JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
NATIONAL IRRIGATION ADMINISTRATION (NIA)

REPUBLIC OF THE PHILIPPINES

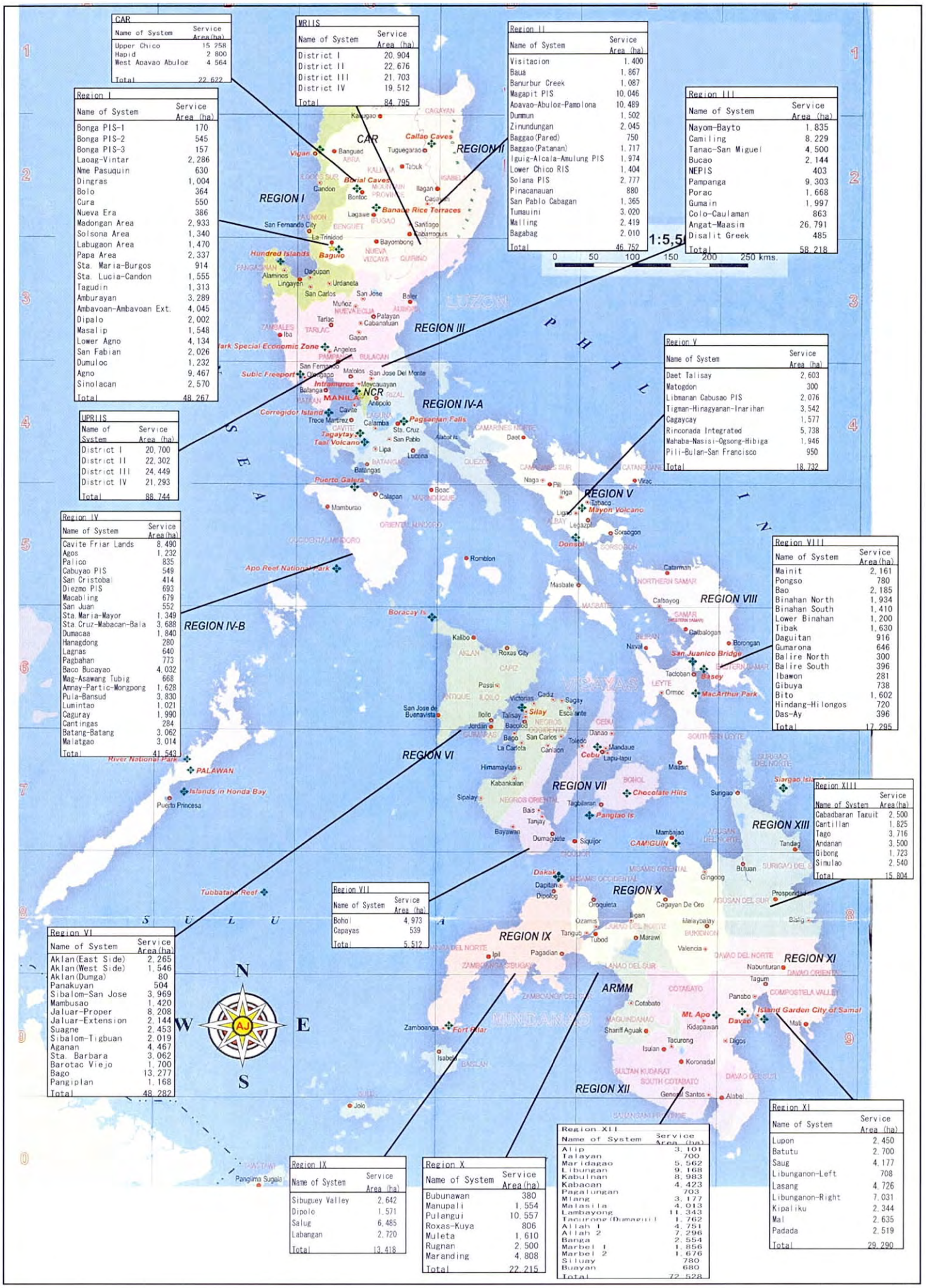
THE STUDY
FOR
THE MAINTENANCE, REHABILITATION AND IMPROVEMENT
PLANNING METHODOLOGY
OF
NATIONAL IRRIGATION SYSTEMS

MANUAL

NOVEMBER 2006

SANYU CONSULTANTS INC.

ADMINISTRATIVE REGIONS AND NATIONAL IRRIGATION SISTEMS (NIS)



CAR	
Name of System	Service Area (ha)
Upper Chico	15,258
Hapid	2,800
West Apayao Abuloc	4,564
Total	22,622

MRIIS	
Name of System	Service Area (ha)
District I	20,904
District II	22,676
District III	21,703
District IV	19,512
Total	84,795

Region II	
Name of System	Service Area (ha)
Visitacion	1,400
Baua	1,867
Banurbur Creek	1,087
Magapit PIS	10,046
Apayao-Abuloc-Pamplona	10,489
Dummun	1,502
Zinundungan	2,045
Baggao(Pared)	750
Baggao(Patanan)	1,717
Iguig-Alcala-Amulung PIS	1,974
Lower Chico RIS	1,404
Solana PIS	2,777
Pinacanauan	880
San Pablo Cabagan	1,365
Tumauini	3,020
Malling	2,419
Bagabag	2,010
Total	46,752

Region III	
Name of System	Service Area (ha)
Nayom-Bayto	1,835
Camiling	8,229
Tanac-San Miguel	4,500
Bucao	2,144
NEPIS	403
Pampanga	9,303
Porac	1,668
Gumain	1,997
Colo-Caulaman	863
Angat-Maasim	26,791
Disalit Greek	485
Total	58,218

Region I	
Name of System	Service Area (ha)
Bonga PIS-1	170
Bonga PIS-2	545
Bonga PIS-3	157
Laoag-Vintar	2,286
Nme Pasuquin	630
Dingras	1,004
Bolo	364
Cura	550
Nueva Era	386
Madongan Area	2,933
Solsona Area	1,340
Labugaon Area	1,470
Papa Area	2,337
Sta. Maria-Burgos	914
Sta. Lucia-Candon	1,555
Tagudin	1,313
Amburayan	3,289
Ambavoan-Ambavoan Ext.	4,045
Dipalo	2,002
Masalip	1,548
Lower Agno	4,134
San Fabian	2,026
Dumuloc	1,232
Agno	9,467
Sinolacan	2,570
Total	48,267

UPRIIS	
Name of System	Service Area (ha)
District I	20,700
District II	22,302
District III	24,449
District IV	21,293
Total	88,744

Region V	
Name of System	Service Area (ha)
Daet Talisay	2,603
Matogdon	300
Libmanan Cabusao PIS	2,076
Tigman-Hinagyanan-Inarihan	3,542
Cagaycay	1,577
Rinconada Integrated	5,738
Mahaba-Nasisi-Ogsong-Hibiga	1,946
Pili-Bulan-San Francisco	950
Total	18,732

Region IV	
Name of System	Service Area (ha)
Cavite Friar Lands	8,490
Agos	1,232
Palico	835
Cabuyao PIS	549
San Cristobal	414
Diezmo PIS	693
Macabling	679
San Juan	552
Sta. Maria-Mayor	1,349
Sta. Cruz-Mabacan-Bala	3,688
Dumacaa	1,840
Hanagdong	280
Lagras	640
Pagbahan	773
Baco Bucayao	4,032
Mag-Asawang Tubig	668
Amnay-Partic-Mongpong	1,628
Pula-Bansud	3,830
Lumintao	1,021
Caguray	1,990
Cantingas	284
Batang-Batang	3,062
Malatgao	3,014
Total	41,543

Region VIII	
Name of System	Service Area (ha)
Mainit	2,161
Pongso	780
Bao	2,185
Binahan North	1,934
Binahan South	1,410
Lower Binahan	1,200
Tibak	1,630
Daguitan	916
Gumarona	646
Balire North	300
Balire South	396
Ibawon	281
Gibuya	738
Bito	1,602
Hindang-Hilongos	720
Das-Ay	396
Total	17,295

Region VII	
Name of System	Service Area (ha)
Bohol	4,973
Capayas	539
Total	5,512

Region XIII	
Name of System	Service Area (ha)
Cabadbaran Tazuit	2,500
Cantillan	1,825
Tago	3,716
Andanan	3,500
Gibong	1,723
Simulao	2,540
Total	15,804

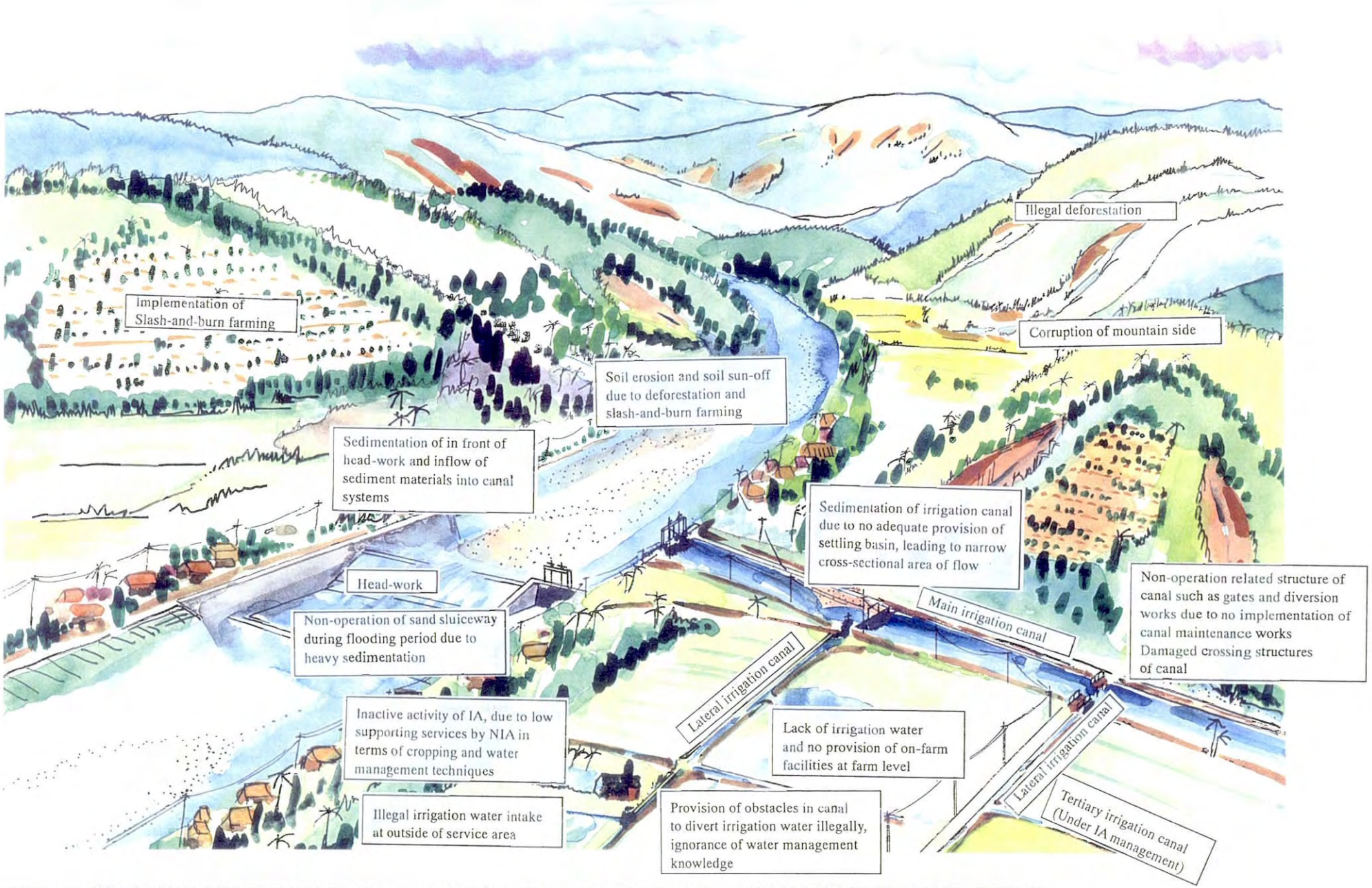
Region VI	
Name of System	Service Area (ha)
Aklan(East Side)	2,265
Aklan(West Side)	1,546
Aklan(Dumga)	80
Panakuyan	504
Sibalom-San Jose	3,969
Mambusao	1,420
Jaluar-Proper	8,208
Jaluar-Extension	2,144
Suagne	2,453
Sibalom-Tigbuan	2,019
Aganan	4,467
Sta. Barbara	3,062
Barotac Viejo	1,700
Bago	13,277
Pangiplan	1,168
Total	48,282

Region IX	
Name of System	Service Area (ha)
Sibuguey Valley	2,642
Dipolo	1,571
Salug	6,485
Labangan	2,720
Total	13,418

Region X	
Name of System	Service Area (ha)
Bubunawan	380
Manupali	1,554
Pulangui	10,557
Roxas-Kuya	806
Muleta	1,610
Rugnan	2,500
Maranding	4,808
Total	22,215

Region XII	
Name of System	Service Area (ha)
Alip	3,101
Talayan	700
Maridagao	5,562
Libungan	9,168
Kabulnan	8,983
Kabacan	4,423
Pagalungan	703
Mlang	3,177
Malasila	4,013
Lambayong	11,343
Tacurong (Dumagui)	1,762
Allah 1	4,751
Allah 2	7,296
Banga	2,554
Marbel 1	1,856
Marbel 2	1,676
Situay	780
Buayan	680
Total	72,528

Region XI	
Name of System	Service Area (ha)
Lupon	2,450
Batutu	2,700
Saug	4,177
Libunganon-Left	708
Lasang	4,726
Libunganon-Right	7,031
Kipaliku	2,344
Mal	2,635
Padada	2,519
Total	29,290



NIS VARIOUS PROBLEMS CAUSED BY COLLAPSE OF CATCHMENT AREA AND INSUFFICIENT O&M WORKS

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ABBREVIATION AND GLOSSARIES

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ABBREVIATION AND GLOSSARIES

1. Related Agencies

ADB	:	Asian Development Bank
CAR	:	Cordillera Autonomous Region
CO	:	Central Office
CORPLAN	:	Corporate Planning
DA	:	Department of Agriculture
DAR	:	Department of Agrarian Reform
EMD	:	Equipment Management Department
DENR	:	Department of Environment and Natural Resources
DPWH-BRS	:	Department of Public Works and Highway-Bureau of Research and Standard
FMB	:	Forest Management Bureau
IA	:	Irrigators' Association
IDD	:	Institutional Development Department
JBIC	:	Japan Bank for International Cooperation
JICA	:	Japan International Cooperation Agency
LGU	:	Local Government Unit
NAFC	:	National Agriculture and Fishery Council
NAMRIA	:	National Mapping and Resources Information Authority
NIA CO	:	National Irrigation Administration Central Office
NISO	:	National Irrigation System Office
NWRB	:	National Water Resources Board
PAGASA	:	Philippine Atmospheric, Geophysical and Astronomical Service Administration
PIMO	:	Provincial Irrigation Management Office
PIO	:	Provincial Irrigation Office
PDD	:	Project Development Department
PMO	:	Project Management Office
PO	:	Project Office
RC	:	Responsibility Center
RIO	:	Regional Irrigation Office
SEC	:	Securities and Exchange Committee
SMD	:	System Management Department

2. Glossaries

AFMA	:	Agriculture and Fisheries Modernization Act
AMRIS	:	Angat-Maasim River Irrigation System
ASBRIS	:	Aganan-Sta. Barbara River Irrigation Systems
CBFM	:	Community Based Forest Management
CIS	:	Communal Irrigation System
CY	:	Crop Year
GDP	:	Gross Domestic Product
GIS	:	Geographical Information System
I/A	:	Implementing Arrangement
IDP	:	Institutional Development Program
IS	:	Irrigation Superintendent
IDO	:	Irrigation Development Officer
IMIS	:	Irrigation Management Information Systems
IMT	:	Irrigation Management Transfer
ISF	:	Irrigation Service Fee
ISFP	:	Integrated Social Forestry Program
ISOP	:	Irrigation Operations Support Project
ISIP	:	Irrigation Systems Improvement Project
MAP	:	Management Action Plan
MOOE	:	Maintenance, Operation and Other Expenses

MRI	:	Maintenance, Rehabilitation and Improvement
MRIIS	:	Magat River Integrated Irrigation System
MTPDO	:	Medium-Term Philippine Development Plan
NIS	:	National Irrigation System
PD	:	Provincial Degree
PERECOM	:	Performance Evaluation/Commitment Report
RRIDFPS	:	Repair, Rehabilitation and Improvement of Drainage and Flood Protection System
RRCFMR	:	Repair, Rehabilitation and Construction of Farm-to-Market Roads
PIDP	:	Participatory Irrigation Development Project
PIS	:	Private Irrigation System
PoW	:	Program of Works
RA	:	Republic Act
R/I	:	Rehabilitation and Improvement
RRENIS	:	Repair and Rehabilitation of Existing National Irrigation Systems
SCRIS	:	Sta. Cruz River Irrigation System
SEC	:	Securities and Exchange Commission
SOEM	:	System Operation and Equipment Management
SSA	:	Sustainable System Agriculture
SWRFT	:	Supervising Water Resources Facility Technician
UPRIIS	:	Upper Pampanga River Integrated Irrigation System
WRDP	:	Water Resources Development Project

3. Unit of Measurements

mm	:	millimeter
cm	:	centimeter
m	:	meter
km	:	kilometer
sq.m	:	square meter
sq.km	:	square kilometer
ha	:	hectare
lit	:	liter
cu.m	:	cubic meter
MCM	:	million cubic meter
cu.m/day	:	cubic meter per day
lit/sec	:	liter per second
cu.m/sec	:	cubic meter per second
ppm	:	parts per million
pH	:	potential of hydrogen
g	:	gram
kg	:	kilogram
t, ton	:	metric ton
sec.	:	second
min.	:	minute
hr.	:	hour
yr.	:	year
ave.	:	average
min.	:	minimum
max.	:	maximum
kcal	:	kilocalories
kw	:	kilowatt
kwh	:	kilowatt-hour

%	:	percent
No.	:	number
^{0}C	:	degree centigrade
cap.	:	capita
md	:	man-day
pers.	:	person
msl	:	meters above mean sea level
N	:	nitrogen
P	:	phosphorus
K	:	potassium
US$	:	US Dollar
PhP	:	Philippines Peso
cavan	:	weight of paddy (1cavan = 50 kg)
peso	:	Philippine currency (1US$ =52.0pesos, as of August 2006)

HAPTER I.

PREFACE

CHAPTER I. PREFACE

1.1 Purpose and Necessity of the Manual

The National Irrigation Administration (NIA), Republic of the Philippines, constructed a number of irrigation facilities since its establishment in 1963, and their total irrigation area (FUSA) as of August 2006 amounted to about 634,020 ha with 205 National Irrigation Systems (NISs) in the country. However, many NISs have been faced to severe degradated situations of the systems due to lack of proper operation and maintenance activities.

Under the situations, to grasp definitely the present functionality of the systems is urgent and prerequisite needs. To meet these requirements, the JICA Study Team implemented the survey of "the Study for the Maintenance, Rehabilitation and Improvement Planning Methodology of National Irrigation Systems (NISs) from October 2005 to August 2006. The Study aims at proper formulation of planning methodology for maintenance, rehabilitation and improvement works for the NISs.

In the courses of the Study, valuable data and information were collected at the selected three Pilot NISs of AMRIS in Region-III, Sta. Cruz RIS in Region-IV, and Aganan RIS in Region-VI, respectively. Aside from these collected data, NIA implemented the Inventory Survey covering whole NISs by using inventory format jointly prepared by the NIA staff and JICA Study Team. The major information of the Inventory Survey is itemized as shown below;

Part-I	:	General Information
Part-II	:	Water Resource and Irrigation Water Requirement Information
Part-III	:	Flood and Drainage Information
Part-IV	:	Functionality Information of Irrigation and Drainage Facilities
Part-V	:	Organization and Operation and Maintenance (O&M) Information

Based on these valuable data and information obtained, the following Manuals for the said purposes of the planning methodology were prepared in the Study.

- Manual for NISs Inventory Survey
- Manual for NISs Operation, Maintenance, Rehabilitation and Improvement Planning Methodology

1.2 Contents of the Manual

The Manuals mentioned above are organized into three major sectors; namely 1) Water Resource and Irrigation Water Use, 2) Irrigation and Drainage Facilities, and 3) Organization and Operation and Maintenance.

It is very essential and important that sustainable and periodical implementation of the Inventory Survey should be realized, and periodical review of the various aspects proposed in this Manual should be undertaken and updated.

CHAPTER II.

MANUAL FOR THR NISs INVENTORY SURVEY

CHAPTER II. MANUAL FOR THE NISs INVENTORY SURVEY

2.1 Renewal of Inventory Survey Data

2.1.1 Inventory Survey Format

Inventory Survey Format for the following objective parts are given in the Form IS-1, and the actual inventory survey data are attached in Table A2-1 in Appendices as a sample in case of the Aganan RIS in Region VI, which is one of the Pilot NIS Areas.

Part-I	General Information
Part-II	Water Resources and Irrigation Water Requirement Information
Part-III	Flood and Drainage Information
Part-IV	Functionality Information on Irrigation and Drainage Facilities
Part-V	Organizations and O&M Information

To carry out the Inventory Survey effectively and smoothly by the relevant staff at RC (NISO) and NIS levels, description guidelines of the Inventory Survey are prepared in Form IS-2.

2.1.2 Updating Procedures of Inventory Survey

1) Timing and Interval of the Inventory Survey

To decide an appropriate timing and interval of the Inventory Survey implementation, the JICA Study Team and NIA officials concerned had a series of discussion and undertaken the "Questionnaire for the Inventory Survey"[1] for the targets of Regional Offices and representative large scale of National Irrigation Systems such as MRIIS and UPRIIS.

Through these discussions and questionnaire survey, timing and interval of the Inventory Survey are determined as shown below.

Timing of Inventory Survey
- Field survey, data collection and filing work : April – May
- Tabulation of data/information : April – May
- Data evaluation and identification of problems : October
- Preparation of MRI Plans : November
- Submission of survey results to Regional Office : End of November

Interval of Inventory Survey : Every Year

2) Data Compilation and Submission Procedures

Data compilation of the implemented Inventory Survey and their report submission procedures are shown in Figure 2-1.

[1] Contents of the Questionnaires and their evaluation results are referred to the Appendices of Main Report.

2.2 Renewal of NISs Numbers, Location and Areas

2.2.1 NISs Numbers and Location by Regions

NISs numbers and their location should be reviewed and updated through the periodical Inventory Survey to be implemented annually, of which detailed descriptions are given in the paragraph of 2.2.2 “Inventory Survey Up-dating Procedures”. The analyzed NISs numbers and location with the latest data should be tabulated in FormAR-1, of which works should be done at the NIA Regional Office and Central Office (SMD).

2.2.2 Areas of Each NIS (Firmed-Up Service, Irrigated, and Benefited Areas)

The areas of firmed-up service areas (FUSA), irrigated areas, and benefited areas of each NIS should be updated in the manners of the following ways, and be tabulated in the Format of Form AR-1, and as an sample, Table A2-1[2] in Appendices show the present conditions of NISs numbers, location and related areas.

Firmed-Up Service Areas

The firmed-up service areas in each irrigation system being potential irrigable areas should be reported considering the converted areas from farm land to other purposes of land use in the reported year.

Irrigated Areas

The actual irrigated areas classified into two types (dry and wet seasons) should be tabulated in the in the reported year of the Inventory Survey. At the reporting stage of the Inventory Survey, which are scheduled to be submitted by the end of November from the Responsibility Center (NISO) to the Regional Office, the wet season irrigated areas are already fixed with completion of harvesting works. However, for the dry season paddy, irrigation water supply are not stared yet, so that the irrigated areas of dry season paddy is of the previous year’s irrigated areas, namely the areas of Cropping Year (CY)

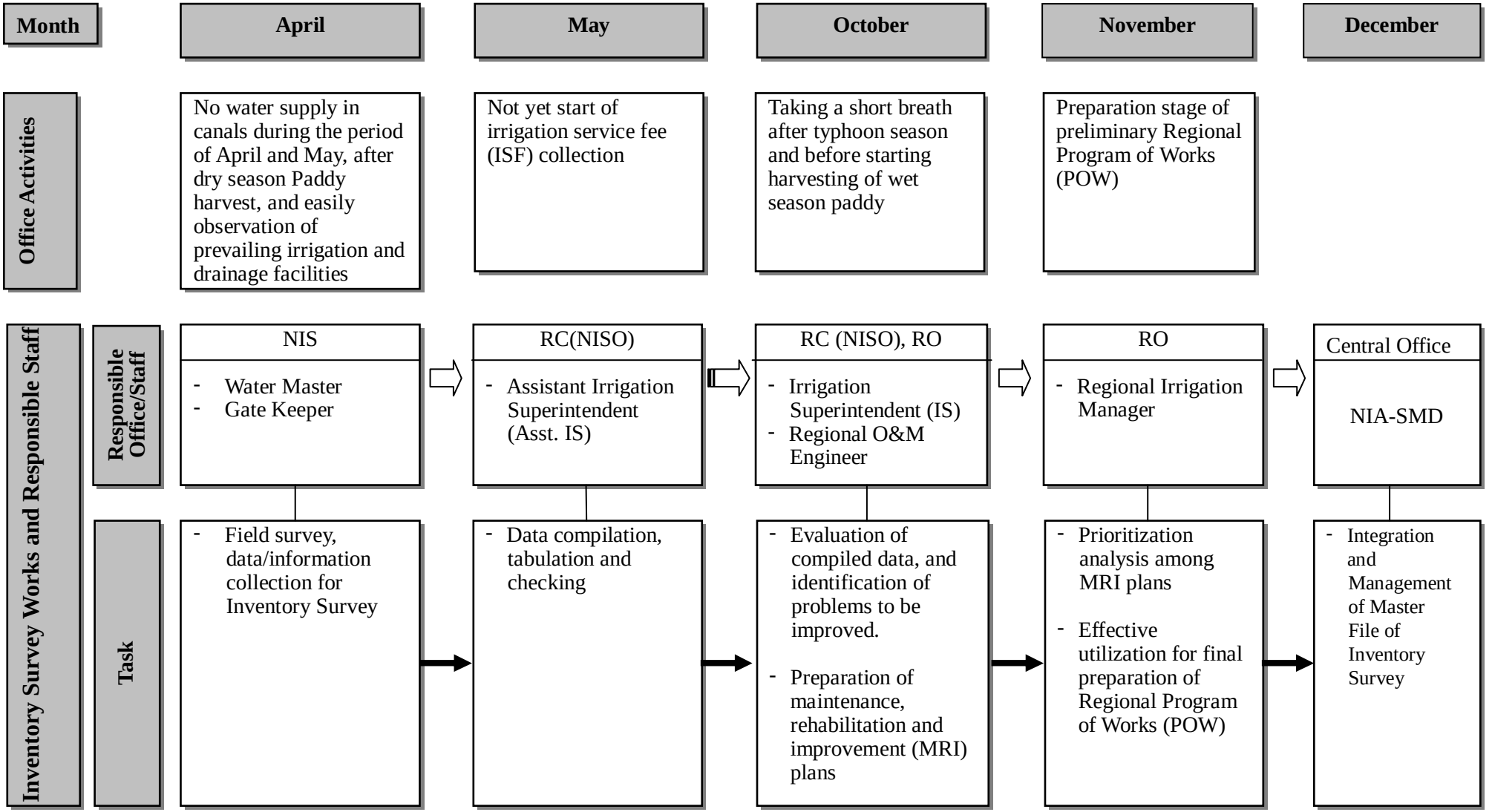
Average Benefited Areas

Average benefited areas classified also into two types (dry and wet seasons), which will be derived from Form TB-1 of the Inventory Survey of Part I-III should be tabulated. These average benefited areas are to be utilized for the project prioritization analysis, depending on required costs and expected benefits.

The format to tabulate the updated NISs Number, location and their related areas mentioned in the above are shown in Form AR-1.

[2] Table A2-2 should basically be tabulated based on the implemented Inventory Survey, but in this Study, due to lack of inventory data, those missing data are filled up using the data of Management Action Plan and Quarterly Report of SOME A1-QS (Master List) in 2005.

Figure 2-1 Flow Diagram of Data Compilation of Inventory Survey and Report Submission Procedures



2.3 Analysis and Evaluation Methods of the Inventory Survey Results

2.3.1 Tabulation of Inventory Survey Data

The obtained Inventory Survey data classified into five Parts mentioned in the above should be tabulated in each Responsibility Center (NISO) for forwarding analysis and evaluation studies on the irrigation systems. Tabulation manners of the Format for each sector are given below.

1) Water Resources, Irrigation Water Use and Flood and Drainage Information

The Inventory Survey data classified into three Parts (Part-I to Part-III) should be tabulated under the title of "Water Resources, Irrigation Water Use and Flood and Drainage Information". Form TB-1 indicates the tabulation format for this sector, and an actual tabulated table is attached in Table A 2-3 in Appendices for the references.

Major tabulation items are listed below;

- Region, RC (NISO) and NIS Name
- Water Resources for Irrigation
- Irrigation Areas and Cropping Intensity
- Damaged Area caused by Water Shortage and Flood
- Average Benefited Area and Crop Yield

2) Functionality Information of Irrigation and Drainage Facilities

The Inventory Survey data should be tabulated under the title mentioned below. Form TB-2 to TB-4 indicates the tabulation formats for this sector, and actual tabulated tables are attached in Table A2-4 to A2-6 in Appendices for the references.

- Form TB-2 : Tabulation of Inventory Survey Results for the Sector of Functionality of Irrigation and Drainage Facilities (General Information and Dimension)
- Form TB-3 : Tabulation of Present Conditions for the Sector of Functionality of Irrigation and Drainage Facilities
- Form TB-4 : Evaluation of NIS Inventory Survey Results for the Sector of Functionality of Irrigation and Drainage Facilities

The tabulations of study results were carried out by the results of NIS inventory in 195 NISs. The necessary data such as dimensions of structure, conditions and function of facilities were collected, examined and tabulated in Table A2-4 (1) to Table A2-4(3).

The conditions and function of the each part of facilities were assessed with percentage. The results of examination of NIS inventory are shown in Table A2-5 (1) to TableA2-5 (3). Applied judgment/criterion for evaluating the conditions is as follows.

Judgment	Percentage (%)	Remarks
Severe	80	- Need repair, rehabilitation or improvement with no-good function
Moderate	50	- Need normally maintenance with function (such as sediment flushing, desilting and clearing of canal, repair light damaged part and repainting)
None	0	- No need maintenance, repair, rehabilitation and improvement with good function

3) Organization and Operation and Maintenance Information

The Inventory Survey data of Part-V should be tabulated under the title of "Organization and Operation and Maintenance". Form TB-5 indicates the tabulation format for this part, and an actual tabulated table is attached in Table A 2-7 in Appendices for the references.

The table below shows the result of the inventory survey. General statistics should be also reported as the table below.

Item	Unit	National Average
1) FUSA / Personnel		
1. FUSA/Personnel	ha/ person	196
2) Viability Index and O&M Cost /FUSA		
2. Viability Index		1.10
3. Operation Cost /FUSA	Peso/ha	1,125
4. Income/FUSA	Peso/ha	1,221
3) Maintenance Index		
5. Maintenance Index		5.3
4) Project Cost/FUSA		
6. Program of Works (PoWs)	Peso/ha	1,201
for Maintenance	Peso/ha	489
for Rehab.&Imp.	Peso/ha	712
5) Cropping Intensity		
7. Cropping Intensity	%	140
6) ISF Collection Efficiency		
8. ISF Collection Efficiency	%	62*1
7) Irrigators Association		
9. Average IA Size	ha	413
10. Membership Rate of IA	%	75
11. IA Functionality Point		1.7

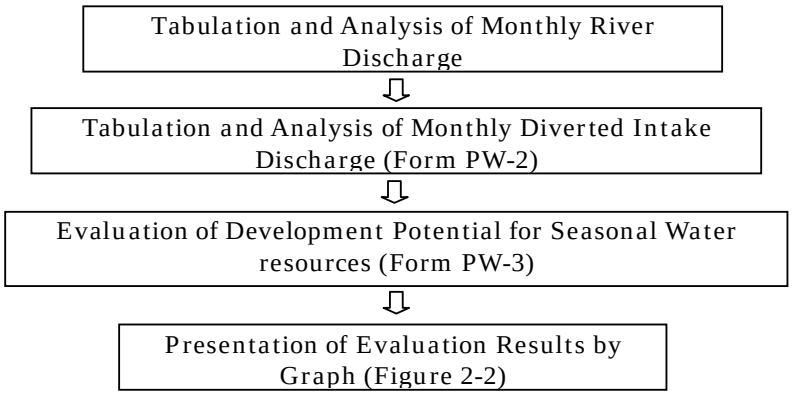
*1: The figure is different from the figure of SMD (53 % in 2004) due to the difference of data and calculation.

2.3.2 Analysis on Inventory Survey Results and Identification of Potential and Problems

1) Water Resources, Irrigation Water Use and Flood and Drainage Information

In this sector, potential water resources for each NIS during both dry season (Nov.-April) and wet season (May-Oct.) are evaluated based on the data obtained through the Inventory Survey. Evaluation procedures are as follows;

Procedures to Evaluate Seasonal Water Resources



Detailed descriptions of the evaluation procedures of the potential water resources are given in Form PW-4. In the Form PW-4, the ranges of development potential of water resources in each NIS should be indicated as the indexes of “High”, “Medium”, and “Low” depending on available water resources.

Evaluation results are presented by the graph applying the Excel function, as shown in Figure 2-2, and detailed procedures for the evaluation are given in Table A2-8 to Table A2-10. These evaluation results of potential water resources for each NIS should be utilized for the prioritization analysis of maintenance, rehabilitation and improvement (MRI) planning of irrigation and drainage facilities.

2) Functionality Information of Irrigation and Drainage Facilities

a) Evaluation of NIS Inventory Survey Date

NIS inventory survey data were collected from 183 NISs (89% of 205 NISs). Evaluation results of these data are shown in following table (Refer to Table A2-6).

Evaluation Result of NIS Inventor Survey Data for Irrigation and Drainage Facilities

Evaluation	Diversion Dam		Pumping Station		Canal		Overall	
	No.	%	No.	%	No.	%	No.	%
A: Very good	70	36	3	18	103	50	49	24
B: Good	62	32	8	47	65	32	80	39
C: Not good	42	21	6	35	15	7	54	26
D: Not submitted	22	11	0	0	22	11	22	11
Total	196	100	17	100	205	100	205	100

b) Identification of Encountered Problems

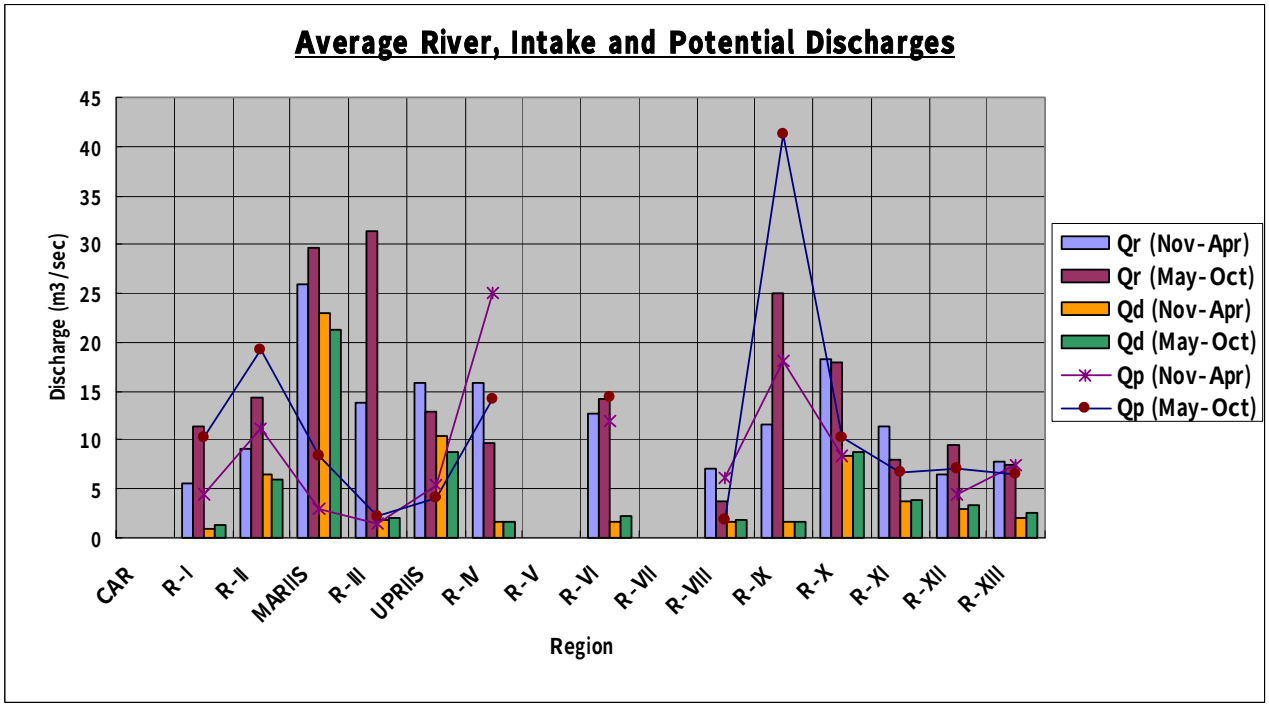
The problems and issues for survey contents and procedures in the sector of functionality information of irrigation and drainage facilities are itemized as follows.

- The rate of collected data is 89 percent in the analyzed 183 NISs. Some important items are included in the unanswered items. Therefore, the analysis and evaluation on implemented NIS inventory survey are obstructed.

- The collected survey data for diversion dam include inventory survey data undertaken under the NIS irrigation facility survey made by JICA Expert in 2004. These collected data didn’t fill out in the present NIS inventory format. Therefore, the analysis and evaluation on implemented NIS inventory survey are obstructed.

- While a lot of incomplete and unclear data are also included, then the analysis and evaluation on implemented NIS inventory survey are also obstructed.

Figure 2-2 Seasonal Potential Water Resources by Region



Region	River Discharge (Qr)		Intake Discharge (Qd)		Development Potential (Qr-Qa)	
	Nov-Apr.	May-Oct	Nov-Apr.	May-Oct	Nov-Apr.	May-Oct
CAR						
R-I	5.52	11.41	0.98	1.24	4.56	10.19
R-II	9.18	14.43	6.6	6.02	11.25	19.2
MARIIS	26.00	29.66	23.05	21.34	2.95	8.31
R-III	13.85	31.34	1.87	2.1	1.42	2.33
UPRIIS	15.81	12.8	10.41	8.73	5.4	4.07
R-IV	15.96	9.66	1.72	1.71	25	14.1
R-V						
R-VI	12.73	14.14	1.59	2.19	11.95	14.29
R-VII						
R-VIII	7.16	3.72	1.66	1.82	6.18	1.87
R-IX	11.51	25.1	1.66	1.63	18.14	41.3
R-X	18.22	17.85	8.41	8.77	8.48	10.36
R-XI	11.33	8.08	3.77	3.91		6.65
R-XII	6.59	9.43	2.9	3.34	4.43	7.15
R-XIII	7.76	7.45	2.04	2.63	7.41	6.55

3) Organizations and Operation and Maintenance Information

a) Firmed-Up Service Area (FUSA)/Personnel

As of the end of 2005, number of staff and FUSA of NISs nationwide are as the table below.

FUSA	Approved Plantilla	Actual No.
632,430 ha	6,933 person	3,656 person
	=91 ha/person	=173 ha/person
	=10.9 person/1,000 ha	=5.8 person/1,000 ha

Source: Made by the Study Team based on NIS Performance Survey 2005, SMD

The number of approved plantilla is designed by Organization and Methods Division of Management Services Department in NIA, based on the anticipated volume and type of works. But actual number of staffs is just 53 percent of the approved one. It shows the downsizing of offices and NISOs' crucial efforts to minimize expenses. Although some staffs are working concurrently, and many offices have given up to employ Institutional Development Officers (IDOs) or most of IDOs are working in temporary basis, NIA still have to reduce the number of staff, as the streamlining policy is progressed.

On the other hand, works for ISF collection is a heavy burden for NISOs. Type II contract has been introduced in order to lighten the burden of NISOs and to utilize IAs' institutional capacity, but still it is one of the heaviest load of NISOs.

b) Viability Index (V.I.) and Operation Cost/FUSA

Viability Index (V.I.) is calculated dividing the total income by expenses. V.I. of 1.0 means that the income and expenses of the office are balanced. The higher V.I. is better in order to secure also the expenses of regional and central office, while NISOs of V.I. below 1.0 are not acting as a profit center, the original function of NISOs. But, on the other hand, there is an indication that performance evaluation by V.I. is leading to under investment in maintenance.

According to the NIS Performance Survey and financial statement of all the NISOs, the biggest share, more than 80 percent, of income is coming from Irrigation Service Fee (ISF), while the biggest share, approximately 80 percent, of expenditure is occupied by personnel salaries at NISO level. Therefore, the increase of ISF collection efficiency and efficient workforce are very important to improve V.I..

