

THE REPUBLIC OF THE PHILIPPINES  
NATIONAL IRRIGATION ADMINISTRATION

THE MASTER PLAN STUDY ON THE SMALL-SCALE  
IRRIGATION DEVELOPMENT PROJECT  
(SSIDP)

MAIN REPORT

FEBRUARY 1992

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

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NATIONAL IRRIGATION ADMINISTRATION

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THE SMALL-SCALE IRRIGATION  
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NATIONAL IRRIGATION ADMINISTRATION**

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**MAIN REPORT**

**FEBRUARY 1992**

**JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)**

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## PREFACE

In response to a request from the Government of the Republic of the Philippines, the Government of Japan decided to conduct a Master Plan Study on the Small Scale Irrigation Development Project and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to the Philippines a study team headed by Mr. Tadashi SAKAMOTO, Nippon Koei Co., Ltd., two times between July 1990 and August 1991.

The team held discussions with the officials concerned of the Government of the Philippines, and conducted field surveys at the study area. After the team returned to Japan, further studies were made and the present report was prepared.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of the Philippines for their close cooperation extended to the team.

February, 1992



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Kensuke Yanagiya  
President

Japan International Cooperation Agency



# PHILIPPINES

116°

120°

124°

20°

20°

## REGIONS AND PROVINCES

### I. ILOCOS

1. ILOCOS NORTE
2. ABRA
3. ILOCOS SUR
4. MOUNTAIN PROVINCE
5. LA UNION
6. BENGUBAT
7. PANGASINAN

### II. CAGAYAN VALLEY

8. BATANES
9. CAGAYAN
10. KALINGA APAYAO
11. ISABELA
12. IPUGAO
13. NUEVA VISCAYA
14. QUIRINO

### III. CENTRAL LUZON

15. NUBVA ECIJA
16. TARLAC
17. ZAMBALES
18. TAMPAGUA
19. BULACAN
20. BATAAN

### IVA. NATIONAL CAPITAL REGION

### IV. SOUTHERN TAGALOG

21. AURORA
22. QUEZON
23. RIZAL
24. CAVITE
25. LAGUNA
26. BATANGAS
27. MARINDUQUE
28. MINDORO ORIENTAL
29. MINDORO OCCIDENTAL
30. ROMBLON
31. PALAWAN

### V. BICOL

32. CAMARINES NORTE
33. CAMARINES SUR
34. CATANDUANES
35. ALSAY
36. SORSOGON
37. MASBATE

### VI. WESTERN VISAYAS

38. AKLAN
39. CAPIZ
40. ANTIQUE
41. ILOILO
42. NEGROS OCCIDENTAL
43. NEGROS DEL NORTE

### VII. CENTRAL VISAYAS

44. CEBU
45. NEGROS ORIENTAL
46. BOHOL
47. SIQUIOR

### VIII. EASTERN VISAYAS

48. NORTHERN SAMAR
49. SAMAR
50. EASTERN SAMAR
51. NORTHERN LEYTE
52. SOUTHERN LEYTE

### IX. WESTERN MINDANAO

53. ZAMBOANGA DEL NORTE
54. ZAMBOANGA DEL SUR
55. BASTAN
56. SULU
57. TAWI-TAWI

### X. NORTHERN MINDANAO

58. SURIGAO DEL NORTE
59. CAGUIN
60. AGUSAN DEL NORTE
61. MISAMIS ORIENTAL
62. MISAMIS OCCIDENTAL
63. BUKIDNON
64. AGUSAN DEL SUR

### XI. EASTERN MINDANAO

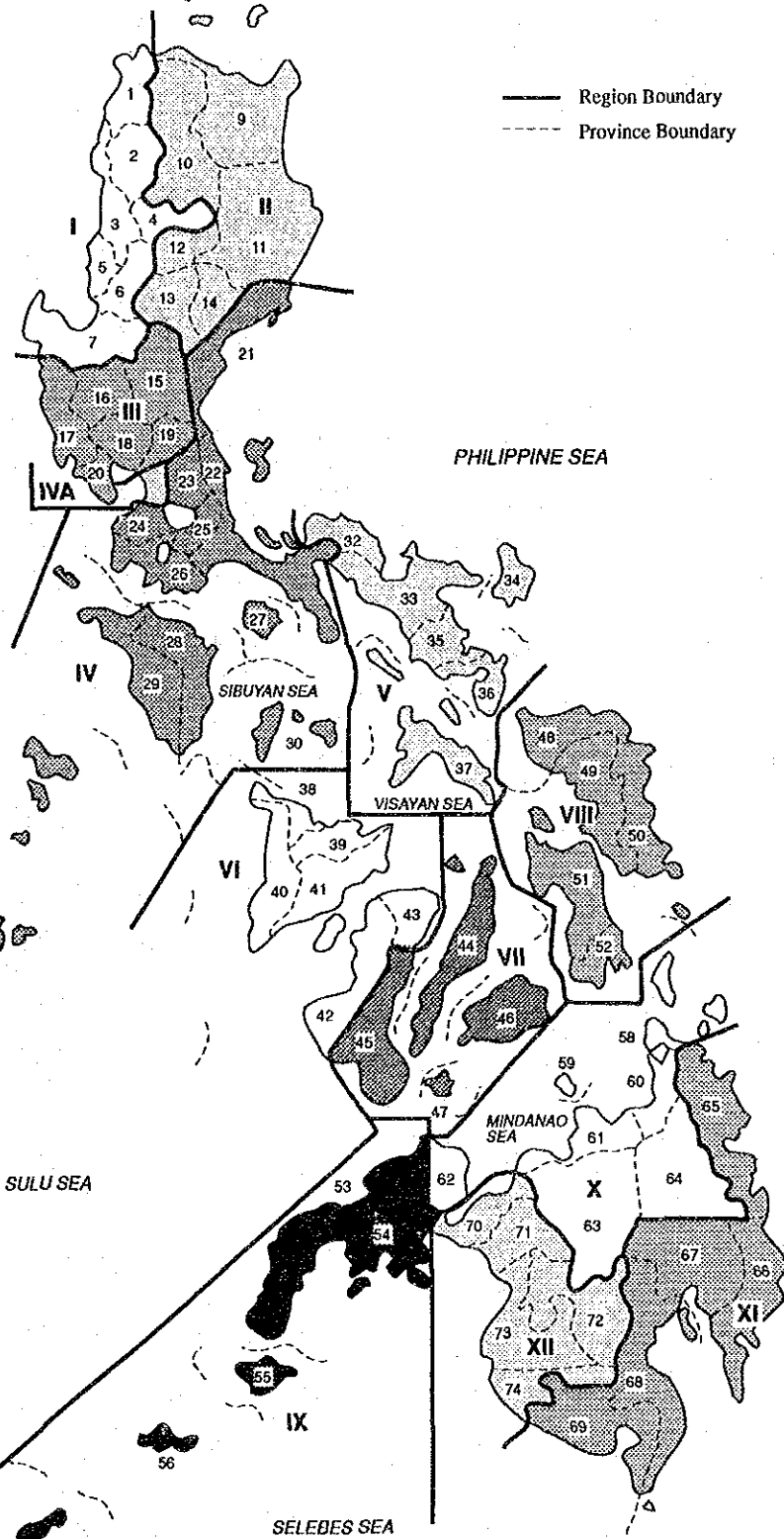
65. SURIGAO DEL SUR
66. DAVAO ORIENTAL
67. DAVAO DEL NORTE
68. DAVAO DEL SUR
69. SOUTH COTABATO

### XII. CENTRAL MINDANAO

70. LANA O DEL NORTE
71. LANA O DEL SUR
72. NORTH COTABATO
73. MAGUINDANAO
74. SULTAN KUDARAT



— Region Boundary  
 - - - Province Boundary



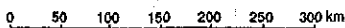
SOUTH CHINA SEA

PHILIPPINE SEA

SULU SEA

SELEBES SEA

SCALE



116°

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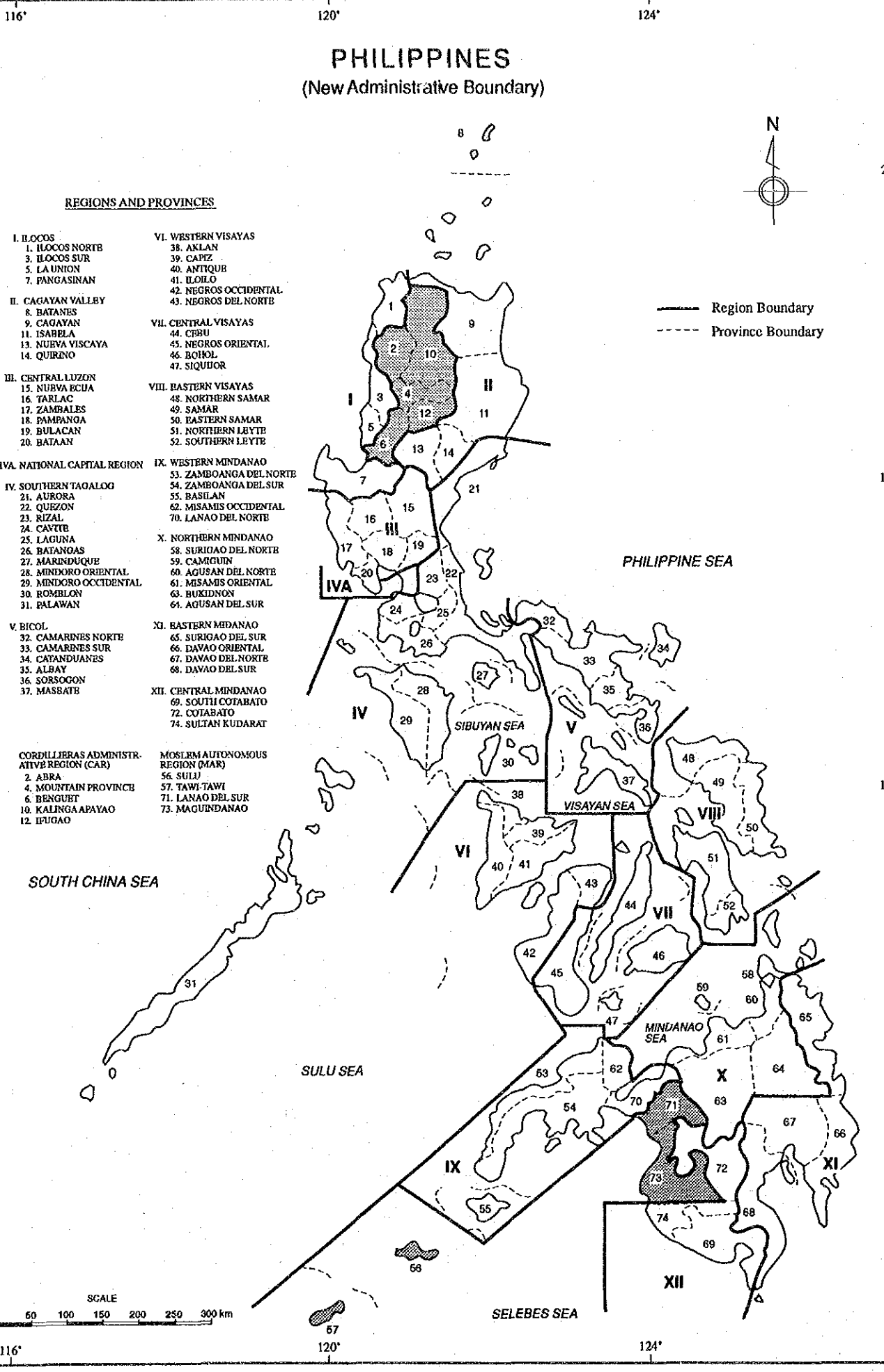
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# PHILIPPINES

## (New Administrative Boundary)



### REGIONS AND PROVINCES

- |   |   |
|---|---|
| <p><b>I. ILOCOS</b></p> <p>1. ILOCOS NORTE<br/>3. ILOCOS SUR<br/>5. LA UNION<br/>7. PANGASINAN</p> <p><b>II. CAGAYAN VALLEY</b></p> <p>8. BATANES<br/>9. CAGAYAN<br/>11. ISABELA<br/>13. NUEVA VISCAYA<br/>14. QUIRINO</p> <p><b>III. CENTRAL LUZON</b></p> <p>15. NUBVA ECUA<br/>16. TARLAC<br/>17. ZAMBALES<br/>18. PAMPANOA<br/>19. BULACAN<br/>20. BATAAN</p> <p><b>IVA. NATIONAL CAPITAL REGION</b></p> <p><b>IV. SOUTHERN TAGALOG</b></p> <p>21. AURORA<br/>22. QUEZON<br/>23. RIZAL<br/>24. CAVITE<br/>25. LAGUNA<br/>26. BATANGAS<br/>27. MARINDUQUE<br/>28. MINDORO ORIENTAL<br/>29. MINDORO OCCIDENTAL<br/>30. ROMBLON<br/>31. PALAWAN</p> <p><b>V. BICOL</b></p> <p>32. CAMARINES NORTE<br/>33. CAMARINES SUR<br/>34. CATANDUANES<br/>35. ALBAY<br/>36. SORSOGON<br/>37. MASSATE</p> <p><b>CORDILLERAS ADMINISTRATIVE REGION (CAR)</b></p> <p>2. ABRA<br/>4. MOUNTAIN PROVINCE<br/>6. BENGUET<br/>10. KALINGA<br/>12. IFUGAO</p> | <p><b>VI. WESTERN VISAYAS</b></p> <p>38. AKLAN<br/>39. CAPIZ<br/>40. ANTIQUE<br/>41. ILOILO<br/>42. NEGROS OCCIDENTAL<br/>43. NEGROS DEL NORTE</p> <p><b>VII. CENTRAL VISAYAS</b></p> <p>44. CEBU<br/>45. NEGROS ORIENTAL<br/>46. BOHOL<br/>47. SIQUJOR</p> <p><b>VIII. EASTERN VISAYAS</b></p> <p>48. NORTHERN SAMAR<br/>49. SAMAR<br/>50. EASTERN SAMAR<br/>51. NORTHERN LEYTE<br/>52. SOUTHERN LEYTE</p> <p><b>IX. WESTERN MINDANAO</b></p> <p>53. ZAMBOANGA DEL NORTE<br/>54. ZAMBOANGA DEL SUR<br/>55. BASHLAN<br/>62. MISAMIS OCCIDENTAL<br/>70. LANA DEL NORTE</p> <p><b>X. NORTHERN MINDANAO</b></p> <p>58. SURIGAO DEL NORTE<br/>59. CAMIGUIN<br/>60. AGUSAN DEL NORTE<br/>61. MISAMIS ORIENTAL<br/>63. BUKIDNON<br/>64. AGUSAN DEL SUR</p> <p><b>XI. EASTERN MINDANAO</b></p> <p>65. SURIGAO DEL SUR<br/>66. DAVAO ORIENTAL<br/>67. DAVAO DEL NORTE<br/>68. DAVAO DEL SUR</p> <p><b>XII. CENTRAL MINDANAO</b></p> <p>69. SOUTH COTABATO<br/>72. COTABATO<br/>74. SULTAN KUDARAT</p> <p><b>MOSLEM AUTONOMOUS REGION (MAR)</b></p> <p>56. SULU<br/>57. TAWI-TAWI<br/>71. LANA DEL SUR<br/>73. MAGUINDANAO</p> |
|---|---|

— Region Boundary  
- - - Province Boundary





**MASTER PLAN STUDY ON  
SMALL SCALE IRRIGATION DEVELOPMENT PROJECT (SSIDP)**

**SUMMARY AND CONCLUSION**

**INTRODUCTION**

01 This is the Master Plan Study Report on the Small Scale Irrigation Development Project (SSIDP). The Report presents the comprehensive results of the master plan study on the SSIDP which was executed by the Japan International Cooperation Agency (JICA) in close cooperation with the National Irrigation Administration (NIA).

