RIOs. NIA has repeatedly emphasized the importance of the institutional development of the PIOs. The master plan study offers broad recommendations for institutional building-up and strengthening of PIOs. It is hoped that NIA will prepare the detailed action program in line with the recommendations and will realize such institutional development of PIOs in parallel with the implementation of the SSIDP program. In Chapter VIII, the suggested annual programs for institutional development are prepared on a preliminary basis.

Project Cost Estimates

10.08 Items of Cost Estimates

The costs required for the implementation of the 10 Year Development Plan for 1993-2002 include (1) construction costs of irrigation and drainage facilities ,(2) costs for pre-engineering activities ,i.e. feasibility studies, re-studies and designs, (3) costs for institutional activities of PIOs, and (4) price contingencies.

10.09 Condition of Cost Estimates

The financial investments costs for the 10 year development program are estimated on the following basic assumptions:

(1) The cost estimate is made at 1990 current price level in Pesos;

(2) The construction works are carried out on the NIA's force account basis including Pacquiao contract;

(3) The 10 year development program is implemented in accordance with the proposed implementation schedules; and

(4) Pre-engineering and institutional activities are carried out in accordance with the existing NIA' guidelines and criteria.

10.10 Construction Costs of Irrigation and Drainage Facilities

The financial construction costs of irrigation/drainage facilities are estimated for the following items, based on the following procedures and assumptions:

(1) Direct Costs

Direct costs include the construction costs of the following facilities;

Chargeable cost	Non-chargeable cost
(a) Diversion weir with intake	(h) Flood protection dike
(b) Diversion channel	(i) Access road
(c) Main/lateral canals	
(d) Field ditches	
(e) Project/farm drains	
(f) Drainage ditches	
(g) Service road	

(2) The construction costs of all the"A" group sub-projects estimated by NIA are updated to those at 1990 current price, applying the NIA' conversion rates;

(3) The construction costs of all the"B","C" and "D" group sub-projects are estimated on a per-ha basis, by applying an average cost per ha of all the"A" group sub-projects, i.e. ₱10,848/ha for CISs and ₱43,994/ha for CIPs;

(4) Indirect costs include the following non-chargeable costs; (a) costs for G.E.S.A.(General Engineering Supervision and Administration) and (b) physical contingencies. The cost for G.E.S.A. is estimated at 12% of direct construction costs. Physical contingencies are estimated at 12% of direct construction costs. Costs for G.E.S.A.of RIOs/PIOs and physical contingencies are combined as overhead and are included in the project costs; and

(5) The project costs are defined as a sum of the direct costs and indirect costs.

10.11 Costs for Pre-Engineering Activities

The pre-engineering activities include the feasibility studies and detailed engineering designs. The costs for the pre-engineering activities are estimated based on the past experience of NIA as follows:

(1) feasibility studies or re-studies	: ₱ 1,500/ha
(2) detailed design	: ₱ 70,000/ sub-project

10.12 Costs for Institutional Activities

The farmers' participatory approach is emphasized in implementation of SSIDP. The IDOs who directly link the PIOs with the IAs, will therefore play an important role for successful implementation of the SSIDP. In this sense, the cost required for the institutional activities of the IDOs are included in the development costs. The IDOs are generally assigned to the sub-project sites for 5 years from design stage to for O&M stage. The costs required for such institutional activities of the IDOs for 5 years are estimated, based on the experiences of NIA, to be ₱300,000 per sub-project for new construction (CIPs) and ₱150,000 for rehabilitation (CISs).

10.13 Price Contingencies

Price escalation rate is estimated at 7% per annum for local currency component based on the data obtained from the 1990 Philippine Statistical Yearbook. No price escalation is considered for foreign currency component. According to the the pre-feasibility studies on the representative sample sub-projects, the average project costs consist of 37% foreign currency component and 63% local currency component. The price escalation is therefore averaged at 4.41% per annum. The price contingencies are estimated based on this average rate.

Fund Requirements for 10 Year Development Plan

10.14 Total Fund Requirements

The total fund requirements for the implementation of the 10 Year Development Plan (CISs: 280,500 ha, CIPs: 290,000 ha) are estimated at about ₱ 25.5 billion in total, consisting of ₱3.9 billion for CISs, ₱13.9 billion for CIPs and ₱7.7 billion for price contingencies for 10 years of 1993-2002:

(unit: ₱ million)

Cost Items	"A" Group CISs	"A" Group CIPs	"A" Group Total	10 Year Program CIS	10 Year Program CIP	10 Year Program Total
Nos. of Sub-projects	313	146	459	1,975	2,062	4,037
Total irrigable areas (ha)	49,024	21,807	70,831	280,517	290,000	570,517
Project costs estimates						
(1) Feasibility studies	52	-	52	401	404	805
(2) Engineering designs	20	7	27	137	142	279
(3) Institutional activities	47	52	99	318	628	946
(4) Construction	532	951	1,483	3,024	12,751	15,775
Subtotal	651	1,010	1,661	3,880	13,925	17,805
Price contingencies	184	213	397	1,633	6,035	7,668
Total	835	1,223	2,058	5,513	19,960	5,473

(for details, see Table 10-03)

Total fund requirements at the provincial and regional levels are compiled in Annex-I. Summary of these fund requirements at the regional level is shown in Table 10-04.

10.15 Costs required for Institutional Development

In addition to the above fund requirements, the following costs are additionally required for institutional development of PIOs:

(unit: ₱ million)

Items	"A" Group	10 Year Program
(1) Training of PIO Staff	25	25
(2) Improvement of PIO's buildings	48	61
(3) Procurement of:		
1) Construction Equipment	438	1,049
2) Survey Equipment	37	41
3) Office Equipment	7	8
Sub-total	555	1,184
(4) Price Contingencies	82	225
Total	637	1,409

(for details, refer to Table 8-01 and 8-04)

10.16 Chargeable Costs and Non-Chargeable Costs

The total construction costs (₱15.77 billion) are divided into chargeable costs and non-chargeable costs. The total chargeable costs are estimated at ₱11.92 billion or

76% of the total construction costs, and the non-chargeable costs are ₱3.85 billion or 24% of the total construction costs:

(unit: ₱ billion)

Items	CISs	CIPs	Total
Chargeable Costs	2.26 (75%)	9.66 (76%)	11.92 (76%)
Non-chargeable Costs	0.76 (25%)	3.09 (24%)	3.85 (24%)
Total	3.02 (100%)	12.75 (100%)	15.77 (100%)

Annual Fund Requirements

10.17 The annual fund requirements at the provincial level are prepared based on the provincial implementation schedules, and those at the regional level are prepared from the provincial fund requirements. Those fund requirements are compiled with the implementation schedules in Annex-I. Summary of regional annual fund requirements is shown in Table 10-05. The annual fund requirements at national level are shown in Table 10-06 and summarized as follows:

(1) 10 Year Development Program

(Unit: ₱ billion)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Total
(1) Development Costs	0.33	0.64	1.47	2.28	2.36	2.40	2.44	2.44	2.27	1.17	17.80
(2) Price Contingencies	0.04	0.12	0.35	0.67	0.83	0.99	1.16	1.32	1.38	0.80	7.67
Total	0.37	0.76	1.82	2.95	3.19	3.39	3.60	3.76	3.65	1.97	25.47

(2) Implementation of "A" Group Sub-projects

(Unit: ₱ billion)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Total
(1) Development Costs	0.25	0.50	0.46	0.26	0.10	0.04	0.02	0.02	0.01	0.00	1.66
(2) Price Contingencies	0.03	0.09	0.11	0.08	0.04	0.02	0.01	0.01	0.01	0.00	0.40
Total	0.28	0.59	0.57	0.34	0.14	0.06	0.03	0.03	0.02	0.00	2.06

Annual O&M Cost

10.18 The annual operation and maintenance (O&M) costs of all the candidate sub-projects in the 10 Year Development Plan are estimated at 2% of total construction costs of ₱ 15.77 billion. The total O&M costs at full development stage will be ₱315 million in total, consisting of ₱60 million for CISs and ₱255 million for CIPs.

CHAPTER XI PROJECT JUSTIFICATION

General

11.01 In this Chapter, the 10 year development program is evaluated as a whole, in accordance with the proposed implementation schedule, through calculation of economic internal rate of return (EIRR), farm budget analysis of typical farm models and studies on the expected socio-economic impacts to be induced by implementation of the program. The evaluation is also made for the "A" group sub-projects which are qualified for implementation and are likely to constitute a first package for implementation as Phase-I of the SSIDP.

11.02 The 10 year development program includes a total of 4,037 sub-projects (CISs: 1,975, CIPs: 2,062), out of which 459 sub-projects (CISs: 313, CIPs: 146) are classified as the "A" group as shown below:

(Unit: nos of sub-projects)

Group	CISs		CIPs		Total	
"A"	313	(16%)	146	(7%)	459	(11%)
"B"	365	(18%)	58	(3%)	423	(10%)
"C"	537	(27%)	1,148	(56%)	1,685	(43%)
"D"	760	(39%)	710	(34%)	1,470	(36%)
Total	1,975	(100%)	2,062	(100%)	4,037	(100%)

Economic Evaluation

11.03 Basic Assumptions

The economic evaluation was carried out on the following basic assumptions:

(1) The 10 year development program as well as the "A" group sub-projects will be implemented in accordance with the schedules proposed in Chapter X;

(2) The economic useful life of the individual sub-projects will be 50 years after completion of construction;

(3) All prices are fixed at the average constant prices of 1990. The exchange rate of US$1.0=₱27.5=¥140.0 as of December 1990 will be used;

(4) For estimation of the economic costs, the price contingencies, taxes and other transfer payments are excluded from the estimated financial costs, and the

financial costs are further shadow-priced at 1.25 for foreign currency portion, 0.6 for unskilled labor and 1.0 for other local costs;

(5) The double cropping of paddy will be considered under future condition with project, and only direct benefits accrued from the increased paddy production by irrigation development will be calculated as economic benefits; and

(6) The irrigation benefits will gradually increase during the build-up period of 3 years after completion of construction. Cost and benefit estimates will be based on the implementation schedules (1993-2002) given in Chapter X.

11.04 Definition of Economic Benefits

The irrigation benefits are primarily derived from the increased paddy production attributable to a stable irrigation water supplies. These benefits are estimated as the difference of the annual net crop production values under with and without project conditions. The net crop production value is defined as the difference between the gross production value and crop production costs.

11.05 Increase of Irrigation Area

The irrigation areas will be drastically increased from 385,400 ha to 1,072,600 ha with the implementation of the "10 year development program" (for details, see Table 11-01)

(unit: 1,000 ha)

	"A" Group	10 Year Program
without project condition		
(1) Irrigated (wet season)	35.3	212.2
(2) Irrigated (dry season)	28.9	173.2
(sub-total)	(64.2)	(385.4)
(3) Rainfed	35.5	358.3
Total	99.7	743.7
with project condition		
(1) Irrigated (wet season)	70.8	570.5
(2) Irrigated (dry season)	63.0	502.1
Total	133.8	1,072.6
Increased Irrigation Area	69.6	687.2

11.06 Increase of Paddy Production

The increased paddy production under the future condition with the "10 year development program" is estimated to be 1.53 million tons as follows (for details, see Table 11-02):

(unit: 1,000 tons)

	"A" Group	10 Year Program
Without project condition	329	2,362
With project condition	484	3,892
Increased paddy production	155	1,530

11.07 Annual Incremental Benefits

The annual benefits (net incremental production values per annum) are estimated to be about ₱ 5.5 billion for the 10 year development program as a whole and ₱ 0.56 billion for the "A" group sub-projects, on the assumption that (1) the economic farm gate price of paddy is ₱6,000 per ton (see Table 11-03), and (2) the crop production costs are 40% of the estimated gross production value:

(unit: ₱ million)

	"A" Group	10 Year Program
Without project condition		
(1) Gross production value	1,972	14,175
(2) Total production costs	789	5,670
(3) Net production value	1,183	8,505
With project condition		
(1) Gross production value	2,902	23,354
(2) Total production costs	1,161	9,342
(3) Net production value	1,741	14,012
Annual benefits (Net incremental production value)	558	5,507

(for details, refer to Table 11-04)

11.08 Standard Conversion Factor

The financial costs are converted to the economic costs by multiplying a standard conversion factor of 0.8 which is defined as a ratio of economic cost over financial costs and is determined by deducting transfer payments such as taxes, duties,

subsidies and interests from the financial costs, and further by applying the fixed shadow price rates of 1.25 for foreign currency portion, 0.6 for unskilled labor and 1.0 for other local costs. The standard conversion factor of 0.8 is determined based on the pre-feasibility studies on the representative sample sub-projects.

11.09 Economic Costs

The financial costs consist of those costs for (1) construction of irrigation facilities, (2) pre-engineering activities including feasibility studies, re-studies and detailed designs, (3) institutional activities by IDOs and (4) general engineering supervision and administration. The annual O&M costs are assumed to be 2% of the total costs.

11.10 The economic construction and O&M costs are calculated on the basis of the above assumptions:

(unit: ₱ million)

	"A" Group	10 Year Program
Economic Project Costs	1,387	14,872
Economic O&M Costs (per annum)	28	298

11.11 Economic Internal Rate of Return (EIRR)

Net present value (NPV), benefit-cost ratio (B/C) and economic internal rate of return are calculated for assessment of the economic viability of both "10 year development program" and "A" group sub-projects. These economic viability factors are calculated on the basis of the projected annual flows of the economic costs and benefits (see Tables 11-05 and 11-06). The calculated economic internal rates of return (EIRR) are as high as 26.7% for the 10 year development program and 29.0% for the "A" group sub-projects. The NPV and B/C at the discount rate of 10% also indicate high economic viability of the SSIDP:

	"A" Group	10 Year Program
NPV (at discount rate of 10%)	₱2,728 million	₱19,035 million
B/C (at discount rate of 10%)	3.6	3.3
EIRR	29.0%	26.7%

Financial Justification from Farmer's Viewpoint

11.12 Average Farm Size

In the inventory survey, all PIOs were asked to fill out the available data on the average size and distribution of land holding in the proposed sub-project areas. The farm size data are available only for the "A" group sub-projects, and therefore those for "B", "C" and "D" groups are estimated using the regional average data for the "A" group sub-projects. Average farm size of the "A" group sub-projects is 1.32 ha, while the estimated average farm size for whole SSIDP is 1.36 ha.

	"A" Group	10 Year Program
Nos. of sub-projects (nos.)	459	4,037
Development area (ha)	70,831	570,517
Nos. of beneficiaries (households)	53,664	419,700*
Average farm size (ha/household)	1.32	1.36*

* : estimated based on the regional average farm size for "A" group sub-projects

11.13 Distribution of Land Holding Size

According to the "minimum selection criteria", the sub-projects with an average farm size of more than 5.0 ha are disqualified; therefore, none of the "A" group sub-projects exceeds the average farm size of 5.0 ha. The farm size of the SSIDP beneficiaries widely varies, but is generally small. Majority of the SSIDP beneficiaries have less than 1.0 ha as shown below:

	Nos. of Beneficiaries					
	CISs		CIPs		Total	
3.0 - 5.0 ha	1,578	(4%)	1,564	(11%)	3,142	(6%)
2.5 - 3.0 ha	1,183	(3%)	1,280	(9%)	2,463	(5%)
2.0 - 2.5 ha	2,367	(6%)	1,564	(11%)	3,931	(7%)
1.5 - 2.0 ha	2,761	(7%)	2,133	(15%)	4,894	(9%)
1.0 - 1.5 ha	5,917	(15%)	2,559	(18%)	8,476	(16%)
0.5 - 1.0 ha	11,045	(28%)	3,128	(22%)	14,173	(26%)
Less than 0.5 ha	14,594	(37%)	1,991	(14%)	16,585	(31%)
Total	39,445	(100%)	14,219	(100%)	53,664	(100%)
Average farm size (ha)	1.24 ha		1.53 ha		1.32 ha	

11.14 Farm Budget Analysis

In order to evaluate the financial viability of the SSIDP from the farmer's viewpoint, farm budget of the SSIDP beneficiaries was analyzed, by preparing representative farm models with three (3) different farm holdings for each CIS and CIP. The representative farm models for the analyses are set out, considering the distribution of farm sizes for the "A" group sub-projects:

	CISs	CIPs
Small size farmer	0.50 ha	0.50 ha
Average size farmer	1.25 ha	1.50 ha
Large size farmer	2.00 ha	2.00 ha

11.15 The estimated farm budget of the representative farm models is as follows:

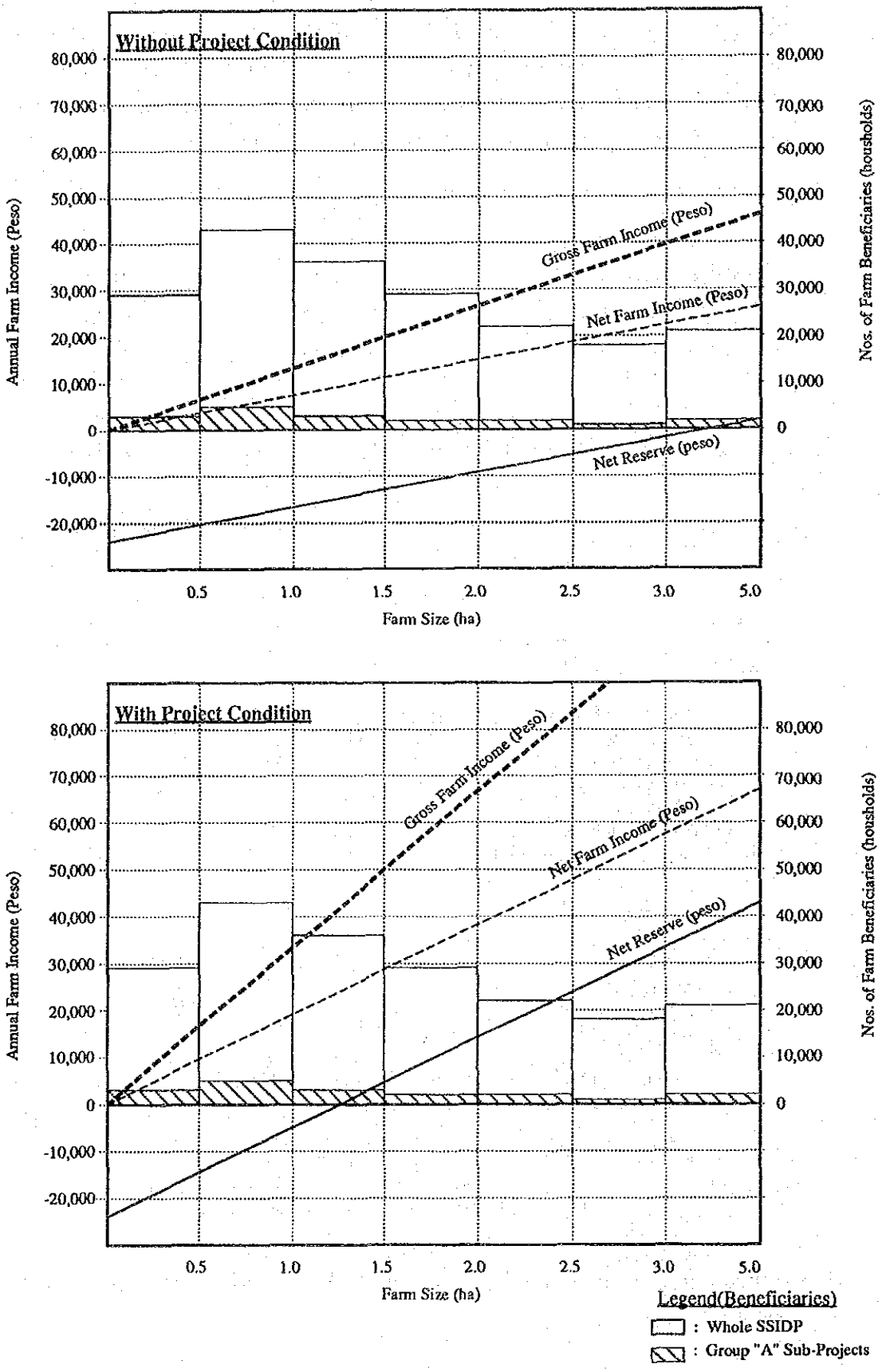
(unit: ₱ 1,000)

