Appendix TA-3 Result of Questionnaire Survey for the Inventory Survey on NISs (for Selective Answers)

Questions & Selections	Answers	
	%	Major Descriptive Answers
I GENERAL		
1 Time consuming activity		
1. Instruction & distribution of format	29	To retrieve format, no fund, to collect data, other regular works, limited number of staff
2. Survey in NISO	79	
3. Compilaiton in NISO	36	
4. Others	79	
2 Activities of RIO		
1. Orientation and distribution of format	93	Follow-up, to provide information, assessment of status, to monitor progress, random check of data
2. Copy of format to FDs	79	
3. NISOs' survey support	64	
4. Compilation of results	57	
5. Print of results	43	
6. Inputting data support	57	
7. Check of results	64	
8. Others	64	
3 Why RIO could not check the data?		
1. No available manpower.	36	Time constraints, lack of manpower, not enough orientation in CO, incomplete data from field
2. No enough time to check	57	
3. It was deemed unnecessary.	21	
4. No problem on collected data	21	
5. Others	64	
4 Problems at RIO		
1. No enough manpower.	50	NISOs are not serious, service vehicles were occupied, lack of hydro-meteorological and other data, multiple water sources in a NIS, no field verification, less priority by NISO
2. No enough budget for activity	57	
3. No enough budget for materials	36	
4. Not understandable format	36	
5. Dispersion and/or loss of records	64	
6. The data are not usually collected.	71	
7. Others	50	
5 CD writing and reading in NISOs		
1. Both possible	14	
2. Reading	71	
3. Neither write nor read	7	
4. Others	21	
6 FD writing and reading		
1. Both possible	71	
2. Reading	29	
3. Neither write nor read	7	
4. Others	7	
7 Windows of NISOs		
1.Windows 95	0	
2.Windows 98	57	
3.Windows 2000	7	
4.Windows XP	43	
5. Others	7	
8 Printers in NISOs		
1. Color	21	
2. Black and white	71	
3. No printer	14	
4. Others	21	
9 Problems at NISO		
1. No enough manpower due to ISF collection	86	Lack of hydro-meteorological and other data, multiple water sources in a NIS, data collection by field staff (no enough instruction), lack of time and manpower, regular works
2. No enough manpower due to regular works	64	
3. No enough budget for activities	64	
4. No enough budget for materials	64	
5. Not understandable format	36	
6. Dispersion and/or loss of records	71	
7. The data are not usually collected.	64	
8. Others	36	
10 Volume of required data		
1. Too many to answer properly	64	Limited number of personnel, inavailability of data
2. Appropriate	50	
3. Small input due to unclear porpose	43	
4. Others	14	

Appendix TA-3 Result of Questionnaire Survey for the Inventory Survey on NISs (for Selective Answers)

Questions & Selections	Answers	
	%	Major Descriptive Answers
11 Expense item		
1. Telecommunication	71	
2. Mailing and/or posting	57	
3. CDs	86	
4. FDs	57	
5. Papers to print out	93	
6. Inks for printers	93	
7. Transportation fee	43	
8. Fuel for transportation	100	
9. Hiring personnel	29	
10. Purchasing of data	21	
11. Allowances for NIA staff	50	
12. Others	14	
12 Suitable months		
Reason	86	Crop maintenance stage, lean collection period, cut-off period
January	43	
February	50	
March	43	
April	36	
May	14	
June	14	
July	50	
August	36	
September	14	
October	14	
November	0	
December	14	
13 Frequency		
Reason	86	No drastic change in a year, too much work, compiled annually and processed next year, limited number of personnel, more significant in 4 crop seasons, logical/practical
Once/year	14	
Once/2 years	79	
Once/3 years	21	
II QUALITY OF DATA		
1 COMMON		
1.1 Incomplete data		
1. No appropriate data	79	Dilapidated observation facilities, NISOs' low priority, no calibration of observation facilities, incapable personnel
2. No knowledge for data collection	29	
3. Financial constraints	57	
4. No observation facilities	71	
5. No manpower to observe	50	
6. Dispersion and/or loss of records	64	
7. Others	50	
1.2 Inappropriate change of cell contents		
1. Not known instruction	50	No through instruction to the operator, no enough Excel worksheets for deviation from standard number of source/canals
2. Neglect of instruction	29	
3. Unfamiliarity on Excel	50	
4. Incomplete instruction to personnel	71	
5. Others	43	
1.3 Mistakes on units		
1. Not accustomed	50	By mistake, not frequently used, not accustomed
2. No enough attention	50	
3. Others	36	
2 WATER RESOURCE AND IRRIGATION REQUIREMENT INFORMATION		
2.1 Lack of discharge data		
1. Malfunctioning of observation facilities	86	They are reported, lack of hydro-meteorological and other data, multiple water sources in a NIS, dipersion/loss of records, present O&M monitoring requiring less data
2. Lack of manpower	71	
3. Never been observed	0	
4. Not necessary	7	
5. Not possible to compile	57	
6. NISOs could not understand how to compile	21	
7. Others	43	
2.2 Discharge management without data		
1. Experiences	86	
2. All diverted in dry season	57	
3. All diverted in wet season, except flood perio	29	
4. Farmers requests	29	
5. According to the schedule	50	
6. Others	21	

Appendix TA-3 Result of Questionnaire Survey for the Inventory Survey on NISs (for Selective Answers)

Questions & Selections	Answers	
	%	Major Descriptive Answers
2.3 Inappropriate change of cell contents for mean value calculation		
1. No instruction	57	
2. NISOs kept instruction.	79	
3. Not enough attention	57	
4. Unfamiliarity on Excel	50	
5. Others	21	
3 FUNCTIONALITY INFORMATION OF IRRIGATION AND DRAINAGE FACILITIES		
3.1 Incomplete data		
1. No appropriate data	71	
2. Dispersion and/or loss of records	71	
3. No knowledge for data collection	36	
4. No time to survey in the field	79	
5. No available manpower	79	
6. It was deemed unnecessary to fill all.	36	
7. Others	7	
3.2 Different format		
1. RIO's falure on format distribution	14	No through instruction to the operator, no through study of the format due to time constraint, overlooking, no instructions
2. NISOs did not keep RIO's instruction.	36	
3. NISOs did not understand RIO's instruction.	21	
4. No such a case in my region	50	
5. Others	57	
3.3 Wrong way of selection (change "0" to other symbols instead of "1")		
1. Other symbols look clearer.	21	No through instruction to the operator, NISO did not understand the relevance of the data relationship
2. Not understood properly	79	
3. Others	36	
3.4 No answers		
1. Not possible to answer	71	No through instruction to the operator, no available data, some facilities are not functional
2. NISOs did not correctly choose "None".	79	
3. NISOs forgot some.	43	
4. Others	36	
4 ORGANIZATION AND O&M INFORMATION		
4.1 1 set of answers of NISs under 1 NISO		
1. NISOs thought NISO base, not NIS base.	50	No through instruction to the operator, some O&M data from integrated systems were compiled and submitted as one
2. Not compiled for NIS base	57	
3. NISOs did not know instruction.	0	
4. No time to compile	36	
5. Others	57	
4.2 Base of PoWs		
1. NISO base	36	
2. NIS base	43	
3. Both	29	
4. Others	29	
III OTHERS		
Comments	50	-The activity should be well-financed. -Excel worksheet should provide for unique situation or condition in NIS/NISO e.g. water distribution scheme of NIS with multiple source of water supply affecting the water requirement calculations. -Personnel should be hired. -Official implementation through memo circular -CO staff should go to RIOs. -Symplify further the format -Old records could hardly found. -CO should prepare a policy guidelines including penalties/ sanction for non-compliance

Appendix TA-4 Result of Questionnaire Survey for the Inventory Survey on NISs (for Expenditure and Timing)

Expenditure Incured during Inventory Survey

Item	CAR	R1	R2	MRIIS	R3	UPRIIS	R4	R5	R6	R7&8	R9	R10	R11	R12	R13	Total
1. Telecommunication	3	4	5		o			5	7	3	11		o	7		10
2. Mailing and/or posting	8	2						6	6		10	5	o	6		8
3. CDs	6	2		5	o		3	7	5	6	8	6	o	5		12
4. FDs	7	1			o		5	8	7		9	7				8
5. Papers to print out	4	8	6	4	o		4	4	3	4	7	3	o	4		13
6. Inks for printers	2	4	4	3	o		2	3	2	2	6	4	o	3		13
7. Transportation fee	5	6						2	4		4	2				6
8. Fuel for transportation	1	10	1	1	o		1	1	1	1	3	1	o	2	2	14
9. Hiring personnel		11	2								1				1	4
10. Purchasing of data	10	6									5					3
11. Allowances for NIA staff	9	9	3	2						5	2			1		7
12. Others																0

Note: 1.Colors show higher ranks of expenditure share.
1st, 2nd
3rd, 4th
2.No.9 (Hiring personnel) and No.11 (Allowances for NIA staff) were not actually incured.
Their higher ranks will be incured, when special measures will be taken.

Preferable Months to Conduct Inventory Survey

Item	CAR	R1	R2	MRIIS	R3	UPRIIS	R4	R5	R6	R7&8	R9	R10	R11	R12	R13	Total
January	o	o								o	o		o		o	6
February	o	o						o			o		o	o	o	7
March	o	o							o		o	o		o		6
April		o		o					o		o	o				5
May				o							o					2
June							o								o	2
July		o	o		o		o		o	o					o	7
August		o	o		o				o	o						5
September		o													o	2
October		o													o	2
November																0
December										o	o					2

Appendix TA-5 Result of Questionnaire Survey for the Inventory Survey on NISs (for Descriptive Answers)

Region	Questions				
	I General				
	1	2	3	4	5
	Time consuming activity	Activities of RIO	Why RIO could not check the data?	Problems at RIO	CD writing and reading in NISOs
CAR	CAR submitted the report one day before the due date.	Constant follow-up of the survey status to NISO's			
R1					
R2	It took time for NISO to retrieve the inventory format contained in the CD-ROM furnished respectively to NISO.	Followed -up from NISO if efforts at retrieval and printing of inventory formats were successfully done.	I think that enough and reliable data were collected based from NIS geographical Info System and PIDP Info Bookkeeping.	The perception that the head of NISO are not serious in accomplishing the survey for profitable end.	
MRIIS	We experienced no problem as we were able to submit the required data of all NISOs on time.	Provide information/data on rainfall, effective rainfall, inflows and intake discharges.	Random checking on submitted NISOs data was only done because during the survey preparation all problems as to the interpretation of the data required were correspondingly cleared and discussed to the personnel involved in the preparation.		
R3	No fund allocation to support the inventory survey.	Prepare communication, feedbacks and result of the inventory surveys coming from F.O. to C.O	Most of NISO's were not submitted their report on the agreed deadline so our intention is to submit immediately to C.O for our compliance	Service Vehicles (PUV) that intended only for the study.	
UPRIIS					
R4		Assessment of status in the implementation. Assist in the collection of data.			
R5	1. It took time for the RIO to collate data collected from each NISO. 2.It took time for RIO to collect inventory results from each NISO.	Monitor the progress of the survey.		1. The lack/unavailability of hydro-meteorological data. 2.The excel files were designed for single source system but most NIS have multiple sources.	
R6	Volume of year end report, POW operation, intensified ISF collection.	Follow-up process of field inventory and progress report preparation.	RIO presumed that data submitted were correct/ reliable.	No field verification as to correctness of data.	Computers not upgraded.
R7&8	Limited ISO technical staff who can undertake the survey.		Some ISO submitted inventory result on the deadline specified by CO. , hence RIO has not enough time to check.		
R9	Survey data for Dipolo RIS were submitted on time although FDs were submitted later.	Survey results were checked at random.	Lack of manpower to do the checking. Collected data should be checked right at the NISOs on reason of accessibility to the data source before submission to RIO who in turn will do a random checking.		
R10	Less assistance provided by the RIO staff due to lack of manpower to give fulltime assistance.		The one (1)day orientation of RIO staff at C.O was not enough to fully digest the entire study. It should have been done on hand-on method so that participant can fully grasp the work to be done.	The above answers justify the reason why the data/study was accomplished at the field level and the RIO was only waiting for the submission of accomplished forms.	Answers taken from Maranding RIS and BUK NIS are different.
R11	O &M Personnel concentrated on ISF collection				
R12	Not applicable to region 12		RO have checked the data but other NISOs have incomplete data.	RO 12 has no available data to countercheck the NISOs report.	
R13		No orientation was done as the format was dispatched directly to the field by the section without discussing it with the OIC of operation.	No time to check the ISO submitted by MRI a long over due report few days before last call by SMD.	Given less priority by ISO as their effort was concentrated more on collection of questionnaire.	Report was already in hard copy and software (C.D)

