CHAPTER IV.

ANALYSIS AND EVALUATION OF NIS INVENTORY SURVEY

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4.1 Analysis on the Results of the Inventory Survey and Identification of Potential and Problems in Pilot NISs

This paragraph deals with the results of analysis based on the Inventory Survey conducted at the following three Pilot NISs.

- AMRIS (South Main Canal) (Region-III)
- Sta. Cruz RIS (Region-IV)
- Agana RIS (Region-VI)

4.1.1 Water Resources, Irrigation Water Use and Flood and Drainage

1) Water Balance Study

One of the important subjects of the Inventory Survey is water balance conditions, whether water resources are enough or not to meet irrigation water requirements. In order to analyze this subject, following data of fundamental hydrology and water use were collected and tabulated at each Pilot NIS Area.

- Monthly average runoff discharge at diversion dam sites (in case no runoff discharge data is available at diversion dam sites, the data at the sites can be estimated by applying the area ratio between the diversion dam sites and an actual discharge observation site adjacent to the target diversion site)
- Monthly average diverted intake discharge and irrigation water requirements
- Monthly rainfall records at drainage area/diversion dam sites and near service areas
- Firmed-up service areas, program area, irrigated and benefited areas
- Typical cropping patterns of paddy

Out of these data, elements of monthly average runoff discharge, monthly average diverted intake discharge, and irrigation water requirement during a report year, (e.g. CY 2004-2005), were tabulated for comparison of monthly data. Figure 4-1 indicates the results of the water balance survey compared with the above mentioned elements. The annual discharges at the three Pilot NISs are summarized as shown below.

Discharge Comparison at the Pilot Areas

(unit : m^3/sec)

RIS	Average Runoff Discharge at Div. Dam Site	Average Diverted Intake Discharge	Irrigation Water Req (CY2004-2005)	Cropping Intensity (%) (CY2004-2005)
AMRIS	16.95	8.69[1/] (51%)[2/]	8.69	152
Sta. Cruz RIS	4.52	3.25 (72%)	2.16	183
Aganan RIS	1.73	1.23 (71%)	1.53	145

1/ : Diverted intake discharges in AMRIS are discharges only for both South Main Canals
2/ : Percentage of diverted intake discharges against average runoff discharges

Followings give general features of each NIS's water balance analysis.

AMRIS (Region III)

Irrigation water for AMRIS area relies on the released discharge (outflow) at the Angat Main Unit for hydropower, and its average discharge released is 33.17 cu.m/sec throughout a year except for April and May, of which monthly discharge is less than 20 cu.m/sec. Percentage of the diverted intake discharge against the runoff discharge is 51 percent per annum. According to the data, average runoff discharge is big enough against the diverted discharge, because of adjusted/stored water by the Angat Dam. However, there exist some critical months of April and May, during which the amount of released water through the Angat Main Unit for hydropower are limited in volume.

Sta. Cruz RIS (Region IV)

Average diverted intake discharge of 3.25 cu.m/sec is almost equal to the average runoff discharge of 4.52 cu.m/sec, which means most of the average river runoff discharges are diverted on average. This diverted discharge seems to be enough to meet required irrigation water. Under the situation, water shortage conditions are considered to be not very severe in this system. Actually, cropping intensity of 183 percent is the highest among the three Pilot NIS areas.

Aganan RIS (Region VI)

As is observed from the graph shown in Figure 4-1, drastic fluctuation of an average runoff discharge is found out between the dry and wet seasons. Especially, during the dry season from January to April, only scarce runoff discharge is available at diversion dam sites. These conditions generally lead to low cropping intensity during the dry season. Even in the comparison between average runoff discharge and the required irrigation water in CY 2004-2005, water shortage is observed.

From these situations, it can be considered that shortages of irrigation water frequently occur in this irrigation system. Although the reasons of these significant features are not cleared at present, some dilapidation of a catchment area due to an increase in deforestation, implementation of slash-and burn farming in the basin, or smallness of the catchment area compared with the current service area are considered.

From these characteristics of each NIS's water resource and irrigation water requirement mentioned above, it can be described that the volume of irrigation water at each NIS on a of cropping pattern and cropping intensity correspond to the available runoff discharge with return period of about 1/2, which will be the minimum criteria for planning an irrigation scheme. However, in the case of Aganan RIS, available water resources are limited. Therefore, in this NIS an adequate review on cropping pattern and intensity, especially during the dry season can be recommended.

2) Evaluation of Irrigation and Drainage Condition

In order to get more detailed information on water resources, irrigation water use and flood and drainage problems facing the NISO, description data and information were also collected in the Inventory Survey. Table 4-1 indicates major problems and countermeasures to solve them. These data and information would be effective to grasp the current situations of irrigation and drainage facilities, and prioritize the facility improvement among related improvement subjects.

Figure 4-1 Results of Water Balance at Three Pilot NISs Areas

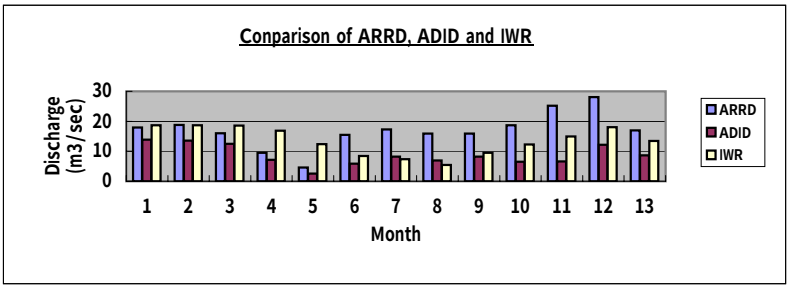
AMRIS (Reg-III) (unit : m^3/sec)

Item	1	2	3	4	5	6	7	8	9	10	11	12	Ave.
Average River Runoff Discharge (ARRD) (total)	34.55	36.05	30.81	18.26	9.28	31	34.61	31.76	31.91	37.41	48.39	53.95	33.17
Average River Runoff Discharge (ARRD) (South	17.97	18.75	16.02	9.49	4.64	15.5	17.31	15.88	15.96	18.71	25.16	28.05	16.95
Average Diverted Intake Discharge (ADID)	13.90	13.58	12.47	7.14	2.57	5.92	8.24	6.97	8.18	6.52	6.66	12.18	8.69
Irrigation Water Requirement in CY (IWR)	18.7	18.7	18.54	16.82	12.38	8.45	7.4	5.44	9.51	12.31	14.96	18.07	13.44

1/ : Estimated by the proportion of irrigation areas in South Main Canal against whole irrigation areas.

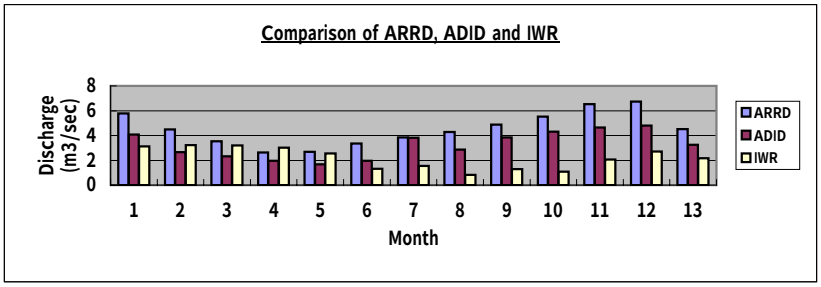
Dry season (Nov - Apr) : 52 %

Wet season (May - Oct.) : 50 %



Sta. Cruz (Reg.-IV) (unit : m3/sec)

Item	1	2	3	4	5	6	7	8	9	10	11	12	Ave.
Average River Runoff Discharge (ARRD)	5.79	4.49	3.53	2.62	2.69	3.36	3.85	4.28	4.87	5.51	6.54	6.73	4.52
Average Diverted Intake Discharge (ADID)	4.07	2.66	2.33	1.97	1.67	1.97	3.81	2.87	3.85	4.3	4.65	4.79	3.25
Irrigation Water Requirement in CY (IWR)	3.11	3.23	3.2	3.03	2.56	1.32	1.55	0.82	1.3	1.08	2.07	2.7	2.16



Aganan RIS (Reg.-VI) (unit : m3/sec)

Item	1	2	3	4	5	6	7	8	9	10	11	12	Ave.
Average River Runoff Discharge (ARRD)	0.98	0.22	0.37	0.59	0.77	1.6	3.56	3.07	2.33	3.98	2.04	1.27	1.73
Average Diverted Intake Discharge (ADID)	0.65	0.36	0.11	0.11	1.23	1.81	1.74	1.76	2.15	2.24	1.58	1.03	1.23
Irrigation Water Requirement in CY (IWR)	1.99	2.15	2.34	2.15	1.36	2.25	0	0	2.73	0	1.72	1.62	1.53

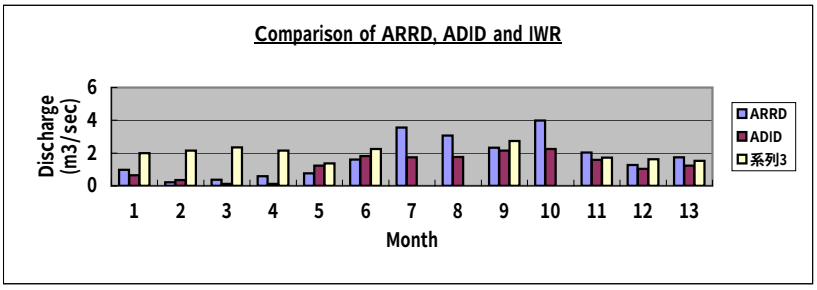


Table 4-1 Major Problems and Countermeasures

RIS	Water Resource and Water Use	Flood and Drainage
AMRIS (Reg.-III)	Problems Stable water supply for irrigation is not secured, because water supply from the Angat Dam through Angat Main Unit is reduced year by year depending on the recent rapid increase of water distribution for domestic water supply to Metro Manila. Countermeasures Monitoring and coordination with NWRB are essential for increasing water release from Angat Dam.	Problems WS-5 : Poor drainage canal conditions due to many squatter houses on the canal embankment. WS6-7: No program area due to regular inundation during the wet season with low lying elevation. WS-12: Poor drainage canal conditions due to many squatter houses on the canal embankment Countermeasures Adequate maintenance of drainage canal by removal of squatter houses
Sta. Cruz RIS (Reg.-IV)	Problems - In August 2005, Sta.Cruz river discharge declined from 3.0 m3/sec of normal discharge to 2.2 m3/sec - Farming activities do not follow the proposed cropping schedule, and then water management is difficult in the systems - Water stealing is frequently happens nearby operating head-gate at night. - Countermeasures - Meeting with an attendance of farmers will be needed to explain to follow the proposed cropping schedule - Tapping an assistance of LGU staff for police power	Problems - Low lying areas along the Laguna Lake were inundated in October 2005 for about one week. Countermeasures - Dredging works for natural drainages will be needed, if funds are available.
Aganan RIS (Reg.-VI)	Problems Farm ditches have been provided at the on-farm level under the Jalaur Multi-Purpose Irrigation Project, which have been implemented during 1997-1983, but at present most of the farm ditches do not exist at the on-farm level. Therefore, effective water distribution could not be implemented. Countermeasures Promotion and strengthening of IA for provision of farm ditches at the on-farm level.	Problems Due to no rehabilitation works of drainage facilities, frequent drainage damages are taken place at the downstream areas during the wet season. Countermeasures Provision and rehabilitation of drainage canals.