Items	CISs			CIPs		
	small	average	large	small	average	large
Without project condition						
1. Gross Farm Income	13.8	34.5	55.2	6.6	19.9	26.5
2. Gross Outgo	29.9	38.7	47.5	27.0	32.9	35.0
(1) Crop production cost	5.8	14.4	23.1	3.0	8.9	11.9
(2) Living expenses	24.0	24.0	24.0	24.0	24.0	24.0
(3) O&M costs	0.1	0.3	0.4	0.0	0.0	0.0
(4) Amortization fee	0.0	0.0	0.0	0.0	0.0	0.0
3. Net Farm Reserve (1. - 2.)	-16.1	-4.2	7.7	-20.4	-13.0	-9.4
With project condition						
1. Gross Farm Income	16.8	42.1	67.3	16.8	50.5	67.3
2. Gross Outgo	31.5	42.7	53.9	31.7	47.1	54.8
(1) Crop production cost	7.1	17.7	28.4	7.1	21.3	28.4
(2) Living expenses	24.0	24.0	24.0	24.0	24.0	24.0
(3) O&M costs	0.3	0.8	1.2	0.3	1.0	1.3
(4) Amortization fee	0.1	0.2	0.3	0.3	0.8	1.1
3. Net Farm Reserve (1. - 2.)	-14.7	-0.6	13.4	-14.9	3.4	12.5
Incremental Net Reserve	1.4	3.6	5.7	5.5	16.4	21.9

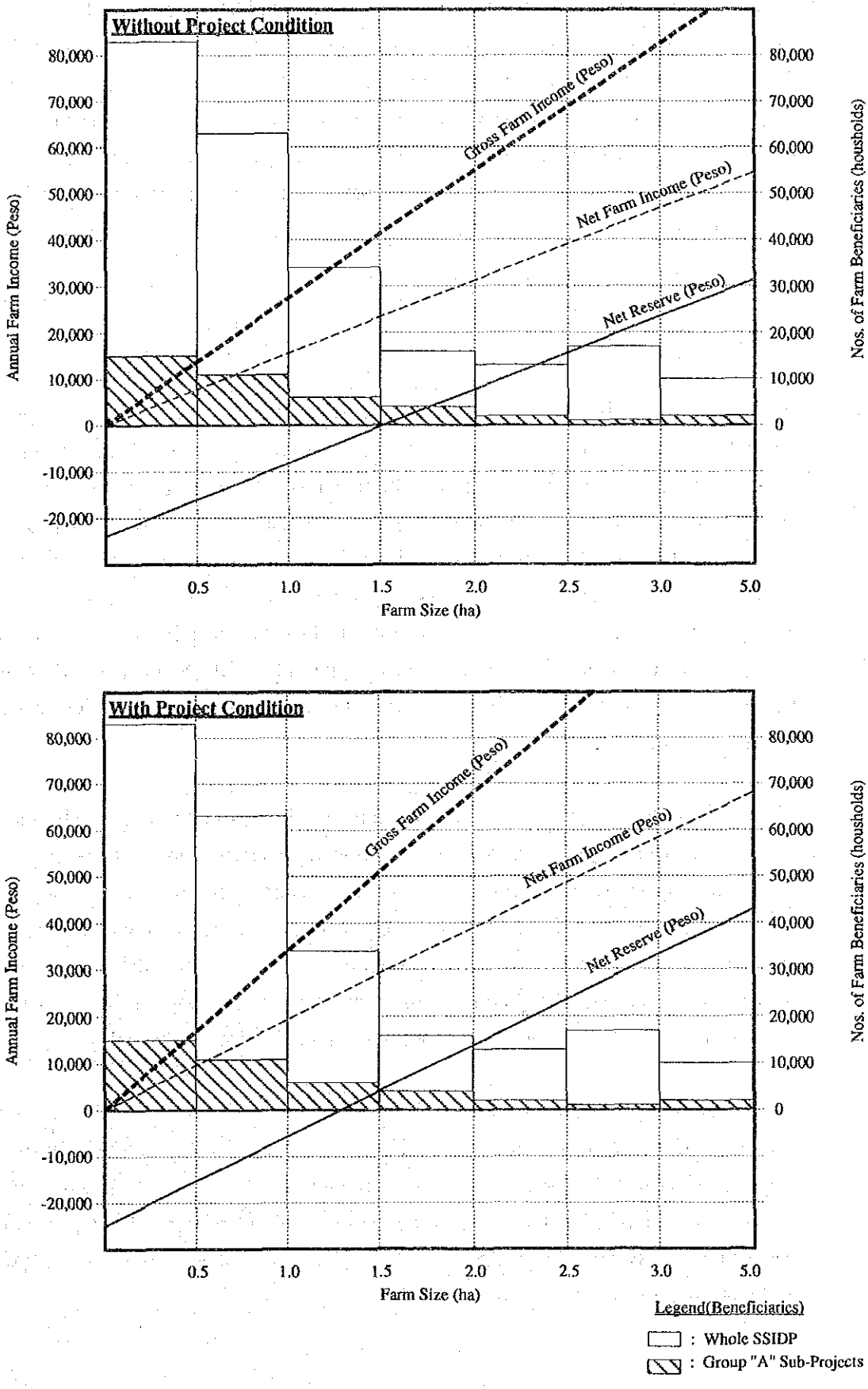
(for details, refer to Tables 11-07 to 11-09)

Annual farm incomes and farm size distributions are illustrated in the next two pages.

ANNUAL FARM INCOME AND FARM SIZE DISTRIBUTIONS FOR CIP



ANNUAL FARM INCOME AND FARM SIZE DISTRIBUTIONS FOR CIS



11.16 The SSIDP will largely improve the farm income. Gross farm incomes with the average farm sizes for each CIS and CIP are expected to increase by 1.2 and 2.5 times respectively. The farm incomes however largely depend upon the farm size. The average farm size of 1.5 ha (CIPs) and over will produce enough income to provide for the family's living costs and sufficient savings to pay additional O&M costs. Farmers with less than 1.0 ha will have to complement their basic source of income with off-farm and/or non-farm income to maintain the living standard and pay amortization fee and O&M costs.

Socio-economic Impacts

11.17 Fig.11-01 shows the diagrams of two scenarios: one showing the rural scenario with eventual problems under the situation with no or inefficient irrigation development, and the other illustrating the scenario with the resulting effects of the communal irrigation development program, particularly the SSIDP. Irrigation development is seen as a prime mover of development in the rural areas because the economy of these areas is primarily dependent on agriculture industry. Both entrepreneurial activities and employment are largely agricultural, hence, major source of income is farming. In effect, development of rural economy is determined by increase in production volume of agricultural commodities. For this reason, irrigation plays a vital role.

11.18 The predicament of agriculture production is largely attributed to low yield due to insufficient water supply and low level of input application. This, plus the frequent occurrence of natural calamities, created a succession of adversities to agriculture industry. Commonly affected by this problem are the people in the industry largely constituted by small farmers. Low productivity means low income. Low income means low standard of living and less investment capacities. This has been a steady vicious circle which is the primary cause of chronic poverty in the rural areas.

11.19 As a result, people (especially the younger ones) tended to migrate to urban areas to find better opportunities. Urban migration poses more difficulty to the government because of its resulting social and environmental problems. To break such circle and get out of it, it is absolutely necessary to implement rural infrastructure development programs like the SSIDP, primarily aiming at socio-economic growth and poverty alleviation in the rural areas.

11.20 Implementation of the SSIDP is expected to have the following impacts on the country's socio-economy:

(1) Improvement of demand and supply situation for rice ;
(2) Generation of employment opportunities;
(3) Strengthening and diversification of rural economy;
(4) Saving and earning of foreign exchange;
(5) Improvement of rural income level;
(6) Full use of rural resources;
(7) Improvement of institutional capabilities of rural folks;
(8) Promotion of equitable distribution of income and wealth ; and
(9) Regional growth and multiplier effects.

11.21 Demand and Supply of Rice

Statistics show that, in the past ten years, the Philippines had been experiencing insufficiency in rice (see Table 11-10 & Fig.11-02). The total demand generally consists of food consumption component which is about 93%. Of this volume, 98% is locally produced and the remaining is imported. Despite its large potential for rice production, the country is importing rice from its neighboring countries mainly because of low productivity. The past 10 years also show that the Philippines' productivity in rice averages a low 2.6 tons/ha. According to various agro- and socio-economic surveys conducted so far, low productivity is mainly attributed to inadequate irrigation water and low level of fertilizer application.

11.22 The SSIDP will develop a total of about 570,500 ha (CISs/CIPs) of paddy fields for irrigation in a period of 10 years (1993-2002). In the first 5 years of project implementation, some 1,208 projects will be executed to rehabilitate about 109,800 ha of irrigation service areas and generate 110,900 ha additionally. The next 5 years will involve 2,829 projects with rehabilitation of 170,700 ha and creation of new areas of 179,100 ha.

11.23 The population growth estimated at 2.0% per annum would increase rice demand for to 6,863,000 tons in 1995 and to 8,050,000 tons in 2002. The production target of the SSIDP is to shift the country's self-sufficiency level to 100% with a surplus of 20,000 tons in 1996 and 1,028,000 tons by the year 2000. Proper implementation of the Project could enable the country to export rice in the near future (see Table 11-10).

11.24 Generation of Employment Opportunities

The present population of the Philippines is about 62 million. Of this total, some 60% are within the age of 15 years old and over. Agriculture occupation group shares almost half of employment and the other half by all non-agriculture group. However, unemployment is more manifest in the rural areas than in the urban areas. This indicates a more profound surplus labor supply in the rural areas and this requires creation of additional employment opportunities. As such, more farm and off-farm employment opportunities have to be created in order to bridge the widening gap of labor supply and demand situations.

11.25 In the next 10 years, reduction of unemployment will still be one of the major concerns of the government, most especially with the large number of new entrants in the labor force. As the country's labor force increases, more jobs have to be created to attain a targeted unemployment rates. Table 11-11 shows these target rates up to the year 2002 and the corresponding jobs that need to be created annually.

11.26 Implementation of the SSIDP is expected to serve the purpose of creating employment opportunities in two stages; construction and operation. Obviously, construction of irrigation facilities necessitates use of human labor both skilled and unskilled. There is an estimated requirement of 68 million man-days for all the SSIDP sub-projects that will be implemented in next 10 years. Computed at 260 days/year/person, some 37,800 of people will be employed at the peak investment year of 2000, thereby decreasing the projected growth of unemployment by about 0.1 %. Labor requirement for the implementation of group "A" sub-projects is estimated at about 6.4 million man-days for its total of 459 projects.

11.27 Completion of the Project will also increase labor requirement in the agriculture sector mainly because of the increase in cultivable areas and increase in required labor for agriculture activities such as planting, weeding and harvesting. The targeted area for rehabilitation and generation under the whole SSIDP is about 570,500 ha. With the total labor requirement of 95 man-days for every hectare cultivated, the total additional labor demand created will be about 35 million man-days at full development in 2005. Labor requirement for the total group "A" projects at this stage is estimated at 13 million man-days. By creating more opportunities in the rural areas, the Project will facilitate transition to stable demographic condition. Migration of the youth to urban areas will be minimized.

11.28 Strengthening and Diversification of Rural Economy

The SSIDP will promote development of rural areas through irrigation development. Target beneficiaries are farmers within the respective service areas of the projects. While the project cannot be selective of its beneficiaries, the "minimum selection criteria" speaks well of its intention to alleviate poverty in the area of influence. Among others, selection of sub-projects rests on the following:

1) Extent of CARP implementation to couple development with social justice and equity;
2) Poverty incidence of the locality in favor of prevalence of poverty;
3) Magnitude of development in favor of underdevelopment; and
4) Potentials for development.

11.29 The economy of most rural areas proposed for irrigation development is predominated by rice production. Irrigation development, however, will not only promote paddy production but also diversification of agriculture products. In fact, it will upgrade production of other crops which show high productivity in each particular locality. Other crops that are more suitable could be encouraged where market is available and significant productivity increase can be attained.

11.30 Dry season rice is expected to be grown on 90 % of the total development area. Despite presence of irrigation facilities, water availability may be less during dry seasons, hence, a smaller area of influence. Dry season, however, can be an opportunity for planting other crops which could thrive on residual moisture such as vegetables and other cash crops. Ultimately, increased production is expected to create a strong linkage among rural economic activities. Among others, opportunities for agro-based industries such as processing and marketing are not remote from being realized in the near future.

11.31 Saving and Earning of Foreign Exchange

The Filipinos are primarily rice consumers. The average per capita consumption of rice is about 100 kg. Average demand per annum in the last 10 years is about 5.3 million tons which consist of 93.5% for food consumption and 6.5% for other uses. Despite several programs launched to increase production, demand is not totally met by local production. Net production per annum had been very variable. Importation of rice continues since 1984 except for 1987; the highest being 538,000 tons in 1985 (refer to Table 11-10).

11.32 The SSIDP projects are expected to create an import substitution on rice supply situation of the country. Along with the completion of the projects, the present gap of import-export will be narrowed until self-sufficiency is attained. Importation of rice will then be dropped out from the country's dollar allocation which can be diverted to importation of essential goods. While it is an ambitious goal, exportation of rice is not far from attainable. In the year 1996, surplus in rice production is anticipated at 20,000 tons. In the long run, the SSIDP will strengthen the country's position in the international trade through export of rice.

11.33 In addition to the assessment by the EIRR, the "Domestic resource cost (often called the Bruno ratio)" was calculated in the Study to evaluate the effect of foreign exchange saving or earning. This ratio shows that to save or earn one unit of foreign exchange how much this project costs in terms of domestic resources. The domestic resource cost can be calculated by the following formula:

$$\text{Domestic resource cost} = \frac{\text{Present worth of domestic currency cost of realizing foreign exchange saving}}{\text{Present worth of net foreign exchange saving}}$$

The economic analysis gives the costs and benefits broken down into their foreign exchange and domestic currency (see Table 11-12) components. The domestic resource cost with a 15% opportunity cost of capital assumed is ₱9.3=US$1.0. This figure means that this project is very efficient from the viewpoint of saving and earning of foreign currency, because the ratio is much smaller than the official exchange rate (₱27.5 = US$1.0).

11.34 Improvement of Rural Income Level

Average income of rural families is only half of that of the urban families. Consistently, average saving is greater in the urban families. The latter saves as much as 250% more than that of rural families. Also, the median income of urban families is nearly twice more than that of rural families and median savings more than two and a half times. While urban families' income increases at a higher rate, expenditure pattern is a reverse. Rural families' expenditure increases at a higher rate. For the whole country, poverty incidence was 49.5% in 1988 (see Table 11-13). In proportion to each population, rural poverty incidence was 63% while urban was only 52%.

11.35 Infrastructure projects, particularly irrigation and rural roads have been found to benefit the population especially in improving their production capabilities and

overall welfare. These facilities or services, however, are still inadequate to better serve the needs of the populace, especially low income group in agricultural sector. Irrigation projects created a pattern of development in the rural areas especially those massively agricultural and the communal projects are very effective in both economic viability and equitable distribution because they can penetrate outlying areas. It is the policy of the government that priority in irrigation development be given to economically depressed areas.

11.36 In almost all areas of the Philippines, water is a limiting factor in agriculture production. Low productivity, especially in paddy is primarily caused by water deficiency. The SSIDP projects will answer this problem for some 570,000 ha of land distributed throughout the Philippines. With the implementation of the SSIDP projects, it is envisioned that paddy yield will rise from 2.7 tons/ha to 3.6 tons/ha (wet season). Rise in yield will be influenced both by yield per ha and greater cropping intensity.

11.37 The SSIDP would specifically address poverty alleviation by directly enhancing and stabilizing the incomes of about 420,000 rural farm families through reliable irrigation and improved agricultural support services. The average farm size of 1.5 ha and over under the SSIDP would produce enough income to provide for the family's living costs and sufficient savings to pay additional O&M costs. Farm incomes with the average farm sizes for each CIS and CIP are expected to increase by 1.2 and 2.5 times respectively. Along with increase in income from production, off-farm income will make a better secondary source. Moreover, incomes of rural families can be augmented by the rise of rural-based off-farm economic activities such as agro-processing, transportation and marketing.

11.38 Full Use of Rural Resources

The number of projects proposed for development under the SSIDP is 4,037 (1,975 CISs and 2,062 CIPs). Location for each project area is naturally endowed with resources for profitable human activities. Land, water and labor are among the resources that lie scarcely exploited for man's benefit. Irrigation development should be the prime agent of change to activate local potentials by tapping these resources.

11.39 Irrigation development as of 1991 is barely half of its potential. Generally, rural areas' potential for production is untapped because of unavailability of facilities for irrigation. About 420,000 ha feasible for irrigation development can be generated

through the communal program and out of which SSIDP will generate some 290,000 ha.

11.40 Implementation of the irrigation program is only the beginning of mobilizing the resources of a locality. Its completion shall bring to the fore a chain of activities. Increased production which is the prime objective of irrigation development will rear other endeavors which will cultivate potentials for agro-industry such as processing and marketing. In the towns, commerce and entrepreneurial activities will be enhanced. Among those institutions that will rise include rice mills, processing plants, buying stations, warehouses and shops dealing with capital goods, including inputs for agriculture, among others. The transport system will increase too. Trading will recognize the need for transporting large volumes of goods and people.

11.41 Irrigated paddy is ecologically the most stable and non-erosive form of land use, and the SSIDP would have a very positive environmental impact through its support for improved resource use and productivity.

11.42 Improvement of Institutional Capabilities of Rural Folks

Implementation of the SSIDP will promote transfer of appropriate technology to beneficiaries via strengthening of the IAs' capability to manage irrigation systems. Further the strategy of project implementation which stresses on coordination with other agencies will also promote transfer of technology that will enhance their future income potential.

11.43 Implementation of the participatory approach depends heavily on the special cadre of field workers, notably the IDOs, who work directly with the project beneficiaries to assist the latter to mobilize and organize themselves to participate in the project planning and construction and to take charge of operation and maintenance after the completion of construction.

11.44 Under the implementation of SSIDP, the capability of the IAs to participate in the three phases of project implementation shall be strengthened by focusing on the personnel/organizational, facilities, logistics and funding aspects. As a packaged development strategy, the SSIDP shall include assistance to the IAs through trainings.

11.45 Promotion of Equitable Distribution of Income and Wealth

The Philippine Government is currently implementing the Comprehensive Agrarian

Reform Program (CARP) which is generally aimed at re-distributing and transferring ownership of the lands the actual tillers of the soil, majority of whom have remained in poverty over the decades. Hence, the CARP is envisaged primarily to support the promotion of equity and social justice in the country.

11.46 However, the present CID program has apparently not provided a strong emphasis on these important socio-economic goals. In particular, the existing NIA's "minimum selection criteria" do not take into account the tenurial status of the target beneficiaries. In other words, the criteria are silent on the issue that the tenants, who belong to the most economically disadvantaged section of society, would indeed need more assistance or support than the relatively better off land-owner operators.

11.47 The SSIDP seeks to respond decisively to this so-called loophole of communal irrigation development. In support of the CARP, the SSIDP will adopt a new selection criteria that take into account the extent of CARP implementation in the sub-project areas, hence, eventually giving higher priority to sub-projects within the CARP strategic areas of operation (see Fig.11-03).

11.48 The totality of 4,037 projects proposed for implementation under the SSIDP is dispersedly located over the country, and is expected to create a nationwide impact especially on the regional growth and overall economic performance. The priority sub-projects are those located in regions and provinces belonging to the bottom 30% in terms of per capita income and RGDP. With a view of reducing inter- and intra-regional disparities, priority is also given to sub-projects in less developed areas such as those that are far-flung and municipalities within the fourth, fifth and sixth class income levels (see Fig.11-04).