Region	Questions				
	I General				
	6	7	8	9	10
	FD writing and reading	Windows of NISOs	Printers in NISOs	Problems at NISO	Volume of required data
CAR					
R1					
R2					
MRIIS					
R3			Some other NISO can print in color.		
UPRIIS					
R4					
R5			Most printers are obsolete.	1.The lack/unavailabity of hydro-meteorological data. 2.The excel files were designed for single source system but most NIS have multiple sources.	
R6				Data collection was delegated to WRFT,WRF Operator, WRF Tender.	
R7&8					
R9				Not enough time to conduct the survey. Needs manpower whose primary function is to focus on data gathering and preparation of the output.	
R10	Answer taken from Maranding RIS and BUK NIS are different.	Answer taken from Maranding RIS and BUK NIS are different.	Answer taken from Maranding RIS and BUK NIS are different.	Assigned personnel for the activity has other responsibilities such as CAP TWG member and responsible in the preparation of CAP paper requirement for applicants.	Since there is a limited number of personnel to accomplish the report.
R11					Unavailability of data for old system.
R12				Some data of the inventory format are not usually collected.	
R13					

Region	Questions				
	I General				
	11	12	13		
	Expense item	Suitable months	Frequency		
CAR		The NISOs have time to conduct the survey during the lean months.	Once in two years is just appropriate to conduct inventory survey.		
R1					
R2		Minimal activities and not quite significant performance efforts are exerted to impact C&M functions.	Significant NISO situational conditions do not change much the system's operability to desirable level.		
MRIIS		Months that will not coincide with the peak ISF collection period and during water delivery cut-off months.	For easy and /or convenient updating of data/information.		
R3					
UPRIIS					
R4		Not so busy with major O&M activities.	Too much work.		
R5		1.Within the crop maintenance stage.2. Lean collection period.3.within the dry season.	Most of the data required are compiled annually and processed after one year.		
R6	12	1.Water cut-off. 2. Crop maintenance and pinpoint problem on drainage.	Update Data		
R7&8		Farming activity/crop stage during these months are vegetative stage, hence ISO personnel will have enough time to undertake the survey.	Variation (e.g. chapter IV) in data may likely happen in 2 years.		
R9	The expenses incurred during the NIS Inventory survey was absorbed in the current Operating Budget of the NIS(Regular Annual Budget)thus no addition expenses were incurred. However if we need a separate survey team to conduct said NIS Inventory survey, the expenses incurred will be rank accordingly as shown.	Inventory survey should fall on these months as it is during the dry season period and data gathering would be easier. A time frame of six months is more convenient.	Once in every two years is enough to do the activity. Hydrological, methodological data are made available and more realistic. There maybe improvements made on irrigation facilities within the span of two years that necessary data be included to the existing inventory.		
R10		Month of March and April has a little or no occurrence of rainfall at the same time there is a schedule of Irrigation Cut-Off on some part of the System, meaning there are more available personnel to assist in accomplishing the activity since their regular works is not so heavy.	There are a limited number of personnel to conduct the Inventory Survey.		
R11		Some O&M personnel are not busy due to crop maintenance or irrigation phase.	Data to be gathered is more significant (4 cropping seasons)		
R12		Personnel not too busy.	Logical/Practical		
R13	Fund Support	These are normal irrigation period and most of the activities are performed by the ISO personnel can devote most of their time to data collection.	Changes may not be observed in short period of one year. But maybe too obvious if conducted more than two years.		

Region	Question				
	II Quality of Data				
	1.1	1.2	1.3	2.1	2.2
	Incomplete data	Inappropriate change of cell contents	Mistakes on units	Lack of discharge data	Discharge management without data
CAR	There are some observation facilities but some were vandalized.			Calibration of river and intake discharges are being taken everyday.	Calibration of river and intake discharges are being taken everyday.
R1					
R2					
MRIIS	Data on diversion dams are the concern of the Dam and Reservoir Division. Hence, NISOs were not required to fill up the data concerning the dams.	NISOs were well informed not to touch or change cells with calculation formula.	It is just by mistake, meaning not intentional.	Data were provided and/or furnished by the EOD/DRD.	Data were provided and/or furnished by the EOD/DRD.
R3					
UPRIIS					
R4		Because the personnel oriented were not the ones directly involved.			
R5	Data gathering has low priority in NIS activities.	The excel worksheet did not provide for deviation from standard number of source/canals.		1. The lack/ unavailability of hydro-meteorological data. 2. The excel files were designed for single source system but most NIS have multiple sources.	
R6	Observation facilities not calibrated.				
R7&8					
R9	Observation facilities were dilapidated that it no longer useful.			Past records were dispersed and/or lost.	
R10	Example is the installation of Rainfall observation at the watershed are which is too far and risky for us to do the collection/observation, unless it is being contracted by a resident there.	In our NIS I think we had properly used the formal since we try to scan the content and try to analyzed how it works.	Maybe its just being mistook by the encoder.	For our NIS, we are submitting intake discharges every 15th and end of the month for BUK NIS.	Our system had devised an Irrigation Delivery schedule since 1996 and the personnel assigned in the field had already known his daily activity for BUKNIS.
R11			Not frequently being used.	Present O&M monitoring requires less data.	
R12		RO 12 have emphasized not to alter the calculation formula.	RO 12 have not noticed this in our NISOs report.		
R13	More personnel assigned is not resourceful enough to obtain data.	Instructions were taken for granted and were not closely observed.	min./day, lips, cavan/hr are the most common data used in their daily activities.		

Region	Question				
	II Quality of Data				
	2.3	3.1	3.2	3.3	3.4
	Inappropriate change of cell contents for mean value calculation	Incomplete data	Different format	Wrong way of selection (change "0" to other symbols instead of "1")	No answers
CAR					
R1					
R2					
MRIIS		NISOs were instructed to fill all cells as much as possible.	Dam and Reservoir Division(DRD) used additional devised format to include other facilities that they are operating and maintaining.	NISOs were instructed to use the symbol as required.	It is possible that such questions are not applicable to some facilities.
R3					
UPRIIS					
R4			Not applicable		
R5			Data inputting and calculation were done by different personnel.	Data inputting and calculation were done by different personnel.	Data inputting and calculation were done by different personnel.
R6			There was no thorough study of the format due to time constraint; NISO failed to re-echo instructions to personnel in-charge.		
R7&8	Survey instruction followed, mean value calculated properly based on excel formula.			Data encoding at ISO level is done by different personnel.	
R9			It might be overlooked.		No available data
R10	Sometimes there is an incomplete data for a certain year so we just include it in the report.		We used format provided by the RIO from CD provided by C.O.	We did the proper use of the format since we understand that it is being linked to other sheet connecting the possible condition	Only linked format with no existing structure was not being answered.
R11	NISOs are doubtful on data gathered for rainfall and river discharges.		No formal Instructions from R.O representative which relied on CD distributed by NIA C.O.		
R12					
R13			No instruction was made as the forms was distributed to the field w/o discussing it with the Optn Div. In-charge.	NISO did not understand the relevance of the data relationship.	Some facilities are not functional. Functionality refer to its capacity to carry discharge .

Region	Question		
	II Quality of Data		III Others
	4.1	4.2	
	1 set of answers of NISs under 1 NISO	Base of PoWs	Comment
CAR	The NISOs of CAR has only NIS each.		
R1			
R2			
MRIIS	Each district (NISO) Office has its own data compilation.	For MARIIS, Program of works are made by each district/Office and being consolidated by the Head Office.	
R3			
UPRIIS			
R4			The activity should be well-financed by JICA.
R5	Data inputting and calculation were done by different personnel.		1.Funds should be provided for the conduct of the survey. Data acquisition constrained by lack of funds. 2.Survey Instrument i.e. excel worksheet, should provide for unique situation or condition in NIS/NISO e.g. water distribution scheme of NIS with multiple source of water supply affecting the water requirement calculations.
R6			
R7&8	Most inventory result submitted were NIS base.		
R9	No NISO covering more than 1 NIS in region 9.	Program of works were prepared NIS base.	Just in case in the near future there will be another NIS inventory survey to be conducted, It is recommended that a separate personnel be hired on the Job Order basis to conduct the NIS survey under the direct supervision of the NISO concerned. As such, the work will be finished on the specified deadline. Funding support is also very necessary for this purpose.
R10	We submit the data report by NIS.	POW is usually made in NIS base then approved at NISO	For future inventory survey we are respectfully requesting the top management officially implement this survey nationwide through memo circular as well as the strict gathering of data. We request also that one (1) C.O. staff will go down to the RIO staff rather than RIO/NISO staff to report to CO. This is to have an actual hand on of the work to be done one (1) time only.
R11	Some O&M data from integrated systems were complied and submitted as one.		Any future survey must be supported with appropriate funding for any given period /duration. Seek or ask relevant questions that are closely related to actual report format submitted to NIA CO.
R12			1.If possible ,simplify further the format. 2.For old NISOs records could hardly found. 3.CO should prepare a policy guidelines including penalties/ sanction for non-compliance.
R13	Not applicable to Caraga.	Not applicable to Caraga.	None

Questionnaire for the Inventory Survey on The Study for The Maintenance, Rehabilitation and Improvement Planning Methodology of National Irrigation Systems

To O&M Chief of All Regional Irrigation Offices,

As you know, NIA and JICA are conducting the "The Study for The Maintenance, Rehabilitation and Improvement Planning Methodology of National Irrigation Systems (hereinafter the Study)" from September 2005 to October 2006. As a part of it, NIA SMD requested you to conduct an inventory survey of all NISs from January to March 2006, according to the instruction of the Study Team.

Due to your sincere effort, data of more than 90 % of NISs among 195 were collected as of middle of May 2006, but the quality of the results were not really satisfactory. The Study Team wants to know the reasons, present condition and constraints in the field, in order to obtain better results from the inventory survey in the future.