According to the study of Asian Development Bank (ADB) in 2000 (Review of Cost Recovery Mechanisms for National Irrigation Systems), the estimated cost for full O&M cost recovery in the field level is 2,300 Pesos/ha, which includes Current Operation Budget (COB) and cost for regular repair and maintenance of NISs. But at present, the average of actual expenditure from 2002 to 2004 in NISOs is about 1,050 Pesos/ha and it contains very minimal cost for maintenance but mostly for operation. Substantial maintenance cost is allocated by the Government of Philippine (GOP) as regular project fund and the budget for rehabilitation and improvement is coming from donors' fund. Refer to "d) Project Cost/FUSA" for those funds.

c) Maintenance Index

The inventory survey inquires the status of actual activities on maintenance, such as utilization of manuals, frequency of inspection and other basic maintenance activities. Every activity is graded from 0 to 10. The most positive status is rated as 10, while the most negative state is rated as 0. Generally speaking, when the activities are not carried out enough, the score falls into 5 points. Surveyed items are shown in the table below.

Maintenance	Surveyed Activities
1. General	Utilization of various manuals, Condition of record keeping, Participation of IAs for PoW formation, Frequency of regular inspection, Other regular maintenance activities.
2. Irrigation Facility	
2.1 Intake Facility	
Mechanical Devices	Removing debris around gates, Greasing on gears, Maintenance for engine/motor, Painting on steel gates.
Diversion Dam	Desiltation around intake, Implementation of river channeling, Measures for riverbed degradation at downstream.
Pump Station	Removal of sediment and debris around intake, Implementation of river channeling, Greasing on pump system, maintenance of pump system, Replacement of deteriorated parts, Maintenance of power supply system
Reservoir Dam	Inspections on unusual phenomena, mechanical and electronic devices, Maintenance of devices, Survey and desiltation of reservoir, Observation facilities check-up, etc.
2.2 Others	Clearing and desiltation of canals, Maintenance of farm to market road, River desiltation, Countermeasures for flood and calamity, record of discharge, etc.
On-Farm Water Management Information	
1. Drought	Coordination and irrigation method during drought
2. Others	Compliance with cropping pattern and water distribution plan, Over-water-taking, Illegal water taking

d) Project Cost/FUSA

At present, the most of fund for maintenance, rehabilitation and improvement (MRI) works are subsidized by the government as a regular project budget of Repair and Rehabilitation of Existing National Irrigation System (RRENIS), and other supplemental sources of local fund and donors' funds.

Work Items and Unit Amount Spent by PoW

Unit; Pesos/ha

Work Item	Nat'l Ave.
1 Desilting, Canal	181
2 Desilting, Drainage	94
3 Canal Lining	305
4 Road Surfacing	181
5 Road Concreting	4
6 Dam Repair	55
7 River Diversion	33
8 Drainage Improvement	69
9 Facility Improvement	227
10 Institutional Development	7
11 Others	46
Total	1,201
Maintenance Cost (item 1,2,4,7)	489
R/I[*1] Cost (other items)	713

Source: Results of the Inventory Survey 2006, average of 2000 to 2004

*1: R/I; Rehabilitation and Improvement

e) Cropping Intensity

Cropping intensity is calculated by dividing irrigated area (sum of wet and dry) by service area, and the nationwide figures in the past vary from 124 to 143 percent, while the average is 137 percent according to NIS Performance Survey of SMD. Until 2003, the service area has been used as the denominator. FUSA is also used these days and the cropping intensity nationwide rises more than 10 percent, when FUSA is used for calculation. Cropping intensity (or irrigated area) is usually restricted by flood area in wet season and water availability in dry season.

f) Irrigation Service Fee (ISF) Collection Efficiency

The collection efficiency of Irrigation Service Fee (ISF) is the biggest source of income for NIA. The share of ISF is 83 percent of NISOs' income and 40 to 50 percent of the whole NIA's income. Therefore its improvement is the biggest task for NIA under the difficult financial situation.

On the other hand, the collection efficiency is far from the satisfactory level. The collection efficiencies of recent years are;

Year	2000	2001	2002	2003	2004
Collection Efficiency*1 (%)	29	32	51	53	53

*1: Actual collection of current account/current collectibles based on benefited area
Source: NIS Performance Survey, SMD

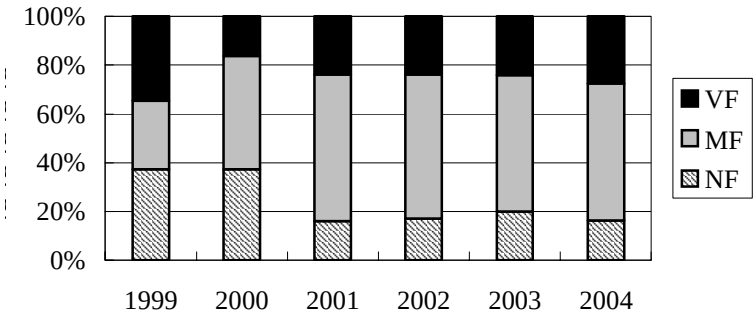
It took five years to recover the collection from the affected level by Socialized ISF rate, and 53 percent is the current level of collection efficiency. It is generally said that the break even point for financial self-reliance of NIA is more than 70 percent, so more efforts are required to achieve that.

g) Irrigators Association

According to NIS IA Masterlist of IDD in 2005, the nationwide average size of IA is 283 ha/IA. Basically IAs are formed based on the water delivery systems or lateral canal basis, while there is no specific standard or requirement in size of IA. But IA splitting is a noticeable approach these days. That is the separation of IAs with the hectarage of some hundreds or more, into 100 to 300 ha of IAs in order to improve internal management.

There is no specific standard or target of membership rate of IA, but 80 percent and above is already the satisfactory level according to IDD. It is also included in the IA functionality survey as one of the evaluation criteria. Since the national average is 80 percent, the achievement is appreciated as satisfactory in terms of the membership rate.

IA is the key organization to improve the O&M of irrigation facilities effectively and economically. According to IDD, the IA functionality survey is conducted for about 87 percent of total IAs annually. Criteria of the survey cover various functions of IAs comprehensively. The recent historical record of IAs' functionality is shown in the graph below. The share of "Not Functional" is decreasing up to less than 20 percent in 2004 from about 40 percent of 1999 level.



*VF; Very Functional, MF; Moderately Functional, NF; Not Functional

CHAPTER III.

MANUAL FOR NISs OPERATION, MAINTENANCE, REHABILITATION AND IMPROVEMENT (MRI) PLANNING METHODOLOGY

CHAPTER III. MANUAL FOR NISs OPERATION, MAINTENANCE, REHABILITATION AND IMPROVEMENT (MRI) PLANNING METHODOLOGY

3.1 NISs Operation and Maintenance Standards for Application

3.1.1 Water Resources and Irrigation Water Use

Regarding the manual for the sectors of water resources and irrigation water use, which have been applied to the operation and maintenance works for the NISs, the following two manuals are dominant one in NIA.

- Manual on Irrigation Water Management, prepared by NIA-ADB Water Management Project Group in August 1970,
- General and Specific Operation & Maintenance Manual, prepared by NIA in January 1991

The former manual deals mainly with paddy rice cultivation under the Philippines condition and does not include the upland crop irrigation. It covers mainly the various steps in data collection, planning, construction, operation, maintenance and improvement of irrigation and drainage facilities for the proper implementation of water management.

The latter manual, on the other hand, was prepared to establish appropriate and sound guideline for operation and maintenance of irrigation and drainage facilities such as diversion dam, canals and other respective structures, etc. in the systems. This manual also deals with organizational aspects, budgeting, participatory system management and other administrative matters with the following volumes.

Volume-I	:	Executive Summary
Volume-II	:	System Operation
Volume-III	:	Maintenance of System Facilities
Volume-IV	:	Maintenance of Electro-Mechanical Facilities
Volume-V	:	System's Organization
Volume-VI	:	Management Information System

3.1.2 Irrigation and Drainage Facilities

Although many manuals aiming at designing irrigation and drainage facilities have been formulated by the NIA, relevant donors, etc, following Manuals are the major design manuals applied for planning and designing the irrigation and drainage facilities in NIA.

- Design Manual for Diversion Dams, prepared by NIA, 1987
- Design Manual for Canals & Canal Structures, prepared by NIA, 1987

These Manuals have been utilized for newly planning, designing and maintenance and rehabilitation works of irrigation and drainage facilities not only for national irrigation systems (NISs) but also communal irrigation systems (CIS) in the country.

3.1.3 Organizations and Operation and Maintenance

Major standards, guidelines and manuals in this section are as indicated in the table below. Information of some documents is not quite sure, because there are no records.

Field	Title of Standard	Contents, Use & Availability	Project	Year Developed
Institutional Development	Resource Materials for Institutional Development Program	Covering all aspects of institutional development from group formation to management comprehensively, not available even in CO	National Irrigation System Improvement Project II (NISIP II) of WB	Mid 80's
	Training Manuals	Composed of four major parts (1. Training Program Mgt., 2. Irrigation System Mgt., 3. Basic Leadership Dev't, 4. Financial Mgt), used for a set of standard trainings or extracted for customization, rarely available in field offices	Accelerated Agricultural Production Project (AAPP) of USAID	1991
System O&M	General Operation & Maintenance Manual	Composed of six major parts (1. Executive Summary, 2.System Operation, 3. Maintenance of System Facilities, 4. Maintenance of Electro-Mechanical Facilities, 5. System's Organization, 6. Management Information System), not available in field offices	Irrigation Operations Support Project (IOSP) of WB	1991
	Specific Operation & Maintenance Manual	Composed of two volumes (1. Operation and Maintenance, 2. Organization and Administration), for certain number (unknown) of NISs, used for O&M of specific NISs, rarely available in field offices	Irrigation Operations Support Project (IOSP) of WB	1991

They were formulated from mid 80's to 1991, when the importance of system's O&M and involvement of IAs were recognized properly. Since then, many manuals for institutional development have been developed but fragmented in specific functions. On the other hand, manuals for O&M have not been newly developed nor updated, although periodic review (three years) is strongly suggested in Specific O&M Manual.

3.2 NISs Operation, Maintenance, Rehabilitation and Improvement (MRI) Planning Methodology

3.2.1 Water Resources and Irrigation Water Use

As the results of Inventory Survey for the whole NISs, it was proved that the rates of NISs without observation of the hydrological data (runoff discharges of river adjacent to the irrigation area and diverted intake discharges to the area) against the whole NIS is about 50 percent of the total numbers of NISs, as shown below. These situations cause various problems in terms of water management in the system, as indicated in Figure 3-1.

- NISs without observation of rover runoff discharges : 101 NISs
- NISs without observation of diverted intake discharges : 97 NISs

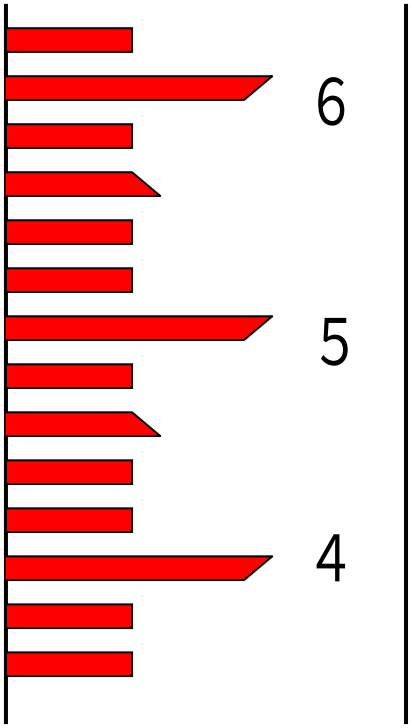
Therefore, in the sector of water resources and irrigation water use, following subjects are considered to be minimum requirements to be involved int the Manual in terms of operation of effective water utilization and management.

- Procedures for canal discharge measurement and water distribution
- Computerization of Operation Plan for water delivery schedule
- Estimation procedures for effective rainfall

1) Procedures for Canal Discharge Measurement and Water Distribution

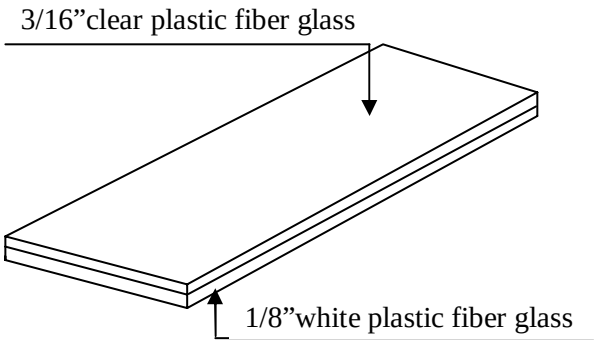
a) Fabrication and Installation of Staff Gauges

- Staff gauges are made up of white and clear fiber (or acrylic) glasses, which could be procured at the principal cities in each Region. Using paint, graduations in centimeters are marked as shown below in the white glass. Then, using sealant, the clear glass should be used to cover the white glass so that the marks will not be erased.



Materials:

White plastic fiber glass (1/8" thick)
Clear plastic fiber glass (3/16" thick)
Epoxy enamel (red)
Epoxy enamel (white)
Epoxy enamel (black)
Epoxy reducer
Sand paper (＃180)
Silicone sealant (clear)



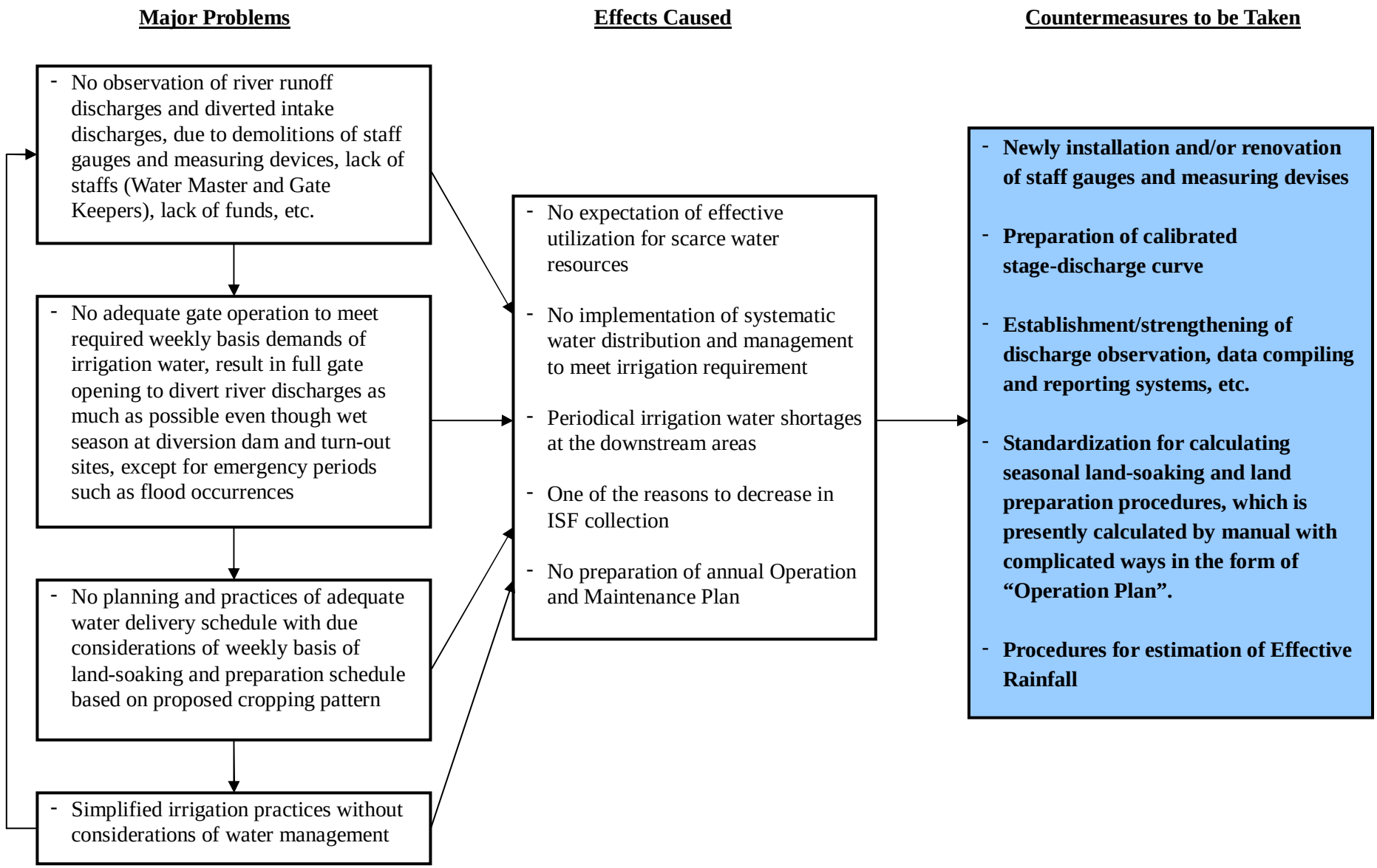
- About 20-30 m downstream of each diversion point (main and lateral canals) staff gauges should be installed in any existing concrete structure using expansion bolts.

- It is ensured that the location of the staff gauges should not be affected by the turbulence of flow so that accurate gauge readings could be made.

b) Calibration and Development of Rating Curve (Stage-Discharge Curve)

- Using current meter, canal discharges should be measured at different water level (with minimum of six levels). Using existing gates, flow is controlled so that the discharge could be measured at the minimum and maximum water level in the canal. Form DM-1 and Form DM-2 indicate the sample calibration table of canal discharge using current meter, in cases of rectangular and trapezoidal canals.

Figure 3-1 Field Survey Results of Pilot NISs in the Sector of Water Resources and Irrigation Water Use



- Calibration data are subjected to curve-fitting (using computer) either quadratic, linear or exponential equations. The equation that results to highest correlation coefficient should be used for the development of "Stage–Discharge Table" (refer to Form DM-3 and Form DM-4).

- The developed "Stage–Discharge Table" should be used by the water management personnel such as Water Resources Facilities (WRF) Technician (Water Master) and Water Resources Facilities Operator (Gate Keeper) in the water management activities such as gate operation, water distribution, etc.

The procedures for calibration development of the Stage-Discharge Curve and Table are given in Form DM-5 of "Description Guidelines of Discharge Measurement". And, furthermore, actual calibration procedures are attached in Table A3-1 to Table A3-4 in Appendices..

c) Observation of Canal Discharges

Canal water level at main and each lateral canal should periodically be observed by the Water Master at fixed time of every day. These water levels should be converted to the quantity of discharges using the above "Stage–Discharge Table". And, 15-day observation data should be submitted to the National Irrigation System Office (NISO).

Form DM-6 gives "Recording Sheet" of canal discharge with weekly basis.

d) Water Distribution Procedures

Water distribution in each canal system should basically be made on weekly basis, of which recording sheet is given in Form DM-7. The weekly schedule for water management activities should be carried out by the following responsibility.

Weekly Schedule of Water Management Activities by Responsible Staff

Date (when)	Responsible Staff (Who)	Activities (What)
Monday	WRF Technician	- Submit the Report of Areas to be irrigated 1/ to Assistant Irrigation Superintendent (IS)
Tuesday	Assistant IS	- Review the Report of Areas - Calculate irrigation demand
Wednesday	Assistant IS	- Submit calculated irrigation demand to IS
Thursday	IS	- Check and review irrigation demand/water distribution - Issue on the instruction of the operation of gates to WRF Technician /WRF Operator
Friday	WRF Technician/WRF Operator	- Adjustments of the regulatory gates

1/ : Areas to be irrigated during next week are preliminarily calculated in the "Operation Plan" of the system, which will be prepared prior to the start of dry and wet season paddy cultivation.

Source : General Operation & Maintenance Manual, Volume I, prepared by NIA 1991.

2) Computerization of Operation Plan for Water Delivery Schedule

With the fabrication and installation of staff gauges to measure the canal discharges, prediction of an average weekly canal discharges would be made possible through out the cropping season of paddy. This matter would leads to the introduction of theoretical determination of weekly land soaking and preparation areas depending on an available weekly amount of water.

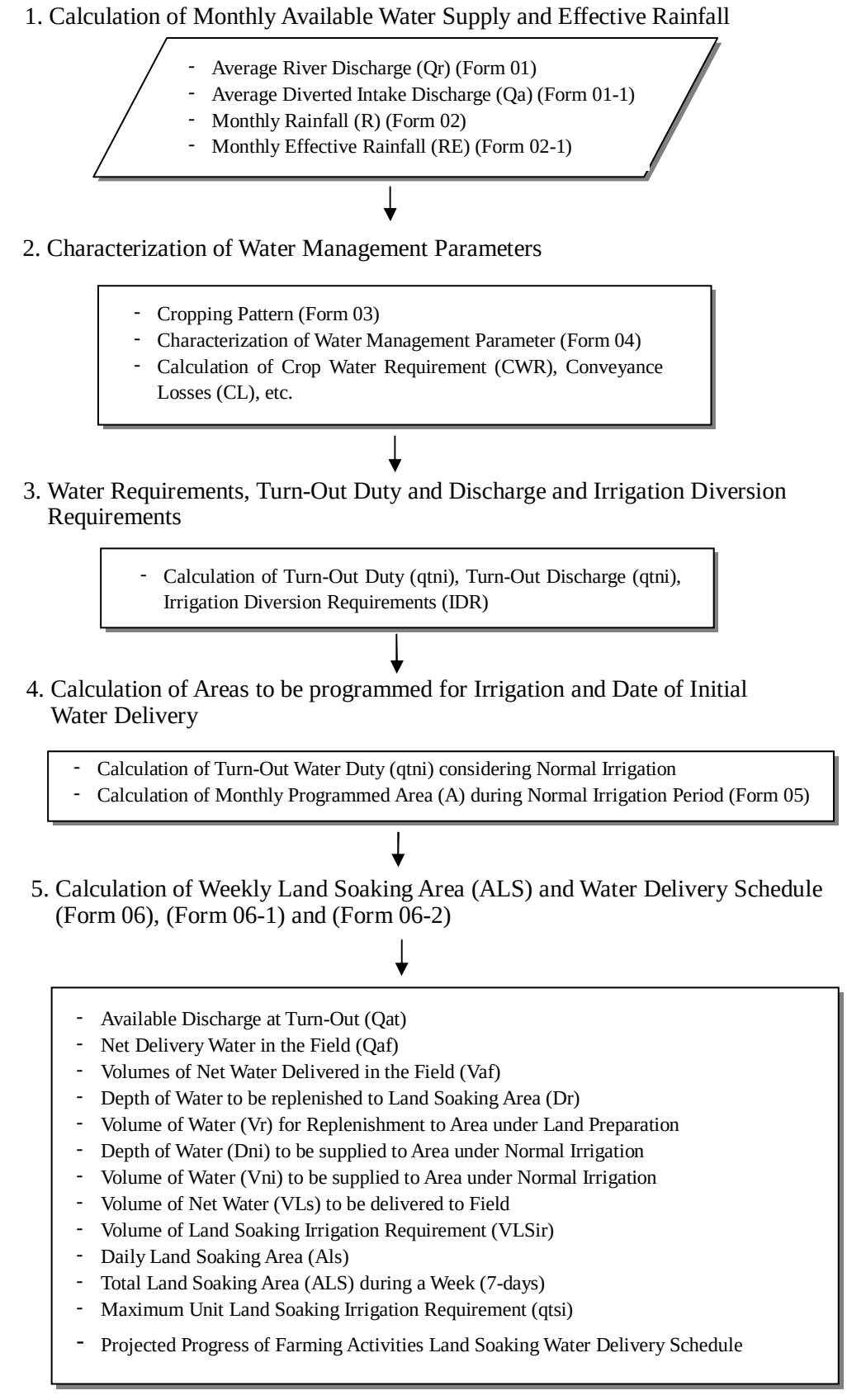
Most of the irrigation systems are presently managed by the formulated irrigation plan so called "Operation and Management Plan", which would be prepared by the Water Control Coordination Unit (WCCU) in each NIS. But This Plan seems not to meet the present actual water delivery and crop cultivation at the farm level, because of low accuracy discharge data. Furthermore, calculation procedures of the Plan are so complicated theory and easily raise calculation errors.

To cope with these complicated and easily making miscalculation, calculation procedures of the "Operation Plan" were computerized applying the Excel function under a prerequisite for available canal discharges observed by measuring devices such as staff gauges mentioned above. Calculation procedures are explained in Figure 3-2. As a sample calculation, the Operation Plan in case of Aganan RIS (Region-VI) is attached in Table A3-5 in Appendices.

3) Estimation Procedures for Effective Rainfall

In the above calculation, estimation of an effective rainfall, which would be counted into the diversion water requirement, should be made. But, estimation methods of an effective rainfall are not clear or not established yet. Therefore, estimation procedures of an effective rainfall are also prepared in the Form RE-1.

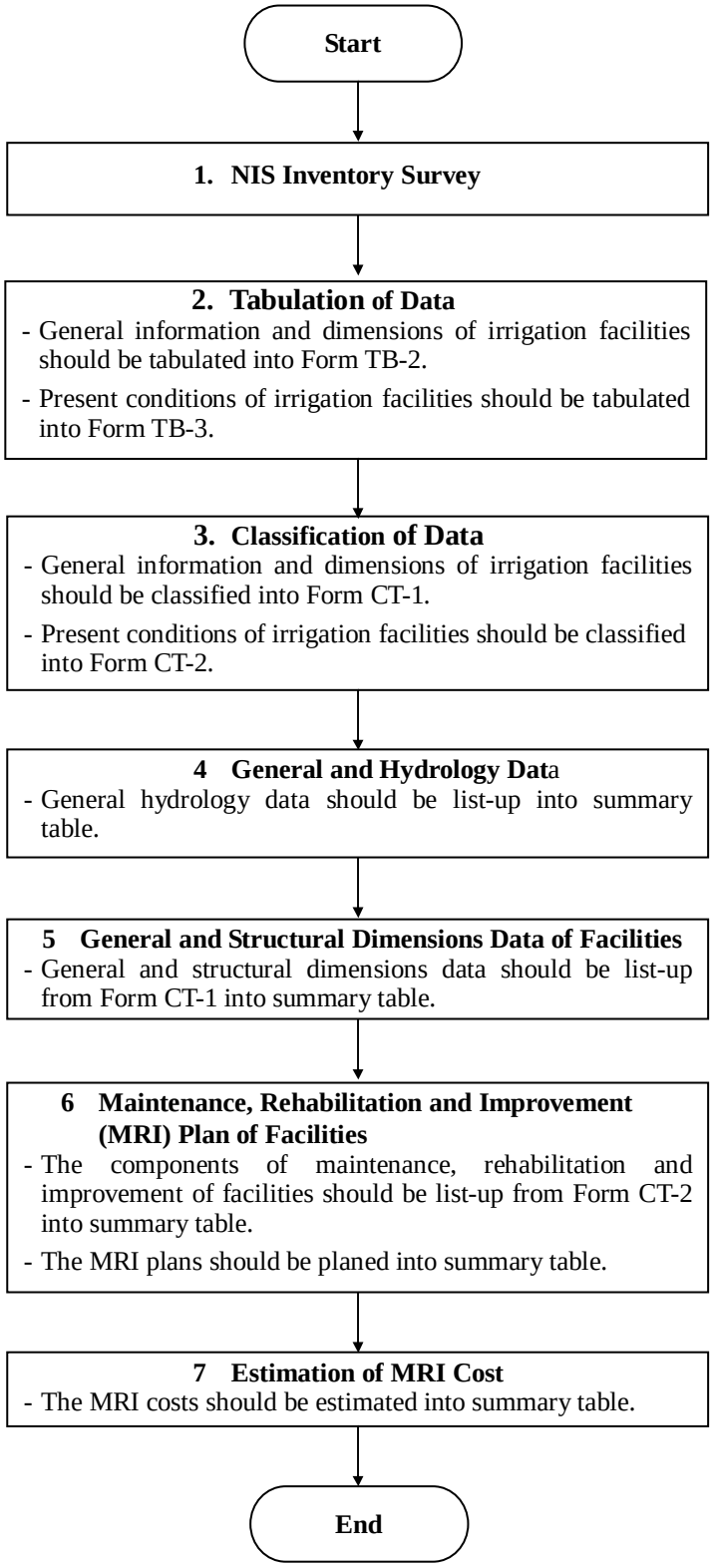
Figure 3-2 Procedures for Calculation of Operation Plan



3.2.2 Irrigation and Drainage Facilities

1) Flowchart of Maintenance, Rehabilitation and Improvement (MRI) Plan for Irrigation Facilities

MRI planning for irrigation facilities should be carried out in accordance with the following flowchart.



2) Component of Maintenance, Rehabilitation and Improvement for Irrigation Facilities

a) Maintenance Plan for Irrigation Facilities

Maintenance works are defined to be normal and routine works to maintain the function of irrigation system. According to NIS inventory survey results, the components of maintenance plans for NISs irrigation facilities are as follows.

(1) Diversion Dam

Work Item	Condition	Part of Facilities	Remarks
Repair	Damaged/Scoured	1) Concrete structure	- Patchwork
		2) Downstream riverbed protection	- Patchwork
		3) Protection dike	- Patchwork
		4) Protection sidewall	- Patchwork
		5) Gate	- Patchwork
Desilting/Flushing	Sediment	1) Sluice way	- Flushing by gate
		2) Intake	- Desilting/Flushing
Replace	Leak	1) Gate	- Replace seal rubber
Repainting	Rust	1) Gate	- Patchwork

(2) Pumping Station

Work Item	Condition	Part of Facilities	Remarks
Repair	Damaged/Scoured/Leak	1) Concrete structure	- Patchwork
		2) Pump	- Patchwork
		4) Slope protection	- Patchwork
		5) Pump house	- Patchwork
		6) Gate	- Patchwork
Desilting	Sediment	1) Suction sump	- Desilting/Flushing
		2) Discharge sump	- Desilting/Flushing
Repainting	Rust	1) Gate	- Patchwork
		2) Pump	- Patchwork

(3) Main and Lateral Canal

Work Item	Condition	Part of Facilities	Remarks
Repair	Damaged	1) Related structures of main and lateral canal	- Patchwork
	Leak	1) Main and lateral canal	- Patchwork
		2) Related structures of main and lateral canal	- Patchwork
Desilting	Sediment	1) Main and lateral canal	- Patchwork
		2) Related structures of main and lateral canal	- Patchwork
Repainting	Rust	1) Gate of related structure	- Patchwork

b) Components of Rehabilitation and Improvement Plan for Irrigation Facilities

When the functions of irrigation system go down or lose, the functions of irrigation system are restored at the same level of original function by rehabilitation plans. However, long time passed already since the construction time, according to decrease irrigation water resources and increase

sediments by devastated catchment area, if its functions will be restored at the same level of original function, when certain effects can't expect, the rehabilitation plans will be reduced within can expect certain effects.

Improvement plans are reconstruction plan of irrigation system to increase its efficiency. The scopes of improvement plans are limited the same level of original function. And according to NIS inventory survey results, the components of improvement plans for NISs irrigation facilities are as follows.

(1) Diversion Dam

Work Item	Condition	Part of Facilities	Remarks
Repair/Reconstruction Replace	Damaged/Scoured /Leak	1) Concrete structure	- Patchwork or whole work
		2) Downstream riverbed protection	- Patchwork or whole work
		3) Protection dike	- Patchwork
		4) Protection sidewall	- Patchwork
		5) Gate	- Patchwork or whole work
Improvement	Damaged/Scoured /Washed-away	1) Concrete structure	- Patchwork or whole work
		2) Downstream riverbed protection	- Patchwork or whole work
		3) Protection sidewall	- Patchwork or whole work
		4) Gate	- Replace
	Sediment	1) Sluice way	- Additional sluice way
		2) Intake	- Additional intake - Intake mouth
		3) Sand settling basin	- Additional sand settling basin
	Rust	1) Gate	- Whole work
Repainting/Replace	Rust	1) Gate	- Whole work

(2) Pumping Station

Work Item	Condition	Part of Facilities	Remarks
Repair	Damaged/Scoured/Leak	1) Concrete structure	- Patchwork
		2) Slope protection	- Patchwork
Improvement	Damaged/Scoured/Leak	1) Slope protection	- Patchwork or whole work
Desilting	Sediment	1) Suction sump	- Desilting by manual
Repainting	Rust	1) Gate	- Patchwork or whole work

(3) Main and Lateral Canal

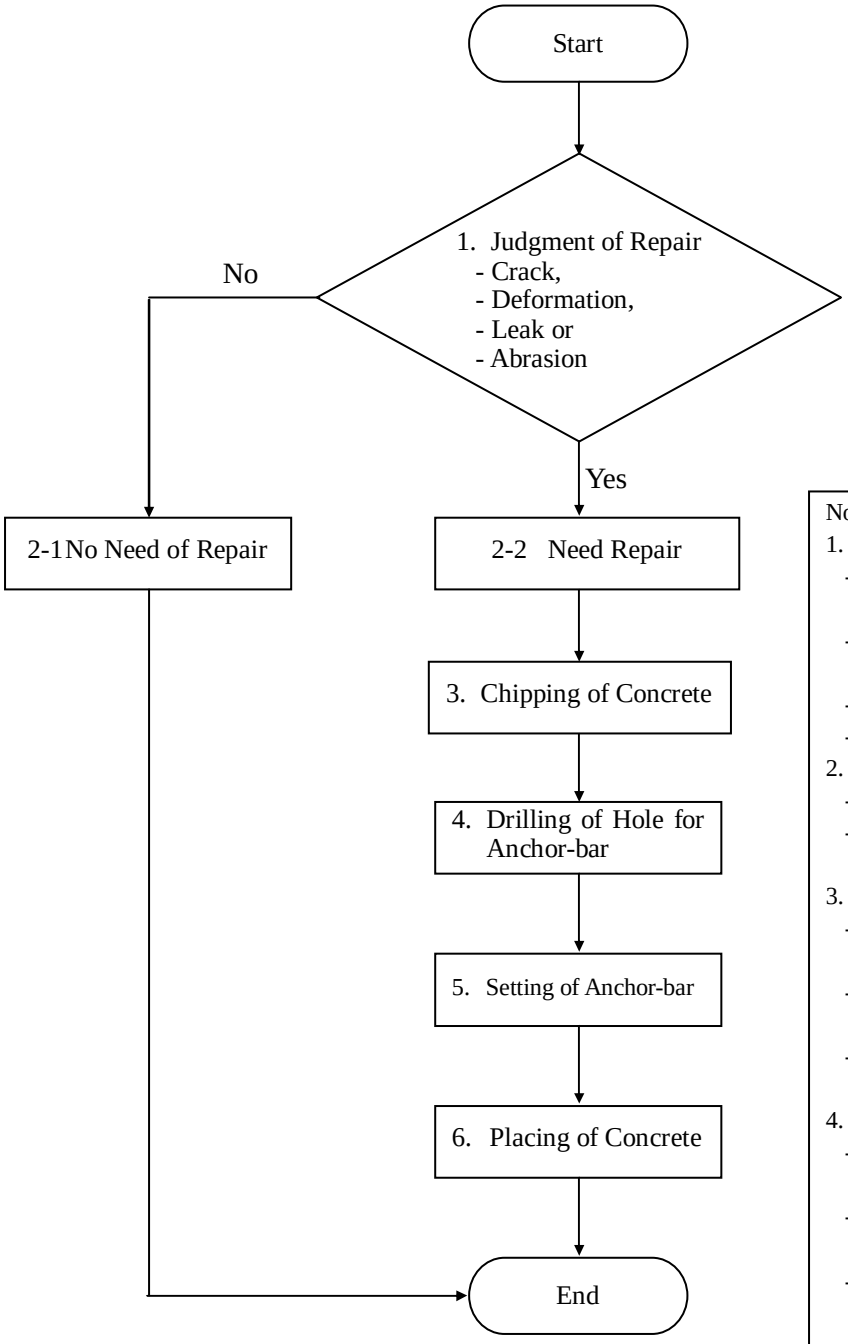
Work Item	Condition	Part of Facilities	Remarks
Repair/Reconstruction	Damaged/Leak	1) Main and lateral canal	- Patchwork
		2) Related structures of main and lateral canal	- Patchwork
Improvement	Damaged/Leak	1) Main and lateral canal	- Patchwork
Desilting	Sediment	1) Main and lateral canal	- Patchwork
		2) Related structures of main and lateral canal	- Patchwork
Repainting/Replace	Rust	1) Gate of related structure	- Whole work

3) Flowchart of MRI Plan

a) Diversion Dam

(1) Repair for Concrete Structures

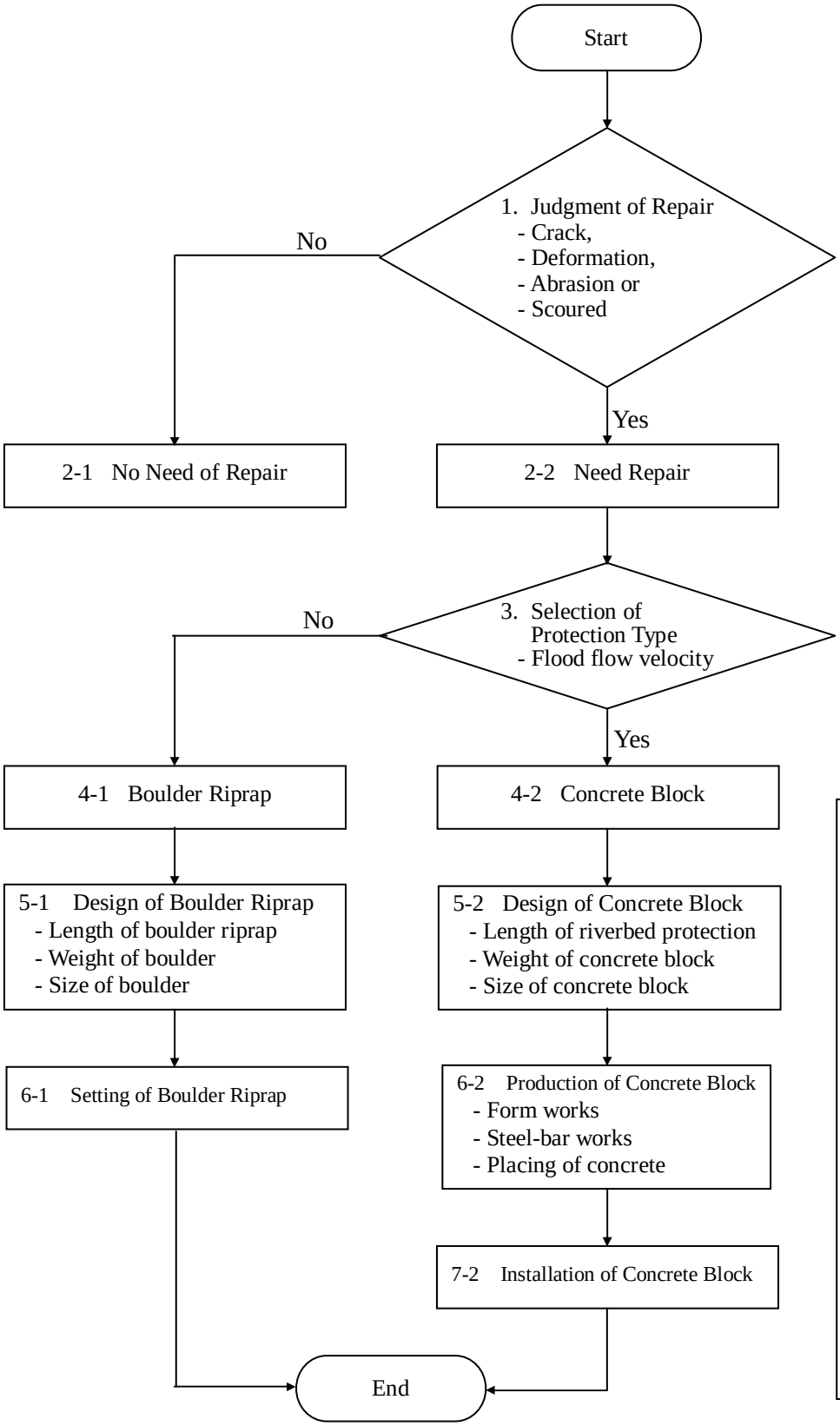
MRI planning for repair of concrete structures should be carried out in accordance with the following flowchart.



Note:
1. Criteria of Judgment for Repair
   - Crack: normal crack is more than one millimeter thickness.
   - Deformation: more than half inch (12mm).
   - Leak: leakage with flow.
   - Abrasion: exposed reinforcement bar.
2. Chipping and Placing of Concrete
   - Depth of chipping is more than 100mm.
   - Thickness of new concrete is more than 100mm.
3. Drilling of Anchor-bar hole
   - Diameter of hole is more than one inch (25mm).
   - Depth of hole is more than one foot (300mm).
   - Arrangement of anchor-bar hole is latticed with one-meter interval.
4. Anchor-bar
   - Material of anchor-bar is deformed reinforcement-bar.
   - Diameter of anchor-bar is 19mm (3/4 inch).
   - Length of anchor-bar is more than two feet (600mm).