11.49 Regional Growth and Multiplier Effects

Intensification of agricultural sector in the project areas will trigger forward and backward linkages to locally based service sectors, particularly to the agro-processing and agro-service sectors with resultant secondary impacts on employment and income levels. Increased availability of rice straw and bran will result in expansion of livestock farming. In addition, the SSIDP is expected to help improve environmental conditions and contribute to upgrade/improve overall rural transport and marketing. In this context, the SSIDP will have a considerable, although at present not quantifiable, secondary impacts on the regional economy.

11.50 The effects on regional economy are anticipated in two ways; one is the economic effects of the investment and the other is those of crop production.

(1) Investment inducing effects

The total multiplier of "construction" sector in the matrix of inverse coefficients is 1.9747808.* The total investment amount of the SSIDP (10 Year Development Program 1993-2002) will be ₱25.47 billion. Hence, the total economic effect of the investment will reach ₱50.3 billion.

(2) Crop production inducing effects

The crop production of the SSIDP will have sizable effects on the regional economy. In the SSIDP, it is planned to develop/increase the production of paddy and agricultural crops. The multiplier of the sector concerned which is categorized as "crops, livestock and poultry" is 1.5196468*. The total production values of the SSIDP during the usefule life of 50 years (1994-2042) will reach ₱3,946.2 billion. Accordingly, the total economic effect of the production will amount to ₱5,996.8 billion.

source: * Matrix of Inverse Coefficients, (1-A)-1 Philippines: 1983, 1990 Philippines Statistical Yearbook, National Statistic Board

11.51 The total multiplier effects of the SSIDP in the years 1995, 2000 and 2005 are estimated to be as follows:

(Unit : ₱million)

Year	Multiplier Effects			Estimated GDP	Contribution of SSIDP to GDP
	Investment	Production	Total		
1995	33,591	2,320	35,911	2,454,895	1.46%
2000	7,433	69,281	76,714	5,416,646	1.42%
2005	-	138,584	138,584	12,083,444	1.15%

Environmental Impact Assessment

11.52 Environmental impacts to be induced by the SSIDP will be small or negligible, since all of the objective areas under the 10 year development program (570,000 ha) are already used as the paddy field and about 49 % of the areas are put under irrigated condition. Implementation of the SSIDP program will not produce a

significant change in environmental conditions.

11.53 None of the sub-projects has such work items that can be recognized as the environmentally critical works in the light of the "Presidential Decree No.1151, the Philippines Environmental Policy"; therefore, no detailed environmental assessment will be required. Moreover, no significant social conflicts and/or problems for land acquisition and transmigration of local people are anticipated.

11.54 Downstream Effects

Potential downstream effects include decrease in the presently available river flows for downstream consumers (either local people or plants/animals). However, all sub-projects have the water right for irrigation purpose; therefore no serious problems will be observed on this aspect Use of agricultural chemicals and fertilizers may pollute the river water in the downstream areas. Such negative impacts could be solved through proper management of irrigation water and farming practices in the project areas.

Overall Evaluation of SSIDP

11.55 The results of overall evaluation of SSIDP including socio-economic impacts, are summarized on the following page:

Overall Evaluation of SSIDP

Index	"A" Group	10 Year Program
Economic Feasibility:	Feasible	Feasible
(1) EIRR (%)	29.0%	26.7%
(2) B/C (at discount rate of 10%)	3.6	3.3
(3) NPV (₱ million at discount rate of 10%)	₱2,728	₱19,035
Technical Soundness:	No specific problem	No specific problem
Environmental Impact:	No serious impacts	No serious impacts
Nos of Sub-projects:	459	4,037
(1) Rehabilitation	313	1,975
(2) New development	146	2,062
Irrigation Development Area:	70,831 ha	570,517 ha
(1) Rehabilitation	49,024 ha	280,517 ha
(2) New development	21,807 ha	290,000 ha
Nos. of Beneficiaries:	53,700 households	419,700 households
Total Project Costs:	₱2.06 billion	₱25.47 billion
Development Benefits:		
(1) Paddy Production:	155,000 tons	1,530,000 tons
(2) New Employment Opportunities (man-days):		
(a) for Construction	6.4 million	68.0 million
(b) for Operation	13.0 million	97.0 million
(3) Foreign Exchange Savings:	₱21.3 billion	₱91.2 billion
(4) Multiplier Effect:		
(a) Investment inducing effect	₱4.6 billion	₱50.3 billion
(b) Operation inducing effect	₱759 billion	₱5,997 billion
(c) Contribution to GDP (2000)	0.22%	1.42%

(5) Other Benefits:

(a) The paddy production target of SSIDP is to shift the country's self-sufficiency level to 100% with a surplus of 1,028,000 tons by the year 2000.
(b) The SSIDP will not only promote paddy production but also diversification of agricultural products which will provide an access to rural based industries and eventually create more opportunities for off-farm activities.
(c) The proposed sub-projects are dispersedly located over the country and will create a nationwide impacts on overall economic performances.
(d) The SSIDP will uplift the living standard of the poor farmers because the priority for project selection is given to those sub-projects in less-developed areas.
(e) The farmers participatory approach will be promoted through implementation of the SSIDP so that the capabilities of rural folks will be strengthened.

CHAPTER XII RECOMMENDATION

Early Implementation of SSIDP

12.01 Despite the agricultural sector's significant contribution to the economy, the rural areas where the majority of the farmers live, continue to suffer from poverty. The rural-urban inequality has worsened over time. The bleak opportunities in the rural areas force the unemployed rural folks to seek employment in the urban commercial areas, which again create another social problem of urban poor. There is a pressing need to make the rural area more productive and attractive. Various government programs including the CARP have launched to attain this prime goal; however, the rural areas are still far from the expected standard of livelihood.

12.02 The Small-Scale Irrigation Development Project (SSIDP), consisting of 4,037 sub-projects (CISs:1,975, CIPs: 2,062), will promote development of rural areas through irrigation development. In almost all areas of the country, water is a limiting factor in agricultural production. Low productivity, especially in paddy is primarily caused by water deficiency. The SSIDP will answer this problem for about 570,000 ha of land distributed throughout the country, and address poverty alleviation by directly enhancing the farm incomes of about 420,000 rural farm families.

12.03 The SSIDP is verified to be technically sound and economically feasible with an overall economic internal rate of return (EIRR) of 26.6% for 4,037 sub-projects. Among the whole SSIDP, 459 sub-projects (CISs: 313, CIPs: 146) are classified as "A" group (the first priority group for implementation). These "A" group sub-projects are also proved to be highly feasible with an overall EIRR of 29.0%.

12.04 The SSIDP has various advantages for enhancing the rural economic activities and stabilizing the rural welfare, in particular, the following shall be emphasized:

(1) The average farm income for each CISs and CIPs will increase by 1.2 and 2.5 times respectively. This will be caused both by higher unit yields per ha and greater cropping intensities under irrigated condition;

(2) The SSIDP will create new employment opportunity of about 68 million man-days for construction works and 97 million man-days for operation of the completed systems;

(3) Intensification of crop production will trigger forward and backward linkages to locally based service sectors, particularly to the agro-based industries with resultant secondary impacts on rural employment and income levels;

(4) The farmers participatory approach will be promoted during the course of the implementation of SSIDP with the full use of rural resources so that the capabilities of rural folks in management and operation will be strengthened;

(5) The SSIDP will greatly reduce inter- and intra-regional disparities, because most of the sub-projects are located in the economically depressed areas; and

(6) The SSIDP will not only promote paddy production but also diversification of agricultural products which will provide an access to rural-based industries and eventually create more opportunities for off-farm activities.

12.05 Considering all these, it is highly recommended that the necessary arrangement for early implementation of the SSIDP, in particular, a first package which will mainly comprise the "A" group sub-projects, shall be taken as soon as possible.

12.06 The first package for implementation is expected to have the two major components; namely, (1) construction of "A" group sub-projects, and (2) institutional build-up and strengthening of PIOs. It is hoped that the pre-engineering activities (investigation, planning and designs) for "B" and "C" sub-projects will also be executed in parallel with the above (1) construction of "A" group sub-projects, to ensure continuous implementation of SSIDP. The following sub-components are considered under the above (2) institutional build-up and strengthening of PIOs:

(1) Training Program for technical/administrative staff of PIOs,

(2) Standardization of engineering designs and procedures for estimates of irrigable area, development costs, project benefits and EIRR,

(3) Provision of equipment and machinery, and

(4) establishment of database system, including training of staff required for its operation and maintenance.

Institutional Development of RIOs/PIOs for Implementation of SSIDP

12.07 Institutional Development of PIOs/RIOs for Implementation of SSIDP

This Study considers the following four (4) target areas of institutional assistance in so far as strengthening the capability of the PIOs/RIOs is concerned (refer to Chapter VIII):

(1) Organizational/operational aspect;
(2) Staffing, training and incentives;
(3) Facilities and logistics support, and
(4) Budgetary aspect.

12.08 With minor modifications, the above target areas for assistance are also emphasized in the institutional development of IAs. It must be added however that the institutional strengthening of the IAs is largely contingent on the resources and capabilities of the field offices, particularly the IDOs.

12.09 To further ensure the success of institutional strengthening efforts at the field level, similar capability building-up is envisaged at the NIA Central Office. Hence, the Study strongly supports the establishment of a Communal Irrigation Department (CID) which shall over-see the planning, implementation and O&M (including continuous inventory) of CIPs and CISs. The proposed CID should have adequate manpower and equipment support, including a computerized data base system to be hooked up later with the field office.

12.10 The Study offers the following recommendations on institutional development (Details of recommendations classified by short and medium/long term periods are found in Table 12-01):

For the PIOs/RIOs

(1) Provide more authority to the PIEs (including RIDs) in the planning and implementation of CID projects;

(2) To the extent possible, provide the field offices with sufficient manpower, training opportunities and work incentives;

(3) Upgrade facilities, equipment and logistics support; and

(4) Seek alternative sources of project financing and adopt innovative budgetary strategies.

For the IAs

(1) Develop IAs into independent, self-reliant and progressive organizations complete with objective visions for the future;

(2) Conduct, for IA members continuous training designed to upgrade know-how and maintain positive outlook for the organization;

(3) Adopt innovative strategies to meet various financial obligations; and

(4) Provide access to other agencies/institutions that will serve as other sources of assistance.

Project Benefit Monitoring and Evaluation

12.11 To further guarantee the success of the SSIDP, the Study proposes the establishment of a monitoring and evaluation system for the SSIDP. This PBME system is designed to regularly monitor the progress of the project, compare target goals and accomplishments, especially an benefits, analyze the factors contributing to performance levels, provide corrective solutions whenever necessary and eventually document the process adopted and lessons learned for future use. The proposed M&E system shall have the following standard basic components; (1)benchmark survey, (2) monitoring proper, and (3) ex-post socio-economic survey. These will provide a systematic and effective approach to information gathering, processing and assessment.

12.12 Specific recommendations on the proposed PBME system are as follows:

(1) Provide for an active participation of IAs, taking into consideration their first hand knowledge/information on the operation of irrigation system, preference for an oral and informal process of information gathering, as well as needs for some incentives on efforts contributed;

(2) Design a system that will be useful not only to project management but also to the IAs and other concerned agencies/institutions;

(3) Observe such cardinal rules in PBME system as simplicity, reliability and sustainability of operation as well as cost effectiveness in view particularly of a chronic funding constraint;

(4) Engage an independent party to conduct a separate evaluation of the information gathered at least on an annual or semi-annual basis; and

(5) In line with the need to integrate similar/related activities within NIA plus the cost saving measures, consider the possibility of integrating the proposed PBME system with the existing monitoring and evaluation system for CID program.

Database System for Administration and Management of SSIDP

12.13 The computerized database system was designed by the JICA Study Team to compile the collected data and information through the inventory survey, and it was fully utilized to grasp present situation and formulate the 10 years development plan

of SSIDP. NIA understands importance of systematic information management, and intends to utilize the computerized database system for administration and management purpose.

12.14 In response to NIA's request, JICA study team modified the database system so that NIA would be able to maintain the database system in future by adding and updating the information. The system, which consists of all data obtained through the inventory survey and the computer programs for data analysis, was handed over in December, 1991. Detail description of the computerized database system is presented in Annex-J.

12.15 The system is prepared mainly for NIA officials working for Communal Irrigation Department of the Central Office, and provide them with basic data and information so quickly at any time when they are required, so that they can prepare the development programs easily and make monitoring and evaluation in correct and efficient manner.

12.16 It is recommended that the database system be fully utilized by the CID for effective management and administration of SSIDP, and further be updated regularly in future by adding the latest data and information for expanded use of the database system. In this sense, it is hoped that the CID will have well-trained technical staff who can fully utilize, modify and expand the computerized database system to meet any administrative requirements by preparing the necessary computer programs.

Suggested Measures for CISs/CIPs Affected by Eruption of Mt. Pinatubo

12.17 The eruption of Mt. Pinatubo occurred in June 1991 and made havoc of farm lands, agricultural crops and infrastructures, inflicting heavy economic disruption in Tarlac, Zambales, Pampanga and Bataan provinces. The SSIDP sub-projects located within 40 km-radius of Mt. Pinatubo in these four provinces were also damaged. The 10 year development program has been, however, prepared on the basis of the data collected before the eruption as a result of the discussion with NIA.

12.18 The existing and proposed irrigation areas of SSIDP located within 40 km-radius of Mt. Pinatubo, which have been affected by the eruption, are estimated at about 9,700 ha of 63 CISs and 2,000 ha of 16 CIPs. About 95 % for CISs and 76 % for CIPS are located within 20-40 km-radius of Mt. Pinatubo. The affected sub-

projects is listed in Tables 12-02 and -03. Locations of the affected sub-projects is indicated on Fig.12-01.

Province	CIS		CIP	
	Irrigation Area (ha)	No.of CISs	Irrigation Area (ha)	No.of CIPs
Tarlac	2,396	9	130	1
Zambales	982	5	-	-
Pampanga	5,448	40	1,885	15
Bataan	870	9	-	-
Total	9,696	63	2,015	16

12.19 It is reported that Mt. Pinatubo erupted 5.7 billion m^3 of pyroclastic flow and 0.5 billion m^3 of ashfall in the aforecited four (4) provinces. To make matters worse, continuous heavy rainfall after the eruption have induced large scale mudflow on the slopes of Mt. Pinatubo, resulting in heavy siltation of rivers, and heavily concentrated mudflow have overflowed into farm lands, and irrigation and drainage facilities as well. There are still a large quantity of pyroclastic deposits on the mountain slopes and gullies, and reportedly it will take quite a long time (at least 5 years) to dislodge most of these deposits to the downstream flood plain, though the deposited ashfall are being turned to mudflow to some extent.

12.20 It is recommended that under these situations, a full scale of rehabilitation works of CISs and new construction works of CIPs shall be delayed until the pyroclastic deposits are washed away and the river flows become stable. If rehabilitation and construction works were undertaken under the present situations, the irrigation and drainage facilities would be again damaged by the mudflow. It is hoped that the relevant PIOs will carry out an inventory survey of CISs/CIPs affected by the eruption and study on tentative measures by means of shallow groundwater development.

TABLES

LIST OF PERSONNEL PARTICIPATED IN THE STUDY

NIA Officials Concened

(1)	Jose B. del Rosario, Jr.	Administrator
(2)	Jose A. Galvez	Assistant Administrator for SOEM
(3)	Antonio A. Galvez	OIC, CID
(4)	Sumio Oishi	JICA Expert, NIA

JICA Advisory Committee

(1)	Kazuo Kimura	Chairman
(2)	Osamu Umekawa	Irrigation and drainage
(3)	Teruyuki Nishijima	Geology
(4)	Haruji Nakagawa	Agriculture
(5)	Masaki Mizuno	Project Evaluation

NIA Technical Advisors

(1)	Isidro R. Digal	Manager, PDD
(2)	Rodrigo N. de Guzman	Division Manager, CID

NIA Counterpart Personnel

(1)	Calixto P. Timonera	Counterpart Team Leader
(2)	Virgilio S. Miguel	Irrigation and Drainage
(3)	Francisco T. Orense	Agriculture
(4)	Conrado M. Paredes	System Design and Analysis
(5)	Silvino A. Alonzo Jr.	Meteorology and Hydrology
(6)	Violeta M. Benico	Agro-economy and Institution
(7)	Adonis C. Beringuela	Facility Planning and Design (Phase-I)
(8)	Epifanio G. Gacusan	Facility Design
(9)	Antonio F. Mamuyac	Researcher
(10)	Ariel M. Baña	Researcher (Phase-I)
(11)	Emelita B. Parallon	Design and Cost Estimates (Phase-II)
(12)	Artemio A. Tapa	Design and Cost Estimates (Phase-II)

JICA Study Team

(1)	Tadashi Sakamoto	Team Leader
(2)	Naoki Ariga	Co-leader/Project Planning
(3)	Toshikazu Higashikawa	Irrigation and Drainage
(4)	Yukihiro Kawahara	Facility Design
(5)	Wilmarth S. Mirasol	Agro-Economy/Institution
(6)	Hisashi Ikewada	Agriculture
(7)	Sei-ichi Makino	Agronomy/Soil
(8)	Kunita Okuwa	Hydrology
(9)	Takuya Igawa	System Design and Analysis
(10)	Fumihiko Furuichi	Project Evaluation

BASIC DATA OF THE PHILIPPINES

(1) TOTAL POPULATION: 1980-1990

		1980	1990
(1)	Total Population (million)	48.078	61.477
(2)	Annual growth rate (%)	—	2.3
(3)	No. of households (million)	8.607	11.380
(4)	Average size of household	5.6	5.3
(5)	Population density	160	202

Source: Preliminary Population Count, NSO, August 1990

(2) MACRO-ECONOMIC INDICATOR: 1986-1990

		1986	1987	1988	1989	1990
(1)	GNP at current prices (₱billion)	627.1	708.4	825.9	964.0	1,130.0
(2)	Real GNP growth (%)	1.9	5.8	6.7	5.7	3.5
(3)	Per capita GNP at current price (₱1,000)	11.0	12.3	14.0	15.9	18.4
(4)	Exports fob (US$ million)	4,842	5,720	7,074	7,821	8,450
(5)	Imports fob (US$ million)	5,044	6,737	8,159	10,419	12,260
(6)	Current acount (US$ billion)	-0.95	-0.44	-0.39	-1.47	-2.98
(7)	Total external debt (US$ billion)	28.3	30.1	29.4	30.4	...
(8)	Total debt service (US$ billion)	2.65	3.22	3.30	3.42	3.68

Source: Philippines Country Profile 1990-1991, The Economic Intelligence Unit

(3) CONSUMER PRICE INDEX: 1980-1990

		1983	1984	1985	1986	1987	1988	1989	1990
(1)	Inflation rate (%)	10.0	50.3	23.1	0.8	3.8	8.8	10.6	14.5
(2)	Exchange Rate: Peso/US$	14.0	19.8	19.0	20.5	20.8	21.3	21.7	24.3
(3)	Consumer price index: 1978=100	190	286	353	355	369	401	443	508

Source: Philippines country Profile 1990-1991, The Economic Intelligence Unit

(4) POVERTY INCIDENCE: 1988

	Poverty threshold*	Nos. of families below poverty line (million)	% of families below poverty line
Urban area	₱4,037	1.297	31.8
Rural area	₱2,531	3.458	52.5
Philippines (total)	₱2,709	5.200	49.5

Source: National Economic Development Authority (NEDA)
*: minimum average monthly income that a family of 6 should receive to be considered above poverty

(5) INDUSTRIAL ORIGIN OF GDP: 1988

		₱ billion	%
(1)	Agriculture, forestry and fishery	27.8	27.4
(2)	Mining	1.6	1.6
(3)	Manufacturing	25.3	24.9
(4)	Construction	4.3	4.2
(5)	Utilities	2.0	2.0
(6)	Transport and Communications	5.5	5.4
(7)	Commerce	15.8	15.6
(8)	Government and other services	19.2	18.9
	Total	101.5	100.0