02 The "Implementing Arrangement (I/A)" was concluded between JICA and NIA on February 8, 1990. It gives the framework of the "Master Plan Study on the Small Scale Irrigation Development Project " (hereinafter referred to as "the Study"):

- (1) objective of the Study is to formulate a master plan for the SSIDP, aiming at orderly utilization of nation's water and land resources;
- (2) the Study area covers the entire Philippines;
- (3) the Study is carried out in the following two (2) Phases:

Phase-I : Inventory survey and analysis

Phase-II : Formulation of master plan

**BACKGROUND**

03 The Philippines has a total land area of about 300,000 km<sup>2</sup>. The total population as of 1990 is estimated at 60.7 million. The population growth rate is about 2.3% per annum on an average during the decade 1980-1990. Future population is projected for the year of 2000 to be 75.2 million. The total labour force as of 1990 is estimated at about 24.3 million. Unemployment rate is officially estimated to be about 11% of the total labour force, while under-employment is put at over 30% of the employed. Households number 11.4 million with an average of 5.3 members. During the period 1961-1988, the total number of poor families increased from 3.3 to 5.2 million. Poverty incidence level stands at a high 49%.

- 04 GNP amounted to ₱1,132 billion (equivalent to US\$46.6 billion) or ₱18,400 (US\$758) per capita at current prices in 1990. Despite its vast resource potentials and a relatively high literacy rate of its labour force, the Philippine economy has tended to lag behind the other middle income countries of Asia. In 1990, real GNP grew only 3.1%, lower by 2.2% than the average annual growth rate during the previous 3 years (1987-1989). The major constraints to the economy's full development potentials are inflationary trends (14.5%), heavy external debt (US\$30.4 billion) and political instability combined with the uncertainties created by the Gulf crises, power supply failures and series of natural calamities.
- 05 In December 1986, the Aquino Government set forth the Medium-Term Philippine Development Plan 1987-1992. The Development Plan is directed towards (1) alleviation of poverty, (2) generation of more productive employment, (3) promotion of equity and social justice, and (4) attainment of sustainable growth. In November 1990, the Government revised the Development Plan in view of the recent economic situations, as given in the Updated Philippine Development Plan 1990-1992. The updated plan is apparently focussing on reducing unemployment and poverty in rural areas, considering the rapid growth of population especially of the labour force resulting from the higher rates of population growth in 1970s, and are directing towards active participation of the farmers in investment programs with efficient and complementary assistances of the government services.
- 06 The prime strategy of the Government is to enhance agricultural productivity, as the basis for self-sustaining economic growth. Agriculture is the most important sector, providing about 30% of the GDP, generating more than 60% of export earnings and directly employing about 50% of the total labour force. About 70% of the country's population live in the rural areas where two-thirds of the households depend on small farms for their main source of income. The rural area has a higher incidence of poverty (53%) compared with the urban areas (32%). In recent years, more than 80% farm families are classified as belonging the lower 30% income bracket. Accordingly, the following agricultural policies are emphasized in the updated development plan:
- (1) to enhance small farmer's income,
  - (2) to sustain the increase in productivity,
  - (3) to effect an equitable distribution of income,
  - (4) to develop and disseminate appropriate location-specific and cost-reducing production technologies,
  - (5) to attain food self-sufficiency/self-reliance,
  - (6) to create/increase employment opportunities in rural areas,
  - (7) to improve the marketing system,
  - (8) to expand availability of agricultural credit and farm input supplies, and

(9) to institutionalize the expanded participation of the farmers.

07 The country is endowed with a favorable climate, soils and labour force for agricultural production. However, the country is susceptible to seasonal variation of rainfall. Water supplies are insufficient in the dry season and sometimes prolonged drought has brought about destructive damages to the agricultural production. In the wet season, frequent floods cause serious damages to agricultural crops as well as the infrastructural facilities which support the agricultural activities. Irrigation and drainage development will surely mitigate such damages and thereby increase the rural income and revitalize the agricultural economy.

08 The country is endowed with the potential irrigable areas of about 3.13 million ha in total, out of which 1.47 million ha or 48% have already been developed:

<u>Potential Irrigable Areas</u>	:	<u>3,126,000 ha</u>
<u>Existing Irrigation Systems</u>	:	<u>1,469,000 ha</u>
National Irrigation System (NIS)	:	621,000 ha
Communal Irrigation system (CIS)	:	696,000 ha
Private Irrigation System (PIS)	:	152,000 ha

09 The irrigation systems in the Philippines are classified as follows:

(1) National Irrigation Systems/Projects (NISs/NIPs)

The NISs/NIPs are constructed and maintained by NIA and the beneficiaries are required to pay the irrigation service fee (ISF). Irrigation areas are generally more than 1,000 ha.

(2) Communal Irrigation Systems/Projects (CISs/CIPs)

The CISs/CIPs are constructed by NIA and owned/operated/maintained by the Irrigator's Associations (IAs) without government assistance. The beneficiaries are required to pay 10% of the chargeable construction cost during the construction stage and the remaining 90% are to be repaid without interest for a period not exceeding 50 years. Irrigation areas are generally less than 1,000 ha.

(3) Private Irrigation Systems/Projects (PISs/PIPs)

The PISs/PIPs are constructed by private organizations and owned, operated and maintained without assistance from NIA.

10 The NIA's communal irrigation development is one of the major components in the government's current countryside development program. The communal irrigation development program seeks to increase productivity of small farmers to uplift them from poverty. The communal irrigation projects are generally small in size and have the following advantages compared to medium-to-large sized projects:

- (1) Being small, the projects can be implemented faster; therefore benefits can be realized earlier;
- (2) The projects can be implemented at a cheaper cost per ha; therefore beneficiary farmers can afford paying the chargeable construction costs and thereby a larger number of farmers can benefit despite the limited funds and other endowed resources;
- (3) A lot of candidate projects have been or will be identified over the country and the project benefits can be distributed more or less equitably throughout the entire country;
- (4) After construction works, the systems can be operated and maintained by the Irrigator's Associations (IAs); therefore continuous government assistance will not be required; and
- (5) Such small projects will easily trigger farmers' potential capability for increased agricultural production, because the projects are constructed through the so-called farmers-participatory approach and the irrigation facilities are owned by the farmers themselves.

1.1 The small scale irrigation development project (SSIDP) is a kind of communal irrigation development and is defined as those of run-of-river type having an irrigation area of 50 - 500 ha in net. The CISs/CIPs that are served by pumps and/or those with storage dams are excluded from the SSIDP. In the light of the above definition, the total number of the existing SSIDP is estimated on the basis of the NIA's master list, to be about 2,800 sub-projects covering a total area of 405,000 ha with an average irrigation area of 143 ha per sub-project. The existing SSIDP correspond to about 70% of CISs in terms of the total net irrigated area (firmed-up).

	Nos.	Total Area (ha)	Average Area (ha)
above 500 ha	115	106,500	926
<u>50 - 500 ha</u>	<u>2,838</u>	<u>405,200</u>	<u>143</u>
below 50 ha	3,852	68,400	18
Total	6,805	580,100	85

Source: NIA's master list of CIS (Pump schemes and SWIM/SRIP are excluded)

## DATA COLLECTION FOR MASTER PALN

### 1.2 Original Inventory Survey

The sub-projects for inventory survey were selected from the following sources, considering the agreed definition of SSIDP:

- (1) Sub-projects for new development: all the CIPs indicated in the " Provincial Irrigation Profiles" prepared by NIA in 1989.
- (2) Existing sub-projects for rehabilitation: all the CISs included in the NIA's master list as of July 1990 (updated by the Study Team)

13 The questionnaires for inventory survey were distributed during the meetings with PIEs held on August 14-16, 1990. The inventory survey was finally completed on December 3, 1990 and the filled-out questionnaires were returned by all of 67 PIOs. Total number of returned questionnaires was 4,192. After screening, 3,889 sub-projects were qualified as the candidate sub-projects for the master plan.

- (1) no. of inventoried sub-projects: 4,811 (CIP; 1,973, CIS: 2,838)
- (2) no. of questionnaires returned: 4,192 (CIP; 1,631, CIS: 2,561)
- (3) no. of sub-projects for the Study: 3,889 (CIP; 1,466, CIS: 2,423)

14 Additional Inventory Survey

The additional inventory survey was carried out for 967 sub-projects (CIS: 763, CIP: 204) which were considered having the detailed engineering data and information that had not been collected at a sufficient level during the original inventory survey. The additional inventory survey was carried out by NIA during March - May, 1991 on the basis of the questionnaires prepared by the JICA Study Team. The filled-out questionnaires returned by June 15, 1991 were 854 in total (CIP: 179, CIS: 657) or about 88% of the inventoried sub-projects. The returned questionnaires were encoded into the computer and merged with the original database for succeeding analysis.

15 Data Collection on Institutional Aspect

NIA has emphasized the importance of strengthening PIOs in order to accelerate the communal irrigation development programs, because all CISs/CIPs are implemented by PIOs under supervision of respective RIOs. The supplemental questionnaires were distributed to 78 PIOs/RIOs( 67 PIOs / 11 RIOs) in October 1990, to clarify the needs and capability of RIOs/PIOs as well as the viability of IAs. The filled-out questionnaires were returned by all PIOs/RIOs and analyzed under Phase-II.

16 Supporting Data Collection/Studies

The following supporting data collection and studies provided the standards and/or guidelines for such cross-checking of the inventoried data as well as supplement of the missing data, and thereby reinforced the computerized database:

- (1) Presently available reports on the foreign-assisted and locally-funded CISs/CIPs;
- (2) Existing NIA's guidelines and criteria for communal irrigation development; and
- (3) Field inspections of existing 32 sample sub-projects (under Phase-I).

#### 17 Pre-feasibility Studies on Representative Sample Sub-projects

The field inspections for the pre-feasibility studies on the representative sample sub-projects were jointly carried out by NIA and the JICA Study Team under Phase-II. The field inspections included walk-through the service areas, engineering measurement at the major structure sites, discussion with IA officials, informal interviews with farmers and discussions with NIA officials at both regional and provincial levels. The data and information collected from the pre-feasibility studies were fully utilized for cross-checking and supplement of the inventoried data. The 10 representative sample sub-projects were as follows:

##### Existing sub-projects for rehabilitation (CISs)

(1)	Tumbaga CIS	(121 ha)	Quezon
(2)	Bayunan CIS	(170 ha)	Iloilo
(3)	De La Paz CIS	(120 ha)	Iloilo
(4)	Tag-Amakan CIS	(51 ha)	Cebu
(5)	Caray-Caray CIS	(150 ha)	Northern Leyte
(6)	Macupa CIS	(450 ha)	Northern Leyte

##### Sub-projects for new development (CIPs)

(1)	Kinatihan CIP	(100 ha)	Quezon
(2)	Pacheco CIP	(200 ha)	Cavite
(3)	Bairan CIP	(64 ha)	Iloilo
(4)	Maragondong	(400 ha)	Northern Leyte

## COMPUTERIZED DATABASE

#### 18 Data Encoding and Computer Program

The most common relational database software "d-BASE III" was used for processing the results of the inventory survey. In order to process the huge amount of data in the shortest possible time, special computer programs for data entry and printing were prepared using internal language of "d-BASE III". The computer programs for checking and classification of the entered data were also prepared: those for checking aim to find out automatically the abnormal figures of the encoded data in the computers, and those for classification aim to calculate the frequency distribution of the answer to each question.

**19 Cross-checking and Supplement of Encoded Data**

The filled-out questionnaires returned from PIOs included a lot of abnormal and/or questionable data or were completely lacking in the basic data which the existing NIA's "project selection criteria" require for qualification of sub-projects for implementation. Various technical analysis of the encoded data was made for cross-checking of the basic data such as designed irrigable area, cropping intensity, development costs, irrigation benefits and economic rate of return; in particular, relationship between construction cost and the related factors such as scale of development, topographic condition, and kinds and size of physical facilities. Based on the analysis and studies, abnormal data were adjusted within the reasonable range, and the missing data (for example, the data for engineering dimensions are available, but no data available for the cost) were supplemented using the available data.

**20 Computerized Database and Master Plan**

Formulation of the master plan was primarily based on the computerized database which was structured under the Study and reinforced through the above cross-checking and supplement of the basic data.

**CURRENT STATUS OF CANDIDATE SUB-PROJECTS**

**21** The candidate sub-projects for the master plan study were 3,889 (CISs: 2,423, CIPs: 1,466) in total. The general features of those candidate sub-projects is summarized hereunder (it should be noted that unless otherwise specified, the following summary was based on the original data of the inventory survey which were neither cross-checked nor supplemented):

**22** The CISs are classified into three types:

- (1) Amortizing System : System constructed by NIA
- (2) Non-Amortizing System : Doled-out system constructed before 1974 or some FSDC constructed projects
- (3) Private System : System constructed by farmers and farmers' association

Amortizing	Non-Amortizing	Private	Total
1,147 (47%)	720 (30%)	556 (23%)	2,423 (100%)

All CIPs/CISs that are constructed/rehabilitated with NIA assistance will be subject

to the present system of amortization. Likewise, this will apply to the existing non-amortization and private systems that will be rehabilitated with NIA assistance.