Since this questionnaire survey is conducted due to the above reason, please answer the following questions carefully and frankly and submit the answer **by June 22nd 2006**.

The Way of Answering; IMPORTANT!

1. Make sure if the question requires single or multiple answer(s).
2. Check a box (☑) next to the answer you chose.
3. Add your answers in words in a long cell next to the "Others", when you have addition.
It is important to follow the instruction, otherwise the analysis may not be properly done.

Example;

1 Why the data of all NISs in the region were not submitted on the agreed deadline of March 2006? (multiple answers)

- ☑ 1. It took time to instruct all NISOs and distribute the inventory format.
- ☑ 2. It took time for NISOs to survey.
- ☐ 3. It took time for NISOs to compile obtained data in the excel format.
- ☑ 4. Others — It took time for RIO to arrange data collected from each NISO.

Questions;

Region _____ Position of Respondent _____

Name of Responder _____

I GENERAL

1 Why the data of all NISs in the region were not submitted on the agreed deadline of March 2006? (multiple answers)

- ☐ 1. It took time to instruct all NISOs and distribute the inventory format.
- ☐ 2. It took time for NISOs to survey.
- ☐ 3. It took time for NISOs to compile obtained data in the excel format.
- ☐ 4. Others

2 What were the actual activities of RIO for the implementation of the inventory survey? (multiple answers)

- ☐ 1. Orientation of the inventory survey and distribution of the format
- ☐ 2. Copy of the inventory format from the CD to floppy discs (FDs)
- ☐ 3. Support for NISOs' survey
- ☐ 4. Compilation of survey results from each NISO
- ☐ 5. Print of survey results
- ☐ 6. Support for inputting data in excel files
- ☐ 7. Check of survey results
- ☐ 8. Others

3 Observing from the dispersion and incompleteness of data, it seems that the data were not checked by RIO. Why you could not check the data, although that was requested? (multiple answers)

- [ ] 1. There were no available manpower.
- [ ] 2. There was not enough time to check such huge volume of documents.
- [ ] 3. I did not think that the data check was necessary.
- [ ] 4. I did not think that there were problems on collected data.
- [ ] 5. Others

4 What were the problems for the implementation of the inventory survey at RIO level? (multiple answers)

- [ ] 1. There were not enough manpower.
- [ ] 2. There were not enough budget for surveyors to conduct survey.
- [ ] 3. There were not enough budget to purchase materials for data compilation.
- [ ] 4. Some parts of the inventory format were not understandable.
- [ ] 5. Past records were dispersed and/or lost.
- [ ] 6. The data corresponding to the inventory format are not usually collected.
- [ ] 7. Others

5 What is the most popular function of NISOs' computers on CD writing and reading? (single answer)

- [ ] 1. Computers of most NISOs can write and read CD.
- [ ] 2. Computers of most NISOs can just read CD.
- [ ] 3. Computers of most NISOs can neither write nor read CD.
- [ ] 4. Others

6 What is the most popular function of NISOs' computers on FD writing and reading? (single answer)

- [ ] 1. Computers of most NISOs can write and read FD.
- [ ] 2. Computers of most NISOs can just read FD.
- [ ] 3. Computers of most NISOs can neither write nor read FD.
- [ ] 4. Others

7 What is the most popular version of "Windows" of NISOs' computers? (single answer)

- [ ] 1.Windows 95
- [ ] 2.Windows 98
- [ ] 3.Windows 2000
- [ ] 4.Windows XP
- [ ] 5. Others

8 What is the most popular function of NISOs' printers? (single answer)

- [ ] 1. Printers of most NISOs can print in color.
- [ ] 2. Printers of most NISOs can print just in black and white.
- [ ] 3. Most NISOs have no printer.
- [ ] 4. Others

9 What were the problems for the implementation of the inventory survey at NISO level? (multiple answers)

- [ ] 1. There were not enough manpower for the survey, because staff were busy for ISF collection.
- [ ] 2. There were not enough manpower for the survey, because staff were busy for regular works.
- [ ] 3. There were not enough budget for surveyors to conduct survey.
- [ ] 4. There were not enough budget to purchase materials for data compilation.
- [ ] 5. Some parts of the inventory format were not understandable.
- [ ] 6. Past records were dispersed and/or lost.
- [ ] 7. The data corresponding to the inventory format are not usually collected.
- [ ] 8. Others

10 Do you think that the inventory survey items are too many? (multiple answers)

- [ ] 1. Too many to answer properly
- [ ] 2. Appropriate
- [ ] 3. The purpose of the inventory survey is not clear, so it is difficult to input human resources and time.
- [ ] 4. Others

11 What are the expenses incurred during the inventory survey? (multiple answers) And also rank them from bigger share.

	Item	Ranking
	1. Telecommunication	
	2. Mailing and/or posting	
	3. CDs	
	4. FDs	
	5. Papers to print out	
	6. Inks for printers	
	7. Transportation fee	
	8. Fuel for transportation	
	9. Hiring personnel	
	10. Purchasing of data	
	11. Allowances for NIA staff	
	12. Others	

12 If the inventory survey will be conducted in the future, which month(s) is(are) most suitable to conduct the inventory survey in your region? Explain the reason on the box provided. (multiple answers)

	Month	Reason
	January	
	February	
	March	
	April	
	May	
	June	
	July	
	August	
	September	
	October	
	November	
	December	

13 Related to the question 12, how often should the inventory survey be conducted? Explain the reason on the box provided. Consider that the foregoing surveys require much less efforts, because they need just renewal of a small part of the already existing inventory format. (single answer)

	Frequency	Reason
	Once/year	
	Once/2 years	
	Once/3 years	

II QUALITY OF DATA

1 COMMON

1.1 Why many or a part of data of most NISs' are incomplete? (multiple answers)

- [ ] 1. NISOs do not have appropriate data.
- [ ] 2. NISOs do not know how to obtain those data.
- [ ] 3. NISOs can not obtain data due to financial constraints.
- [ ] 4. There are no observation facilities.
- [ ] 5. There are observation facilities but no manpower to observe.

☐ 6. Past records were dispersed and/or lost.
☐ 7. Others

1.2 Why many cells, which had calculation formula, were changed, although the Study Team instructed not to change those cells? (multiple answers)

☐ 1. The instructions were not known.
☐ 2. The instructions were neglected.
☐ 3. NISOs' personnel do not know how to use the excel well.
☐ 4. Data inputting and calculation were done by different personnel.
☐ 5. Others

1.3 Why there are many mistakes in units, e.g. mm/day vs. mm/month, lit/sec vs. m3/sec, cavan/ha vs. ton/ha? (multiple answers)

☐ 1. NISOs made mistakes, because they are not accustomed to the designated units.
☐ 2. NISOs did not pay enough attention to units.
☐ 3. Others

2 WATER RESOURCE AND IRRIGATION REQUIREMENT INFORMATION

2.1 Why many NISs do not have the data of river discharge and/or intake discharge? (multiple answers)

☐ 1. They are not observed due to malfunctioning of observation facilities, though they were observed before.
☐ 2. They are not observed due to lack of manpower, though they were observed before.
☐ 3. They have never been observed.
☐ 4. They are not necessary.
☐ 5. NISOs could not compile the data, though there are the data.
☐ 6. NISOs could not understand how to compile the data in the format, though there are the data.
☐ 7. Others

2.2 Although many NISs do not have the data of river discharge and/or intake discharge, how do they manage intake discharge? (multiple answers)

☐ 1. Based on their experiences
☐ 2. No particular management is needed in dry season, because all river discharge is diverted.
☐ 3. All river discharge is diverted in wet season, except during flood period.
☐ 4. Intake discharge is controlled based on the requests from farmers.
☐ 5. Planned volume of intake discharge is diverted according to the schedule.
☐ 6. Others

2.3 In order to calculate the mean value (at the bottom of the tables) of rainfall and river discharge in tables, the calculation formula in cells in the column of annual total (far right) should be deleted, when there is no data in a certain year, otherwise the mean value is not calculated correctly. But they were not always deleted, why? (multiple answers)

☐ 1. There was no such instruction.
☐ 2. NISOs did not touch cells with calculation formula, as instructed.
☐ 3. NISOs did not pay enough attention to mean value.
☐ 4. NISOs' personnel do not know how to use the excel well.
☐ 5. Others

3 FUNCTIONALITY INFORMATION OF IRRIGATION AND DRAINAGE FACILITIES

3.1 Why many or a part of data of most NISs' facilities are incomplete? (multiple answers)

☐ 1. NISOs do not have appropriate data.
☐ 2. Past records were dispersed and/or lost.
☐ 3. NISOs do not know how to obtain those data.
☐ 4. There was no time to survey or measure in the field.
☐ 5. There was no available manpower to survey or measure in the field.
☐ 6. NISOs did not think that it was necessary to fill all cells/information.
☐ 7. Others

3.2 Why some NISOs answered in different format from the distributed format? (multiple answers)

- [ ] 1. RIO could not distribute the inventory format to all NISOs.
- [ ] 2. Some NISOs did not keep the instruction from RIO.
- [ ] 3. Some NISOs did not understand the instruction from RIO.
- [ ] 4. There was no such a case in my region.
- [ ] 5. Others

3.3 In case of selective questions, "0" of the selected cell should be changed into "1" as instructed, otherwise calculation in cells of linked sheet of "Present Condition" is not made correctly. But some NISOs used check box or other symbols, why? (multiple answers)

- [ ] 1. Other symbols rather than "1" look clearer.
- [ ] 2. It was not known that the way of selection affected the calculation of other sheets.
- [ ] 3. Others

3.4 Why there are no answers on some questions of functionality information? (multiple answers)

- [ ] 1. It was not possible to assess some functional aspects of some facilities.
- [ ] 2. NISOs did not correctly choose "None", when the functionality of the facility was good.
- [ ] 3. NISOs forgot answering on some questions.
- [ ] 4. Others

4 ORGANIZATION AND O&M INFORMATION

4.1 When one NISO covers some NISs, data for NISs should be compiled for each NIS. But some NISOs covering more than 1 NIS answered as one NISO instead of each NIS, why? (multiple answers)

- [ ] 1. NISOs thought that data should be compiled for NISO base, not NIS base.
- [ ] 2. Data on organization and O&M are not compiled for NIS base regularly, so it is difficult to separate the information for each NIS.
- [ ] 3. NISOs did not know the instruction.
- [ ] 4. There are data for each NIS, but there was no time to compile them.
- [ ] 5. Others

4.2 When one NISO covers some NISs, are the Programs of Works made in NISO base or NIS base? (multiple answers)

- [ ] 1. NISO base
- [ ] 2. NIS base
- [ ] 3. There are both cases.
- [ ] 4. Others

III OTHERS

Please note comments below, if there are any. Thank you very much for your sincere cooperation.