(2) Repair for Riverbed Protection

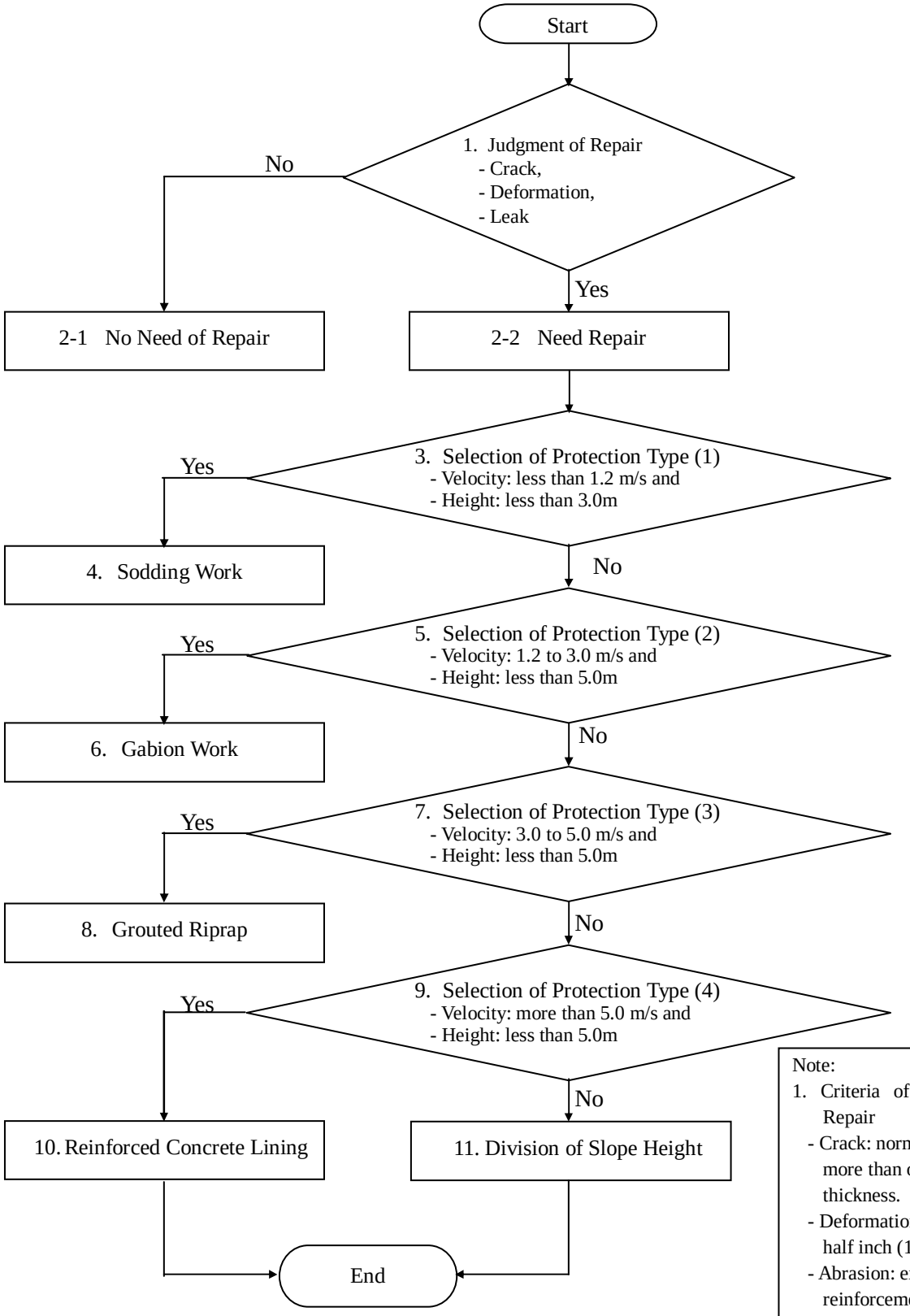
MRI planning for repair of riverbed protection should be carried out in accordance with the following flowchart.



Note:
1. Criteria of Judgment for Repair
   - Crack: normal crack is more than one millimeter thickness.
   - Deformation: more than half inch (12mm)
   - Abrasion: exposed reinforcement bar.
   - Scoured: more than protection thickness.
2. Selection of Protection Type
   - Flood flow velocity on the protection is more than three meters.
3. Design of Boulder Riprap and Concrete Block
   - Refer to "Design Manual for Diversion Dams, NIA, 1987"
   - Thickness of boulder riprap is more than three times of maximum diameter of boulder.

(3) Repair for Slop Protection

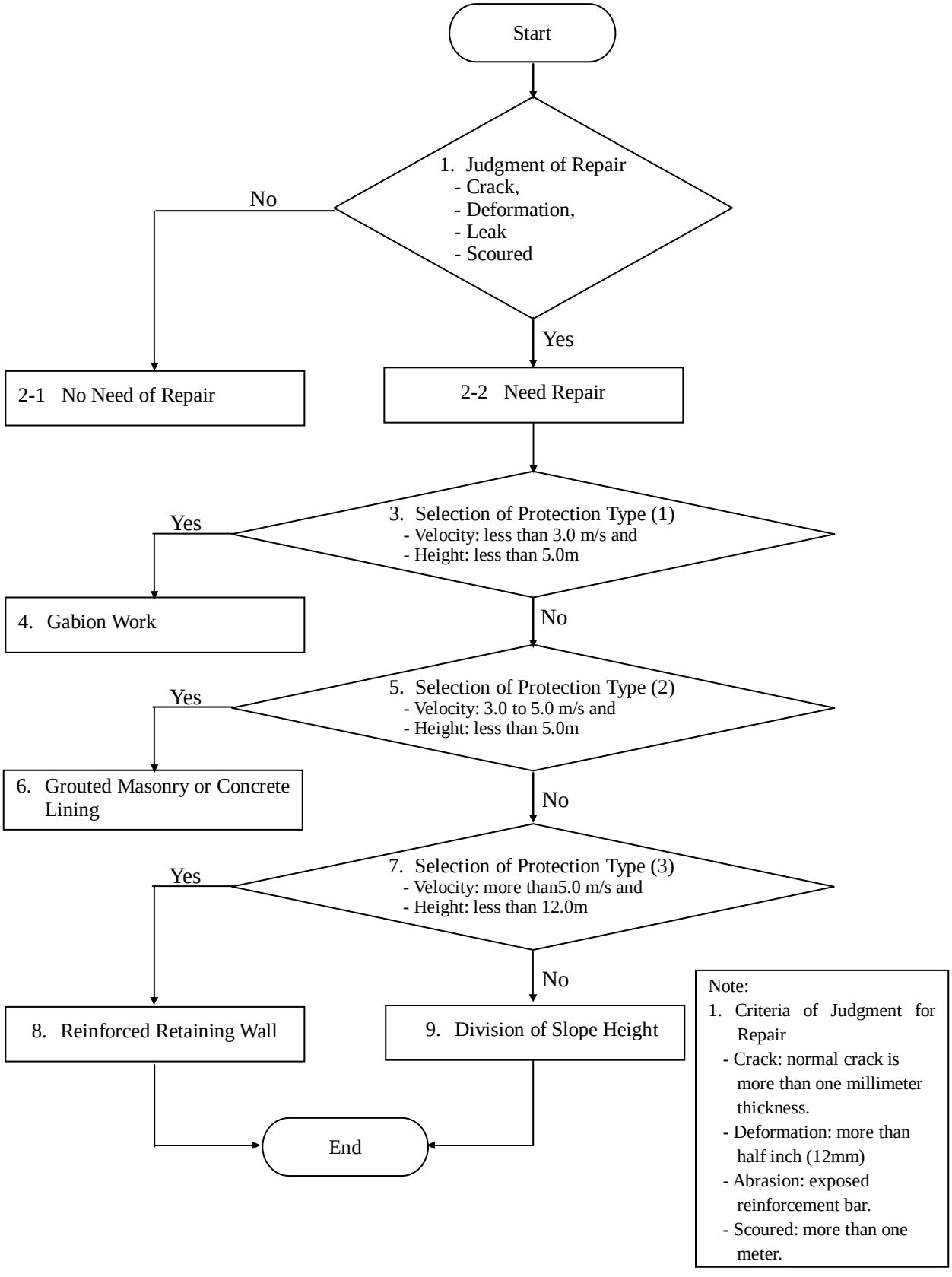
MRI planning of repair for slope protection should be carried out in accordance with the following flowchart.



Note:
1. Criteria of Judgment for Repair
- Crack: normal crack is more than one millimeter thickness.
- Deformation: more than half inch (12mm)
- Abrasion: exposed reinforcement bar.
- Scoured: more than one meter.

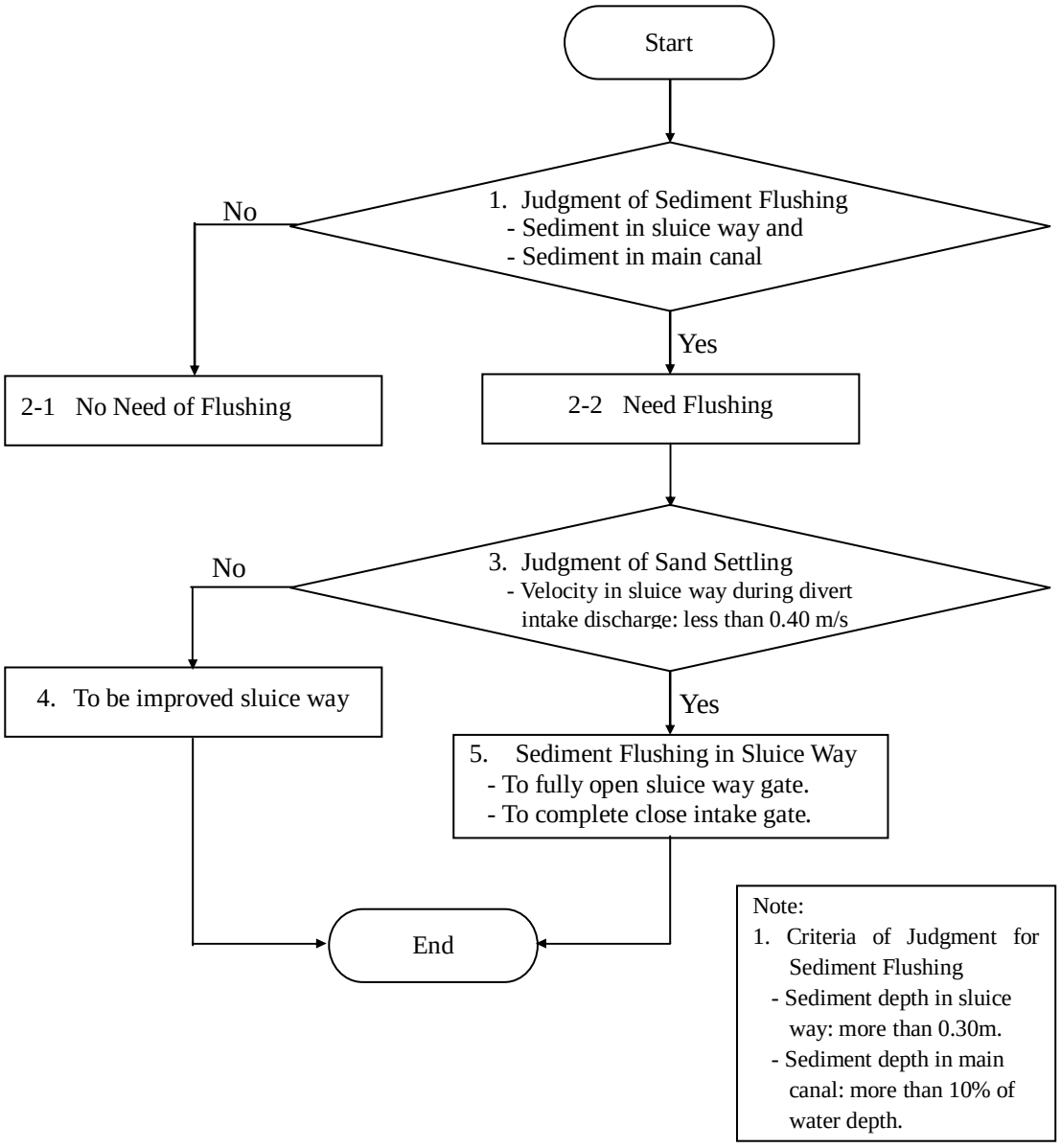
(4) Repair for Protection Sidewall

MRI planning for repair of protection sidewall should be carried out in accordance with the following flowchart.



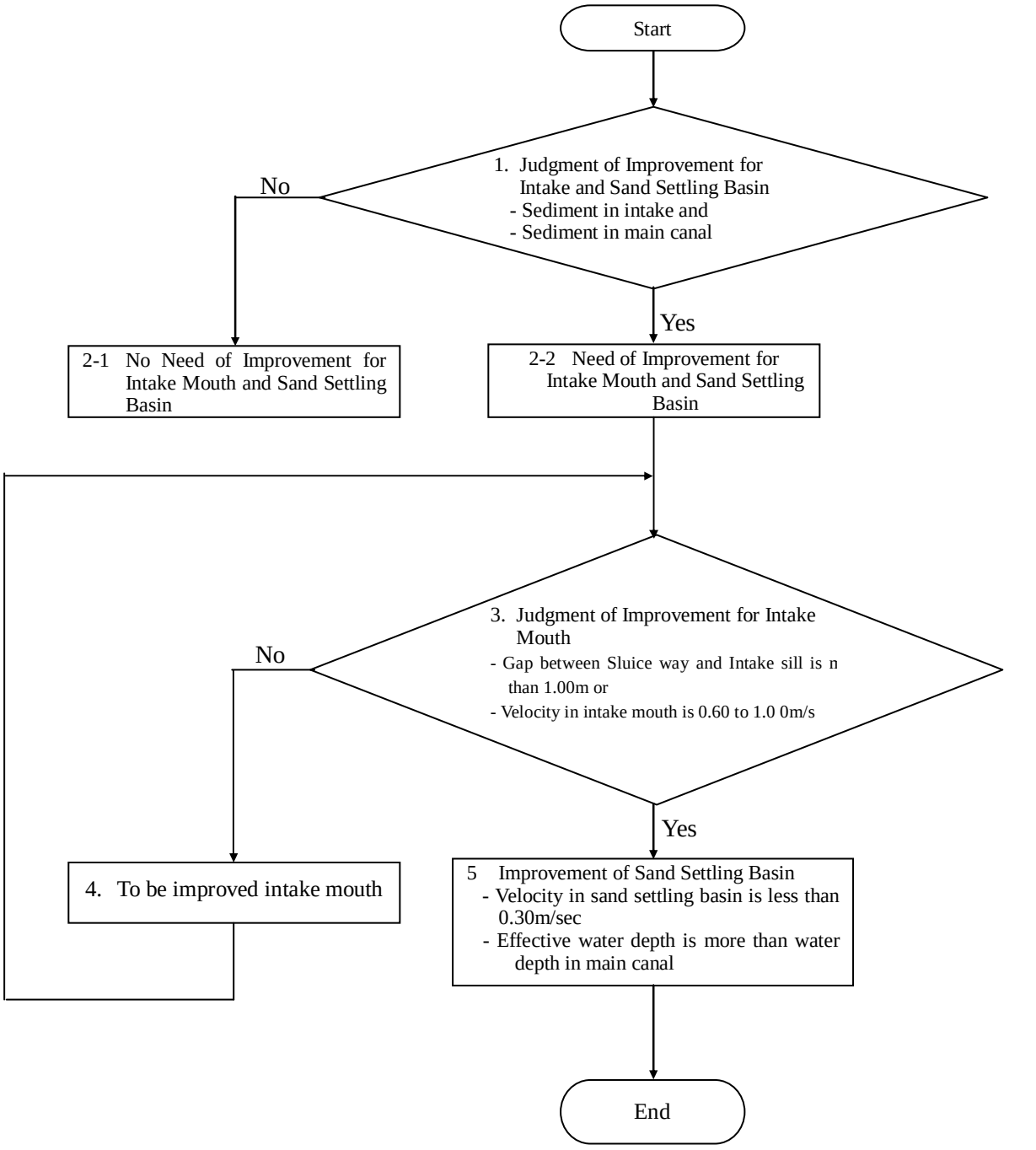
(5) Sediment Flushing in Sluice Way

MRI planning for sediment flushing in sluice way should be in accordance with the following flowchart.



(6) Improvement of Intake Mouth and Sand Settling Basin

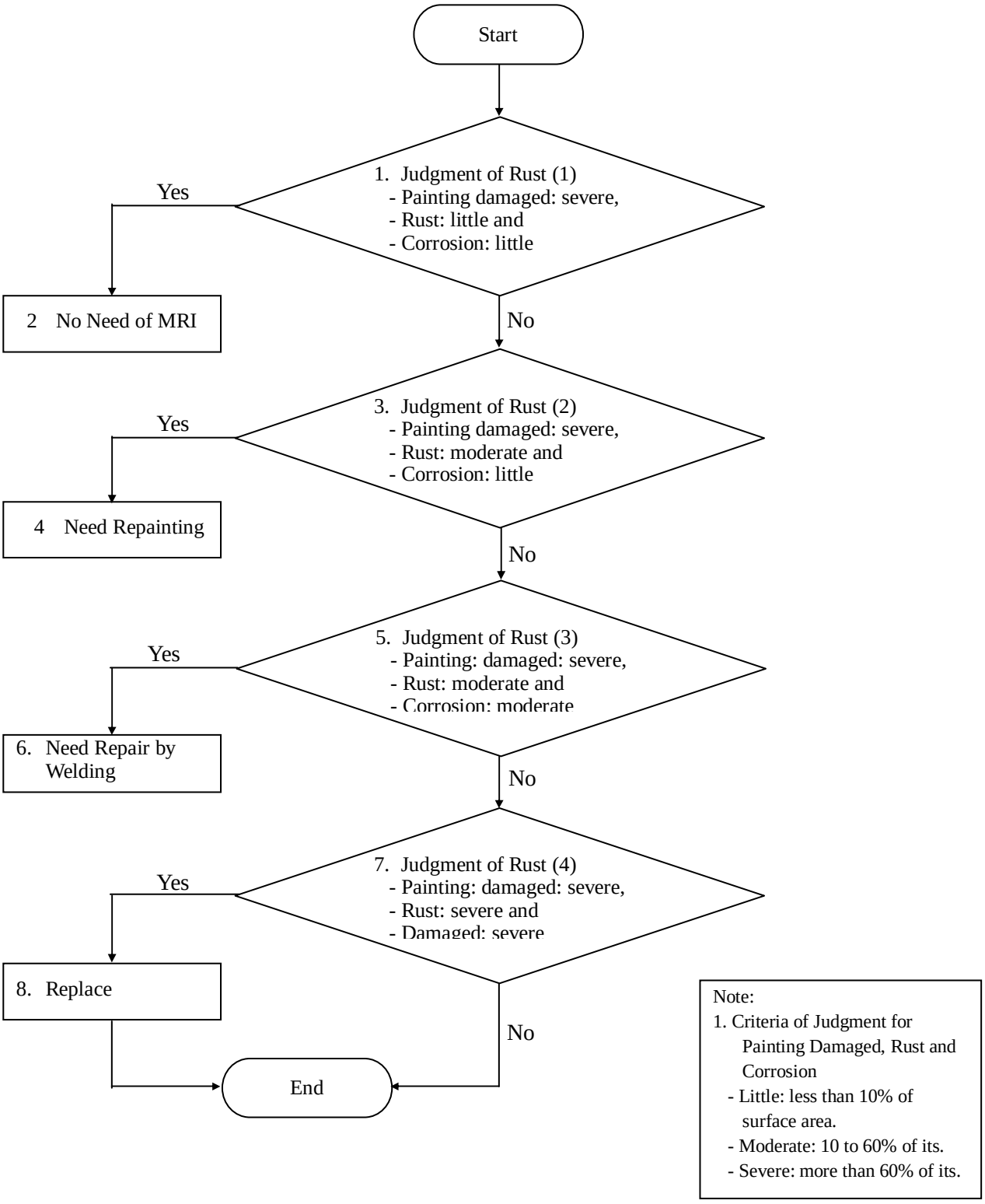
MRI planning for improvement of intake mouth and sand settling basin should be in accordance with the following flowchart.



Note:
1. Criteria of Judgment for Improvement of Intake Mouth and Sand Settling Basin
- Sediment depth in intake: more than 0.30m.
- Sediment depth in main canal: more than 10% of water depth.

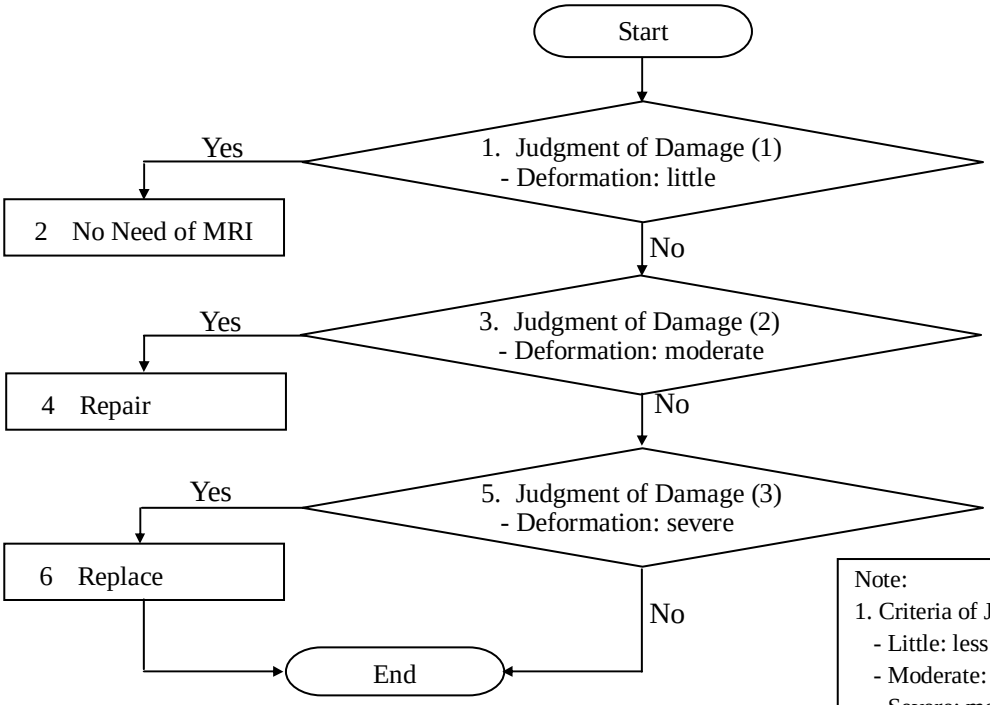
(7) Maintenance, Rehabilitation and Improvement (MRI) Planning for Rust of Gate

MRI planning for the rust of gates should be carried out in accordance with the following flowchart.



(8) Maintenance, Rehabilitation and Improvement (MRI) Planning for Damage of Gate

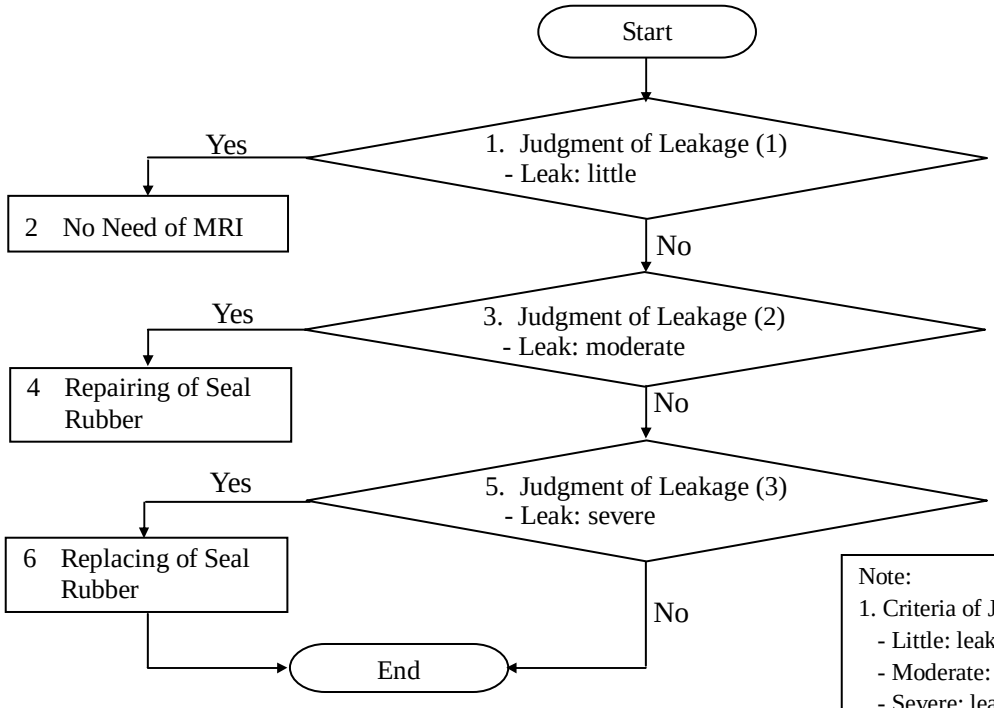
MRI planning for the damage of gates should be carried out in accordance with the following flowchart.



Note:
1. Criteria of Judgment for Deformation
- Little: less than 1/600 of length.
- Moderate: 1/600 to 1/400 of length.
- Severe: more than 1/400 of length.

(9) Maintenance, Rehabilitation and Improvement (MRI) Planning for Leakage of Gate

MRI planning for the leakage of gate should be carried out in accordance with the following flowchart.



Note:
1. Criteria of Judgment for Leakage
- Little: leakage is not flow.
- Moderate: leakage is flow.
- Severe: leakage spout out.

b) Pumping Station

MRI planning of repair for concrete structures, slope protection and repainting for intake gate and pump should be carried out according to the foregoing paragraph.

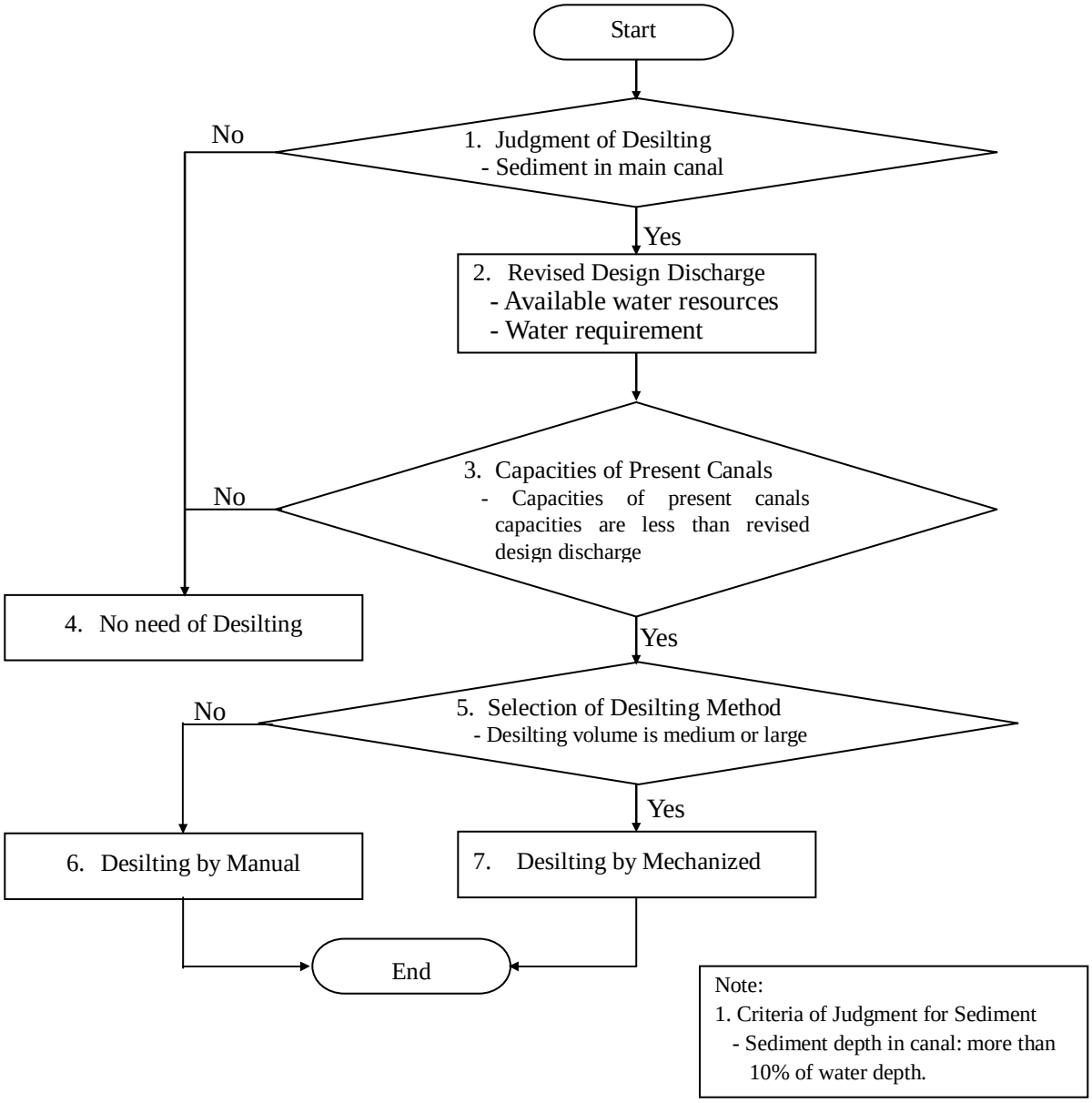
c) Main and Lateral Canal

(1) Repair for Concrete Structures

MRI planning of repair and repainting for concrete structures and gate should be carried out according to the foregoing paragraph.

(2) Desilting in Main and Lateral Canal

MRI planning of desilting in main and lateral canals should be carried out in accordance with the following flowchart.



3.2.3 Organizations and Operation and Maintenance

Figures of the targeted NISO/NISs are compared with the national average as shown in the table below. Hereinafter, analyses on the three pilot sites are made based on the observation derived from these data and additional data of the inventory survey.

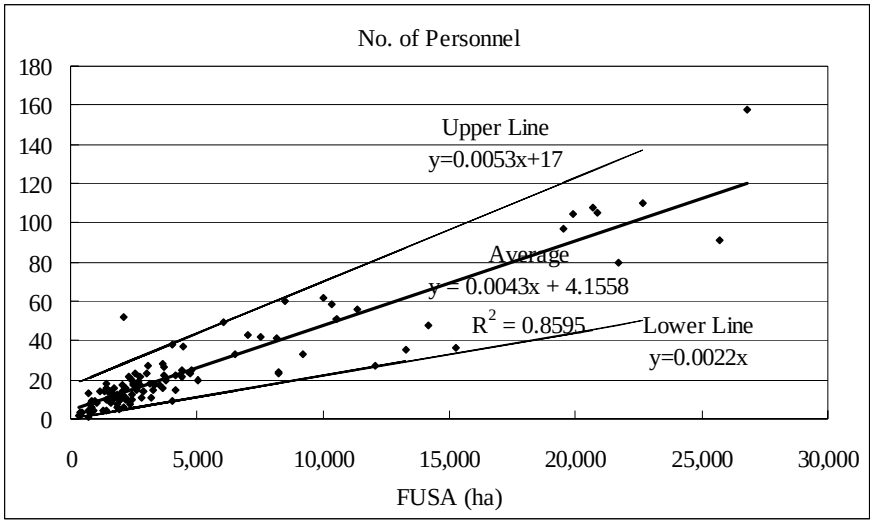
Item	Unit	National Average	AMRIS	SCRIS	ASBRIS
1) FUSA / Personnel					
1. FUSA/Personnel	ha/ person	196	170	168	179
2) Viability Index and O&M Cost /FUSA					
2. Viability Index		1.10	0.96	0.68	1.15
3. Operation Cost /FUSA	Peso/ha	1,125	1,523	1,164	715
4. Income/FUSA	Peso/ha	1,221	1,395	950	691
3) Maintenance Index					
5. Maintenance Index		5.3	4.0	6.0	5.5
4) Project Cost/FUSA					
6. Program of Works (PoWs)	Peso/ha	1,201	1,142	1,008	687
for Maintenance	Peso/ha	489	539	266	225
for Rehab.&Imp.	Peso/ha	712	603	742	462
5) Cropping Intensity					
7. Cropping Intensity	%	140	135	132	132
6) ISF Collection Efficiency					
8. ISF Collection Efficiency	%	62 (53 %; SMD 2004)	36	34	47
7) Irrigators Association					
9. Average IA Size	ha	413	277	615	486
10. Membership Rate of IA	%	75	100	100	79
11. IA Functionality Point		1.7	1.7	0.8	1.8

1) Firmed-Up Service Area (FUSA) / Personnel

The present number of personnel in NISOs is almost a half of the number which is authorized in the approved plantilla. But in course of streamlining program, they can not expect the increase of manpower, so efficient personnel management is important.

From the analysis based on the latest inventory survey data, a relationship between FUSA and the number of personnel is shown in the graph below. The graph shows that the number of personnel in almost all of NISOs ranges 2.2 to 5.3 persons per 1,000 ha, while the national average is 4.3 persons per 1,000 ha.

Some NISOs have also a function as a Provincial Irrigation Office, so the number includes staffs working for Communal Irrigation Systems (CISs) simultaniously. Therefore planning for personnel management should be done carefully, considering the unique situations of NISOs.



As it is analysed in the following section, "2) Viability Index and O&M Cost/FUSA", the ratio of expenditures for personnel services and Maintenance, Operation and Other Expenses (MOOE) should be also examined.

2) Viability Index and O&M Cost/FUSA

The estimated cost for full O&M cost recovery in the field level is 2,300 Pesos/ha[1], which includes Current Operation Budget (COB) and cost for regular maintenance and repair of NISs. At present, the average of actual expenditure in NISOs is 1,125 Pesos/ha and it contains very minimal cost for maintenance but mostly for operation. Substantial maintenance cost is allocated by the Government of Philippine (GOP) as regular project fund and the budget for rehabilitation and improvement is coming from donors' fund. Refer to "4) Project Cost/FUSA" for those funds.

Total Expenses

When the unit expenditure is much less than the national average (1,125 Pesos/ha), that might lead the facility degradation, although it should be compressed as much as possible in terms of financial aspect. MOOE should be secured more than 20 percent in the total expenditure, otherwise daily activities will be severely limited.

Total Income

Since the biggest source of income is ISF in all NISOs, its collection efficiency should be improved. Refer to "6) Irrigation Service Fee (ISF) Collection Efficiency" for the improvement of ISF collection efficiency. It is also important to diversify income sources and to collaborate with LGUs for joint projects and financial support.

3) Maintenance Index

The maintenance index represents the status of actual activities on maintenance, such as utilization of manuals, frequency of inspection and other basic maintenance activities. Refer to the previous chapter for each surveyed items. Every activity is graded from zero to ten. The most positive status is rated as ten, while the most negative state is rated as zero. Generally speaking, when the

[1] Review of Cost Recovery Mechanisms for National Irrigation Systems, NIA-ADB, 2000

activities are not carried out enough, the score falls into five points. Analyses should be used for better maintenance of irrigation facilities. WRFTs should carry out regular maintenance activities and reporting. Situations beyond their capacity should be managed by ISs. A system of maintenance should be established. Record keeping and data management should be also reconsidered, when those are not properly managed.

4) Project Cost/FUSA

The inventory survey collects the information of last five years' Program of Works (PoWs) of all NISOs. All the activities are divided into 11 work items as shown in the table below. The table also contains the figures for the national average.

Work Items and Unit Amount Spent by PoWs

Unit; Pesos/ha

Work Item	Nat'l Ave.
1 Desilting, Canal	181
2 Desilting, Drainage	94
3 Canal Lining	305
4 Road Surfacing	181
5 Road Concreting	4
6 Dam Repair	55
7 River Diversion	33
8 Drainage Improvement	69
9 Facility Improvement	227
10 Institutional Development	7
11 Others	46
Total	1,201
Maintenance Cost (item 1,2,4,7)	489
R/I[*1] Cost (other items)	713

Source: Results of the Inventory Survey 2006, average of 2000 to 2004

*1: R/I; Rehabilitation and Improvement

When the invenstment for canal lining is very high, the economical aspect should be reconsidered. Refer to "3.2.2 Irrigation and Drainage Facilities" for systematic and economical planning.

5) Cropping Intensity

The inventory survey collects the information of last five years' cropping intensity for both dry and wet season. Appropriate water delivery is the most important mission of NIA and the cropping intensity shows the effectiveness of NIA's service. Cropping intensity (or irrigated area) is usually restricted by flood area in wet season and water availability in dry season.

Since NISs in Mindanao tend to have higher cropping intensity probably due to retalively better natural environment than Luzon and Visayas, it might be difficult to overcome the difference in those areas, if the same efforts for water management are made. Improvement of efficiency on water management is really important for the increase of cropping intensity. Refer to "3.2.1 Water Resources and Irrigation water use" for better water management.

6) Collection Efficiency of Irrigation Service Fee (ISF)

Irrigation Service Fee (ISF) is the remuneration for NIA's service and the most important income for NIA, so the improvement of NIA's service leads to better collection efficiency, and increase of collection efficiency is necessary for NIA's financial viability and sustainable maintenance of facilities, which are the national assets. But in fact there are various factors to affect ISF collection efficiency, such as facility condition, water availability, farmers' ownership, climate condition, pest and diseases, price of rice, fund availability for farm inputs, influence from delinquent farmers and so on. NIA's fundamental mandate is to deliver irrigation water to the fields, but it is just one of the concerns from the side of farmers. Therefore various supports to farmers are essential to improve the ISF collection efficiency.

Aside from the improvement of water management and irrigation facilities, NISOs should make more efforts on the following points;

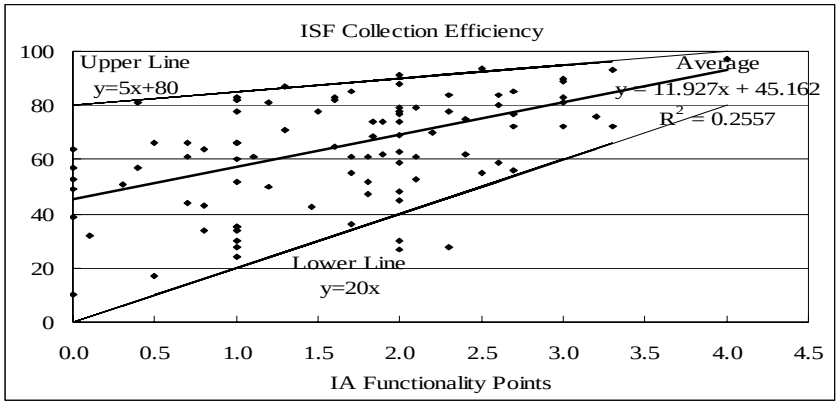
- Explanation on legal aspects of the obligation for ISF payment; RA # 3601 (06-22-63, NIA creation) states the power of NIA to collect ISF.
- Remedial measures on collection activities; collection activities are heavy burden for NISOs, although under the present situation, NIA should provide services to farmers primarily. The collection activities should be facilitated through capacity building of farmers.
- Collaboration with LGUs; PD # 1508 (06-11-78) states the responsibility of Barangays to settle disputes at its level, and NISOs should coordinate with them for regulation enforcement. NISOs should also provide various services to farmers through the network of local authorities.
- Dialogue with farmers; Water Masters should be strengthened as institutional development officers and they should support IAs from the aspect of not only water management and collection activities but also institutional capacity building.

Some of them are strongly related to the institutional development, which is analyzed in the following part. The inventory survey results of 2006 shows the positive correlation between ISF collection efficiency and IA functionality points, so the improvement of IA capacity leads to the improvement of ISF collection efficiency.

7) Irrigators Association

The inventory survey results of 2006 shows the positive correlation[2] between ISF collection efficiency and IA functionality points as shown in the graph below.

[2] It is natural that there is correlation between them, because one of the criteria of IA functionality survey is ISF collection efficiency. But its weight in the survey is at most 3 % only. The observed correlation is same level as the correlation between number of personnel and amount of expenses. Share of personnel service in expenses is 80 %, so there must be strong correlation between them. Therefore the observed correlation is deemed also strong. Besides, there is no clear correlation between IA functionality point and cropping intensity, which is also one of the criteria of IA functionality survey.



The graph shows that 5 to 20 percent of increase on ISF collection efficiency is expected corresponding to one point increase of IA functionality point, while the average increase is 12percent. IA functionality point is the figure converted from the adjective rating of IA functionality survey as the NIS average. Refer to the table below for rating. In other words, upgrading of the adjective rating of IA functionality may bring the aveage of about 282 Pesos/ha (= 12 % * 2,350 Pesos/ha (= 2 cavans in wet season * 50 kg * 9 Pesos/kg + 3 cavans in dry season * 50 kg * 10 Pesos/kg)) of income to NIA.

Adjective Rating of IA Functionality Survey	IA Functionality Point in Inventory Survey
Outstanding	4
Very Satisfactory	3
Satisfactory	2
Fair	1
Poor	0

Therefore institutional development is really essential and effective for NIA's financial viability and sustainable O&M of irrigation and drainage facilities. There are allegedly still some NISOs and staffs who are skeptical for institutional development aversely to farmers' overpower or for fear of layoff due to irrigation management transfer (IMT). However, NIA staffs should always make efforts to improve services to farmers and NIA should also provide the systems promptly to its employees for early retirement and priority reemployment by IA and other institutions.