### 2.3 Average Catchment Area at Intake

Catchment area data are available for 50% of CISs and 58% of CIPs. The average catchment area at intake is 21 km<sup>2</sup> for CISs and 18 km<sup>2</sup> for CIPs. The catchment areas of about 90% of the CISs/CIPs are smaller than 100 km<sup>2</sup>.

Catchment Area	0-100 km <sup>2</sup>	100-1,000 km <sup>2</sup>	Over 1,000 km <sup>2</sup>	Total
CISs (no.)	1,100 (90%)	100 (8%)	29 (2%)	1,229
CIPs (no.)	783 (93%)	56 (7%)	5 (0%)	844

### 2.4 Average Low Flow in the Dry Season

River discharge data are available for 53% of CISs and 60% of CIPs. The average low flow in the dry season is about 190 lit./sec for both CISs/CIPs. More than 80% of the CISs/CIPs are smaller than 1,000 lit./sec.

Low Flow (lit./sec)	Less than 500	500 - 1,000	More than 1,000	Total
CISs (no.)	1,115 (68%)	256 (16%)	254 (16%)	1,625 (100%)
CIPs (no.)	628 (69%)	106 (12%)	168 (19%)	902 (100%)

### 2.5 Designed Irrigable Area

Average designed irrigable area in the wet season is 145 ha for CISs and 144 ha for CIPs, while that in the dry season is 135 ha for CISs and 128 ha for CIPs. About 70% of CISs/CIPs have the designed irrigable area of less than 150 ha.

	50 - 150 ha	150 - 300 ha	300 - 500 ha	Total	Average (ha)
CISs (no.)	1,669	554	200	2,423	(145)
CIPs (no.)	1,024	338	104	1,466	(144)

### 2.6 Actually Irrigated Areas (CISs)

The actually irrigated areas are always smaller than the designed irrigable areas; on an average, 75% the designed irrigable area for wet season and 59 % for dry season:



Designed Irrigable Area	Wet Season		Dry Season	
	Actually Irrigated Area	Ratio	Actually Irrigated Area	Ratio
351,769	263,554	0.75	207,681	0.59

## 27 Cropping Intensity

Average present cropping intensity is 171% for CISs and 128% for CIPs.

	Cropping Intensity (%)									Average (ha)
	0-50	50-100	100-130	130-150	150-170	170-200	Over 200	Unknown	Total	
CISs (no.)	0	213	121	230	233	1,191	20	415	2,423	171.3
CIPs (no.)	74	221	68	111	79	170	1	742	1,466	128.2

(Definition of cropping intensity is shown in Glossary)

## 28 Irrigation and Drainage Facilities

The candidate sub-projects generally have such irrigation and drainage facilities as diversion dam with an intake structure, irrigation and drainage canals, access/service roads and flood protection dike. The average densities of the facilities are as follows:

Facilities	Densities
1. Diversion weir	26.4 m/sub-project
2. Irrigation canals	
2.1 Diversion channels	7.9 m/ha
2.2 Main/lateral canals	28.6 m/ha
2.3 Field ditches	34.2 m/ha
3. Drainage canals	
3.1 Project/farm drains	9.4 m/ha
3.2 Drainage ditches	9.5 m/ha
4. Service road	1.4 km/sub-project
5. Access road	1.6 km/sub-project
6. Flood protection dike	878 m/sub-project

(Based on the cross-checked and supplemented data)

## 29 Average Farm Size

Average farm size of CISs and CIPs is 1.5 ha and 1.7 ha, respectively and almost all of CISs and CIPs are less than 5 ha in average farm size:

Farm Size (ha)	Less 1	1-2	2-3	3-4	4-5	Over 5	Unknown	Total	Average
CISs (no.)	681	652	220	93	39	2	736	2,423	1.5
CIPs (no.)	268	282	127	56	22	6	705	1,466	1.7

### 30 Average Crop Yield

Double cropping of paddy is commonly practiced in the CISs/CIPs, covering 94% of the total irrigable areas. Major diversified crops are sugarcane, vegetable, legume and fruit. Average paddy yield for CISs is 3.6 ton/ha both for wet and dry seasons, while that for CIPs is 2.7 ton/ha for wet season and 2.9 ton/ha for dry season:

Paddy Yield (tons/ha)	Wet Season	Dry Season
CISs	3.6 tons/ha	3.6 tons/ha
CIPs	2.7 tons/ha	2.9 tons/ha
Incremental Unit Yield per ha	0.9 ton/ha	0.7 ton/ha

### 31 Status of Irrigators' Associations (IAs)

The Irrigator's Associations (IAs) are organized in 74% of CISs and 9% of CIPs. Average number of the IA members are 100 households for CISs and 79 households for CIPs.

	No IA organized	IA organized	Unknown	Total	Average nos. of IA members
CISs	405	1,804	214	2,423	100
CIPs	1,152	129	185	1,466	79

## PROCEDURES FOR IMPLEMENTATION OF CISs/CIPs

### 32 Organizational Set-up for Implementation of CISs/CIPs

At the NIA Central Office, the over-all planning, coordination and monitoring of activities pertaining to communal irrigation development is being handled by the Communal Irrigation Department (CID) which, although approved by the NIA Board, has yet to be concurred by the Department of Budget and Management.

33 Regional Irrigation Offices (RIOs)

The RIOs are tasked with CID planning and programming at the regional level. They supervise the preparation of the annual and 5-year communal irrigation development programs of the PIOs based on identified sub-projects. The annual programs of the PIOs are determined by the budgetary allocation set by the RIOs based on the allotment given by the Central Office. Under the provisions for delegated authority, the RIOs approve certain levels of program of works, prepare design of structures and enter into contract for project construction/rehabilitation. They also endorse proposed sub-projects to the Central Office for funding.

34 Provincial Irrigation Offices (PIOs)

The CISs/CIPs are actually implemented by the PIOs under the direct supervision of the RIO. The PIOs' functions are divided into three phases:

- (1) Pre-Construction Phase  
Conduct all activities under F/S and D/E stages as well as form IAs and provide them with basic training and assistance on the organizational aspect.
- (2) Construction Phase  
Undertake and/or supervise construction works as well as conduct periodic cost reconciliation with IAs and training on irrigation system management
- (3) Operation and Maintenance Phase  
Sustain the activities of the IAs as viable organizations since at this stage, the entire responsibility of system operation is left to the IAs.

35 The participatory approach is a basic requirement in the implementation of CIS/CIP. It enables the farmers to familiarize themselves with irrigation project, provide the "ownership status" and corresponding responsibility, and prepare them for an effective operation and maintenance of the system. Therefore, farmers' participation is ensured at all phases of project implementation, and for this purpose, the PIOs assign the Irrigation Development Officers (IDOs) at the sub-project sites. The IDOs play a key role in establishing the IAs, building up their capabilities and providing the vital link with NIA with the following functions:

- (1) Assists farmers/irrigators in organizing IAs;
- (2) Helps IAs in the securing of legal requirements;
- (3) Facilitates the establishment of IAs' working committees ;
- (4) Facilitates the capability development programs on IA leadership, financial management and irrigation system management;
- (5) Monitors and evaluates the progress and status of the IAs;
- (6) Assists in the collection of amortization fee;
- (7) Monitors and evaluates the O&M performance of the systems ; and
- (8) Helps the IAs to secure assistance from other government agencies.

36 A 5-year period is generally required in the implementation of CIS/CIP. This consists of the following phases :

- (1) Identification, investigation and selection phase (about 1 year);
- (2) Pre-construction phase (about 1 year);
- (3) Construction phase (about 1.5 years); and
- (4) O&M phase (about 1.5 years).

### **CRITERIA FOR SCREENING AND PRIORITIZATION**

37 Technical and administrative manuals for implementation of CISs/CIPs have been prepared by NIA. The manuals contain 34 specific guidelines with many standard forms which deal with almost all aspects of the required works for communal irrigation development . These guidelines are generally well-prepared, and hence, further improvement would not be required under the present circumstances. However, upon the request of NIA, the following two criteria were examined under the Study:

- (1) Selection of priority sub-projects, and
- (2) Prioritization of such qualified sub-projects.

38 NIA will allow PIOs to implement any sub-projects satisfying the "minimum selection criteria" and leave PIOs to prioritize such qualified sub-projects. The "minimum selection criteria" are therefore very important in this sense, compared with the "criteria for prioritization". The "minimum selection criteria" are applied to all types of CISs/CIPs, irrespective of funding sources. The proposed sub-projects are expected to have the feasibility studies and are sufficiently supported with basic data to examine their qualification in the light of the "minimum selection criteria.

39 The proposed "minimum selection criteria" for CIPs are as follows:

- (1) The sub-project with more than 20% land still eligible for re-distribution under the CARP should be included only after emancipation patents had been issued for more than 80% of the eligible land;
- (2) The expected cropping intensity should be at least 130% based on the net irrigable area estimated during the pre-engineering phase;
- (3) The proposed irrigation area should have soils and slopes suitable for irrigated crop production;

- (4) There should be no conversion of land use from productive permanent crops like coconuts and orchards;
- (5) The smallest sub-project should serve at least 20 farmers;
- (6) The average farm size in the proposed irrigable area should be not more than 5 ha;
- (7) Farmers should be actively involved in preparing their scheme, and should concur with its initial feasibility design (at least 80% of the representative sample respondents are willing to amortize chargeable cost of the sub-project);
- (8) The designed irrigation and drainage facilities should be conformable to the minimum requirement of facilities which is specified in separate guideline;
- (9) The irrigation development cost (chargeable cost) for each sub-project should not exceed ₱ 70,000/ha. Subject to this ceiling of per ha cost, average chargeable cost for a package of sub-projects should not exceed ₱ 35,000/ha. Exceptions to this criterion would be sub-project in areas suitable for high value crops, for which a ceilings of ₱ 100,000/ha may apply, provided the average costs are maintained as stipulated earlier (all at 1990 prices); and
- (10) The economic internal rate of return (EIRR) of the proposed sub-project should be not less than 10%.

**40** The proposed "minimum selection criteria" for CISs (rehabilitation) are as follows:

- (1) A package plan should exclude the sub-projects which have been constructed or rehabilitated during the past 5 years; however, the amortizing sub-projects damaged by typhoon, floods and all other calamities shall be included, irrespective of the years after construction and /or rehabilitation;
- (2) Rehabilitation and/or improvement works have been requested by the Irrigator's Association and at least 80% of the IA members are willing to amortize chargeable cost of the sub-project;
- (3) The irrigator's association (IA) is amortizing the existing loan or has fully paid the required equity (in case of amortizing system);
- (4) In case of the sub-projects with more than 20% land still eligible for re-distribution under the CARP, the emancipation patents have been issued for more than 80% of eligible land;
- (5) The irrigation development cost (chargeable cost) for each sub-project should not exceed ₱ 35,000/ha. Subject to this ceiling of per ha cost, average chargeable cost for each package of sub-projects should not exceed ₱ 18,000/ha. Exceptions to this criterion would be sub-project in areas suitable for high value crops, for which a ceilings of ₱ 55,000/ha may apply, provided the average

costs are maintained as stipulated earlier (all at 1990 prices).

- (6) At least one of the following should be applicable:
- (a) The actual cropping intensity has continuously been less than 130% during the past 5 years;
  - (b) Actually irrigated area has decreased by more than 25% in the past 5 years;
  - (c) Operation and maintenance (O&M) costs are charged by the irrigator's association (IA); however, actual expenses have increased in the past 5 years due to deterioration of the irrigation and drainage facilities;
  - (d) The existing irrigation and drainage facilities are not conformable to the minimum requirement of facilities which is specified in separate guideline;
  - (e) The existing facilities are damaged by natural disaster such as typhoon, floods and earthquakes and rehabilitation is urgently required; and
- (7) The economic internal rate of return (EIRR) of the proposed sub-project should be not less than 10%.

41 Only qualified sub-projects will be entitled to proceed for further prioritization and implementation. The "criteria for prioritization" should be location-specific at the provincial level, reflecting relative importance of the the following factors (for which standard merit points are suggested):

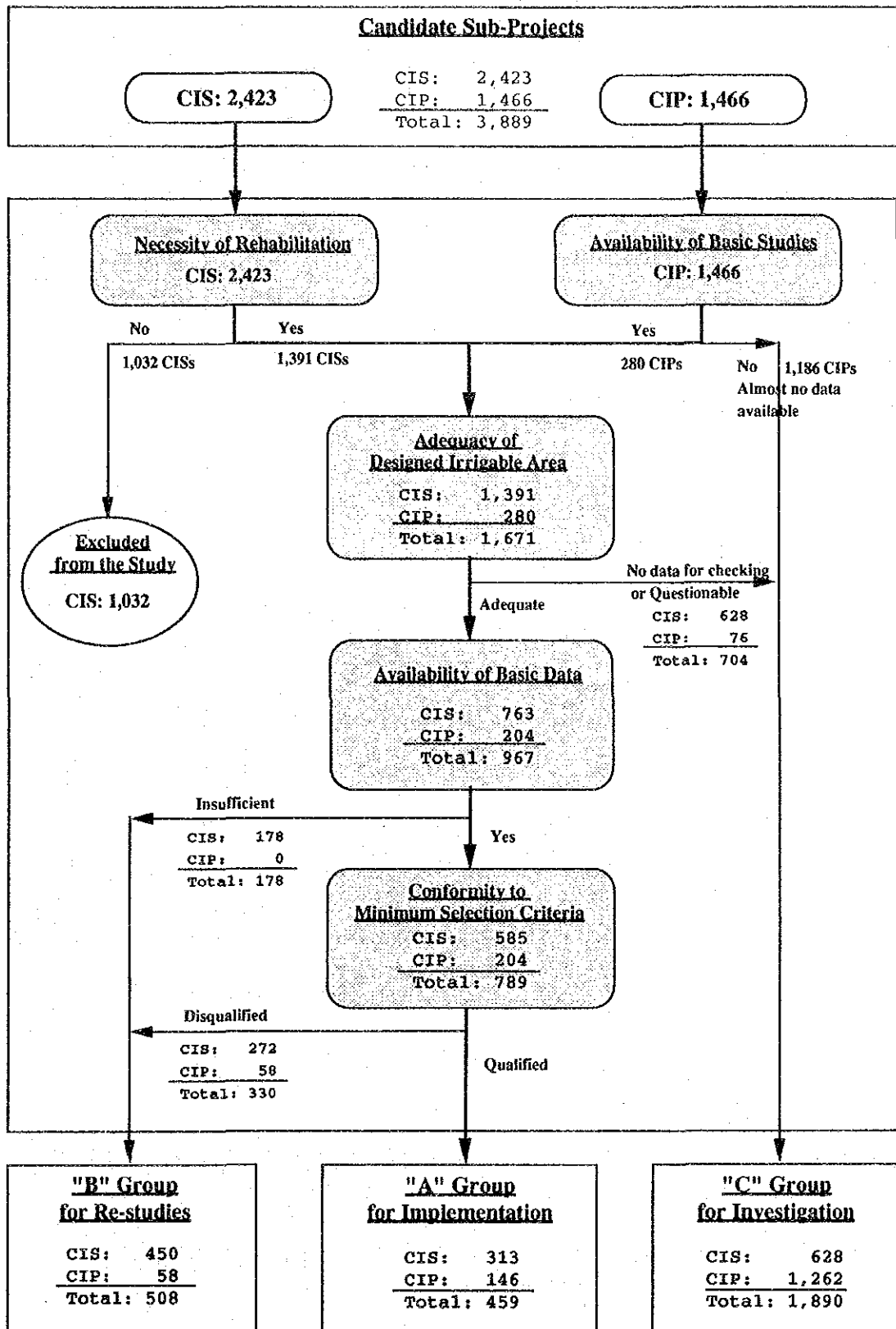
(1)	<u>Economic Viability Factors</u>	50
	(a) Economic internal rate of return (EIRR)	30
	(b) Cropping intensity for CIPs or % of area restoration for CISs	20
(2)	<u>Institutional Factors</u>	30
	(a) Organization of IAs	10
	(b) Willingness to render equity/amortization	10
	(c) Right of way problem	5
	(d) Local government endorsement	5
(3)	<u>Socio-economic Factors</u>	20
	(a) Average farm size	5
	(b) Average farm income	5
	(c) Land eligible for re-distribution under CARP	5
	(d) Peace and order condition	5