Appendix TA-7 Tabulation of Inventory Survey Result for the Sector of Organization and Operation and Maintenance (Regional Statistics)

Reg. No	Item	NISO (Responsible Center (RC)) Information, Management																																				
		Firmed Up Service Area (FUSA)	Total No. of Personnel	Personnel /FUSA	FUSA/ Personnel	Viability Index	Expenses						Income						Collaborative Activity	Program of Work																			
																				Work Item																			
							Personnel Services	MOOE	Project personnel	Total	FUSA	Unit Expenses/ FUSA	ISF	Equip. Rental	Others	Total	FUSA	Unit Expenses/ FUSA		Desilting, Canal	Desilting, Drainage	Canal Lining	Road Surfacing	Road Covering	Dam Repair	River Diversion	Drainage Imp/vment	Facility Imp/vment	Institl Dev.	Others	Total	FUSA	Total Unit Amount	Maintenance Cost		RI Cost		IDP Fund Allocation in 2004
		(ha)	(person)	(pers./ha)	(ha/person)	(index)	(P'000)	(P'000)	(P'000)	(P'000)	(ha)	(P/ha)	(P'000)	(P'000)	(P'000)	(P'000)	(ha)	(P/ha)	(rating)	(P'000)	(P'000)	(P'000)	(P'000)	(P'000)	(P'000)	(P'000)	(P'000)	(P'000)	(P'000)	(P'000)	(P'000)	(ha)	(P/ha)	(P'000)	(P/ha)	(P'000)	(P/ha)	(mark)
(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)	(31)	(32)	(36)	(37)	(38)	(39)	(40)	(41)	(42)
CAR	Total	15,258	36	0.0024	424	1.01	9,493	1,574	0	11,067	15,258	725	9,954	565	1,187	11,706	15,258			264	4	2,041	113	0	0	55	369	2,789	61	89	5,786	15,258	379	436	29	5,349	351	0
	Average	15,258	36	0.0024	424	1.01	9,493	1,574	0	11,067	15,258	725	9,954	565	1,187	11,706	15,258			264	4	2,041	113	0	0	55	369	2,789	61	89	5,786	15,258	379	436	29	5,349	351	
	Unit Amount (values/ha)			0.0024	424		622	103	0	725			652	37	78	767				17	0	134	7	0	0	4	24	183	4	6	379			29		351		
	Ratio (%)						86	14	0	100			85	5	10	100				5	0	35	2	0	0	1	6	48	1	2	100							0
	Max	15,258	36	0.0024	424	1.01						725						767															379		29		351	
	Min	15,258	36	0.0024	424	1.01						725						767															379		29		351	
I	Total	44,254	142	0.0243	1,616	21.15	23,942	15,753	868	40,563	39,741	42,977	27,020	4,005	5,922	36,947	39,741			3,194	1,707	5,279	3,187	180	2,211	2,543	1,814	3,838	281	505	24,740	28,078	21,411	10,632	9,885	14,108	11,527	12
	Average	5,532	24	0.0041	269	1.18	1,330	875	51	2,254	2,208	2,388	1,501	223	329	2,053	2,208			152	81	251	152	9	105	121	86	183	13	24	1,178	1,337	1,020	506	471	672	549	
	Unit Amount (values/ha)			0.0032	312		602	396	22	1,021			680	101	149	930				114	61	188	114	6	79	91	65	137	10	18	881			379		502		
	Ratio (%)						59	39	2	100			73	11	16	100				13	7	21	13	1	9	10	7	16	1	2	100							600
	Max	14,167	48	0.0053	446	2.28						12,174						6,717															2,834		1,363		1,472	
	Min	1,585	15	0.0022	189	0.40						150						249															43		23			
II	Total	44,122	297	0.1120	2,592	15.52	39,890	16,207	18,950	75,047	42,112	22,702	58,540	2,475	1,046	62,061	42,010			11,483	28,143	8,333	22,884	181	675	3,757	8,172	24,651	211	588	109,078	40,508	33,350	66,267	14,717	42,811	18,633	4
	Average	2,941	20	0.0075	173	1.11	2,849	1,158	1,354	5,361	3,008	1,622	4,181	177	75	4,433	3,001			883	2,165	641	1,760	14	52	289	629	1,896	16	45	8,391	3,116	2,565	5,097	1,132	3,293	1,433	
	Unit Amount (values/ha)			0.0067	149		947	385	450	1,782			1,393	59	25	1,477				283	695	206	565	4	17	93	202	609	5	15	2,693			1,636		1,057		
	Ratio (%)						53	22	25	100			94	4	2	100				11	26	8	21	0	1	3	7	23	0	1	100							200
	Max	10,046	62	0.0246	311	1.48						3,144						2,305															5,649		3,885		4,592	
	Min	880	4	0.0032	41	0.89						887						741															426		0		0	
MRITS	Total	84,795	392	0.0185	878	5.28	68,834	18,991	1,180	89,005	84,795	4,211	97,595	6,779	3,423	107,797	84,795			6,090	156	5,001	1,429	0	338	0	1,897	7,151	261	8,672	30,995	84,795	1,476	7,675	376	23,320	1,100	3
	Average	21,199	98	0.0046	219	1.32	17,209	4,748	295	22,251	21,199	1,053	24,399	1,695	856	26,949	21,199			1,522	39	1,250	357	0	85	0	474	1,788	65	2,168	7,749	21,199	369	1,919	94	5,830	275	
	Unit Amount (values/ha)			0.0046	216		812	224	14	1,050			1,151	80	40	1,271				72	2	59	17	0	4	0	22	84	3	102	366			91		275		
	Ratio (%)						77	21	1	100			91	6	3	100				20	1	16	5	0	1	0	6	23	1	28	100							150
	Max	22,676	110	0.0050	271	1.49						1,195						1,419															558		173		406	
	Min	19,512	80	0.0037	199	1.10						977						1,129															121		17		86	
III	Total	39,537	214	0.0277	1,016	3.47	36,222	12,383	95	48,700	39,537	5,628	30,451	3,178	10,036	43,665	39,537			9,207	5,146	18,371	4,592	1,173	354	277	3,939	2,704	610	2,717	49,089	39,134	14,174	19,221	2,554	29,867	11,621	3
	Average	7,907	43	0.0055	203	0.87	7,244	2,477	19	9,740	7,907	1,126	6,090	636	2,007	8,733	7,907			2,302	1,286	4,593	1,148	293	88	69	985	676	152	679	12,272	9,784	3,544	4,805	638	7,467	2,905	
	Unit Amount (values/ha)			0.0054	185		916	313	2	1,232			770	80	254	1,104				235	131	469	117	30	9	7	101	69	16	69	1,254	9		491		763		
	Ratio (%)						74	25	0	100			70	7	23	100				19	10	37	9	2	1	1	8	6	1	6	100							150
	Max	26,791	158	0.0077	358	1.05						2,089						1,395															9,669		974		8,695	
	Min	403	2	0.0028	130	0.52						413						375															368		115		253	
UPRITS	Total	66,362	303	0.0140	666	0.00	0	0	0	0	0	0	0	0	0	0	0			8,935	0	0	586	0	0	0	0	1,133	0	0	10,654	20,700	515	9,521	460	1,133	55	0
	Average	22,121	101	0.0047	222	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!			8,935	0	0	586	0	0	0	0	1,133	0	0	10,654	20,700	515	9,521	460	1,133	55	
	Unit Amount (values/ha)			0.0046	219		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!			#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!				432	0	0	28	0	0	0	0	55	0	0	515			460		53		
	Ratio (%)						#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!			#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!				84	0	0	5	0	0	0	0	11	0	0	100							0
	Max	25,738	108	0.0052	283	0.00						0						0															515		460		55	
	Min	19,924	91	0.0035	192	0.00						0						0															515		460		55	
IV	Total	32,138	233	0.0881	1,851	8.03	41,312	1,107	685	43,104	29,933	16,377	31,510	2,261	4,090	37,861	29,933			13,901	55	22,886	20,540	0	1,715	4,382	9,589	16,290	129	410	89,898	29,933	59,861	38,878	31,927	51,020	27,938	1
	Average	2,678	19	0.0073	154	0.89	3,756	101	62	3,919	2,721	1,489	2,865	206	372	3,442	2,721			1,264	5	2,081	1,867	0	156	398	872	1,481	12	37	8,173	2,721	5,442	3,534	2,902	4,638	2,540	
	Unit Amount (values/ha)			0.0072	138		1,380	37	23	1,440			1,053	76	137	1,265				464	2	765	686	0	57	146	320	544	4	14	3,003			1,299		1,704		
	Ratio (%)						96	3	2	100			83	6	11	100				15	0	25	23	0	2	5	11	18	0	0	100							50
	Max	8,490	60	0.0108	350	1.47						2,724						1,629															19,589		19,589		8,685	
	Min	773	4	0.0029	93	0.44						876						574															699		266		0	
V	Total	12,462	84	0.0471	1,345	6.55	12,790	2,398	255	15,443	12,462	8,333	11,369	402	1,261	13,032	12,462			1,465	401	1,235	5,271	0	0	5	121	1,126	20	1,239	10,883	10,885	6,178	7,142	3,039	3,741	3,140	0
	Average	1,780	12	0.0067	192	0.94	1,827	343	36	2,206	1,780	1,190	1,624	57	180	1,862	1,780			244	67	206	878	0	0	1	20	188	3	206	1,814	1,814	1,030	1,190	507	623	523	