Source: Philippines country Profile 1990-1991, The Economic Intelligence Unit

(6) TREND OF EMPLOYMENT: 1985-1989

	1985	1986	1987	1988	1989
(1) Labour force (million)	21.3	22.0	23.0	23.4	25.2
(2) Employmment (million)	19.8	20.6	20.8	21.5	22.3
(3) Unemployment (million)	1.5	1.5	2.1	2.0	2.9
as % of labour force	7.1	11.1	9.1	8.3	11.4
(4) Underemployment (as % of employed)	33.7	36.0	30.5	29.4	—

Source: Philippines country Profile 1990-1991, The Economic Intelligence Unit

NIA DEVELOPMENT TARGET : 1990 - 2000

I. Target for New Development

(Unit: 1,000 ha)

Year	Service Area (ha)			Total Service Area (ha)
	National	Communal	Pump	
1990	16.1	19.2	0.0	35.3
1991	16.5	39.6	0.0	56.1
1992	7.6	20.0	0.0	27.6
1993	12.0	20.3	0.0	32.3
1994	20.1	21.1	0.0	41.2
1995	20.4	17.4	0.0	37.8
1996	19.2	16.3	0.0	35.5
1997	39.3	21.3	0.0	60.6
1998	50.2	24.4	0.0	74.6
1999	57.8	22.6	0.0	80.4
2000	30.0	19.8	0.0	49.8
Total	289.2	241.7	0.0	531.2
Average/Year	26.3	22.0	0.0	48.3

Minor differences in totals due to rounding
Source: NIA Corporate Plan: 1990 - 2000
NIA, May 1990

II. Target for Rehabilitation

(Unit: 1,000 ha)

Year	Service Area (ha)			Total Service Area (ha)
	National	Communal	Pump	
1990	262.4	83.5	0.0	345.9
1991	94.5	40.2	0.0	134.7
1992	118.4	21.5	0.0	139.9
1993	30.8	21.0	0.0	51.8
1994	31.1	21.3	0.0	52.4
1995	37.5	20.4	0.0	57.9
1996	70.0	18.2	0.0	88.2
1997	58.5	22.4	0.0	80.9
1998	44.0	22.8	0.0	66.8
1999	23.9	21.6	0.0	45.5
2000	17.8	21.4	0.0	39.2
Total	788.9	314.1	0.0	1,103.2
Average/Year	71.7	28.6	0.0	100.3

Minor differences in totals due to rounding

STATUS OF IRRIGATION DEVELOPMENT: 1980 - 1989
(New Development)

(Unit: 1,000 ha)

Year	National Annual	National Comulative	Communal Annual	Communal Comulative	Pump Annual	Pump Comulative	Total
1979		475.2		552.1		152.1	1,179.4
1980	-3.0	472.2	27.7	579.8	0.0	152.1	1,204.1
1981	19.5	491.7	22.3	602.1	0.0	152.1	1,245.9
1982	22.6	514.3	32.0	634.1	0.0	152.1	1,300.5
1983	35.6	549.9	14.8	648.9	0.0	152.1	1,350.9
1984	-1.6	548.3	9.9	658.8	0.0	152.1	1,359.2
1985	19.9	568.2	6.3	665.1	0.0	152.1	1,385.4
1986	27.7	595.9	3.7	668.8	0.0	152.1	1,416.8
1987	1.1	597.0	4.3	673.1	0.0	152.1	1,422.2
1988	17.2	614.2	11.5	684.6	0.0	152.1	1,450.9
1989	6.9	621.1	11.4	696.0	0.0	152.1	1,469.2
Average/Year	14.6		14.4		0.0		29.0

(a) Service areas were firmed up.
(b) Small systems were turned over to IAs and thus converted to CISs.

Minor differences in totals due to rounding
Source: NIA Corporate Plan: 1990 - 2000
NIA, May 1990

STATUS OF IRRIGATION DEVELOPMENT: 1980 - 1989
(Rehabilitation)

(Unit: 1,000 ha)

Year	National Annual	National Comulative	Communal Annu	Communal Comulative	Pump Annual	Pump Comulative	Total
1980	85.8	85.8	17.6	17.6	0.5	0.5	103.9
1981	27.4	113.2	16.3	33.9	0.0	0.5	147.6
1982	27.7	140.9	20.0	53.9	0.0	0.5	195.3
1983	23.8	164.7	17.9	71.8	0.0	0.5	237.0
1984	5.6	170.3	12.4	84.2	0.0	0.5	255.0
1985	10.2	180.5	11.3	95.5	0.0	0.5	276.5
1986	4.7	185.2	10.4	105.9	0.0	0.5	291.6
1987	5.3	190.5	21.3	127.2	0.0	0.5	318.2
1988	155.1	345.6	40.9	168.1	0.0	0.5	514.2
1989	207.7	553.3	21.6	189.7	0.0	0.5	743.5
Average/Year	55.3		19.0		0.0		74.3

(a) Service areas were firmed up.
(b) Small systems were turned over to IAs and thus converted to CISs.

Minor differences in totals due to rounding
Source: NIA Corporate Plan: 1990 - 2000
NIA, May 1990

IRRIGATION DEVELOPMENT : 1989

Region	Potential Area (ha)	Service Area (ha)			Total Service Area (ha)	%
		National	Communal	Pump		
1	309,810	45,386	132,782	5,520	183,688	59.3
2	539,710	153,287	83,486	36,593	273,366	50.7
3	482,220	172,064	84,817	22,946	279,827	58.0
4	263,590	55,455	69,818	27,948	153,221	58.1
5	239,650	16,209	50,887	16,943	84,039	35.1
6	197,250	53,500	32,285	21,677	107,462	54.5
7	50,740	0	18,611	2,481	21,092	41.6
8	84,380	15,633	36,100	2,176	53,909	63.9
9	76,500	13,348	21,337	2,804	37,489	49.0
10	230,150	20,282	44,636	2,045	66,963	29.1
11	290,250	38,370	62,564	5,872	106,806	36.8
12	362,080	37,610	58,621	4,123	100,354	27.7
Total	3,126,330	621,144	695,944	151,128	1,468,216	47.0

Source: NIA Corporate Plan: 1990 - 2000
NIA, May 1990

ANNUAL STATUS OF IRRIGATION DEVELOPMENT: 1979 - 1989

Year	Service Area (ha)			Total Service Area (ha)	%
	National	Communal	Pump		
1979	475,174	552,092	152,128	1,179,394	37.7
1980	472,182	579,751	152,128	1,204,061	38.5
1981	491,729	602,081	152,128	1,245,938	39.9
1982	514,334	634,102	152,128	1,300,564	41.6
1983	549,930	648,837	152,128	1,350,895	43.2
1984	548,345	658,807	152,128	1,359,280	43.5
1985	568,203	665,099	152,128	1,385,430	44.3
1986	595,902	668,828	152,128	1,416,858	45.3
1987	596,953	673,119	152,128	1,422,200	45.5
1988	614,164	684,639	152,128	1,450,931	46.4
1989	621,144	695,944	152,128	1,469,216	47.0

Source: NIA Corporate Plan: 1990 - 2000
NIA, May 1990

ESTIMATES OF REGIONAL/PROVINCIAL ALLOCATION FOR CIDIP (1/5)

(1) REGIONAL SHARING FORMULA

RA = 0.25 NA/12 + O.25 NA (UCLR/UCLN) + 0.25 NA (RNI) + 0.25 NA (RPI)

RA: Regional Allocation

NA: National Allocation

UCLR: Unirrigated Communal Land in the Region

UCLN: Unirrigated Communal Land Nationwide

RNI: Regional Need for Irrigation

= 0.35 AFI + 0.35 FRP + 0.30 CC

AFI: Average Family Income Index

= AFIN /AFIR

AFIN: Average Family income (national)

AFIR: Average Family income (regional)

FRP: Food Requirement to Production Ratio

= FR/FP (≤1.0)

FR: Food requirement

FP: Food production

CC: Climatic Condition

= TR + RR

TR: Typhoon frequency rating

RR: Rainfall rating

RPI: Regional Performance Index (average for last 2 years)

= Expenditures/Releases

ESTIMATES OF REGIONAL/PROVINCIAL ALLOCATION FOR CIDIP (2/5)

(2) PROVINCIAL SHARING FORMULA

PA = 0.50 RA (1/NP) + O.25 RA (UCLP/UCLR) + 0.25 RA (PPI)

PA:	Provincial Allocation
RA:	Regional Allocation
NP:	No. of Provinces in the Region
UCLP:	Unirrigated Communal Land in the Province
UCLR:	Unirrigated Communal Land Regionwide
PPI:	Provincial Permormance Index (PIO's Performance)
	= 0.25 PP + 0.25 PC + 0.20 OM + 0.25 FM + 0.05 AA

PP:	Planning and Programming quantity, quality, timeliness and acceptability of reports and/or designs submitted
PC:	Project Construction overall physical/financial status of project construction, turnover/acceptance, equity generation and IA participation
OM:	Operation and Maintenance no. of functioning systems, area actually irrigated to programmed ratio and frequency of repairs of operable equipment
FM:	Financial Management provincial viability index (expenditures/ releases) and collection efficiency of CIS amortization
AA:	Administrative Aspect cleaness and neatness of office and compound

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ESTIMATES OF REGIONAL/PROVINCIAL ALLOCATION FOR CIDIP (3/5)

(3) DATA FOR ESTIMATES OF REGIONAL/PROVINCIAL ALLOCATION

Region	Potential Irrigable Area (ha) (RPIA)	Service Area 1989 (ha) (SAR)	Unirrigated Communal Land 1989 (ha) (UCLR)	Average Family Income 1988 (Peso) (AFIR)	Rice Production 1989 (tons) (FP)	Population 1990 (thousand)	Rice Requirement 1989 (tons) (FR)
1	309,810	183,688	72,983	33,421	617,326	4,292	553,368
2	539,710	273,366	65,014	32,765	711,242	2,845	301,200
3	482,220	279,827	19,160	46,034	1,093,842	6,142	709,770
4	263,590	153,221	46,712	38,381	669,595	8,105	1,023,094
5	239,650	84,039	47,825	26,676	433,766	4,388	436,211
6	197,250	107,462	20,130	30,397	702,575	5,672	613,427
7	50,740	21,092	11,243	27,351	150,232	4,616	407,593
8	84,380	53,909	29,400	25,069	246,804	3,360	409,954
9	76,500	37,489	16,609	32,033	247,775	3,195	348,990
10	230,150	66,963	50,679	34,422	305,450	3,616	508,193
11	290,250	107,806	22,572	36,680	470,155	4,334	398,641
12	362,080	100,354	71,853	34,605	499,108	2,942	331,063
Total/ Average	3,126,330 (NPIA)	1,469,216 (SAN)	474,180 (UCLN)	39,728 (AFIN)	6,147,870	53,507	6,041,503
Source	Corplan	Corplan	PIP/CIDIP	NSCB	BAS	NCSO	NCSO

(4) WORKING TABLE (RATIO OF REGIONAL/NATIONAL)

Region	Potential Irrigable Area (RPIA)	Service Area 1989 (SAR)	Unirrigated Communal Land 1989 (UCLR/UCLN)	Average Family Income 1988 (AFIN/AFIR)	Rice Production 1989 (FP)	Population 1990	Food Requirement (FR)
1	0.10	0.13	0.15	1.19	0.10	0.08	0.09
2	0.17	0.19	0.14	1.21	0.12	0.05	0.05
3	0.15	0.19	0.04	0.86	0.18	0.11	0.12
4	0.08	0.10	0.10	1.04	0.11	0.15	0.17
5	0.08	0.06	0.10	1.49	0.07	0.08	0.07
6	0.06	0.07	0.04	1.31	0.11	0.11	0.10
7	0.02	0.01	0.02	1.45	0.02	0.09	0.07
8	0.03	0.04	0.06	1.58	0.04	0.06	0.07
9	0.02	0.03	0.04	1.24	0.04	0.06	0.06
10	0.07	0.05	0.11	1.15	0.05	0.07	0.08
11	0.09	0.07	0.05	1.08	0.08	0.08	0.07
12	0.12	0.07	0.15	1.15	0.08	0.05	0.05
Total/ Average	1.00	1.00	1.00	1.00	1.00	1.00	1.00

ESTIMATES OF REGIONAL/PROVINCIAL ALLOCATION FOR CIDIP (4/5)

(5) WORKING TABLE (Calculation of Regional Allocation)

Region	Food Production Index (FRP)	Climatic Condition (CC)	Regional Need for Irrigation (RNI)	Regional Share for RNI	Regional Performance Index (RPI)	Regional Share for RPI	Regional Share (RA)
1	0.90	0.90	0.9998	0.0851	0.8600	0.0909	0.1033
2	0.42	0.90	0.8426	0.0718	0.8000	0.0846	0.0942
3	0.65	0.90	0.7992	0.0681	0.5700	0.0603	0.0630
4	1.00	0.80	0.9523	0.0811	0.7100	0.0751	0.0845
5	1.00	0.80	1.1112	0.0946	0.7400	0.0782	0.0893
6	0.87	1.00	1.0630	0.0905	0.7700	0.0814	0.0744
7	1.00	0.90	1.1284	0.0961	1.0200	0.1078	0.0777
8	1.00	0.70	1.1147	0.0949	0.9200	0.0973	0.0844
9	1.00	1.00	1.0841	0.0923	0.4600	0.0486	0.0648
10	1.00	0.90	1.0240	0.0872	0.9100	0.0962	0.0934
11	0.85	0.80	0.9158	0.0780	0.9600	0.1015	0.0776
12	0.66	0.80	0.8740	0.0744	0.7400	0.0782	0.0969
Total	0.98	10.4000	11.9090	1.01	9.46	1.00	1.00

(6) RATING FOR CLIMATIC CONDITION

Type-I: Two pronounced seasons, dry from November to April, wet during the rest of the year

Type-II: No dry season with very pronounced wet season from November to January

Type-III: Seasons not very pronounced, dry from November to April, wet during the rest of the year

Type-IV: Rainfall more or less evenly distributed throughout the year

		Rainfall Rating (RR)			
		Type-I	Type-II	Type-III	Type-IV
Typhoon frequency (TR)		60	40	60	40
Rare	40	R6	R10&11	R6,7,9,10	R7,11,12
Frequent	30	R1,3,4,5	R5&8	R2&4	R4

Region	TR	RR	CC
1	0.30	0.60	0.90
2	0.30	0.60	0.90
3	0.30	0.60	0.90
4	0.30	0.50	0.80
5	0.30	0.50	0.80
6	0.40	0.60	1.00
7	0.40	0.50	0.90
8	0.30	0.40	0.70
9	0.40	0.60	1.00
10	0.40	0.50	0.90
11	0.40	0.40	0.80
12	0.40	0.40	0.80

ESTIMATES OF REGIONAL/PROVINCIAL ALLOCATION FOR CIDIP (5/5)

(7) WORKING TABLE (Sample Calculation of Provincial Allocation)

REGION		PROVINCE	UCLP (ha)	UPLP/UPLR	PPI	Provincial Allocation (PA)	Share in Regional Allocation (RA)	Share in National Allocation (NA)	Budget (P600,000,000)
I	1	ILOCOS NORTE	17,557	0.24	0.880	0.352	0.151	0.0156	9,340,019
	2	ABRA	7,233	0.10	0.885	0.317	0.136	0.0138	8,303,085
	3	ILOCOS SUR	9,086	0.12	0.865	0.319	0.137	0.0139	8,338,326
	4	MOUNTAIN PROVINCE	19,504	0.27	0.950	0.376	0.161	0.0164	9,827,506
	5	LA UNION	3,916	0.05	0.890	0.307	0.132	0.0134	8,038,598
	6	BENGUET	14,057	0.19	0.910	0.347	0.149	0.0151	9,077,940
	7	PANGASINAN	1,630	0.02	0.950	0.315	0.135	0.0137	8,226,115
		Sub-total	72,983	1.00	6.330	2.333	1.000	0.1033	61,980,000
II	8	BATANES	0	-	-	-	-	-	-
	9	CAGAYAN	12,246	0.19	0.788	0.327	0.177	0.0166	9,971,364
	10	KALINGA APAYAO	9,344	0.14	0.733	0.303	0.164	0.0154	9,212,779
	11	ISABELA	15,515	0.24	0.783	0.339	0.183	0.0172	10,316,115
	12	IFUGAO	14,130	0.22	0.708	0.315	0.170	0.0160	9,582,910
	13	NUEVA VISCAYA	3,481	0.05	0.693	0.270	0.146	0.0137	8,221,648
	14	QUIRINO	10,298	0.16	0.693	0.296	0.160	0.0150	9,019,958
		sub-total	65,014	1.00	4.398	1.850	1.000	0.0942	56,520,000
III	15	NUEVA ECIJA	6,485	0.34	0.613	0.321	0.188	0.0117	7,033,653
	16	TARLAC	3,441	0.18	0.538	0.263	0.154	0.0096	5,753,313
	17	ZAMBALES	4,103	0.21	0.655	0.301	0.176	0.0110	6,582,983
	18	PAMPANGA	3,276	0.17	0.695	0.300	0.176	0.0109	6,565,667
	19	BULACAN	840	0.04	0.560	0.234	0.137	0.0086	5,130,578
	20	BATAAN	1,015	0.05	0.765	0.288	0.169	0.0105	6,302,856
		sub-total	19,160	1.00	3.826	1.707	1.000	0.9630	37,880,000
IV	21	AURORA	2,942	0.13	0.513	0.206	0.079	0.0067	3,992,495
	22	QUEZON	2,308	0.05	0.340	0.268	0.102	0.0087	5,196,160
	23	RIZAL	152	0.00	0.645	0.208	0.079	0.0067	4,026,463
	24	CAVITE	1,735	0.04	0.650	0.217	0.083	0.0070	4,215,038
	25	LAGUNA	380	0.01	0.840	0.257	0.099	0.0083	4,996,026
	26	BATANGAS	3,014	0.06	0.614	0.215	0.082	0.0070	4,173,176
	27	MARINDUQUE	456	0.01	0.578	0.192	0.074	0.0062	3,733,020
	28	MINDORO ORIENTAL	4,357	0.09	0.593	0.217	0.083	0.0070	4,210,719
	29	MINDORO OCCIDENTAL	7,486	0.16	0.745	0.272	0.104	0.0088	5,272,834
	30	ROMBLON	747	0.02	0.719	0.229	0.088	0.0074	4,447,182
	31	PALAWAN	23,153	0.50	0.649	0.332	0.127	0.0107	6,433,455
		sub-total	46,730	1.00	7.386	2.613	1.000	0.0845	50,700,000
V	32	CAMARINES NORTE	8,998	0.19	0.856	0.344	0.171	0.0153	9,164,918
	33	CAMARINES SUR	11,158	0.23	0.900	0.367	0.182	0.0163	9,758,167
	34	CATANDUANES	1,187	0.02	0.764	0.281	0.140	0.0124	7,466,140
	35	ALBAY	19,846	0.41	0.846	0.399	0.198	0.0177	10,607,556
	36	SORSOGON	4,286	0.09	0.855	0.319	0.159	0.0142	8,502,732
	37	MASBATE	2,350	0.05	0.821	0.301	0.150	0.0133	8,007,180
		sub-total	47,825	1.00	5.042	2.011	1.000	0.0893	53,580,000
VI	38	AKLAN	510	0.03	0.840	0.316	0.201	0.0148	8,899,150
	39	CAPIZ	2,586	0.13	0.684	0.303	0.193	0.0142	8,527,311
	40	ANTIQUE	2,510	0.12	0.818	0.336	0.213	0.0157	9,443,185
	41	ILOILO	2,183	0.11	0.784	0.323	0.205	0.0151	9,089,814
	42	NEGROS OCCIDENTAL	12,341	0.61	0.170	0.296	0.188	0.0139	8,320,540
	43	NEGROS DER NORTE	0	-	-	-	-	-	-
		sub-total	20,130	1.00	3.296	1.576	1.000	0.0741	44,640,000
VII	44	CEBU	2,583	0.23	0.022	0.188	0.154	0.0128	7,658,710
	45	NEGROS ORIENTAL	6,540	0.58	0.735	0.454	0.397	0.0308	18,508,377
	46	BOHOL	1,020	0.09	0.818	0.352	0.308	0.0239	14,351,982
	47	SIQUIJOR	1,100	0.10	0.000	0.149	0.131	0.0102	6,090,743
		sub-total	11,243	1.00	1.575	1.144	1.000	0.0777	46,620,000
VIII	48	NORTHERN SAMAR	7,012	0.24	0.840	0.370	0.233	0.0196	11,779,643
	49	WESTERN SAMAR	5,727	0.19	0.810	0.351	0.221	0.0187	11,192,395
	50	EASTERN SAMAR	5,221	0.18	0.713	0.323	0.203	0.0171	10,282,446
	51	NORTHERN LEYTE	10,094	0.34	0.012	0.189	0.119	0.0100	6,017,948
	52	SOUTHERN LEYTE	1,346	0.05	0.980	0.356	0.224	0.0189	11,359,600
		sub-total	29,400	1.00	3.355	1.589	1.000	0.0844	50,640,000
IX	53	ZAMBOANGA DEL NORTE	3,335	0.20	0.005	0.218	0.234	0.0152	9,108,835
	54	ZAMBOANGA DEL SUR	13,069	0.79	0.720	0.543	0.584	0.0378	22,692,485
	55	BASILAN	205	0.01	0.000	0.170	0.182	0.0118	7,089,120
	56	SULU	0	-	-	-	-	-	-
	57	TAWI-TAWI	0	-	-	-	-	-	-
		sub-total	16,609	1.00	0.725	0.931	1.000	0.0648	38,880,000
X	58	SURIGAO DEL NORTE	4,991	0.10	0.815	0.300	0.138	0.0129	7,738,840
	59	CAMIGUIN	315	0.01	0.820	0.278	0.128	0.0120	7,175,566
	60	AGUSAN DEL NORTE	4,245	0.08	0.835	0.301	0.139	0.0130	7,772,893
	61	MISAMIS ORIENTAL	5,142	0.10	0.820	0.302	0.139	0.0130	7,790,337
	62	MISAMIS OCCIDENTAL	2,884	0.06	0.820	0.291	0.134	0.0125	7,502,757
	63	BUKIDNON	15,482	0.31	0.825	0.354	0.163	0.0152	9,139,515
	64	AGUSAN DEL SUR	17,610	0.35	0.750	0.346	0.159	0.0149	8,926,545
		sub-total	50,669	1.00	5.685	2.171	1.000	0.0934	56,040,000
XI	65	SURIGAO DEL SUR	3,105	0.14	0.810	0.337	0.186	0.0145	8,686,749
	66	DAVAO ORIENTAL	1,695	0.08	0.759	0.309	0.170	0.0133	7,955,310
	67	DAVAO DEL NORTE	4,080	0.18	0.950	0.383	0.211	0.0164	9,867,676
	68	DAVAO DEL SUR	3,940	0.17	0.960	0.384	0.211	0.0165	9,892,157
	69	SOUTH COTABATO	9,752	0.43	0.779	0.403	0.222	0.0173	10,385,215
		sub-total	22,572	1.00	4.258	1.815	1.000	0.0776	46,560,000
XII	70	LANAO DEL NORTE	6,566	0.09	0.905	0.349	0.206	0.0199	11,921,232
	71	LANAO DEL SUR	13,347	0.19	0.406	0.248	0.147	0.0141	8,466,838
	72	NORTH COTABATO	30,520	0.42	0.950	0.444	0.262	0.0253	15,151,508
	73	MAGUINDANAO	14,365	0.20	0.810	0.352	0.208	0.0201	12,036,835
	74	SULTAN KUDARAT	7,055	0.10	0.695	0.298	0.176	0.0170	10,186,513
		sub-total	71,853	1.00	3.766	1.692	1.000	0.0969	58,140,000
		Total	474,188		49.642			1.0000	600,000,000