## PRIORITY GROUPING OF CANDIDATE SUB-PROJECTS

42 Priority grouping of the inventoried sub-projects aims to facilitate the formulation of 10 year development program for SSIDP. The inventoried sub-projects were classified into the following three (3) priority groups (refer to next page):

- (1) "A" group: sub-projects to be implemented,
- (2) "B" group: sub-projects to be re-studied, and
- (3) "C" group: sub-projects to be newly investigated

## PRIORITY GROUPING OF CANDIDATE SUB-PROJECTS



43 The results of the priority grouping are summarized as follows:

Group	CISs		CIPs		Total	
	Nos.	Area (ha)	Nos.	Area (ha)	Nos.	Area (ha)
(1) "A" Group	313	49,024	146	21,807	459	70,831
(2) "B" Group	450	62,826	58	7,999	508	70,825
(3) "C" Group	628	89,734	1,262	181,895	1,890	271,629
sub-total	<u>1,391</u>	<u>201,584</u>	<u>1,466</u>	<u>211,701</u>	<u>2,857</u>	<u>413,285</u>
(4) Excluded from the Study	1,032	150,262	-	-	1,032	150,262
Total	2,423	351,846	1,466	211,701	3,889	563,547

44 The general features of the "A" Group sub-projects are as follows:

Items	CIPs	CISs	Total (average)
Nos. of sub-projects (nos.)	146	313	459
Designed Irrigable Area (ha)			
Wet season	21,807	49,024	70,831
Dry season	19,623	43,325	62,948
Total	41,430	92,349	133,779
Cropping intensity (%)	190%	188%	189%
Irrigation areas to be restored (ha)			
Wet season	0	16,300	16,300
Dry season	0	20,200	20,200
Total	0	36,500	36,500
Farmers beneficiaries (nos.)	14,219	39,455	53,664
Average farm size (ha)	1.53	1.24	1.32
Incremental rice production (tons)	113,000	88,000	201,000
Project cost (₹ 1,000)			
Chargeable cost	727,528	399,046	1,126,574
Non-chargeable cost	231,853	132,763	364,616
Total	959,381	531,809	1,491,190
Chargeable cost per ha (₹)	33,362	8,140	(15,905)

## FRAMEWORK OF MASTER PLAN

45 The Study is intended to provide the framework plan for implementation of SSIDP which shall be reflected in the NIA Corporate Plan in the future, focusing on:

- (1) 10 year development program (1993-2002) which shall comprise:
  - national development targets
  - strategies to attain the target
  - annual implementation schedule
  - financial requirement for implementation



- (2) Program for strengthening and improvement of RIOs/PIOs, and
- (3) Program for institutional development of IAs.

#### 46 Development Target

NIA set forth the development target for 1990-2000 in the Corporate Plan, in which a total of 816,400 ha (CISs: 395,700 ha, CIPs: 420,700 ha) is given as an official target for the communal irrigation development:

(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.

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

The country is short of about 0.28 million tons of rice as of 1990. The situation will go from bad to worse in the coming years, unless special measures will be taken. The shortage of rice in 2000 is estimated to be about 1.89 million tons. The demand and supply situations of rice for 2000 are compared with those for 1990 as follows:

		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

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

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 above development target will be realized:

		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

**49** Development Target for SSIDP

Judging from the supply and demand projections for rice, the NIA's efforts to realize the target would be needed and appreciated. The SSIDP is expected to contribute 70% against the above target of 816,400 ha or about 570,000 ha in total (CISs: 280,000 ha, CIPs: 290,000 ha).

- 50** The development target for SSIDP is compared with the total irrigable area of the candidate sub-project for the Study:

	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

- 51** Shortage of the sub-projects is obvious against the development target for SSIDP. More candidate sub-projects will be needed to catch up with the targets. Those sub-projects to be identified in the future are referred to as "D" group sub-projects. Among 74 provinces, 49 provinces need to identify the "D" group sub-projects.

**52** Provincial Development Targets

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 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).

53 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%)

54 Strategies to Attain the Development Target

In order to attain the development target, all of the inventoried sub-projects ("A", "B" and "C" groups) are included in the 10 year development program. The program will also indicate the provincial target areas for identification of the "D" group sub-projects. The conceptual strategies to attain the development target is given on the next page.

55 The development target is rather ambitious. The following, among others, will be required to attain the target:

- (1) Implementation of development program at the provincial level,
- (2) Strengthening and improvement of implementing capability of PIOs,
- (3) Improvement of administrative/managerial capacity of NIA Central Office, and
- (4) Arrangement of funding sources for implementation of development program.

## **INSTITUTIONAL DEVELOPMENT FOR SSIDP**

- 56 The ultimate goal of institutional development is to enable the farmer beneficiaries identify and understand their needs, problems and capabilities and then empower them to uplift their conditions using their resources with only minimal assistances from NIA and other concerned agency/entity.
- 57 Major target groups for institutional development will be the PIOs (and to some extent RIOs) and the IAs. The PIOs/RIOs are generally constrained to do the task, because they are understaffed and/or have inadequately trained staff as well as lack the necessary facilities and equipment. The problem has worsened in view of the current wider scope of the PIO's responsibilities due to the shift of development focus from medium/large-scale to communal type irrigation schemes.
- 58 The participatory approach has helped forge a more effective partnership between NIA and the IAs. This approach has given a new dimension to the bottom-to-top planning process which has been welcomed among the local government officers and farmers representatives. It has opened new possibilities which are considered unthinkable in rural development perspective. To further ensure the success of such a participatory approach, there will be a need to sustain and improve the present institutional development efforts of NIA.
- 59 Strengthening of PIOs/RIOs  
 The implementing capability of the PIOs/RIOs, 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 will help ensure the successful implementation of the 10 year development program. The Study offers the following recommendations :

## Strengthening of PIOs/RIOs

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### Personnel Complement:

- (1) Fill-up vacant technical positions in PIOs; give utmost priority to the recruitment of those NIA personnel who have been temporarily laid-off;
- (2) Upgrade the salary of the PIE equivalent to the level of other provincial chiefs of other government agencies according to the 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 Improvement:

- (5) Ensure a better coordination of activities and cultivate more rapport among project preparation staff, project-in-charge (construction) and IDOs;
- (6) Increase the participation or authority of the PIOs/RIOs in the bidding and packaging 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 Supports

- (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 Aspects

- (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) so as to commence construction works from January to June;
  - (13) Establish a regular seed fund for investigation and survey of the proposed sub-projects which would be replenished once project funds are available; and
  - (14) Provide more allotment directly to project construction works and minimize the budgetary reserve fund, management fees and general overhead surcharges.
-

## **6 0 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.

## **6 1 Institutional Development of IAs**

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. Suggestions on this aspect are as follows :

### **Personnel/Organizational Improvement**

- (1) Give continuous emphasis on its participatory approach, self-liquidating or non dole-out mechanism;
- (2) Avoid over-dependency of IAs on the IDOs; encourage the IAs to handle a bigger share of the task or responsibility;
- (3) Assess IA's weaknesses, strengths and potentials and provide appropriate training correspondingly;

### **Facilities and Logistics / Funding Supports**

- (4) In line with the self-improvement policy, encourage IAs to procure 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.

## IMPLEMENTATION SCHEDULE AND COST ESTIMATES

### 6.2 Implementation Schedule

The implementation schedule for the 10 year development plan was prepared on the provincial basis under the following conditions:

- (1) Development priority 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) The "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 the qualified ones are to be implemented;
- (4) For the "C" group sub-projects, feasibility studies (F/S) shall be carried out, and after these studies, only the 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;
- (6) Periods for feasibility study or re-study, detailed design, and construction shall be as follows;
 

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 ; and
- (8) The implementation schedule shall be regularly reviewed and revised.

### 6.3 The implementation schedule of the 10 year development program is as follows:

(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
<b>Total</b>	<b>49,024</b>	<b>21,807</b>	<b>70,831</b>	<b>280,517</b>	<b>290,000</b>	<b>570,517</b>

#### 64 Total Fund Requirement for 10 Year development Program

The total fund requirements are estimated at ₱ 25.5 billion for the implementation of 10 year development program and ₱ 2.1 billion for the "A" group sub-projects, including the price contingencies for 10 years of 1993-2002:

Cost Items	(unit: ₱ million)					
	"A" Group			10 Year Program		
	CISs	CIPs	Total	CIS	CIP	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
<u>Project costs estimates</u>						
(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(4.41%/year)	184	213	397	1,633	6,035	7,668
Total	835	1,223	2,058	5,513	19,960	25,473

(at current price in 1990)

#### 65 Costs required for Institutional Development

In addition to the above fund requirements, the following costs are required for institutional development of PIOs/RIOs (preliminary estimates):

Items	(unit: ₱ million)	
	"A" Group	10 Year Program
(1) Training of PIO Staff	25	25
(2) Improvement of Offices	48	61
(3) Procurement of Construction Equipment	438	1,049
(4) Procurement of Survey Equipment	37	41
(5) Procurement of Office Equipment	7	8
<u>Sub-total</u>	<u>555</u>	<u>1,184</u>
(6) Price Contingencies(4.41%/year)	82	225
Total	637	1,409



## GENERAL CONCEPT OF IMPLEMENTATION SCHEDULE

Works	Total No. of Sub-Projects		Total Designed Irrigable Area (ha)		10 - Year Period															
	CIS	CIP	CIS	CIP	1st 5 Year					2nd 5 Year										
					1993	1994	1995	1996	1997	1998	1999	2000	2001	2002						
<b>I. "A" Group Sub-Projects</b>																				
<u>CISs (313 Sub-Projects)</u>																				
- D/D Completed Sub-Projects	33	-	7,111	-																
- F/S Completed Sub-Projects	53	-	7,057	-																
- F/S Sub-Projects	227	-	34,856	-																
<u>CIPs (146 Sub-Projects)</u>																				
- 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)																
<b>II. "B" Group Sub-Projects</b>																				
<u>CISs (450 Sub-Projects)</u>																				
- Restudy Sub-Projects	365	-	50,583	-																
<u>CIPs (58 Sub-Projects)</u>																				
- Restudy Sub-Projects	-	58	-	8,028																
<b>III. "C" Group Sub-Projects</b>																				
<u>CISs (628 Sub-Projects)</u>																				
- F/S Sub-Projects	537	-	75,162	-																
<u>CIPs (1,262 Sub-Projects)</u>																				
- F/S Sub-Projects	-	1,148	-	165,665																
Sub-Total (I + II + III)	(1,215)	(1,352)	(174,769)	(195,500)																
<b>IV. "D" Group Sub-Projects</b>																				
<u>CISs</u>																				
- Identification Sub-Projects			105,748	-																
<u>CIPs</u>																				
- Identification Sub-Projects			-	94,500																
Grand Total (I + II + III + IV)			289,517	290,000																
<b>V. Review of 10 - Year Development Plan</b>																				

**LEGEND :**

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

## PROJECT JUSTIFICATION

66 The 10 year development program, together with 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, was evaluated as a whole, through calculation of EIRR, farm budget analysis of typical farm models and studies on the expected socio-economic impacts to be induced by implementation of the program.

### 67 Economic Evaluation

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%

### 68 Farm Budget Analysis

The farm size of the beneficiaries widely varies, but is generally small. The estimated farm budget of the representative farm models is as follows:

(unit: ₦ 1,000)

Items	CISs			CIPs		
	small (0.5ha)	average (1.25ha)	large (2.0ha)	small (0.5ha)	average (1.5ha)	large (2.0ha)
<u>Without project condition</u>						
(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	35.9
(3) Net farm reserve	-16.1	-4.2	7.7	-20.4	-13.0	-9.4
<u>With project condition</u>						
(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
(3) Net farm reserve	-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

69 The SSIDP will largely improve the farm income. The 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 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 amortization fee and O&M costs.