	Unit Amount (values/ha)			0.0067	148		1,026	192	20	1,239			912	32	101	1,046				135	37	113	484	0	0	0	11	103	2	114	1,000			656		344		
	Ratio (%)						83	16	2	100			87	3	10	100				13	4	11	48	0	0	0	1	10	0	11	100							0
	Max	3,084	27	0.0096	389	1.18						1,688						1,743															2,129		1,575		1,395	
	Min	300	2	0.0026	104	0.70						220						93															0		0		0	
VI	Total	49,451	226	0.0641	2,270	10.11	38,350	3,654	2,388	44,392	49,451	12,083	35,781	6,857	412	43,050	49,451			3,114	204	8,746	5,344	0	740	189	1,415	10,414	310	1,716	32,193	44,984	8,740	8,852	2,259	23,341	6,481	5
	Average	4,496	21	0.0058	206	0.92	3,486	332	217	4,036	4,496	1,098	3,253	623	37	3,914	4,496			311	20	875	534	0	74	19	141	1,041	31	172	3,219	4,498	874	885	226	2,334	648	
	Unit Amount (values/ha)			0.0046	219		776	74	48	898			724	139	8	871				69	5	194	119	0	16	4	31	231	7	38	716			197		519		
	Ratio (%)						86	8	5	100			83	16	1	100				10	1	27	17	0	2	1	4	32	1	5	100							250
	Max	13,277	42	0.0120	379	1.29						1,860						1,689															1,775		474		1,746	
	Min	1,168	10	0.0026	83	0.36						537						475															257		29		162	
VII	Total	4,387	21	0.0048	209	1.02	4,053	0	0	4,053	4,387	924	4,145	0	0	4,145	4,387			29	0	2,886	325	0	0	0	0	0	0	0	3,241	4,387	739	355	81	2,886	658	0
	Average	4,387	21	0.0048	209	1.02	4,053	0	0	4,053	4,387	924	4,145	0	0	4,145	4,387			29	0	2,886	325	0	0	0	0	0	0	0	3,241	4,387	739	355	81	2,886	658	
	Unit Amount (values/ha)			0.0048	209		924	0	0	924			945	0	0	945				7	0	658	74	0	0	0	0	0	0	0	739			81		658		
	Ratio (%)						100	0	0	100			100	0	0	100				1	0	89	10	0	0	0	0	0	0	0	100							0
	Max	4,387	21	0.0048	209	1.02						924						945															739		81		658	
	Min	4,387	21	0.0048	209	1.02						924						945															739		81		658	
VIII	Total	17,533	97	0.0736	1,731	8.99	12,616	2,347	1	14,964	14,608	11,136	10,304	3,675	1,352	15,331	16,793			3,670	511	52,858	8,078	0	12,203	300	1,287	17,218	41	3,188	99,355	17,533	74,981	12,559	9,591	86,795	65,394	0
	Average	1,461	10	0.0074	173	0.90	1,262	235	0	1,496	1,461	1,114	937	334	123	1,394	1,527			282	39	4,066	621	0	939	23	99	1,324	3	245	7,643	1,349	5,768	966	738	6,677	5,030	
	Unit Amount (values/ha)			0.0055	181		864	161	0	1,024			614	219	81	913				209	29	3,015	461	0	696	17	73	982	2	182	5,667			716		4,950		
	Ratio (%)						84	16	0	100			67	24	9	100				4	1	53	8	0	12	0	1	17	0	3	100							0
	Max	2,185	16	0.0181	325	1.29						1,834						1,751															12,384		1,974		12,302	
	Min	386	3	0.0031	55	0.63						460						457															359		0		87	
IX	Total	13,417	75	0.0229	708	5.65	9,788	811	0	11,628	13,417	3,379	11,697	2,943	1,074	15,714	13,417			1,904	125	4,863	644	0	234	0	217	313	34	259	8,594	9,205	1,983	2,674	854	5,920	1,129	1
	Average	3,354	19	0.0057	177	1.41	3,263	270	0	2,907	3,354	845	2,924	736	269	3,929	3,354			952	63	2,432	322	0	117	0	108	157	17	130	4,297	4,603	992	1,337	427	2,960	565	
	Unit Amount (values/ha)			0.0056	179		730	60	0	790			872	219	80	1,171				207	14	528	70	0	25	0	24	34	4	28	934			290		643		
	Ratio (%)						92	8	0	100			74	19	7	100				22	1	57	7	0	3	0	3	4	0	3	100							50
	Max	6,485	33	0.0064	197	1.61						1,038						1,386															1,133		761		757	
	Min	1,571	8	0.0051	155	1.25						655						806															850		93		372	
X	Total	19,335	110	0.0352	760	4.72	21,914	3,766	2	25,682	19,335	7,781	24,428	6,160	863	31,451	19,335			2,708	359	2,112	3,165	0	258	0	0	4,054	150	225	13,031	19,335	4,705	6,232	1,952	6,799	2,756	2
	Average	3,867	22	0.0070	152	1.18	4,383	753	0	5,136	3,867	1,556	4,886	1,232	173	6,290	3,867			542	72	422	633	0	52	0	0	811	30	45	2,606	3,867	941	1,246	390	1,360	551	
	Unit Amount (values/ha)			0.0057	176		1,133	195	0	1,328			1,263	319	45	1,627				140	19	109	164	0	13	0	0	210	8	12	674			322		352		
	Ratio (%)						85	15	0	100			78	20	3	100				21	3	16	24	0	2	0	0	31	1	2	100							100
	Max	10,557	51	0.0090	207	1.32						1,971						2,163															1,790		707		1,542	
	Min	806	6	0.0048	111	1.06						1,172						1,401															520		248		253	
XI	Total	29,290	171	0.0529	1,651	11.89	24,936	7,610	0	32,546	29,290	10,206	42,130	5,748	3,788	51,666	29,290			5,304	2,310	1,806	2,042	181	1,634	0	1,289	1,363	212	921	17,061	29,290	5,337	9,656	2,775	7,405	2,562	5
	Average	3,254	19	0.0059	183	1.49	2,771	846	0	3,616	3,254	1,144	4,681	639	421	5,741	3,254			589	257	201	227	20	182	0	143	151	24	102	1,896	3,254	593	1,073	308	823	285	
	Unit Amount (values/ha)			0.0058	171		851	260	0	1,111			1,438	196	129	1,764				181	79	62	70	6	56	0	44	47	7	31	582			330		253		
	Ratio (%)						77	23	0	100			82	11	7	100				31	14	11	12	1	10	0	8	8	1	5	100							250
	Max	7,031	43	0.0082	335	2.12						1,579						2,238															1,327		649		678	
	Min	708	4	0.0030	123	1.10						792						1,435															289		39		115	
XII	Total	54,506	276	0.0520	2,656	11.93	35,690	10,830	1,880	60,535	53,619	13,875	61,804	8,697	6,575	77,076	56,080			10,204	390	3,618	2,695	0	890	3,310	1,458	5,505	626	540	29,238	56,080	9,048	16,599	6,220	12,639	2,829	9
	Average	4,955	28	0.0052	266	1.19	3,245	985	171	5,045	4,468	1,156	4,415	621	470	5,505	4,006			729	28	258	193	0	64	236	104	393	45	39	2,088	4,006	646	1,186	444	903	202	
	Unit Amount (values/ha)			0.0051	197		666	202	35	903			1,102	155	117	1,374				182	7	65	48	0	16	39	26	98	11	10	521			296		225		
	Ratio (%)						74	22	4	100			80	11	9	100				35	1	12	9	0	3	11	5	19	2	2	100							450
	Max	11,355	58	0.0113	700	1.78						1,846						2,623															1,654		1,437		635	
	Min	700	1	0.0014	89	0.76						277						424															164		42		56	
XIII	Total	14,382	86	0.0302	851	4.81	12,009	4,774	0	16,783	14,382	6,376	12,623	3,685	2,226	18,534	14,382			1,664	3,798	0	2,380	0	4,215	223	0	5,841	81	205	18,408	9,716	6,259	8,065	2,666	10,343	3,592	1
	Average	2,876	17	0.0060	170	1.20	2,402	955	0	3,357	2,876	1,275	2,525	737	445	3,707	2,876			555	1,266	0	793	0	1,405	74	0	1,947	27	68	6,136	3,239	2,086	2,688	889	3,448	1,197	
	Unit Amount (values/ha)			0.0060	167		835	332	0	1,167			878	256	155	1,289				171	391	0	245	0	434	23	0	601	8	21	1,895			830		1,065		
	Ratio (%)						72	28	0	100			68	20	12	100				9	21	0	13	0	3	1	0	32	0	1	100							50
	Max	3,716	26	0.0070	206	1.39						2,258						1,452															3,877		1,462		2,415	
	Min	1,825	12	0.0049	143	1.07						860						980															624		304		320	
Nat'l Ave.	Total	541,229	2,763	0.6698	21,223	120.13	391,839	102,205	26,304	520,348	462,327	166,804	469,351	57,430	43,255	570,036	466,871			83,137	43,309	140,034	83,276	1,715	25,468	15,042	31,569	104,390	3,028	21,276	552,243	459,821	249,136	224,764	89,384	327,480	159,767	46
	Average	4,790	26	0.0062	197	1.10	3,407	889	235	4,531	3,952	1,426	3,911	479	360	4,750	3,891			705	367	1,187	706	15	216	127	268	885	26	180	4,680	3,897	2,111	1,905	757	2,775	1,354	
	Unit Amount (values/ha)			0.0051	196		848	221	57	1,125			1,005	123	93	1,221				181	94	305	181	4	55	33	69	227	7	46	1,201			489		712		
	Ratio (%)						75	20	5	100			82	10	8	100				15	8	25	15	0	5	3	6	19	1	4	100							2,300
	Max	26,791	158	0.0246	700	2.28						12,174						6,717															19,589		19,589		12,302	
	Min	300	1	0.0014	41	0.36						150						93															0		0		0	