4.1.2 Functionality of Irrigation and Drainage Facilities

1) Present Conditions of Irrigation and Drainage Facilities

a) AMRIS (Region III)

(1) Diversion Dam

Assessments of conditions and function of the diversion dam are as follows:

Work Item	Condition	Maintenance (31% to 70%)	Rehabilitation/Improvement (71% to 100%)
Repair Reconstruction Improvement	Damaged, Scoured/Washed-away Leak	- Sluice Way, - Protection Dike - Protection Sidewall	- D/S Apron,
Desilting Flush away	Sedimentation	- Sluice Way	

(2) Canals

Assessments of conditions and function of the canals are as follows:

Work Item	Condition	Maintenance (31% to 70%)	Rehabilitation/Improvement (71% to 100%)
Repair Reconstruction Improvement	Damaged, Scoured/Washed-away Leak	- Main Canals - Lateral Canals	- Related Structure of Main Canal - Related Structure of Lateral
Desilting Flush away	Sedimentation	- Main Canals - Lateral Canals	- Related Structure of Main Canal - Related Structure of Lateral
Repainting	Rust		- Related Structure of Lateral

b) Sta. Cruz RIS (Region IV)

(1) Diversion Dam

Assessments of conditions and function of diversion dam are as follows:

Work Item	Condition	Maintenance (31% to 70%)	Rehabilitation/Improvement (71% to 100%)
Repair Reconstruction Improvement	Damaged, Scoured/Washed-away Leak	- Weir - Sluice Way - Protection Sidewall - Sluice Way Gate - Intake Gate	- Spillway, - Sluice Way, - Protection Dike and Side-wall,
Desilting Flush away	Sedimentation		- Spillway, - Sluice Way,
Repainting	Rust	- Sluice Way Gate, - Intake Gate,	

(2) Canals

Assessments of conditions and function of canals are as follows:

Work Item	Condition	Maintenance (31% to 70%)	Rehabilitation/Improvement (71% to 100%)
Repair Reconstruction	Damaged, Scoured/Washed-away	- Main Canal - Related Structure of Main Canal	

Improvement	Leak	- Lateral Canal	
Desilting Flush away	Sedimentation	- Lateral, Canal - Related Structure of Lateral	
Repainting	Rust	- Related Structure of Lateral Gate	

c) Aganan RIS (Region VI)

(1) Diversion Dam

Assessments of conditions and function of the diversion dam are as follows:

Work Item	Condition	Maintenance (31% to 70%)	Rehabilitation/Improvement (71% to 100%)
Repair Reconstruction Improvement	Damaged, Scoured/Washed-away Leak	- D/S Riverbed Protection - Sluice Way Pier - Intake - Protection Dike - Sluice Way gate	
Desilting Flush away	Sedimentation		- Sluice Way - Intake
Repainting	Rust	- Sluice Way Gate - Intake Gate	

(2) Canals

Assessments of conditions and function of the canal are as follows:

Work Item	Condition	Maintenance (31% to 70%)	Rehabilitation/Improvement (71% to 100%)
Repair Reconstruction Improvement	Damaged, Scoured/Washed-away Leak	- Main Canal - Related Structure of Main Canal - Lateral Canal - Related Structure of Lateral	- Related Structure of Main canal - Related Structure of Lateral
Desilting	Sedimentation		- Main canal - Lateral Canal
Repainting	Rust	- Related Structure of Main canal - Related Structure of Lateral	- Related Structure of Main canal - Related Structure of Lateral

2) Maintenance Plan and Costs

Maintenance components and scales are picked-up from Table A3-7 (1) and A3-8 (1) in Appendices of Manual. Maintenance costs are estimated as follows.

a) AMRIS (South main canal: in Region III)

Summary Table of Maintenance Cost for Diversion Dam (unit: peso)

Maintenance Component	Type	Unit	Quntities	Unit Cost	Amount
1. Repair of sluice way (left)	large	m	1.50	3,250	4,900
2. Repair of sluice way (right)	large	m	1.50	3,250	4,900
3. Repair of protection dike (left)	medium	m	20.20	970	19,600
4. Repair of protection dike (right)	medium	m	20.20	970	19,600
5. Repair of protection sidewall (left)	small	m	5.80	520	3,000
6. Repair of protection sidewall (right)	medium	m	10.80	1,840	19,900
7. Greasing of sluice way gates (left and right)	large	set	3.00	2,100	6,300
8. Greasing of intake gates (left and right)	small	set	22.00	450	9,900
Total Annual Maintenance Cost					**88,100**
Maintenance Cost / Service Area					**3**

Summary Table of Maintenance Cost for Main and Lateral Canal (unit: peso)

Maintenance Component	Type	Unit	Quntities	Unit Cost	Amount
1. Repair of damaged south main canal	large	km	3.00	66,400	199,200
2. Repair of leaked south main canal	large	km	3.00	54,700	164,100
3. Desilting of south main canal	large	km	3.00	10,500	31,500
4. Maintenance of related structure of south main canal	large	place	1.00	294,200	294,200
5. Repair of damarged Lateral Canal	large	km	19.60	37,600	737,000
6. Repair of damarged Lateral Canal	medium	km	6.20	22,900	142,000
7. Repair of leaked Lateral Canal	large	km	19.60	37,600	737,000
8. Repair of leaked Lateral Canal	medium	km	6.20	22,900	142,000
9. Desilting of Lateral Canal	large	km	18.50	1,300	24,100
10. Desilting of Lateral Canal	medium	km	6.20	300	1,900
11. Maintenance of related structure of Lateral Canal	large	place	21.00	33,800	709,800
12. Maintenance of related structure of Lateral Canal	medium	place	9.00	12,700	114,300
Total					**3,297,100**

Note: The greasing cost of related canal structure will be included in maintenance cost of related structures.

Summary Table of Annual Maintenance Cost (Service area: Dam 26,791ha, Canal 10,129ha, unit: peso)

Description	Maintenance Cost	Maintenance Cost / Service Area
1. Diversion Dam	88,100	3
2. Main/Lateral Canal	3,297,100	326
Annual Total Maintenance Cost	**3385200**	**329**

< Actual amount: 539 Peso/ha
(see page 4-13)

b) Sta. Cruz RIS (Region IV)

Summary Table of Maintenance Cost for Diversion Dam (unit: peso)

Maintenance Component	Type	Unit	Quntities	Unit Cost	Amount
1. Repair of weir	medium	m	7.50	1,680	12,600
2. Repair of sluice way (left)	medium	m	1.00	2,170	2,200
3. Repair of protection sidewall (right)	medium	m	5.00	1,840	9,200
4. Repair of sluice way gate (left)	medium	set	1.00	68,000	68,000
5. Replace of seal rubber for sluice way gate (left)	medium	set	1.00	1,320	1,300
6. Repainting of sluice way gate (left)	medium	set	1.00	3,650	3,700
7. Greasing of sluice way gate (left)	medium	set	1.00	690	700
8. Repair of intake gate (left)	large	set	1.00	46,600	46,600
9. Repainting of intake gate (left)	large	set	1.00	2,500	2,500
10. Greasing of intake gate (left)	large	set	3.00	600	1,800
Total Annual Maintenance Cost					**146,800**

Summary Table of Maintenance Cost for Main and Lateral Canal (unit: peso)

Maintenance Component	Type	Unit	Quntities	Unit Cost	Amount
1. Repair of damaged main canal	medium	km	0.20	37,500	7,500
2. Repair of leaked main canal	medium	km	0.20	32,600	6,500
3. Desilting of main canal	medium	km	0.20	2,500	500
4. Maintenance of related structure of main canal	medium	place	1.00	82,800	82,800
5. Repair of damarged Lateral Canal	large	km	1.30	37,600	48,900
6. Repair of damarged Lateral Canal	medium	km	1.90	22,900	43,500
7. Repair of leaked Lateral Canal	large	km	1.30	37,600	48,900
8. Repair of leaked Lateral Canal	medium	km	1.90	22,900	43,500
9. Desilting of Lateral Canal	large	km	1.30	1,300	1,700
10. Desilting of Lateral Canal	medium	km	1.90	300	600
11. Maintenance of related structure of Lateral Canal	large	place	1.00	33,800	33,800
Total					**318,200**

Summary Table of Annual Maintenance Cost (Service area: 2,184ha, unit: peso)

Description	Maintenance Cost
1. Diversion Dam	146,800
2. Main/Lateral Canal	318,200
Annual Total Maintenance Cost	**465,000**
Maintenance Cost / Servuce Area	**220**

< Actual amount: 266 Peso/ha
(see page 4-13)

c) Aganan RIS (Region VI)

Summary Table of Maintenance Cost for Diversion Dam (unit: peso)

Maintenance Component	Type	Unit	Quntities	Unit Cost	Amount
1. Repair of D/S riverbed protection	small	m^2	400.00	174	69,600
2. Repair of sluice way pier	medium	pc.	1.00	29,300	29,300
3. Repair of intake concrete	medium	lot	1.00	58,540	58,500
4. Repair of protection dike (left)	medium	m	14.00	970	13,600
5. Repair of sluice way gate	medium	set	1.00	68,000	68,000
6. Replace of seal rubber for sluice way gate	medium	set	1.00	1,320	1,300
7. Greasing of sluice way gate	medium	set	1.00	690	700
8. Repainting of sluice way gate	medium	set	1.00	1,250	1,300
9. Repainting of intake gate	medium	set	1.00	1,250	1,300
10. Greasing of intake gate	medium	set	7.00	510	3,600
Total					**242,300**