#### 70 Socio-Economic Impacts

The following socio-economic impacts will be induced by the implementation of the 10 year development program:

- (1) The SSIDP will produce an additional paddy production of 1.53 million tons and improve the country's self sufficiency level to 100% with a surplus of 1,028,000 tons by the year 2000;
- (2) The SSIDP will generate an additional employment of 68.0 million man-days for construction and 97.0 million man-days for operation.
- (3) 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;
- (4) The domestic resource cost (present worth of domestic currency cost of realizing foreign exchange saving / present worth of net foreign exchange saving) corresponds to US\$1.00 = ₱ 9.30; this figure, being smaller than the current exchange rate of US\$1.00 = ₱ 27.50, means that the SSIDP is very efficient from the viewpoint of saving and earning of foreign currency;
- (5) The SSIDP will address poverty alleviation by directly enhancing and stabilizing the incomes of 419,700 rural farm families;
- (6) The proposed sub-projects are dispersedly distributed over the country and will create a nationwide impacts on the overall economic performances;
- (7) The SSIDP will uplift the living standard of the poor farmers because the development priority is given to those in the economically depressed areas;
- (8) The farmers' participatory approach will be promoted through the implementation of the SSIDP so that the capabilities of rural folks in management and operation will be strengthened; and
- (9) The total multiplier effect induced by the implementation of SSIDP amount to ₱ 76.7 billion in the year 2000 which will contribute to 1.42% of the estimated Gross Domestic Product (GDP).

71 The results of overall evaluation of SSIDP are summarized on the next page.

## Overall Evaluation of SSIDP

Index	"A" Group	10 Year Program
<u>Economic Feasibility:</u>	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
<u>Technical Soundness:</u>	No specific problem	No specific problem
<u>Environmental Impact:</u>	No serious impacts	No serious impacts
<u>Nos of Sub-projects:</u>	<u>459</u>	<u>4,037</u>
(1) Rehabilitation	313	1,975
(2) New development	146	2,062
<u>Irrigation Development Area:</u>	<u>70,831 ha</u>	<u>570,517 ha</u>
(1) Rehabilitation	49,024 ha	280,517 ha
(2) New development	21,807 ha	290,000 ha
<u>Nos. of Beneficiaries:</u>	53,700 households	419,700 households
<u>Total Project Costs:</u>	₱2.06 billion	₱25.47 billion
<u>Development Benefits:</u>		
(1) <u>Paddy Production:</u>	155,000 tons	1,530,000 tons
(2) <u>New Employment Opportunities (man-days):</u>		
(a) for Construction	6.4 million	68.0 million
(b) for Operation	13.0 million	97.0 million
(3) <u>Foreign Exchange Savings:</u>	₱21.3 billion	₱91.2 billion
(4) <u>Multiplier Effect:</u>		
(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) <u>Other Benefits:</u>		
(a)	The paddy production target of SSIDP is to improve 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 development priority 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.	

## 72 Environmental Impacts

Environmental impacts to be induced by the SSIDP will be small or negligible, since all of the development areas (570,500 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.

## RECOMMENDATIONS

### 73 Early Implementation of SSIDP

The SSIDP is verified to be technically sound and economically feasible with an overall economic internal rate of return (EIRR) of 26.7% 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 found to be highly feasible with an overall EIRR of 29.0%. The SSIDP is not only economically feasible but also will bring about enormous impacts on the improvement and stabilization of rural income and welfare. Considering the above, it is highly recommended that the necessary arrangement for early implementation of the SSIDP be taken as soon as possible, in particular, for a first package which mainly consists of the "A" group sub-projects.

74 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.

75 Suggested Measures for CISs/CIPs affected by the Eruption of Mt. Pinatubo

The 10 year development program was prepared on the basis of the data collected before the eruption of Mt. Pinatubo which occurred in June 1991. The SSIDP located within 40 km-radius of Mt. Pinatubo are estimated at about 9,700 ha of 63 CISs and 2,000 ha of 16 CIPs.

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

76 It is reported that Mt. Pinatubo erupted 5.7 billion m<sup>3</sup> of pyroclastic flow and 0.5 billion m<sup>3</sup> of ashfall in the aforecited provinces. To make matters worse, continuous heavy rainfall after the eruption have induced large scale mudflow, 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.

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

**MASTER PLAN STUDY ON  
SMALL SCALE IRRIGATION DEVELOPMENT PROJECT (SSIDP)**

**FINAL REPORT**

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## GLOSSARY

1. SSIDP (Small Scale Irrigation Development Project) : a kind of communal irrigation development and is defined as those of run-of- river type having an irrigation area of 50-500ha in net
2. CIS (Communal Irrigation System) : an existing sub-project under communal irrigation development
3. CIP (Communal Irrigation Project) : a new sub-project under communal irrigation development
4. "A" Sub-Project : a sub-project to be immediately implemented in the 10 year devotement plan
5. "B" Sub-Project : a sub-project to be re-studied in the 10 year development plan
6. "C" Sub-Project : a sub-project to be newly investigated in the 10 year development plan
7. "D" Sub-Project : a sub-project to be newly identified in the 10 year development plan
8. Sample Sub-Project : a sub-project for field inspection (post-evaluation study) carried out under the master plan study
9. Representative Sample Sub-Project : a sub-project for pre-feasibility study carried out under the master plan study
10. Designed Irrigable Area : a total irrigable area in net determined by using methodology developed by NIA at feasibility study level
11. Cropping Intensity : percentage (%) defined as "area planted during dry and wet seasons divided by area planted during wet season x 100 "
12. Diversion Channel : an irrigation canal conveying irrigation water from a diversion weir to an entrance of the sub-project area
13. Pacquiao Contract : a supply contract of labors and construction materials concluded between NIA and IA in order to generate equity to IA

14. Institutional Development : a process designed to strengthen the capability of both NIA and IAs to promote irrigation development program, ultimately enabling the farmer-beneficiaries identify and understand their problems, needs and capabilities and then empowering them to uplift their conditions using their resources with minimal support from the concerned agency ; and primarily involves training and logistic components
15. Participatory Approach : a scheme calling for a meaningful participation of the farmer-beneficiaries in irrigation projects starting from conceptualization up to implementation, thereby enhancing the irrigators' ownership feeling and corresponding responsibilities towards the sub-project
16. Plantilla Position : specific and approved positions in the regular (permanent) organizational structure of NIA and the special projects; plantilla position under the latter set-up is co-terminus with the project
17. Irrigation Development Officer (IDO) : an institutional development worker of NIA tasked to assist the IAs in their participation in the irrigation project from the conceptualization stage to the early part of the implementation phase
18. Irrigation Technician (IT) : a NIA employee who starts providing technical assistance to the IAs when the IDO finishes his job assignment with the IAs
19. Irrigators' Association (IA) : an organization of prospective and present farmer-beneficiaries of irrigation projects which deals directly with NIA regarding its participation in the project planning and implementation
20. Farmer Irrigators Organizer (FIO) : farmer-beneficiaries chosen from the IA members and trained to assist the IDO in developing the IAs; the concept of FIO was first tested in national irrigation projects/systems and is being contemplated for replication in communal irrigation projects/systems
21. Training Ratio : a ratio of the number of training slots availed by NIA personnel divided by the number of NIA personnel
22. Viability Incentive Grant : periodical monetary incentive given to NIA regional and provincial offices depending on their performances in terms of physical and financial viabilities

## ABBREVIATIONS

(1) Organization

NIA	National Irrigation Administration
C.O.	NIA Central Office
RIO	Regional Irrigation Office of NIA
PIO	Provincial Irrigation Office of NIA
PDD	Project Development Department in NIA
DSD	Design and Specifications Department in NIA
SMD	System Management Department in NIA
IDD	Institutional Development Department in NIA
DPWH	Department of Public Works and Highways
DENR	Department of Environment and Natural Resources
DA	Department of Agriculture
DBM	Department of Budget and Management
AFC	Agricultural and Fisheries Councils
NWRB	National Water Resources Board
FSDC	Farm Systems Development Corporation
CAR	Cordillera Administrative Region
MAR	Moslem Autonomous Region
JICA	Japan International Cooperation Agency

(2) Others

SSIDP	Small Scale Irrigation Development Project
NIP/NIS	National Irrigation Project/System
CIP/CIS	Communal Irrigation Project/System
CIDP	Communal Irrigation Development Project
CIDIP	Communal Irrigation Development Implementation Project
CARP-IC	Comprehensive Agrarian Reform Program-Irrigation Component
VCIPP	Visayas Communal Irrigation Participatory Program
O&M	Operation and Maintenance
SWIM	Small Water Impounding Management Projects
SWIP	Small Water Impounding Projects
IA	Irrigators' Associations
IT	Irrigation Technician
RID	Regional Irrigation Director
PIE	Provincial Irrigation Engineer
IDO	Irrigation Development Officer
GDP	Gross Domestic Product
EIRR	Economic Internal Rate of Return
F/S	Feasibility Study
DD	Detailed Engineering Designs
D/E	Detailed Engineering
BOD	Board of Directors
G.E.S.A.	General Engineering Supervision and Administration
LMC	Local Minor Contract
M&E	Monitoring and Evaluation
NGO	Non-Government Organization
PAP	Provincial Annual Program
PCR	Project Completion Report
POW	Program of Work
PVO	Private Volunteers Organization
RAP	Regional Annual Program
RIM	Regional Irrigation Manager
ROW	Right-of-Way
SEC	Securities and Exchange Commission

₱ Philippine Peso  
 ¥ Japanese Yen  
 US\$ US Dollar

(3) Measurement

Length

mm = millimeter  
 cm = centimeter  
 m = meter  
 km = kilometer

Area

cm<sup>2</sup> = square centimeter  
 m<sup>2</sup> = square meter  
 ha = hectare

Other Measures

% = percent  
 m<sup>3</sup>/s = cubic meter per second  
 lit/s = liter per second

Weight

mg = milligram  
 g = gram  
 kg = kilogram  
 ton = metric ton

Volume

cm<sup>3</sup> = cubic centimeter  
 l = liter  
 kl = kiloliter  
 m<sup>3</sup> = cubic meter  
 MCM = million cubic meter



## CHAPTER I INTRODUCTION

### Authority

- 1.01 This Report is prepared in accordance with the Implementing Arrangement (I/A) for the Master Plan Study on Small-Scale Irrigation Development Project (hereinafter referred to as "the Study") agreed upon between National Irrigation Administration (NIA) and Japan International Cooperation Agency (JICA) on February 8, 1990. The I/A is shown in Attachment-1.

### Objectives and Scope of the Study

- 1.02 The Study is intended to formulate a master plan for rehabilitation and new development of small-scale communal irrigation systems/projects, aiming at orderly utilization of the nation's water and land resources. The Study area covers the entire Philippines.
- 1.03 The Study was commenced in July 1990 and completed in February 1992. The Study is divided into two (2) phases; namely, Phase-I (Inventory Survey) in 1990/91 and Phase-II (Formulation of Master Plan) in 1991/92. The general work flow and schedule of the Study are illustrated on Figs.1-01 and 1-02. The Study was executed jointly by the JICA Study Team comprising 10 experts and the NIA counterpart team. The personnel participated in the Study is listed in Table 1-01.
- 1.04 The Phase-I includes the following major work items:

#### Field Work (in the Philippines: July 1990 - Dec. 1990)

- (1) Inventory survey of all possible candidate sub-projects for SSIDP
- (2) Field inspection of sample sub-projects for SSIDP
- (3) Classification of the inventoried sub-projects
- (4) Preparation of Progress Report -I (in December 1990)

#### Home Office Work (in Japan: Dec. 1990 - Mar. 1991)

- (5) Grouping of the inventoried sub-projects into several categories of SSIDP
- (6) Selection of representative sub-projects from each category of SSIDP
- (7) Preparation of guidelines for formulation of Master Plan
- (8) Preparation of Interim Report (in March, 1991)

1.05 The Phase-II includes the following major activities:

Field Work (in the Philippines: June 1991 - Aug. 1991)

- (1) Pre-feasibility study of the representative sample sub-projects
- (2) Preparation of Framework of Master Plan
- (3) Preparation of Progress Report-II (in August 1991)

Home Office Work (in Japan: Sept. 1991 - Feb. 1992)

- (1) Preparation of Master Plan
- (2) Preparation of Draft Final Report
- (3) Discussion with NIA (in the Philippines)
- (4) Finalization of the Draft Final Report, incorporating the comments from NIA

1.06 The following reports have been prepared during the course of the Study:

- |                           |   |                |
|---------------------------|---|----------------|
| (1) Inception Report      | : | July, 1990     |
| (2) Initial Work Progress | : | October, 1990  |
| (3) Progress Report No.1  | : | December, 1990 |
| (4) Interim Report        | : | March, 1991    |
| (5) Progress report No.2  | : | August, 1991   |
| (6) Draft Final Report    | : | December, 1991 |
| (7) Final Report          | : | February, 1992 |

1.07 This Report presents all the results of the Study covering Phase-I and Phase-II, consisting the following three (3) volumes; (1) Main Report, (2) Annex and (3) Data Book. This volume is the Main Report giving the summary of the Study.

**Major Activities during Phase-I Period**

1.08 Discussion with NIA on the Inception Report

The JICA Study Team prepared the Inception Report in July 1990 and explained the Report to NIA on August 1 and 2, 1990. The schedule and basic strategies of the Study were discussed and those mentioned in the Inception Report were basically accepted by NIA (see Attachment-2). It was agreed between NIA and the JICA Study Team at the meeting for the Inception Report that the SSIDP would be a kind of communal irrigation systems/projects (CISs/CIPs) and be defined as those of run-of-river type having an irrigation area of 50 - 500 ha in net.

1.09 Inventory Survey

The sub-projects for inventory survey were selected from the following sources, considering the agreed definition of SSIDP:



- |   |  |
|---|--|
| (1) Sub-projects for new development:         | all the CIPs indicated in the "Provincial Irrigation Profiles" prepared by NIA in 1989.    |
| (2) Existing sub-projects for rehabilitation: | all the CISs included in the NIA's master list as of July 1990 (updated by the Study Team) |

1.10 The questionnaires for inventory survey were distributed during the meetings with PIEs held on August 14-16, 1990, with expectation that the filled out questionnaires would be returned by the end of September, 1990. However, the inventory survey was delayed and the questionnaires were gradually returned by the PIOs. The inventory survey was finally completed on December 3, 1990 and the filled-out questionnaires were returned by all of 67 PIOs. Total number of returned questionnaires was 4,192. After screening, 3,889 sub-projects were qualified as the candidate sub-projects for the master plan.