Appendix TA-7 Tabulation of Inventory Survey Result for the Sector of Organization and Operation and Maintenance (Regional Statistics)

Reg. No	Item	NISO (Responsible Center (RC)) Information, Maintenance																																																					
		Maintenance Index (Unit: Index)																																																					
		B. Maintenance																																														C. On-Farm Water Management Information								Over-all Ave.
		B.1 General								B.2 Irrigation Facility																																						C.1 Drought			C.2 Others					
										B.2.1 Intake Facility																												B.2.2 Others																			
										Mechanical Devices					Diversion Dam				Pump Station							Reservoir Dam																															
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	Ave.	(1)	(2)	(3)	(4)	Ave.	(5)	(6)	(7)	Ave.	(8)	(9)	(10)	(11)	(12)	(13)	Ave.	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	Ave.	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	Ave.	(1)	(2)	Ave.	(1)	(2)	(3)	(4)	Ave.	
(1)	(2)	(43)	(44)	(45)	(46)	(47)	(48)	(49)	(50)	(51)	(52)	(53)	(54)	(55)	(56)	(57)	(58)	(59)	(60)	(61)	(62)	(63)	(64)	(65)	(66)	(67)	(68)	(69)	(70)	(71)	(72)	(73)	(74)	(75)	(76)	(77)	(78)	(79)	(80)	(81)	(82)	(83)	(84)	(85)	(86)	(87)	(88)	(89)	(90)	(91)	(92)	(93)	(94)	(95)	(96)	(97)	(98)
CAR	Total	0	0	0	5	10	0	3	3	5	3	5	0	3	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0	5	5	5	10	10	5	0	10	5	5	5	0	0	3	3
	Average	0.0	0.0	0.0	5.0	10.0	0.0	3.1	2.6	5.0	2.5	5.0	0.0	3.1	3.3	0.0	0.0	1.1	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	5.0	5.0	0.0	0.0	0.0	5.0	5.0	5.0	10.0	10.0	4.5	0.0	10.0	5.0	5.0	5.0	0.0	0.0	2.5	3.3
	Unit Amount (values/ha)																																																						
	Ratio (%)																																																							
	Max								2.6					3.1				1.1							0.0												0.0											4.5								2.5	3.3
	Min								2.6					3.1				1.1							0.0												0.0											4.5								2.5	3.3
I	Total	140	140	140	85	100	80	59	106	40	170	95	15	81	56	56	7	40	43	43	130	43	43	43	57	0	0	0	0	0	0	0	0	0	0	0	0	85	85	80	65	85	100	85	85	150	150	97	80	170	125	90	95	15	5	51	88
	Average	8.2	8.2	8.2	5.0	5.9	4.7	3.5	6.2	2.2	9.4	5.6	0.8	4.5	3.1	3.1	0.4	2.2	3.3	3.3	10.0	3.3	3.3	3.3	4.4	####	####	####	####	####	####	####	####	####	####	####	####	5.0	5.0	4.7	3.8	5.0	5.9	5.0	5.0	8.8	8.8	5.7	4.7	10.0	7.4	5.3	5.6	0.9	0.3	3.0	4.9
	Unit Amount (values/ha)																																																						
	Ratio (%)																																																							
	Max								6.9					8.8				3.3							4.4												0.0											6.0								5.0	5.1
	Min								3.3					3.3				0.0							4.4												0.0											4.5								2.5	3.3
II	Total	105	100	105	100	85	50	93	95	115	98	40	60	89	33	30	20	28	23	20	30	20	17	20	22	0	0	0	0	0	0	0	0	0	0	0	0	100	85	70	35	40	110	50	40	50	115	71	50	130	90	95	85	60	55	78	84
	Average	7.0	6.7	7.0	6.7	5.7	4.2	6.2	6.3	8.2	7.5	3.6	5.0	6.4	3.7	3.3	2.2	3.1	7.8	6.7	10.0	6.7	5.6	6.7	7.2	####	####	####	####	####	####	####	####	####	####	####	####	7.1	6.1	5.0	2.5	3.1	8.5	3.6	3.3	3.6	8.2	5.1	3.6	9.3	6.4	7.3	6.5	5.0	4.6	6.0	5.6
	Unit Amount (values/ha)																																																						
	Ratio (%)																																																							
	Max								8.9					10.0				5.6							7.8												0.0											8.0								8.8	7.6
	Min								3.4					2.5				0.0							6.1												0.0											3.0								5.0	4.0
MRIIS	Total	30	30	30	20	15	20	12	22	20	18	20	10	17	3	0	0	1	10	3	15	10	7	10	10	0	0	0	0	0	0	0	0	0	0	0	0	30	20	15	5	25	30	25	25	25	25	23	15	40	28	25	25	5	10	16	22
	Average	10.0	10.0	10.0	6.7	5.0	6.7	3.9	7.5	6.7	5.8	6.7	3.3	5.6	1.7	0.0	0.0	0.6	5.0	3.3	7.5	5.0	3.3	5.0	5.1	####	####	####	####	####	####	####	####	####	####	####	####	7.5	5.0	3.8	1.7	6.3	7.5	6.3	6.3	6.3	6.3	5.8	3.8	10.0	6.9	6.3	6.3	1.3	2.5	4.1	5.5
	Unit Amount (values/ha)																																																						
	Ratio (%)																																																							
	Max								8.3					8.1				1.1							6.7												0.0											7.8								7.5	7.6
	Min								6.3					3.8				0.0							3.6												0.0											5.0								2.5	3.9
III	Total	20	15	20	20	30	5	12	17	30	25	10	20	24	27	17	3	16	3	0	5	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	30	30	20	0	20	35	20	30	30	35	27	0	40	20	20	20	10	10	15	21
	Average	5.0	3.8	5.0	5.0	7.5	1.3	3.0	4.4	6.0	5.0	2.5	4.0	4.7	5.3	3.3	0.7	3.1	3.3	0.0	5.0	3.3	3.3	3.3	3.0	####	####	####	####	####	####	####	####	####	####	####	####	6.0	6.0	4.0	0.0	5.0	7.0	4.0	6.0	7.5	8.8	5.5	0.0	10.0	5.0	5.0	5.0	2.5	2.5	3.8	5.2
	Unit Amount (values/ha)																																																						
	Ratio (%)																																																							
	Max								6.3					9.2				6.7							3.0												0.0											8.8								5.0	8.4
	Min								3.3					1.3				1.1							3.0												0.0											4.0								2.5	3.9
UPRIIS	Total	15	15	20	10	15	5	5	13	10	13	10	5	10	10	10	10	10	0	0	0	3	0	0	1	0	0	7	7	7	7	3	5	10	10	10	7	10	15	10	15	5	10	5	10	20	20	12	5	20	13	10	15	10	10	11	12
	Average	7.5	7.5	10.0	5.0	7.5	2.5	5.0	6.5	5.0	6.3	10.0	2.5	5.0	5.0	5.0	5.0	5.0	0.0	####	####	3.3	0.0	####	1.1	####	####	6.7	6.7	6.7	6.7	3.3	5.0	10.0	10.0	10.0	7.2	5.0	7.5	5.0	7.5	2.5	5.0	2.5	5.0	10.0	10.0	6.0	2.5	10.0	6.3	5.0	7.5	5.0	5.0	5.6	5.8
	Unit Amount (values/ha)																																																						
	Ratio (%)																																																							
	Max								7.1					7.5				6.7							1.1												7.2											6.5								6.3	6.4
	Min								5.8					2.5				3.3							1.1												7.2											5.5								5.0	5.2
IV	Total	130	130	195	155	100	145	222	157	195	268	130	35	164	43	40	30	43	0	0	0	17	17	0	6	17	17	17	0	17	17	17	25	25	25	25	18	160	160	125	15	100	270	135	80	30	25	122	40	250	145	145	175	130	115	141	51
	Average	4.3	4.3	6.5	5.2	3.6	5.0	7.4	5.2	6.5	8.9	4.8	1.2	5.5	1.5	1.4	1.2	1.5	0.0	0.0	0.0	3.3	3.3	0.0	1.1	3.3	3.3	3.3	0.0	3.3	3.3	3.3	5.0	5.0	5.0	5.0	3.6	5.3	5.3	4.2	1.0	6.7	9.0	4.5	2.7	1.0	0.9	4.1	1.3	8.3	4.8	4.8	5.8	4.3	3.8	4.7	5.1
	Unit Amount (values/ha)																																																						
	Ratio (%)																																																							
	Max								8.4					10.0				7.8							1.1												3.6											7.0								7.5	7.0
	Min								1.2					2.5				0.0							1.1												3.6											2.0								2.5	2.6
V	Total	20	10	20	25	70	20	31	28	55	48	20	5	32	13	7	7	9	3	0	5	7	7	7	5	0	0	0	0	0	0	0	0	0	0	0	0	40	40	25	5	40	60	25	25	25	15	30	30	50	40	40	55	35	30	40	30
	Average	2.9	1.4	2.9	3.6	10.0	2.9	4.4	4.0	7.9	6.8	2.9	0.7	4.6	1.9	0.9	0.9	1.3	3.3	0.0	5.0	6.7	6.7	6.7	4.7	####	####	####	####	####	####	####	####	####	####	####	####	5.7	5.7	3.6	0.7	5.7	8.6	3.6	3.6	3.6	2.1	4.3	6.0	8.3	6.7	5.7	7.9	5.0	4.3	5.7	4.3
	Unit Amount (values/ha)																																																						
	Ratio (%)																																																							
	Max								7.9					6.3				3.3							4.7												0.0											6.0								7.5	6.1
	Min								1.9					2.5				0.0							4.7												0.0											2.0								3.8	3.0
VI	Total	30	20	40	45	25	40	44	36	85	60	65	50	65	30	27	23	27	10	10	15	10	3	10	10	0	0	0	0	0	0	0	0	0	0	0	0	45	45	35	20	60	75	35	40	35	60	45	40	80	60	45	60	25	20	38	46
	Average	3.3	2.2	4.4	5.0	3.1	4.4	4.9	4.0	9.4	6.7	7.2	5.6	7.2	3.3	3.0	2.6	3.0	5.0	5.0	7.5	5.0	1.7	5.0	4.9	####	####	####	####	####	####	####	####	####	####	####	####	5.6	5.6	4.4	2.5	7.5	9.4	4.4	5.0	4.4	7.5	5.6	5.0	10.0	7.5	5.6	7.5	3.1	2.5	4.7	5.1
	Unit Amount (values/ha)																																																						
	Ratio (%)																																																							
	Max								6.3					10.0				8.9							5.3												0.0											8.5								7.5	6.6
	Min								2.1					3.1				0.0							4.5												0.0											3.5								1.3	4.2
VII	Total	10	10	0	5	0	5	5	7	5	3	5	5	4	0	0	0	0	0	0	0	0	0	0	0	7	3	7	7	3	3	0	10	10	5	5	5	5	5	5	0	0	10	10	5	10	10	6	5	10	8	5	5	5	5	5	5
	Average	10.0	10.0	####	5.0	####	5.0	5.3	7.1	5.0	2.5	5.0	5.0	4.4	0.0	0.0	0.0	0.0	####	####	####	####	####	####	####	6.7	3.3	6.7	6.7	3.3	3.3	0.0	10.0	10.0	5.0	5.0	5.5	5.0	5.0	5.0	0.0	0.0	10.0	10.0	5.0	10.0	10.0	6.0	5.0	10.0	7.5	5.0	5.0	5.0	5.0	5.0	5.3
	Unit Amount (values/ha)																																																						
	Ratio (%)																																																							
	Max								7.1					4.4				0.0							0.0												5.5											6.0								5.0	5.3
	Min								7.1					4.4				0.0							0.0												5.5											6.0								5.0	5.3
VIII	Total	50	50	50	55	60	60	67	57	100	110	85	50	88	67	23	30	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	85	40	25	75	110	80	85	20	80	68	55	120	88	95	105	45	45	73	65
	Average	4.5	4.5	4.5	5.0	5.5	5.5	6.7	5.2	9.1	9.2	7.1	4.2	7.4	5.5	2.1	2.5	3.5	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	0.0	0.0	0.0	0.0	6.7	7.1	3.3	2.1	6.3	9.2	6.7	7.1	1.7	6.7	5.7	4.6	10.0	7.3	7.9	8.8	3.8	3.8	6.0	5.4
	Unit Amount (values/ha)																																																						
	Ratio (%)																																																							
	Max								8.5					8.8				6.7							0.0												0.0											8.0								7.5	7.3
	Min								1.4					5.6				1.1							0.0												0.0											4.0								2.5	2.9
IX	Total	10	10	10	20	25	25	24	18	40	35	30	20	31	10	7	13	10	0	0	0	0	0	0	0	7	0	7	0	7	0	0	10	10	10	0	6	25	20	20	10	35	40	15	25	10	25	23	15	40	28	30	35	20	15	25	21
	Average	2.5	2.5	2.5	5.0	6.3	6.3	6.1	4.4	10.0	8.8	7.5	5.0	7.8	2.5	1.7	3.3	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7	0.0	6.7	####	6.7	0.0	0.0	10.0	10.0	10.0	####	5.6	6.3	5.0	5.0	2.5	8.8	10.0	3.8	6.3	2.5	6.3	5.6	3.8	10.0	6.9	7.5	8.8	5.0	3.8	6.3	5.3
	Unit Amount (values/ha)																																																						
	Ratio (%)																																																							
	Max								7.9					10.0				3.3							0.0												5.6											6.5								7.5	6.0
	Min								2.9					4.4				1.1							0.0												5.6											5.0								5.0	3.7
X	Total	50	50	45	35	25	20	34	38	30	35	30	15	28	27	20	7	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	35	25	10	35	45	35	25	50	50	35	15	50	33	40	35	15	15	26	29
	Average	10.0	10.0	9.0	7.0	5.0	5.0	6.8	7.7	6.0	7.0	6.0	3.0	5.5	5.3	4.0	1.3	3.6	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	0.0	0.0	0.0	0.0	8.0	7.0	5.0	2.0	7.0	9.0	7.0	5.0	10.0	10.0	7.0	3.0	10.0	6.5	8.0	7.0	3.0	3.0	5.3	5.8
	Unit Amount (values/ha)																																																						
	Ratio (%)																																																							
	Max								8.9					9.4				6.7							0.0												0.0											8.5								6.3	7.1
	Min								6.5					2.5				1.1							0.0												0.0											6.0								5.0	4.7
XI	Total	20	20	50	35	60	35	37	39	70	70	50	20	56	40	43	13	43	0	0	0	0	0	0	0	30	30	20	0	10	30	30	30	30	0	0	19	75	45	40	10	60	65	25	30	60	85	52	25	90	58	90	85	45	45	66	49
	Average	2.9	2.9	7.1	5.0	8.6	8.8	5.2	5.6	7.8	7.8	7.1	2.5	6.2	4.4	5.4	2.7	4.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5	7.5	5.0	0.0	2.5	7.5	7.5	7.5	7.5	0.0	0.0	4.8	8.3	5.0	4.4	1.1	7.5	8.1	3.1	3.8	7.5	9.4	5.8	2.8	10.0	6.4	10.0	9.4	5.0	5.0	7.4	5.4
	Unit Amount (values/ha)																																																						
	Ratio (%)																																																							
	Max								7.6					10.0				8.4							0.0												6.4											7.0								7.5	6.1
	Min								3.4					2.5				1.1							0.0												0.0											3.5								6.3	2.3
XII	Total	80	80	100	65	60	60	65	74	95	85	75	15	71	63	63	37	54	7	0	0	0	3	7	4	10	7	13	7	13	3	7	10	10	10	0	8	100	70	50	35	60	105	25	45	95	115	70	55	110	88	85	85	30	25	56	69
	Average	7.3	7.3	9.1	6.5	5.5	5.5	5.9	6.7	7.9	7.1	6.8	1.4	5.9	5.8	5.8	3.3	4.9	6.7	0.0	####	####	3.3	6.7	4.2	5.0	3.3	6.7	3.4	6.7	1.7	3.4	5.0	5.0	5.0	0.0	4.1	8.3	5.8	4.2	2.9	5.0	8.8	2.1	3.8	7.9	9.6	5.8	5.0	9.2	7.3	7.1	7.1	2.5	2.1	4.7	5.8
	Unit Amount (values/ha)																																																						
	Ratio (%)																																																							
	Max								9.1					8.8				10.0							4.2												4.4											9.0								7.5	7.2
	Min								2.9					3.8				0.0							4.2												3.8											3.5								2.5	3.7
XIII	Total	25	20	20	25	10	10	33	29	40	40	20	20	33	20	13	20	18	0	0	0	0	0	0	0	7	7	7	7	7	3	7	5	5	5	5	6	40	25	20	15	10	50	25	20	30	35	28	20	50	40	35	40	20	20	29	29
	Average	6.3	5.0	5.0	6.3	3.3	3.3	6.5	5.8	8.0	8.0	6.7	4.0	6.6	5.0	3.3	6.7	4.4	####	####	####	####	####	####	####	6.7	6.7	6.7	6.7	6.7	3.3	6.7	5.0	5.0	5.0	5.0	5.8	8.0	5.0	4.0	3.0	2.5	10.0	5.0	4.0	6.0	7.0	5.5	5.0	10.0	8.0	7.0	8.0	4.0	4.0	5.8	5.8
	Unit Amount (values/ha)																																																						
	Ratio (%)																																																							
	Max								9.4					8.8				7.8							0.0												5.8											7.0								7.5	6.4
	Min								2.5					4.4				0.0							0.0												5.8											3.0								2.5	5.4
Nat'l	Total	735	700	845	705	690	580	745	739	935	1,078	690	345	796	445	356	219	358	100	76	200	113	99	100	118	77	63	77	27	63	63	63	95	100	65	45	69	870	770	580	265	650	1,120	600	575	650	855	714	450	1,260	865	855	925	470	425	673	623
Ave.	Average	5.6	5.3	6.5	5.4	5.5	4.8	5.7	5.6	6.9	7.9	5.6	2.6	5.8	3.5	2.8	1.8	2.8	2.7	2.2	5.7	3.1	2.7	2.8	3.2	4.5	3.7	4.3	1.6	3.5	3.5	3.5	5.3	5.6	3.6	2.6	3.9	6.4	5.7	4.3	2.2	5.6	8.4	4.4	4.3	4.9	6.4	5.2	3.4	9.4	6.5	6.4	6.9	3.5	3.2	5.0	5.3
	Unit Amount (values/ha)																																																						
	Ratio (%)																																																							
	Max								9.4					10.0				10.0							7.8												7.2											9.0								8.8	8.4
	Min								1.2					1.3				0.0							0.0												0.0											2.0								1.3	2.3