COMMUNAL IRRIGATION: FOREIGN ASSISTED PROJECTS

	Period	Name of Projects		Funding Agency	Service Area (ha)
1	1975-1983	Mindro Rural Development Project*	(CIC)	World Bank	3,000
2	1978-1984	Philippine Rural Infrastructure Project*	(CIC)	World Bank	8,500
3	1976- ?	Pulangui River Irrigation Project (NIS)**	(CIC)	ADB	2,800
4	1979- ?	Second Agusan Irrigation Project (NIS)**	(CIC)	ADB	2,000
5	1979- ?	Allah River Irrigation Project (NIS)**	(CIC)	ADB	1,100
6	1980- ?	Bicol River Irrigation Project (NIS)**	(CIC)	ADB	2,100
7	1980-1987	Samar Island Rural Development Project*	(CIC)	World Bank	2,000
8	1982-1989	Palawan Integrated Agricultural Dev't Project*	(CIC)	ADB	3,000
9	1983-1990	Communal Irrigation Dev't Project (CIDP-I)	CIS/CIP	World Bank/IFAD	65,000
10	1985-1992	First Irrigation Saterite Project (Region 11&12)*	(CIC)	ADB	15,000
11	1987-1991	Highland Agricultural Development Project*	(CIC)	ADB	2,000
12	1987-1991	Accelerated Agricultural Production Project ***	(CIC)	USAID	10,000
13	1989-1994	Sorsogan Integrated Area Development Project*	(CIC)	ADB	3,000
14	1990-1995	Central Cordillera Agricultural Project*	(CIC)	EEC	?
15	1991-1997	Communal Irrigation Dev't Project (CIDP-II)	CIS/CIP	World Bank	25,000
16	1990-1994	Earthquake Rehabilitation Project(Region 1,2&3)***	(CIC)	World Bank	?
17	1989-1993	Palawan Integrated Area Development Project*	(CIC)	ADB	4,319
18	1992-1996	Communal Irrigation Support Program****	(CIC)	IFAD	?
		Total			148,819

CIC: Communal Irrigation Component
*: mostly small scale less than 50 ha
**: incorporated into NIS
***: Minor repairs only
****: under negotiation

Source: National Irrigation Administration (NIA)

Communal Irrigation Development began in 1970's either as component of a rural development project or an irrigation project. Most of these projects were financed either by the World Bank or Asian Development Bank (ADB). The first "pure" project was the World Bank/IFAD financed Communal Irrigation Development Project (CIDP-I) in 1983.

MAJOR FEATURES OF CIDP-I

1. Project Name : Communal Irrigation Development Project (CIDP-I)
2. Implementation Period : 1983 - 1990
3. Project Features

(1) Strengthening of PIOs
  (i) New construction and rehabilitation of office buildings and workshops
  (ii) Provision of equipment,machinery and vehicls for construction
  (iii) Provision of office and workshops equipment
  (iv) Provision of instruments for topographic surveying and hydrologic observations

(2) Training to the following personnel
  (i) RIOs' and PIOs' staff (some 2,600 persons)
  (ii) Community Organizers (at present called IDOs)
  (iii) DA extension workers
  (iv) IAs

(3) Development of CISs/CIPs
  (i) Plan (as of May, 1982)
    - New Construction : 94 nos. (22,800 ha)
    - Rehabilitation/improvement : 50 nos. (10,700 ha)
  (ii) Progress (as of July, 1990)
    - New Construction : 64 nos. (18,500 ha)
    - Rehabilitation/implementation : 100 nos. (24,400 ha)

(4) Monitoring and evaluation (M&E) system
  (i) Improvement and implementation of M&E system
  (ii) Improvement of monthly reporting system
  (iii) Monitoring the O&M of 80 sample sub-projects

(5) Review of NIA's financial reporting system with a support of local consultants
  (i) Review of the present system
  (ii) Preparation of 5-year work program for development of integrated financial management

4. Costs

(Unit : US$ million)

	Items	Local	Foreign	Total
(i)	Strengthening of PIOs	3.4	17.2	20.6
(ii)	Training	2.1	0.8	2.9
(iii)	Development of CISs/CIPs	25.8	25.2	51.0
(iv)	Monitoring and evaluation	1.2	0.2	1.4
(v)	Review of financial reporting system	0.1	0.2	0.3
(vi)	Contingencies etc.	26.7	18.9	45.6
	Total	59.3	62.5	121.8

(Source : World Bank's Staff Appraisal Report in May, 1992)

MAJOR FEATURES OF CIDP-II

1. Project Name : Second Communal Irrigation Development Project (CIDP-II)

2. Implementation Period : 1991 - 1995

3. Project Features

(1) Development of CISs/CIPs
  (i) New Construction : 65 nos. (10,000 ha)
  (ii) Rehabilitation/Improvement : 115 nos. (15,000 ha)

(2) Development of IAs
  (i) Review of IA training program
  (ii) Training and related activities to assist the establishment of IAs and to strengthen IAs

(3) Institutional Strengthening of NIA
  (i) Improvement of NIA's communal irrigation accounting system and collection efficiency
  (ii) Strengthening of monitoring and evaluation system
  (iii) Strengthening of RIOs and PIOs
  (iv) Training of NIA's technical staff including improvement of NIA's ability to assess micro-catchment hydrological potential and yield

(4) Agricultural Development
  (i) Preparation and implementation of agricultural development plans for all the CISs/CIPs of CIDP-II.
  (ii) Coordination between NIA, DA and DENR
  (iii) Technical guidance to IAs

4. Costs

(Unit : US$ million)

	Items	Local	Foreign	Total
(i)	Development of CISs/CIPs	18.4	15.5	33.9
(ii)	Development of IAs	2.4	0.3	2.7
(iii)	Institutional Strengthening of NIA	4.4	7.3	11.7
(iv)	Agricultural Development	0.6	0.3	0.9
(v)	Contingencies etc.	10.4	5.4	15.8
	Total	36.2	28.8	65.0

(Source : World Bank's Staff Appraisal Report in June 1990)

SUMMARY OF CIDP - I & - II BY REGION AND PROVINCE

REGION NO.	REGION NAME	PROVINCE NO.	PROVINCE NAME	NEW No.	NEW Area	EXISTING No.	EXISTING Area	TOTAL No.	TOTAL Area
I	ILOCOS	01	Ilocos Norte	0	0	16	2772	16	2,772
		02	Abra	7	155	4	157	11	312
		03	Ilocos Sur	2	194	1	211	3	405
		04	Mountain	5	618	0	0	5	618
		05	La Union	4	209	12	1280	16	1,489
		06	Benguet	5	104	1	67	6	171
		07	Pangasinan	3	390	11	1864	14	2,254
			SUB-TOTAL	26	1,670	45	6,351	71	8,021
II	CAGAYAN VALLEY	08	Batanes	0	0	0	0	0	0
		09	Cagayan	1	80	8	2,257	9	2,337
		10	Kalinga Apayao	2	330	2	210	4	540
		11	Isabela	2	400	2	380	4	780
		12	Ifugao	4	993	4	310	8	1,303
		13	Nueva Viscaya	1	600	6	855	7	1,455
		14	Quirino	6	1,435	2	160	8	1,595
			SUB-TOTAL	16	3,838	24	4,172	40	8,010
III	CENTRAL LUZON	15	Nueva Ecija	0	0	4	976	4	976
		16	Tarlac	1	160	3	1,157	4	1,317
		17	Zambales	0	0	4	1,001	4	1,001
		18	Pampanga	1	211	4	876	5	1,087
		19	Bulacan	1	300	0	0	1	300
		20	Bataan	0	0	1	40	1	40
			SUB-TOTAL	3	671	16	4,050	19	4,721
IV	SOUTHERN TAGALOG	21	Aurora	4	849	1	200	5	1,049
		22	Quezon	6	878	0	0	6	878
		23	Rizal	0	0	0	0	0	0
		24	Cavite	0	0	0	0	0	0
		25	Laguna	0	0	0	0	0	0
		26	Batangas	6	871	3	290	9	1,161
		27	Marinduque	0	0	2	330	2	330
		28	Mindoro Oriental	3	650	2	638	5	1,288
		29	Mindoro Occcider	1	100	3	2,510	4	2,610
		30	Rombion	1	165	1	50	2	215
		31	Palawan	0	0	0	0	0	0
			SUB-TOTAL	21	3,513	12	4,018	33	7,531
V	BICOL	32	Camarines Norte	4	1,060	2	175	6	1,235
		33	Camarines Sur	2	750	3	640	5	1,390
		34	Catanduanes	2	205	3	710	5	915
		35	Albay	1	650	6	2,644	7	3,294
		36	Sorsogon	5	1,010	3	361	8	1,371
		37	Masbate	1	230	2	92	3	322
			SUB-TOTAL	15	3,905	19	4,622	34	8,527
VI	WESTERN VISAYAS	38	Aklan	2	260	5	530	7	790
		39	Capiz	1	900	12	815	13	1,715
		40	Antique	3	360	4	347	7	707
		41	Iloilo	2	500	5	695	7	1,195
		42	Negros Occidental	5	626	5	465	10	1,091
		43	Negros del Norte	0	0	0	0	0	0
			SUB-TOTAL	13	2,646	31	2,852	44	5,498
VII	CENTRAL VISAYAS	44	Cebu	2	202	5	975	7	1,177
		45	Negros Oriental	3	940	1	350	4	1,290
		46	Bohol	1	50	4	660	5	710
		47	Siquijor	0	0	0	0	0	0
			SUB-TOTAL	6	1,192	10	1,985	16	3,177
VIII	EASTERN VISAYAS	48	Northern Samar	1	227	1	80	2	307
		49	Samar	3	270	0	0	3	270
		50	Eastern Samar	3	360	0	0	3	360
		51	Northern Leyte	5	1,025	4	900	9	1,925
		52	Southern Leyte	4	446	4	724	8	1,170
			SUB-TOTAL	16	2,328	9	1,704	25	4,032
IX	WESTERN MINDANAO	53	Zamboanga del Norte	2	460	3	849	5	1,309
		54	Zamboanga del Sur	1	170	4	517	5	687
		55	Basilan	0	0	0	0	0	0
		56	Sulu	0	0	0	0	0	0
		57	Tawi Tawi	0	0	0	0	0	0
			SUB-TOTAL	3	630	7	1,366	10	1,996
X	NORTHERN MINDANAO	58	Surigao del Norte	1	550	1	197	2	747
		59	Camiguin	0	0	0	0	0	0
		60	Agusan del Norte	2	280	0	0	2	280
		61	Misamis Oriental	2	372	3	752	5	1,124
		62	Misamis Occidental	0	0	0	0	0	0
		63	Bukidnon	0	0	1	400	1	400
		64	Agusan del Sur	1	400	0	0	1	400
			SUB-TOTAL	6	1,602	5	1,349	11	2,951
XI	EASTERN MINDANAO	65	Surigao del Sur	3	480	0	0	3	480
		66	Davao Oriental	1	125	2	420	3	545
		67	Davao del Norte	3	1,104	5	1,010	8	2,114
		68	Davao del Sur	3	620	3	675	6	1,295
		69	South Cotobato	8	1,455	5	2,102	13	3,557
			SUB-TOTAL	18	3,784	15	4,207	33	7,991
XII	CENTRAL MINDANAO	70	Lanao del Norte	2	1,520	2	410	4	1,930
		71	Lanao del Sur	1	50	0	0	1	50
		72	North Cotobato	2	338	6	957	8	1,295
		73	Maguindanao	9	1,650	0	0	9	1,650
		74	Sultan Kudarat	3	1,370	2	590	5	1,960
			SUB-TOTAL	17	4,928	10	1,957	27	6,885
	TOTAL			160	30,707	203	38,633	363	69,340

SUMMARY OF CIDP - I BY REGION AND PROVINCE

REGION NO.	REGION NAME	PROVINCE NO.	PROVINCE NAME	NEW No.	NEW Area	EXISTING No.	EXISTING Area	TOTAL No.	TOTAL Area
I	ILOCOS	01	Ilocos Norte	0	0	7	1230	7	1,230
		02	Abra	0	0	1	54	1	54
		03	Ilocos Sur	0	0	1	211	1	211
		04	Mountain	2	368	0	0	2	368
		05	La Union	1	150	3	775	4	925
		06	Benguet	0	0	0	0	0	0
		07	Pangasinan	1	250	6	1488	7	1,738
			SUB-TOTAL	4	768	18	3,758	22	4,526
II	CAGAYAN VALLEY	08	Batanes	0	0	0	0	0	0
		09	Cagayan	0	0	6	1,914	6	1,914
		10	Kalinga Apayao	1	70	0	0	1	70
		11	Isabela	1	300	1	150	2	450
		12	Ifugao	2	608	2	210	4	818
		13	Nueva Viscaya	1	600	3	458	4	1,058
		14	Quirino	1	750	1	60	2	810
			SUB-TOTAL	6	2,328	13	2,792	19	5,120
III	CENTRAL LUZON	15	Nueva Ecija	0	0	2	390	2	390
		16	Tarlac	0	0	2	678	2	678
		17	Zambales	0	0	0	0	0	0
		18	Pampanga	0	0	4	876	4	876
		19	Bulacan	1	300	0	0	1	300
		20	Bataan	0	0	1	40	1	40
			SUB-TOTAL	1	300	9	1,984	10	2,284
IV	SOUTHERN TAGALOG	21	Aurora	2	559	0	0	2	559
		22	Quezon	3	553	0	0	3	553
		23	Rizal	0	0	0	0	0	0
		24	Cavite	0	0	0	0	0	0
		25	Laguna	0	0	0	0	0	0
		26	Batangas	2	200	3	290	5	490
		27	Marinduque	0	0	2	330	2	330
		28	Mindoro Oriental	0	0	0	0	0	0
		29	Mindoro Occcider	0	0	2	2,410	2	2,410
		30	Romblon	1	165	1	50	2	215
		31	Palawan	0	0	0	0	0	0
			SUB-TOTAL	8	1,477	8	3,080	16	4,557
V	BICOL	32	Camarines Norte	2	870	1	85	3	955
		33	Camarines Sur	1	600	1	180	2	780
		34	Catanduanes	0	0	1	350	1	350
		35	Albay	0	0	4	2,257	4	2,257
		36	Sorsogon	3	827	2	210	5	1,037
		37	Masbate	0	0	0	0	0	0
			SUB-TOTAL	6	2,297	9	3,082	15	5,379
VI	WESTERN VISAYAS	38	Aklan	0	0	1	50	1	50
		39	Capiz	1	900	3	155	4	1,055
		40	Antique	1	200	0	0	1	200
		41	Iloilo	1	300	1	180	2	480
		42	Negros Occidental	2	310	2	330	4	640
		43	Negros del Norte	0	0	0	0	0	0
			SUB-TOTAL	5	1,710	7	715	12	2,425
VII	CENTRAL VISAYAS	44	Cebu	1	170	5	975	6	1,145
		45	Negros Oriental	2	630	1	350	3	980
		46	Bohol	1	50	4	660	5	710
		47	Siquijor	0	0	0	0	0	0
			SUB-TOTAL	4	850	10	1,985	14	2,835
VIII	EASTERN VISAYAS	48	Northern Samar	0	0	0	0	0	0
		49	Samar	0	0	0	0	0	0
		50	Eastern Samar	0	0	0	0	0	0
		51	Northern Leyte	3	845	3	650	6	1,495
		52	Southern Leyte	3	363	1	473	4	836
			SUB-TOTAL	6	1,208	4	1,123	10	2,331
IX	WESTERN MINDANAO	53	Zamboanga del Norte	1	180	3	849	4	1,029
		54	Zamboanga del Sur	1	170	1	150	2	320
		55	Basilan	0	0	0	0	0	0
		56	Sulu	0	0	0	0	0	0
		57	Tawi Tawi	0	0	0	0	0	0
			SUB-TOTAL	2	350	4	999	6	1,349
X	NORTHERN MINDANAO	58	Surigao del Norte	1	550	1	197	2	747
		59	Camiguin	0	0	0	0	0	0
		60	Agusan del Norte	1	150	0	0	1	150
		61	Misamis Oriental	2	372	3	752	5	1,124
		62	Misamis Occidental	0	0	0	0	0	0
		63	Bukidnon	0	0	0	0	0	0
		64	Agusan del Sur	1	400	0	0	1	400
			SUB-TOTAL	5	1,472	4	949	9	2,421
XI	EASTERN MINDANAO	65	Surigao del Sur	3	480	0	0	3	480
		66	Davao Oriental	1	125	1	150	2	275
		67	Davao del Norte	3	1,104	3	660	6	1,764
		68	Davao del Sur	3	620	2	480	5	1,100
		69	South Cotobato	3	980	2	1,742	5	2,722
			SUB-TOTAL	13	3,309	8	3,032	21	6,341
XII	CENTRAL MINDANAO	70	Lanao del Norte	2	1,520	2	410	4	1,930
		71	Lanao del Sur	0	0	0	0	0	0
		72	North Cotobato	0	0	4	447	4	447
		73	Maguindanao	1	300	0	0	1	300
		74	Sultan Kudarat	1	620	0	0	1	620
			SUB-TOTAL	4	2,440	6	857	10	3,297
	TOTAL			64	18,509	100	24,356	164	42,865