- |  |              |                          |
|--|--------------|--------------------------|
| (1) no. of inventoried sub-projects:   | <u>4,811</u> | (CIP; 1,973, CIS: 2,838) |
| (2) no. of questionnaires returned:    | <u>4,192</u> | (CIP; 1,631, CIS: 2,561) |
| (3) no. of sub-projects for the Study: | <u>3,889</u> | (CIP; 1,466, CIS: 2,423) |

1.11 The most common relational database software "d-BASE III" was used for processing the results of the inventory survey. In order to process the huge amount of data in the shortest possible time, special computer programs for data entry and printing were prepared using internal language of "d-BASE III". The computer programs for checking and classification of the entered data were also prepared. Those for checking aim to find out automatically the abnormal figures of the encoded data in the computers, and those for classification aim to calculate the frequency distribution of the answer to each question.

#### 1.12 Data Collection

The following data and information were gathered by the JICA Study Team during the Phase-I field work period:

- (1) Computerized master list of CISs (prepared by NIA),
- (2) Complete set of "Provincial Irrigation Profile" (74 volumes),
- (3) List of foreign assisted CISs/CIPs,
- (4) List of CISs/CIPs for which feasibility studies are completed,
- (5) List of CISs/CIPs for CARP-IC,
- (6) Existing guidelines and criteria for CISs/CIPs,
- (7) Standard tender documents/technical specifications for construction works,
- (8) Feasibility studies of the sample sub-projects,
- (9) Standard criteria for cost estimates and unit prices of construction works,
- (10) Sample "By-Laws of IA",
- (11) Sample turn-over agreement between NIA and IA,

- (12) General data of climate, hydrology, soils and geology of the country,
- (13) Monthly discharge records at all gauging stations of the country, and
- (14) General data and information concerning agro-economic and institutional aspects of CISs.

#### 1.13 Field Inspections of Existing Sample Sub-projects

Field inspection was carried out for 38 sample sub-projects (CIS: 32, CIP: 6) selected from each region. The total area of the sample sub-projects is about 6,500 ha. Field inspection was safely carried out with full support from the respective PIOs. The results obtained from the post evaluation studies were utilized for analysis of the computerized database, in particular:

- (1) preparation of computer program for automatic checking of raw data,
- (2) judgement of adequacy of the data by the above computer program,
- (3) determination of method for effective use of the computerized database,
- (4) determination of frequency distribution range for data analysis, and
- (5) judgement of adequacy of the data obtained from the database analysis.

#### 1.14 Discussion with NIA on the "Initial Work Progress"

The JICA Study Team prepared the "explanatory note on the initial progress of Phase-I field work" and explained it to NIA on October 18, 1990. The initial findings and basic strategies of the Study mentioned in the explanatory note were basically accepted by NIA (see Attachment-3). During the meeting, the following were discussed:

- (1) average development cost per ha,
- (2) computerized database for master plan study,
- (3) minimum selection criteria for implementation of CISs/CIPs,
- (4) adequacy of 130% cropping intensity, for the minimum selection criteria,
- (5) framework of master plan for SSIDP,
- (6) transfer of knowledge to counterpart personnel, and
- (7) delayed submission of questionnaires for inventory survey.

#### 1.15 Preliminary Studies on NIA's Guidelines and Criteria

The following aspects of communal irrigation development were studied on the basis of the existing reports and documents under Phase-I Study:

- (1) NIA's basic policies on implementation of CISs/CIPs,
- (2) NIA's criteria for selection of CISs/CIPs,
- (3) Implementing procedures of CISs/CIPs,
- (4) Engineering standard and requirement for implementation of CISs/CIPs, and
- (5) Foreign assisted CISs/CIPs.

#### 1.16 Supplemental Questionnaires on Institutional Aspect

In order to assess the current capability and needs of PIOs/RIOs for implementation

of CISOs/CIPs, supplemental questionnaires were prepared and mailed to each PIO/RIO. The initial findings obtained through the supplemental questionnaires are summarized in the Interim Report. The answers were returned to the Central Office of NIA from all of RIOs/PIOs by the end of July, 1991. Full analysis were made under Phase-II.

1.17 Discussion with NIA on the "Progress Report No.1"

The JICA Study Team prepared the "Progress Report No.1" and explained it to NIA on December 11, 1990. The initial findings of the Phase-I Study and basic framework for the master plan were basically accepted by NIA (see Attachment-4). During the meeting, NIA and the JICA Study Team recognized, among others, the importance of the computerized database for the formulation of master plan on SSIDP and agreed that the computerized database would be refined through cross-checking process of the encoded data.

1.18 Phase-I Home Office Work (in Japan)

The Phase-I field work was completed on December 17, 1990. The JICA Study Team carried out the the following studies in Japan and prepared the "Interim Report". The Interim Report was submitted to NIA in March, 1991.

- (1) Cross-checking of designed irrigable areas,
- (2) Grouping of the inventoried sub-projects into several categories of SSIDP,
- (3) Cross-checking of development costs by each category of SSIDP,
- (4) Selection of representative sub-projects from each category of SSIDP,
- (5) Preliminary priority grouping of sub-projects,
- (6) Preparation of guidelines for formulation of 10 Year Development Plan, and
- (7) Preparation of Interim Report (in March, 1991)

**Major Activities during Phase-II Period**

1.19 Discussion with NIA on the "Interim Report"

The JICA Study Team submitted the Interim Report to NIA in March 1991 and discussed it with NIA in June 1991 under Phase-II. The following matters were discussed (Attachment-6):

- (1) Selection of pre-feasibility studies on the representative sample sub-projects,
- (2) Additional inventory survey for candidate sub-projects,
- (3) Improvement of implementing capability of PIOs,
- (4) Criteria for selection and prioritization of candidate sub-projects, and
- (5) Work schedule of Phase-II.

#### 1.20 Pre-feasibility Studies on Representative Sample Sub-projects

The field inspections for pre-feasibility studies were jointly carried out by NIA and the JICA Study Team during the period of June 24 - July 14, 1991. The field inspections included walk-through the service areas, engineering measurement at the major structure sites, discussion with IA officials, informal interviews with farmers and discussions with NIA officials at both regional and provincial levels. The field visits were made to the following 10 representative sample sub-projects:

##### Existing sub-projects for rehabilitation (CISs)

(1)	Tumbaga CIS	(121 ha)	Quezon
(2)	Bayunan CIS	(220 ha)	Iloilo
(3)	De La Paz CIS	(89 ha)	Iloilo
(4)	Tag-Amakan CIS	(51 ha)	Cebu
(5)	Caray-Caray CIS	(130 ha)	Northern Leyte
(6)	Macupa CIS	(448 ha)	Northern Leyte

##### Sub-projects for new development (CIPs)

(1)	Kinatihan CIP	(100 ha)	Quezon
(2)	Pacheco CIP	(172 ha)	Cavite
(3)	Bairan CIP	(64 ha)	Iloilo
(4)	Maragondong	(320 ha)	Northern Leyte

#### 1.21 Data Encoding and Analysis of Additional Inventory Survey

The additional inventory survey was carried out for those sub-projects which are supported by the feasibility studies, and, in case of CISs, requires rehabilitation works. The sub-projects inventoried were 967 in total (CIS: 763, CIP: 204). Those sub-projects were considered having more detailed engineering data and information which had not been collected at sufficient level during the inventory survey under Phase-I. The additional inventory survey was carried out by NIA during March - May, 1991 on the basis of the questionnaires prepared by the JICA Study Team. The filled-out questionnaires returned by June 15, 1991 were 854 in total (CIP: 179, CIS: 675) or about 88% of the inventoried sub-projects. The returned questionnaires were encoded into the computer and merged with the original database for succeeding analysis.

#### 1.22 Cross-checking and Supplement of Encoded Data

The original data and information returned from PIOs contain a lot of unrealistic figures and questionable answers. The database should therefore be refined through cross-checking of the basic data. The cross-checking was mainly based upon the answers obtained from the additional inventory survey and the results of the pre-feasibility studies. Various technical analysis of the encoded data was made

for cross-checking of the basic data such as costs, benefits and economic rate of return; in particular, relationship between construction cost and the related factors such as scale of development, topographic condition, and kinds and size of physical facilities. Based on the analysis and studies, the missing data were supplemented and abnormal data were adjusted to place them within the reasonable range.

#### 1.23 Framework of Master Plan

It was agreed between NIA and the JICA Study Team that the master plan on SSIDP comprises the following three major components:

- (1) 10 year development program (1993 - 2002),
- (2) Programs for improvement of implementing capabilities of RIOs/PIOs, and
- (3) Program for improvement of IA activities.

The 10 year development program of SSIDP (1993-2002) was prepared with the full use of the supplemented/cross-checked database, and the other programs for institutional development of PIOs/IAs was also studied through analysis of the supplemental questionnaire survey on institutional aspect under the Phase-II.

#### 1.24 Preparation of "Progress Report No.2"

The JICA Study Team submitted the "Progress Report No.2" to NIA on August 23, 1991. The report deals with the findings and major outcomes of the Phase-II field work. Discussion meeting on the Progress Report No.2 was held on August 27, 1991 (see Attachment -7).

#### 1.25 Phase-II Home Office Work (in Japan)

The Phase-II field work was completed on August 31, 1991. The JICA Study Team carried out the the following studies in Japan and prepared the "Draft Final Report". The Draft Final Report was submitted to NIA in November, 1991.

- (1) Finalization of 10 Year Development Program,
- (2) Further studies on institutional development for strengthening of PIOs,
- (3) Pre-feasibility studies on representative sample sub-projects,
- (4) Overall justification of 10 Year Development Program,
- (5) Re-structuring of computerized database, and
- (6) Preparation of the "Draft Final Report".

#### 1.26 Discussion with NIA on "Draft Final Report" and Preparation of "Final Report"

The JICA Study Team consisting of the Team Leader, Project Planner and Irrigation/Drainage Engineer, visited the Philippines during the early part of December, 1991 to discuss the "Draft Final Report" with NIA. Discussion meeting

on the Draft Final Report was held on December 4, 1991 (see Attachment-8). The JICA Study Team received the comments on the report dated December 13, 1991 from NIA. This Final Report is prepared referring to those comments.

1.27 Data Base System for Administration and Management

NIA has requested the JICA Study Team, after completion of the Study, to transfer the computerized database system to NIA. NIA intends to utilize the database system for administration and management of communal irrigation development. Millions of data concerning the sub-projects both for rehabilitation and new development are stored in the existing computerized database, and if these data are to be well maintained, updated and utilized, the database system will largely help NIA to prepare the annual and medium to long term development programs as well as to monitor and evaluate the progress of construction works and/or project benefits after construction. However, the existing database system has not been designed for such administrative purposes but only for analysis of the inventoried data for master planning. The existing database system is therefore re-structured, considering the administrative requirement of NIA. Discussions were made with NIA officials concerned on this aspect under Phase-II field work. Based on the agreed concept, the existing database system was revised in Japan and handed over to NIA in December, 1991.

Supports from NIA

1.28 Project Office and Counterpart Personnel

NIA provided office space at the DCIEC Building of NIA. The office was furnished with the extension line of telephone as well as enough number of desks and chairs. NIA assigned the following personnel to the Study:

Technical Advisors:

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

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) | Violeta M. Benico      | Agro-economy and Institution           |
| (6) | Silvino A. Alonzo, Jr. | Meteorology and Hydrology              |
| (7) | Adonis C. Beringuela   | Facility Planning and Design (Phase-I) |

(8)	Epifanio G. Gacusan Jr.	Facility Design (Phase-I)
(9)	Antonio F. Mamuyac	Researcher
(10)	Ariel M. Baña	Researcher (Phase-I)
(11)	Emelita B. Parallon	Designs and Cost Estimate (Phase-II)
(12)	Artemio A. Tapa	Designs and Cost Estimate (Phase-II)

1.29 Inventory Survey and Field Inspection

The inventory survey was carried out by NIA on the basis of the questionnaires jointly finalized by NIA and the JICA Study Team. All of 67 PIOs were involved in the execution of the inventory survey during August - December, 1990. The additional inventory survey was also carried out by NIA during the period of March - June, 1991 in order to supplement the basic data for master planning. The RIOs/PIOs were further involved in supplementary questionnaire survey on institutional aspect. The NIA counterpart team carried out the field inspection of 38 sample sub-projects for post-evaluation studies under Phase-I, and made field inspection of 10 representative sample sub-projects for pre-feasibility studies under Phase-II. The NIA counterpart team assisted the JICA Study Team in every aspect for preparation of master plan during the course of the field work in the Philippines.

1.30 Regular Meeting

Meetings between the JICA Study Team and the NIA Counterpart Team have been held regularly once a week since August, 1990. The regular meetings were held 27 times during the field work in the Philippines. All results of the meetings were reported to the NIA officials concerned.

## CHAPTER II BACKGROUND OF THE PROJECT

### General Economic Situations of the Philippines

- 2.01 The Philippines has a total land area of about 300,000 km<sup>2</sup>. The total population as of 1990 is estimated at 60.7 million. The population density is about 200 persons per km<sup>2</sup>. The population growth rate is about 2.3% per annum on the average during the decade 1980-1990. Future population is projected for the year of 2000 to be 75.2 million. The total labour force as of 1990 is estimated at about 24.3 million or 64% of working-age population. Under-employment and unemployment are serious problem. Unemployment rate is officially estimated to be about 11% of the total labour force, while under-employment is put at over 30%. Households number 11.4 million with an average of 5.3 members. During the period 1961-1988, the total number of poor families increased from 3.3 to 5.2 million. Poverty incidence level stands at a high 49%.
- 2.02 GNP amounted to ₱1,132 billion (equivalent to US\$46.6 billion) at current prices or ₱18,400 (US\$758) per capita in 1990. Despite its vast resource potentials and a relatively high literacy rate of its labour force, the Philippine economy has tended to lag behind the other middle income countries of Asia. The Government originally projected an average annual growth of 7.6% in GNP for the period 1978 - 82, but the performance was below this target and has worsen in each of these years. The economic growth rate in 1983 was the lowest for over two decades, and over the next two years the economy went into sharp decline, to the point that by March 1986 it was officially estimated that two-thirds of the population were living below the poverty line.
- 2.03 There were some improvements in national economic performances during the initial period of the Aquino administration. In general, however, the economic activities have slowed down again. In 1990, real GNP grew by only 3.1%, lower by 2.2% than the average annual growth rates during the previous 3 years (1987-1989). The major constraints limiting the economy's full potentials are inflationary trends (14.5% in 1990), heavy external debt (US\$30.4 billion in 1990) and political instability combined with the uncertainties created by the Gulf crises, power supply failures and series of natural calamities.