Summary Table of Maintenance Cost for Main and Lateral Canal (unit: peso)

Maintenance Component	Type	Unit	Quntities	Unit Cost	Amount
1. Repair of damaged main canal	medium	km	1.20	37,500	45,000
2. Repair of leaked main canal	medium	km	1.20	32,600	39,100
3. Maintenance of related structure of main canal	medium	lot	1.00	82,800	82,800
4. Repair of damarged Lateral A	large	km	1.80	37,600	67,700
5. Repair of leaked Lateral A	large	km	1.80	37,600	67,700
6. Maintenance of related structure of Lateral A	large	lot	1.00	33,800	33,800
7. Repair of damaged Lateral B	large	km	2.10	37,600	79,000
8. Repair of leaked Lateral B	large	km	2.10	37,600	79,000
9. Maintenance of related structure of Lateral B	large	lot	1.00	33,800	33,800
10. Repair of damaged Lateral C	small	km	0.10	15,500	1,600
11. Maintenance of related structure of Lateral C	small	lot	1.00	3,200	3,200
12. Repair of damaged Lateral D	medium	km	0.50	22,900	11,500
13. Repair of leaked Lateral D	medium	km	0.50	22,900	11,500
Total					**544,200**

Summary Table of Annual Maintenance Cost (Service area: 4,472ha, unit: peso)

Description	Main. Cost
1. Diversion Dam	242,300
2. Main/Lateral Canal	544,200
Annual Maintenance Cost	**786,500**
Maintenance Cost / Service area	**176**

< Actual amount: 225 Peso/ha
(see page 4-13)

3) Plan and Cost of Rehabilitation and Improvement

Components and scales of rehabilitation and improvement are picked-up from Table A3-7 (1) and A3-8 (1) in Appendices of Manual. Rehabilitation and improvement costs are estimated as follows.

a) AMRIS (South main canal area: in Region III)

Summary Table of Rehabilitation and Improvement Cost for Diversion Dam (unit: peso)

Rehabilitation and improvement Component	Type	Unit	Quntities	Unit Cost	Amount
1. Improvement of D/S Apron	medium	m	160.00	2,980,000	476,800,000
Total					**476,800,000**

Note: The R/I Cost for Bustos Diversion Dam in "The Rehabilitation Project of Angat-Maasim River Irrigation System" is Pesos 470,000,00(

Summary Table of Rehabilitation and Improvement Cost for South Main Canal (unit: peso)

Rehabilitation and Improvement Component	Type	unit	Quantities	Unit Cost	Amount
1. Improvement of related structures of South Main Cana	large	place	2	4,250,000	8,500,000
2. Improvement of related structures of Lateral Bacao	medium	place	1	222,000	222,000
3. Improvement of related structures of Lateral E	large	place	2	854,000	1,708,000
4. Improvement of related structures of Lateral F	large	place	1	854,000	854,000
5. Improvement of related structures of Lateral H	medium	place	1	222,000	222,000
6. Improvement of related structures of Lateral J-extra	medium	place	1	222,000	222,000
Total					**11,728,000**

Summary Table of Rehabilitation and Improvement Cost (Service area: Dam 26,791ha, Canal 10,129ha, unit: peso)

Description	R/I Cost	R/I Cost / Service Area
1. Diversion Dam	476,800,000	17,800
2. Main/Lateral Canal	11,728,000	1,200
Total R/I Cost	**488,530,000**	19,000

< Actual amount: 603 Peso/ha/year x 30 years
= 18,100Peso/ha (see page 4-13)

b) Sta. Cruz RIS (region IV)

Summary Table of Rehabilitation and Improvement Cost for Diversion Dam (unit: peso)

Rehabilitation and improvement Component	Type	Unit	Quntities	Unit Cost	Amount
1. Improvement of D/S apron	medium	m	80.00	1,250,000	100,000,000
2. Improvement of D/S riverbed protection	medium	m2	1,600.00	3,500	5,600,000
3. Improvement of protection sidewall (left)	medium	m	50.00	97,000	4,850,000
Total					**110,500,000**

Note: The R/I Cost for Sta. Cruz Diversion Dam in "The Rehabilitation Project of Sta. Cruz River Irrigation System" is Pesos 79,000,000.

The present conditions of the main and lateral canals are assessed as "Severe" in Table A3-8 (3). However, there is no "Severe".

Summary Table of Rehabilitation and Improvement Cost (Service area: 2,184ha, unit: peso)

Description	R/I Cost
1. Diversion Dam	110,450,000
2. Main/Lateral Canal	0
Total R/I Cost	**110,450,000**
R/I Cost / Service area	**50,600**

< Actual amount: 742 Peso/ha/year x 70 years
= 51,900Peso/ha (see page 4-13)

c) Aganan RIS (Region VI)

Summary Table of Rehabilitation and Improvement Cost for Diversion Dam (unit: peso)

Rehabilitation and improvement Component	Type	Unit	Quntities	Unit Cost	Amount
1. Improvement of sluice way	medium	lot	1.00	11,600,000	11,600,000
2. Proposed sand settling basin	medium	lot	1.00	32,500,000	32,500,000
Total					**44,100,000**

Note: The R/I Coat for Aganan Diversion Dam in "The Rehabilitation Project of Aganan RIS" is Pesos 34,100,000.

Summary Table of Rehabilitation and Improvement Cost for Main and Lateral Canals (unit: peso)

Rehabilitation and Improvement Component	Type	unit	Quantities	Unit Cost	Amount
1. Desilting of main canal (R/ I)	medium	km	1.20	152,000	182,400
2. Improvement of related structure of main canal (R/I)	medium	place	2.00	498,000	996,000
3. Desilting of Lat. A (R/I)	large	km	1.80	55,600	100,100
4. Improvement of related structure of Lat. A (R/I)	large	place	1.00	256,000	256,000
5. Desilting of Lat. B	large	km	2.10	55,600	116,800
6. Improvement of related structure of Lat. B	large	place	2.00	256,000	512,000
7. Desilting of Lat. D	medium	km	0.50	26,200	13,100
8. Improvement of related structure of Lat. D	medium	place	1.00	108,000	108,000
Total					**2,284,400**

Summary Table of Rehabilitation and Improvement Cost (Service area: 4,467ha, unit: peso)

Description	Main. Cost
1. Diversion Dam	44,100,000
2. Main/Lateral Canal	2,284,400
Rehabilitation and Improvement Cost	**46,384,400**
R/I Cost / Service area	**10,372**

< Actual amount: 462 Peso/ha/year x 25 years
= 11,600Peso/ha (see page 4-13)

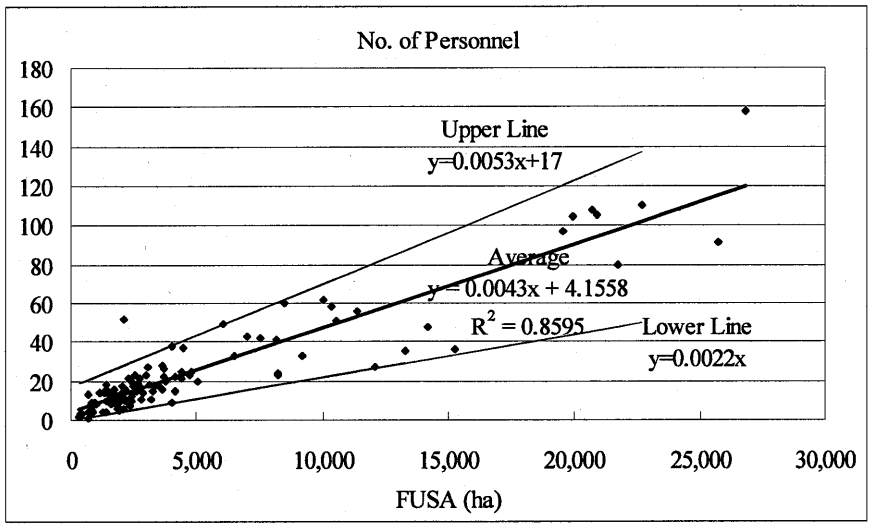
4.1.3 Organizations and O&M

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					
1) Viability Index		1.10	0.96	0.68	1.15
2) Operation Cost /FUSA	Peso/ha	1,125	1,523	1,164	715
3) Income/FUSA	Peso/ha	1,221	1,395	950	691
3. Maintenance Index					
1) Maintenance Index		5.3	4.0	6.0	5.5
4. Project Cost/FUSA					
1) 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					
1) Cropping Intensity	%	140	135	132	132
6. ISF Collection Efficiency					
1) ISF Collection Efficiency	%	62 (53 %;SMD 2004)	36	34	47
7. Irrigators Association					
1) Average IA Size	ha	413	277	615	486
2) Membership Rate of IA	%	75	100	100	79
3) IA Functionality Point		1.7	1.7	0.8	1.8

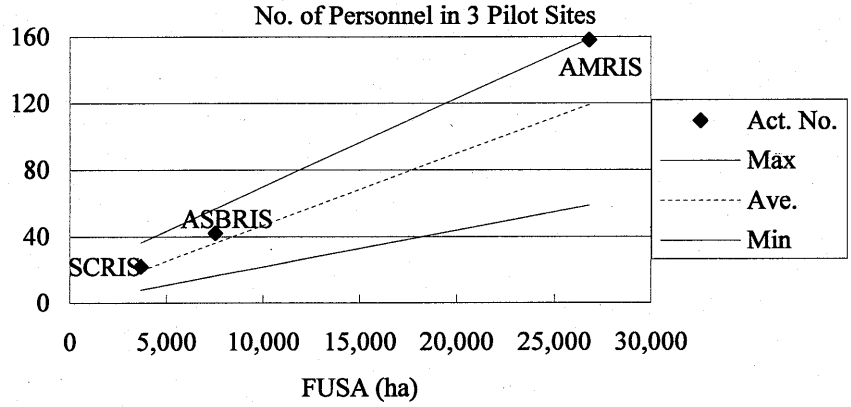
1) Firmed-Up Service Area (FUSA) / Personnel

From the analysis based on the 2006 inventory survey data, the relationship between FUSA and the number of personnel is shown in the right graph. 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.