Appendix TA-7 Tabulation of Inventory Survey Result for the Sector of Organization and Operation and Maintenance (Regional Statistics)

Reg. No	Item	NIS Information												Rating of Organization on O&M Capability						
		Management Record							IA					NIS Func'lity Survey			ISF CE	Data Collection		Inventory
		FUSA	IMT Area	Cropping Intensity			Average Yield	ISF C.E. Year	Debt to IA, 2004	Coverage Area	Average Size	Membership Rate	Func'lity Ave. Pts	Point	Adjective Rating	Inventory Rating	Rating 70<=High Med<70 Low<50	Class of Data Collection	Inventory Rating	Rating on Org.
				Dry	Wet	Annual														
		(ha) : (99)	(ha) (100)	(%) (101)	(%) (102)	(%) (103)	(cav./ha) (104)	(%) (105)	(Pesos) (106)	(ha) (107)	(ha) (108)	(%) (109)	(point) (110)	(point) (111)	(rating) (112)	(rating) (113)	(rating) (114)	(class) (115)	(rating) (116)	(rating) (117)
(1)	(2)																			
CAR	Total	15,258	0	55	55	111	82	44	0	4,762	159	100	0.7						High	1
	Average	15,258	0	55	55	111	82	44	0	4,762	159	100	0.7						Med	0
	Unit Amount (values/ha)								0										Low	0
	Ratio (%)		0							31									Total	1
	Max	15,258	0	55	55	111	82	44	0		159	100	0.7	85.0						
	Min	15,258	0	55	55	111	82	44	0		159	100	0.7	81.5						
I	Total	44,249	956	1,147	1,488	2,629	1,929	1,399	0	27,054	8,190	1,313	38.2						High	7
	Average	1,844	46	52	68	120	84	70	0	1,353	372	66	1.9						Med	7
	Unit Amount (values/ha)								0										Low	3
	Ratio (%)		2							61									Total	17
	Max	9,467	550	93	100	180	109	121	0		729	100	4.0	0.0						
	Min	157	0	4	2	62	74	24	0		138	29	0.0	0.0						
II	Total	44,122	16,773	1,020	900	1,919	1,105	977	0	37,843	9,599	1,122	25.8						High	0
	Average	2,941	1,118	68	60	128	79	70	0	2,911	738	86	2.0						Med	9
	Unit Amount (values/ha)								0										Low	1
	Ratio (%)		38							86									Total	10
	Max	10,046	10,046	89	79	161	98	93	0		2,010	100	2.5	84.0						
	Min	889	0	41	27	68	64	30	0		144	68	1.5	64.5						
MRIIS	Total	84,795	57,580	326	319	647	350	314	102,406	83,663	926	403	7.7						High	1
	Average	21,199	14,395	82	80	162	88	79	25,602	20,916	232	101	1.9						Med	0
	Unit Amount (values/ha)								1										Low	0
	Ratio (%)		68							99									Total	1
	Max	22,676	22,676	95	93	189	91	88	85,930		247	103	2.6	0.0						
	Min	19,512	7,130	71	68	139	84	64	0		218	100	0.8	0.0						
III	Total	39,537	3,118	328	332	659	382	179	119,137	37,505	994	365	6.7						High	0
	Average	7,907	624	66	66	132	76	36	29,784	9,376	248	91	2.2						Med	2
	Unit Amount (values/ha)								3										Low	4
	Ratio (%)		8							95									Total	6
	Max	26,791	1,828	91	88	165	86	56	114,592		277	109	2.7	65.0						
	Min	403	0	32	28	79	68	17	0		202	66	1.7	65.0						
UPRIIS	Total	66,362	4,362	228	242	470	230	163	164,897	0	469	0	0.0						High	2
	Average	22,121	2,181	76	81	157	77	54	54,966	#DIV/0!	235	#DIV/0!	#DIV/0!						Med	0
	Unit Amount (values/ha)								2										Low	0
	Ratio (%)		7							0									Total	2
	Max	25,738	2,734	83	95	179	91	64	164,897		256	0	0.0	95.0						
	Min	19,924	1,628	71	67	141	64	44	0		213	0	0.0	89.0						
IV	Total	32,138	3,974	761	808	1,570	880	732	202,968	22,107	5,291	859	7.7						High	0
	Average	2,678	331	63	67	131	73	61	16,914	2,010	441	86	1.0						Med	5
	Unit Amount (values/ha)								6										Low	1
	Ratio (%)		12							69									Total	6
	Max	8,490	1,453	123	107	230	85	82	202,968		1,021	100	2.0	76.8						
	Min	773	0	17	44	64	50	34	0		131	63	0.0	67.4						
V	Total	12,462	0	761	760	1,519	798	483	244,789	12,027	3,600	761	5.3						High	0
	Average	1,246	0	76	76	152	80	54	24,479	1,336	400	85	1.3						Med	0
	Unit Amount (values/ha)								20										Low	0
	Ratio (%)		0							97									Total	0
	Max	3,084	0	99	100	199	90	81	160,748		1,038	100	2.0	0.0						
	Min	180	0	40	20	59	55	27	0		180	66	0.4	0.0						
VI	Total	49,378	200	840	999	1,840	1,005	575	109,261	46,860	7,747	988	15.1						High	2
	Average	3,798	17	65	77	142	77	58	8,405	3,605	596	76	1.2						Med	5
	Unit Amount (values/ha)								2										Low	6
	Ratio (%)		0							95									Total	13
	Max	13,277	200	83	90	172	91	107	107,597		900	98	3.3	0.0						
	Min	504	0	44	55	111	65	10	0		358	50	0.0	0.0						
VII	Total	4,387	0	59	61	120	85	55	0	4,387	337	84	1.7						High	0
	Average	4,387	0	59	61	120	85	55	0	4,387	337	84	1.7						Med	0
	Unit Amount (values/ha)								0										Low	0
	Ratio (%)		0							100									Total	0
	Max	4,387	0	59	61	120	85	55	0		337	84	1.7	0.0						
	Min	4,387	0	59	61	120	85	55	0		337	84	1.7	0.0						
VIII	Total	17,533	837	1,078	1,247	2,312	1,256	611	0	14,743	2,952	625	5.8						High	2
	Average	1,096	52	67	78	145	79	41	0	1,134	227	48	0.8						Med	2
	Unit Amount (values/ha)								0										Low	7
	Ratio (%)		5							84									Total	11
	Max	2,185	386	100	105	198	98	80	0		386	87	2.1	0.0						
	Min	281	0	22	27	49	68	17	0		103	17	0.0	0.0						
IX	Total	13,417	1,545	287	288	575	307	263	0	10,750	2,465	278	5.7						High	3
	Average	3,354	386	72	72	144	77	66	0	3,583	822	93	1.9						Med	1
	Unit Amount (values/ha)								0										Low	0
	Ratio (%)		12							80									Total	4
	Max	6,485	1,545	87	88	175	89	78	0		1,360	95	2.7	91.3						
	Min	1,571	0	56	56	113	61	52	0		515	91	1.0	76.0						
X	Total	19,339	0	311	285	599	386	349	61,313	19,508	2,302	379	5.8						High	3
	Average	3,868	0	62	57	120	77	70	12,263	3,902	460	76	1.2						Med	1
	Unit Amount (values/ha)								3										Low	0
	Ratio (%)		0							101									Total	4
	Max	10,557	0	95	88	183	81	85	61,313		801	97	2.0	96.0						
	Min	806	0	26	26	53	75	57	0		222	57	0.4	85.0						
XI	Total	29,290	0	827	836	1,661	719	664	324,987	24,929	2,633	660	24.6						High	7
	Average	3,254	0	92	93	185	80	83	36,110	2,770	293	83	2.7						Med	0
	Unit Amount (values/ha)								11										Low	0
	Ratio (%)		0							85									Total	7
	Max	7,031	0	107	107	213	111	90	255,253		854	99	3.0	100.0						
	Min	708	0	82	84	170	65	72	0		148	59	2.3	91.0						
XII	Total	56,080	3,177	1,056	1,146	2,201	1,034	750	0	57,176	4,419	895	22.3						High	7
	Average	4,006	227	75	82	157	74	63	0	4,084	340	69	1.9						Med	3
	Unit Amount (values/ha)								0										Low	2
	Ratio (%)		6							102									Total	12
	Max	11,355	3,177	108	108	216	86	87	0		803	97	3.0	0.0						
	Min	700	0	17	29	46	45	34	0		116	18	1.0	0.0						
XIII	Total	14,382	2,112	323	340	662	377	355	0	15,095	1,242	298	12.4						High	5
	Average	2,876	422	65	68	132	75	71	0	3,019	248	75	2.5						Med	0
	Unit Amount (values/ha)								0										Low	0
	Ratio (%)		15							105									Total	5
	Max	3,716	2,112	78	82	161	79	79	0		316	96	3.2	95.0						
	Min	1,825	0	47	46	92	69	55	0		169	55	2.1	83.0						
Nat'l	Total	542,729	94,635	9,406	10,105	19,494	10,925	7,913	1,329,759	418,409	53,324	9,130	185.5						High	40
Ave.	Average	3,849	701	68	73	140	79	62	9,924	3,347	413	75	1.7						Med	35
	Unit Amount (values/ha)								2										Low	24
	Ratio (%)		17							77									Total	99
	Max	26,791	22,676	123	108	230	111	121	255,253		2,010	109	4.0	100.0						
	Min	157	0	4	2	46	45	10	0		103	17	0.0	64.5						