SUMMARY OF CIDP - II BY REGION AND PROVINCE

REGION NO.	REGION NAME	PROVINCE NO.	PROVINCE NAME	NEW No.	NEW Area	EXISTING No.	EXISTING Area	TOTAL No.	TOTAL Area
I	ILOCOS	01	Ilocos Norte	0	0	9	1542	9	1,542
		02	Abra	7	155	3	103	10	258
		03	Ilocos Sur	2	194	0	0	2	194
		04	Mountain	3	250	0	0	3	250
		05	La Union	3	59	9	505	12	564
		06	Benguet	5	104	1	67	6	171
		07	Pangasinan	2	140	5	376	7	516
			SUB-TOTAL	22	902	27	2,593	49	3,495
II	CAGAYAN VALLEY	08	Batanes	0	0	0	0	0	0
		09	Cagayan	1	80	2	343	3	423
		10	Kalinga Apayao	1	260	2	210	3	470
		11	Isabela	1	100	1	230	2	330
		12	Ifugao	2	385	2	100	4	485
		13	Nueva Viscaya	0	0	3	397	3	397
		14	Quirino	5	685	1	100	6	785
			SUB-TOTAL	10	1,510	11	1,380	21	2,890
III	CENTRAL LUZON	15	Nueva Ecija	0	0	2	586	2	586
		16	Tarlac	1	160	1	479	2	639
		17	Zambales	0	0	4	1,001	4	1,001
		18	Pampanga	1	211	0	0	1	211
		19	Bulacan	0	0	0	0	0	0
		20	Bataan	0	0	0	0	0	0
			SUB-TOTAL	2	371	7	2,066	9	2,437
IV	SOUTHERN TAGALOG	21	Aurora	2	290	1	200	3	490
		22	Quezon	3	325	0	0	3	325
		23	Rizal	0	0	0	0	0	0
		24	Cavite	0	0	0	0	0	0
		25	Laguna	0	0	0	0	0	0
		26	Batangas	4	671	0	0	4	671
		27	Marinduque	0	0	0	0	0	0
		28	Mindoro Oriental	3	650	2	638	5	1,288
		29	Mindoro Occcidor	1	100	1	100	2	200
		30	Romblon	0	0	0	0	0	0
		31	Palawan	0	0	0	0	0	0
			SUB-TOTAL	13	2,036	4	938	17	2,974
V	BICOL	32	Camarines Norte	2	190	1	90	3	280
		33	Camarines Sur	1	150	2	460	3	610
		34	Catanduanes	2	205	2	360	4	565
		35	Albay	1	650	2	387	3	1,037
		36	Sorsogon	2	183	1	151	3	334
		37	Masbate	1	230	2	92	3	322
			SUB-TOTAL	9	1,608	10	1,540	19	3,148
VI	WESTERN VISAYAS	38	Aklan	2	260	4	480	6	740
		39	Capiz	0	0	9	660	9	660
		40	Antique	2	160	4	347	6	507
		41	Iloilo	1	200	4	515	5	715
		42	Negros Occidental	3	316	3	135	6	451
		43	Negros del Norte	0	0	0	0	0	0
			SUB-TOTAL	8	936	24	2,137	32	3,073
VII	CENTRAL VISAYAS	44	Cebu	1	32	0	0	1	32
		45	Negros Oriental	1	310	0	0	1	310
		46	Bohol	0	0	0	0	0	0
		47	Siquijor	0	0	0	0	0	0
			SUB-TOTAL	2	342	0	0	2	342
VIII	EASTERN VISAYAS	48	Northern Samar	1	227	1	80	2	307
		49	Samar	3	270	0	0	3	270
		50	Eastern Samar	3	360	0	0	3	360
		51	Northern Leyte	2	180	1	250	3	430
		52	Southern Leyte	1	83	3	251	4	334
			SUB-TOTAL	10	1,120	5	581	15	1,701
IX	WESTERN MINDANAO	53	Zamboanga del Norte	1	280	0	0	1	280
		54	Zamboanga del Sur	0	0	3	367	3	367
		55	Basilan	0	0	0	0	0	0
		56	Sulu	0	0	0	0	0	0
		57	Tawi Tawi	0	0	0	0	0	0
			SUB-TOTAL	1	280	3	367	4	647
X	NORTHERN MINDANAO	58	Surigao del Norte	0	0	0	0	0	0
		59	Camiguin	0	0	0	0	0	0
		60	Agusan del Norte	1	130	0	0	1	130
		61	Misamis Oriental	0	0	0	0	0	0
		62	Misamis Occidental	0	0	0	0	0	0
		63	Bukidnon	0	0	1	400	1	400
		64	Agusan del Sur	0	0	0	0	0	0
			SUB-TOTAL	1	130	1	400	2	530
XI	EASTERN MINDANAO	65	Surigao del Sur	0	0	0	0	0	0
		66	Davao Oriental	0	0	1	270	1	270
		67	Davao del Norte	0	0	2	350	2	350
		68	Davao del Sur	0	0	1	195	1	195
		69	South Cotobato	5	475	3	360	8	835
			SUB-TOTAL	5	475	7	1,175	12	1,650
XII	CENTRAL MINDANAO	70	Lanao del Norte	0	0	0	0	0	0
		71	Lanao del Sur	1	50	0	0	1	50
		72	North Cotobato	2	338	2	510	4	848
		73	Maguindanao	8	1,350	0	0	8	1,350
		74	Sultan Kudarat	2	750	2	590	4	1,340
			SUB-TOTAL	13	2,488	4	1,100	17	3,588
	TOTAL			96	12,198	103	14,277	199	26,475

Table 3-01

NUMBER OF CANDIDATE SUB-PROJECTS FOR THE STUDY : CIS / CIP

(Unit : Nos.)

Region		Province	Inventoried Sub-Projects			Sub-Projects Given Answers as of Dec.3			Candidate Sub-Projects for SSIDP		
			CISs	CIPs	Total	CISs	CIPs	Total	CISs	CIPs	Total
I	1	ILOCOS NORTE	127	1	128	122	1	123	119	0	119
	2	ABRA	46	19	65	38	17	55	37	17	54
	3	ILOCOS SUR	76	74	150	73	68	141	70	51	121
	4	MOUNTAIN PROVINCE	52	76	128	8	44	52	8	44	52
	5	LA UNION	39	29	68	39	27	66	39	27	66
	6	BENGUET	7	56	63	10	53	63	9	42	51
	7	PANGASINAN	311	6	317	187	7	194	178	3	181
		Sub-total	658	261	919	477	217	694	460	184	644
II	8	BATANES	0	0	0	0	0	0	0	0	0
	9	CAGAYAN	103	69	172	105	66	171	105	66	171
	10	KALINGA APAYAO	65	52	117	64	44	108	64	43	107
	11	ISABELA	44	49	93	47	46	93	47	44	91
	12	IFUGAO	37	54	91	42	49	91	35	46	81
	13	NUEVA VISCAYA	137	20	157	134	13	147	131	13	144
	14	QUIRINO	28	47	75	29	45	74	29	41	70
		sub-total	414	291	705	421	263	684	411	253	664
III	15	NUEVA ECIJA	45	4	49	45	3	48	43	1	44
	16	TARLAC	40	5	45	37	3	40	36	3	39
	17	ZAMBALES	47	17	64	10	0	10	10	0	10
	18	PAMPANGA	93	22	115	78	20	98	73	20	93
	19	BULACAN	21	5	26	18	4	22	18	4	22
	20	BATAAN	37	2	39	35		35	30	0	30
		sub-total	283	55	338	223	30	253	210	28	238
IV	21	AURORA	38	14	52	41	10	51	39	10	49
	22	QUEZON	38	19	57	38	18	56	38	16	54
	23	RIZAL	27	2	29	19	1	20	19	1	20
	24	CAVITE	6	9	15	5	6	11	5	6	11
	25	LAGUNA	25	3	28	26	2	28	25	2	27
	26	BATANGAS	20	31	51	23	23	46	22	21	43
	27	MARINDUQUE	4	5	9	6	2	8	5	0	5
	28	MINDORO ORIENTAL	65	28	93	48	26	74	48	18	66
	29	MINDORO OCCIDENTAL	54	20	74	55	15	70	54	15	69
	30	ROMBLON	11	4	15	2	2	4	2	2	4
	31	PALAWAN	41	98	139	42	98	140	41	96	137
		sub-total	329	233	562	305	203	508	298	187	485
V	32	CAMARINES NORTE	13	67	80	18	63	81	18	63	81
	33	CAMARINES SUR	116	67	183	116	61	177	96	30	126
	34	CATANDUANES	10	4	14	11	1	12	9	1	10
	35	ALBAY	80	77	157	83	66	149	78	48	126
	36	SORSOGON	44	15	59	34	8	42	34	7	41
	37	MASBATE	16	17	33	19	14	33	19	8	27
		sub-total	279	247	526	281	213	494	254	157	411
VI	38	AKLAN	14	4	18	15	2	17	14	2	16
	39	CAPIZ	14	12	26	14	10	24	12	10	22
	40	ANTIQUE	49	23	72	45	21	66	41	19	60
	41	ILOILO	44	14	58	37	3	40	34	3	37
	42	NEGROS OCCIDENTAL	8	45	53	17	35	52	17	34	51
	43	NEGROS DEL NORTE	0	0	0	0	0	0	0	0	0
		sub-total	129	98	227	128	71	199	118	68	186
VII	44	CEBU	13	6	19	13	5	18	11	5	16
	45	NEGROS ORIENTAL	24	19	43	26	15	41	26	14	40
	46	BOHOL	40	0	40	39	0	39	39	0	39
	47	SIQUIJOR	0	4	4	0	4	4	0	4	4
		sub-total	77	29	106	78	24	102	76	23	99
VIII	48	NORTHERN SAMAR	15	42	57	15	42	57	13	40	53
	49	SAMAR	9	24	33	10	23	33	10	19	29
	50	EASTERN SAMAR	1	28	29	2	15	17	2	12	14
	51	NORTHERN LEYTE	110	55	165	106	49	155	101	43	144
	52	SOUTHERN LEYTE	21	7	28	22	4	26	20	4	24
		sub-total	156	156	312	155	133	288	146	118	264
IX	53	ZAMBOANGA DEL NORTE	14	19	33	15	18	33	15	13	28
	54	ZAMBOANGA DEL SUR	60	34	94	52	19	71	51	19	70
	55	BASILAN	1	1	2	2		2	2	0	2
	56	SULU	0	6	6		4	4	0	4	4
	57	TAWI-TAWI	0	6	6		4	4	0	4	4
		sub-total	75	66	141	69	45	114	68	40	108
X	58	SURIGAO DEL NORTE	34	32	66	26	20	46	22	19	41
	59	CAMIGUIN	3	2	5	3	1	4	3	0	3
	60	AGUSAN DEL NORTE	58	33	91	61	33	94	43	24	67
	61	MISAMIS ORIENTAL	18	22	40	16	17	33	16	13	29
	62	MISAMIS OCCIDENTAL	25	5	30	20	3	23	20	3	23
	63	BUKIDNON	29	50	79	35	44	79	31	41	72
	64	AGUSAN DEL SUR	11	32	43	16	26	42	16	26	42
		sub-total	178	176	354	177	144	321	151	126	277
XI	65	SURIGAO DEL SUR	20	20	40	23	17	40	22	17	39
	66	DAVAO ORIENTAL	15	18	33	15	14	29	12	14	26
	67	DAVAO DEL NORTE	42	19	61	15	9	24	15	9	24
	68	DAVAO DEL SUR	35	10	45	34	7	41	32	7	39
	69	SOUTH COTABATO	26	33	59	33	25	58	31	25	56
		sub-total	138	100	238	120	72	192	112	72	184
XII	70	LANAO DEL NORTE	17	28	45	20	25	45	20	22	42
	71	LANAO DEL SUR	7	48	55	10	30	40	10	29	39
	72	NORTH COTABATO	30	84	114	30	78	108	24	77	101
	73	MAGUINDANAO	36	71	107	44	58	102	43	58	101
	74	SULTAN KUDARAT	32	30	62	23	25	48	22	24	46
		sub-total	122	261	383	127	216	343	119	210	329
		Total	2838	1973	4811	2561	1631	4192	2423	1466	3889

Table 3-02

SAMPLE SUB-PROJECTS OF SSIDP

Region	Province	Sample Sub-Projects (Scheduled)	Area (ha)	Sample Sub-Projects (Final)	Area (ha)	Inspection Period in 1990	Remarks
I	Pangasinan	(1) Cameing CIS	60				The road is not passable due to flood.
		(2) Viga CIP	100				Peace and order problem.
		(3) Alos-Paed CIS	280	(1) Alos-Paed CIS	280	Sept. 4 - 7	
		(4) Nama-Inuman-Sugcong CIS	430	(2) Nama-Inuman-Sugcong CIS	369	"	
				(3) Calsib CIS	180	"	Selected by PIE's recommendation
II	Nueva Viscaya	(5) San Vicente CIS	380				Poor accessibility
		(6) Aurora CIP	200				Under construction as CARP-IC
		(7) Allay-Nangcalapan CIS	160	(4) Allay-Nangcalapan CIS	117	Sept. 11 - 15	
				(5) Conception CIS	165	"	Selected by PIE's recommendation
				(6) Casat-Wacal CIS	80	"	"
				(7) Simmaguer CIS	400	"	"
III	Pampanga	(8) Culubasa CIS	359				Not constructed due to peace and order problem.
		(9) Camias CIS	58	(8) Camias CIS	58	Sept. 10	
		(10) San Agustin CIS	187	(9) San Agustin CIS	187	"	
		(11) Gatiawin CIS	83	(10) Gatiawin CIS	83	"	
IV	Palawan	(12) Tigman CIS	84	(11) Tigman CIS	75	Sept. 11 - 14	
		(13) Barake CIS	150	(12) Barake CIS	135	"	
				(13) Tagbuaya CIP	250	"	Selected by PIE's recommendation
V	Camarines Sur	(14) Pinit CIS	110	(14) Pinit CIS	107	Sept. 4 - 7	
		(15) Kaanunangan CIP	150	(15) Kaanunangan CIS	150	"	
				(16) Gatbo CIS	150	"	Selected by PIE's recommendation
				(17) Curry Caromas CIS	500	"	"
VI	Iloilo	(16) Oyungan CIS	162				Not constructed due to ROW problem.
		(17) Bayunan CIS	310	(18) Bayunan CIS	310	Oct. 9 - 12	
		(18) Bairan CIP	125	(19) Bairan CIP	64	"	
				(20) Tanduyan CIS	80	"	Selected by PIE's recommendation
VII	Cebu	(19) Argao CIS	110	(21) Argao CIS	110	Oct. 2 - 4	
		(20) Lagan-Ocana CIS	270	(22) Lagan-Ocana CIS	145	"	
		(21) Dumanjug CIS	285	(23) Dumanjug CIS	300	"	
VIII	Northern Leyte	(22) San Vicente CIS	410				No data is available.
		(23) Macanip CIS	160	(24) Macanip CIS	160	Sept. 18 - 21	
		(24) Maragundong CIP	150	(25) Maragundong CIP	400	"	
				(26) Caray-Caray CIS	130	"	Selected by PIE's recommendation
IX	Zamboanga del Sur	(25) Guiwan CIS	114	(27) Guiwan CIS	114	Oct. 9 - 12	
		(26) Vitali CIP	150	(28) Vitali CIP	160	"	
		(27) Binayan CIP	100	(29) Binayan CIP	100	"	
X	Misamis Oriental	(28) Lampasyao CIS	70	(30) Lampasyao CIS	70	Sept. 18 - 21	
		(29) Lourdes CIS	102	(31) Lourdes CIS	102	"	
		(30) Farmbugas CIP	100	(32) Farmbugas CIP	65	"	
		(31) Mat-i II CIP	300	(33) Mat-i II CIS	65	"	
XI	Davao del Norte	(32) Mawab CIS	250				No feasibility study is made yet.
		(33) Linoan CIS	85	(34) Linoan CIS	200	Oct. 2 - 5	
				(35) Daunan CIS	150	"	Selected by PIE's recommendation
XII	Lanao del Norte	(34) Balagtas-Segapod CIS	200				Poor accesssibility
		(35) Digkilaan CIP	200				Poor accesssibility
				(36) Balili CIS	220	Sept. 22 - 23	Selected by PIE's recommendation
				(37) Waterfalls CIS	80	"	"
				(38) Limuag CIS	200	"	"
	TOTAL	6,444 ha 25 CISs = 4,869 ha 10 CIPs = 1,575 ha		6,511 ha 32 CISs = 5,472 ha 6 CIPs = 1,039 ha			

GENERAL CHARACTERISTICS OF SAMPLE SUB-PROJECTS

Table 3-03

I. GENERAL

(1) Classification According to Present Stage

CISs

Present Stage	CISs (Nos.)	Proportion (%)
O/M	15	47
F/S for Rehabilitation/Improvement and O/M	4	13
D/D for Rehabilitation/Improvement and O/M	7	22
Rehabilitation/Improvement Works	3	9
New Construction	3	9
Total	32	100

CIPs

Present Stage	CIPs (Nos.)	Proportion (%)
F/S for Irrigation Development	1	17
D/D for Irrigation Development	5	83
Total	6	100

(2) Distribution of Irrigable Area

Area (ha)	CISs (Nos.)	CIPs (Nos.)	Total (Nos.)	Proportion (%)
50 - 100	8	2	10	26
100 - 200	15	2	17	45
200 - 300	4	1	5	13
300 - 400	3	0	3	8
400 - 500	2	1	3	8
Total	32	6	38	100

II. MAJOR REQUIREMENTS OF THE SELECTION CRITERIA OF CISs/CIPs

(3) Distribution of Cropping Intensity

Cropping Intensity (%)	CISs (Nos.)	CIPs (Nos.)	Total Nos.)	Proportion %
Less thn 130	0	0	0	0
130 - 150	6	0	6	16
150 - 175	5	0	5	13
175 - 200	21	6	27	71
Total	32	6	38	100

(4) Distribution of Average Farm Size

Average Farm Size (ha)	CISs (Nos.)	CIPs (Nos.)	Total (Nos.)	Proportion (%)
Less than 1	3	0	3	8
1 - 2	20	4	24	63
2 - 3	5	1	6	16
3 - 4	2	1	3	8
4 - 5	2	0	2	5
Total	32	6	38	100

(5) Distribution of Development Cost per ha (at a 1990 price level)

New Project

Development Cost per ha	Sub-Projects (Nos.)	Proportion (%)
Less than P 35,000	10	71
P 35,000 - P 70,000	4	29
P 70,000 - P 100,000	9	0
Average/Total	P 25,000	100

Rehabilitation Project

Development Cost per ha	Sub-Projects (Nos.)	Proportion (%)
Less than P 18,000	18	82
P 18,000 - P 35,000	2	10
P 35,000 - P 55,000	1	4
More than P 55,000	1	4
Average/Total	P 14,700	100