The table and graph below show the actual and calculated numbers of personnel in the three Pilot Area sites.

No.	Item	Unit	AMRIS	SCRIS	ASBRIS
1	Firmed Up Service Area	ha	26,791	3,688	7,530
2	Actual No. of Personnel	pers.	158	22	42
3	Calculated No. of Personnel (Max)	pers.	159	37	57
4	Calculated No. of Personnel (Ave)	pers.	119	20	36
5	Calculated No. of Personnel (Min)	pers.	59	8	17



They show that all three Pilot Area sites are located within the range but above the average line. This means there is still a possibility for three NISOs to rationalize personnel management. But AMRIS and SCRIS also have a function as a Provincial Irrigation Office, therefore the number includes staffs working for Communal Irrigation Systems (CISs) simultaniously. Therefore planning for personnel management should be done carefully.

2) Viability Index and O&M Cost/FUSA

The detailed inventory survey data of the three Pilot Area sites and the national average for O&M cost are summarized in the table below.

Comparison of Operation and Mainyenance Costs

No.	Item	Unit	AMRIS	SCRIS	ASBRIS	Nat'l Ave.
1	Firmed Up Service Area	ha	26,791	3,688	7,530	
2	Actual No. of Personnel	pers.	158	22	42	
3	FUSA / Personnel	ha/pers	170	168	179	196
4	Total Expenses (Amount)	P'000	40,807	4,294	5,382	
5	Unit Amount/FUSA	P/ha	1,523	1,164	715	1,125
6	Unit Amount/Person	P'000/pers.	258	195	128	188
7	Personnel Services (Amount)	P'000	29,104	3,954	4,759	
8	MOOE (Amount)	P'000	11,703	340	623	
9	Personnel Services (Ratio)	%	71	92	88	80
10	MOOE (Ratio)	%	29	8	12	20
11	Total Income	P'000	37,384	3,504	5,203	
12	Unit Amount/FUSA	P/ha	1,395	950	691	1,221
13	ISF (Amount)	P'000	26,606	2,655	4,884	
14	Equipment Rental (Amount)	P'000	1,436	342	233	
15	Others (Amount)	P'000	9,342	507	86	
16	ISF (Ratio)	%	71	76	94	82
17	Equipment Rental (Ratio)	%	4	10	4	10
18	Others (Ratio)	%	25	14	2	8
19	ISF Collection Efficiency	%	36	34	47	53
20	Viability Index		0.96	0.68	1.15	1.20

Total Expenses

AMRIS and SCRIS exceed the national average, wherease ASBRIS has a lower figure. AMRIIS has the highest value of unit amount on personnel. The ratio of personnel services and MOOE at the national average are 80 : 20, while AMRIS marks higher ratio in MOOE at others are lower.

Total Income

As for the average income / FUSA, AMRIS has the highest value, while SCRIS and ASBRIS have quite lower values. The ratio of income sources of ISF, equipment rental and others of the national average are 82 : 10 : 8, while AMRIS marks higher ratio in others and ASBRIS largely depends on ISF.

These values indicate following features of the three Pilot Area sites.

Site	Implication
AMRIS	As the unit amount/FUSA of expense and the viability index show, input is positively done for MOOE supported by the income apart from ISF in spite of very low collection efficiency. Improvement of collection efficiency is strongly expected.
SCRIS	Expenses are mostly paid for personnel services, so that a fund for various activities might not be enough. The viability index is quite low due to very low collection efficiency, although the office has income sources from equipment rental and others. Improvement of collection efficiency is badly needed.
ASBRIS	The office is making extreme efforts to secure its viability, but that might be leading to the facility degradation. As the office heavily depends on ISF as the biggest source of income, its improvement is essential. However, the office has various sources of cooperation actually, which would be a great help for regular O&M.

3) Maintenance Index

The table below shows the maintenance index of pilot and the average values of NISs functioning well.

Item	AMRIS	SCRIS	ASBRIS	Nat'l Ave.
Maintenance				
1. General	6.3	8.4	3.5	5.6
2. Irrigation Facility				
2.1 Intake Facility				
Mechanical Devices	1.3	4.4	10.0	5.8
Diversion Dam	1.1	4.5	3.3	2.8
Pump Station	3.0			3.2
Reservoir Dam				3.9
2.2 Others	5.6	7.0	5.0	5.2
On-Farm Water Management Information				
1. Drought	5.0	5.0	7.5	6.5
2. Others	2.5	2.5	6.3	5.0
Overall Average	4.0	6.0	5.5	5.3

Noticable features of the three Pilot Area sites are summarized in the table below. However these are not based on the actual conditions of facilities, but referring to the section of irrigation and drainage facilities for the planning methodology on maintenance.

Site	Implication
AMRIS	The score of the general section is good, although the maitenance of intake facilities are poorly carried out. Compliance with water distribution plan and regulation (value in "2. Others, of On-Farm Wter Management Information") is quite low.
SCRIS	The score of the general section is quite good and maintenance for intake facilities is implemented, though it is not sufficient. Compliance with the water distribution plan and regulation is quite low.
ASBRIS	The office scored lower rate in the general section, mainly due to lack of manuals, but the mechanical devices are well maintained.

4) Project Cost/FUSA

The table below shows the costs for 11 major activities of Program of Works (PoWs) in the three Pilot Area sites and the national average. The total amount varies from 687 Pesos/ha of ASBRIS to 1,201 Pesos/ha of the national average. The total value of ASBRIS is very low. The values are also defined as maintenance cost and repair cost to clarify the purpose of use.

Work Items and Unit Amount Spent by PoW

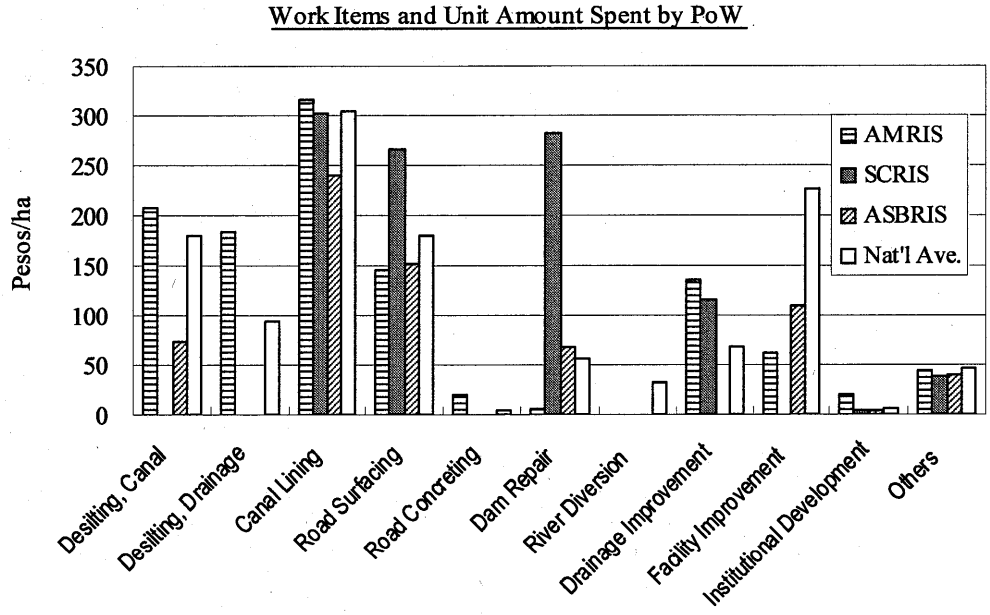
(unit; Pesos/ha)

Work Item	AMRIS	SCRIS	ASBRIS	Nat'l Ave.
1 Desilting, Canal	208	0	73	181
2 Desilting, Drainage	184	0	0	94
3 Canal Lining	316	301	239	305
4 Road Surfacing	147	266	152	181
5 Road Concreting	20	0	0	4
6 Dam Repair	7	282	69	55
7 River Diversion	0	0	0	33
8 Drainage Improvement	135	116	0	69
9 Facility Improvement	62	0	109	227
10 Institutional Development	19	4	5	7
11 Others	44	37	40	46
Total	1,142	1,008	687	1,201
Maintenance Cost (item 1,2,4,7)	539	266	225	489
R/I*1 Cost (other items)	603	742	462	713

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

*1: R/I; Rehabilitation and Improvement

Unit amount for each work item are shown in the graph below.



Noticable features of the three Pilot Area sites observed in the analyes are summarized in the table below, but needless to say, program coordination should be based on the actual conditions in the field. Refer to the section of irrigaiton and drainage facilites for actual program coordination.

Site	Implication
Common	Much invenstment for canal lining should be reconsidered from the economical aspect.
AMRIS	Nothing special is observed except for canal lining. Even though the system has a large-scale regulator dam, inputs into dam repair is quite minimal because Japanese grant supported its rehabilitation.
SCRIS	Inputs emphasize to canal lining, road surfacing and dam repair, while general maintenance works of desiltation have not been implemented for the last five years. In fact, the diversion dam have been endangered due to severe riverbed degradation since 2000, and major rehaiblitation works for the dam and desiltation have been approved for 2006 PoWs.
ASBRIS	Inputs are minimal except for canal lining, road surfacing and facility improvement. The total amount is very low, therfore, prioritization for work items should be carefully examined, if the situation is not be changed. As the office is emphasizing institutional development, that would be an effective way for improvement of facility maintenance in the long run.

5) Cropping Intensity

The table below shows the values of cropping intensity at the three Pilot Area sites and the national average. The values vary 44 percent durinng the dry season to 88 percent during the wet season at ASBRIS.

Cropping Intensity	AMRIS	Sta.Cruz	Aganan	Nat'l Ave.
Dry (%)	77	65	44	68
Wet (%)	58	67	88	73
Total	135	132	132	140

Noticable features of the three Pilot Area sites observed in the analyes are summarized in the table below, but actual conditions are not completely reflected on these values. Therefore refer to the section of water resources and irrigation water use for effective water management.

Site	Implication
AMRIS	The cropping intensity during the dry season is much higher than the figure in wet season, although it is still less than 80 percent. In fact, due to the steady release flow from Angat Dam upstream, managed by National Power Corporation, AMRIS has a good water source even during the dry season. However, the downstream area is located in lowland, and this is why the intensity is quite low during the wet season. Improvement of the drainage system may be effective, if it is feasible.
Sta.Cruz	The values during the dry and wet seasons are well balanced, but both are low. They report flood damages during the wet season at low lying areas near Laguna Lake. Improvement of water management during the dry season is important.
Aganan	The instensityduring the dry season is quite low, while its values during the wet season is very high. It indicates that the river discharge fluctuate widely. Efficient water management is crucial during the dry season and watershed management is also very important in the long run.