- The good membership rate should be maintained, but further efforts for institutional development should be made in system-wide.
- More than five percent institutional development program (IDP) fund must be included in locally funded projects as MC No.59, S. 2003 directs, in order to provide sustainable fund source for institutional development.
- There should be at least one IDO in every responsible center to organize overall activities for IA support.
- Reorientation of water resources facility technicians (WRFTs or water masters) as IDOs are necessary, because they are the direct interface of NISOs to IAs and in the closest position to support IAs carefully.
- Collaboration with local authorities

3.3 Maintenance, Rehabilitation and Improvement (MRI) Plan and Evaluation of NISs

3.3.1 Comprehensive Evaluation of NISs

1) Scales of NIS Facilities

The criteria and results of classification of the NIS facility by scale are as follows (Details are given in Table A3-7).

a) Diversion Dams

Diversion dams classified into the categories of large, medium and small-scales are of 20 places (14 %), 80 places (56 %) and 44 places (30 %), respectively.

Criteria for Classifications of NIS Facility by Scale (Diversion Dam)

Description		Service Area (ha)	Intake Discharge (m^3/s)	Diversion Dam		Intake	
				Width (m)	Height (m)	Width (m)	Height (m)
Scale	Maximum	29,846	62.52	747.54	14.70	30.00	5.74
	Mean	2,784	6.60	98.43	4.57	5.52	1.66
	Minimum	42	0.28	1.50	0.90	0.50	0.60
Large-scale	Maximum	30,000	63.00	750.00	15.00	30.00	10.00
	Minimum	4,001	10.01	150.01	7.01	3.01	2.01
Medium-scale	Maximum	4,000	10.00	150.00	7.00	3.00	2.00
	Minimum	1,001	3.01	50.01	2.01	1.01	1.01
Small-scale	Maximum	1,000	3.00	50.00	2.00	1.00	1.00
	Minimum	0	0.00	0.00	0.00	0.00	0.00

Summary Table of Results of Classifications for NIS Facility by Scale (No. of Diversion Dam)

Scale of Diversion Dam	Service Area	Intake Discharge	Diversion Dam		Intake		Average
			Width	Height	Width	Height	
Large-scale	34	27	18	14	8	21	20
Medium-scale	85	64	53	71	111	98	80
Small-scale	62	70	51	37	10	31	44
Total	181	161	122	122	129	150	144

Summary Table of Results of Classifications for NIS Facility by Scale (Percentage of Diversion Dam)

Scale of Diversion Dam	Service Area	Intake Discharge	Diversion Dam		Intake		Average
			Width	Height	Width	Height	
Large-scale	19	17	15	11	6	14	14
Medium-scale	47	40	43	58	86	65	56
Small-scale	34	43	42	30	8	21	30
Total	100	100	100	100	100	100	100

b) Pumping Stations

The pumping station classified into the categories of large, medium and small-scales are of five places (28 %), six places (33 %) and seven places (39 %), respectively.

Criteria for Classifications of NIS Facility by Scale (Pumping Station)

Description		Service Area (ha)	Total Discharge (m^3/s)	Lifting Head (m)	Suction Sump Width (m)	Discharge Sump Width (m)	Pump House Area (m^2)
Scale	Maximum	10,046	16.60	47.00	4.00	6.40	324.50
	Mean	945	6.63	11.41	2.00	3.19	88.09
	Minimum	25	0.12	1.00	0.90	0.80	5.00
Large-scale	Maximum	11,000	20.00	50.00	5.00	10.00	350.00
	Minimum	1,401	10.01	15.01	3.01	4.01	60.01
Medium-scale	Maximum	1,400	10.00	15.00	3.00	4.00	60.00
	Minimum	501	3.01	6.01	1.01	2.01	30.01
Small-scale	Maximum	500	3.00	6.00	1.00	2.00	30.00
	Minimum	0	0.00	0.00	0.00	0.00	0.00

Summary Table of Results of Classifications of NIS Facility by Scale (No. of Pumping Station)

Scale of Pumping Station	Service Area	Total Discharge	Lifting Head	Suction Sump Width	Discharge Sump Width	Pump House Area	Average
Large-scale	3	3	4	6	9	6	5
Medium-scale	5	1	14	4	2	8	6
Small-scale	17	11	3	3	4	2	7
Total	25	15	21	13	15	16	18

Summary Table of Results of Classifications of NIS Facility by Scale (Percentage of Pumping Station)

Scale of Pumping Station	Service Area	Total Discharge	Lifting Head	Suction Sump Width	Discharge Sump Width	Pump House Area	Average
Large-scale	12	20	19	46	60	37	28
Medium-scale	20	7	67	31	13	50	33
Small-scale	68	73	14	23	27	13	39
Total	100	100	100	100	100	100	100

c) Main Canals

The main canal classified into the categories of large, medium and small-scales are of 32 lines (16 %), 100 lines (51 %) and 65 lines (33 %), respectively.

Criteria for Classifications of NIS Facility by Scale (Main Canal)

Description		Service Area (ha)	Main Canal			
			Discharge (m^3/s)	Length (km)	Bottom Width (m)	Side-Wall Height (m)
Scale	Maximum	29,846	59.00	162.40	12.00	5.00
	Mean	2,662	8.12	16.50	2.78	1.75
	Minimum	43	0.15	0.91	0.40	0.55
Large-scale	Maximum	30,000	60.00	170.00	12.00	5.00
	Minimum	4,001	12.01	25.01	4.21	2.61
Medium-scale	Maximum	4,000	12.00	25.00	4.20	2.60
	Minimum	1,301	4.01	8.01	1.41	0.91
Small-scale	Maximum	1,300	4.00	8.00	1.40	0.90
	Minimum	0	0.00	0.00	0.00	0.00

Summary Table of Results of Classifications for NIS Facility by Scale (No. of Main Canal)

Scale of Main Canal	Service Area	Discharge	Length	Bottom Width	Side-wall Height	Average
Large-scale	39	33	36	27	27	32
Medium-scale	77	68	104	117	136	100
Small-scale	100	86	74	45	20	65
Total	216	187	214	189	183	197

Summary Table of Results of Classifications for NIS Facility by Scale (Percentage of Main Canal)

Scale of Main Canal	Service Area	Discharge	Length	Bottom Width	Side-wall Height	Average
Large-scale	18	18	17	14	15	16
Medium-scale	36	36	48	62	74	51
Small-scale	46	46	35	24	11	33
Total	100	100	100	100	100	100

2) Present Conditions and Encountered Problems of Irrigation and Drainage Facilities

The present conditions and encountered problems of irrigation and drainage facilities are as follows (Details are given in Table A3-8).

a) Diversion Dams

The diversion dams classified into the categories of good, moderate or severe condition are of 82 places (48 %), 75 places (43 %) and 16 places (9 %), respectively.

Summary Table of Results of Conditions for Diversion Dam

Conditions of Diversion Dam	Number (place)	Percentage (%)
Good Condition	82	48
Moderate Condition	75	43
Severe Condition	16	9
Total	173	100

The major encountered problems with severe conditions are as follows.

Major Encountered Problems of Diversion Dam (more than 10 %)

Problems	Part of Facilities	No. of Dam (place)	Percentage of Dam (%)
1) Damaged	1) Spillway gate	2	20
	2) Sluice way gate	23	14
	3) Intake gate	18	10
2) Scoured	1) Downstream apron	30	19
	2) Riverbed protection	26	18
	3) Protection dike	21	10
	4) Protection sidewall	21	11
3) Leak	1) Spillway gate	2	20

	2) Sluice way gate	17	10
4) Sediment	1) Sluice way	22	13
	2) Intake	29	16
5) Rust	1) Spillway gate	3	30
	2) Sluice way gate	25	15
	3) Intake gate	21	11

b) Pumping Stations

The pumping stations classified into the categories of good, moderate or severe condition are of six places (34 %), 11 places (62 %) and one place (4 %), respectively.

Summary Table of Results of Conditions of Pumping Station

Conditions of Pumping Station	Number (place)	Percentage (%)
Good Condition	6	34
Moderate Condition	11	62
Severe Condition	1	4
Total	18	100

The major encountered problems with severe condition are as follows.

Major Encountered Problems of Pumping Station (more than 10%)

Problems	Part of Facilities	No. of P.S. (place)	Percentage of P.S. (%)
1) Damaged	1) Suction Sump	2	13
2) Scoured	1) Suction Sump	2	13
3) Leak	1) Suction Sump	2	13
4) Sediment	1) Suction Sump	3	19
5) Rust	1) Intake gate	2	18

c) Main Canals

The main canals classified into the categories of good, moderate or severe condition are of 28 places (13 %), 128 places (60 %) and 57 places (27 %), respectively.

Summary Table of Results of Conditions of Main Canal

Conditions of Diversion Dam	Number (line)	Percentage (%)
Good Condition	28	13
Moderate Condition	128	60
Poor Condition	57	27
Total	213	100

The major encountered problems with severe condition are as follows.

Major Encountered Problems of Main and Lateral Canal (more than 10 %)

Problems	Part of Facilities	No. of Canal (place)	Percentage of Canal (%)
1) Damaged	1) Related structures of main canal	106	50
	2) Related structures of lateral canal	401	42
2) Leak	1) Main canal	28	13
	2) Lateral canal	91	10
3) Sediment	1) Main canal	82	38
	2) Lateral canal	341	36

3.3.2 MRI Plan and Evaluation of All Systems

205 NISs spreading out in the whole country have a various problems. The MRI plans to solve these problems should be made by the proposed Manual of NIS's MRI planning methodology and prevailing current Design Manuals for structures.

Major MRI plans for the irrigation and drainage facilities are as follows.

1) Maintenance Plan for Irrigation Facilities

Maintenance works for irrigation and drainage facilities are of normal and routine works to maintain the function of irrigation system. According to NIS Inventory Survey results, the components of maintenance plans for NISs irrigation and drainage facilities are as follows.

Work Item	Condition	Part of Facilities	Remarks
Repair	Damaged/Scoured /Leak	1) Concrete structure	- Patchwork
		2) Downstream riverbed protection	- Patchwork
		3) Protection dike	- Patchwork
		4) Protection sidewall	- Patchwork
		5) Gate	- Patchwork
Desilting/Flushing	Sediment	1) Sluice way	- Flushing by gate
		2) Intake	- Desilting/Flushing
Replace	Leak	1) Seal rubber of gate	- Replace
Repainting	Rust	1) Gate	- Patchwork

a) Pumping Stations

Work Item	Condition	Part of Facilities	Remarks
Repair	Damaged/Scoured/Leak	1) Concrete structure	- Patchwork
		2) Pump	- Patchwork
		4) Slope protection	- Patchwork
		5) Pump house	- Patchwork
		6) Gate	- Patchwork
Desilting	Sediment	1) Suction sump	- Whole work
		2) Discharge sump	- Whole work
Repainting	Rust	1) Gate	- Patchwork
		2) Pump	- Patchwork

b) Main and Lateral Canals

Work Item	Condition	Part of Facilities	Remarks
Repair	Damaged	1) Related structures of main and lateral canal	- Patchwork
	Leak	1) Main and lateral canal	- Patchwork
		2) Related structures of main and lateral canal	- Patchwork
Desilting	Sediment	1) Main and lateral canal	- Patchwork
		2) Related structures of main and lateral canal	- Patchwork
Replace	Leak	1) Seal rubber of gate	- Replace
Repainting	Rust	1) Gate of related structure	- Patchwork

2) Components of Rehabilitation and Improvement Plan for Irrigation Facilities

According to the NIS Inventory Survey results, the components of improvement plans for NISs irrigation facilities are as follows.

a) Diversion Dams

Work Item	Condition	Part of Facilities	Remarks
Repair/ Reconstruction Replace	Damaged/Scoured /Leak	1) Concrete structure	- Patchwork or whole work
		2) Downstream riverbed protection	- Patchwork or whole work
		3) Protection dike	- Patchwork
		4) Protection sidewall	- Patchwork
		5) Gate	- Patchwork or whole work
Improvement	Damaged/Scoured /Washed-away	1) Concrete structure	- Patchwork or whole work
		2) Downstream riverbed protection	- Patchwork or whole work
		3) Protection sidewall	- Patchwork or whole work
		4) Gate	- Replace
	Sediment	1) Sluice way	- Additional sluice way
		2) Intake	- Additional intake - Intake mouth
		3) Sand settling basin	- Additional sand settling basin
	Rust	1) Gate	- Whole work
Replace	Leak	1) Seal rubber of gate	- Replace
Repainting/Replac e	Rust	1) Gate	- Whole work

b) Pumping Stations

Work Item	Condition	Part of Facilities	Remarks
Repair	Damaged/Scoured/Leak	1) Concrete structure	- Patchwork
		2) Slope protection	- Patchwork
Improvement	Damaged/Scoured/Leak	1) Slope protection	- Patchwork or whole work
Desilting	Sediment	1) Suction sump	- Desilting by manual
Repainting	Rust	1) Gate	- Patchwork or whole work

c) Main and Lateral Canals

Work Item	Condition	Part of Facilities	Remarks
Repair/Reconstruction	Damaged/Leak	1) Main and lateral canal	- Patchwork
		2) Related structures of main and lateral canal	- Patchwork
Improvement	Damaged/Leak	1) Main and lateral canal	- Patchwork
Desilting	Sediment	1) Main and lateral canal	- Patchwork
		2) Related structures of main and lateral canal	- Patchwork
Repainting/Replace	Rust	1) Gate of related structure	- Whole work

3.4 Prioritization Methods for MRI of NISs

3.4.1 Economical MRI Methods

1) Maximum Facility's Capacities

a) Available Irrigation Water

The devastated catchment area in upstream portion at the intake point for irrigation water could not be easily improved even in future. And available irrigation water is the river discharge with return period of once in two-year.

b) Maximum Irrigation Water Requirement

Irrigation plan should be made by introduction of water saving irrigation methods such as rotation method and considering available irrigation water.

c) Maximum Facility's Capacities

The maximum facility's capacities would not exceed the maximum present available irrigation water, and it would be designed by the maximum irrigation water requirement without rainfall.

2) Economical Local Materials and Construction Methods

a) Economical Local Materials

Local materials such as soils, woods and stones would be utilized for an economical MRI works.

b) Economical Construction Methods

(1) Riverbed Protection

Suitable types of the riverbed protection works would be selected applying the following criteria considering the selected economical construction methods.

Case	Flood Flow Velocity	Economical Construction Methods	Specification
Case-1	- Less than 3.0 m/s	- Boulder riprap	- Diameters of boulder are more than 30cm. - Thickness of riprap is more than two times of diameter of boulder riprap and more than 60cm.
Case-2	- 3.0 to 5.0 m/s	- Concrete block (2.0 ton class)	- Thickness of concrete block is more than 50cm.
Case-3	- More than 5.0 m/s	- Concrete block (4.0 ton class)	- Thickness of concrete block is more than 70cm.

(2) Slope Protection

Suitable types of the slope protection would be selected applying the following criteria considering the select economical construction methods.

Case	Max. Flow Velocity	Economical Construction Method	Specification
Case-1	- Less than 1.2 m/s	- Earth lining with sodding	- Side-slope is less than 1 : 2.0. - Height of slope is less than 3.0m.
Case-2	- 1.2 to 3.0 m/s	- Gabion box	- Gabion box size is more than 1.0m x 1.0m x 1.0m. - Height of slope less than 5.0m.
Case-3	- 3.0 to 5.0 m/s	- Grouted masonry	- Thickness of masonry is more than 30cm. - Height of slope is less than 5.0m.
Case-4	- More than 5.0 m/s	- Reinforced concrete lining	- Thickness of concrete lining is more than 30cm. - Height of slope is less than 5.0m.

(3) Protection Sidewall

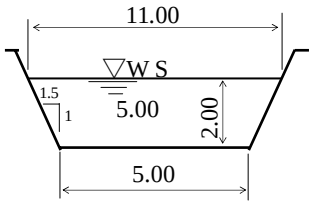
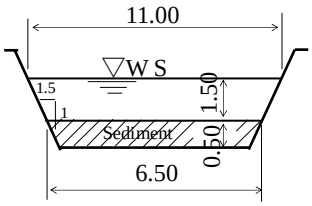
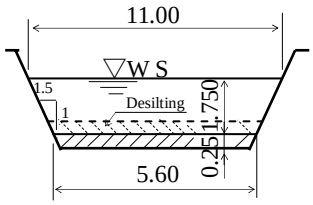
The type of protection sidewall will be selected by the following criteria due to select economical construction methods.

Case	Flood flow velocity	Economical Construction Method	Specification
Case-1	- Less than 1.2 m/s	- Earth lining with sodding	- Side-slope is less than 1 : 2.0. - Height of sidewall is less than 3.0m.
Case-2	- 1.2 to 3.0 m/s	- Gabion box	- Gabion box size is more than 1.0m x 1.0m x 1.0m. - Height of sidewall less than 5.0m.
Case-3	- 3.0 to 5.0 m/s	- Grouted masonry	- Thickness of masonry is more than 30cm. - Height of sidewall is less than 5.0m.
Case-4	- More than 5.0 m/s	- Reinforced concrete wall	- Thickness of structural part is more than 30cm.

(4) Desilting Plan for Main and Lateral Canals

The design discharges of canals considering the desilting works are of the maximum available irrigation water and not exceeds the maximum irrigation water requirement. An example is shown as follows.

Desilting Plan for Main and Lateral Canals

Description	Unit	Original Design	Present Situation	Desilted Plan
Cross-Section				
Design Discharge	m^3/s	40.00	30.00	35.00
Water Depth	m	2.00	1.50	1.75
Bottom Width	m	5.00	6.50	5.75
Flow Area	m^2	16.00	13.13	14.66
Wetted Perimeter	m	12.21	11.91	12.06
Hydraulic Radius	m	1.310	1.102	1.216
Hydraulic Gradient		0.00100	0.00100	0.00100
Roughness Coefficient		0.015	0.015	0.015
Velocity	m/s	2.52	2.25	2.40
Estimated Discharge	m^3/s	40.32	29.54	35.18

The sediment volume is 2.87 m^3/m (= 16.00 - 13.13 m^3/m, 17.9 %) and the desilting volume is 1.53 m^3/m (= 14.66 – 13.13 m^3/m, 53.3 % of sediment volume).

3.4.2 Prioritization Methods for MRI of Facilities among NISs and Facility Components in NIS within Region and National Level

From the results of the study, it was identified that maintenance works could be defined to be the normal and routine works to maintain well-functional conditions of the irrigation facilities and systems, while rehabilitation and improvement (R/I) works could be of recovering the functionality of the facilities and systems. For the study on prioritization analysis of facility MRI, R/I case only would be dealt in the prioritization study, because estimated maintenance costs to be required for facility maintenance are almost same to the actual maintenance costs spent during past five years.

Regarding the prioritization analysis for R/I works of the irrigation and drainage facilities, following two cases of analysis should be examined in each Regional Office, and their examination results would be reflected to the preparation of Plan of Operations (PoWs) in the Region, which would be prepared by the end of December;

- Prioritization method for R/I of facilities among NISs
- Prioritization method for R/I of facility components within NIS

1) Prioritization Methods for R/I of Facilities among NISs

Following criterion should be taken into account for prioritization plan of R/I works of NISs;

- Severe functionality of the system (Imperiousness)
- Project justification (Economical Efficiency)
- Water resources potentiality (Water Resources)

- Scale of R/I works (Project Scale and Instant Effect)
- O&M capability of the related organizations (Organizational Capability)
- Contribution to Regional Economy (Project Contribution)

Severe Functionality of the System

In case a certain facility in the system has a severe defect, that lowers the functionality of the whole systems, priority for the rehabilitation and improvement (R/I) would be marked "High".

Project Justification

In case project justification indexes such as cost-benefit performance (B/C ratio) give reasonable values more than one, priority for R/I would be ranked depending on the estimated values.

Water Resources Potentiality

In case water resources potentiality indicates to be adequate especially during the dry season, the priority for the R/I of the system would be ranked depending on its potentiality.

Scale of MRI Works

In case the scale of R/I works such as irrigated areas, work volumes, cost per hectare, etc shows low values, instant project effects could be expected. In this case, priority for the R/I would be marked "High".

O&M Capability of the Related Organization

In case "Functionality Survey" result, which is presently undertaken at a part of NISs, indicates high values, priority for the R/I would be marked "High". But, no data on the "Functionality Survey" are available, ISF collection rate of the NIS would be substituted.

Contribution to Regional Economy

In case agricultural production by the system is a major economical activity and the R/I works are expected to contribute to drastic upgrading of regional economy, priority for the R/I would be marked "High".

The priority ranking in the Region should be evaluated by total score to be estimated applying following weighted point rating method;

Weighting Point Rates to be Applied

Criterion	Weighted Point	Scouring Points			Total Score
		High	Medium	Low	
Functionality of whole System	30	5	3	1	
Project Justification	20	5	3	1	
Water Resources Potentiality	20	5	3	1	
Scale of MRI Works	15	5	3	1	
O&M Capability of the Related Organization	10	5	3	1	
Contribution to Regional Economy	5	5	3	1	
Total	100				

Table 3-1 indicates the evaluation table for prioritization of the R/I works among NISs.

2) Prioritization Methods for R/I of Facility Components within NIS

Regarding the prioritization for the R/I of facility components within NIS, following three criterion as mentioned in the above should be taken into account for planning of the R/I works of facility components such as diversion dam, pumping station, canal and structures.

- Severe functionality of the system (Imperiousness)
- Project justification (Economical Efficiency)
- Scale of R/I works (Project Scale and Instant Effect)

The priority ranking should be evaluated by following total score applying following weighted point rating method;

Weighting Point Rates to be Applied

Criterion	Weighted Point	Scouring Points			Total Score
		High	Medium	Low	
Functionality of whole System	50	5	3	1	
Project Justification	30	5	3	1	
Scale of MRI Works	20	5	3	1	
Total	100				

Table 3-2 indicates the evaluation table for prioritization of the R/I works within NIS (sampled evaluation in case of the three Pilot NIS areas).

Table 3-1 Evaluation Table for Prioritization of NIS's R/I Plan among NISs

No.	Region	RC (NISO)	NIS	Severe Functionality of System				Project Justification (B/CRatio)				Water Resources Potentiarity				Scale of MRI Works (Cost)				O&M Capability (Functionality Survey/ISF				Contribution of Regional Economy				Total Score by Weighting Points Rates	Order of Priority
				WP	30			WP	20			WP	20			WP	15			Wp	10			WP	5				
					Severe	Moderate	Good		> 10.0	1.0 - 10.0	< 1.0		High	Mediun	Low		Large	Medium	small		Good	Moderate	Low		High	Medium	Low		
				SP	5	3	1	SP	5	3	1	SP	5	3	1	SP	5	3	1	Sp	5	3	1	SP	5	3	1		
1	**CAR**	Upper Chico	Upper Chico			1			1					1			1				1				1			400	1
2		Hapid IP	Hapid																									0	100
3		West Apayao Abulog IS	West Apayao Abulug																									0	100
4	**Reg. I**	Ilocos Norte	Bonga PIS-1																									0	100
5			Bonga PIS-2			1				1			1						1		1					1		330	17
6			Bonga PIS-3				1				1		1						1		1						1	220	71
7			Laoag Vintar																									0	100
8			Nmc Pasuquin																									0	100
9			Dingras				1				1		1						1			1				1		180	80
10			Bolo			1					1		1						1			1					1	230	60
11			Cura		1					1			1						1		1						1	380	4
12			Nueva Era																									0	100
13			Madongan Area		1					1				1			1					1				1		360	11
14			Solsona Area		1					1					1		1				1					1		370	8
15			Labugaon Area			1				1					1		1					1				1		260	50
16			Papa Area			1				1					1		1				1					1		310	26
17		Ilocos Sur	Sta. Maria-Burgos				1			1					1				1		1						1	180	80
18			Sta. Lucia-Candon				1				1				1				1			1				1		100	95
19			Tagudin																									0	100
20		Amburayan	Amburayan			1				1			1						1				1			1		290	35
21		Ambayoan-Dipalo	Ambayoan		1					1				1			1						1		1			380	4
22			Ambayoan-Extension																									0	100
23			Dipalo			1					1				1		1						1			1		230	60
24		Masalip	Masalip																									0	100
25		Lower Agno	Lower Agno				1		1						1				1			1			1			190	77
26		San Fabian- Dumuloc	San Fabian				1				1				1				1		1					1		150	88
27			Dumuloc			1				1					1				1			1				1		200	74
28		Agno-Sinolacan	Agno																									0	100
29			Sinolacan																									0	100
30	**Reg. II**	Vistacion	Vistacion																									0	100
31		Baua	Baua			1				1					1				1			1				1		200	74
32		Banurbur	Banurbur Creek			1				1			1					1				1				1		310	26
33		Magapit Pump	Magapit PIS			1			1						1				1			1			1			250	53
34		Apayao- Abulog- Pamplona	Apayao-Abulug			1					1				1		1					1			1			230	60
35			Pamplona																									0	100
36		Dummun	Dummun			1					1				1		1					1				1		220	71
37		Zinundungan	Zinundungan																									0	100
38		Baggao	Baggao			1			1						1				1			1				1		240	56
39		Iguig-Alcala- Amulung	Iguig-Alcala-Amulung PIS																									0	100
40		Lower Chico	Lower Chico																									0	100
41		Solana- Pinacanuan	Solana PIS																									0	100
42			Pinacanauan																									0	100
43		San Pablo Cabagan	San Pablo Cabagan			1			1						1				1			1				1		240	56
44		Tumauini	Tumauini				1			1			1						1			1				1		220	71
45		Mallig	Mallig				1				1		1						1			1				1		180	80

No.	Region	RC (NISO)	NIS	Severe Functionality of System				Project Justification (B/CRatio)				Water Resources Potentiarity				Scale of MRI Works (Cost)				O&M Capability (Functionality Survey/ISF				Contribution of Regional Economy				Total Score by Weighting Points Rates	Order of Priority
				WP	30			WP	20			WP	20			WP	15			Wp	10			WP	5				
					Severe	Moderate	Good		> 10.0	1.0 - 10.0	< 1.0		High	Mediun	Low		Large	Medium	small		Good	Moderate	Low		High	Medium	Low		
				SP	5	3	1	SP	5	3	1	SP	5	3	1	SP	5	3	1	Sp	5	3	1	SP	5	3	1		
46	**Reg. II**	N.V Bagabag	Bagabag		1					1					1			1					1			1		300	30
47	**MRIIS**	MRIIS Disrtict I	MRIIS Distric I																									0	100
48		MRIIS Disrtict II	MRIIS Distric II																									0	100
49		MRIIS 1+D83 Disrtict III	MRIIS Distric III				1				1				1				1		1				1			160	87
50		MRIIS Disrtict IV	MRIIS Distric IV																									0	100
51	**Reg.III**	Nayom-Bayto	Nayom																									0	100
52			Bayto																									0	100
53		Camiling	Camiling		1					1					1		1						1		1			340	15
54		Tarlac-San Miguel	Tarlac																									0	100
55			San-Miguel																									0	100
56		Bucao	Bucao																									0	100
57		NEPIS (Nueva Ecija PIS)	NEPIS																									0	100
58		Pampanga	Pampanga																									0	100
59		Porac-Gumain	Porac				1				1				1				1			1				1		100	95
60			Gumain			1				1					1			1				1				1		230	60
61		Colo- Caulaman	Colo																									0	100
62			Caulaman																									0	100
63		Angat- Massim	Angat			1				1			1				1						1		1			360	11
64			Maasim			1			1				1						1				1			1		330	17
65		Disalit Creek	Disalit Creek				1				1			1					1				1				1	140	91
66	**UPRIIS**	UPRIIS District I	UPRIIS District I				1				1			1					1		1						1	180	80
67		UPRIIS District II	UPRIIS District II																									0	100
68		UPRIIS District III	UPRIIS District III																									0	100
69			UPRIIS District III(Vaca)																									0	100
70		UPRIIS District IV	UPRIIS District IV			1			1						1			1			1				1			330	17
71	**Reg. IV**	Cavite Friar Lands	Molino																									0	100
72			Embarcadero-Baluctot																									0	100
73			Luksuhin-Makuling																									0	100
74			Pasong Kastila-Julian																									0	100
75			Bankud																									0	100
76			Butas Marcelo																									0	100
77			Plucena-Bayan																									0	100
78			Butas-Lawang Bato																									0	100
79			Navarro																									0	100
80			Matanda																									0	100
81			Balayungan																									0	100
82			Tres Cruses																									0	100
83			San Agustin-Pasong Buaya																									0	100
84			Culong-Culong																									0	100
85			Sahing																									0	100
86		Agos	Agos																									0	100
87		Palico	Palico																									0	100
88		Laguna Friar Lands	Cabuyao PIS																									0	100
89			San Cristobal																									0	100
90			Diezmo PIS																									0	100
91			Macabling																									0	100
92			San Juan																									0	100
93		Sta. Maria- Mayor	Sta. Maria																									0	100

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				WP	30			WP	20			WP	20			WP	15			Wp	10			WP	5				
					Severe	Moderate	Good		> 10.0	1.0 - 10.0	< 1.0		High	Mediun	Low		Large	Medium	small		Good	Moderate	Low		High	Medium	Low		
				SP	5	3	1	SP	5	3	1	SP	5	3	1	SP	5	3	1	Sp	5	3	1	SP	5	3	1		
94			Mayor																									0	100
95	**Reg. IV**		Dambo PIS																									0	100
96		Sta. Cruz-Mabacan- Balanac	Sta. Cruz			1					1				1		1						1			1		230	60
97			Mabacan																									0	100
98			Balanac																									0	100
99			Lumban																									0	100
100			Malaunod																									0	100
101		Dumacaa-Hanagdong-Lagnas	Dumacaa			1				1				1			1					1				1		300	30
102			Hanagdong			1				1				1					1			1					1	230	60
103			Lagnas			1			1						1				1			1					1	230	60
104		Pagbahan	Pagbahan																									0	100
105		Baco Bucayao- Mag- Asawang Tubig	Baco Bucayao																									0	100
106			Mag-Asawang Tubig																									0	100
107		Amnay- Partic- Mongpong	Amnay-Patric																									0	100
108			Mongpong																									0	100
109		Pula-Bansud	Pula																									0	100
110			Bansud																									0	100
111		Lumintao	Lumintao																									0	100
112		Caguray	Caguray																									0	100
113		Cantingas	Cantingas																									0	100
114		Batang- Batang- Malatgao	Batang-Batang			1				1				1					1			1				1		240	56
115			Malatgao			1					1				1			1				1				1		190	77
116	**Reg. V**	Daet Talisay- Matognon	Daet Talisay																									0	100
117			Matogdon																									0	100
118		Libmanan Cabusao	Libmanan Cabusao PIS																									0	100
119		Tigman- Hinagyanan- Inarihan	Tigman-Hinagyanan																									0	100
120			Inarihan																									0	100
121		Cagayan	Cagaycay																									0	100
122		Rinconada Integrated	Barit																									0	100
123			Rida																									0	100
124			Buhi-Lalo																									0	100
125		Mahaba- Nasisi Ogsong- Hibiga	Mahaba																									0	100
126			Nasisi																									0	100
127			Ogsong																									0	100
128			Hibiga																									0	100
129		Pili-Bulan San- Barbara	San Francisco																									0	100
130			San Ramon																									0	100
131	**Reg. VI**	Aklan-Panakuyan	Aklan (East Side)		1					1					1		1					1				1		320	24
132			Panakuyan		1					1				1				1					1				1	330	17
133		Sibalom-San Jose	Sibalom-San Jose			1				1				1				1			1					1		320	24
134		Mambusao	Mambusao			1			1						1				1				1			1		250	53
135		Jaluar-Suague	Jalaur-Proper			1			1				1					1				1			1			360	11
136			Jalaur- Extension			1				1			1					1				1				1		310	26
137			Suague			1				1				1				1				1				1		270	48
138		Sibalom- Tigbuan	Sibalom-Tigbuan		1					1					1			1					1			1		300	30
139		Aganan- Ata. Barbara	Aganan			1				1					1			1					1		1			250	53
140			Sta. Barbara		1					1				1				1			1					1		380	4
141		Barotac Viejo	Barotac Viejo			1				1				1					1				1				1	240	56

No.	Region	RC (NISO)	NIS	Severe Functionality of System				Project Justification (B/CRatio)				Water Resources Potentiarity				Scale of MRI Works (Cost)				O&M Capability (Functionality Survey/ISF				Contribution of Regional Economy				Total Score by Weighting Points Rates	Order of Priority
				WP	30			WP	20			WP	20			WP	15			Wp	10			WP	5				
					Severe	Moderate	Good		> 10.0	1.0 - 10.0	< 1.0		High	Mediun	Low		Large	Medium	small		Good	Moderate	Low		High	Medium	Low		
				SP	5	3	1	SP	5	3	1	SP	5	3	1	SP	5	3	1	Sp	5	3	1	SP	5	3	1		
142		Bago	Bago		1					1					1		1						1		1			340	15
143		Pangiplan	Pangiplan		1					1					1				1			1				1		260	50
144	**Reg. VII**	Bohol	Bohol																									0	100
145			Capayas																									0	100
146	**Reg. VIII**	Mainit- Pongso	Mainit			1				1				1					1		1					1		290	35
147			Pongso				1			1					1				1		1						1	180	80
148		Bao	Bao		1				1						1				1			1				1		300	30
149		Binahaan- Tibak	Binahaan North																									0	100
150			Binahan South																									0	100
151			Lower Binahaan																									0	100
152			Tibak																									0	100
153		Daguitan- Guinarona	Daguitan				1				1				1				1				1				1	100	95
154			Gumarona				1				1				1				1				1				1	100	95
155		Balire-Ibawon Gibuga	Balire North		1						1				1		1						1				1	280	42
156			Balire South		1						1				1		1						1				1	280	42
157			Ibawon		1					1					1			1					1				1	290	35
158			Gibuya		1					1					1			1					1				1	290	35
159		Bito	Bito																									0	100
160		Hindang-Hilongod- Das-Ay	Hindang-Hilongos				1				1				1				1			1					1	90	99
161			Das-Ay				1			1					1				1				1				1	140	91
162	**Reg. IX**	Sibuguey Valley	Sibuguey Valley				1				1				1				1		1					1		150	88
163		Salug-Dipolo	Dipolo				1				1				1			1			1						1	170	86
164			Salug				1				1		1						1		1					1		230	60
165		Labangan	Labangan			1				1			1						1			1				1		280	42
166	**Reg. X**	Bubunawab	Bubunawab																									0	100
167		Manupali	Manupali				1			1					1			1				1			1			180	80
168		Pulangui- Roxas-Kuya	Pulangui				1				1			1					1		1				1			200	74
169			Roxas-Kuya				1				1				1				1		1					1		150	88
170		Muleta	Muleta				1		1						1				1		1					1		230	60
171		Rugnan	Rugnan																									0	100
172		Maranding	Maranding																									0	100
173	**Reg. XI**	Lupon	Lupon			1				1					1			1			1					1		280	42
174		Batutu	Batutu			1				1				1					1		1					1		290	35
175		Saug- Libunganon Left	Saug			1			1				1						1		1				1			380	4
176			Libunganon-Left				1				1				1				1		1						1	140	91
177		Lasang- Libuganon- Kipaliku	Lasang																									0	100
178			Libunganon-Right		1				1						1			1			1				1			390	2
179			Kipaliku																									0	100
180		Mal-Padada	Mal			1				1					1			1			1					1		280	42
181			Padada				1				1			1					1		1					1		190	77
182	**Reg.XII**	Alip-Talayan	Alip			1				1					1			1			1					1		280	42
183			Talayan																									0	100
184		Maridagao	Maridagao																									0	100
185		Libungan	Libungan			1			1					1			1					1			1			350	14
186		Kabulnan	Kabulnan																									0	100
187		Kabacan- Pagalungan	Kabacan			1			1				1						1			1			1			330	17
188			Pagalungan				1				1				1				1				1			1		110	94
189		Mlang- Malasila	Mlang																									0	100

No.	Region	RC (NISO)	NIS	Severe Functionality of System				Project Justification (B/CRatio)				Water Resources Potentiarity				Scale of MRI Works (Cost)				O&M Capability (Functionality Survey/ISF				Contribution of Regional Economy				Total Score by Weighting Points Rates	Order of Priority
				WP	30			WP	20			WP	20			WP	15			Wp	10			WP	5				
					Severe	Moderate	Good		> 10.0	1.0 - 10.0	< 1.0		High	Mediun	Low		Large	Medium	small		Good	Moderate	Low		High	Medium	Low		
				SP	5	3	1	SP	5	3	1	SP	5	3	1	SP	5	3	1	Sp	5	3	1	SP	5	3	1		
190			Malasila			1			1						1				1		1				1			300	30
191		Lambayong- Tacurong	Lambayaong			1			1					1				1					1		1			330	17
192			Tacurong (Dumaguil)			1				1			1					1				1				1		310	26
193	**Reg.XII**	Allah-Banga-Marbel	Allah-1																									0	100
194			Allah-2																									0	100
195			Banga				1			1				1				1			1					1		260	50
196			Marbel-I			1			1						1				1		1					1		290	35
197			Marbel 2		1					1					1		1				1					1		370	8
198		Siluay- Buayan	Siluay				1		1						1				1		1					1		230	60
199			Buayan			1					1				1			1			1						1	230	60
200	**Reg.XIII**	Cabadbaran-Taguibo	Cabadbaran-Taguibo		1				1					1					1		1					1		390	2
201		Cantillan	Cantillan			1			1					1					1		1					1		330	17
202		Tago	Tago			1			1						1				1		1					1		290	35
203		Andanan	Andanan			1				1			1					1			1				1			370	8
204		Gibong	Gibong				1		1					1					1		1					1		270	48
205		Simulao	Simulao																									0	100

Table 3-2 Evaluation Table for Prioritization of NISs R/I Plan within NIS

No.	Region	RC (NISO)	NIS Part of Facilities	Severe Functionality of System				Project Justification (B/CRatio)				Scale of MRI Works (Cost)				Total Score by Weighting Points Rates
				WP	50			WP	30			WP	20			
					Severe	Moderate	Good		> 5.0	1.0 - 5.0	< 1.0		Large	Medium	small	
				SP	5	3	1	SP	5	3	1	SP	5	3	1	
63	Reg. 3	Angat-Massim	Angat RIS													
			Diversion Dam				1			1			1			240
			Pumping Station													0
			Canal			1				1			1			340
96	Reg. 4	Sta. Cruz-Mabacan-Balanac	Sta. Cruz RIS													
			Diversion Dam		1				1					1		460
			Pumping Station													0
			Canal				1				1			1		140
139	Reg. 6	Aganan-Sta. Barbara	Aganan RIS													
			Diversion Dam			1				1			1			340
			Pumping Station													0
			Canal		1				1				1			500

CHAPTER IV.

INTEGRATION AND MANAGEMENT OF MASTER FILE DATA IN NIA REGIONAL AND CENTRAL OFFICES

CHAPTER IV. INTEGRATION AND MANAGEMENT OF MASTER FILE DATA IN NIA REGIONAL AND CENTRAL OFFICES

4.1 Related Organizations

As already stated in the paragraph of "2.1.2 Inventory Survey Updating Procedures", the related organizations concerning the implementation of the Inventory Survey are proved as follows.

Region Level
- National Irrigation System (NIS)
- Responsibility Center (RC)/National Irrigation System Office (NISO)
- Regional Office (RO)

Central Office
- NIA-System Management Department (SMD)

The data obtained through the Inventory Survey should be managed and stored by each related offices, and their data contents to be saved at each offices are itemized as follows. Updated annual data should be stored under the responsibility of each office manager.

Data Management by Related Organizations

Related Organizations	Managed, Evaluated and Stored Data	Saving Means
NIS	Collected raw data	Paper Filling
RC/NISO	Tabulated and checked/verified data within RC/NISO	Floppy Diskette /CD
RO	Tabulated and evaluated data, and prioritized MRI plan data within Region	CD/Regional Host Computer
NIA-SMD	Integration of tabulated and evaluated and prioritized MRI plans in the country	CD/SMD Host Computer

4.2 Data Management of Master Files in Regional and Central Offices

The compiled data on the Inventory Survey and on the proposed MRI Plan inclusive of the prioritization plan, etc. should be submitted from the Regional Office to the NIA-SMD in the Central Office by the end of December. The data submitted from each Regional Offices should be stored in the host computer of SMD, and integrated into NIA Master File.

Table 4-1 indicates the list of annual data to be stored in the Regional and NIA-SMD host computers.