(6) Distribution of EIRR

EIRR (%)	CISs (Nos.)	CIPs (Nos.)	Total (Nos.)	Proportion (%)
10 - 20	9	1	10	26
20 - 30	9	2	11	29
30 - 40	6	0	6	16
More than 40	2	1	3	8
Unknown	6	2	8	21
Total (Nos.)	32	6	38	100
Average (%)	26.7%	26.7%	26.7%	---

III. TECHNICAL ASPECTS

(7) Sub-Projects with/without Diversion Weir

Items	CISs (Nos.)	CIPs (Nos.)	Total (Nos.)	Proportion (%)
No Diversion Weir (Intake Only)	2	0	2	5
Concrete Weir	23	4	27	71
Rubble Masonry Weir	7	0	7	19
Unknown (Under Design)	0	2	2	5
Total	32	6	38	100

(8) Sub-Projects with/without Drainage Facilities

Items	CISs (Nos.)	CIPs (Nos.)	Total (Nos.)	Proportion (%)
With Drainage Facilities	11	1	12	32
Without Drainage Facilities	21	3	24	63
Unknown (Under Design)	0	2	2	5
Total	32	6	38	100

(9) Sub-Project with/without Water Shortage in Dry Season

Items	CISs (Nos.)	CIPs (Nos.)	Total (Nos.)	Proportion (%)
With Water Shortage	7	0	7	18
Without Water Shortage	25	6	31	82
Total	32	6	38	100

IV. INSTITUTIONAL ASPECT

(10) IA's Viability

IA's Viability	CISs (Nos.)	Proportion (%)
Good	12	38
Fair	11	34
Poor	9	28
Total	32	100

V. ENVIRONMENTAL ASPECT

(11) Negative Environmental Aspect

Negative Environ. Impact	CISs	CIPs	Total	Proportion
No Negative Impact	21	3	24	63
Deforestration	5	2	7	18
Schistosomiasis etc.	3	1	4	11
Polluted Water	2	0	2	5
Quarrying in the River	1	0	1	3
Total	32	6	38	100

IMPLEMENTATION PROCEDURES OF CISs/CIPs (1/2)

ACTIVITIES OF PIOs/RIOs (Activities of RIO are shown in brackets.)	Related Activities of IDO/IAs	Activities of Central Office
I. Identification, Investigation and Selection Phase (About 1 year)		
I- 1 Identification of Projects (2 weeks)	• Farmers' Petition of CIP/CIS to PIO	
I- 2 Preparation and Submission of Program-of-Work (POW) for Investigation and Data Gathering to CO through RIO (1 week)		I- 3 Evaluation of POW and Fund Release for Preliminary Investigation
I- 4 Conduct of Preliminary Investigation (see Form I-2) and Submission of Results to C.O. through RIO (1 week)		I- 5 Evaluation of Results and Fund Release for Investigation and Data Gathering
I- 6 Investigation and Data Gathering • Soil Survey and Analysis (1 week) • Discharge Measurement • Agro-Economic Survey (1 week) • Institutional Profile Preparation (see Form I-3B)	• Farmers' Cooperation to PIO's Investigation and Data Gathering at Field	
I- 7 Preparation of Initial Project Feasibility Report (see Form I-3C) (1 week)		I- 8 Evaluation of Report and Fund Release for Topo. Survey
I- 9 Conduct of Topo. Survey (4 weeks)		
I-10 Preparation of Technical Report (1 week)		
I-11 Preparation of Final Project Feasibility Report (see Form I-3) (1 week)		
I-12 Project Evaluation, Selection & Prioritization at PIO (1 week) and at RIO (1 week)		
I-13 (Preparation and Submission of the Following to C.O.) • List of Project for Implementation (2 weeks) • Regional Annual Program (2 weeks) • POW of Detailed Survey and Design (2 weeks)		I-14 Evaluation of the List I-15 Evaluation of the Program I-16 Evaluation of POW and Fund Release for Detailed Survey (1 week)
	1. Request to hire IDO to CO through RIO (6 weeks)	2. Evaluation and Approval of Request
II. Pre-Construction Phase (About 1 year)		
II-1 Conduct of Detailed Survey (12 weeks)	3. Hire and Training of IDO at PIO/RIO (4 weeks) 4. Orientation to IDO at PIO (2 days) 5. Commencement of IDO's Integration with Farmers Community or IA (4 weeks) 6. Reactivation or Formulation of Committee for Pre-Construction (2 weeks)	
II-2 Conduct of Design (10 weeks)	7. Firming-up of IA Membership (8 weeks) 8. Formulation of IA and Ratification of By-Laws (2 weeks)	
II-3 Preparation and Submission of Construction POW to RIO (4 weeks)	9. Commencement of Negotiation of Right-of-Way 10. IA Training Needs Analysis (1 week) and Conduct of IA Training 11. Preparation and Submission of IA Registration Paper to Securities and Exchange Commission (SEC), (4 weeks)	
II-4 (Evaluation of Construction POW by RIO and Submission to C.O.) (3 weeks)	12. Application of Water Permit to National Water Resources Board (NWRB), (4 weeks) 13. IDOs Training for Construction Phase (2 weeks)	II-5 Evaluation of POW and Fund Release for Construction (4 weeks)
II-6 (Request of Contract Bidding for Local Minor Contract (LMC) to C.O.) (4 weeks)	14. First Pre-Construction Conference (2 days) 15. Reactivation or Formulation of Working Committee for Construction (2 weeks) 16. Formulation of NIA-IA Policies and System for Construction Phase (4 weeks) 17. Final Pre-Construction Conference (2 days) 18. Evaluation of IA Viability (1 week) 19. Signing of Memorandum of Agreement (MOA) (1 week)	II-7 Evaluation of Contract Bidding and Approval for LMC

Note; PIO: Provincial Irrigation Office, RIO: Regional Irrigation Office, IDO: Irrigation Development Officer, IA: Irrigator's Association, CO: Central Office of NIA

IMPLEMENTATION PROCEDURES OF CISs/CIPs (2/2)

ACTIVITIES OF PIOs/RIOs (Activities of RIO are shown in brackets.)	Related Activities of IDO/IAs	Activities of Central Office
III. Construction Phase (About 1.5 years)		
III-1 Bidding for LMC		
III-2 Evaluation of Bid and Contract Award (4 weeks)		
III-3 (Approval of Contract by RIO) and Issuance of Notice to Proceed (2 weeks)		
III-4 Construction (52 weeks)	20. Orientation of Planning of On-Farm Facilities and Conduct of Maintenance Works on Completed Structures	
III-5 Inventory of Completed Facilities by PIO and IA (1 week)	21. Pre O&M Conference (1 week)	
III-6 Test Run by PIO and IA (2 weeks)	22. Reactivation or Formulation of O&M Committee (1 week) and Appointment of O&M Personnel (1 week)	
III-7 Repair of Defect of Facilities (6 weeks)	23. Formulation of Repayment Scheme (1 week)	
III-8 Conduct of Final Cost and Equity Reconciliation (2 weeks)	24. Evaluation of IA Viability (1 week)	
III-9 Turnover of Facilities to IA (see form III-3B and 3C) (2 weeks)		
IV. Operation & Maintenance Phase (About 1.5 years)		
IV-1 Preparation and Submission of Project Completion Report (5 weeks)	25. Conduct of IA Workshops (3 weeks) • Financial Management • System Management • Monitoring and Evaluation (M&E)	IV-2 Evaluation/Registration
• Technical Assistance to IA	26. Firming up of O&M Plans and M&E System through Board of Directors (BOD) of IA and General Assembly (2 weeks)	
	27. Conduct of Regular IA Meetings and the Following Activities (20 weeks) • Implementation of System Management Plan • Implementation of Financial Management Plan • Education and Training • Implementation of Complete Management Mechanism • Issuance of Water Service Bill • In-Season Monitoring and Evaluation	
	28. Post-Season Evaluation through BOD and General Assembly (2 weeks)	
	29. Conduct of Regular IA Meetings and the Following Activities (20 weeks) • Implementation/Updating of System Management Plan • Implementation/Updating of Financial Management Plan • Education and Training • Implementation/Updating of Conflict Management Mechanism • Issuance of Water Service Bill • In-Season Monitoring and Evaluation	
	30. Annual Post Evaluation through BOD and General Assembly (2 weeks)	
	31. Revision/Amendment of By-Laws (2 weeks)	
	32. Evaluation of IA Viability (1 week)	
	33. Pull-out of IDOs	

Note; PIO: Provincial Irrigation Office, RIO: Regional Irrigation Office, IDO: Irrigation Development Officer, IA: Irrigator's Association, CO: Central Office of NIA

Table 4-01

CANDIDATE SUB-PROJECTS FOR PRE-FEASIBILITY STUDIES PRE-SELECTED UNDER PHASE-I

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

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

Table 5-01

NUMBER OF SUB-PROJECTS FOR ADDITIONAL INVENTORY SURVEY

Region		Province	Candidate Sub-Projects for SSIDP			Sub-Projects for Additional Inventory Survey			Sub-Projects with Returned as of June 15, 1991		
			CISs (1)	CIPs (2)	Total (3) = (1) + (2)	CISs (4)	CIPs (5)	Total (6) = (4) + (5)	CISs (7)	CIPs (8)	Total (9) = (7) + (8)
I	1	ILOCOS NORTE	119	0	119	43	0	43	43	-	43
	2	ABRA	37	17	54	7	1	8	7	1	8
	3	ILOCOS SUR	70	51	121	5	11	16	5	11	16
	4	MOUNTAIN PROVINCE	8	44	52	6	6	12	6	6	12
	5	LA UNION	39	27	66	26	1	27	26	1	27
	6	BENGUET	9	42	51	6	6	12	6	6	12
	7	PANGASINAN	178	3	181	2	1	3	2	1	3
		Sub-total	460	184	644	95	26	121	95	26	121
II	8	BATANES	0	0	0	0	0	0	-	-	-
	9	CAGAYAN	105	66	171	48	1	49	48	1	49
	10	KALINGA APAYAO	64	43	107	0	3	3	-	3	3
	11	ISABELA	47	44	91	1	2	3	1	2	3
	12	IFUGAO	35	46	81	25	3	28	23	3	26
	13	NUEVA VISCAYA	131	13	144	42	0	42	42	-	42
	14	QUIRINO	29	41	70	18	2	20	18	2	20
		sub-total	411	253	664	134	11	145	132	11	143
III	15	NUEVA ECIJA	43	1	44	4	0	4	4	-	4
	16	TARLAC	36	3	39	12	0	12	-	-	0
	17	ZAMBALES	10	0	10	0	0	0	-	-	-
	18	PAMPANGA	73	20	93	0	0	0	-	-	-
	19	BULACAN	18	4	22	0	0	0	-	-	-
	20	BATAAN	30	0	30	0	0	0	-	-	-
		sub-total	210	28	238	16	0	16	4	0	4
IV	21	AURORA	39	10	49	13	1	14	13	1	14
	22	QUEZON	38	16	54	3	4	7	3	3	6
	23	RIZAL	19	1	20	1	0	1	-	-	-
	24	CAVITE	5	6	11	0	3	3	-	3	3
	25	LAGUNA	25	2	27	0	0	0	-	-	-
	26	BATANGAS	22	21	43	0	0	0	-	-	-
	27	MARINDUQUE	5	0	5	4	0	4	4	-	4
	28	MINDORO ORIENTAL	48	18	66	13	1	14	0	0	0
	29	MINDORO OCCIDENTAL	54	15	69	0	0	0	-	-	-
	30	ROMBLON	2	2	4	2	1	3	2	1	3
	31	PALAWAN	41	96	137	9	13	22	9	13	22
		sub-total	298	187	485	45	23	68	31	21	52
V	32	CAMARINES NORTE	18	63	81	12	10	22	12	10	22
	33	CAMARINES SUR	96	30	126	22	10	32	0	0	0
	34	CATANDUANES	9	1	10	1	0	1	1	-	1
	35	ALBAY	78	48	126	1	3	4	0	3	3
	36	SORSOGON	34	7	41	27	5	32	27	5	32
	37	MASBATE	19	8	27	4	1	5	4	1	5
		sub-total	254	157	411	67	29	96	44	19	63
VI	38	AKLAN	14	2	16	11	2	13	0	0	0
	39	CAPIZ	12	10	22	0	0	0	-	-	-
	40	ANTIQUE	41	19	60	31	4	35	30	4	34
	41	ILOILO	34	3	37	16	1	17	16	1	17
	42	NEGROS OCCIDENTAL	17	34	51	2	10	12	2	10	12
	43	NEGROS DEL NORTE	0	0	0	0	0	0	-	-	-
		sub-total	118	68	186	60	17	77	48	15	63
VII	44	CEBU	11	5	16	4	1	5	4	1	5
	45	NEGROS ORIENTAL	26	14	40	15	13	28	15	13	28
	46	BOHOL	39	0	39	11	0	11	0	-	0
	47	SIQUIJOR	0	4	4	0	2	2	-	2	2
		sub-total	76	23	99	30	16	46	19	16	35
VIII	48	NORTHERN SAMAR	13	40	53	3	3	6	3	3	6
	49	SAMAR	10	19	29	9	3	12	0	0	0
	50	EASTERN SAMAR	2	12	14	1	3	4	1	3	4
	51	NORTHERN LEYTE	101	43	144	88	3	91	88	3	91
	52	SOUTHERN LEYTE	20	4	24	15	3	18	15	3	18
		sub-total	146	118	264	116	15	131	107	12	119
IX	53	ZAMBOANGA DEL NORTE	15	13	28	12	4	16	12	4	16
	54	ZAMBOANGA DEL SUR	51	19	70	1	0	1	1	-	1
	55	BASILAN	2	0	2	0	0	0	-	-	-
	56	SULU	0	4	4	0	0	0	-	-	-
	57	TAWI-TAWI	0	4	4	0	0	0	-	-	-
		sub-total	68	40	108	13	4	17	13	4	17
X	58	SURIGAO DEL NORTE	22	19	41	6	2	8	6	2	8
	59	CAMIGUIN	3	0	3	3	0	3	3	-	3
	60	AGUSAN DEL NORTE	43	24	67	25	6	31	23	6	29
	61	MISAMIS ORIENTAL	16	13	29	5	5	10	5	5	10
	62	MISAMIS OCCIDENTAL	20	3	23	16	0	16	16	-	16
	63	BUKIDNON	31	41	72	17	11	28	17	10	27
	64	AGUSAN DEL SUR	16	26	42	9	7	16	9	7	16
		sub-total	151	126	277	81	31	112	79	30	109
XI	65	SURIGAO DEL SUR	22	17	39	22	3	25	22	3	25
	66	DAVAO ORIENTAL	12	14	26	3	2	5	3	2	5
	67	DAVAO DEL NORTE	15	9	24	3	2	5	3	2	5
	68	DAVAO DEL SUR	32	7	39	5	3	8	5	3	8
	69	SOUTH COTABATO	31	25	56	24	3	27	24	3	27
		sub-total	112	72	184	57	13	70	57	13	70
XII	70	LANAO DEL NORTE	20	22	42	1	4	5	-	-	-
	71	LANAO DEL SUR	10	29	39	1	3	4	-	-	-
	72	NORTH COTABATO	24	77	101	12	0	12	12	-	12
	73	MAGUINDANAO	43	58	101	21	3	24	21	3	24
	74	SULTAN KUDARAT	22	24	46	14	9	23	13	9	22
		sub-total	119	210	329	49	19	68	46	12	58
		Total	2423	1466	3889	763	204	967	675	179	854

CONSTRUCTION COSTS OF MODELED SUB-PROJECTS (CIPs)

Unit : 1,000 Peso

WORKS		DEVELOPMENT SCALE			
		Small (100 ha)	Medium (255 ha)	Large (400 ha)	Average (149 ha)
I.	**Chargeable Cost**				
1.1	Diversion weir with intake	1,463	1,463	1,463	1,463
1.2	Diversion channel (Earth)	294	590	582	987
1.3	Diversion channel (Lined)	500	425	236	358
1.4	Main/lateral canals (Earth)	721	1,947	3,055	1,162
1.5	Main/lateral canals (Lined)	447	519	779	412
1.6	Field ditches	94	212	378	141
1.7	Project/farm drains	10	23	41	15
1.8	Drainage ditches	16	36	64	24
1.9	Service road	43	43	43	43
	Chargeable Cost	**3,588 (P 35,880/ha)**	**5,258 (P 20,620/ha)**	**6,641 (P 16,603/ha)**	**4,605 (P 30,906/ha)**
II.	**Non-Chargeable Cost**				
2.1	Flood Protection dike	46	46	46	46
2.2	Access road	86	86	86	86
	Direct Cost	3,720	5,390	6,773	4,737
2.3	Overhead (24% of direct cost)	893	1,294	1,626	1,137
	Non-Chargeable Cost	**1,025**	**1,426**	**1,758**	**1,269**
	PROJECT COST	**4,613 (P 46,130/ha)**	**6,684 (P 26,211/ha)**	**8,399 (P 20,998/ha)**	**5,874 (P 39,423/ha)**

Table 5-03

Table 5-04

AVERAGE PRICES OF MATERIALS & LABOUR WAGES

(Unit : Peso)

ITEM		UNIT	PRICES
I.	MATERIALS		
1.	Gravel	m3	325
2.	Sand	m3	297
3.	Cement	40 kg	118
4.	Timber	board foot *	14
5.	Reinforcement bar	ton	19,087
II.	FUEL		
1.	Gasoline	liter	15.8
2.	Light oil	liter	44.4
3.	Diesel oil	liter	9.3
4.	Grease	kg	56.4
III.	LABOUR WAGES		
1.	Foreman	man-day	176
2.	Common labour	man-day	106
3.	Carpenter	man-day	149
4.	Equipment operator	man-day	160
5.	Driver	man-day	151

* : 1 foot x 1 foot x 1 inch = 0.236m3

AVERAGE UNIT PRICES OF MAJOR WORKS

(Unit : Peso)

ITEM		UNIT	PRICES
I.	EARTH WORKS		
1.	Excavation (manpower)	m3	45.81
2.	Excavation (equipment)	m3	28.22
3.	Embankment (manpower)	m3	46.81
4.	Embankmwnt (equipment)	m3	34.89
II.	CONCRETE WORK		
1.	Class A concrete (3,000 psi or 1,046 kg/cm2)	m3	3,828
2.	Class B concrete (2,400 psi or 837 kg/cm2)	m3	2,755
3.	Class C concrete (2,000 psi or 697 kg/cm2)	m3	2,441
III.	OTHERS		
1.	Reinforcement bar work	ton	24,454
2.	Concrete pipe work		
	- Dia 300 mm	m	561
	- Dia 450 mm	m	833
	- Dia 600 mm	m	1,109
	- Dia 1,000 mm	m	2,139

Table 5-05

AVERAGE UNIT YIELD OF PADDY UNDER PRESENT CONDITION

(ton / ha)