6) Collection Efficiency of Irrigation Service Fee (ISF)

The table below shows the ISF collection efficiencies of each NIS or its national average.

Collection Efficiency	AMRIS	Sta.Cruz	Aganan	Nat'l Ave.
%	36	34	47	53

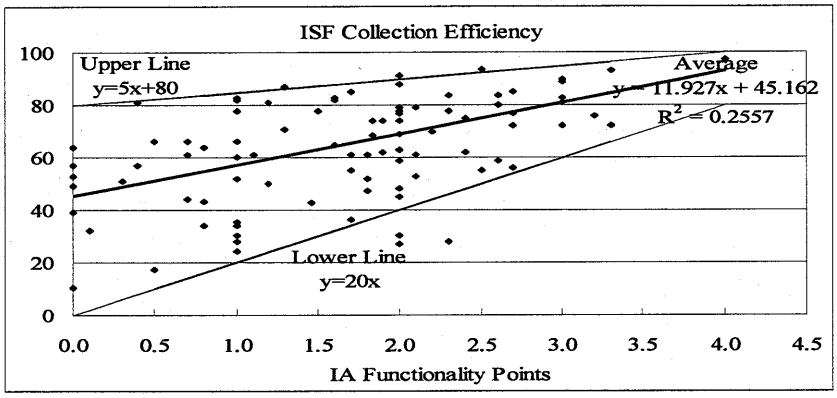
Note: Source of the national average is O&M Performance Report of SMD in 2004.

The collection efficiencies in AMRIS and Sta.Cruz are very low and that of Aganan is still lower than the national average, two. 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.

7) Irrigators Association

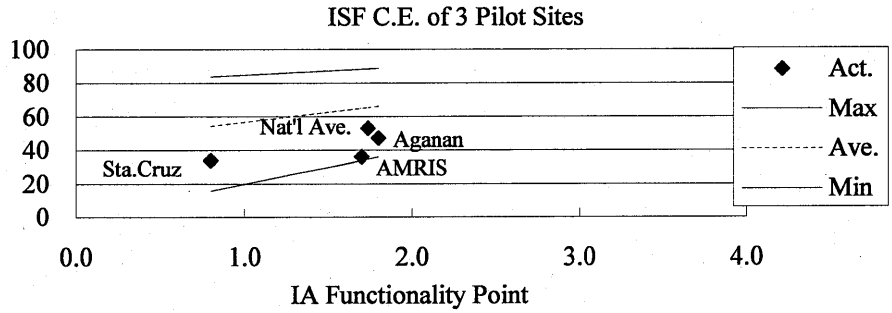
The inventory survey results shows the positive correlation between ISF collection efficiency and IA functionality points as shown in the graph below.



The graph shows that five 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 12 percent.

The table and graph below show the figures on the criteria of three Pilot Area sites and the national average. The figure of average area of IA is large in Sta.Cruz. These days, since the effectiveness of IA splitting has been appreciated as one of the methods to activate IAs, that might be a way of improvement. Membership rate in three Pilot Area sites are satisfactory rate. AMRIS and Aganan score lower rate in IA functionality point and Sta.Cruz scores quite low, worse than "Fair" in adjective rating. The graph shows the relationship between ISF C.E. and IA functionality point. Since they locate below the average line, there is a possibility to improve the ISF C.E. drastically through institutional development.

No.	Item	AMRIS	Sta.Cruz	Aganan	Nat'l Ave.
1	Average Area of IAs (ha)	277	615	486	413
2	Membership Rate (%)	100	100	79	75
3	IA Functionality Point	1.7	0.8	1.8	1.7
4	ISF C.E. (Actual)	36	34	47	53
5	ISF C.E. (Calculated Max)	89	84	89	89
6	ISF C.E. (Calculated Ave)	65	55	66	66
7	ISF C.E. (Calculated Min)	34	16	36	35
8	IDP Fund Allocation*1	Yes	No	No	39



The table also contains the allocation for five percent of institutional development program (IDP) fund in their program of works (PoWs). Although it must be allocated according to the MC No.59, S. 2003, many offices can not really allocate due to financial constraints or other reasons. Only AMRIS allocates it among three Pilot Area sites and that probability (1/3) is incidentally same as the national average.

Noticable features of the three Pilot Area sites observed in the analyes are summarized in the table below.

Site	Implication
Common	1. Current good membership rate should be maintained, but further efforts for institutional development should be made at system-wide level. 2. More than five percent of the institutional development program (IDP) funds must be included in locally funded projects as MC No.59, S. 2003 directs, in order to provide sustainable fund source for institutional development. 3. There should be at least one IDO in every responsible center to organize overall activities for IA support. 4. Reorientation of water resources facility technicians (WRFTs or water masters) as IDOs are necessary, because they are a direct interface of NISOs to IAs and in the closest position to support IAs carefully. 5. Collaboration with local authorities
AMRIS	Since AMRIS is a large office covering more than 26,000 ha, the office has a chief and a section for IDOs. Constant allocation of five percent of the IDP funds is appreciated. It should be maintained.
Sta.Cruz	Currently quite low functionality should be improved, though collaboration with LGUs for hiring ditch tenders is appreciated. Apart from the items raised as common implication, IA splitting should be considered for easier management within IAs.
Aganan	Although the overall functionality point for NIS is stll not high, their efforts to support IAs from various aspects are really appreciated, which should be maintained. Besides the utilization of the post harvest facilities granted by Japan, the office emphasizes support to farmers from various aspects by using its network with LGUs, NGOs and other institutions fully.

4.2 Analysis on Inventory Survey Results and Identification of Potential and Problems for Whole NISs

4.2.1 Water Resources, Irrigation Water Use and Flood and Drainage

The 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 Inventory Survey. Evaluation procedures are as follows;

Procedures to Evaluate Seasonal Potential Water Resources

Tabulation and Analysis of Monthly River Discharge
(see Table A2-8)

⇩

Tabulation and Analysis of Monthly Diverted Intake Discharge
(see Table A2-9)

⇩

Evaluation of Development Potential for Seasonal Water Resources
(see Table A2-10)

⇩

Presentation of Evaluation Results by Graph
(see Figure A2-1)

In the above procedures, the development potential for each seasonal water resources by NIS basis are evaluated using indexes of "High", "Medium", and "Low" depending on the available water resources.

Evaluation results are presented by the graph applying the Excel function, as shown in Figure 4-2. 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.

As seen in Figure 4-2, it is observed that the Region having development potential of water resources are Region-IX, Region-IV and Region-II, while Region-III, MARIIS, UPRIIS and Region-XI have entirely a scarce potential in terms of water resources.

4.2.2 Functionality of Irrigation and Drainage Facilities

1) Present Conditions of Irrigation and Drainage Facilities

The present conditions and classifications of irrigation and drainage facilities are shown in Table A2-5 and Table A3-8.

2) Maintenance Cost

Maintenance components and scales are picked-up from Table A3-7 (1) and A3-8 (1) in Appendices. The maintenance costs are given in Table 4-2.

The average maintenance cost of 506 Pesos/ha is almost same cost of the national average maintenance cost with 489 Pesos/ha of last five years.

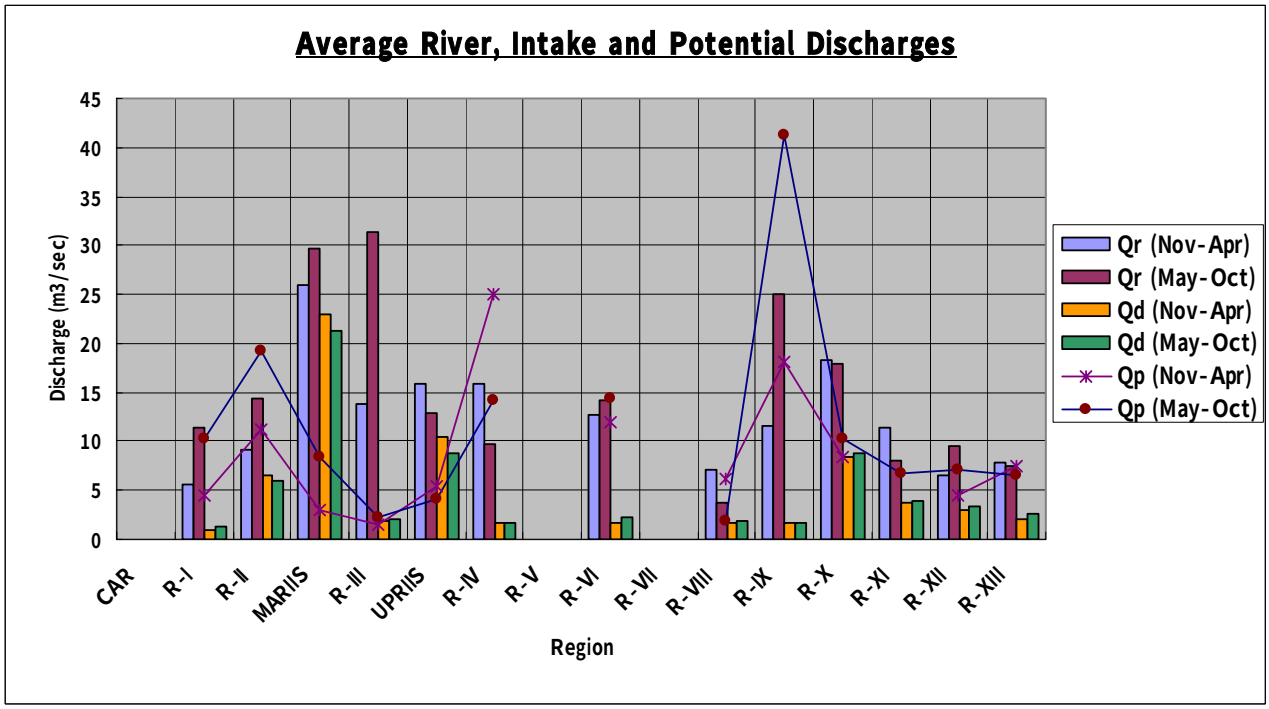
3) Rehabilitation and Improvement (R/I) Cost

The components and scales of rehabilitation and improvement are picked-up from Table A3-7 (1) and A3-8 (1) in Appendices. The rehabilitation and improvement costs are given in Table 4-3.