- 2.04 The Philippine economy is now facing the difficulties of external debt payment due to a higher import bill, lower remittances from overseas workers and stagnant export growth. The current payment deficit has brought about a major cut in government budget for public investment including agricultural and irrigation sectors. This lead to a deadlock of the government departments' and state corporations' activities. The government agencies are directed to improve their operating efficiency levels.
- 2.05 In December 1986, the Aquino Government set forth the Medium-Term Philippine Development Plan 1987-1992. The Development Plan is directed towards the following goals:
- (1) alleviation of poverty,
  - (2) generation of more productive employment,
  - (3) promotion of equity and social justice, and
  - (4) attainment of sustainable growth.
- 2.06 The Development Plan projects the economic activities will back to the 1983 level by 1991. This target is now in question given the economic performance of the last two years 1989-1990. In November 1990, the Government revised the Development Plan 1987-1992 in view of the aforesaid economic situations, as given in the Updated Philippine Development Plan 1990-1992. The updated plan emphasizes the the following strategies to realize sustainable economic growth:
- (1) economic stabilization,
  - (2) countryside agro-industrial development,
  - (3) market liberalization or economic deregulation,
  - (4) human resources development,
  - (5) institutional/administrative reforms, and
  - (6) decentralization.
- 2.07 The above strategies are apparently focussing on reducing unemployment and poverty in rural areas, considering the rapid growth of population especially of the labour force resulting from the higher rates of population growth in 1970s, and are directing to active participation of the farmers in investment programs with efficient and complementary assistances of the government services.

## Government Policies on Agricultural Development

- 2.08 The agricultural sector still remains as a major pillar of the Philippine economy. It accounts for about 30% of the GDP, more than 60% of export earnings and about 50% of the total employment. Two-thirds of the population reside in the rural areas and are dependent, either directly or indirectly, on the primary sector for their main source of livelihood.
- 2.09 However, majority of the rural residents, especially the small farmers, remain under poverty. The rural area has a higher incidence of poverty (53%) compared with the urban areas (32%). The rural-urban inequality has worsen over time as the ratio of average rural family income to average urban family income has declined from 0.67 in 1975 to 0.46 in 1985. In recent years, more than 80% farm families are classified as belonging the lower 30% income bracket.
- 2.10 In view of these, the Updated Philippine Development Plan 1990-1992 has adopted the following agricultural policy thrusts:
- (1) to enhance small farmer's income,
  - (2) to sustain the increase in productivity,
  - (3) to effect an equitable distribution of income,
  - (4) to develop and disseminate appropriate location-specific and cost-reducing production technologies,
  - (5) to attain food self-sufficiency/self-reliance,
  - (6) to create/increase employment opportunities in rural areas,
  - (7) to improve the marketing system,
  - (8) to expand availability of agricultural credit and farm input supplies, and
  - (9) to institutionalize the expanded participation of the farmers.
- 2.11 In support of these efforts to revitalize the agricultural economy, irrigation development, especially of the communal type and those based on farmers-participatory approach, shall be strong pursued. Much can be accomplished on this aspect, considering the many unirrigated small paddy lands scattered throughout the country, untapped sources of irrigation water, generally favorable climate and fertile soil as well as abundant labour force. The smal-scale irrigation development project is expected to contribute a large share in the promotion and implementation of the communal irrigation development efforts in the country.

## **National Irrigation Administration (NIA)**

### **2.12 Establishment and Its Function**

Public Act 3601 established NIA in 1964 as a semi-autonomous agency responsible for planning, constructing, operating and maintaining all NISs (National Irrigation Systems/Projects). NIA was empowered to investigate and study all national water resources for irrigation purpose; to plan and construct new projects; periodically repair NISs and CISs; and to collect irrigation service fees (ISF) from NISs and to recover chargeable construction costs from CISs. In 1974, Presidential Decree No.552 provided NIA with broader power and authority to undertake related projects such as flood control, drainage, land reclamation, hydropower development, domestic water supplies, road construction, reforestation and other activities to maintain the ecological balance, in coordination with other agencies.

### **2.13 NIA Organizational Structure**

As a semi-autonomous body, NIA has considerable flexibility in conducting its operations. NIA is governed by a Board of Directors appointed by the President, currently consisting of the Secretary of DPWH (chairman), Administrator of NIA (vice chairman), Director General of NEDA, Secretary of DA, General Manager of NPC and a representative from the private sector. NIA is a well-structured agency with its operation carried out through a network of national, regional, provincial and system-level offices throughout the country (refer to Fig. 2-01).

### **2.14 NIA Central Office**

At its central office at Manila, NIA's organizational structure includes four units; (1) Project Development and Implementation; (2) System Operation and Equipment Management (which also supervises CISs/CIPs development); (3) Finance and Management; and (4) Personnel and Administrative Services. The first two are technical departments covering all phases of irrigation development cycle and the latter two departments cover all the support functions.

### **2.15 NIA Regional and Provincial Offices**

NIA has 11 regional irrigation offices (RIOs). Only one RIO is responsible for Regions 7 and 8. The RIO for Region 1 also covers a portion of CAR, while that for Region 2 covers the rest of CAR. Each RIO is headed by a Regional Irrigation Director (RID). Some 100 irrigation system offices (ISOs) are each responsible for one NIS, or a cluster of NISs, and headed by an Irrigation Superintendent (IS).

Another 67 provincial irrigation offices (PIOs), each headed by a Provincial Irrigation Engineer (PIE), are responsible for communal irrigation development. The ISs and PIEs are directly supervised by the RID of the region.

2.16 Inter-Agency Coordination

At the regional level, the Regional Development Council (RDC), comprising the provincial governors, regional heads of departments and representatives from the private sector, serves as a forum for inter-agency coordination and for reviewing development projects in the region (including proposed CISs/CIPs). For agricultural related projects, there are also National, Regional, Provincial and Municipal Agricultural and Fisheries Councils (NAFC, RAFC, PAFC and MAFC). At each of these levels, joint or collaborative agency work programs are executed between NIA, DA, DENR and other related agencies.

NIA's Basic Policies on Irrigation Development

2.17 Principal Policies

NIA's basic policies and targets on irrigation development are described in its Corporate Plan which is a long term development plan covering 10 year period and has been updated every year. The latest version of the Corporate Plan covers the period 1990 - 2000. The NIA's principal policies for irrigation development are indicated as follows:

- (1) Support national food production program, particularly self-sufficiency in rice,
- (2) Promote economic development in the rural area,
- (3) Contribute to equitable distribution of income particularly in rural area, and
- (4) Support the Comprehensive Agrarian Reform Program (CARP).

2.18 Priority Policies

NIA Corporate Plan 1990 - 2000 also indicates NIA's priority policies as follows:

- (1) General priority policies
  - (a) maintain NIA's corporate stability and autonomy, and
  - (b) ensure efficient utilization of present resources particularly within the limits of available funding support from the Government.
- (2) Irrigation development policies
  - (a) Early completion of on-going projects,
  - (b) Immediate turn-over of completed projects to the IAs,
  - (c) Rehabilitation and improvement of existing systems,
  - (d) Promotion of watershed management projects,

- (e) Adequate preparation and packaging of future projects,
- (f) Sustainable balance of large and small-to-medium scale projects (Small projects shall have priority when funds are limited.),
- (g) Continuous strengthening of the O&M capabilities in NISs and CISs,
- (h) Strengthening of IA development and farmers participation,
- (i) Promotion of dry season irrigation management, and
- (j) Maximum utilization and effective management of machines/equipment.

(3) Financial and administrative management policies

- (a) Stability of revenue (effective collection of ISF and CIS amortizations),
- (b) Manpower development with appropriate training programs and adequate exposure to modern and applicable technologies, and
- (c) Improvement of procedures of procurement and property management.

2.19 Development Target for 1990 - 2000

NIA's targets for the next decade are as follows (for details, see Table 2-02):

(1) NIA Regular Program

	New Development Area	Rehabilitation Area
NIP/NIS	289,200 ha	788,900 ha
CIP/CIS	241,700 ha	314,100 ha
Total	530,900 ha	1,103,000 ha

(2) CARP-IC Program

	New Development Area	Rehabilitation Area
NIP/NIS	44,800 ha	48,000 ha
CIP/CIS	179,000 ha	81,600 ha
Total	223,800 ha	129,600 ha

Classification of Irrigation Systems in the Philippines

2.20 All irrigation systems in the Philippines are classified into three major types:

National Irrigation System (NIS)

- (1) The systems are constructed and operated/maintained by NIA.
- (2) The systems are irrigated by direct diversion (run-of-river) and/or by pumps either with or without storage dams.
- (3) The beneficiary farmers are required to pay the irrigation service fee (ISF):  
 Wet season : 2-3 cavans/ha (Cavan: 50 kg, 5 pesos/kg)  
 Dry season : 3-5 cavans/ha (Cavan: 50 kg, 5 pesos/kg)
- (4) There are 147 NISs with a total irrigation service area of about 615,000 ha.

### Communal Irrigation System (CIS)

- (1) The systems are constructed by NIA. After completion of the construction works, the systems were turned over to the Irrigators' Associations (IAs) and the irrigators are required to operate/maintain their own systems with minimal government assistance.
- (2) The systems are mostly of run-of-river type. The systems also include pump systems and storage dam type systems (SWIM and SRIP).
- (3) The beneficiary farmers are required to pay 10% of the chargeable cost during the construction stage, and the remaining 90% are to be repaid without interest for a period not exceeding 50 years (amortization). Annual amortization is at least 1.5 cavans per ha.
- (4) There are about 6,800 CISs with a total irrigation service area of about 696,000 ha.

### Private Irrigation System (PIS)

- (1) The systems are constructed by private organizations and are privately owned and operated/maintained without assistance of NIA.
- (2) The systems are mostly irrigated by pumps and/or direct diversion.
- (3) There are about 17,000 PISs with a total irrigation service area of about 152,000 ha.
- (4) NIA does not provide the private irrigation systems with any supports.

## Present Status of Irrigation Development

### 2.21 Present Status of Irrigation Development:1990

The Philippines has a potential irrigable area of about 3,126,000 ha. During the past 10 years (1980-1989), NIA generated new irrigated area of about 290,000 ha and rehabilitated about 640,000 ha (Table 2-03 to be referred). As of 1989, about 1,469,000 ha or 47% of the potential irrigable area are irrigated (for details, see Table 2-04 and Fig. 2-02). Present irrigation service areas by system are as follows:

System	Irrigated Area	Proportional extent (%)
NIS	621,000 ha	(43%)
CIS	696,000 ha	(47%)
PIS	152,000 ha	(10%)
Total	1,469,000 ha	(100%)

## Current Constraints for Irrigation Development

2.22 The following constraints on irrigation development have been reported:

- (1) Financial restraints by the Government  
(₱ 2,143 million in 1980, ₱ 2,233 million in 1989) resulting in shortage of available funds for new projects, and in particular stagnation in implementation of new NIPs.
- (2) Decrease of cropping intensity in NISs  
(141% in 1980 and 137% in 1989) mainly due to deterioration of facilities, and poor water management.
- (3) Low collection efficiency of ISF  
(about 55% in 1989) resulting mainly from low farmer's income due to inadequate agricultural inputs and support services to promote increased yields and partly from negative farmers' attitudes, water shortage in some systems, prolonged dry spell, occurrence of typhoons, and poor conditions of facilities. (Most beneficiary farmers want to abolish ISF. However, NIA intends to maintain the present system of ISF collection.)
- (4) Increase of O&M costs  
(₱ 86 million in 1980 and ₱ 242 million in 1989) which has been caused by price escalation (Total O&M costs in the NISs are bigger than the collected total amount of ISF, although the ratio of ISF amount to O&M costs has improved from 69% in 1980 to 88% in 1989.)
- (5) Low repayment rate of amortization in CIS  
(About 6 to 7% for whole CIS on an average) which is again attributed to (a) the low farmer's income due to inadequate agricultural inputs and support services to promote the increased yields, (b) frequent damages of facilities due to typhoon and floods, and (c) inadequate O&M due to weak IA activities. Higher payment rate is however, observed in CIDP-I financed by World Bank, as follows :

New sub-project (CIPs)	:	50%
Rehabilitation/Improvement of CISs	:	36%

## Present Status of Communal Irrigation Development

### 2.23 Importance of Communal Irrigation Development

About 70% of the country's population live in the rural areas where two-thirds of the households depend on small farms for their main source of income. More than 50% of these households subsist below the absolute poverty, because of very low agricultural productivity (in 1988, 53% of families in the rural areas were below the official poverty line of ₱2,531 per month). This is the main reason why the major thrusts of the government's current countryside development program are aimed at the communal irrigation development. The NIA's communal irrigation development

program seeks to increase productivity of small farmers to uplift them from the poverty level. Today, there are more irrigated areas covered by CISs than NISs (CISs: 696,000 ha, NISs: 615,000 ha).

#### 2.24 Advantages of Communal Irrigation Development

Most of the communal irrigation development projects are small in size and have the following advantages compared to medium-to-large sized projects:

Such smaller projects:

- (1) can be implemented faster; therefore benefits can be realized earlier;
- (2) can be implemented at cheaper unit cost per ha; therefore beneficiary farmers can afford to pay amortization for chargeable costs;
- (3) can be implemented simultaneously over the country; therefore a larger number of farmers can benefit despite the limited funds and other endowed resources;
- (4) can be operated/maintained by the Irrigator's Associations (IAs) after construction works; therefore continuous government assistance for O&M will not be required; and
- (5) will easily trigger farmers' potential capability for increased agricultural production under irrigated condition because the projects are constructed through the so-called farmers participatory approach and the constructed irrigation facilities are owned/operated/maintained by farmers themselves.

#### 2.25 Historical Overview of Communal Irrigation Development

Official assistance to the communal irrigation development increased from about 30 systems in the late 1950s to over 900 systems in the late 1970s, and about 2,000 systems in the late 1980s. During the early 1980s, the Government disbursed an average of about ₱130 million per year to communal irrigation development. The economic crisis of 1983-85 curtailed this level of budgetary support, which dropped to about ₱80 million per year. However, since 1987 the Government has again increased allocations to the communal irrigation development to about ₱400 million per year.

2.26 Presidential Decree (PD) No. 552 of 1974, gave a new dimension to government assistance to CIPs/CISs which are implemented with NIA's technical and financial assistance and, among other things, required the establishment of irrigators' associations (IAs) in all the irrigated area. NIA's assistance to communal irrigation development involves both (a) rehabilitation, improvement and expansion of the existing systems (CISs), and (b) construction of new systems in areas not



previously served by irrigation (CIPs). Voluntary participation of the beneficiary farmers is essential for the implementation of CIPs/CISs.