Table 4-1 Lists of Data to be Stored Annually in Regional Offices and NIA-SMD Host Computers

Data		Data Storing in Host Computer		
Form No.	Data Title	RC/NISO	Regional Office	NIA-SMD
Form AR-1	NISs Number, Location and Related Areas by Region	○	○	○
Form IS-1	Inventory Survey	○	○	○
Form TB-1	Tabulation of Inventory Survey Results for the Sector of Water Resources, Irrigation Water Use and Flood and Drainage Information	○	○	○
Form TB-2	Tabulation of Inventory Survey Results for the Sector of Functionality of Irrigation and Drainage Facilities (General Information and Dimension	○	○	○
Form TB-3	Tabulation of Present Conditions for the Sector of Functionality of Irrigation and Drainage Facilities	○	○	○
Form TB-4	Evaluation of NIS Inventory Survey Results for the Sector of Functionality of Irrigation and Drainage Facilities	○	○	○
Form TB-5	Tabulation of Inventory Survey Results for the Sector of Organization and Operation and Maintenance	○	○	○
Form PW-1	Monthly Average River Discharge	○		
Form PW-2	Monthly Average Diverted Intake Discharge	○		
Form PW-3	Evaluation of Development Potential for Seasonal Water Resources	○		
Form DM-1	Calibration Table of Canal Discharge (Rectangular Canal)	○		
Form DM-2	Calibration Table of Canal Discharge (Trapezoidal Canal)	○		
Form DM-3	Developed Stage-Discharge Curve and Calibrated Stage-Discharge Table (Rectangular Canal)	○		
Form DM-4	Developed Stage-Discharge Curve and Calibrated Stage-Discharge Table (Trapezoidal Canal)	○		
Form DM-5	Description Guidelines for Discharge Measurement and Development of Stage-Discharge Curve	○		
Form DM-7	Weekly Report of Farming Activities, Actual Water Supply and Problems Encountered	○	○	
Form OP-1	Operation Plan for Water Delivery Schedule	○	○	
Form CT-1	Classified Table of NIS Facility Scale for the Sector of Functionality of Irrigation and Drainage Facilities (General Information and Dimension)		○	
Form CT-2	Classified Table of Present Conditions for the Sector of Functionality of Irrigation and Drainage Facilities		○	
Form PR-1	Evaluation Table for Prioritization of MRI Works		○	○

4-2

INVENTORY FORMAT

LIST OF FORMATS

Form IS-1 Inventory Survey Format

INVENTORY SURVEY
FOR
NATIONAL IRRIGATION SYSTEMS (NIS)

NIS Name : (Region)

Survey Year : CY 200X – 200X

Page

Survey Contents

Submitted by:

Name : _____

Irrigation Superintendent RIS

Date : _____

I. General Information							
1. Name of Irrigation System							
2. Location of Diversion Dam	Latitude			Longitude			
3. Official Opening of the System							
4. Source of Water Supply							
5. Approved Water Right		lit/sec					
6. Designed Service Area		ha					
7. Firmed-up Service Area (FUSA)		ha					
8. Towns Served	Province	District		Town		Area Served (ha)	
	Total					0	
9. Number of Landowners		Landowner					
10. Number of Farmers Served		Farmer					
11. Average Farm Size	#DIV/0!	ha/Farm Household					
12. Irrigation Facilities							
Dam	Name						
	Water Source						
Diversion Dam	Name						
	Water Source						
Main Irrigation Canal	Total Length			km			
Lateral Irrigation Canal	Total Length			km			
Service Roads		km					
Access Roads		km					
Drainage Canal		km	Density	#DIV/0!		m/ha	
Farm-Ditch		km	Density	#DIV/0!		m/ha	
13. Main Crops							
Wet Season							
Dry Season							
14. No. of Organized IA and Their Activity							
Name of IA						ha	
						ha	
						ha	
						ha	
						ha	
						ha	
						ha	
						ha	
						ha	
						ha	
	Total			0		ha	
Length of Canal under Contract (Type-1)		km					
Areas covered by Contract		ha	#DIV/0!	%			

II. Water Resource and Irrigation Requirement Information (WRIR)

2.1 Available Water Resources

(1) Name of Water Source (River Name)										
(2) Drainage Area at Diversion Site		km^2								
(3) Climate Type										
(4) Average River Discharge at Diversion Site	Dry		m^3/s	Wet		m^3/s	Average		m^3/s	
(5) Average Diverted Intake Discharge	Dry		m^3/s	Wet		m^3/s	Averafe		m^3/s	
(6)Total Rainfall : Service Area	Dry		mm	Wet		mm	Annual		mm	
: Drainage Area	Dry		mm	Wet		mm	Annual		mm	

2.2 Irrigation Water Requirement (IWR)

(1) Firmed-up Service Area (FUSA)		0	ha							
(2) Irrigated Area in the Crop Year (CY)	Crop Year	—				Dry		ha		
						Wet		ha		
(3) First Crop (Main Cropping Season)	Dry Season Paddy	1								
	Wet Season Paddy	2								
(4) Irrigation Parameter for LS/LP										
Soil Texture										
Percolation (p)	Dry		mm/day	Wet		mm/day				
Evaporation (Ev)	Dry		mm/day	Wet		mm/day				
Evapo-Transpiration (Et)	Dry		mm/day	Wet		mm/day				
(5) Average Monthly Irrigation Water Requirement (IWR)										
Crop Water Requirement (CWR) (W/O Effe. Rainfall)	Dry		mm/day	Wet		mm/day				
Turn-out Water Duty (qtni) (W/O Effective Rainfall)	Dry		lit/sec/ha	Wet		lit/sec/ha				
Irrigation Diversion Requirement (IDR)	Dry		lit/sec/ha	Wet		lit/sec/ha				
(6) Max. Unit Land Soaking Irrigation Requirement (qtsi) (W Effective Rainfall)	Dry		lit/sec/ha	Wet		lit/sec/ha				
(7) Area and Percentage of Water Shortage	Dry		ha	#DIV/0!	%					
	Wet		ha	#DIV/0!	%					
(8) Location of Water Shortage Occurrence in Dry Season Crop	Up-stream Area	1								
	Middle-stream Area	2								
	Down-stream Area	3								
(9) Damaged Amounts by Water Shortage	Dry Season Crop		million Peso							
	Wet Season Paddy		million Peso							
(10) Reasons of Water Shortage	Absolute Lack of Water						1			
	Damaged Facilities						2			
	Inadequate Water Management						3			
	Others						4			
(11) Utilization Conditions of Return Flow (Re-Use)	Yes	1								
	No	2								
Type of Return-Flow Facilities										
No. of Facilities		place								
Irrigated Area by Return-Flow		ha								

2.3 Farm Management Conditions

(1) Present Cropping Pattern and Irrigated Area

Typical Cropping Pattern	Refer to Figure 2-1					
Average Irrigated Area	Dry	Paddy	#DIV/0!	ha	Intensity (%)	#DIV/0!
		Upland	#DIV/0!	ha	Intensity (%)	#DIV/0!
	Wet	Paddy	#DIV/0!	ha	Intensity (%)	#DIV/0!
		Upland	#DIV/0!	ha	Intensity (%)	#DIV/0!
Average Benefited Area	Dry	0	ha	Wet	0	ha

(2) Introduction of Water Saving Technology

Method in Dry Season

For Example :

Intermittent Irrigation	Method	1	
Rotational Irrigation		2	
Aerobic Cultivation	Area		ha
Sustainable System of Irrigated Agriculture			ha

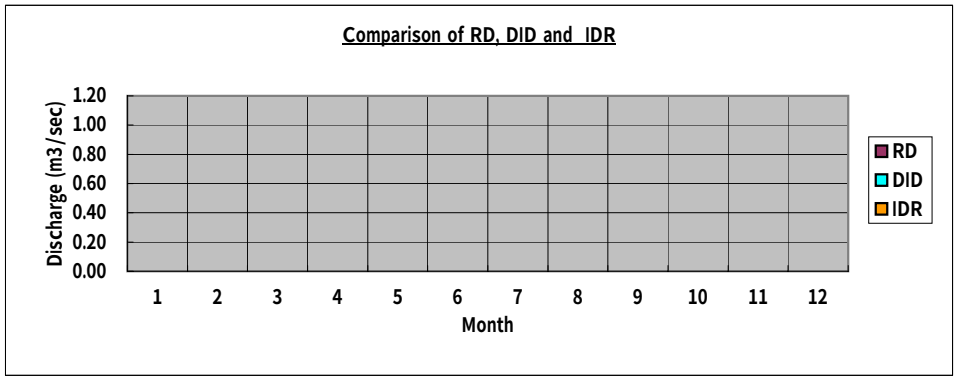
(3) Introduction Period of Water Saving Technology during dry Season

Method	1		-	
	2		-	

2.4 Balance of Available Water Resources (AWR) and Irrigation Water Requirement (IWR) in Average Year

(unit : m^3/sec)

Item	1	2	3	4	5	6	7	8	9	10	11	12
Ave. River Discharge (RD)												
Ave. Diverted Intake Discharge (DI												
Ave. Irrigation Diversionr Req. (ID												



2.5 Evaluation of Water Use

(1) Irrigation Water Use Conditions and Problems in the Reported Year CY —

(2) Countermeasures to Solve the Above Problems

III. Flood and Drainage Information

3.1 Flood Information

(1) Drainage Area at Diversion Dam Site		0	km^2		
(2) Average Annual Rainfall at Drainage Area			mm		
(3) Peak Flood Discharge for Past 10-Year					
Peak Flood Discharge			m^3/sec	Date	
Gauge Height at Peak Discharge			m-msl		
Max. Daily Rainfall			mm/day		
Run-off Coefficient at Peak Flood Discharge		#DIV/0!	%		
(4) Design Flood Discharge at Diversion Sites			m^3/sec	Probability	

3.2 Drainage Information

(1) Inundation Conditions in the Crop Year of CY —

Inundation Area						
Main		ha	Duration Period		day
Lateral		ha	Duration Period		day
Lateral		ha	Duration Period		day
Lateral		ha	Duration Period		day
Lateral		ha	Duration Period		day
Lateral		ha	Duration Period		day
Total	0	ha			

Damaged Amounts by Inundation in CY CY — Amounts million Peso

Reasons of Inundation Occurrence		
Heavy Rainfall	1	
Inadequate Drainage System	2	
Inadequate Water Management	3	
Others	4	

3.3 Evaluation of Flood and Drainage Conditions

(1) Flood and Drainage Conditions and Problems in the Reported Year CY —

(2) Countermeasures to solve the Above Problems

Table 2-1 Monthly Average River Discharge Records (at Diversion Site)

River Name
Drainage Area km^2 Lat.: Lon.:

(unit : m^3/sec)

Year	Month												Average		
	Jan	Feb.	Mar.	April	May	June	July	Aug	Sept.	Oct.	Nov.	Dec.	Dry S.	Wet S.	Average
1980															#DIV/0!
1981															#DIV/0!
1982															#DIV/0!
1983															#DIV/0!
1984															#DIV/0!
1985															#DIV/0!
1986															#DIV/0!
1987															#DIV/0!
1988															#DIV/0!
1989															#DIV/0!
1990															#DIV/0!
1991															#DIV/0!
1992															#DIV/0!
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2000															#DIV/0!
2001															#DIV/0!
2002															#DIV/0!
2003															#DIV/0!
2003															#DIV/0!
2004															#DIV/0!
2005															#DIV/0!
2006															#DIV/0!
2007															#DIV/0!
Mean	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Max.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Dry Season — Wet Season —

Data Source :

Table 2-2 Monthly Average River Discharge Records (at Adjacent Station in Other Drainage Area) (Tabulated in Case Data in Table 2-1 are not Available)

River Name
Drainage Area km^2 Lat.: Lon.:

(unit : m^3/sec)

Year	Month												Average		
	Jan	Feb.	Mar.	April	May	June	July	Aug	Sept.	Oct.	Nov.	Dec.	Dry S.	Wet S.	Average
1980															#DIV/0!
1981															#DIV/0!
1982															#DIV/0!
1983															#DIV/0!
1984															#DIV/0!
1985															#DIV/0!
1986															#DIV/0!
1987															#DIV/0!
1988															#DIV/0!
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2002															#DIV/0!
2003															#DIV/0!
2004															#DIV/0!
2005															#DIV/0!
2006															#DIV/0!
2007															#DIV/0!
Mean	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Max.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Data Source :

Table 2-3 Monthly Average Diverted Intake Discharge Records

River Name
Drainage Area km^2 Lat.: Lon.:

(unit : m^3/sec)

Year	Month												Average		
	Jan	Feb.	Mar.	April	May	June	July	Aug	Sept.	Oct.	Nov.	Dec.	Dry S.	Wet S.	Average
1980															#DIV/0!
1981															#DIV/0!
1982															#DIV/0!
1983															#DIV/0!
1984															#DIV/0!
1985															#DIV/0!
1986															#DIV/0!
1987															#DIV/0!
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2002															#DIV/0!
2003															#DIV/0!
2004															#DIV/0!
2005															#DIV/0!
2006															#DIV/0!
2007															#DIV/0!
Mean	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Max.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Data Source :

Table 2-4 Monthly Rainfall Records (Near Service Area)

Name of Station :
Station Location : Lat: Lon:

(unit : mm/month)

Year	Month												Total		
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec	Dry S.	Wet S	Annual
1980															0.0
1981															0.0
1982															0.0
1982															0.0
1983															0.0
1984															0.0
1985															0.0
1986															0.0
1987															0.0
1988															0.0
1989															0.0
1990															0.0
1991															0.0
1992															0.0
1993															0.0
1994															0.0
1995															0.0
1996															0.0
1997															0.0
1998															0.0
1999															0.0
2000															0.0
2001															0.0
2002															0.0
2003															0.0
2004															0.0
2005															0.0
2006															0.0
															0.0
Mean	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0
Max.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Dry Season — Wet Season —

Data Source :

Note : Zero (0) figures in the column of annual total should be erased in the lines with no data available.

Table 2-5 **Monthly Rainfall Records** (in Drainage Area/Diversion Site) (tabulated in case data in Table2-4 are not available)

Name of Station :
Station Location : Lat: Lon:

(unit : mm/month)

Year	Month												Total		
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec	Dry S.	Wet. S	Annual
1980															0.0
1981															0.0
1982															0.0
1983															0.0
1984															0.0
1985															0.0
1986															0.0
1987															0.0
1988															0.0
1989															0.0
1990															0.0
1991															0.0
1992															0.0
1993															0.0
1994															0.0
1995															0.0
1996															0.0
1997															0.0
1998															0.0
1999															0.0
2000															0.0
2001															0.0
2002															0.0
2003															0.0
2004															0.0
2005															0.0
Mean	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0
Max.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Data Source :

Figure 2-1 Typical Cropping Pattern of Paddy

(Dry Season)

Month	Oct.				Nov.				Dec.				Jan.					Feb.				Mar.				Apr.					Mat			
Date					1	8	15	22	29	6	13	20	27	3	10	17	24	31	7	14	21	28	7	14	21	28	4	11	18	25	2	13	20	27
					7	14	21	28	5	12	19	26	2	9	16	23	30	6	13	20	27	6	13	20	27	3	10	17	24	1	12	19	26	3
Week					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
					LS/LP								NORMAL IRRGATION PERIOD									TD/H												

(Wet Season)

Month	May	June				July					Aug.				Sept.				Oct.					Nov.				Dec.					
Date		1	8	15	22	29	6	13	20	27	3	10	17	24	31	7	14	21	28	5	12	19	26	2	9	16	23	30	6	13	20	27	
		7	14	21	28	5	12	19	26	2	9	16	23	30	6	13	20	27	4	11	18	25	1	8	15	22	29	5	12	19	26	2	
Week				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
				LS/LP							NORMAL IRRGATION PERIOD													TD/H									

Table 2-6 Firm-Up Service Area, Program Area, Irrigated and Benefited Areas

Year	Firm-Up Service Area (ha)	Dry Season										Wet Season									
		Program Area (ha)	Irrigated Area (ha)				Benefited Area (ha)				Average Yield (ton/ha)	Program Area (ha)	Irrigated Area (ha)				Benefited Area (ha)				Average Yield (ton/ha)
			Paddy	Upland	Total	Cropping Intensity (%)	Paddy	Upland	Total				Paddy	Upland	Total	Cropping Intensity (%)	Paddy	Upland	Total		
1974					0	#DIV/0!			0						0	#DIV/0!			0		
1975					0	#DIV/0!			0						0	#DIV/0!			0		
1976					0	#DIV/0!			0						0	#DIV/0!			0		
1977					0	#DIV/0!			0						0	#DIV/0!			0		
1978					0	#DIV/0!			0						0	#DIV/0!			0		
1979					0	#DIV/0!			0						0	#DIV/0!			0		
1980					0	#DIV/0!			0						0	#DIV/0!			0		
1981					0	#DIV/0!			0						0	#DIV/0!			0		
1982					0	#DIV/0!			0						0	#DIV/0!			0		
1983					0	#DIV/0!			0						0	#DIV/0!			0		
1984					0	#DIV/0!			0						0	#DIV/0!			0		
1985					0	#DIV/0!			0						0	#DIV/0!			0		
1986					0	#DIV/0!			0						0	#DIV/0!			0		
1987					0	#DIV/0!			0						0	#DIV/0!			0		
1988					0	#DIV/0!			0						0	#DIV/0!			0		
1989					0	#DIV/0!			0						0	#DIV/0!			0		
1990					0	#DIV/0!			0						0	#DIV/0!			0		
1991					0	#DIV/0!			0						0	#DIV/0!			0		
1992					0	#DIV/0!			0						0	#DIV/0!			0		
1993					0	#DIV/0!			0						0	#DIV/0!			0		
1994					0	#DIV/0!			0						0	#DIV/0!			0		
1995					0	#DIV/0!			0						0	#DIV/0!			0		
1996					0	#DIV/0!			0						0	#DIV/0!			0		
1997					0	#DIV/0!			0						0	#DIV/0!			0		
1998					0	#DIV/0!			0						0	#DIV/0!			0		
1999					0	#DIV/0!			0						0	#DIV/0!			0		
2000					0	#DIV/0!			0						0	#DIV/0!			0		
2001					0	#DIV/0!			0						0	#DIV/0!			0		
2002					0	#DIV/0!			0						0	#DIV/0!			0		
2003					0	#DIV/0!			0						0	#DIV/0!			0		
2004					0	#DIV/0!			0						0	#DIV/0!			0		
2005					0	#DIV/0!			0						0	#DIV/0!			0		
Ave.	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!	#DIV/0!	0	#DIV/0!	
Max.	0	0	0	0	0	#DIV/0!	0	0	0	0.00	0	0	0	0	0	#DIV/0!	0	0	0	0.00	
Min.	0	0	0	0	0	#DIV/0!	0	0	0	0.00	0	0	0	0	0	#DIV/0!	0	0	0	0.00	

Data Source :

IV. Functionality Information of Irrigation and Drainage Facilities

4.1 Diversion Dam

4.1.1 Inventory Survey

A. Dimension Survey

A.1 General Information

(1) Name of NIS		(6) Irrigation Service Area		ha	
(2) Name of Responsible Center		(7) Name of River			
(3) Name of Diversion Dam		(8) Water Right Status		m3/s	
(4) Completed Year		(9) Name of Water Right Holder			
(5) Construction Cost	Pesos	(10) No. of IA (active)			

(11) Location of Diversion Dam

Region		Province	
Municipality		Barangay	

(12) Type of Weir: 0 Fixed Type, 0 Gated Type,
o Others: Please describe below.

(13) Purpose of Water Use: 0 Irrigation, 0 Industry, 0 Drinking, 0 Hydro-power, 0 Flood Control, 0 Fish Culture, 0 Leisure,

A.2 Hydrology

(1) Annual Average Rainfall	mm	(8) Total Width of Diversion Dam	m
(2) Name of Rainfall Observation Station		(9) Height of Diversion Dam	m
(3) Catchment Area at Intake	km2	(10) Max. Flood Discharge	0 m3/s
(4) Riverbed Elevation in front of Intake	EL	(11) Average Discharge (Wet Season)	m3/s
(5) Riverbed Elevation (Upstream)	EL	(12) Average Discharge (Dry Season)	m3/s
(6) Riverbed Elevation (Downstream)	EL	(13) Peak Intake Discharge	m3/s
(7) Max. Flood Water Level (Upstream)	EL	(14) Average Intake Discharge (Wet)	m3/s
(8) Max. Flood Water Level (Downstream)	EL	(15) Average Intake Discharge (Dry)	m3/s

(16) Foundation: 0 Rock, 0 Riverbed Material,
o Others: Please describe below.

(17) Riverbed Material: 0 Boulder, 0 Cobblestone, 0 Gravel, 0 Sand, 0 Silt, 0 Clay,

(18) Max. Diameter of Riverbed Material: mm

(19) Sedimentation: 0 Severe, 0 Moderate, 0 None,

(20) Countermeasure for Sedimentation: 0 Sluice Way, 0 Sediment Settling Basin, 0 Sediment Scouring Facility,
o Others: Please describe below.

(21) Watershed Condition: 0 Good, 0 Moderate, 0 No Good,

(22) Watershed Management: 0 Undertaken with Great Care, 0 Undertaken Moderately, 0 None,

(23) Scoured at Downstream: 0 Severe, 0 Moderate, 0 None,

B. Facility Functional Survey

(1) General Facility Function	0 Excellent function,	0 Good function,	0 Moderate function,
	0 Poor function	0 Damaged function,,	
(2) Reservoir Dam Function	0 Excellent function,	0 Good function,	0 Moderate function,
	0 Poor function	0 Damaged function,,	
(3) Diversion Dam Function	0 Excellent function,	0 Good function,	0 Moderate function,
	0 Poor function	0 Damaged function,,	
(4) Pumping Station Function	0 Excellent function,	0 Good function,	0 Moderate function,
	0 Poor function	0 Damaged function,,	
(5) Main Canal Function	0 Excellent function,	0 Good function,	0 Moderate function,
	0 Poor function	0 Damaged function,,	
(6) Lateral Canal Function	0 Excellent function,	0 Good function,	0 Moderate function,
	0 Poor function	0 Damaged function,,	
(7) Related Facility Function	0 Excellent function,	0 Good function,	0 Moderate function,
	0 Poor function	0 Damaged function,,	

C. Present Structural Situation of Spillway						
Choose Spillway Type	0 C-1: Fixed Type,		0 C-2: Gated Type			
C.1 Fixed Type						
C.1.1 Structure of Fixed Weir						
(1) Shape of Weir	0 Ogee					
	o Others: Please describe below.					
(2) Major Material of Fixed Weir	0 Reinforced Concrete		0 Plain Concrete			
	0 Rubble Masonry		0 Rockfilled Concrete Cover			
	o Others: Please describe below.					
(3) Crest Elevation		EL	(6) Volume of Weir Body		m3	
(4) Weir Height		m	(7) Upstream Slope			
(5) Weir Width		m	(8) Downstream Slope			
C.1.2 Condition of Fixed Weir Body						
(9) Crack	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(10) Deformation	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(11) Leak	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(12) Abrasion	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(13) Sedimentation	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(14) Other Damage	o Please describe below.					
C.1.3 Structure of Downstream Apron						
(15) Type of Downstream Apron	0 Fixed Type (on rock)		0 Floating Type (on riverbed deposit)			
	o Others: Please describe below.					
(16) Major Material of D/S Apron	0 Reinforced Concrete		0 Plain Concrete			
	0 Rubble Masonry		0 Rockfilled Concrete Cover			
	o Others: Please describe below.					
(17) Elevation at End of D/S Apron		EL	(20) Min. Thickness of D/S Apron		m	
(18) Length of D/S Apron		m	(21) Depth of D/S Cut-off (sheet pile)		m	
(19) Max. Thickness of D/S Apron		m	(22) Downstream Slope			
C.1.4 Condition of Downstream Apron						
(23) Crack	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(24) Deformation	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(25) Leak	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(26) Abrasion	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(27) Sedimentation	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(28) Scoured	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(29) Other Damage	o Please describe below.					

C.1.5 Structure of Downstream Riverbed Protection							
(30) Type of D/S Riverbed Protection	0	Concrete Block	0	Boulder			
	o Others: Please describe below.						
(31) Top Elev. of D/S Riverbed Protection		EL	(33) Weight of D/S Riverbed Protection			ton	
(32) Length of D/S Riverbed Protection		m					
C.1.6 Condition of Downstream Riverbed Protection							
(34) Crack	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(35) Deformation	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(36) Abrasion	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(37) Scoured	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(38) Sedimentation	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(39) Other Damage	o Please describe below.						
C.2 Gated Type							
C.2.1 Structure of Spillway Pier							
(1) Material of Spillway Pier	0	Reinforced Concrete	0	Plain Concrete			
	0	Rubble Masonry	0	Rockfilled Concrete Cover			
	o Others: Please describe below.						
(2) Gate Sill Elevation of Spillway		EL	(4) Height of Spillway Pier			m	
(3) No. of Spillway Pier		pc.	(5) Thickness of Spillway Pier			m	
C.2.2 Condition of Spillway Pier							
(6) Crack	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(7) Deformation	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(8) Leak	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(9) Abrasion	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(10) Other Damage	o Please describe below.						
C.2.3 Structure of Spillway Downstream Apron							
(11) Type of Downstream Apron	0	Fixed Type (on rock)	0	Floating Type (on riverbed deposit)			
	o Others: Please describe below.						
(12) Major Material of D/S Apron	0	Reinforced Concrete	0	Plain Concrete			
	0	Rubble Masonry	0	Rockfilled Concrete Cover			
	o Others: Please describe below.						
(13) Elevation at End of D/S Apron		EL	(16) Min. Thickness of D/S Apron			m	
(14) Length of D/S Apron		m	(17) Depth of D/S Off-off (sheet pile)			m	
(15) Max. Thickness of D/S Apron		m	(18) Downstream Slope				
C.2.4 Condition of Spillway Downstream Apron							
(19) Crack	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						

(20) Deformation	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(21) Leak	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(22) Abrasion	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(23) Sedimentation	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(24) Scoured	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(25) Other Damage	o Please describe below.					
C.2.5 Structure of Spillway Downstream Riverbed Protection						
(26) Type of D/S Riverbed Protection	0 Concrete Block	0 Boulder				
	o Others: Please describe below.					
(27) Top Elevation of D/S Protection		EL	(29) Weight of D/S Riverbed Protection		ton	
(28) Length of D/S Riverbed Protection		m				
C.2.6 Condition of Spillway Downstream Riverbed Protection						
(30) Washed away	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(31) Scoured	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(32) Crack	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(33) Abrasion	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(34) Sedimentation	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(35) Other Damage	o Please describe below.					
C.2.7 Structure of Spillway Gate						
(36) Type of Spillway Gate	0 Slide Gate,	0 Roller Gate,	0 Rubber Gate,			
	0 Hinge Type Gate (incl. flap, radial, sector, drum),					
	o Others: Please describe below.					
(37) Material of Spillway Gate	0 Iron,	0 Stainless,	0 Rubber,			
	o Others: Please describe below.					
(38) No. of Spillway Gates installed		sets	(40) Spillway Gate Height		m	
(39) No. of Spillway Gates functioning		sets	(41) Spillway Gate Width (each)		m	
C.2.8 Condition of Spillway Gate						
(41) Rust	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(42) Deformation	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(43) Leak	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(44) Other Damage	o Please describe below.					

C.2.9 Spillway Gate Operating Device							
(45) Type of Operating Device	0	Spindle,	0	Roller + Wire,	0	Air (Rubber Gate),	
	0	Water (Rubber Gate),	0	Hinge + Wire,			
	o Others: Please describe below.						
(46) Material of Operating Device	0	Iron,	0	Stainless,			
	o Others: Please describe below.						
(47) No. of Devices		sets	(49) Device Length			m	
(48) No. of Devices functioning		sets	(50) Device Capacity			kw	
(51) Power of Operating Device	0	Manpower,	0	Diesel Engine (permanent),			
	0	Diesel Engine (mobile),	0	Motor (Electricity) ,			
	o Others: Please describe below.						
(52) Supplementary Power	0	There is					
	0	None					
C.2.10 Condition of Operating Device							
(53) Rust	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(54) Deformation	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(55) Function	0	Good,	0	Operational,	0	No Good,	
	o Others: Please comment below.						
(56) Other Damage	o Please describe below.						
D. Present Structural Situation of Sluice Way							
(1) Sluice Way (civil work)	0	There is or are.	0	None,			
If there is or are sluice way, fill following.							
D.1 Sluice Way (civil work)							
D.1.1 Structure of Sluice Way							
(1) Type of Sluice Way for flushing	0	Supercritical Flow Type,	0	Subcritical Flow Type,			
	o Others: Please describe below.						
(2) Material Sluice Way (civil work)	0	Reinforced Concrete	0	Plain Concrete			
	0	Rubble Masonry	0	Rockfilled Concrete Cover			
	o Others: Please describe below.						
(3) Sill Elevation of Sluice Way		EL	(5) Upstream Slope				
(4) Width of Sluice Way		m	(6) Downstream Slope				
D.1.2 Condition of Sluice Way (civil work)							
(7) Crack	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(8) Deformation	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(9) Leak	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(10) Abrasion	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(11) Sedimentation	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(12) Other Damage	o Please describe below.						

D.1.3 Structure of Sluice Way Downstream Apron						
(13) Type of Downstream Apron	0 Fixed Type (on rock)		0 Floating Type (on riverbed deposit)			
	o Others: Please describe below.					
(14) Major Material of D/S Apron	0 Reinforced Concrete		0 Plain Concrete			
	0 Rubble Masonry		0 Rockfilled Concrete Cover			
	o Others: Please describe below.					
(15) Elevation at End of D/S Apron		EL	(18) Min. Thickness of D/S Apron		m	
(16) Total Length of D/S Apron		m	(19) Depth of D/S Off-off (sheet pile)		m	
(17) Max. Thickness of D/S Apron		m	(20) Downstream Slope			
D.1.4 Condition of Sluice Way Downstream Apron						
(21) Crack	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(22) Deformation	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(23) Leak	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(24) Abrasion	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(25) Sedimentation	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(26) Scoured	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(27) Other Damage	o Please describe below.					
D.1.5 Structure of Sluice Way Downstream Riverbed Protection						
(28) Type of D/S Riverbed Protection	0 Concrete Block		0 Boulder			
	o Others: Please describe below.					
(29) Top Elevation of D/S Protection		EL	(31) Weight of D/S Riverbed Protection		ton	
(30) Length of D/S Riverbed Protection		m				
D.1.6 Condition of Sluice Way Downstream Riverbed Protection						
(32) Crack	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(33) Deformation	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(34) Abrasion	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(35) Scoured at Downstream	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(36) Sedimentation	0 Severe,	0 Moderate,	0 None,			
	o Others: Please comment below.					
(37) Other Damage	o Please describe below.					
D.2 Sluice Way Pier						
D.2.1 Structure of Sluice Way Pier						
(1) Material of Sluice Way Pier	0 Reinforced Concrete		0 Plain Concrete			
	0 Rubble Masonry		0 Rockfilled Concrete Cover			
	o Others: Please describe below.					
(2) No. of Sluice Way Pier		pc.	(4) Thickness of Sluice Way Pier		m	
(3) Height of Sluice Way Pier		m	(5) Length of Sluice Way Pier		m	

D.2.2 Condition of Sluice Way Pier						
(6) Crack	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					
(7) Deformation	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					
(8) Leak	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					
(9) Abrasion	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					
(10) Sedimentation	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					
(11) Other Damage	o Please describe below.					
D.3 Sluice Way Gate						
D.3.1 Structure of Sluice Way Gate						
(1) Type of Gate	0	Slide Gate,	0	Roller Gate,	0	Rubber Gate,
	0	Hinge Type Gate (incl. flap, radial, sector, drum),				
	o Others: Please describe below.					
(2) Major Material of Gate	0	Iron,	0	Stainless,	0	Rubber,
	o Others: Please describe below.					
(3) No. of Gates installed		sets	(5) Gate Height			m
(4) No. of Gates functioning		sets	(6) Gate Width (each)			m
D.3.2 Condition of Sluice Way Gate						
(7) Rust	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					
(8) Deformation	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					
(9) Leak	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					
(10) Other Damage	o Please describe below.					
D.3.3 Operating Device of Sluice Way Gate						
(11) Type of Operating Device	0	Spindle,	0	Roller + Wire,	0	Air (Rubber Gate),
	0	Water (Rubber Gate),	0	Hinge + Wire,		
	o Others: Please describe below.					
(12) Material of Operating Device	0	Iron,	0	Stainless,		
	o Others: Please describe below.					
(13) No. of Devices		sets	(15) Device Length			m
(14) No. of Devices functioning		sets	(16) Device Capacity			kw
(17) Power of Operating Device	0	Manpower,	0	Diesel Engine (permanent),		
	0	Diesel Engine (mobile),	0	Motor (Electricity) ,		
	o Others: Please describe below.					
(18) Supplementary Power	0	There is				
	0	None				
D.3.4 Condition of Operating Device						
(19) Rust	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					

(20) Deformation	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(21) Function	0	Good,	0	Operational,	0	No Good,	
	o Others: Please comment below.						
(22) Other Damage	o Please describe below.						
E. Present Structural Situation of Protection Dike and Side-wall							
(1) Protection Dike (embankment)	0	There is or are.	0	None,			
(2) Protection Side-wall	0	There is or are.	0	None,			
If there is or are protection dike (s) and/or side-wall (s), fill following.							
E.1 Protection Dike (embankment)							
E.1.1 Structure of Protection Dike (embankment) on the Left-bank							
(1) Material of Protection Dike (embankment)	0	Sand,	0	Silt,	0	Clay,	
	o Others: Please describe below.						
(2) Lining of Protection Dike (embankment)	0	Reinforced Concrete Lining	0	Plain Concrete Lining			
	0	Wet Stone Pitching	0	Dry Stone Pitching			
	o Others: Please describe below.						
(3) Total Length		m	(5) River-side Slope				
(4) Average Height		m	(6) Land-side Slope				
E.1.2 Condition of Protection Dike (embankment) on the Left-bank							
(7) Crack	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(8) Deformation	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(9) Leak	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(10) Scoured	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(11) Other Damage	o Please describe below.						
E.1.3 Structure of Protection Dike (embankment) on the Right-bank							
(12) Material of Protection Dike (embankment)	0	Sand,	0	Silt,	0	Clay,	
	o Others: Please describe below.						
(13) Lining of Protection Dike (embankment)	0	Reinforced Concrete Lining	0	Plain Concrete Lining			
	0	Wet Stone Pitching	0	Dry Stone Pitching			
	o Others: Please describe below.						
(14) Total Length		m	(16) River-side Slope				
(15) Average Height		m	(17) Land-side Slope				
E.1.4 Condition of Protection Dike (embankment) on the Right-bank							
(18) Crack	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(19) Deformation	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(20) Leak	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(21) Scoured	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(22) Other Damage	o Please describe below.						

E.2 Protection Side-wall							
E.2.1 Structure of Protection Side-wall on the Left-bank							
(1) Mainly Tape of Protection Side-wall	0	Masonry type,	0	Gravity type,	0	Cantilever type ,	
	0	Reversed-T type,	0	L type,	0	Buttress type ,	
	o Others: Please describe below.						
(2) Mainly Material of Protection Side-wall	0	Reinforced Concrete,	0	Plain Concrete,	0	Stone,	
	o Others: Please describe below.						
(3) Total Length		m	(5) River-side Slope				
(4) Average Height		m					
E.2.2 Condition of Protection Side-wall on the Left-bank							
(6) Washed away	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(7) Scoured	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(8) Deformation	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(9) Crack	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(10) Other Damage	o Please describe below.						
E.2.3 Structure of Protection Side-wall on the Right-bank							
(11) Mainly Tape of Protection Side-wall	0	Masonry type,	0	Gravity type,	0	Cantilever type ,	
	0	Reversed-T type,	0	L type,	0	Buttress type ,	
	o Others: Please describe below.						
(12) Material of Protection Side-wall	0	Reinforced Concrete,	0	Plain Concrete,	0	Stone,	
	o Others: Please describe below.						
(13) Total Length		m	(15) River-side Slope				
(14) Average Height		m	(16) Land-side Slope				
E.2.4 Condition of Protection Side-wall on the Right-bank							
(17) Washed away	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(18) Scoured	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(19) Deformation	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(20) Crack	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(21) Other Damage	o Please describe below.						
F. Present Structural Situation of Fish Ladder							
(1) Fish Ladder	0	There is or are.	0	None,			
If there is or are sediment settling basin (s), fill following.							
F.1 Structure of Fish Ladder							
(1) Location of Fish Ladder	0	Left side,	0	Center,	0	Right side,	
	0	Both side,	0	Center and both sides,			
(2) Material of Fish Ladder	0	Reinforced Concrete	0	Plain Concrete			
	0	Rubble Masonry					
	o Others: Please describe below.						
(3) No. of Fish Ladder		sets	(5) Depth of Fish Ladder			m	
(4) Length of Fish Ladder		m	(6) Width of Fish Ladder			m	

F.2 Function and Condition of Fish Ladder								
(7) Fish Ladder Function	0	Excellent function,	0	Good function,	0	Moderate function,		
	0	Poor function	0	Damaged function,,				
(8) Crack	0	Severe,	0	Moderate,	0	None,		
	o Others: Please comment below.							
(9) Deformation	0	Severe,	0	Moderate,	0	None,		
	o Others: Please comment below.							
(10) Leak	0	Severe,	0	Moderate,	0	None,		
	o Others: Please comment below.							
(11) Sedimentation	0	Severe,	0	Moderate,	0	None,		
	o Others: Please comment below.							
G. .Present Structural Situation of Intake								
G.1 Intake								
G.1.1 Structure of Intake								
(1) Location of Intake	0	Left-side,	0	Right-side,	0	Both-sides,		
	o Others: Please describe below.							
(2) Material of Intake	0	Reinforced Concrete	0	Plain Concrete				
	0	Rubble Masonry						
	o Others: Please describe below.							
(3) Total Width of Intake		m	(6) Max. Inflow Velocity		#DIV/0!	m3		
(4) Water Depth in front of Intake		m	(7) Average Inflow Velocity (Wet)		#DIV/0!	m/s		
(5) Water Depth at Intake		m	(8) Average Inflow Velocity (Dry)		#DIV/0!	m/s		
G.1.2 Condition of Intake								
(9) Crack	0	Severe,	0	Moderate,	0	None,		
	o Others: Please comment below.							
(10) Deformation	0	Severe,	0	Moderate,	0	None,		
	o Others: Please comment below.							
(11) Leak	0	Severe,	0	Moderate,	0	None,		
	o Others: Please comment below.							
(12) Abrasion	0	Severe,	0	Moderate,	0	None,		
	o Others: Please comment below.							
(13) Sedimentation	0	Severe,	0	Moderate,	0	None,		
	o Others: Please comment below.							
G.2 Intake Gate								
G.2.1 Structure of Intake Gate								
(1) Type of Gate	0	Slide Gate,	0	Roller Gate,	0	Rubber Gate,		
	0	Hinge Type Gate (incl. flap, radial, sector, drum),						
	o Others: Please describe below.							
(2) Major Material of Gate	0	Iron,	0	Stainless,	0	Rubber,		
	o Others: Please describe below.							
(3) No. of Gates installed		sets	(5) Gate Height			m		
(4) No. of Gates functioning		sets	(6) Gate Width (each)			m		
(7) Screen	0	There is,	0	None,				
G.2.2 Condition of Intake Gate								
(8) Rust	0	Severe,	0	Moderate,	0	None,		
	o Others: Please comment below.							
(9) Deformation	0	Severe,	0	Moderate,	0	None,		
	o Others: Please comment below.							

(10) Leak	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					
(11) Other Damage	o Please describe below.					
G.2.3 Operating Device of Intake Gate						
(12) Type of Operating Device	0	Spindle,	0	Roller + Wire,	0	Air (Rubber Gate),
	0	Water (Rubber Gate),	0	Hinge + Wire,		
	o Others: Please describe below.					
(13) Material of Operating Device	0	Iron,	0	Stainless,		
	o Others: Please describe below.					

(14) No. of Devices	sets	(16) Device Length		m
(15) No. of Devices functioning	sets	(17) Device Capacity		kw

(18) Power of Operating Device	0	Manpower,	0	Diesel Engine (permanent),		
	0	Diesel Engine (mobile),	0	Motor (Electricity) ,		
	o Others: Please describe below.					
(19) Supplementary Power	0	There is				
	0	None				
G.2.4 Condition of Operating Device						
(20) Rust	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					
(21) Deformation	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					
(22) Function	0	Good,	0	Operational,	0	No Good,
	o Others: Please comment below.					
(23) Other Damage	o Please describe below.					

H. Present Structural Situation of Sediment Settling Basin

(1) Sediment Settling Basin	0	There is or are.	0	None,

If there is or are sediment settling basin (s), fill following.

H.1 Sediment Settling Basin

H.1.1 Structure of Sediment Settling Basin

(1) Location of Sediment Settling Basin	0	Just downstream from Intake,	0	Less than 500m from Intake,
	0	More than 500m from Intake		
(2) Material of Intake	0	Reinforced Concrete	0	Plain Concrete
	0	Rubble Masonry		
	o Others: Please describe below.			