The average rehabilitation and improvement cost of 9,728 Pesos/ha is 13.6[1] times of the national average R/I cost with 713 Pesos/ha of last five years.

[1] This 13.6 times of the national average R/I cost is less than 20 to 25 times of Japanese results.

Figure 4-2 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

Table 4-2 Summary of Maintenance Cost (99 NISs)

No.	Reg.	NIS Name	FUSA	Estimated Maintenance Cost						Nat'l Ave.	Difference
				Dam	Pump Station	Canal	Canal Str.	Total	Unit Cost	Maint.Cost	(11)-(10)
			(ha)	(Pesos)	(Pesos)	(Pesos)	(Pesos)	(Pesos)	(P/ha)	(P/ha)	(P/ha)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1	CAR	Upper Chico	15,258	1,591,983	0	2,842,045	6,134,500	10,568,529	693	489	(-204)
5	Region I	Bonga PIS-2	545	0	246,950	90,319	284,200	621,469	1,140	489	(-651)
6		Bonga PIS-3	157	0	287,950	37,291	151,700	476,941	3,038	489	(-2,549)
9		Dingras	1,004	271,120	0	131,744	3,657,400	4,060,264	4,044	489	(-3,555)
10		Bolo	364	279,711	0	112,490	9,600	401,801	1,104	489	(-615)
11		Cura	550	510	0	125,583	9,600	135,693	247	489	242
13		Madongan Area	2,933	182,546	0	58,488	961,700	1,202,733	410	489	79
14		Solsona Area	1,340	271,938	0	13,868	769,200	1,055,006	787	489	(-298)
15		Labugaon Area	1,470	122,084	0	127,452	749,000	998,536	679	489	(-190)
16		Papa Area	2,337	278,304	0	93,900	414,000	786,204	336	489	153
17		Sta. Maria-Burgos	914	165,733	0	83,390	252,000	501,123	548	489	(-59)
18		Sta. Lucia-Candon	1,555	102,900	0	110,720	252,000	465,620	299	489	190
20		Amburayan	3,289	209,550	0	423,135	379,300	1,011,985	308	489	181
21		Ambayoan	3,945	8,656	0	574,546	152,400	735,602	186	489	303
23		Dipalo	2,002	403,576	0	82,757	63,500	549,834	275	489	214
25		Lower Agno	4,134	212,320	0	1,467,412	4,012,900	5,692,632	1,377	489	(-888)
26		San Fabian	2,026	157,190	0	128,783	413,000	698,973	345	489	144
27		Dumuloc	1,232	500,716	0	189,565	219,200	909,481	738	489	(-249)
31	Region II	Baua	1,867	223,041	0	50,448	273,800	547,288	293	489	196
32		Banurbur Creek	1,087	518,048	0	124,726	562,300	1,205,074	1,109	489	(-620)
33		Magapit PIS	10,046	0	503,300	632,661		1,135,961	113	489	376
34		Apayao-Abulog	8,175	290,800	0	1,368,474	1,725,800	3,385,074	414	489	75
36		Dummun	1,502	3,987	0	165,878	1,312,000	1,481,865	987	489	(-498)
38		Baggao	2,467	12,780	0	93,982	248,400	355,162	144	489	345
43		San Pablo Cabagan	1,365	0	0	157,945	1,491,900	1,649,845	1,209	489	(-720)
44		Tumauini	3,020	4,220	0	335,221	262,200	601,641	199	489	290
45		Mallig	2,419	359,232	0	294,423	827,500	1,481,155	612	489	(-123)
46		Bagabag	2,010	236,710	0	255,017	254,500	746,227	371	489	118
49	MRIIS	MRIIS Distric III	21,703	1,046,202	4,641,930	2,852,631	30,421,600	38,962,363	1,795	489	(-1,306)
53	Region III	Camiling	8,229	498,453	0	1,384,835	382,900	2,266,187	275	489	214
59		Porac	1,668	154,221	0	3,414	236,600	394,235	236	489	253
60		Gumain	1,997	246,245	0	23,400	74,000	343,645	172	489	317
63		Angat	26,791	88,026	0	4,285,429	5,819,800	10,193,255	380	489	109
64		Maasim	3,457	636,385	716,260	123,412	76,200	1,552,257	449	489	40
65		Disalit Creek	485	62,347	0	0	85,900	148,247	306	489	183
66	UPRIIS	UPRIIS District I	20,700	309,722	0	593,499	4,005,600	4,908,821	237	489	252
70		UPRIIS District IV	21,293	256,640	38,530	2,006,615	3,358,900	5,660,685	266	489	223
96	Region IV	Sta. Cruz	2,184	98,179	0	336,763	33,800	468,742	215	489	274
101		Dumacaa	1,840	209,522	0	554,536	1,187,600	1,951,658	1,061	489	(-572)
102		Hanagdong	280	114,904	0	26,362	127,900	269,166	961	489	(-472)
103		Lagnas	640	322,546	0	62,586	260,100	645,232	1,008	489	(-519)
114		Batang-Batang	3,062	190,060	0	310,604	1,816,900	2,317,564	757	489	(-268)
115		Malatgao	3,014	750,201	0	399,756	680,800	1,830,757	607	489	(-118)
131	Region VI	Aklan	3,891	323,916	0	368,406	635,800	1,328,122	341	489	148
132		Panakuyan	504	165,424	0	72,197	28,600	266,221	528	489	(-39)
133		Sibalom-San Jose	3,969	840,044	0	186,728	544,500	1,571,272	396	489	93
134		Mambusao	1,420	208,935	0	194,745	1,238,000	1,641,680	1,156	489	(-667)
135		Jalaur-Proper	8,208	2,242,284	389,980	1,055,545	5,740,000	9,427,809	1,149	489	(-660)
136		Jaluar- Extension	2,144	201,412	0	480,974	1,859,900	2,542,286	1,186	489	(-697)
137		Suague	2,453	162,050	0	0	368,400	530,450	216	489	273
138		Sibalom-Tigbuan	2,019	92,330	0	198,096	424,000	714,426	354	489	135
139		Aganan	4,467	273,908	0	405,149	148,400	827,457	185	489	304
140		Sta. Barbara	3,062	9,363	0	289,967	1,616,200	1,915,530	626	489	(-137)
141		Barotac Viejo	1,700	208,231	5,700	270,323	1,221,700	1,705,954	1,004	489	(-515)
142		Bago	13,277	327,050	0	995,669	5,041,800	6,364,519	479	489	10
143		Pangiplan	1,168	293,337	0	105,148	136,800	535,286	458	489	31
146	Region VIII	Mainit	2,161	340,783	0	82,975	322,500	746,257	345	489	144
147		Pongso	780	318,120	0	42,904	275,400	636,424	816	489	(-327)
148		Bao	2,185	224,145	0	254,217	407,200	885,562	405	489	84
153		Daguitan	916	151,740	0	76,899	160,000	388,639	424	489	65
154		Gumarona	646	69,710	0	0	15,900	85,610	133	489	356
155		Balire North	300	73,360	0	0	109,200	182,560	609	489	(-120)
156		Balire South	396	1,200	0	423	47,700	49,323	125	489	364
157		Ibawon	281	338,671	0	7,488	55,100	401,259	1,428	489	(-939)
158		Gibuya	738	247,996	0	22,878	437,300	708,173	960	489	(-471)
160		Hindang-Hilongos	720	1,200	0	0	41,600	42,800	59	489	430
161		Das-Ay	396	11,410	0	3,416	69,000	83,826	212	489	277
162	Region IX	Sibuguey Valley	2,642	3,060	0	0	403,000	406,060	154	489	335
163		Dipolo	1,571	702,147	0	77,412	160,400	939,958	598	489	(-109)
164		Salug	6,485	729,930	0	8,166	3,634,000	4,372,096	674	489	(-185)
165		Labangan	2,720	419,387	0	370,109	863,200	1,652,696	608	489	(-119)
167	Region X	Manupali	1,554	184,770	0	4,906	638,800	828,476	533	489	(-44)
168		Pulangui	10,557	50,642	0	742,783	2,126,000	2,919,426	277	489	212
169		Roxas-Kuya	806	9,694	0	1,457	410,300	421,451	523	489	(-34)
170		Muleta	1,610	16,270	0	445	67,200	83,915	52	489	437
173	Region XI	Lupon	2,450	186,409	0	433,963	0	620,372	253	489	236
174		Batutu	2,700	1,139,360	0	346,960	56,200	1,542,520	571	489	(-82)
175		Saug	4,177	341,429	0	642,910	624,400	1,608,738	385	489	104
176		Libunganon-Left	708	314,368	0	74,252	496,800	885,420	1,251	489	(-762)
178		Libunganon-Right	7,031	159,976	0	691,317	248,400	1,099,693	156	489	333
180		Mal	2,635	213,210	0	82,669	166,800	462,679	176	489	313
181		Padada	2,519	104,030	0	0	157,200	261,230	104	489	385
182	Region XII	Alip	3,101	172,644	0	226,994	256,800	656,437	212	489	277
185		Libungan	9,168	73,310	0	569,204	309,200	951,714	104	489	385
187		Kabacan	4,423	225,561	0	441,265	926,200	1,593,026	360	489	129
188		Pagalungan	703	1,020	0	22,296	0	23,316	33	489	456
190		Malasila	4,013	76,390	0	81,240	421,700	579,330	144	489	345
191		Lambayong	11,343	278,702	0	528,910	1,112,400	1,920,012	169	489	320
192		Tacurong (Dumaguil)	1,762	63,561	0	40,519	121,600	225,680	128	489	361
195		Banga	2,554	157,490	0	66,429	472,500	696,419	273	489	216
196		Marbel-1	1,856	151,503	0	93,850	26,500	271,853	146	489	343
197		Marbel-2	1,676	39,912	0	69,948	29,700	139,561	83	489	406
198		Siluay	780	2,400	0	11,520	25,600	39,520	51	489	438
199		Buayan	680	19,301	0	167,243	76,800	263,344	387	489	102
200	Region XIII	Cabadbaran-Taguibo	2,500	399,024	0	109,092	1,316,800	1,824,916	730	489	(-241)
201		Cantillan	1,825	59,050	0	273,743	0	332,793	182	489	307
202		Tago	3,716	412,970	0	555,421	2,897,700	3,866,091	1,040	489	(-551)
203		Andanan	3,500	435,031	0	427,467	529,200	1,391,698	398	489	91
204		Gibong	1,723	111,166	0	6,902	3,200	121,267	70	489	419
Total			359,645	25,771,642	6,830,600	35,419,641	113,935,800	181,957,683	506	489	(-17)