2.27 Until the early 1970s, NIA did not require repayment of its contribution to communal irrigation development and no irrigation service fees were levied. Since 1975, however, official assistance has been provided in the form of interest-free loans, payable up to a maximum period of 50 years. In addition, since 1985, the IAs have been required to make cash or in-kind contributions towards construction costs as equity (a minimum 10% of the chargeable costs).

2.28 During the construction stage, the IAs are required to pay the amount equivalent to 10% of the chargeable cost (out of the total project cost) and the remaining cost of 90% are to be repaid without interest for a period not exceeding 50 years after completion of the project (CIS amortization). The projects are constructed by NIA. After completion of the construction works, the facilities are turned over to the IAs, and the O&M are carried out by the IAs.

2.29 The chargeable cost is defined as the net costs of labor, materials, equipment, fuel and oil used for the implementation of the project, and do not include those invested for buildings, roads, flood protection works, power generating facilities and reforestation. Administrative and engineering expenses are borne by NIA.

2.30 NIA Memorandum Circular No. 4, Series of 1986 gave the new guidelines for CIS amortization system; i.e., "where the association want to qualify for exemption from payment of amortization, they should put up the following equity:

- (1) 30% of the total chargeable cost for projects with a chargeable cost of ₱ 5,000 to ₱ 8,000 per hectare, or
- (2) 25% of the total chargeable cost for projects with a chargeable cost of more than ₱ 8,000 per hectare."

2.31 Implementing Procedures

The communal irrigation development projects are implemented by PIOs under the administrative supervision of RIOs. The NIA central office is also involved at the time of important activities related to the implementation particularly for evaluation of development plans and engineering designs and approval for fund release. Reporting and fund release are made through RIOs.

2.32 Proposed projects are generally identified by PIOs mainly on the basis of petition from farmers cooperatives or Irrigators' Association (IA), but the following factors are also considered.

- (1) Irrigation development status of the relevant municipality and barangay.
- (2) Opinions of the relevant municipality and barangay administrative offices.
- (3) Past IA's viability and resolutions in case of existing systems.

2.33 After identifying the proposed project, the PIO will prepare a "program-of-work" (POW) for investigation and data gathering and submit it to the central office for approval. After getting the approval for POW, the investigation and data gathering are conducted and finally a feasibility report is compiled. Based on the feasibility reports on the proposed projects in the province, evaluation and selection of priority projects are carried out by the PIO in consultation with RIO. Only the qualified projects which are conformable to the minimum selection criteria set forth by the central office will be allowed to go into further detailed engineering design and construction phases.

2.34 Farmers participatory approach is emphasized in the implementation of CIS/CIP. It is considered that through this approach, the beneficiary farmers can familiarize themselves with irrigation, have stronger responsibility for their own facilities, and operate and maintain irrigation facilities by themselves as members of the IA. Therefore, farmers participation have been promoted at all the phases of project cycle. In order to promote the farmers participation, NIA assigns an Irrigation Development Officer (IDO) who will stay at the proposed project site and perform the following duties:

- (1) Orientation of CIS/CIP development to farmers
- (2) Formulation of IA and registration of IA
- (3) Evaluation of IA viability
- (4) Formulation of working committees for pre-construction and construction
- (5) IA training needs analysis and IA training
- (6) Settlement of right-of-way problem
- (7) Preparation and signing of memorandum of agreement between NIA and IA
- (8) Formulation of repayment schedule for amortization
- (9) Guidance of O&M activities and conduct of IA workshops

The IDO will stay at the project site for 1 - 1.5 years even after the completion of the construction works, in order to make necessary training for IA in the field of O&M activities.

2.35 Budget Allocation Formula for CIDIP

NIA has recently developed "Budget Allocation Formula" which will determine the annual development budget allocation to RIOs/PIOs for implementation of the locally funded program (CIDIP). There are two kinds of formula; one for regional allocation of national budget, and the other for provincial allocation of the allocated regional budget (Table 2-05 to be referred).

2.36 In the regional allocation formula, the following factors are considered:

- (1) regional share of nationwide potential irrigable areas for future CIPs,
- (2) regional need for irrigation which is assessed by:
  - average farm income level,
  - self-sufficiency level of rice,
  - typhoon frequency and rainfall pattern, and
- (3) past performance of respective RIO.

2.37 In the provincial allocation formula, the following factors are assessed:

- (1) provincial share of regionwide potential irrigable areas for future CIPs, and
- (2) past performance of respective PIO.

2.38 The NIA's formula for regional/provincial budget allocation is generally well prepared. However, the following rooms for future improvement are observed:

- (1) Needs for rehabilitation of the existing systems are not considered; and
- (2) The potential irrigable area, which is the most decisive factor in the formula, has not been updated yet and involves some vague estimates at present (re-estimate of the potential irrigable area is under way).

2.39 Basic Policies for Communal Irrigation Development

NIA's basic policies for implementation of communal irrigation development projects have been reported as follows:

- (1) Higher priority of CIPs/CISs  
NIA estimates that at least 60% of the areas yet to be irrigated are appropriate for the CISs/CIPs form of development. Although well balanced development of medium-to-large and small scale projects is considered, small projects shall have priority when funds are limited.
- (2) Farmers participatory approach  
Present system of farmers' participation for the implementation of CIPs/CISs shall be maintained and strengthened.

- (3) Unified minimum selection criteria regardless of funding sources  
The CIPs/CISs are currently implemented using the following financial sources; however, the NIA's present selection criteria shall be used for qualification of the proposed CISs/CIPs regardless of funding sources:
  - (a) Locally funded projects
  - (b) CARP funded projects
  - (c) Foreign assisted projects
- (4) Improvement of implementing capacity  
PIOs shall be strengthened through the improvement of office facilities, provision of additional survey and construction equipment and vehicles, and employment of additional engineers and technicians. The training programs shall be enhanced for the engineers and staff (including IDOs) who will be directly involved in the implementation of CIPs/CISs.
- (5) Establishment of M&E system  
Monitoring and evaluation (M&E) system shall be established at national, regional and provincial levels in order to give adequate and timely technical support to the farmers.
- (6) Collaboration and coordination with DA  
NIA shall maintain closer collaboration and coordination with DA to improve the crop yield under irrigated condition and improve farm income by extending agricultural support services.
- (7) Improvement of technique for implementation of CIPs/CISs  
The training program for the technical staff of the PIOs shall be strengthened to improve technical qualities for planning, design and construction of CIPs/CISs and to accelerate work progress of project implementation.
- (8) Implementation by Provincial Irrigation Offices (PIOs)  
The project selection and prioritization shall be primarily conducted by the PIOs. Selection of the proposed sub-projects shall be made either as a package (less than 10 sub-projects) or individual sub-projects in accordance with the NIA's minimum selection criteria.

#### 2.40 Foreign Assisted CIS/CIP

Foreign-assisted communal irrigation development began in 1970s as either a component of rural area development projects or national irrigation projects. Most of these projects are assisted either by the World Bank or the Asian Development Bank (ADB). Such foreign assisted projects which include the communal irrigation components are listed in Table 2-06.

- 2.41 The "Communal Irrigation Development Project (CIDP-I)" financed by the World Bank/IFAD is the first "pure" communal irrigation development project. The CIDP-I started in 1983 and was completed in 1990. This project will be continued as "Second Communal Irrigation Projects (CIDP-II) which will be implemented from 1991 to 1995. Loan agreement on the CIDP-II was concluded between the World

Bank and NIA in August 1990. Major features of the CIDP-I & -II are summarized in Table 2-07 and Table 2-08.

- 2.42 Under CIDP-I, 164 sub-projects which cover about 42,800 ha, are constructed. It is hoped that about 200 sub-projects covering about 26,500 ha will be implemented under CIDP-II. The total number of sub-projects under both CIDP-I & -II is about 364, and total area to be newly irrigated and/or rehabilitated is about 69,300 ha (for details, see Table 2-09). The JICA Master Plan Study inventoried 4,811 sub-projects covering about 696,000 ha. These sub-projects under CIDP-I & -II therefore correspond to about 8% of those inventoried under the JICA Study or about 10% in terms of total service area. The sub-projects under CIDP-I & -II are well distributed over the country. It is generally observed that the implementing capacity of NIA for communal irrigation development has been much improved/strengthened through the implementation of CIDP-I.

#### Small-Scale Irrigation Development Project (SSIDP)

##### 2.43 Agreed Definition of SSIDP

The SSIDP would be a kind of communal irrigation projects and be defined as those of run-of-river type having an irrigation area of 50-500 ha in net. The CISs/CIPs that are served by pumps and/or those with storage dams are excluded from the SSIDP.

##### 2.44 Share of SSIDP in CISs/CIPs

In the light of the above definition, the total number of the existing SSIDP is estimated on the basis of the NIA's master list, to be about 2,800 covering a total area of 405,000 ha. The existing SSIDP corresponds to about 42% of the existing CISs (about 6,800) in number or about 70% in the total net irrigated area (about 580,000 ha: firmed-up).

	No.	Total Area (ha)	Average Area (ha)
above 500 ha	115	106,500	926
<u>50 - 500 ha</u>	<u>2,838</u>	<u>405,200</u>	<u>143</u>
below 50 ha	3,852	68,400	18
Total	6,805	580,100	85

Source: NIA's master list of CIS (Pump schemes and SWIM/SRIP are excluded)

2.45 CIS and SSIDP are well-distributed over the country as shown below:

(Unit: 1,000 ha)

Region	<u>≥500 ha</u>		<u>50 - 500 ha</u>		<u>&lt;50 ha</u>		<u>Total</u>	
	No.	Area	No.	Area	No.	Area	No.	Area
1	18	14.3	<u>658</u>	<u>88.2</u>	2,240	30.8	2,916	133.3
2	6	4.7	<u>414</u>	<u>53.1</u>	390	9.3	810	67.1
3	27	24.7	<u>283</u>	<u>46.3</u>	86	2.7	396	73.7
4	18	16.8	<u>329</u>	<u>47.2</u>	280	6.6	627	70.6
5	11	8.0	<u>279</u>	<u>39.2</u>	235	5.6	525	52.8
6	5	3.4	<u>129</u>	<u>14.8</u>	51	1.5	185	19.7
7	2	2.5	<u>77</u>	<u>10.7</u>	235	4.0	314	17.1
8	4	2.6	<u>156</u>	<u>21.8</u>	157	3.1	317	27.5
9	4	3.4	<u>75</u>	<u>11.1</u>	33	0.9	112	15.4
10	5	4.0	<u>178</u>	<u>25.9</u>	114	3.1	297	33.1
11	5	7.1	<u>138</u>	<u>22.9</u>	14	0.5	157	30.5
12	10	15.0	<u>122</u>	<u>24.0</u>	17	0.3	149	39.3
Total	115	106.5	<u>2,838</u>	<u>405.2</u>	3,852	68.4	6,805	580.1

Source: NIA's master list of CIS (Pump schemes and SWIM/SRIP are excluded)

#### 2.46 Classification of CIS/SSIDP

CISs are classified into three types:

- (1) Amortizing System : System constructed by NIA
- (2) Non-Amortizing System : Doled-out system constructed before 1974 or some of the systems constructed under the FSDC
- (3) Private System : System constructed by farmers' association

All CIPs/CISs that are constructed or rehabilitated with NIA assistance will be subject to the present system of amortization. Likewise, this will apply to the existing non-amortization and private systems that will be rehabilitated with NIA assistance.

2.47 CISs comprise 27% of amortizing system, 24% of non-amortizing system and 49% of private system. About 63% of all the amortizing systems are included in SSIDP as shown below:

(Unit: 1,000 ha)

Region	Amortizing		Non-Amortizing		Private		Total	
	No.	Area	No.	Area	No.	Area	No.	Area
CIS	1,816	251.1	1,658	158.4	3,332	170.6	6,806	580.1
(%)	(27)	(43)	(24)	(27)	(49)	(29)	(100)	(100)
SSIDP	1,147	174.6	823	119.0	868	111.6	2,838	405.1
(%)	(40)	(43)	(29)	(29)	(31)	(28)	(100)	(100)
Ratio (%) (SSIDP/CIS)	63%	70%	50%	75%	26%	65%	42%	70%

#### 2.48 Master Plan Study on SSIDP

The master plan study on small-scale irrigation development project (SSIDP) is intended to provide the framework plan for overall CIS/CIP development (for 50 - 500 ha range) in the future, with particular emphasis on:

- (1) long list of candidate CISs/CIPs for each province,
- (2) criteria and guidelines on programming for implementation of CISs/CIPs,
- (3) criteria and guidelines on prioritizing CISs/CIPs based on technical, economic, financial and other relevant factors, and
- (4) packaging of priority CISs/CIPs and implementation schedule for the master plan period of 1993 - 2002.

## CHAPTER III CURRENT STATUS OF SSIDP

### Inventory Survey

#### 3.01 Objectives

The objectives of the inventory survey are (1) to collect data on all the sub-projects of CISs/CIPs in the form of questionnaires, (2) to prepare the computerized database by entering such data into the computer and (3) to make a data analysis in order to clarify the current status of SSIDP for formulating a master plan of SSIDP.

#### 3.02 Scope of Inventory Survey

The inventory survey was carried out in the following steps:

- (1) Selection of inventoried sub-projects,
- (2) Preparation of questionnaires for the inventory survey,
- (3) Distribution of questionnaires to PIEs,
- (4) Collection of answered questionnaires,
- (5) Computer programming for database,
- (6) Encoding of answered questionnaires,
- (7) Cross-checking of encoded data, and
- (8) Analysis of the database

#### 3.03 Inventoried Sub-Projects

The sub-projects of CISs/CIPs to be inventoried are selected from the following sources, considering the agreed definition of SSIDP.

- (1) New sub-projects: all the CIPs indicated in the "Provincial Irrigation Profiles" prepared by NIA in 1989
- (2) Existing sub-projects: all the CISs included in the NIA's master list as of July 1990 (updated by the Study Team)

3.04 The inventoried sub-projects are 4,811 in total, covering about 696,000 ha as follows:

	Nos. of sub-projects	Designed Irrigable Area (ha)
New sub-projects	1,973	291,200 ha
Existing sub-projects	2,838	405,200 ha
<b>Total</b>	<b>4,811</b>	<b>696,400 ha</b>