Region		Province	CIS		CIP	
			Wet Season	Dry Season	Wet Season	Dry Season
I	1	ILOCOS NORTE	3.00	3.11	-	-
	2	ABRA	3.40	3.16	2.56	2.27
	3	ILOCOS SUR	3.05	3.05	3.26	2.23
	4	MOUNTAIN PROVINCE	3.39	3.58	2.62	2.51
	5	LA UNION	3.77	4.14	2.91	-
	6	BENGUET	2.49	2.70	2.13	2.03
	7	PANGASINAN	3.38	3.55	2.27	-
		Sub-total	3.27	3.44	2.80	2.36
II	8	BATANES	-	-	-	-
	9	CAGAYAN	2.96	2.55	1.80	-
	10	KALINGA APAYAO	3.68	4.15	1.86	2.17
	11	ISABELA	3.43	3.72	3.06	3.14
	12	IFUGAO	1.75	1.44	2.45	2.90
	13	NUEVA VISCAYA	3.47	4.02	2.28	3.12
	14	QUIRINO	4.00	4.05	2.24	2.13
		sub-total	3.30	3.50	2.07	2.66
III	15	NUEVA ECIJA	4.06	4.52	2.00	-
	16	TARLAC	4.01	4.32	2.88	4.36
	17	ZAMBALES	5.87	4.80	-	-
	18	PAMPANGA	3.91	3.73	2.77	3.59
	19	BULACAN	3.65	2.90	-	-
	20	BATAAN	4.26	4.59	-	-
		sub-total	4.10	4.28	2.78	3.96
IV	21	AURORA	2.52	3.01	2.19	2.40
	22	QUEZON	3.55	4.15	1.74	1.15
	23	RIZAL	4.10	4.59	2.77	-
	24	CAVITE	2.63	3.32	1.87	-
	25	LAGUNA	3.58	3.93	2.95	2.78
	26	BATANGAS	3.04	4.46	2.58	3.30
	27	MARINDUQUE	5.42	2.72	-	-
	28	MINDORO ORIENTAL	4.36	4.33	2.34	2.18
	29	MINDORO OCCIDENTAL	3.10	3.85	2.94	3.37
	30	ROMBLON	4.33	4.51	3.65	3.13
	31	PALAWAN	4.13	3.72	2.39	2.80
		sub-total	3.67	3.95	2.52	2.72
V	32	CAMARINES NORTE	2.63	3.01	2.82	3.11
	33	CAMARINES SUR	3.82	3.92	3.08	3.21
	34	CATANDUANES	3.12	2.80	-	2.50
	35	ALBAY	3.80	3.95	3.29	3.50
	36	SORSOGON	3.82	3.55	3.10	3.62
	37	MASBATE	3.05	2.52	2.08	-
		sub-total	3.71	3.71	3.16	3.44
VI	38	AKLAN	3.82	3.81	2.60	2.15
	39	CAPIZ	3.61	2.98	2.35	2.13
	40	ANTIQUE	3.18	3.11	2.95	2.87
	41	ILOILO	3.43	3.01	4.06	3.45
	42	NEGROS OCCIDENTAL	2.86	2.18	2.34	1.90
	43	NEGROS DEL NORTE	-	-	-	-
		sub-total	3.34	3.12	2.72	2.51
VII	44	CEBU	2.27	2.48	0.50	0.56
	45	NEGROS ORIENTAL	4.23	4.08	2.63	2.87
	46	BOHOL	3.47	3.42	-	-
	47	SIQUIJOR	-	-	1.00	-
		sub-total	3.69	3.60	2.53	2.48
VIII	48	NORTHERN SAMAR	2.35	3.00	1.82	-
	49	SAMAR	3.62	2.86	1.90	3.97
	50	EASTERN SAMAR	2.63	-	1.72	1.20
	51	NORTHERN LEYTE	3.40	3.03	2.74	2.03
	52	SOUTHERN LEYTE	4.04	3.90	3.25	2.85
		sub-total	3.46	3.14	2.35	2.55
IX	53	ZAMBOANGA DEL NORTE	3.78	3.99	2.92	2.11
	54	ZAMBOANGA DEL SUR	4.60	4.99	3.08	2.28
	55	BASILAN	1.36	1.43	-	-
	56	SULU	-	-	-	-
	57	TAWI-TAWI	-	-	1.00	-
		sub-total	4.38	4.76	2.94	2.20
X	58	SURIGAO DEL NORTE	3.47	3.28	2.65	2.13
	59	CAMIGUIN	3.47	3.90	-	-
	60	AGUSAN DEL NORTE	4.30	4.07	3.18	2.80
	61	MISAMIS ORIENTAL	4.23	3.81	3.21	2.92
	62	MISAMIS OCCIDENTAL	4.47	4.36	-	-
	63	BUKIDNON	4.09	3.35	2.74	2.27
	64	AGUSAN DEL SUR	2.99	2.49	2.55	2.23
		sub-total	4.05	3.70	2.80	2.30
XI	65	SURIGAO DEL SUR	3.86	3.74	3.26	2.29
	66	DAVAO ORIENTAL	3.27	3.63	3.00	2.00
	67	DAVAO DEL NORTE	3.14	3.00	4.08	3.28
	68	DAVAO DEL SUR	3.97	3.67	2.93	2.74
	69	SOUTH COTABATO	4.17	3.98	3.34	3.11
		sub-total	3.86	3.63	3.44	3.07
XII	70	LANAO DEL NORTE	3.51	3.41	2.71	2.34
	71	LANAO DEL SUR	2.68	2.77	2.47	-
	72	NORTH COTABATO	3.83	3.45	3.54	3.10
	73	MAGUINDANAO	3.46	3.84	2.89	2.80
	74	SULTAN KUDARAT	4.37	3.82	3.22	3.23
		sub-total	3.58	3.52	2.66	3.11
		Total	3.58	3.64	2.73	2.87

ECONOMIC FARMGATE PRICES OF AGRICULTURAL INPUT AND OUTPUT

Unit : Peso/kg

Region	Paddy	Corn	Urea	Potassium	TSP Phosphate
I	6.21	5.54	18	13	18
II	6.52	6.05	19	14	19
III	6.23	5.54	18	12	18
IV	5.55	4.64	17	11	17
V	6.05	5.24	17	11	17
VI	5.71	4.80	17	11	17
VII	6.05	5.34	18	12	18
VIII	6.04	5.33	18	12	18
IX	5.82	5.10	18	13	18
X	6.06	5.30	17	12	17
XI	5.95	5.17	18	12	18
XII	5.94	5.16	18	12	18
Average	**6.0**	**5.3**	**18**	**12**	**18**

TYPICAL PADDY CROP BUDGET FOR ECONOMIC EVALUATION

(I) Without Project

		Unit	Unit Price (peso)	Wet Season		Dry Season	
				Quantity	Amount (peso)	Quantity	Amount (peso)
I.	Gross Income						
1.1	Unit Yield	ton/ha	-	2.7	-	2.9	-
1.2	Unit Price	peso/ton	-	-	6,000	-	6,000
1.3	Gross Income	peso	-	-	16,200	-	17,400
II.	Production Cost						
2.1	Seed	kg	6	100	600	100	600
2.2	Fertilizer						
	a) N	kg	18	55	990	60	1,080
	b) P205	kg	18	14	252	14	252
	c) K20	kg	12	0	0	0	0
2.3	Agro-chemicals	lit.	430	1.8	774	1.8	774
2.4	Labor Inputs	man-day	27	85	2,295	89	2,403
2.5	Animal Power	day	54	16	864	16	864
2.6	Machinery	lump sum	-	-	324	-	348
2.7	Other Cost	lump sum	-	-	162	-	174
	Total Production Cost				6,261		6,495
III.	Net Return				9,939		10,905

(II) With Project

		Unit	Unit Price (peso)	Wet Season		Dry Season	
				Quantity	Amount (peso)	Quantity	Amount (peso)
I.	Gross Income						
1.1	Unit Yield	ton/ha	-	3.6	-	3.6	-
1.2	Unit Price	peso/ton	-	-	6,000	-	6,000
1.3	Gross Income	peso	-	-	21,600	-	21,600
II.	Production Cost						
2.1	Seed	kg	10	50	500	50	500
2.2	Fertilizer						
	a) N	kg	18	73	1,314	73	1,314
	b) P205	kg	18	28	504	28	504
	c) K20	kg	12	28	336	28	336
2.3	Agro-chemicals	lit.	430	3	1,290	3	1,290
2.4	Labor Inputs	man-day	27	94	2,538	94	2,538
2.5	Animal Power	day	54	16	864	16	864
2.6	Machinery	lump sum	-	-	432	-	432
2.7	Other Cost	lump sum	-	-	216	-	216
	Total Production Cost				7,994		7,994
III.	Net Return				13,606		13,606

EXISTING MANUALS/GUIDELINES FOR IMPLEMENTATION OF CIS/CIP

1. Basic Manuals and Guidelines

(1) New and Updated Guidelines on the Communal Irrigation Development Program Implementation, May 1988
(2) Manual of Procedures for Participatory Irrigation Projects
(3) Communal Irrigation System Management Manual for Facilitators, 1988
(4) ABECADE Communal Irrigation System Profile

2. Specific Guidelines given in the Above Documents

(1) Guidelines on the Preparation of the 5-Year Communal Irrigation Development Program
(2) Guidelines on the Preparation of Provincial Annual Program
(3) Guidelines on the Preparation of Regional Annual Program
(4) Guidelines on the Identification of Communal Irrigation Projects
(5) Guidelines on the Standard Derivation of Unit Cost for Investigation and Survey
(6) Guidelines on the Conduct of Preliminary Investigation for Communal Irrigation Project
(7) Guidelines on the Gathering of Discharge Measurement for Communal Irrigation Projects
(8) Guidelines on the Agro-Economic Data Gathering for Feasibility Report
(9) Simplified Soil Texture Determination and Soil Nutrient Analysis Using Soil Kit
(10) Guidelines on Institutional Profile Writing
(11) Guidelines on the Recruitment of Profile Writers
(12) Suggested Prototype Design on CIS Profile Writer's Training
(13) Planning and Monitoring System for Profile Writers
(14) Guidelines on the Conduct of Profile Writers Performance Evaluation
(15) Guidelines on the Preparation on Initial Project Feasibility Report
(16) Guidelines on the Conduct of Topographic Survey for Communal Irrigation Projects
(17) Guidelines on the Preparation of Final Project Feasibility Report
(18) Revised Guidelines on the Conduct of Project Selection and Prioritization Workshops
(19) ICO (IDO) Recruitment and Selection Guidelines
(20) Revised Guidelines on the Conduct of ICO (IDO) Performance Evaluation
(21) Sample Joint NIA-IA Policies and Systems for Construction
(22) Checklist of Requirements Prior to Project Construction
(23) Revised Guidelines on IA Viability Evaluation
(24) Guidelines on the Conduct of the Orientation and Planning Workshop on Farm Level Facilities and System Maintenance
(25) Guidelines on the Conduct of Pre-Operation & Maintenance Conference
(26) Guidelines on the Conduct of Test-Run for Communal Irrigation Projects
(27) Guidelines on the Repair of Damages for Communal Irrigation Projects/Systems
(28) Guidelines on the Turnover of Communal Irrigation System
(29) Guidelines on the Preparation of Project Completion Report
(30) Guidelines on the Cancellation, Deferment and Suspension of Communal Irrigation Project
(31) Guidelines on the Reallocation of Funds
(32) Standard Cost Basis for Institutional Development Program
(33) Guidelines on the Preparation of the Provincial Irrigation Profile
(34) Communal Irrigation Project Implementation Network

3. Design Standard and Criteria

(1) Design and Preparation of Plans Shown in the Manual of Procedures for Participatory Irrigation Projects
(2) Selection Criteria and Design Standard for Communal Irrigation Projects (For use of CIDP), December 1983

SUMMARY OF ENGINEERING STANDARD AND REQUIREMENT FOR IMPLEMENTATION OF CIS/CIP

1. Investigation (Feasibility Study)

The following survey and investigation are conducted for feasibility studies.

(1)	Soil Survey :	When a service area is less than 500 ha, soil sampling is carried out at a density of one per 50 ha. The soil samples are tested to identify soil texture and chemical properties. Land classification shall also be made according to the guidelines prepared by DA.
(2)	Discharge Measurement :	At the prospective diversion point, river discharge is measured by use of current meter at an interval of once a month for one year. When river discharge in dry season is insufficient to irrigate more than 1/3 of the service area, a gauzing staff is established and the discharge measurement is made twice a day.
(3)	Agro-Economic Survey :	The following items are surveyed; population, farm household, land holding, land use, cropping pattern, agricultural production, production cost, farm income, etc.
(4)	Institutional Survey :	The following items are surveyed; project history and government assistance, needs of beneficiary farmers needs, viability of IAs, etc.
(5)	Others :	The following items are surveyed; environmental impacts, problem on acquisition of ROW and eagerness of farmers to the implementation of CIS/CIP, etc.

2. Detailed Survey and Design

Evaluation, selection and prioritization are made on the basis of the feasibility studies, and design and construction are conducted only for the selected and prioritized projects.

(1)	Detailed Survey	
	(i) Topographic Survey	Scale: 1/4,000
	(ii) Diversion Site Survey	Scale: 1/500 or 1/1,000
	(iii) Profile and Cross Section Survey of River	Scale of profile: H = 1/4,000 , V = 1/100 Scale of cross section: 1/100
	(iv) Profile and Cross Section Survey of Main Canals and Laterals	Scale of profile: H = 1/4,000, V = 1/100 Scale of cross section: 1/100
	(v) Paddy Field Elevation Survey	One elevation per parcel
	(vi) Flood Level Survey	Flood level is shown in the cross section of the river.
	(vii) Foundation Investigation at Diversion Site	At least one test pit
(2)	Design	
	(i) Diversion Water Requirement (DWR)	Measured value is recommended. When it is not available, it is estimated by applying Modified Penman formula with 80% dependability. DWR is 1 to 3 lit/sec/ha. (mostly 1.5 lit/sec/ha)

SUMMARY OF ENGINEERING STANDARD AND REQUIREMENT FOR IMPLEMENTATION OF CIS/CIP

(ii) Overall Irrigation Efficiency	Paddy field : 40 to 58% Upland field : 33 to 45%
(iii) Diversion Weir	General types of weir are checkgate and ogee concrete weir. Design criteria is almost in comformity with that of Bureau of Reclamation, USA. Design flood is a probable 20 - 25 years flood.
(iv) Canals and Related Structures	Design criteria is almost in conformity with that of USA.
(v) Drainage Module	Design discharge is a run off caused by a probable 5-year daily rainfall. Paddy field : 5 to 6 lit/sec/ha Upland field : 7 to 8 lti/sec/ha

3. Construction

(1) The projects are constructed under NIA force account base or on a contract base.

(2) Since construction works are generally small in scale and voluntary participation of farmers is promoted. Construction is generally carried out under NIA force account base in combination with Pacquiao contract.

(3) Same technical specifications for national irrigation project is appllied to communal irrigation project.

(4) After the completion of construction work, a test-run is jointly conducted by PIO staff and IA members, and the facilities are turned over to the IA .

4. Operation and Maintenance (O&M)

(1) Irrigation Development Officer (IDO) stays at the project site to train IA members and provide the technical guidance of O&M for a period of minimum two crop seasons.

(2) Major works of IDO are as follows:

(i) Organizational Management
- Updating of membership of IA
- Organization of O&M personnel
- Revisions/amendments of By-Laws

(ii) System Management
- Assessment, evaluation and planning of O&M
- Preparation of guidelines for holding the system management workshop
- Implementation of the system management plan
- Monitoring and evaluation of the implementation of the system management plan

(iii) Financial Management
- Irrigation fee collection
- Amortization
- Yearly review/audit of IA financial records

SUMMARY OF EXISTING NIA'S DESIGN CRITERIA FOR IRRIGATION/DRAINAGE FACILITIES

(Design criteria of NIA are generally based on those of the Bureau of Reclamation, USA.)

1. Irrigation Water Requirements

   (1) The evapotranspiration should be estimated by Modified Pennman formula if relevant meteorological data are available.

   (2) The irrigation water requirements should be estimated based on the evapotranspiration, cropping pattern, requirements for land preparation and nursery, flooding for cultivation, percolation and effective rainfall, with dependability of 80%.

   (3) The diversion water requirements should be estimated considering appropriate overall irrigation efficiency. The standard overall irrigation efficiency would be 40 to 58% for paddy field and 33 to 45% for upland field.

   (4) Standard unit diversion water requirements would be 1.0 to 2.0 lit/sec/ha.

2. Drainage Water Requirements (Drainage Module)

   (1) Drainage water requirements should be a runoff caused by a 5 or 10-year probable flood. The standard requirements would be 5 to 10 lit/sec/ha.

   (2) Design discharge for drainage crossings provided under roads and highways should be a runoff caused by a 25-year probable flood.

3. Diversion Weir and Intake

   (1) The diversion weir should be generally concrete ogee type or check-gate type.

   (2) The design flood discharge should be a runoff caused by a 25 or more than 25-year probable flood, depending on local conditions.

   (3) The intake structure should be steel-gated with concrete head orifice turnout.

4. Irrigation Canals

   (1) The canal density of main and lateral canals should be more than 13 m/ha.

   (2) The service area for a turnout should not exceed 50ha.

   (3) Water depth above the ground surface at the terminal structure should be more than 30 cm.

SUMMARY OF EXISTING NIA'S DESIGN CRITERIA FOR IRRIGATION/DRAINAGE FACILITIES

(4) Earth canals are generally trapezoidal in shape and the side slope should be 1:1 or flatter depending on soil conditions.

(5) Where the soil is porous or pervious, concrete-lined canal is advisable. At mountain side locations and deep cut sections wherein it is expected that the ground water table is very much higher than the water level in the canal, the bottom of concrete-lined canal should be provided with several one-way relief valves uniformly spaced and weep holes at the side slopes. The side slope should be 1:1 or flatter depending on soil conditions.

5. Farm Roads

(1) Farm roads should be provided along one embankment of main and lateral canals at a maximum density of about 20 m per ha.

(2) In case that a water surface width of main and lateral canals is less than 9 m, a 4 m wide road having 3 m wide gravel surfacing of 20 cm thickness should be provide on either bank of the canals, to the point in canal where design discharge becomes 0.3 m^3/sec. After this point, a 2.5 m wide road having 1.7 m wide gravel surfacing of 20 cm thickness should be provided to the end of main and lateral canals.

6. Drains

(1) All the drains should have a side slope of 1:1 or flatter depending on the soil conditions.

(2) To facilitate O&M work, one embankment of drains should be wide enough for utilizing the excavated materials from the channels so that it can be used as a roadway.

7. Hydraulic Design of Canals and Drains

(1) Hydraulic design of canals drains should be made using Manning's formula.

(2) Coefficients of roughness (n) should be as follows:

- Main and lateral canals (earth):	0.025
- Main and lateral canals (concrete):	0.015
- Farm ditch :	0.030
- Drain :	0.040

(3) Permissible velocities should be determined using Kennedy formula. Minimum velocity should be as follows:

- Irrigation canal:	0.3m/sec
- Drain:	0.4m/sec

NUMBERS OF SUB-PROJECTS DISQUALIFIED FROM CONFORMITY TO MINIMUM SELECTION CRITERIA

CISs

Conditions		Nos. of Sub-Project Disqualified
(One Condition)		(200)
1.	Years After Construction	26
2.	IA's Willingness	2
3.	Status of Amortizing Loan	54
4.	Ceiling of Development Cost	20
5.	Necessity of Rehabilitation	1
6.	EIRR	97
(Two Conditions)		(53)
7.	Years After Construction + Status of Amortizing Loan	7
8.	Years After Construction + Ceiling of Development Cost	1
9.	Years After Construction + Necessity of Rehabilitation	1
10.	Years After Construction + EIRR	3
11.	IA's Willingness + EIRR	5
12.	Status of Amortizing Loan + Ceiling of Development Cost	1
13.	Status of Amortizing Loan + EIRR	11
14.	Ceiling of Development Cost + EIRR	23
15.	Necessity of Rehabilitation+ EIRR	1
(Three Conditions)		(18)
16.	Years After Construction & Status of Amortizing Loan + Necessity of Rehabilitation	1
17.	IA's Willingness + Ceiling of Development Cost + EIRR	11
18.	Status of Amortizing Loan + Ceiling of Development Cost + EIRR	6
(Four Conditions)		
19.	Years After Construction + Status of Amortizing Loan + Necessity of Rehabilitation + EIRR	1
	Total	**272**

CIPs

Conditions		Nos. of Sub-Project Disqualified
(One Condition)		(48)
1.	Cropping Intensity	4
2.	Farm Household	3
3.	Average Farm Size	3
4.	Farmer's Willingness	5
5.	Minimum Requirement of Facilities	19
6.	Ceiling of Development Cost	8
7.	EIRR	6
(Two Conditions)		(8)
8.	Farmers' Willingness + Minimum Requirement of Facilities	1
9.	Farmers' Willingness + Ceiling of Development Cost	2
10.	Minimum Requirement of Facilities + Ceiling of Development Cost	2
11.	Development Cost + EIRR	3
(Three Conditions)		(2)
12.	Farmers' Willingness + Ceiling of Development Cost + EIRR	1
13.	Minimum Requirement of Facilities + Ceiling of Development Cost + EIRR	1
	Total	**58**