Table 4-3 Summary of Rehabilitation and Improvement Cost

No.	Reg.	NIS Name	FUSA	Estimated Rehabilitation and Improvement Cost						Nat'l Ave. RI Cost/year	RI Period (10)/(11)
				Dam	Pump Station	Canal	Canal Str.	Total	Unit Cost		
			(ha)	(Pesos)	(Pesos)	(Pesos)	(Pesos)	(Pesos)	(P/ha)	(P/ha/year)	(year)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1	CAR	Upper Chico	15,258	32,728,490		5,299,038	48,877,000	86,904,528	5,696	713	8.0
5		Bonga PIS-2	545		550	1,552,501	249,000	1,802,051	3,307	713	4.6
6		Bonga PIS-3	157				83,000	83,000	529	713	0.7
9		Dingras	1,004	0		0	222,000	222,000	221	713	0.3
10		Bolo	364	87,000			5,343,000	5,430,000	14,918	713	20.9
11		Cura	550	4,092,200		4,794,877	7,274,000	16,161,077	29,384	713	41.2
13		Madongan Area	2,933	59,407,252		104,321,841	24,056,000	187,785,092	64,025	713	89.8
14		Solsona Area	1,340	61,714,350		4,638,823	4,264,000	70,617,173	52,699	713	73.9
15		Labugaon Area	1,470	58,873,325		3,855,455	5,063,000	67,791,780	46,117	713	64.7
16		Papa Area	2,337	64,634,190		23,349,939	0	87,984,129	37,648	713	52.8
17		Sta. Maria-Burgos	914	35,870		0	2,514,000	2,549,870	2,790	713	3.9
18		Sta. Lucia-Candon	1,555	0		0	4,174,000	4,174,000	2,684	713	3.8
20		Amburayan	3,289	1,364,970		62,799	8,276,000	9,703,769	2,950	713	4.1
21		Ambayoan	3,945	44,739,740		576,790	31,741,000	77,057,530	19,533	713	27.4
23		Dipalo	2,002	44,585,000		12,981,484	4,994,000	62,560,484	31,249	713	43.8
25		Lower Agno	4,134	1,554,270		1,374,000		2,928,270	708	713	1.0
26		San Fabian	2,026	0				0	0	713	0.0
27		Dumuloc	1,232	8,853,600		2,291,040	1,066,000	12,210,640	9,911	713	13.9
31	II	Baua	1,867			4,482,462	12,252,000	16,734,462	8,963	713	12.6
32		Banurbur Creek	1,087	8,336,610		17,737,866	7,476,000	33,550,476	30,865	713	43.3
33		Magapit PIS	10,046			363,589		363,589	36	713	0.1
34		Apayao-Abulog	8,175	49,760		8,433,810	64,519,000	73,002,570	8,930	713	12.5
36		Dummun	1,502				59,500,000	59,500,000	39,614	713	55.6
38		Baggao	2,467	12,987,674		0	0	12,987,674	5,265	713	7.4
43		San Pablo Cabagan	1,365			644,725	0	644,725	472	713	0.7
44		Tumauini	3,020			6,263,640	3,638,000	9,901,640	3,279	713	4.6
45		Mallig	2,419	0		0	444,000	444,000	184	713	0.3
46		Bagabag	2,010			16,199,755	6,534,000	22,733,755	11,310	713	15.9
49	MRIIS	MRIIS Distric III	21,703	0	0	0	1,660,000	1,660,000	76	713	0.1
53	III	Camiling	8,229	55,713,100		2,005,805	49,052,000	106,770,905	12,975	713	18.2
59		Porac	1,668	0		0	9,960,000	9,960,000	5,971	713	8.4
60		Gumain	1,997	45,478,070		135,346	4,980,000	50,593,416	25,335	713	35.5
63		Angat	26,791	476,800,000		122,056,018	70,882,000	669,738,018	24,999	713	35.1
64		Maasim	3,457	14,696,500	0	0	0	14,696,500	4,251	713	6.0
65		Disalit Creek	485	0		0		0	0	713	0.0
66	UPRIIS	UPRIIS District I	20,700			0	388,000	388,000	19	713	0.0
70		UPRIIS District IV	21,293	19,971,320		1,943,294		21,914,614	1,029	713	1.4
96	IV	Sta. Cruz	2,184	110,450,000		0	0	110,450,000	50,572	713	70.9
101		Dumacaa	1,840	56,001,200		4,074,440		60,075,640	32,650	713	45.8
102		Hanagdong	280	108,420		1,417,934	1,599,000	3,125,354	11,162	713	15.7
103		Lagnas	640	95,320		1,157,742	1,387,000	2,640,062	4,125	713	5.8
114		Batang-Batang	3,062	0		39,195	2,770,000	2,809,195	917	713	1.3
115		Malatgao	3,014	0		32,328,594	11,548,000	43,876,594	14,558	713	20.4
131	VI	Aklan	3,891	47,362,264		74,233,758	23,056,000	144,652,022	37,176	713	52.1
132		Panakuyan	504	13,100		14,852,880	21,362,000	36,227,980	71,881	713	100.8
133		Sibalom-San Jose	3,969	0		32,891,038	14,442,000	47,333,038	11,926	713	16.7
134		Mambusao	1,420	0		1,631,527	444,000	2,075,527	1,462	713	2.0
135		Jalaur-Proper	8,208	24,855,280	689,880	0	0	25,545,160	3,112	713	4.4
136		Jaluar- Extension	2,144	24,855,280		0	3,228,000	28,083,280	13,099	713	18.4
137		Suague	2,453	24,875,000			5,028,000	29,903,000	12,190	713	17.1
138		Sibalom-Tigbuan	2,019	16,653,808		1,691,534	18,607,000	36,952,342	18,302	713	25.7
139		Aganan	4,467	44,100,000		502,340	1,782,000	46,384,340	10,384	713	14.6
140		Sta. Barbara	3,062	20,506,250		244,902	24,903,000	45,654,152	14,910	713	20.9
141		Barotac Viejo	1,700	0		38,566	14,062,000	14,100,566	8,294	713	11.6
142		Bago	13,277	0		81,758,454	26,798,000	108,556,454	8,176	713	11.5
143		Pangiplan	1,168	4,269,340		6,608,251	0	10,877,591	9,313	713	13.1
146	VIII	Mainit	2,161	0		23,070	6,227,000	6,250,070	2,892	713	4.1
147		Pongso	780	416,000		0	3,198,000	3,614,000	4,633	713	6.5
148		Bao	2,185	0		110,357	11,066,000	11,176,357	5,115	713	7.2
153		Daguitan	916	0		0	0	0	0	713	0.0
154		Gumarona	646	0		0		0	0	713	0.0
155		Balire North	300	63,596,440		17,963,655	1,765,000	83,325,095	277,750	713	389.6
156		Balire South	396	63,265,430		13,146,656	2,831,000	79,243,086	200,109	713	280.7
157		Ibawon	281	4,157,694		12,995,075	3,974,000	21,126,769	75,184	713	105.4
158		Gibuya	738	157,860		24,230,688	977,000	25,365,548	34,371	713	48.2
160		Hindang-Hilongos	720	0		0	498,000	498,000	692	713	1.0
161		Das-Ay	396	3,300		0	782,000	785,300	1,983	713	2.8
162	IX	Sibuguey Valley	2,642	0		0	166,000	166,000	63	713	0.1
163		Dipolo	1,571	44,100,000		16,216	166,000	44,282,216	28,187	713	39.5
164		Salug	6,485	0		0	83,000	83,000	13	713	0.0
165		Labangan	2,720	16,400		207,101	5,561,000	5,784,501	2,127	713	3.0
167	X	Manupali	1,554	44,100,000		168,416	249,000	44,517,416	28,647	713	40.2
168		Pulangui	10,557	0		0	166,000	166,000	16	713	0.0
169		Roxas-Kuya	806	0		0	0	0	0	713	0.0
170		Muleta	1,610	0		792,315	0	792,315	492	713	0.7
173	XI	Lupon	2,450	44,113,100		0		44,113,100	18,005	713	25.3
174		Batutu	2,700	0		521,808	13,351,000	13,872,808	5,138	713	7.2
175		Saug	4,177	0		315,223	83,000	398,223	95	713	0.1
176		Libunganon-Left	708	0				0	0	713	0.0
178		Libunganon-Right	7,031	29,310,190		1,765,728	12,782,000	43,857,918	6,238	713	8.7
180		Mal	2,635	11,684,850		4,484,040	5,710,000	21,878,890	8,303	713	11.6
181		Padada	2,519	0			4,797,000	4,797,000	1,904	713	2.7
182	XII	Alip	3,101	46,899,620		331,543	782,000	48,013,163	15,483	713	21.7
185		Libungan	9,168	78,561,040		291,502	5,229,000	84,081,542	9,171	713	12.9
187		Kabacan	4,423	2,774,640		0		2,774,640	627	713	0.9
188		Pagalungan	703			0		0	0	713	0.0
190		Malasila	4,013	13,573,560				13,573,560	3,382	713	4.7
191		Lambayong	11,343	44,100,000		1,977,149	0	46,077,149	4,062	713	5.7
192		Tacurong (Dumaguil)	1,762	44,113,100		159,863	4,316,000	48,588,963	27,576	713	38.7
195		Banga	2,554	0		38,894,400	0	38,894,400	15,229	713	21.4
196		Marbel-1	1,856	13,100		8,786,200	664,000	9,463,300	5,099	713	7.2
197		Marbel-2	1,676	27,027,260		31,002,679	5,273,000	63,302,939	37,770	713	53.0
198		Siluay	780	388,000		0		388,000	497	713	0.7
199		Buayan	680	44,100,000		625	249,000	44,349,625	65,220	713	91.5
200	XIII	Cabadbaran-Taguibo	2,500	7,138,258		214,630	1,446,000	8,798,888	3,520	713	4.9
201		Cantillan	1,825	540,120		114,882	533,000	1,188,002	651	713	0.9
202		Tago	3,716	0		115,583	747,000	862,583	232	713	0.3
203		Andanan	3,500	0		7,706,352	23,406,000	31,112,352	8,889	713	12.5
204		Gibong	1,723	169,700		0		169,700	98	713	0.1
Total			359,645	2,005,168,214	690,430	765,171,810	727,574,000	3,498,604,455	9,728	713	13.6