(3) No. of Settling Basin		rows	(7) Length of Settling Basin		m
(4) Width of unit Row		m	(8) Max. Velocity in Settling Basin	#DIV/0!	m/s
(5) Total Water Depth in Settling basin		m	(9) Average Velocity in Basin (Wet)	#DIV/0!	m/s
(6) Effective Water Depth in Settling Basin		m	(10) Average Velocity in Basin (Dry)	#DIV/0!	m/s

H.1.2 Function and Condition of Sediment Settling Basin

(11) Sediment Settling Function	0	Excellent function,	0	Good function,	0	Moderate function,
	0	Poor function	0	Damaged function,,		
(12) Sediment Flushing Function	0	Excellent function,	0	Good function,	0	Moderate function,
	0	Poor function	0	Damaged function,,		
(13) Crack	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					
(14) Deformation	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					

(15) Leak	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					
(16) Abrasion	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					
H.2 Scouring Gate						
H.2.1 Structure of Scouring Gate						
(1) Type of Gate	0	Slide Gate,	0	Roller Gate,	0	Rubber Gate,
	0	Hinge Type Gate (incl. flap, radial, sector, drum),				
	o Others: Please describe below.					
(2) Major Material of Gate	0	Iron,	0	Stainless,	0	Rubber,
	o Others: Please describe below.					
(3) No. of Gates installed		sets	(5) Gate Height			m
(4) No. of Gates functioning		sets	(6) Gate Width			m
H.2.2 Condition of Scouring Gate						
(7) Rust	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					
(8) Deformation	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					
(9) Leak	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					
(10) Other Damage	o Please describe below.					
H.2.3 Operating Device of Scouring Gate						
(11) Type of Operating Device	0	Spindle,	0	Roller + Wire,	0	Air (Rubber Gate),
	0	Water (Rubber Gate),	0	Hinge + Wire,		
	o Others: Please describe below.					
(12) Material of Operating Device	0	Iron,	0	Stainless,		
	o Others: Please describe below.					
(13) No. of Devices		sets	(15) Device Length			m
(14) No. of Devices functioning		sets	(16) Device Capacity			kw
(17) Power of Operating Device	0	Manpower,	0	Diesel Engine (permanent),		
	0	Diesel Engine (mobile),	0	Motor (Electricity) ,		
	o Others: Please describe below.					
(18) Supplementary Power	0	There is				
	0	None				
H.2.4 Condition of Operating Device						
(19) Rust	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					
(20) Deformation	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					
(21) Function	0	Good,	0	Operational,	0	No Good,
	o Others: Please comment below.					
(22) Other Damage	o Please describe below.					

4.1.2 Present Conditions

A. General Information

(1) Name of NIS	0		(10) Construction Cost	0	Pesos
(2) Name of Diversion Dam	0		(11) Name of River	0	
(3) Completed Year	0		(12) Catchment Area at Intake	0	km2
(4) Location of Diversion Dam			(13) Annual Average Rainfall	0	mm
Region	0		(14) Max. Flood Discharge	0	m3/s
Province	0		(15) Max. Flood Water Depth (U/S)	0.00	m
Municipality	0		(16) Average Discharge (Wet)	0.00	m3/s
Barangay	0		(17) Average Discharge (Dry)	0.00	m3/s
(5) Purpose of Water Use			(18) Peak Intake Discharge	0.00	m3/s
(6) Irrigation Service Area	0 ha		(19) Ave. Intake Discharge (Wet)	0.00	m3/s
(7) Type of Weir			(20) Ave. Intake Discharge (Dry)	0.00	m3/s
(8) Total Width of Diversion Dam	0.00 m		(21) Foundation		
(9) Height of Diversion Dam	0.00 m		(22) Max. Dia. of Riverbed Material	0	mm
(23) Sedimentation					
(24) Countermeasure for Sedimentation					
(25) Watershed Condition					
(26) Watershed Management					
(27) Scoured at Downstream					

B. Present Structural Situation of Spillway

B.1 Structure of Fixed Weir

B.1.1 General Information of Fixed Weir Body

(1) Shape of Weir		(3) Weir Width	0.00	m
(2) Major Material of Fixed Weir		(4) Weir Height	0.00	m

B.1.2 Condition of Fixed Weir Body

	0%	Slightly	30%	Moderate	70%	Severe	100%
(5) Damaged	0 %						
(6) Sedimentation	0 %						

B.1.3 Structure of Downstream Apron

(7) Type of Foundation		(10) Width of D/S Apron	0.00	m
(8) Major Material of D/S Apron		(11) Max. Thickness of D/S Apron	0.00	m
(9) Length of D/S Apron	0.00 m	(12) Min. Thickness of D/S Apron	0.00	m

B.1.4 Condition of Downstream Apron

	0%	Slightly	30%	Moderate	70%	Severe	100%
(13) Damaged	0 %						
(14) Scoured	0 %						
(15) Sedimentation	0 %						

B.1.5 Structure of Downstream Riverbed Protection

(16) Type of Riverbed Protection		(18) Width of Riverbed Protection	0.00	m
(17) Length of Riverbed Protection	0.00 m	(19) Weight of Riverbed Protection	0.00	ton

B.1.6 Condition of D/S Riverbed Protection

	0%	Slightly	30%	Moderate	70%	Severe	100%
(20) Damaged	0 %						
(21) Scoured	0 %						
(22) Sedimentation	0 %						

B.2 Gated Type

B.2.1 Structure of Spillway Pier

(1) Major Material of Spillway Pier		(3) Height of Spillway Pier	0.00	m
(2) No. of Spillway Pier	0 pc.	(4) Thickness of Spillway Pier	0.00	m

B.2.2 Condition of Spillway Pier

	0%	Slightly	30%	Moderate	70%	Severe	100%
(5) Damaged	0 %						

B.2.3 Structure of Spillway Downstream Apron

(6) Type of Foundation		(9) Width of D/S Apron	0.00	m
(7) Major Material of D/S Apron		(10) Max. Thickness of D/S Apron	0.00	m
(8) Length of D/S Apron	0.00 m	(11) Min. Thickness of D/S Apron	0.00	m

B.2.4 Condition of Spillway D/S Apron

	0%	Slightly	30%	Moderate	70%	Severe	100%
(12) Damaged	0 %						
(13) Scoured	0 %						
(14) Sedimentation	0 %						

B.2.5 Structure of Spillway Downstream Riverbed Protection

(15) Type of Riverbed Protection		(17) Width of Riverbed Protection	0.00 m
(16) Length of Riverbed Protection	0.00 m	(18) Weight of Riverbed Protection	0.00 ton

B.2.6 Condition of D/S Riverbed Protection		0%	Slightly	30%	Moderate	70%	Severe	100%
(19) Damaged	0 %							
(20) Scoured	0 %							
(21) Sedimentation	0 %							

B.2.7 Structure of Spillway Gate

(22) Type of Spillway Gate		(25) No. of Spillway Gates functioning	0 sets
(23) Material of Spillway Gate		(26) Spillway Gate Height	0.00 m
(24) No. of Spillway Gates installed	0 sets	(27) Spillway Gate Width (each)	0.00 m

B.2.8 Condition of Spillway Gate		0%	Slightly	30%	Moderate	70%	Severe	100%
(28) Rust	0 %							
(29) Damaged	0 %							
(30) Leak	0 %							

B.2.9 Spillway Gate Operating Device

(31) Type of Operating Device		(34) Power of Operating Device	
(32) No. of Devices	0 sets	(35) Device Capacity	0.00 kw
(33) No. of Devices functioning	0 sets	(36) Supplementary Power	

B.2.10 Condition of Operating Device		0%	Slightly	30%	Moderate	70%	Severe	100%
(37) Rust	0 %							
(38) Damaged	0 %							
(39) Function	0 %							

C. Present Structural Situation of Sluice Way

C.1 Sluice Way (civil work)

C.1.1 Structure of Sluice Way

(1) Major Material of Sluice Way		(3) Upstream Slope	0.00
(2) Width of Sluice Way	0.00 m	(4) Downstream Slope	0.00

C.1.2 Condition of Sluice Way		0%	Slightly	30%	Moderate	70%	Severe	100%
(5) Damaged	0 %							
(6) Leak	0 %							
(7) Sedimentation	0 %							

C.1.3 Structure of Sluice Way Downstream Apron

(8) Type of Foundation		(11) Width of D/S Apron	0.00 m
(9) Major Material of D/S Apron		(12) Max. Thickness of D/S Apron	0.00 m
(10) Length of D/S Apron	0.00 m	(13) Min. Thickness of D/S Apron	0.00 m

C.1.4 Condition of D/S Apron		0%	Slightly	30%	Moderate	70%	Severe	100%
(14) Damaged	0 %							
(15) Scoured	0 %							
(16) Sedimentation	0 %							

C.1.5 Structure of Sluice Way Downstream Riverbed Protection

(17) Type of Riverbed Protection		(19) Width of Riverbed Protection	0.00 m
(18) Length of Riverbed Protection	0.00 m	(20) Weight of Riverbed Protection	0.00 ton

C.1.6 Condition of D/S Riverbed Protection		0%	Slightly	30%	Moderate	70%	Severe	100%
(21) Damaged	0 %							
(22) Scoured	0 %							
(23) Sedimentation	0 %							

C.2 Sluice Way Pier

C.2.1 Structure of Sluice Way Pier

(1) Major Material of Pier		(3) Height of Sluice Way Pier	0.00 m
(2) No. of Sluice Way Pier	0 pc.	(4) Thickness of Sluice Way Pier	0.00 m

C.2.2 Condition of Sluice Way Pier		0%	Slightly	30%	Moderate	70%	Severe	100%
(5) Damaged	0 %							
(6) Leak	0 %							

C.3 Sluice Way Gate

C.3.1 Structure of Sluice Way Gate

(1) Type of Sluice Way Gate		(4) No. of Sluice Way Gates functioning	0 sets
(2) Material of Sluice Way Gate		(5) Sluice Way Gate Height	0.00 m
(3) No. of Sluice Way Gates installed	0 sets	(6) Sluice Way Gate Width (each)	0.00 m

C.3.2 Condition of Sluice Way Gate		0%		Slightly		30%		Moderate		70%		Severe		100%				
(7) Rust	0	%																
(8) Damaged	0	%																
(9) Leak	0	%																
C.3.3 Operating Device of Sluice Way Gate																		
(10) Type of Operating Device								(13) Power of Operating Device										
(11) No. of Devices			0	sets				(14) Device Capacity							0.00	kw		
(12) No. of Devices functioning			0	sets				(15) Supplementary Power										
C.3.4 Condition of Operating Device		0%		Slightly		30%		Moderate		70%		Severe		100%				
(16) Rust	0	%																
(17) Damaged	0	%																
(18) Function	0	%																
D. Present Structural Situation of Protection Dike and Side-wall																		
D.1 Protection Dike (embankment)																		
D.1.1 Structure of Protection Dike (embankment) on the Left-bank																		
(1) Material of Protection Dike								(4) Average Height							0.00	m		
(2) Lining of Protection Dike								(5) River-side Slope							0.00			
(3) Total Length			0.00	m				(6) Land-side Slope							0.00			
D.1.2 Condition of Protection Dike (Left)		0%		Slightly		30%		Moderate		70%		Severe		100%				
(6) Damaged	0	%																
(7) Scoured	0	%																
(8) Leak	0	%																
D.1.3 Structure of Protection Dike (embankment) on the Right-bank																		
(9) Material of Protection Dike								(12) Average Height							0.00	m		
(10) Lining of Protection Dike								(13) River-side Slope							0.00			
(11) Total Length			0.00	m				(14) Land-side Slope							0.00			
D.1.4 Condition of Protection Dike (Right)		0%		Slightly		30%		Moderate		70%		Severe		100%				
(15) Damaged	0	%																
(16) Scoured	0	%																
(17) Leak	0	%																
D.2 Protection Side-wall																		
D.2.1 Structure of Protection Side-wall on the Left-bank																		
(1) Type of Protection Side-wall								(3) Total Length							0.00	m		
(2) Mainly Material of Side-wall								(4) Average Height							0.00	m		
D.2.2 Condition of Side-wall (Left)		0%		Slightly		30%		Moderate		70%		Severe		100%				
(5) Washed away	0	%																
(6) Scoured	0	%																
(7) Damaged	0	%																
D.2.3 Structure of Protection Side-wall on the Right-bank																		
(8) Type of Protection Side-wall								(10) Total Length							0.00	m		
(9) Mainly Material of Side-wall								(11) Average Height							0.00	m		
D.2.4 Condition of Side-wall (Right)		0%		Slightly		30%		Moderate		70%		Severe		100%				
(12) Washed away	0	%																
(13) Scoured	0	%																
(14) Damaged	0	%																
E. Present Structural Situation of Fish Ladder																		
E.1 Structure of Fish Ladder																		
(1) Location of Fish Ladder								(4) Length of Fish Ladder							0.00	m		
(2) Material of Fish Ladder								(5) Depth of Fish Ladder							0.00	m		
(3) No. of Fish Ladder			0	sets				(6) Width of Fish Ladder							0.00	m		
E.2 Function and Condition of Fish Ladder		0%		Slightly		30%		Moderate		70%		Severe		100%				
(7) Fish Ladder Function	0	%																
(8) Damaged	0	%																
(9) Sedimentation	0	%																
F. .Present Structural Situation of Intake																		
F.1 Intake																		
F.1.1 Structure of Intake																		
(1) Location of Intake								(4) Water Depth in front of Intake							0.00	m		
(2) Material of Intake								(5) Water Depth at Intake							0.00	m		
(3) Total Width of Intake			0.00	m				(6) Max. Inflow Velocity							#DIV/0!	m/s		

F.1.2 Condition of Intake	0%	Slightly	30%	Moderate	70%	Severe	100%
(7) Damaged	0 %						
(8) Leak	0 %						
(9) Sedimentation	0 %						

F.2 Intake Gate					
F.2.1 Structure of Intake Gate					
(1) Type of Intake Gate			(4) No. of Intake Gates functioning	0	sets
(2) Material of Intake Gate			(5) Intake Gate Height	0.00	m
(3) No. of Intake Gates installed	0	sets	(6) Intake Gate Width (each)	0.00	m

F.2.2 Condition of Intake Gate	0%	Slightly	30%	Moderate	70%	Severe	100%
(7) Rust	0 %						
(8) Damaged	0 %						
(9) Leak	0 %						

F.2.3 Operating Device of Intake Gate					
(10) Type of Operating Device			(13) Power of Operating Device		
(11) No. of Devices	0	sets	(14) Device Capacity	0.00	kw
(12) No. of Devices functioning	0	sets	(15) Supplementary Power		

F.2.4 Condition of Operating Device	0%	Slightly	30%	Moderate	70%	Severe	100%
(16) Rust	0 %						
(17) Damaged	0 %						
(18) Function	0 %						

G. Present Structural Situation of Sediment Settling Basin					
G.1 Sediment Settling Basin					
G.1.1 Structure of Sediment Settling Basin					
(1) Location of Settling Basin			(5) Total Water Depth	0.00	m
(2) Material of Settling Basin			(6) Effective Water Depth	0.00	m
(3) No. of Settling Basin	0	rows	(7) Length of Settling Basin	0.00	m
(4) Width of unit Row	0.00	m	(8) Max. Velocity in Settling Basin	#DIV/0!	m/s

G.1.2 Function and Condition	0%	Slightly	30%	Moderate	70%	Severe	100%
(9) Sediment Settling Function	0 %						
(10) Sediment Flushing Function	0 %						
(11) Damaged	0 %						
(12) Leak	0 %						

G.2 Scouring Gate					
G.2.1 Structure of Scouring Gate					
(1) Type of Scouring Gate			(4) No. of Scouring functioning	0.00	sets
(2) Material of Scouring Gate			(5) Scouring Gate Height	0.00	m
(3) No. of Scouring Gates installed	0.00	sets	(6) Scouring Gate Width (each)	0.00	m

G.2.2 Condition of Scouring Gate	0%	Slightly	30%	Moderate	70%	Severe	100%
(7) Rust	0 %						
(8) Damaged	0 %						
(9) Leak	0 %						

G.2.3 Operating Device of Scouring Gate					
(10) Type of Operating Device			(13) Power of Operating Device		
(11) No. of Devices	0.00	sets	(14) Device Capacity	0.00	kw
(12) No. of Devices functioning	0.00	sets	(15) Supplementary Power		

G.2.4 Condition of Operating Device	0%	Slightly	30%	Moderate	70%	Severe	100%
(16) Rust	0 %						
(17) Damaged	0 %						
(18) Function	0 %						

4.2 Canal

4.2.1 Inventory Survey

A. Dimension and Facilities Functional Survey

A.1 General Information

(1) Name of NIS			(7) No. of Main Canal		lines
(2) Name of Responsible Center			(8) Total Length of Main Canal		km
(3) Name of Water Source (River Name)			(9) No. of Lateral Canal		lines
(4) Completed Year			(10) Total Length of Lateral Canal		km
(5) Construction Cost		Pesos	(11) No. of Sub-lateral Canal		lines
(6) Irrigation Service Area		ha	(12) Total Length of Sub-lateral Canal		km

A.2 Facility Functional Survey

(1) General Facility Function	0	Excellent function,	0	Good function,	0	Moderate function,	
	0	Poor function	0	Damaged function,,			
(2) Main Canal Function	0	Excellent function,	0	Good function,	0	Moderate function,	
	0	Poor function	0	Damaged function,,			
(3) Lateral A and Sub-lateral A Function	0	Excellent function,	0	Good function,	0	Moderate function,	
	0	Poor function	0	Damaged function,,			
(4) Lateral B and Sub-lateral B Function	0	Excellent function,	0	Good function,	0	Moderate function,	
	0	Poor function	0	Damaged function,,			
(5) Lateral C and Sub-lateral C Function	0	Excellent function,	0	Good function,	0	Moderate function,	
	0	Poor function	0	Damaged function,,			
(6) Lateral D and Sub-lateral D Function	0	Excellent function,	0	Good function,	0	Moderate function,	
	0	Poor function	0	Damaged function,,			
(7) Lateral E and Sub-lateral E Function	0	Excellent function,	0	Good function,	0	Moderate function,	
	0	Poor function	0	Damaged function,,			

B. Present Structural Situation of Main Canal

B.1 Main Canal

B.1.1 Structure of Main Canal

(1) Irrigation Service Area		ha	(6) Related Structures		
(2) Max. Design Discharge in Main Canal		m3/s	No. of Check Gate		sets
(3) Total Length of Main Canal		km	No. of Drop		sets
(4) Length of Lining Canal		km	No. of Siphon		sets
(5) Length of Non-lining Canal	0.00	km	No. of Aqueduct		sets
			No. of Bridge		sets
			No. of Drainage Crossing		sets

(7) Type of Canal	0	Open type	0	Culvert type	0	Pipe Line type
	o Others: Please describe below.					
(8) Shape of Typical Cross-section	0	Trapezoid	0	Rectangle	0	Round Shape
	o Others: Please describe below.					
(9) Type of Lining	0	Concrete lining,	0	Asphalt lining	0	Earth lining
	o Others: Please describe below.					

B.1.1.1 Maximum Cross-section

(10) Max. Designed Discharge		m3/s	(15) Average Water Depth		m
(11) Average Discharge		m3/s	(16) Side Slope		
(12) Width of Canal Bottom		m	(17) Longitudinal Slope		
(13) Height of Side-wall		m	(18) Max. Velocity	#DIV/0!	m/s
(14) Max. Water Depth		m	(19) Average Velocity	#DIV/0!	m/s

B.1.1.2 Minimum. Cross-section

(20) Max. Designed Discharge		m3/s	(25) Average Water Depth		m
(21) Average Discharge		m3/s	(26) Side Slope		
(22) Width of Canal Bottom		m	(27) Longitudinal Slope		
(23) Height of Side-wall		m	(28) Max. Velocity	#DIV/0!	m/s
(24) Max. Water Depth		m	(29) Average Velocity	#DIV/0!	m/s

B.1.2 Condition of Main Canal

(30) Crack	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					

(31) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(32) Leak	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(33) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(34) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(35) Other Damage	o Please describe below.
(36) Length of Damaged Canal	km
B.1.3 Condition of Related Structures	
B.1.3.1 Check Gate	
(37) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(38) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(39) Leak	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(40) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(41) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(42) Rust	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(43) Other Damage	o Please describe below.
(44) No. of Damaged Check Gate	sets
B.1.3.2 Drop	
(45) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(46) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(47) Leak	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(48) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(49) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(50) Other Damage	o Please describe below.
(51) No. of Damaged Drop	sets
B.1.3.3 Siphon	
(52) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(53) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.

(54) Leak	0 Severe,	0 Moderate,	0 None,
	o Others: Please comment below.		
(55) Scoured	0 Severe,	0 Moderate,	0 None,
	o Others: Please comment below.		
(56) Sedimentation	0 Severe,	0 Moderate,	0 None,
	o Others: Please comment below.		
(57) Other Damage	o Please describe below.		
(58) No. of Damaged Siphon		sets	
B.1.3.4 Aqueduct			
(59) Crack	0 Severe,	0 Moderate,	0 None,
	o Others: Please comment below.		
(60) Deformation/Slide	0 Severe,	0 Moderate,	0 None,
	o Others: Please comment below.		
(61) Leak	0 Severe,	0 Moderate,	0 None,
	o Others: Please comment below.		
(62) Scoured	0 Severe,	0 Moderate,	0 None,
	o Others: Please comment below.		
(63) Sedimentation	0 Severe,	0 Moderate,	0 None,
	o Others: Please comment below.		
(64) Rust	0 Severe,	0 Moderate,	0 None,
	o Others: Please comment below.		
(65) Other Damage	o Please describe below.		
(66) No. of Damaged Aqueduct		sets	
B.1.3.5 Bridge			
(67) Crack	0 Severe,	0 Moderate,	0 None,
	o Others: Please comment below.		
(68) Deformation/Slide	0 Severe,	0 Moderate,	0 None,
	o Others: Please comment below.		
(69) Scoured	0 Severe,	0 Moderate,	0 None,
	o Others: Please comment below.		
(70) Other Damage	o Please describe below.		
(71) No. of Damaged Bridge		sets	
B.1.3.6 Drainage Crossing			
(72) Crack	0 Severe,	0 Moderate,	0 None,
	o Others: Please comment below.		
(73) Deformation/Slide	0 Severe,	0 Moderate,	0 None,
	o Others: Please comment below.		
(74) Leak	0 Severe,	0 Moderate,	0 None,
	o Others: Please comment below.		
(75) Scoured	0 Severe,	0 Moderate,	0 None,
	o Others: Please comment below.		
(76) Sedimentation	0 Severe,	0 Moderate,	0 None,
	o Others: Please comment below.		
(77) Other Damage	o Please describe below.		
(78) No. of Damaged Drainage Crossing		sets	

C. Present Structural Situation of Lateral A and Sub-lateral A

C.1 Lateral A

C.1.1 Structure of Lateral A and Su-lateral A

(1) Total Irrigation Service Area		ha	(9) Related Structures of Lateral A and Sub-lateral A		
(2) Max. Design Discharge in Lateral A		m3/s	No. of Head Gate		sets
(3) Total Length of Lateral A		km	No. of Check Gate		sets
(4) Total Length of Lining Canal on Lat. A		km	No. of Drop		sets
(5) Length of Non-lining Canal on Lat. A	0.00	km	No. of Siphon		sets
(6) Total Length of Sub-lateral A		km	No. of Aqueduct		sets
(7) Length of Lining Canal on Sub-lateral A		km	No. of Bridge		sets
(8) Length of Non-lining Canal on Sub-lateral A	0.00	km	No. of Drainage Crossing		sets

(10) Type of Canal: 0 Open type; 0 Culvert type; 0 Pipe Line type
o Others: Please describe below.

(11) Shape of Typical Cross-section: 0 Trapezoid; 0 Rectangle; 0 Round Shape
o Others: Please describe below.

(12) Type of Lining: 0 Concrete lining, ; 0 Asphalt lining; 0 Earth lining
o Others: Please describe below.

C.1.1.1 Maximum Cross-section of Lateral A and Sub-lateral A

(13) Max. Designed Discharge		m3/s	(18) Average Water Depth		m
(14) Average Discharge		m3/s	(19) Side Slope		
(15) Width of Canal Bottom		m	(20) Longitudinal Slope		
(16) Height of Side-wall		m	(21) Max. Velocity	#DIV/0!	m/s
(17) Max. Water Depth		m	(22) Average Velocity	#DIV/0!	m/s

C.1.1.2 Minimum. Cross-section of Lateral A and Sub-lateral A

(23) Max. Designed Discharge		m3/s	(28) Average Water Depth		m
(24) Average Discharge		m3/s	(29) Side Slope		
(25) Width of Canal Bottom		m	(30) Longitudinal Slope		
(26) Height of Side-wall		m	(31) Max. Velocity	#DIV/0!	m/s
(27) Max. Water Depth		m	(32) Average Velocity	#DIV/0!	m/s

C.1.2 Condition of Lateral A and Sub-lateral A

(33) Crack: 0 Severe, ; 0 Moderate, ; 0 None,
o Others: Please comment below.

(34) Deformation/Slide: 0 Severe, ; 0 Moderate, ; 0 None,
o Others: Please comment below.

(35) Leak: 0 Severe, ; 0 Moderate, ; 0 None,
o Others: Please comment below.

(36) Scoured: 0 Severe, ; 0 Moderate, ; 0 None,
o Others: Please comment below.

(37) Sedimentation: 0 Severe, ; 0 Moderate, ; 0 None,
o Others: Please comment below.

(38) Other Damage
o Please describe below.

(39) Length of Damaged Canal: km

C.1.3 Condition of Related Structures

C.1.3.1 Head Gate

(40) Crack: 0 Severe, ; 0 Moderate, ; 0 None,
o Others: Please comment below.

(41) Deformation/Slide: 0 Severe, ; 0 Moderate, ; 0 None,
o Others: Please comment below.

(42) Leak: 0 Severe, ; 0 Moderate, ; 0 None,
o Others: Please comment below.

(43) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(44) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(45) Rust	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(46) Other Damage	o Please describe below.
C.1.3.2 Check Gate	
(47) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(48) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(49) Leak	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(50) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(51) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(52) Rust	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(53) Other Damage	o Please describe below.
(54) No. of Damaged Check Gate	sets
C.1.3.3 Drop	
(55) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(56) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(57) Leak	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(58) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(59) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(60) Other Damage	o Please describe below.
(61) No. of Damaged Drop	sets
C.1.3.4 Siphon	
(62) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(63) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(64) Leak	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(65) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.

(66) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(67) Other Damage	o Please describe below.
(68) No. of Damaged Siphon	sets
C.1.3.5 Aqueduct	
(69) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(70) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(71) Leak	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(72) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(73) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(74) Rust	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(75) Other Damage	o Please describe below.
(76) No. of Damaged Aqueduct	sets
C.1.3.6 Bridge	
(77) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(78) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(79) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(80) Other Damage	o Please describe below.
(81) No. of Damaged Bridge	sets
C.1.3.7 Drainage Crossing	
(82) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(83) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(84) Leak	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(85) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(86) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(87) Other Damage	o Please describe below.
(88) No. of Damaged Drainage Crossing	sets

D. Present Structural Situation of Lateral B and Sub-lateral B							
D.1 Lateral B							
D.1.1 Structure of Lateral B and Su-lateral B							
(1) Total Irrigation Service Area		ha	(9) Related Structures of Lateral B and Sub-lateral B				
(2) Max. Design Discharge in Lateral B		m3/s	No. of Head Gate				sets
(3) Total Length of Lateral B		km	No. of Check Gate				sets
(4) Total Length of Lining Canal on Lat. B		km	No. of Drop				sets
(5) Length of Non-lining Canal on Lat. B	0.00	km	No. of Siphon				sets
(6) Total Length of Sub-lateral B		km	No. of Aqueduct				sets
(7) Length of Lining Canal on Sub-lateral B		km	No. of Bridge				sets
(8) Length of Non-lining Canal on Sub-lateral B	0.00	km	No. of Drainage Crossing				sets
(10) Type of Canal	0 Open type		0 Culvert type		0 Pipe Line type		
	o Others: Please describe below.						
(11) Shape of Typical Cross-section	0 Trapezoid		0 Rectangle		0 Round Shape		
	o Others: Please describe below.						
(12) Type of Lining	0 Concrete lining,		0 Asphalt lining		0 Earth lining		
	o Others: Please describe below.						
D.1.1.1 Maximum Cross-section of Lateral B and Sub-lateral B							
(13) Max. Designed Discharge		m3/s	(18) Average Water Depth				m
(14) Average Discharge		m3/s	(19) Side Slope				
(15) Width of Canal Bottom		m	(20) Longitudinal Slope				
(16) Height of Side-wall		m	(21) Max. Velocity			#DIV/0!	m/s
(17) Max. Water Depth		m	(22) Average Velocity			#DIV/0!	m/s
D.1.1.2 Minimum. Cross-section of Lateral B and Sub-lateral B							
(23) Max. Designed Discharge		m3/s	(28) Average Water Depth				m
(24) Average Discharge		m3/s	(29) Side Slope				
(25) Width of Canal Bottom		m	(30) Longitudinal Slope				
(26) Height of Side-wall		m	(31) Max. Velocity			#DIV/0!	m/s
(27) Max. Water Depth		m	(32) Average Velocity			#DIV/0!	m/s
D.1.2 Condition of Lateral B and Sub-lateral B							
(33) Crack	0 Severe,		0 Moderate,		0 None,		
	o Others: Please comment below.						
(34) Deformation/Slide	0 Severe,		0 Moderate,		0 None,		
	o Others: Please comment below.						
(35) Leak	0 Severe,		0 Moderate,		0 None,		
	o Others: Please comment below.						
(36) Scoured	0 Severe,		0 Moderate,		0 None,		
	o Others: Please comment below.						
(37) Sedimentation	0 Severe,		0 Moderate,		0 None,		
	o Others: Please comment below.						
(38) Other Damage	o Please describe below.						
(39) Length of Damaged Canal		km					
D.1.3 Condition of Related Structures							
D.1.3.1 Head Gate							
(40) Crack	0 Severe,		0 Moderate,		0 None,		
	o Others: Please comment below.						
(41) Deformation/Slide	0 Severe,		0 Moderate,		0 None,		
	o Others: Please comment below.						
(42) Leak	0 Severe,		0 Moderate,		0 None,		
	o Others: Please comment below.						

(43) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(44) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(45) Rust	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(46) Other Damage	o Please describe below.
D.1.3.2 Check Gate	
(47) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(48) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(49) Leak	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(50) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(51) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(52) Rust	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(53) Other Damage	o Please describe below.
(54) No. of Damaged Check Gate	sets
D.1.3.3 Drop	
(55) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(56) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(57) Leak	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(58) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(59) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(60) Other Damage	o Please describe below.
(61) No. of Damaged Drop	sets
D.1.3.4 Siphon	
(62) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(63) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(64) Leak	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(65) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.

(66) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(67) Other Damage	o Please describe below.
(68) No. of Damaged Siphon	sets
D.1.3.5 Aqueduct	
(69) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(70) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(71) Leak	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(72) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(73) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(74) Rust	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(75) Other Damage	o Please describe below.
(76) No. of Damaged Aqueduct	sets
D.1.3.6 Bridge	
(77) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(78) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(79) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(80) Other Damage	o Please describe below.
(81) No. of Damaged Bridge	sets
D.1.3.7 Drainage Crossing	
(82) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(83) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(84) Leak	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(85) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(86) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(87) Other Damage	o Please describe below.
(88) No. of Damaged Drainage Crossing	sets

E. Present Structural Situation of Lateral C and Sub-lateral C

E.1 Lateral C

E.1.1 Structure of Lateral C and Su-lateral C

(1) Total Irrigation Service Area		ha	(9) Related Structures of Lateral C and Sub-lateral C		
(2) Max. Design Discharge in Lateral C		m3/s	No. of Head Gate		sets
(3) Total Length of Lateral C		km	No. of Check Gate		sets
(4) Total Length of Lining Canal on Lat. C		km	No. of Drop		sets
(5) Length of Non-lining Canal on Lat. C	0.00	km	No. of Siphon		sets
(6) Total Length of Sub-lateral C		km	No. of Aqueduct		sets
(7) Length of Lining Canal on Sub-lateral C		km	No. of Bridge		sets
(8) Length of Non-lining Canal on Sub-lateral C	0.00	km	No. of Drainage Crossing		sets

(10) Type of Canal: 0 Open type; 0 Culvert type; 0 Pipe Line type
o Others: Please describe below.

(11) Shape of Typical Cross-section: 0 Trapezoid; 0 Rectangle; 0 Round Shape
o Others: Please describe below.

(12) Type of Lining: 0 Concrete lining, ; 0 Asphalt lining; 0 Earth lining
o Others: Please describe below.

E.1.1.1 Maximum Cross-section of Lateral C and Sub-lateral C

(13) Max. Designed Discharge		m3/s	(18) Average Water Depth		m
(14) Average Discharge		m3/s	(19) Side Slope		
(15) Width of Canal Bottom		m	(20) Longitudinal Slope		
(16) Height of Side-wall		m	(21) Max. Velocity	#DIV/0!	m/s
(17) Max. Water Depth		m	(22) Average Velocity	#DIV/0!	m/s

E.1.1.2 Minimum. Cross-section of Lateral C and Sub-lateral C

(23) Max. Designed Discharge		m3/s	(28) Average Water Depth		m
(24) Average Discharge		m3/s	(29) Side Slope		
(25) Width of Canal Bottom		m	(30) Longitudinal Slope		
(26) Height of Side-wall		m	(31) Max. Velocity	#DIV/0!	m/s
(27) Max. Water Depth		m	(32) Average Velocity	#DIV/0!	m/s

E.1.2 Condition of Lateral C and Sub-lateral C

(33) Crack: 0 Severe, ; 0 Moderate, ; 0 None,
o Others: Please comment below.

(34) Deformation/Slide: 0 Severe, ; 0 Moderate, ; 0 None,
o Others: Please comment below.

(35) Leak: 0 Severe, ; 0 Moderate, ; 0 None,
o Others: Please comment below.

(36) Scoured: 0 Severe, ; 0 Moderate, ; 0 None,
o Others: Please comment below.

(37) Sedimentation: 0 Severe, ; 0 Moderate, ; 0 None,
o Others: Please comment below.

(38) Other Damage
o Please describe below.

(39) Length of Damaged Canal: km

E.1.3 Condition of Related Structures

E.1.3.1 Head Gate

(40) Crack: 0 Severe, ; 0 Moderate, ; 0 None,
o Others: Please comment below.

(41) Deformation/Slide: 0 Severe, ; 0 Moderate, ; 0 None,
o Others: Please comment below.

(42) Leak: 0 Severe, ; 0 Moderate, ; 0 None,
o Others: Please comment below.

(43) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(44) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(45) Rust	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(46) Other Damage	o Please describe below.
E.1.3.2 Check Gate	
(47) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(48) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(49) Leak	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(50) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(51) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(52) Rust	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(53) Other Damage	o Please describe below.
(54) No. of Damaged Check Gate	sets
E.1.3.3 Drop	
(55) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(56) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(57) Leak	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(58) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(59) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(60) Other Damage	o Please describe below.
(61) No. of Damaged Drop	sets
E.1.3.4 Siphon	
(62) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(63) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(64) Leak	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(65) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.

(66) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(67) Other Damage	o Please describe below.
(68) No. of Damaged Siphon	sets
E.1.3.5 Aqueduct	
(69) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(70) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(71) Leak	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(72) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(73) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(74) Rust	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(75) Other Damage	o Please describe below.
(76) No. of Damaged Aqueduct	sets
E.1.3.6 Bridge	
(77) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(78) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(79) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(80) Other Damage	o Please describe below.
(81) No. of Damaged Bridge	sets
E.1.3.7 Drainage Crossing	
(82) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(83) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(84) Leak	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(85) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(86) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(87) Other Damage	o Please describe below.
(88) No. of Damaged Drainage Crossing	sets

F. Present Structural Situation of Lateral D and Sub-lateral D

F.1 Lateral D

F.1.1 Structure of Lateral D and Su-lateral D

(1) Total Irrigation Service Area		ha	(9) Related Structures of Lateral D and Sub-lateral D		
(2) Max. Design Discharge in Lateral D		m3/s	No. of Head Gate		sets
(3) Total Length of Lateral D		km	No. of Check Gate		sets
(4) Total Length of Lining Canal on Lat. D		km	No. of Drop		sets
(5) Length of Non-lining Canal on Lat. D	0.00	km	No. of Siphon		sets
(6) Total Length of Sub-lateral D		km	No. of Aqueduct		sets
(7) Length of Lining Canal on Sub-lateral D		km	No. of Bridge		sets
(8) Length of Non-lining Canal on Sub-lateral D	0.00	km	No. of Drainage Crossing		sets

(10) Type of Canal: 0 Open type; 0 Culvert type; 0 Pipe Line type
o Others: Please describe below.

(11) Shape of Typical Cross-section: 0 Trapezoid; 0 Rectangle; 0 Round Shape
o Others: Please describe below.

(12) Type of Lining: 0 Concrete lining, ; 0 Asphalt lining; 0 Earth lining
o Others: Please describe below.

F.1.1.1 Maximum Cross-section of Lateral D and Sub-lateral D

(13) Max. Designed Discharge		m3/s	(18) Average Water Depth		m
(14) Average Discharge		m3/s	(19) Side Slope		
(15) Width of Canal Bottom		m	(20) Longitudinal Slope		
(16) Height of Side-wall		m	(21) Max. Velocity	#DIV/0!	m/s
(17) Max. Water Depth		m	(22) Average Velocity	#DIV/0!	m/s

F.1.1.2 Minimum. Cross-section of Lateral D and Sub-lateral D

(23) Max. Designed Discharge		m3/s	(28) Average Water Depth		m
(24) Average Discharge		m3/s	(29) Side Slope		
(25) Width of Canal Bottom		m	(30) Longitudinal Slope		
(26) Height of Side-wall		m	(31) Max. Velocity	#DIV/0!	m/s
(27) Max. Water Depth		m	(32) Average Velocity	#DIV/0!	m/s

F.1.2 Condition of Lateral D and Sub-lateral D

(33) Crack: 0 Severe, ; 0 Moderate, ; 0 None,
o Others: Please comment below.

(34) Deformation/Slide: 0 Severe, ; 0 Moderate, ; 0 None,
o Others: Please comment below.

(35) Leak: 0 Severe, ; 0 Moderate, ; 0 None,
o Others: Please comment below.

(36) Scoured: 0 Severe, ; 0 Moderate, ; 0 None,
o Others: Please comment below.

(37) Sedimentation: 0 Severe, ; 0 Moderate, ; 0 None,
o Others: Please comment below.

(38) Other Damage
o Please describe below.

(39) Length of Damaged Canal: km

F.1.3 Condition of Related Structures

F.1.3.1 Head Gate

(40) Crack: 0 Severe, ; 0 Moderate, ; 0 None,
o Others: Please comment below.

(41) Deformation/Slide: 0 Severe, ; 0 Moderate, ; 0 None,
o Others: Please comment below.

(42) Leak: 0 Severe, ; 0 Moderate, ; 0 None,
o Others: Please comment below.

(43) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(44) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(45) Rust	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(46) Other Damage	o Please describe below.
F.1.3.2 Check Gate	
(47) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(48) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(49) Leak	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(50) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(51) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(52) Rust	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(53) Other Damage	o Please describe below.
(54) No. of Damaged Check Gate	sets
F.1.3.3 Drop	
(55) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(56) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(57) Leak	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(58) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(59) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(60) Other Damage	o Please describe below. None
(61) No. of Damaged Drop	0 sets
F.1.3.4 Siphon	
(62) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(63) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(64) Leak	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(65) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.

(66) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(67) Other Damage	o Please describe below.
(68) No. of Damaged Siphon	sets
F.1.3.5 Aqueduct	
(69) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(70) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(71) Leak	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(72) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(73) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(74) Rust	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(75) Other Damage	o Please describe below.
(76) No. of Damaged Aqueduct	sets
F.1.3.6 Bridge	
(77) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(78) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(79) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(80) Other Damage	o Please describe below.
(81) No. of Damaged Bridge	sets
F.1.3.7 Drainage Crossing	
(82) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(83) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(84) Leak	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(85) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(86) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(87) Other Damage	o Please describe below.
(88) No. of Damaged Drainage Crossing	sets

G. Present Structural Situation of Lateral E and Sub-lateral E						
G.1 Lateral E						
G.1.1 Structure of Lateral E and Su-lateral E						
(1) Total Irrigation Service Area		ha	(9) Related Structures of Lateral E and Sub-lateral E			
(2) Max. Design Discharge in Lateral E		m3/s	No. of Head Gate			sets
(3) Total Length of Lateral E		km	No. of Check Gate			sets
(4) Total Length of Lining Canal on Lat. E		km	No. of Drop			sets
(5) Length of Non-lining Canal on Lat. E	0.00	km	No. of Siphon			sets
(6) Total Length of Sub-lateral E		km	No. of Aqueduct			sets
(7) Length of Lining Canal on Sub-lateral E		km	No. of Bridge			sets
(8) Length of Non-lining Canal on Sub-lateral E	0.00	km	No. of Drainage Crossing			sets
(10) Type of Canal	0 Open type		0 Culvert type		0 Pipe Line type	
	o Others: Please describe below.					
(11) Shape of Typical Cross-section	0 Trapezoid		0 Rectangle		0 Round Shape	
	o Others: Please describe below.					
(12) Type of Lining	0 Concrete lining,		0 Asphalt lining		0 Earth lining	
	o Others: Please describe below.					
G.1.1.1 Maximum Cross-section of Lateral E and Sub-lateral E						
(13) Max. Designed Discharge		m3/s	(18) Average Water Depth			m
(14) Average Discharge		m3/s	(19) Side Slope			
(15) Width of Canal Bottom		m	(20) Longitudinal Slope			
(16) Height of Side-wall		m	(21) Max. Velocity	#DIV/0!		m/s
(17) Max. Water Depth		m	(22) Average Velocity	#DIV/0!		m/s
G.1.1.2 Minimum. Cross-section of Lateral E and Sub-lateral E						
(23) Max. Designed Discharge		m3/s	(28) Average Water Depth			m
(24) Average Discharge		m3/s	(29) Side Slope			
(25) Width of Canal Bottom		m	(30) Longitudinal Slope			
(26) Height of Side-wall		m	(31) Max. Velocity	#DIV/0!		m/s
(27) Max. Water Depth		m	(32) Average Velocity	#DIV/0!		m/s
G.1.2 Condition of Lateral E and Sub-lateral E						
(33) Crack	0 Severe,		0 Moderate,		0 None,	
	o Others: Please comment below.					
(34) Deformation/Slide	0 Severe,		0 Moderate,		0 None,	
	o Others: Please comment below.					
(35) Leak	0 Severe,		0 Moderate,		0 None,	
	o Others: Please comment below.					
(36) Scoured	0 Severe,		0 Moderate,		0 None,	
	o Others: Please comment below.					
(37) Sedimentation	0 Severe,		0 Moderate,		0 None,	
	o Others: Please comment below.					
(38) Other Damage	o Please describe below.					
(39) Length of Damaged Canal		km				
G.1.3 Condition of Related Structures						
G.1.3.1 Head Gate						
(40) Crack	0 Severe,		0 Moderate,		0 None,	
	o Others: Please comment below.					
(41) Deformation/Slide	0 Severe,		0 Moderate,		0 None,	
	o Others: Please comment below.					
(42) Leak	0 Severe,		0 Moderate,		0 None,	
	o Others: Please comment below.					

(43) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(44) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(45) Rust	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(46) Other Damage	o Please describe below.
G.1.3.2 Check Gate	
(47) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(48) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(49) Leak	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(50) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(51) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(52) Rust	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(53) Other Damage	o Please describe below.
(54) No. of Damaged Check Gate	sets
G.1.3.3 Drop	
(55) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(56) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(57) Leak	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(58) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(59) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(60) Other Damage	o Please describe below. None
(61) No. of Damaged Drop	0 sets
G.1.3.4 Siphon	
(62) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(63) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(64) Leak	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(65) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.

(66) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(67) Other Damage	o Please describe below.
(68) No. of Damaged Siphon	sets
G.1.3.5 Aqueduct	
(69) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(70) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(71) Leak	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(72) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(73) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(74) Rust	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(75) Other Damage	o Please describe below.
(76) No. of Damaged Aqueduct	sets
G.1.3.6 Bridge	
(77) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(78) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(79) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(80) Other Damage	o Please describe below.
(81) No. of Damaged Bridge	sets
G.1.3.7 Drainage Crossing	
(82) Crack	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(83) Deformation/Slide	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(84) Leak	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(85) Scoured	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(86) Sedimentation	0 Severe, 0 Moderate, 0 None, o Others: Please comment below.
(87) Other Damage	o Please describe below.
(88) No. of Damaged Drainage Crossing	sets

4.2.2 Present Conditions

A. Dimension and Facilities Functional Survey

A.1 General Information

(1) Name of NIS	0		(7) Total Length of Main Canal	0.00	km
(2) Name of Water Source	0		(8) No. of Lateral Canal	0	lines
(3) Completed Year	0		(9) Total Length of Lateral Canal	0.00	km
(4) Construction Cost	0	Pesos	(10) No. of Sub-lateral Canal	0	lines
(5) Irrigation Service Area	0	ha	(11) Total Length of Sub-lateral	0.00	km
(6) No. of Main Canal	0	lines			

B. Present Structural Situation of Main Canal

B.1 Main Canal

B.1.1 Structure of Main Canal

(1) Irrigation Service Area	0	ha	(6) No. of Related Structures							
(2) Max. Design Discharge	0.00	m3/s		Structure	No.	unit	Structure	No.	unit	
(3) Total Length of Main Canal	0.00	km		Check Gate	0	sets	Aqueduct	0	sets	
(4) Length of Lining Canal	0.00	km		Drop	0	sets	Bridge	0	sets	
(5) Length of Non-lining Canal	0.00	km		Siphon	0	sets	Drainage Crossing	0	sets	

B.1.1.1 Maximum Cross-section

(7) Max. Designed Discharge	0.00	m3/s	(10) Max. Water Depth	0.00	m
(8) Width of Canal Bottom	0.00	m	(11) Side Slope	0	
(9) Height of Side-wall	0.00	m	(12) Max. Velocity	#DIV/0!	m/s

B.1.1.2 Minimum. Cross-section

(13) Max. Designed Discharge	0.00	m3/s	(16) Max. Water Depth	0.00	m
(14) Width of Canal Bottom	0.00	m	(17) Side Slope	0	
(15) Height of Side-wall	0.00	m	(18) Max. Velocity	#DIV/0!	m/s

B.1.2 Condition of Main Canal

		0%	Slightly	30%	Moderate	70%	Severe	100%
(1) Damaged	0	%						
(2) Leak	0	%						
(3) Sedimentation	0	%						

B.1.3 Condition of Related Structures

B.1.3.1 Check Gate

		0%	Slightly	30%	Moderate	70%	Severe	100%
(1) Damaged	0	%						
(2) Leak	0	%						
(3) Sedimentation	0	%						
(4) Rust	0	%						

B.1.3.2 Drop

		0%	Slightly	30%	Moderate	70%	Severe	100%
(5) Damaged	0	%						
(6) Leak	0	%						
(7) Sedimentation	0	%						

B.1.3.3 Siphon

		0%	Slightly	30%	Moderate	70%	Severe	100%
(8) Damaged	0	%						
(9) Leak	0	%						
(10) Sedimentation	0	%						

B.1.3.4 Aqueduct

		0%	Slightly	30%	Moderate	70%	Severe	100%
(11) Damaged	0	%						
(12) Leak	0	%						
(13) Sedimentation	0	%						
(14) Rust	0	%						

B.1.3.5 Bridge

		0%	Slightly	30%	Moderate	70%	Severe	100%
(15) Damaged	0	%						
(16) Scoured	0	%						

B.1.3.6 Drainage Crossing

		0%	Slightly	30%	Moderate	70%	Severe	100%
(17) Damaged	0	%						
(18) Leak	0	%						
(19) Sedimentation	0	%						

C. Present Structural Situation of Lateral A and Sub-lateral A

C.1 Lateral A

C.1.1 Structure of Lateral A and Su-lateral A

(1) Total Irrigation Service Area	0	ha		(9) No. of Related Structures							
(2) Max. Design Discharge	0.00	m3/s		Structure	No.	unit	Structure	No.	unit		
(3) Total Length of Lateral A	0.00	km		Head Gate	0	sets	Aqueduct	0	sets		
(4) Length of Lining Canal on Lat. A	0.00	km		Check Gate	0	sets	Bridge	0	sets		
(5) Length of Non-lining Canal on Lat. A	0.00	km		Drop	0	sets	Drainage Crossing	0	sets		
(6) Total Length of Sub-lat. A	0.00	km		Siphon	0	sets					
(7) Length of Lining Canal on Sub-lat. A	0.00	km									
(8) Length of Non-lining Canal on Sub-lat. A	0.00	km									

C.1.1.1 Maximum Cross-section of Lateral A and Sub-lateral A

(10) Max. Designed Discharge	0.00	m3/s	(13) Max. Water Depth	0.00	m	
(11) Width of Canal Bottom	0.00	m	(14) Side Slope	0		
(12) Height of Side-wall	0.00	m	(15) Max. Velocity	#DIV/0!	m/s	

C.1.1.2 Minimum. Cross-section of Lateral A and Sub-lateral A

(16) Max. Designed Discharge	0.00	m3/s	(19) Max. Water Depth	0.00	m	
(17) Width of Canal Bottom	0.00	m	(20) Side Slope	0		
(18) Height of Side-wall	0.00	m	(21) Max. Velocity	#DIV/0!	m/s	

C.1.2 Condition of Lat. A and Sub-lat. A		0%	Slightly	30%	Moderate	70%	Severe	100%
(1) Damaged	0	%						
(2) Leak	0	%						
(3) Sedimentation	0	%						

C.1.3 Condition of Related Structures

C.1.3.1 Head Gate		0%	Slightly	30%	Moderate	70%	Severe	100%
(1) Damaged	0	%						
(2) Leak	0	%						
(3) Sedimentation	0	%						
(4) Rust	0	%						
C.1.3.2 Check Gate		0%	Slightly	30%	Moderate	70%	Severe	100%
(5) Damaged	0	%						
(6) Leak	0	%						
(7) Sedimentation	0	%						
(8) Rust	0	%						
C.1.3.3 Drop		0%	Slightly	30%	Moderate	70%	Severe	100%
(9) Damaged	0	%						
(10) Leak	0	%						
(11) Sedimentation	0	%						
C.1.3.4 Siphon		0%	Slightly	30%	Moderate	70%	Severe	100%
(12) Damaged	0	%						
(13) Leak	0	%						
(14) Sedimentation	0	%						
C.1.3.5 Aqueduct		0%	Slightly	30%	Moderate	70%	Severe	100%
(15) Damaged	0	%						
(16) Leak	0	%						
(17) Sedimentation	0	%						
(18) Rust	0	%						
C.1.3.6 Bridge		0%	Slightly	30%	Moderate	70%	Severe	100%
(19) Damaged	0	%						
(20) Scoured	0	%						
C.1.3.7 Drainage Crossing		0%	Slightly	30%	Moderate	70%	Severe	100%
(21) Damaged	0	%						
(22) Leak	0	%						
(23) Sedimentation	0	%						

D. Present Structural Situation of Lateral B and Sub-lateral B

D.1 Lateral B

D.1.1 Structure of Lateral B and Su-lateral B

(1) Total Irrigation Service Area	0	ha		(9) No. of Related Structures							
(2) Max. Design Discharge	0.00	m3/s		Structure	No.	unit	Structure	No.	unit		
(3) Total Length of Lateral B	0.00	km		Head Gate	0	sets	Aqueduct	0	sets		
(4) Length of Lining Canal on Lat. B	0.00	km		Check Gate	0	sets	Bridge	0	sets		
(5) Length of Non-lining Canal on Lat. B	0.00	km		Drop	0	sets	Drainage Crossing	0	sets		
(6) Total Length of Sub-lat. B	0.00	km		Siphon	0	sets					
(7) Length of Lining Canal on Sub-lat. B	0.00	km									
(8) Length of Non-lining Canal on Sub-lat. B	0.00	km									

D.1.1.1 Maximum Cross-section of Lateral B and Sub-lateral B

(10) Max. Designed Discharge	0.00	m3/s	(13) Max. Water Depth	0.00	m
(11) Width of Canal Bottom	0.00	m	(14) Side Slope	0	
(12) Height of Side-wall	0.00	m	(15) Max. Velocity	#DIV/0!	m/s

D.1.1.2 Minimum. Cross-section of Lateral B and Sub-lateral B

(16) Max. Designed Discharge	0.00	m3/s	(19) Max. Water Depth	0.00	m
(17) Width of Canal Bottom	0.00	m	(20) Side Slope	0	
(18) Height of Side-wall	0.00	m	(21) Max. Velocity	#DIV/0!	m/s

D.1.2 Condition of Lat. B and Sub-lat. B		0%	Slightly	30%	Moderate	70%	Severe	100%
(1) Damaged	0 %							
(2) Leak	0 %							
(3) Sedimentation	0 %							

D.1.3 Condition of Related Structures

D.1.3.1 Head Gate		0%	Slightly	30%	Moderate	70%	Severe	100%
(1) Damaged	0 %							
(2) Leak	0 %							
(3) Sedimentation	0 %							
(4) Rust	0 %							
D.1.3.2 Check Gate		0%	Slightly	30%	Moderate	70%	Severe	100%
(5) Damaged	0 %							
(6) Leak	0 %							
(7) Sedimentation	0 %							
(8) Rust	0 %							
D.1.3.3 Drop		0%	Slightly	30%	Moderate	70%	Severe	100%
(9) Damaged	0 %							
(10) Leak	0 %							
(11) Sedimentation	0 %							
D.1.3.4 Siphon		0%	Slightly	30%	Moderate	70%	Severe	100%
(12) Damaged	0 %							
(13) Leak	0 %							
(14) Sedimentation	0 %							
D.1.3.5 Aqueduct		0%	Slightly	30%	Moderate	70%	Severe	100%
(15) Damaged	0 %							
(16) Leak	0 %							
(17) Sedimentation	0 %							
(18) Rust	0 %							
D.1.3.6 Bridge		0%	Slightly	30%	Moderate	70%	Severe	100%
(19) Damaged	0 %							
(20) Scoured	0 %							
D.1.3.7 Drainage Crossing		0%	Slightly	30%	Moderate	70%	Severe	100%
(21) Damaged	0 %							
(22) Leak	0 %							
(23) Sedimentation	0 %							

E. Present Structural Situation of Lateral C and Sub-lateral C

E.1 Lateral C

E.1.1 Structure of Lateral C and Su-lateral C

(1) Total Irrigation Service Area	0	ha		(9) No. of Related Structures							
(2) Max. Design Discharge	0.00	m3/s		Structure	No.	unit	Structure	No.	unit		
(3) Total Length of Lateral C	0.00	km		Head Gate	0	sets	Aqueduct	0	sets		
(4) Length of Lining Canal on Lat. C	0.00	km		Check Gate	0	sets	Bridge	0	sets		
(5) Length of Non-lining Canal on Lat. C	0.00	km		Drop	0	sets	Drainage Crossing	0	sets		
(6) Total Length of Sub-lat. C	0.00	km		Siphon	0	sets					
(7) Length of Lining Canal on Sub-lat.C	0.00	km									
(8) Length of Non-lining Canal on Sub-lat.C	0.00	km									

E.1.1.1 Maximum Cross-section of Lateral C and Sub-lateral C

(10) Max. Designed Discharge	0.00	m3/s	(13) Max. Water Depth	0.00	m	
(11) Width of Canal Bottom	0.00	m	(14) Side Slope	0		
(12) Height of Side-wall	0.00	m	(15) Max. Velocity	#DIV/0!	m/s	

E.1.1.2 Minimum. Cross-section of Lateral C and Sub-lateral C

(16) Max. Designed Discharge	0.00	m3/s	(19) Max. Water Depth	0.00	m	
(17) Width of Canal Bottom	0.00	m	(20) Side Slope	0		
(18) Height of Side-wall	0.00	m	(21) Max. Velocity	#DIV/0!	m/s	

E.1.2 Condition of Lat.C and Sub-lat.C		0%	Slightly	30%	Moderate	70%	Severe	100%
(1) Damaged	0	%						
(2) Leak	0	%						
(3) Sedimentation	0	%						
E.1.3 Condition of Related Structures								
E.1.3.1 Head Gate		0%	Slightly	30%	Moderate	70%	Severe	100%
(1) Damaged	0	%						
(2) Leak	0	%						
(3) Sedimentation	0	%						
(4) Rust	0	%						
E.1.3.2 Check Gate		0%	Slightly	30%	Moderate	70%	Severe	100%
(5) Damaged	0	%						
(6) Leak	0	%						
(7) Sedimentation	0	%						
(8) Rust	0	%						
E.1.3.3 Drop		0%	Slightly	30%	Moderate	70%	Severe	100%
(9) Damaged	0	%						
(10) Leak	0	%						
(11) Sedimentation	0	%						
E.1.3.4 Siphon		0%	Slightly	30%	Moderate	70%	Severe	100%
(12) Damaged	0	%						
(13) Leak	0	%						
(14) Sedimentation	0	%						
E.1.3.5 Aqueduct		0%	Slightly	30%	Moderate	70%	Severe	100%
(15) Damaged	0	%						
(16) Leak	0	%						
(17) Sedimentation	0	%						
(18) Rust	0	%						
E.1.3.6 Bridge		0%	Slightly	30%	Moderate	70%	Severe	100%
(19) Damaged	0	%						
(20) Scoured	0	%						
E.1.3.7 Drainage Crossing		0%	Slightly	30%	Moderate	70%	Severe	100%
(21) Damaged	0	%						
(22) Leak	0	%						
(23) Sedimentation	0	%						

F. Present Structural Situation of Lateral D and Sub-lateral D

F.1 Lateral D

F.1.1 Structure of Lateral D and Su-lateral D

(1) Total Irrigation Service Area	0	ha		(9) No. of Related Structures							
(2) Max. Design Discharge	0.00	m3/s		Structure	No.	unit	Structure	No.	unit		
(3) Total Length of Lateral D	0.00	km		Head Gate	0	sets	Aqueduct	0	sets		
(4) Length of Lining Canal on Lat. D	0.00	km		Check Gate	0	sets	Bridge	0	sets		
(5) Length of Non-lining Canal on Lat. D	0.00	km		Drop	0	sets	Drainage Crossing	0	sets		
(6) Total Length of Sub-lat. D	0.00	km		Siphon	0	sets					
(7) Length of Lining Canal on Sub-lat. D	0.00	km									
(8) Length of Non-lining Canal on Sub-lat. D	0.00	km									

F.1.1.1 Maximum Cross-section of Lateral D and Sub-lateral D

(10) Max. Designed Discharge	0.00	m3/s	(13) Max. Water Depth	0.00	m	
(11) Width of Canal Bottom	0.00	m	(14) Side Slope	0		
(12) Height of Side-wall	0.00	m	(15) Max. Velocity	#DIV/0!	m/s	

F.1.1.2 Minimum. Cross-section of Lateral D and Sub-lateral D

(16) Max. Designed Discharge	0.00	m3/s	(19) Max. Water Depth	0.00	m	
(17) Width of Canal Bottom	0.00	m	(20) Side Slope	0		
(18) Height of Side-wall	0.00	m	(21) Max. Velocity	#DIV/0!	m/s	

F.1.2 Condition of Lat. D and Sub-lat. D

		0%	Slightly	30%	Moderate	70%	Severe	100%
(1) Damaged	0 %							
(2) Leak	0 %							
(3) Sedimentation	0 %							

F.1.3 Condition of Related Structures

F.1.3.1 Head Gate		0%	Slightly	30%	Moderate	70%	Severe	100%
(1) Damaged	0 %							
(2) Leak	0 %							
(3) Sedimentation	0 %							
(4) Rust	0 %							
F.1.3.2 Check Gate		0%	Slightly	30%	Moderate	70%	Severe	100%
(5) Damaged	0 %							
(6) Leak	0 %							
(7) Sedimentation	0 %							
(8) Rust	0 %							
F.1.3.3 Drop		0%	Slightly	30%	Moderate	70%	Severe	100%
(9) Damaged	0 %							
(10) Leak	0 %							
(11) Sedimentation	0 %							
F.1.3.4 Siphon		0%	Slightly	30%	Moderate	70%	Severe	100%
(12) Damaged	0 %							
(13) Leak	0 %							
(14) Sedimentation	0 %							
F.1.3.5 Aqueduct		0%	Slightly	30%	Moderate	70%	Severe	100%
(15) Damaged	0 %							
(16) Leak	0 %							
(17) Sedimentation	0 %							
(18) Rust	0 %							
F.1.3.6 Bridge		0%	Slightly	30%	Moderate	70%	Severe	100%
(19) Damaged	0 %							
(20) Scoured	0 %							
F.1.3.7 Drainage Crossing		0%	Slightly	30%	Moderate	70%	Severe	100%
(21) Damaged	0 %							
(22) Leak	0 %							
(23) Sedimentation	0 %							

G. Present Structural Situation of Lateral E and Sub-lateral E

G.1 Lateral E

G.1.1 Structure of Lateral E and Su-lateral E

(1) Total Irrigation Service Area	0	ha		(9) No. of Related Structures							
(2) Max. Design Discharge	0.00	m3/s		Structure	No.	unit	Structure	No.	unit		
(3) Total Length of Lateral E	0.00	km		Head Gate	0	sets	Aqueduct	0	sets		
(4) Length of Lining Canal on Lat. E	0.00	km		Check Gate	0	sets	Bridge	0	sets		
(5) Length of Non-lining Canal on Lat. E	0.00	km		Drop	0	sets	Drainage Crossing	0	sets		
(6) Total Length of Sub-lat. E	0.00	km		Siphon	0	sets					
(7) Length of Lining Canal on Sub-lat.E	0.00	km									
(8) Length of Non-lining Canal on Sub-lat. E	0.00	km									

G.1.1.1 Maximum Cross-section of Lateral E and Sub-lateral E

(10) Max. Designed Discharge	0.00	m3/s	(13) Max. Water Depth	0.00	m	
(11) Width of Canal Bottom	0.00	m	(14) Side Slope	0		
(12) Height of Side-wall	0.00	m	(15) Max. Velocity	#DIV/0!	m/s	

G.1.1.2 Minimum. Cross-section of Lateral E and Sub-lateral E

(16) Max. Designed Discharge	0.00	m3/s	(19) Max. Water Depth	0.00	m	
(17) Width of Canal Bottom	0.00	m	(20) Side Slope	0		
(18) Height of Side-wall	0.00	m	(21) Max. Velocity	#DIV/0!	m/s	

G.1.2 Condition of Lat. E and Sub-lat. E		0%	Slightly	30%	Moderate	70%	Severe	100%
(1) Damaged	0 %							
(2) Leak	0 %							
(3) Sedimentation	0 %							
G.1.3 Condition of Related Structures								
G.1.3.1 Head Gate		0%	Slightly	30%	Moderate	70%	Severe	100%
(1) Damaged	0 %							
(2) Leak	0 %							
(3) Sedimentation	0 %							
(4) Rust	0 %							
G.1.3.2 Check Gate		0%	Slightly	30%	Moderate	70%	Severe	100%
(5) Damaged	0 %							
(6) Leak	0 %							
(7) Sedimentation	0 %							
(8) Rust	0 %							
G.1.3.3 Drop		0%	Slightly	30%	Moderate	70%	Severe	100%
(9) Damaged	0 %							
(10) Leak	0 %							
(11) Sedimentation	0 %							
G.1.3.4 Siphon		0%	Slightly	30%	Moderate	70%	Severe	100%
(12) Damaged	0 %							
(13) Leak	0 %							
(14) Sedimentation	0 %							
G.1.3.5 Aqueduct		0%	Slightly	30%	Moderate	70%	Severe	100%
(15) Damaged	0 %							
(16) Leak	0 %							
(17) Sedimentation	0 %							
(18) Rust	0 %							
G.1.3.6 Bridge		0%	Slightly	30%	Moderate	70%	Severe	100%
(19) Damaged	0 %							
(20) Scoured	0 %							
G.1.3.7 Drainage Crossing		0%	Slightly	30%	Moderate	70%	Severe	100%
(21) Damaged	0 %							
(22) Leak	0 %							
(23) Sedimentation	0 %							

4.3 Pumping Station									
4.3.1 Inventory Survey									
A. Dimension Survey									
A.1 General Information									
(1) Name of NIS			(6) Irrigation Service Area		ha				
(2) Name of Responsible Center			(7) Name of Water Source						
(3) Name of Pumping Station			(8) Water Right Status		m3/s				
(4) Completed Year			(9) Name of Water Right Holder						
(5) Construction Cost		Pesos	(10) No. of IA (active)						
(11) Location of Pumping Station									
Region			Province						
Municipality			Barangay						
(12) Purpose of Water Use	0	Irrigation,	0	Industry,	0	Drinking,	0	Hydro-power,	
	0	Flood Control,	0	Fish Culture,	0	Leisure,			
A.2 Hydrology									
(1) Annual Average Rainfall		mm	(7) Average Discharge (Wet Season)		m3/s				
(2) Name of Rainfall Observation Station			(8) Average Discharge (Dry Season)		m3/s				
(3) Catchment Area at Intake		km2	(9) Peak Intake Discharge		m3/s				
(4) Riverbed Elevation in front of Intake		EL	(10) Average Intake Discharge (Wet)		m3/s				
(5) Max. Flood Water Level		EL	(11) Average Intake Discharge (Dry)		m3/s				
(6) Max. Flood Discharge		m3/s	(12) Distance from river to Pumping Station		m				
(13) Foundation	0	Rock,	0	Riverbed Material,					
	o Others: Please describe below.								
(14) Riverbed Material	0	Boulder,	0	Cobblestone,	0	Gravel,	0	Sand,	
	0	Silt,	0	Clay,					
(15) Max. Diameter of Riverbed Material		mm							
(16) Sedimentation	0	Severe,	0	Moderate,	0	None,			
(17) Countermeasure for Sedimentation	0	Sluice Way,	0	Sediment Settling Basin,	0	Sediment Scouring Facility,			
	o Others: Please describe below.								
(18) Watershed Condition	0	Good,	0	Moderate,	0	No Good,			
(19) Watershed Management	0	Undertaken with Great Care,	0	Undertaken Moderately,					
	0	None,							
(20) Scoured at Downstream	0	Severe,	0	Moderate,	0	None,			
B. Facility Functional Survey									
(1) General Facility Function	0	Excellent function,	0	Good function,	0	Moderate function,			
	0	Poor function	0	Damaged function,,					
(2) Reservoir Dam Function	0	Excellent function,	0	Good function,	0	Moderate function,			
	0	Poor function	0	Damaged function,,					
(3) Diversion Dam Function	0	Excellent function,	0	Good function,	0	Moderate function,			
	0	Poor function	0	Damaged function,,					
(4) Pumping Station Function	0	Excellent function,	0	Good function,	0	Moderate function,			
	0	Poor function	0	Damaged function,,					
(5) Main Canal Function	0	Excellent function,	0	Good function,	0	Moderate function,			
	0	Poor function	0	Damaged function,,					
(6) Lateral Canal Function	0	Excellent function,	0	Good function,	0	Moderate function,			
	0	Poor function	0	Damaged function,,					
(7) Related Facility Function	0	Excellent function,	0	Good function,	0	Moderate function,			
	0	Poor function	0	Damaged function,,					

C. Present Structural Situation of Intake Gate and Operation Device							
C.1 Intake Gate							
C.1.1 Structure of Intake Gate							
(1) Type of Intake Gate	0 Slide Gate,	0 Roller Gate,	0 Hinge Type Gate,				
	o Others: Please describe below.						
(2) Material of Intake Gate	0 Iron,	0 Stainless,	0 Rubber,				
	o Others: Please describe below.						
(3) No. of Intake Gates installed		sets	(5) Intake Gate Height		m		
(4) No. of Intake Gates functioning		sets	(6) Intake Gate Width (each)		m		
(7) Screen	0 There is or are.	0 None,					
C.1.2 Condition of Intake Gate							
(8) Rust	0 Severe,	0 Moderate,	0 None,				
	o Others: Please comment below.						
(9) Deformation	0 Severe,	0 Moderate,	0 None,				
	o Others: Please comment below.						
(10) Leak	0 Severe,	0 Moderate,	0 None,				
	o Others: Please comment below.						
(11) Other Damage	o Please describe below.						
D Present Structural Situation of Suction Sump							
D.1 Structure of Suction Sump							
(1) Major Material of Suction Sump	0 Reinforced Concrete	0 Plain Concrete					
	0 Rubble Masonry	0 Rockfilled Concrete Cover					
	o Others: Please describe below.						
(2) Length of Suction Sump		m	(4) No. of Row		row		
(3) Height of Suction Sump		m	(5) Width of Suction Sump (each)		m		
D.2 Condition of Suction Sump							
(6) Crack	0 Severe,	0 Moderate,	0 None,				
	o Others: Please comment below.						
	None						
(7) Deformation	0 Severe,	0 Moderate,	0 None,				
	o Others: Please comment below.						
(8) Leak	0 Severe,	0 Moderate,	0 None,				
	o Others: Please comment below.						
(9) Abrasion	0 Severe,	0 Moderate,	0 None,				
	o Others: Please comment below.						
(10) Sedimentation	0 Severe,	0 Moderate,	0 None,				
	o Others: Please comment below.						
(11) Scoured	0 Severe,	0 Moderate,	0 None,				
	o Others: Please comment below.						
(12) Other Damage	o Please describe below.						
E Present Structural Situation of Pump							
E.1 Structure of Pump							
(1) Type of Pump	0 Volute	0 Axial flow	0 Mixed Flow				
	0 Turbine	0 Submergible					
	o Others: Please describe below.						
(2) Pump Head		m	(6) Length of Pump		m		
(3) No. of Pumps installed		sets	(7) Width of Pump		m		
(4) No. of Pumps functioning		sets	(8) Height of Pump		m		
(5) Capacity of Pump		m3/min/pump					

(9) Power of Pump	0	Diesel Engine (permanent)	0	Diesel Engine (mobile)			
	0	Motor (electricity)	0				
	o Others: Please describe below.						
E.2 Condition of Pump							
(10) Rust	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
	None						
(11) Deformation	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(12) Leak	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(13) Function	0	Good,	0	Operational,,	0	No Good,	
	o Others: Please comment below.						
F Present Structural Situation of Discharge Sump							
F.1 Structure of Discharge Sump							
(1) Major Material of Discharge Sump	0	Reinforced Concrete	0	Plain Concrete			
	0	Rubble Masonry	0	Rockfilled Concrete Cover			
	o Others: Please describe below.						
(2) Length of Discharge Sump		m	(4) No. of Row			row	
(3) Height of Discharge Sump		m	(5) Width of Discharge Sump (each)			m	
F.2 Condition of Suction Sump							
(6) Crack	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
	None						
(7) Deformation	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(8) Leak	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(9) Abrasion	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(10) Sedimentation	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(11) Scoured	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(12) Other Damage	o Please describe below.						
G Present Structural Situation of Slope Protection							
G.1 Structure of Slope Protection							
(1) Major Material of Slope Protection	0	Gabion	0	Reinforced Concrete	0	Plain Concrete	
	0	Rubble Masonry	0	Rockfilled Concrete Cover			
	o Others: Please describe below.						
(2) Length of Slope Protection		m	(4) Slope Length of Slope Protection			m	
(3) Slope of Slope Protection			(5) Average Height of Slope Protection			m	
G.2 Condition of Slope Protection							
(6) Crack	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
	None						
(7) Deformation	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						
(8) Leak	0	Severe,	0	Moderate,	0	None,	
	o Others: Please comment below.						

(9) Abrasion	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					
(10) Sedimentation	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					
(11) Scoured	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					
(12) Other Damage	o Please describe below.					

H Present Structural Situation of Pump House

(1) Pump House	0	There is or are.	0	None,
If there is or are sluice way, fill following.				

H.1 Structure of Pump House

(1) Major Material of Pump House	0	Reinforced Concrete	0	Wood
	0	Corrugated Tinplate		
	o Others: Please describe below.			
(2) No. of Pump House		Nos.	(4) Width of Pump House (each)	m
(3) Length of Pump House (each)		m	(5) Height of Pump House (each)	m

H.2 Condition of Pump House

(6) Crack	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					
	None					
(7) Deformation	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					
(8) Leak	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					
(9) Abrasion	0	Severe,	0	Moderate,	0	None,
	o Others: Please comment below.					
(10) Other Damage	o Please describe below.					

4.3.2 Present Conditions

A. General Information

(1) Name of NIS	0	(11) Max. Flood Discharge	0 m3/s
(2) Name of Pumping Station	0	(12) Max. Flood Water Depth (U/S)	0 m
(3) Completed Year	0	(13) Average Discharge (Wet)	0.00 m3/s
(4) Location of Pumping Station		(14) Average Discharge (Dry)	0.00 m3/s
Region	0	(15) Peak Intake Discharge	0.00 m3/s
Province	0	(16) Ave. Intake Discharge (Wet)	0.00 m3/s
Municipality	0	(17) Ave. Intake Discharge (Dry)	0.00 m3/s
Barangay	0	(18) Foundation	
(5) Purpose of Water Use		(19) Max. Dia. of Riverbed Material	0.00 mm
(6) Irrigation Service Area	0 ha	(20) Sedimentation	
(7) Construction Cost	0 Pesos	(21) Countermeasure for Sedimentation	
(8) Name of Water Source	0.00	(22) Watershed Condition	
(9) Catchment Area at Intake	0.00 km2	(23) Watershed Management	
(10) Annual Average Rainfall	0.00 mm	(24) Scoured at Downstream	

B. Present Structural Situation of Pumping Station

B.1 Intake Gate

B.1.1 Structure of Intake Gate

(1) Type of Intake Gate		(4) No. of Intake Gates functioning	0 sets
(2) Material of Intake Gate		(5) Intake Gate Height	0.00 m
(3) No. of Intake Gates installed	0 sets	(6) Intake Gate Width (each)	0.00 m

B.1.2 Condition of Intake Gate

	0%	Slightly	30%	Moderate	70%	Severe	100%
(7) Rust	0 %						
(8) Damaged	0 %						
(9) Leak	0 %						

B.2 Suction Sump

B.2.1 Structure of Suction Sump

(1) Major Material of Suction Sump		(4) No. of Row	0 row
(2) Length of Suction Sump	0.00 m	(5) Wedth of Suction Sump (each)	0.00 m
(3) Height of Suction Sump	0.00 m		

B.2.2 Condition of Suction Sump

	0%	Slightly	30%	Moderate	70%	Severe	100%
(6) Damaged	0 %						
(7) Leak	0 %						
(8) Sedimentation	0 %						
(9) Scoured	0 %						

B.3 Pump

B.3.1 Structure of Pump

(1) Type of Pump		(6) Length of Pump	0.00 m
(2) Pump Head	0.00 m	(7) Width of Pump	0.00 m
(3) No. of Pumps installed	0 sets	(8) Height of Pump	0.00 m
(4) No. of Pumps functioning	0 sets	(9) Power of Pump	
(5) Capacity of PumpNo. of Row	0.00 m3/m/p		

B.3.2 Condition of Pump

	0%	Slightly	30%	Moderate	70%	Severe	100%
(10) Rust	0 %						
(11) Damaged	0 %						
(12) Leak	0 %						
(13) Function	0 %						

B.4 Discharge Sump

B.4.1 Structure of Discharge Sump

(1) Major Material of Dis. Sump		(4) No. of Row	0 row
(2) Length of Discharge Sump	0.00 m	(5) Width of Discharge Sump (each)	0.00 m
(3) Height of Dischaege Sump	0.00 m		

B.4.2 Condition of Discharge Sump

	0%	Slightly	30%	Moderate	70%	Severe	100%
(6) Damaged	0 %						
(7) Leak	0 %						
(8) Sedimentation	0 %						
(9) Scoured	0 %						

B.5 Slope Protection

B.5.1 Structure of Slope Protection

(1) Major Material of Protection		(4) Slope Length of Protection	0.00 m
(2) Length of Slope Protection	0.00 m	(5) Average Height of Protection	0.00 m
(3) Slope of Slope Protection	0		

B.5.2 Condition of Slope Protection		0%	Slightly	30%	Moderate	70%	Severe	100%
(6) Damaged	0 %							
(7) Leak	0 %							
(8) Sedimentation	0 %							
(9) Scoured	0 %							

B.6 Pump House

B.6.1 Structure of Pump House

(1) Major Material of Protection		(4) Width of Pump House (each)	0.00 m
(2) No. of Pump House	0 Nos.	(5) Height of Pump House (each)	0.00 m
(3) Length of Pump House (each)	0 m		

B.6.2 Condition of Pump House		0%	Slightly	30%	Moderate	70%	Severe	100%
(6) Damaged	0 %							
(7) Leak	0 %							

V. Organization and O&M Information

5.1 NISO Information on Management and Facility ***Figures in colored cells are calculated automat**

A. Organization

(1) Name of NISO				
(2) Region				
(3) Service Area of NISO			(7) Total Number of Personnel	
(4) Firmed-Up Service Area of NISO			(8) Number of Permanent Staff	
(5) Number of NISs			(9) Number of Engineers	
(6) Number of Approved Plantilla			(10) Number of IDOs	

(11) Last 5 Years Viability Index (VI) of I	2005	2004	2003	2002	2001	Average
						#DIV/0!

(12) Last 5 Years O&M Expenses Based on NISO Performance Report ('000 Pesos)

Year	Personnel Services (COB)	MOOE (Maintenance & Other Operating Expenses)	Project Charge Personnel	Total
2005				0
2004				0
2003				0
2002				0
2001				0
Average	#DIV/0!	#DIV/0!	#DIV/0!	0

(13) Last 5 Years Incomes Based on NISO Performance Report ('000 Pesos)

Year	ISF Collection	Equipment Rental	Others	Total
2005				0
2004				0
2003				0
2002				0
2001				0
Average	#DIV/0!	#DIV/0!	#DIV/0!	0

(14) Please draw an Organization Chart of NISO including positions and number of staffs.

B. Facility and Equipment Condition

(1) Facility for O&M (NIA's property)

Facility	Year of Construction	Condition*	Necessary Countermeasure (if any)
Office			
Workshop			
Gate Keeper's Hous			
Guesthouse			

* In the column of "Condition", **number** the box based on the choices as "1.Very Well", "2.Well", "3.No Good" or "4.Poor".

(2) Transport & Heavy Equipment *Add more if you have.

Equipment	Car	Motorbike	Bicycle	Truck	Dump truck	Bulldozer	Backhoe	Tractor Shovel	Grader
Number									
Condition*									

Equipment	Crane								
Number									
Condition*									

* In the column of "Condition", **number** the box based on the choices as "1.Very Well", "2.Well", "3.No Good" or "4.Poor".

(3) Office Equipment *Add more if you have.

Equipment	Phone	Fax	Xerox	Computer	Printer	Degi-camera	Camera	Typewriter	
Number									
Condition*									

* In the column of "Condition", **number** the box based on the choices as "1.Very Well", "2.Well", "3.No Good" or "4.Poor".

(4) O&M Equipment *Add more if you have.

Equipment	Theodolite	Level	Hand level	Staff	Tape measure	Tool kit	Manual Transit		
Number									
Condition*									

* In the column of "Condition", **number** the box based on the choices as "1.Very Well", "2.Well", "3.No Good" or "4.Poor".

(5) Frequency of Regular Maintenance of Equipment

* In the line of "Frequency", **number** the box on the choices as "1.Daily", "2.Weekly", "3.Monthly", "4.Quaterly", "5.Semiannually", "6.Yearly" or "7.None".

Equipment	Transport	Heavy Eq.	Office Eq.	O&M Eq.
Frequency*				

5.2 NISO Information on O&M Status of Irrigation Facility ***Figures in colored cells are calculated automat**

A. Maintenance

A.1 General * **Number** the box based on the choices.

(1) Utilization of Operation Manual		1.Yes	2.No	3.N.A. (not available)
(2) Utilization of Maintenance Manual		1.Yes	2.No	3.N.A. (not available)
(3) Utilization of Planning Manual for PoW		1.Yes	2.No	3.N.A. (not available)
(4) Record Keeping of Project Document & Drawings		1.Complet	2.Not enough	3.N.A. (not available)
(5) Planning Method of Program of Works' Components				
1.NISO's observation	2.Consultation with IA		3.Based on requests from IA	
(6) Frequency of Regular Inspection		1.Daily	2.Weekly	3.Monthly

(7) Frequency and Activity of Regular Maintenance of Facility

* In the line of "Frequency", **number** the box on the choices as "1.Daily", "2.Weekly", "3.Monthly", "4.Quaterly" "5.Semiannually", "6.Yearly" or "7.None". In the line of "Activity", describe the periodical activities

Facility	Intake structure	Main canal	Lateral canal	Division box	Canal structure	Road
Frequency*						
Activity						

A.2 Irrigation Facility

A.2.1 Intake Facility * **Number** the box based on the choices.