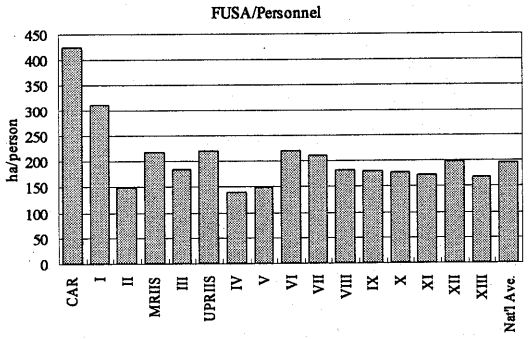
4.2.3 Organizations and O&M

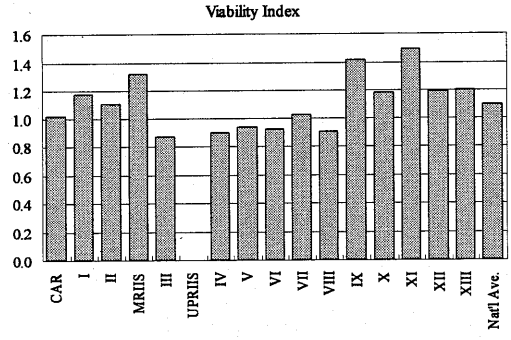
The analyses on the overall result of the inventory survey are summarized in the table below. Detailed values and graphs are shown in Table 4-4.

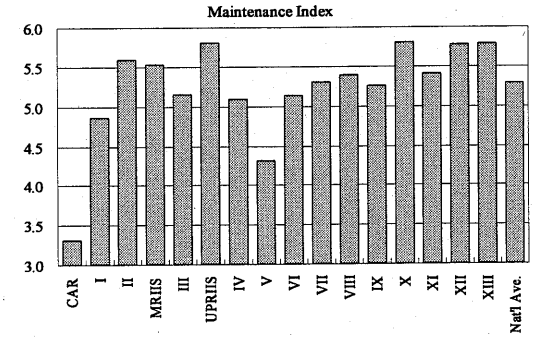
Item	Unit	National Average	Evaluation
1) FUSA / Personnel			CAR has the largest area per personnel (424 ha) and Region I follows, while Region IV has the smallest. Areas of other regions are the almost same as the national average.
1. FUSA/Personnel	ha/ person	196	
2) Viability Index and O&M Cost /FUSA			Financial status of NISOs is represented well in the viability index. All regions in Mindanao have higher values than the national average, while Region I, II and MRIIS mark higher values, two. Viability index is generally low in the regions from central Luzon to Visaya.
2. Viability Index		1.10	
3. Operation Cost /FUSA	Peso/ha	1,125	
4. Income/FUSA	Peso/ha	1,221	
3) Maintenance Index			Maintenance index is low in CAR and Region V, while other regions score the almost same point as the national average.
5. Maintenance Index		5.3	
4) Project Cost/FUSA			Annual average amount of PoWs varies very widely from 5,700 Pesos/ha in Region VIII to 366 Pesos/ha in MRIIS. Although the values are calculated as the average during the last five years, large-scale rehabilitation projects still greatly affect to budget distribution.
6. Program of Works (PoWs)	Peso/ha	1,201	
for Maintenance	Peso/ha	489	
for Rehab.&Imp.	Peso/ha	712	
5) Cropping Intensity			Values are varying from 111 percent of CAR to 185 percent of Region XI. Two integrated systems of MRIIS and UPRIIS, which have reservoir dams, secure about 160 percent of C.I. Other regions in Luzon mostly have low C.I. except for Region V. C.I. of Region X, although it is located in Mindanao.
7. Cropping Intensity	%	140	
6) ISF Collection Efficiency			Values in CAR, Region III and VIII are quite low. Other regions in north to central Luzon and Mindanao exceed 60 to 70 percent. The national average is 62 percent in the inventory survey and much higher than actual value (53 %), because the calculation is different from the formal computation. When data are collected from more systems, the value will become closer.
8. ISF Collection Efficiency	%	62 (53 %;SMD 2004)	
7) Irrigators Association			Membership rate of IAs is varying from 48 percent in Region VIII to 100 percent of CAR and MRIIS. It is anticipated that a policy of each region for the institutional development has a large influence to the membership rate, although the membership rate is not really related with the functionality point. Northern Luzon and Central & Southern Mindanao have better values at the functionality point.
9. Average IA Size	ha	413	
10. Membership Rate of IA	%	75	
11. IA Functionality Point		1.7	

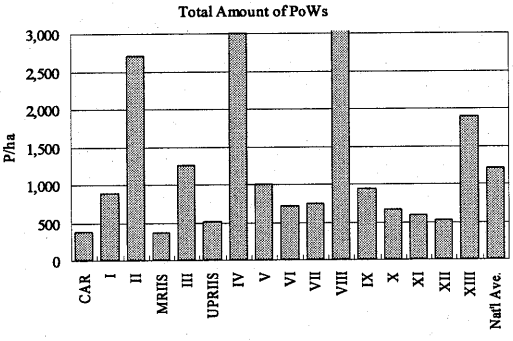
Table 4-4 Average Figures of Evaluation Criteria for Each Region

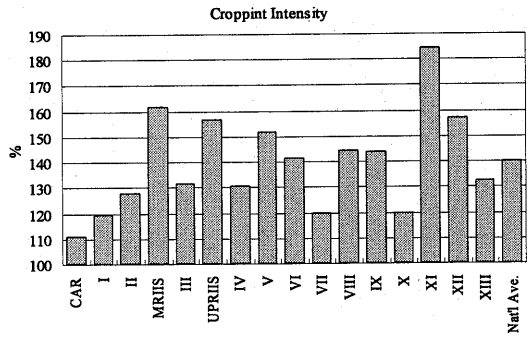
Region	FUSA/ Personnel	Viability Index	Total Expenses	Total Income	Maintenance Index	Amount of PoW			Cropping Intensity	ISF Collection Efficiency	IA		
						Total	Maintenance	RI			Average Size	Membership Rate	Funct'ty Point
	(ha/person)	(index)	(P/ha)	(P/ha)	(index)	(P/ha)	(P/ha)	(P/ha)	(%)	(%)	(ha)	(%)	
CAR	424	1.01	725	767	3.3	379	29	351	111	44	159	100	0.7
I	312	1.18	1,021	930	4.9	881	379	502	120	70	372	66	1.9
II	149	1.11	1,782	1,477	5.6	2,693	1,636	1,057	128	70	738	86	2.0
MRIIS	216	1.32	1,050	1,271	5.5	366	91	275	162	79	232	101	1.9
III	185	0.87	1,232	1,104	5.2	1,254	491	763	132	36	248	91	2.2
UPRIIS	219	#DIV/0!	#DIV/0!	#DIV/0!	5.8	515	460	55	157	54	235	#DIV/0!	#DIV/0!
IV	138	0.89	1,440	1,265	5.1	3,003	1,299	1,704	131	61	441	86	1.0
V	148	0.94	1,239	1,046	4.3	1,000	656	344	152	54	400	85	1.3
VI	219	0.92	898	871	5.1	716	197	519	142	58	596	76	1.2
VII	209	1.02	924	945	5.3	739	81	658	120	55	337	84	1.7
VIII	181	0.90	1,024	913	5.4	5,667	716	4,950	145	41	227	48	0.8
IX	179	1.41	790	1,171	5.3	934	290	643	144	66	822	93	1.9
X	176	1.18	1,328	1,627	5.8	674	322	352	120	70	460	76	1.2
XI	171	1.49	1,111	1,764	5.4	582	330	253	185	83	293	83	2.7
XII	197	1.19	903	1,374	5.8	521	296	225	157	63	340	69	1.9
XIII	167	1.20	1,167	1,289	5.8	1,895	830	1,065	132	71	248	75	2.5
Nat'l Ave.	196	1.10	1,125	1,221	5.3	1,201	489	712	140	62	413	75	1.7

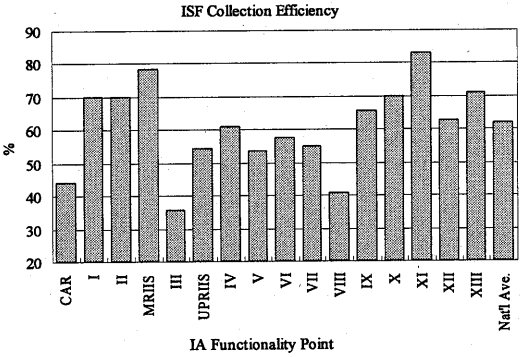


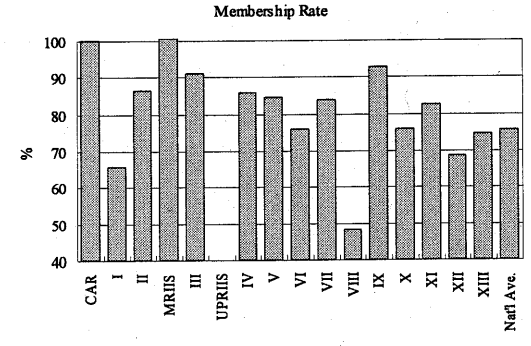


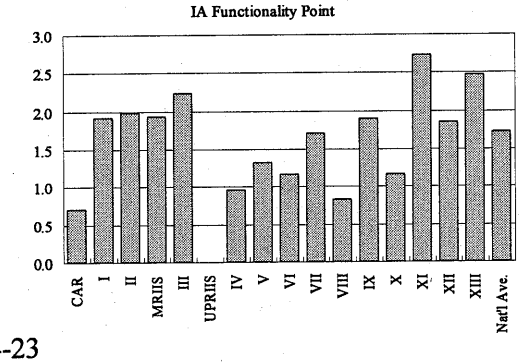












4.3 Prioritization Methods for MRI of Facilities among NISs and Facility Components in NIS within Region and National Level

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 4-5 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 4-6 indicates the evaluation table for prioritization of the R/I works within NIS (sampled evaluation in case of the three Pilot NIS areas).

Table 4-5 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

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		
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 4-6 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