Mechanical Devices						
(1) Removing Debris around Gates		1.Enough	2.Not enough	3.None		
(2) Greasing on Gears		1.Weekly	2.Monthly	3.Biannually	4.Annually	5.None
(3) Necessary Maintenance for Defects of Engine (or Motor)		1.Enough	2.Not enough	3.None		
(4) Painting on Steel Gates		1.Enough	2.Not enough	3.None		
Diversion Dam						
(5) Desiltation in front of Intake		1.No.Need	2.Enough	3.Not enough	4.None	
(6) Implementation of River Channeling		1.No.Need	2.Enough	3.Not enough	4.None	
(7) Measures for Riverbed Degradation (downstream)		1.No.Need	2.Enough	3.Not enough	4.None	
Pump Station						
(8) Removal of Sediment & Debris in front of Intake		1.No.Need	2.Enough	3.Not enough	4.None	
(9) Implementation of River Channeling		1.No.Need	2.Enough	3.Not enough	4.None	
(10) Greasing on Pump System		1.Enough	2.Not enough	3.None		
(11) Maintenance of Pump System		1.No.Need	2.Enough	3.Not enough	4.None	
(12) Replacement of Deteriorated Parts		1.No.Need	2.Enough	3.Not enough	4.None	
(13) Maintenance of Power Supply System		1.No.Need	2.Enough	3.Not enough	4.None	
Reservoir Dam						
(14) Inspection on Unusual Phenomena		1.No.Need	2.Enough	3.Not enough	4.None	
(15) Measures on Unusual Phenomena		1.No.Need	2.Enough	3.Not enough	4.None	
(16) Inspection on Mechanical Devices		1.No.Need	2.Enough	3.Not enough	4.None	
(17) Inspection on Electronic Devices		1.No.Need	2.Enough	3.Not enough	4.None	
(18) Maintenance of Devices		1.No.Need	2.Enough	3.Not enough	4.None	
(19) Survey on Sedimentation of Reservoir		1.No.Need	2.Enough	3.Not enough	4.None	
(20) Desiltation in Reservoir		1.No.Need	2.Enough	3.Not enough	4.None	
(21) Number of Dam Observation Facilities		1.Enough	2.Not enough	3.None		
(22) Function of Dam Observation Facilities		1.Enough	2.Not enough	3.None		
(23) Analysis of Dam Observation		1.Enough	2.Not enough	3.None		
(24) Maintenance of Alarming System		1.Enough	2.Not enough	3.None		

A.2.2 Others		
(25) Implementation of Canal Clearing		1.Enough 2.Not enough 3.None
(26) Implementation of Canal Desiltation		1.Enough 2.Not enough 3.None
(27) Maintenance of Farm to Market Road		1.Enough 2.Not enough 3.None
(28) Implementation of River Desiltation		1.Enough 2.Not enough 3.None
(29) Operation for Normal Flood		1.Smooth 2.Not much 3.None
(30) Inspection after Flood		1.Enough 2.Not enough 3.None
(31) Calamity Prevention		1.Enough 2.Not enough 3.None
(32) Countermeasure for Calamity		1.Ready 2.Not much 3.Not at all
(33) Record of River Discharge		1.Yes 2.No 3.N.A. (not available)
(34) Record of Intake Discharge		1.Yes 2.No 3.N.A. (not available)
B. On-Farm Water Management Information		
B.1 Drought * **Number** the box based on the choices or fill appropriate figure.		
(1) Coordination during Drought		1.Difficult 2.Not Difficult 3.No problem
(2) Irrigation Method during Drought		1.None 2.Rotation 3.Others, explain;
(3) Intake Discharge during Drought		m3/s
(4) Irrigation Area during Drought		ha
B.2 Others		
(1) Compliance with Cropping Pattern		1.Enough 2.Not enough 3.None
(2) Compliance with Water Distribution Plan		1.Enough 2.Not enough 3.None
(3) Condition of Over-water-taking		1.Rampant 2.Not much 3.None
(4) Condition of Illegal Water Taking		1.Rampant 2.Not much 3.None

Evaluation of "A. Maintenance" and "B. On-Farm Water Management Information"

* Every item is graded from 0 to 10. The most positive condition is rated as 10, while the most negative state is ra
* (5) of "A.1" is rated according to the highest answer of farmers' involvement, when plural answers are chosen.
* As for (7) of "A.1", the average value of frequency is rated.

A. Maintenance

A.1 General	(1)	(2)	(3)	(4)	(5)*	(6)	(7)*	
							#DIV/0!	
A.2 Irrigation Facility								
A.2.1 Intake Facility	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
A.2.2 Others	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)
	(33)	(34)						

B. On-Farm Water Management Information

B.1 Drought	(1)	(2)						
B.2 Others	(1)	(2)	(3)	(4)				

The average rate of "A." and "B."

#DIV/0!

C. Last 5 Years Record of Program of Works (PoWs)

Please fill the sheet, "**V.2 C. PoW summary**", based on the actually approved and implemented PoWs in the la
The aim of this information is to categorize the work items implemented in the past, and to measure economical
of each work item annually, for future planning. Filling procedures are as followings.

1. Prepare all the PoWs in the last 5 years.
2. Each work item of a PoW should be categorized into one of the combinations in the table below.

No	Major Work Item	Unit
1	Desilting, Canal	km
2	Desilting, Drainage	km
3	Canal Lining	m
4	Road Surfacing	km
5	Road Concreting	m
6	Dam Repair	LS
7	River Diversion	LS
8	Drainage Improvement	m
9	Facility Improvement	site
10	Institutional Development	LS
11	Others	LS

3. Fill the sheet, "**V.2 C. PoW summary**", referring to the sample sheets based on the actual PoWs.

* The sheet, "Sample V.2 C. PoW", shows components of actual PoWs. And the sheet, "Sample V.2 C. PoW **summary**" is the filled form of PoW summary, based on the information of "Sample V.2 C. PoW" sheet. Refer to "Description Guidelines for NIS Inventory Format" for filin structure. **The sheet, "Sample V.2 C. PoW", is just a sample to show PoWs' components as reference, so it is not necessary to make.**

* The amount is the total direct cost base. Refer to the sheet, "V.2 C. PoW summary" for other detail

4. Calculations and graphs in "V.2 C. PoW analysis" sheet will be automatically obtained, when "V.2 C. PoW summary" is properly filled.

D. Collaboration with Other Agencies

(1) Last 5 Years Record of Maintenance, Rehabilitation and Improvement (**MRI**) Works Supported by LGUs

Year	Target Facility & Location of Works, and Major Work Items	Volume of Works	Cost ('000 P)	Source of Fund (Program & Project)

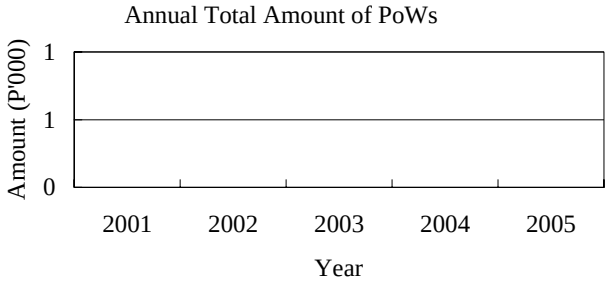
(2) Any Other Collaboration with LGU/Other Organization (not only facility rehabilitation but also agricultural extension, etc)

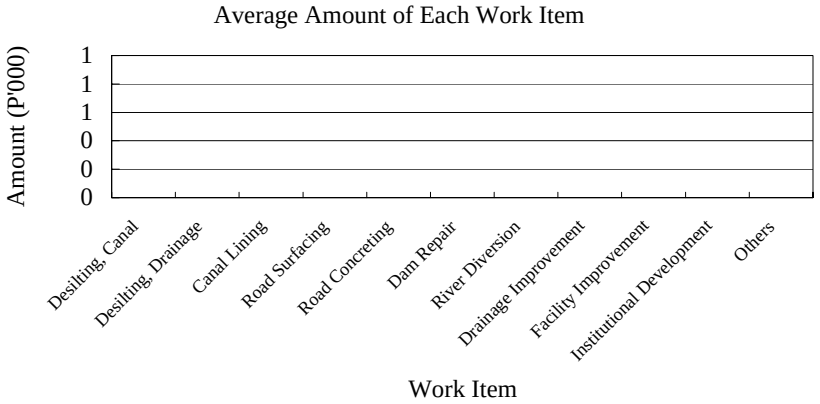
Year	Description of Collaboration with LGU/Other Organization

Analysis of Last 5 Years PoWs

Name of NIS				Region					
Item	Year					Total	Average	Cost/SA Peso/ha	Cost/FUSA Peso/ha
	2001	2002	2003	2004	2005				
Number of PoWs	0	0	0	0	0	0	0	-	-
Annual Total Amount ('000 Pesos)	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!

	Work Item ('000 Pesos)	2001	2002	2003	2004	2005	Total	Average	Share (%)	Rank	
1	Desilting, Canal	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	Total Share
2	Desilting, Drainage	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	of Rank 1-3
3	Canal Lining	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!
4	Road Surfacing	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	Total Share
5	Road Concreting	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	of Rank 1-5
6	Dam Repair	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!
7	River Diversion	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	
8	Drainage Improvement	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	
9	Facility Improvement	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	
10	Institutional Development	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	
11	Others	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	
Total		0	0	0	0	0	0	0	#DIV/0!		





Chronological Record of All Program of Works in the Last 5 Years (Direct Cost Base)

Name of NISO Region

Approved Year	No	Name of Project	Fund Source *1	Work to Be Undertaken	Major Work Item *2	Location	Unit	Volume	Amount (P) *3
								Sub-total 1	
								Sub-total 2	
								Sub-total 3	

Chronological Record of All Program of Works in the Last 5 Years (Direct Cost Base)

Name of NISO Region

Approved Year	No	Name of Project	Fund Source *1	Work to Be Undertaken	Major Work Item *2	Location	Unit	Volume	Amount (P) *3
								Sub-total 4	
								Sub-total 5	
								Grand Total	

5.3 NIS Information ***Figures in colored cells are calculated automatically.**

A. Management Record

(1) Name of NIS		
(2) Number of Staff Assigned to NIS		
(3) Number of Permanent Staff Assigned to NIS		
(4) Number of Engineers Assigned to NIS		
(5) Number of IDOs Assigned to NIS		
(6) Service Area of NIS		ha
(7) Firmed-Up Service Area of NIS		ha
(8) IMT Completed Area of NIS		ha

(9) Last 5 Years **Irrigated Area (ha)** of NIS

	2005	2004	2003	2002	2001	Average
Dry						#DIV/0!
Wet						#DIV/0!
Year	0	0	0	0	0	0

(10) Last 5 Years **Benefited Area (ha)** of NIS

	2005	2004	2003	2002	2001	Average
Dry						#DIV/0!
Wet						#DIV/0!
Year	0	0	0	0	0	0

(11) Last 5 Years **Cropping Intensity (%)** of NIS (Service Area Base)

	2005	2004	2003	2002	2001	Average
Dry	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Wet	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Year	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

(12) Last 5 Years **Average Yield (cavan/ha)** of NIS

	2005	2004	2003	2002	2001	Average
Dry						#DIV/0!
Wet						#DIV/0!
Year	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

(13) Last 5 Years **ISF Collection Efficiency (%)** of NIS; **Current Account**

	2005	2004	2003	2002	2001	Average
Dry						#DIV/0!
Wet						#DIV/0!
Year						#DIV/0!

(14) Total Debt of NIS to IA due to Unpaid Remuneration (Pesos)

2005	2004	2003	2002	2001	2000	1999	1998	1997	1996

B. IA (each NIS) ***Figures in colored cells are automatically excerpted from the other sheet.**

(1) Fill the attached sheet, "**V.3 B. IA**", first, then fill the followings based on it.

(2) Number of IAs		
(3) Average Size of Service Area / IA	#DIV/0!	ha
(4) Average Years after Organization	#DIV/0!	years
(5) Overall Membership Rate (No. of members/Potential No. of farmers)	#DIV/0!	%

(6) Number of IAs for Each Grade of Functionality Survey (2004)

Grade	Outstanding	V.Satisfactory	Satisfactory	Fair	Poor	Average Pts
Number	0	0	0	0	0	#DIV/0!

C. Past Records of Major Rehabilitation

(1) Historical Record of All Major Program of Works (PoWs), Actually Implemented and Expended, **More Than 5 Million Pesos**, from Start of Operation to Date

Year	Items of Work		Project Cost ('000 P)	Name of Project	Source of Fund
	Major	Others			

IA List

No.of each Rating	O	0	
	VS	0	
	S	0	
	F	0	
	P	0	

Region

Name of NISO

Name of NIS

***1 Add lines when necessary.**

***2 Colored cells calculate necessary values automatically.**

***3 Figures of thick lined cells with shade are automatically referred to the other sheet.**

No	Name	Service Area	Years after Organization	No. of Farmers			Type of Contract 1/						Functionality	
				Potential	Members	%	None	Type I	Type II	IMT	Others	Total	Rating 2/	Points 3/
						#DIV/0!						0		0
						#DIV/0!						0		0
						#DIV/0!						0		0
						#DIV/0!						0		0
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						#DIV/0!						0		0
Total		0	-	0	0	-	0	0	0	0	0	-	-	-
Average		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	-	-	-	-	-	#DIV/0!	-	#DIV/0!

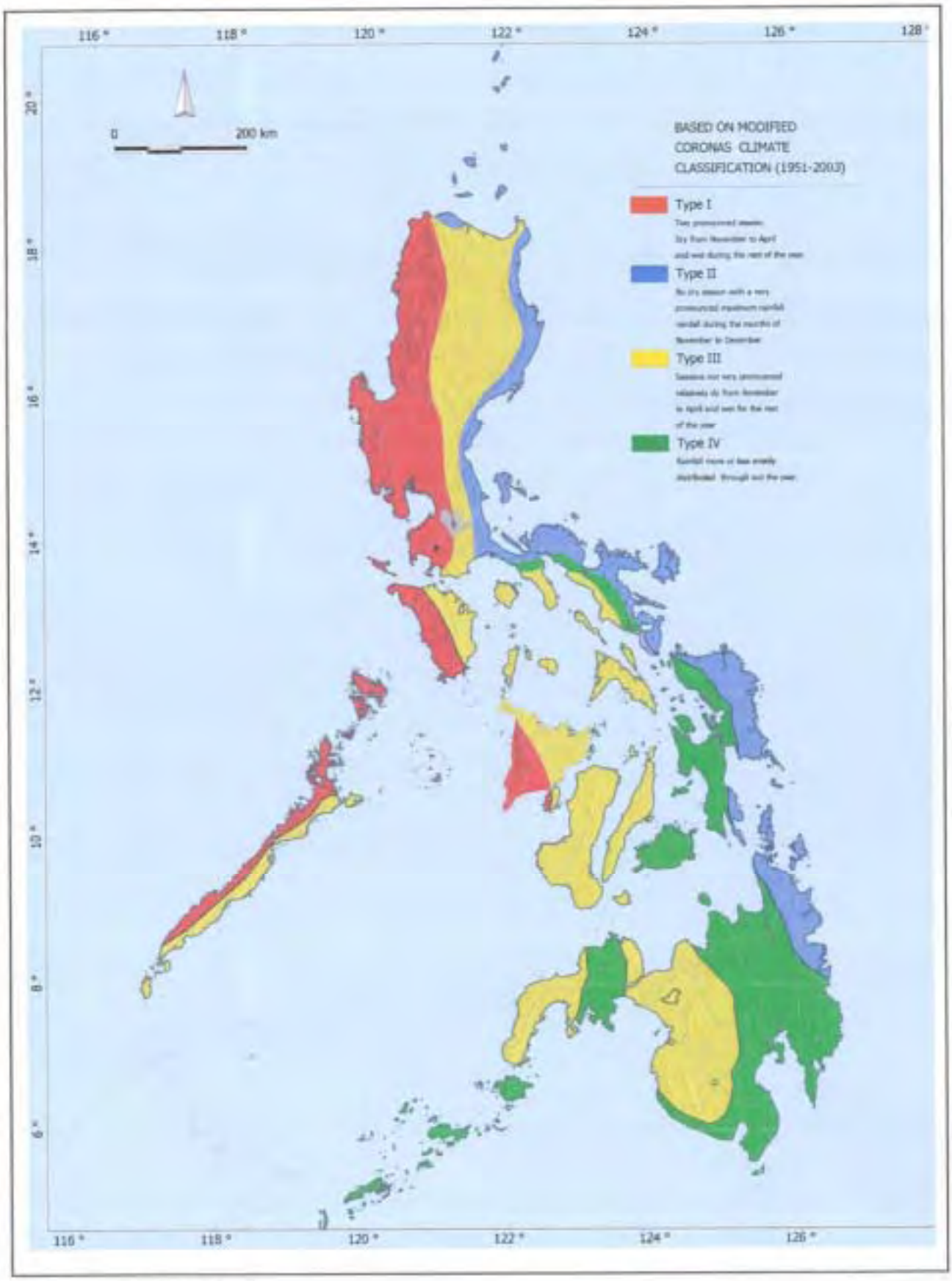
1/ Put "1" in corresponding cells.

2/ The Functionality Ratings are classified into; O: Outstanding, VS: Very Satisfactory, S: Satisfactory, F: Fine, and P: Poor.
Put their initials as "O", "VS", "S", "F" or "P".

3/ The Functionality Points are automatically calculated as; O: 4pts, VS: 3pts, S: 2pts, F: 1pt, and P: 0pt.

Form IS-2 Description Guidelines for NIS Inventory Survey

Information	Item		Description Guidelines
	No	Item	
I. General			This information is mostly derived from "NIS Profile" prepared annually by each NISO /PIMO Office. Colored boxes are automatically calculated using the Microsoft Excel function. Therefore, the colored boxes should never be clicked, or never input the data by manual. **Electric files for I General, II Water Resources and Irrigation Water Requirement, and III Flood and Drainage are saved in the Folder of "Inventory Survey Format I, II, and III".**
II. Water Resource and Irrigation Water Requirement (IWR)			Prior to start the filling works of this section of "Water Resources and Irrigation Water Requirement", following data should firstly be arranged and tabulated; Table 2-1 : Monthly Average Discharge Records (at Diversion Dam/Dam Site) Table 2-2 : Monthly Average Discharge Records (at Adjacent Station in Other Drainage Area) Table 2-3 : Monthly Average Diverted Intake Discharge Records Table 2-4 : Monthly Rainfall Records (near Service Area) Table 2-5 : Monthly Rainfall Records (around Drainage Area/Diversion Dam Site) Table 2-6 : Firm-Up Service Area, Program Area, Irrigated and Benefited Areas Figure 2-1 : Typical Cropping Pattern of Paddy These data are to be updated annually by adding new monthly data, although at the initial inventory survey all the data are newly arranged and tabulated. Regarding detailed descriptions of these data arrangement and tabulation, additional descriptions are given in subsequent section Titled by "Tabulation of Tables and Figures".
2.1 Available Water Resources	(3)	Climate Type	Refer to attached "Climate Map of the Philippines" to decide the climate type around the NISs concerned. In general, climate types of the Philippines are classified into four of Type –I, II, III and IV.
	(4)	Average River Discharge at Diversion Site	Based on the tabulated river discharge (Table 2-1), seasonal (dry and wet seasons) and annual average river discharges are inputted with the **unit of m^3/sec**.
	(5)	Average Diverted Intake Discharge	Based on the tabulated diverted intake discharges (Table 2-3), seasonal (dry and wet seasons) and annual average intake discharges are inputted with the **unit of m^3/sec**.



Climate Map of The Philippines

Information	Item		Description Guidelines
	No	Item	
	(6)	Total Rainfall	Based on the tabulated monthly rainfall (Table 2-4 and Table 2-5), seasonal (dry and wet seasons) and annual rainfall observed at near service area or around drainage area are inputted with the **unit of mm/month.**
2.2 Irrigation Water Requirement	(2)	Irrigation Area in Crop Year (CY) of 200X-200Y	Irrigated areas of CY of 200X to 200Y, which corresponds to the periods from the dry season crop in 200X to the wet season crop in 200Y, are described. Irrigation areas are derived from the report of "Operation Plan (OP)" periodically prepared by each NISO/PIMO by the end of August 200X.
	(3)	First Crop	First crop (dry season crop or wet season crop) is chosen, and marked with encircle (O) .
	(4)	Irrigation Parameter for LS/LP	These parameters classified into dry and wet seasons for land soaking and land preparation (LS/LP) are derived from the OP mentioned above.
	(5)	Average Monthly Irrigation Water Requirement (IWR)	Average monthly irrigation water requirement are periodically calculated in the above mentioned OMP, so these figures could be obtained as shown below; <u>Crop Water Requirement (CWR) (Without Effective Rainfall)</u> CWR (P + Et) with the **unit of mm/day** (in case of without effective rainfall) for dry and wet seasons could be derived from the Form 04-1 of the Operation Plan (OP). <u>Turn-Out Water Duty (qtni) (Without Effective Rainfall)</u> Qtni with the **unit of lit/sec/ha** (in case of without effective rainfall) for dry and wet seasons could also be derived from the Form 04-1 of the OP <u>Irrigation Diversion Requirement (IDR)</u> IDR with the **unit of lit/sec/ha** (in case of without effective rainfall) for dry and wet seasons could be calculated by dividing irrigation diversion requirement (lit/sec) by programmed area (ha).
	(6)	Maximum Unit Land Soaking Irrigation Requirement (qtsi)	qtsi with the **unit of lit/sec/ha** for dry and wet seasons could be derived from Form 06 of OMP.

Information	Item		Description Guidelines
	No	Item	
	(7)	Area and Percentage of Water Shortage	Areas having irrigation water shortage for both dry and wet season during the reported crop year (CY) are inputted, and their percentages of the water shortage ratio are automatically calculated by Micro-Soft Excel function.
	(8)	Location of Water Shortage Occurrence in Dry Season	Occurrence of water shortage, especially during dry season is shown with a mark of encircle (O).
	(9)	Damaged Amounts by Water Shortage	Estimated damages amounts caused by the water shortage are inputted for the dry and wet seasons.
	(10)	Reasons of Water Shortage	Corresponding reasons of the water shortages are chosen with a mark of encircle (O).
	(11)	Utilization Condition of Return Flow	When re-used of return flow is planned in the system, their facility, name and numbers, and coverage areas by return flow are inputted.
2.3 Farm Management Conditions	(1)	Present Cropping Pattern and Irrigated Area	Present cropping pattern and irrigated areas for dry and wet seasons are inputted, and then their cropping intensities are automatically calculated by Micro-Soft Excel function.
	(2)	Introduction of Water Saving Technology in Dry Season	Water saving technology methods, areas and their introduction periods are described, if they were applied during dry season.
	(3)	Introduction Period of Water Saving Technology	Durations for introducing the water saving technology are inputted.
2.4 Balance of Available Water Resources (AWR) and IWR			Average River Discharge (RD) Monthly basis of average RD with the **unit of m^3/sec** could be derived from Table 2-2, and inputted in each month. Average Diverted Intake Discharge (DID) Monthly basis of DID with unit of the **unit of m^3/sec** could be derived from Table 2-3, and inputted in each month. Average Irrigation Diversion Requirement (IDR) Monthly basis of IDR with the **unit of m^3/sec** could be derived from Form 04-1 of Operation Plan (OP), but dimension of the unit has to converted from **lit./sec to m3/sec**.

Information	Item		Description Guidelines
	No	Item	
			Based on these elements, relations of available discharges, diverted intake discharges and IWR are automatically shown in graph.
2.5 Evaluation of Water Use	(1)	Present Water Use Conditions and Problems	Present water use (irrigation) conditions and major problems encountered during the reported crop year are itemized.
	(2)	Countermeasures to solve the Problems	Expected necessary countermeasures to solve above problems are itemized.
III. Flood and Drainage			
3.1 Flood Information	(2)	Average Annual Rainfall	This amount could be derived from Table 2-6.
	(3)	Peak Flood Discharge, Daily Rainfall at Diversion Dam Site	These data during past 10-year are considered to be some difficult to find, but fill-up will be made on the basis of past record, hearing investigation from inhabitants living in the area, etc.
	(4)	Design Flood Discharge at Diversion Dam	Design flood discharge and its expected probability (return period) are inputted.
3.2 Drainage Information	(1)	Inundation Conditions	Inundation conditions such as inundation area by canal systems, inundation periods, and inundation damage amounts for the reported crop year (CY) are inputted. And, expected reasons for the inundation are selected with a mark of encircle (O).
3.3 Evaluation of Flood and Drainage Conditions	(1)	Flood and Drainage Conditions and Problems	Present flood and drainage conditions and major problems encountered during the reported crop year are itemized.
	(2)	Countermeasures to solve the Problems	Expected necessary countermeasures to solve above problems are itemized.
TABULATION OF TABLES AND FIGURES		Table 2-1	Monthly Average Discharge Records (at Diversion Dam/Dam Site) Daily basis of runoff discharge records at diversion site are periodically observed by NIA, so these data arranged in monthly basis are tabulated with the **unit of m^3/sec**. And, seasonal (dry and wet seasons) and annual average amounts are calculated. Decision of the definition of the dry and wet season periods will be made based on the monthly rainfall amounts presented in Table 2-4 and Table 2-5. Furthermore, mean, maximum and minimum amounts are automatically calculated by computer.

Information	Item		Description Guidelines
	No	Item	
		Table 2-2	Monthly Average Discharge Records (at Adjacent Station in Other Drainage Area) In connection with Table 2-1, if no observation data at diversion dam site were available, runoff data should be estimated applying drainage area ratio between diversion dam site and an actual observation site in the vicinity of the service area. Therefore, these discharge records are tabulated with the **unit of m^3/sec**, and seasonal (dry and wet seasons), annual average and mean , maximum and minimum amounts are calculated.
		Table 2-3	Monthly Average Diverted Intake Discharge Records NIA has been observing the daily basis of diverted intake discharges for irrigation purposes to the system. These data arranged in the monthly basis are tabulated as long as possible of data with the **unit of m^3/sec**. Seasonal (dry and wet seasons), annual average, maximum and minimum amounts are also calculated.
		Table 2-4	Monthly Rainfall Records (near Service Area) Monthly rainfall data observed around service area are generally available at PIMO or PAGASA, and tabulated with the **unit of mm/month**. Seasonal (dry and wet seasons), annual, maximum and minimum amounts are also calculated.
		Table 2-5	Monthly Rainfall Records (around Drainage Area/Diversion Dam Site) Rainfall data around drainage area or at the diversion dam site are available observed by other agencies such as DA, PAGASA, etc are also tabulated with the **unit of mm/month** in case the data of Table 2-4 are not available. Seasonal (dry and wet seasons), annual, maximum and minimum amounts are also calculated.
		Table 2-6	Firm-Up Service Areas, Program Areas, Irrigated and Benefited Areas Firm-up Service Areas, Program Areas, Irrigated and Benefited Areas in both dry and wet seasons are tabulated with the **unit of hectare** depending on available data.
		Figure 2-1	Typical Cropping Pattern of Paddy Prevailed typical cropping pattern of paddy is delineated with weekly basis, which could be derived from the "Operation Plan", which will be prepared annually by NISO as a seasonal formulation of land-soaking area and irrigation water distribution plan.

Information	Item		Description Guidelines
	No	Item	
IV. Functionality of Irrigation and Drainage Facilities		General information	This field covers information of functionality of irrigation and drainage facilities. The three Excel files ("**NIS Inventory IV. 1. Diversion Dam .xls**", "**NIS Inventory IV. 2. Canal .xls**" and "**NIS Inventory IV. 3. Pumping Station .xls**" consists of 12 sheets (1. Diversion Dam), 18 sheets (2. Canal) and 4 sheets (3. Pumping Station).
		Basics	1. Figures in the colored cells (the color is **gray** in the Excel file) are calculated from other sheet automatically. Therefore, nothing should be inputted. 2. Please put answers in empty boxes with thicker line. Some are table format. 3. For the questions, which have multiple choices, please change from "0" to "1" and answer with under-line. 4. The slope shall be shown as Vertical : Horizontal (this is Japanese style, exp. = 1 : 1.5).
		Criteria of judgment for the conditions	Severe: need repair, rehabilitation or improvement with no-good function. Moderate: need normally maintenance with function. None: no need maintenance, repair, rehabilitation and improvement with good function
		Necessary data and documents etc.	1) "NIS Profile" prepared annually by each NISO/PIMO Office, 2) "Major Irrigation Facilities Inventory Survey" by JICA Short-term Expert (SMD-JICA, 2004), 3) "MC13: Preliminary Assessment of System Performance (Walk Thru Results)" prepared by each NISO/PIMO Office, 4) "Drawings of Structures" and "Profile and Plan of Canal" prepared by each NISO/PIMO Office,
4.1 Diversion Dam		Structure and Component	The content is as follow: 1.Diversion Dam A. Dimension Survey B. Facility Functional Survey C. Present Structural Situation of Spillway D. Present Structural Situation of Sluice Way E. Present Structural Situation of Protection Dike and Side-wall

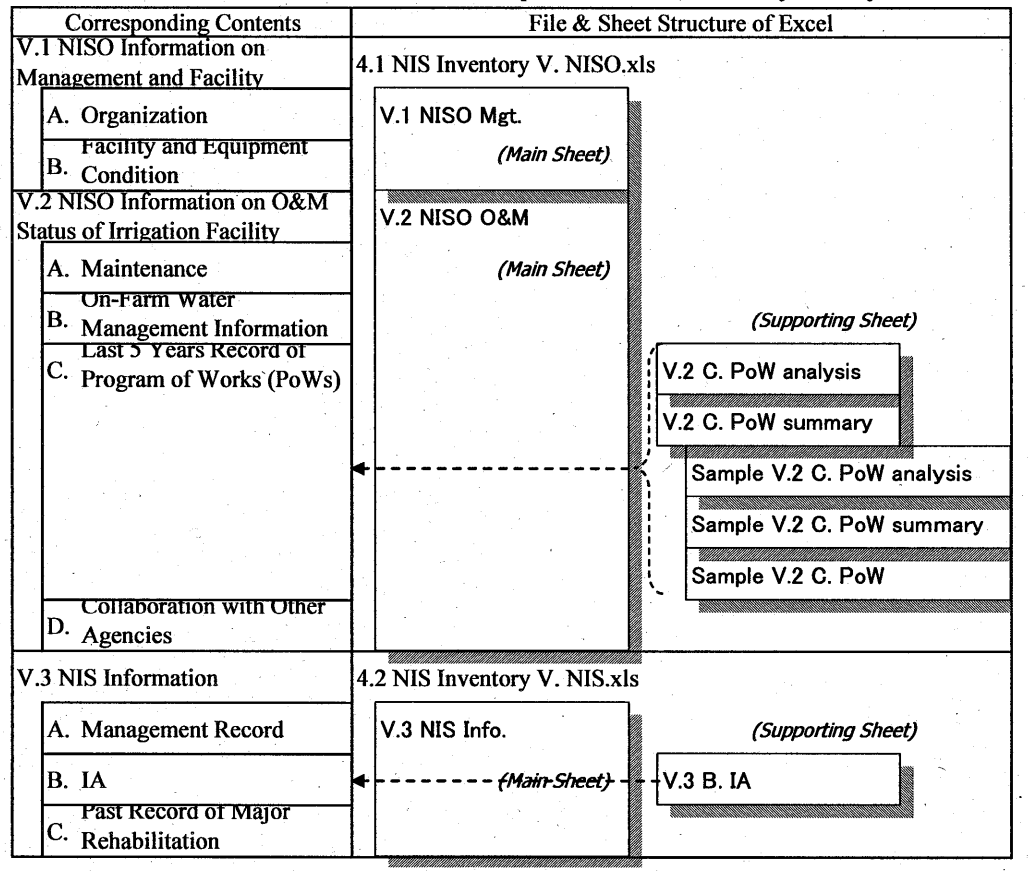
Information	Item		Description Guidelines
	No	Item	
			F. Present Structural Situation of Fish Ladder G. Present Structural Situation of Intake H. Present Structural Situation of Sediment Settling Basin
Technical Term		Technical term	Refer to attached "Typical Layout of Diversion Dam" (Figure-2 to 3) to understand the technical terms.
A.1 General Information	(12)	Type of Weir	"Fixed Type" is "Weir Type"
A.2 Hydrology	(5)	Riverbed Elevation (Upstream)	Riverbed elevation (U/S) is the same elevation on the crest elevation of weir.
C.1.1 Structure of Fixed Weir	(4)	Weir Height	Weir Height = Crest elevation – Elevation at the end of D/S apron
C.2.7 Structure Spillway Gate	(37)	Material of Spillway Gate	"Iron" is "Steel iron" and "Cast iron" etc.
D. Present Structural Situation of Sluice Way	(1)	Sluice Way	If there are two sluice ways at the both sides, please get copy page 5/12 to 8/12 to answer respectively.
D.1.1 Structure of Sluice Way	(4)	Width of Sluice Way	Width of sluice way is included both thickness of abutment piers
F. Present Structural Situation of Fish Ladder	(1)	Fish Ladder	If there are plural fish ladders, please get copy page 9/12 to 10/12 to answer respectively.
G. Present Structural Situation of Intake	(1)	Location of Intake	If there are two intakes at the both sides, please get copy page 10/12 to 11/12 to answer respectively.

Information	Item		Description Guidelines
	No	Item	
4.2 Canal		Structure and Component	The content is as follow: 2. Canal A. Dimension and Facilities Functional Survey B. Present Structural Situation of Main Canal C. Present Structural Situation of Lateral A and Sub-lateral A D. Present Structural Situation of Lateral B and Sub-lateral B E. Present Structural Situation of Lateral C and Sub-lateral C F. Present Structural Situation of Lateral D and Sub-lateral D G. Present Structural Situation of Lateral E and Sub-lateral E
		Additional copy	This NIS Inventory Survey Format has one main canal and five lateral canals. Please get additional copy (page 1/18 to 4/18 for main canal and page 16/18 to 18/18 for lateral canal), if need.
B.1.1 Structure of Main Canal	(6)	No. of Aqueduct	"Aqueduct" is bridge type canal.
V. Organization and O&M Information		Structure and Component	The purpose of this part is to collect information for organization and O&M condition on NISOs and NISs separately. Information of office organization, equipment, maintenance activities, Program of Works (PoWs), etc. should be collected on NISO basis, while information of area, IA, and past record of facility rehabilitation should be collected on NIS basis. Refer to Table XXX for existing NISOs and NISs. On the other hand, the Excel file of this section consists of two files, and file "4.1 NIS Inventory V. NISO.xls" has seven sheets, while "4.2 NIS Inventory V. NIS.xls" has two sheets. The relationship is described as the figure below.

Information	Item		Description Guidelines
	No	Item	

The structure is complicated, because;

1. Information of NISO and NIS must be separated. This inventory survey focuses on



physical information mainly for every NIS. But O&M activities in each NIS are carried out by NISOs. So, when a NISO is managing several NISs, there is inseparable information as a NISO or it is very difficult for several NISOs to separate some sorts of information. Therefore, managerial information is collected as one whole NISO and physical information is collected as one NIS. Therefore contents in the file "4.1 NIS Inventory V. NISO.xls" should be same for responsible

Information	Item		Description Guidelines
	No	Item	
			NISs under one NISO. 2. Supporting sheets are required to summarize PoWs and IA data, because they have quite a lot of information. 3. Sample sheets are attached as examples for summarization and categorization of work items in PoWs.
		Basics	1. Please read the notes around the questions carefully and refer to the samples before you fill the format. 2. Figures in the **colored cells** (the color is **gray** in the Excel file.) are calculated or/ and excerpted from other sheet automatically. Therefore **nothing should be inputted**. 3. Please put answers in empty boxes with thicker line. Some are table format. 4. For the questions, which have multiple choices, please put the corresponding number in the box.
5.1 NISO Information on Management and Facility			The Excel file, "4.1 NIS Inventory V. NISO.xls", requires information of the whole NISO as one.
A. Organization	(1)-(10)		Please fill the blank boxes.
	(11)	Last 5 Years Viability Index (VI) of NISO	Please put the figures to 2 decimal places, like 0.87, 1.09, for example.
	(12), (13)		Please put the figures in '000 Pesos. One million pesos is described as 1,000.
	(14)	Organization Chart	Please draw an Organization Chart of NISO including positions and number of staffs.
B. Facility and Equipment Condition	(1)-(5)		Please follow the instruction of the note(s) on the sheet. As indicated in the notes, please put the corresponding numbers, not words, for selection of the status on condition and frequency.
5.2 NISO Information on O&M Status of Irrigation Facility			The Excel file, "4.1 NIS Inventory V. NISO.xls", requires information of the whole NISO as one.
A. Maintenance			The information is aiming to overview the condition of maintenance activity.
A.1 General	(1)-(4)		Please put a corresponding number, not a word, for selection of the answer.
	(5)	Planning Method of Program of Works' Components	This is multiple choices. You can choose more than one answer.
	(6)	Frequency of Regular Inspection	Same as (1)-(4).
	(7)	Frequency and Activity of	In the upper row, please put a corresponding number, not a word, for selection of the

Information	Item		Description Guidelines
	No	Item	
		Regular Maintenance of Facility	answer. In the lower raw, please write the activities.
A.2 Irrigation Facility			
A.2.1 Intake Facility	(1)-(24)		These are the questions for fulfillment of maintenance on major intake facilities, according to the structures. Please put a corresponding number, not a word, for selection of the answer. When some of the facilities are not in the NIS, please leave them blank. For instance, an ordinary NIS has a diversion dam but no reservoir dam and pump station.
A.2.2 Others	(25)-(34)		These are the questions for the facilities aside from the intake facility. Please put a corresponding number, not a word, for selection of the answer.
B. On-Farm Water Management Information			The information is aiming to overview the On-farm water management condition.
B.1 Drought	(1), (2)		Please put a corresponding number.
	(3), (4)		Please put a appropriate figures.
B.2 Others	(1)-(4)		Please put a corresponding number.
Evaluation of "A. Maintenance" and "B. On-Farm Water Management Information"			The results of "A." and "B." are automatically graded from 0 to 10. The most positive condition is rated as 10, while the most negative state is rated as 0.
C. Last 5 Years Record of Program of Works (PoWs)	(2)		The aim of this information is to categorize the work items implemented in the past, and to measure economical amount of each work item annually, for future planning. Please refer the instructions of the sheet and the instructions in the below, "Supporting Excel Sheet", to fill it. Those 11 work items are chosen from the analysis on actual PoWs of the last 5 years in Angat-Maasim RIS.
D. Collaboration with Other Agencies	(1)		Collaborative efforts with LGUs accompanied with their commitment are described here.
	(2)		Collaborative efforts with LGUs and other organizations (including NGOs, private sector, etc.) accompanied with their commitment are described here.
Supporting Excel Sheet			Supporting Excel sheets are required to summarize data of PoWs, because they have quite a lot of information. Sample sheets are required as examples for categorization of PoW work items.
5.2 C. PoW analysis			Calculations and graphs in "V.2 C. PoW analysis" sheet will be automatically obtained, when "V.2 C. PoW summary" is properly filled.

Information	Item		Description Guidelines
	No	Item	
5.2 C. PoW summary			Please fill the table based on the actual PoWs in NISO. Main targets on this sheet are; 1. to tabulate PoWs in last 5 years, and 2. to categorize all programs into 11 work items. The amount of the cost is the total **direct cost** base, excluding indirect cost to simplify the tabulation. General procedures are explained in the Part **V.2 C. Last 5 Years Record of Program of Works (PoWs),** of the Excel sheet, "V.2 NISO O&M". In order to extract and calculate values automatically, the following rules must be kept. 1. Fill the cells in the table highlighted as printing area. Cells outside the printing area contain formula, so they should not be touched. 2. Column B, "Approved Year"; Approved year of all PoWs must be put, starting from the cell of A10. Column B must be filled for all independent PoWs, otherwise extraction of "Amount" (Column P) will not be made. 3. Column C, "No"; The figures of this column stand for the number of PoWs in each year. 4. Column H (& I, J), "Manor Work Item"; One of the major work items in the table below on the sheet should be put in this column, otherwise the amount of the work will not be reflected to the following calculation. Although actual works in the field consists of several number of items and may not match one of those 11 items completely, it is important to overview the tendency of the amount of certain kind of work item. 5. Column K (& L, M), "Location"; Location and station of the works are important to identify the volume of works. 6. Column N, "Unit"; Unit of the volume should be encoded in the column. 7. Column O, "Volume"; Volume of the work should be encoded in the column. 8. Column P, "Amount (P)"; The amount of the cost is the **direct cost** base, excluding indirect cost to simplify the tabulation. 9. The line of sub-total should be provided at the bottom of each year. "Sub-total 1" to "Sub-total 5" should be inputted in the Column O to extract annual sub-total automatically to the sheet of "V.2 C. PoW analysis", as they are provided in the table. Extraction is made in the cell R2 – R6. 10. When you want to increase the number of lines, copy existing lines and insert them, neither just copy nor insert, so that calculations in the line would not be disturbed.
Sample Excel Sheets			1. Sample sheets are provided as examples for categorization of PoW work items. The sheet, "Sample V.2 C. **PoW**", has the contents of regular PoWs. **This sheet is just an example, so there is no need to make it.**

Information	Item		Description Guidelines
	No	Item	
			2. The sheet, "Sample V.2 C. **PoW summary**", is the result of categorization and summarization of the contents of PoWs. The amount of the cost is the total **direct cost** base, excluding indirect cost to simplify the tabulation. 3. Please refer both of them to fill the Excel sheet, "V.2 C. PoW summary". 4. "Sample V.2 C. **PoW analysis**" shows the result of summarization and categorization of "Sample V.2 C. **PoW summary**". Calculations and graphs will be automatically obtained, when "V.2 C. **PoW summary**" is properly filled.
5.3 NIS Information			The Excel file, "4.2 NIS Inventory V. NIS.xls", requires information of each NIS.
A. Management Record			The Excel sheet, "V.3 NIS Info.", requires information of NIS, IA and past record of major rehabilitation of the NIS.
	(1)-(8)		Please fill the blank boxes.
	(9)-(14)		Please fill the blank boxes in the tables. Colored cells automatically calculate values. In the item, "(13) Last 5 Years ISF Collection Efficiency (%) of NIS", please put ISF collection efficiency for each dry/ wet season, and annual basis.
B. IA			Most cells are filled automatically, after the Excel sheet, "**V.3 B. IA**", is filled.
	(1)		Therefore, the sheet, "**V.3 B. IA**", should be filled first. Please refer the instructions of "Supporting Excel Sheet" to fill it.
	(2)-(6)		Put the number of IAs of the NIS in "(2) Number of IAs". Other cells are automatically filled after the Excel sheet, "**V.3 B. IA**", is filled.
C. Past Records of Major Rehabilitation	(1)	Historical Record of Major PoWs (> 5 million Pesos)	All major program of works (PoWs), actually implemented and expended, with the cost of more than 5 million Pesos, from start of operation to date, should be explained here. Although old PoWs may not be available, please fill the table as much as and as exactly as possible. You can add more lines, when necessary.
Supporting Excel Sheet			Supporting Excel sheets are required to summarize IA data, because they have quite a lot of information.
V.3 B. IA			Please fill the table based on the latest status of all IAs of the NIS. Colored cells calculates values automatically. Please refer the notes of the sheet for details. Calculated values are automatically excerpted for the information of IAs in the Excel sheet of "V.3 NIS Info.".