Appendix TA-8 Maintenance, Rehabilitation and Improvement (MRI) Plan for Three Pilot NISs

I. AMRIS (Region III)

1. General and Hydrology Information

The general and hydrology informations of NIS are as follows (refer to Part I to III and Table A2-4 in the Manual

Summary Table of General and Hydrolgy Informations

Description	Unit	Wet Season (Aug.)		Dry Season (Dec.)	
		Designed	Programmed	Designed	Programmed
1. Service area:	ha	20,091	17,428	26,791	23,240
(South main canal area)	ha	(9,395)	(10,723)	(10,129)	(11,561)
2. Max. flood discharge:	m³/sec	3,030	-	-	-
3. Total Design intake discharge	m³/sec	44.00	-	-	-
(South main canal area)	m³/sec	(16.64)	-	-	-
4. Max. available water resources:	m³/sec	-	91.91	-	105.43
5. Average available water resources:	m³/sec	-	31.80	-	54.00
6. Max. water requirement:	m³/sec	-	32.42	44.00	38.81
(South main canal area)	m³/sec	-	(19.94)	-	(19.31)
7. Revised design intake discharge:	m³/sec	32.42		38.81	
(South main canal area)	m³/sec	19.94		19.31	

Note: Maximum unit land soaking irrigation requirement, wet: 1.86 lit/sec/ha, dry: 1.67 lit/sec/ha

2. Maintenance Plan

2.1 Diversion Dam

2.1.1 General and Structural Dimensions

The general and structural deimensions are picked-up from Table A2-4 (1) in the Manual

Summary Table of General and Structural Dimensions for Diversion Dam

Description	Width (m)	Height (m)	Length (m)	No.(pc.)
1. Diversion dam	525.00	11.50	-	1
2. Spillway (weir type)	480.00	3.00	100.00	1
3. Spillway (gate type)	79.00	2.50	-	6
4. Sluice way gate (left)	15.00	4.50	100.00	1
5. Sluice way gate (right)	15.00	4.50	100.00	2
6. Intake gate (left)	1.00	1.00	-	10
7. Intake gate (right)	1.00	1.00	-	12
8. Protection dike (left)	-	5.00	202.00	1
9. Protection dike (right)	-	5.00	202.00	1
10. Protection sidewall (left)	-	3.00	58.00	1
11. Protection sidewall (right)	-	4.50	108.00	1

2.1.2 Maintenance Plan

The maintenance components and scales are picked-up from Table A3-7 (1) and A3-8 (1) in the Manual

Summary Table of Maintenance Components for Diversion Dam

Maintenance Component	Scale	Width (m)	Height (m)	Length (m)	No.(pc.)
1. Repair of sluice way (left)	large	15.00	4.50	100.00	1
2. Repair of sluice way (right)	large	15.00	4.50	100.00	2
3. Repair of protection dike (left)	medium	-	5.00	202.00	1
4. Repair of protection dike (right)	medium	-	5.00	202.00	1
5. Repair of protection sidewall (left)	small	-	3.00	58.00	1
6. Repair of protection sidewall (right)	medium	-	4.50	108.00	1
7. Greasing of sluice way gates (left and right)	large	15.00	4.50	-	3
8. Greasing of intake gates (left and right)	small	1.00	1.00	-	22

2.1.3 Maintenance Cost

The maintenace costs are estimated as follows

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**

2.2 South Main and Lateral Canal

2.2.1 General and Structural Dimensions

The general and structural deimensions are picked-up from Table A2-4 (3) in the Manual

Summary Table of General and Structural Dimensions for South Main and Lateral Canal

Name of Canal	Service Area (ha)	Discharge (m3/sec)	Rivised Q (m3/sec)	Length (km)	Width (m)	Height (m)	Related Str. (set)
1. Main Canal	10,723	19.39	19.94	29.60	11.00	1.50	21
2. Lateral A	261	0.27	0.49	3.42	1.50	1.00	8
3. Lateral Bacao	429	0.40	0.80	16.50	1.25	1.00	12
4. Lateral B	786	1.62	1.46	15.93	1.00	0.80	10
5. Lateral C	219	0.28	0.41	7.27	1.75	1.00	6
6. Lateral D	1,184	2.32	2.20	32.04	2.25	1.00	13
7. Lateral E	1,552	3.56	2.89	54.38	3.60	1.50	31
8. Lateral F	448	0.81	0.83	13.42	2.00	1.00	9
9. Lateral G	75	0.05	0.14	0.94	0.90	0.70	1
10. Lateral H	114	0.19	0.21	2.09	1.35	0.80	1
11. Lateral I	80	0.24	0.15	3.13	1.00	0.60	1
12. Lateral J	1,846	5.10	3.43	58.65	3.00	1.20	36
13. Lateral J-extra	52	0.12	0.10	2.05	1.00	0.70	1
14. Lateral K	291	0.61	0.54	9.30	1.75	1.00	7
15. Lateral L	757	1.55	1.41	16.87	3.40	1.20	7
16. Lateral M	280	1.40	0.52	11.12	2.50	1.00	7
17. San. Marcos	230	1.62	0.43	10.53	0.75	0.70	3

2.2.2 Maintenance Plan

The maintenance components and scales are picked-up from Table A3-7 (3) and A3-8 (3) in the Manual

Summary Table of Maintenance Components for Main and Lateral Canal

Maintenance Component	Scale	Length (km)	Width (m)	Height (m)	No.(pc.)
1. Repair of damaged south main canal	large	29.60	11.00	1.50	1
2. Repair of leaked south main canal	large	29.60	11.00	1.50	1
3. Desilting of south main canal	large	29.60	11.00	1.50	1
4. Maintenance of related structure of south main canal	large	-	-	-	3
5. Repair of damarged Lateral A	medium	3.42	1.50	1.00	1
6. Repair of leaked Lateral A	medium	3.42	1.50	1.00	1
7. Desilting of Lateral A	medium	3.42	1.50	1.00	1
8. Maintenance of related structure of Lateral A	medium	-	-	-	1
9. Repair of damaged Lateral Bacao Creek	medium	16.50	1.25	1.00	1
10. Repair of leaked Lateral Bacao Creek	medium	16.50	1.25	1.00	1
11. Desilting of Lateral Bacao Creek	medium	16.50	1.25	1.00	1
12. Maintenance of related structure of Lateral Bacao Cree	medium	-	-	-	11
13. Repair of damaged Lateral B	medium	15.93	1.00	0.80	1
14. Repair of leaked Lateral B	medium	15.93	1.00	0.80	1
15. Desilting of Lateral B	medium	15.93	1.00	0.80	1
16. Maintenance of related structure of Lateral B	medium	-	-	-	5
17. Repair of damaged Lateral C	medium	7.27	1.75	1.00	1
18. Repair of leaked Lateral C	medium	7.27	1.75	1.00	1
19. Desilting of Lateral C	medium	7.27	1.75	1.00	1
20. Maintenance of related structure of Lateral C	medium	-	-	-	4
21. Repair of damaged Lateral D	large	32.04	2.25	1.00	1
22. Repair of leaked Lateral D	large	32.04	2.25	1.00	1
23. Desilting of Lateral D	large	32.04	2.25	1.00	1
24. Maintenance of related structure of Lateral D	large	-	-	-	7
25. Repair of damaged Lateral E	large	54.38	3.60	1.50	1
26. Repair of leaked Lateral E	large	54.38	3.60	1.50	1
27. Desilting of Lateral E	large	54.38	3.60	1.50	1
28. Maintenance of related structure of Lateral E	large	-	-	-	19
29. Repair of damaged Lateral F	large	13.42	2.00	1.00	1
30. Repair of leaked Lateral F	large	13.42	2.00	1.00	1
31. Desilting of Lateral F	large	13.42	2.00	1.00	1
32. Maintenance of related structure of Lateral F	large	-	-	-	5
33. Repair of damaged Lateral G	medium	0.94	0.90	0.70	1
34. Repair of leaked Lateral G	medium	0.94	0.90	0.70	1
35. Desilting of Lateral G	medium	0.94	0.90	0.70	1
36. Maintenance of related structure of Lateral G	medium	-	-	-	1
37. Repair of damaged Lateral H	medium	2.09	1.35	0.80	1
38. Repair of leaked Lateral H	medium	2.09	1.35	0.80	1

39. Desilting of Lateral H	medium	2.09	1.35	0.80	1
40. Maintenance of related structure of Lateral H	medium	-	-	-	1
41. Repair of damaged Lateral I	medium	3.13	1.00	0.60	1
42. Repair of leaked Lateral I	medium	3.13	1.00	0.60	1
43. Desilting of Lateral I	medium	3.13	1.00	0.60	1
44. Maintenance of related structure of Lateral I	medium	-	-	-	1
45. Repair of damaged Lateral J	large	58.65	3.00	1.20	1
46. Repair of leaked Lateral J	large	58.65	3.00	1.20	1
47. Desilting of Lateral J	large	58.65	3.00	1.20	1
48. Maintenance of related structure of Lateral J	large	-	-	-	21
49. Repair of damaged Lateral J-extra	medium	2.05	1.00	0.70	1
50. Repair of leaked Lateral J-extra	medium	2.05	1.00	0.70	1
51. Desilting of Lateral J-extra	medium	2.05	1.00	0.70	1
52. Repair of damaged Lateral K	large	9.30	1.75	1.00	1
53. Repair of leaked Lateral K	large	9.30	1.75	1.00	1
54. Desilting of Lateral K	large	9.30	1.75	1.00	1
55. Maintenance of related structure of Lateral K	large	-	-	-	4
56. Repair of damaged Lateral L	large	16.87	3.40	1.20	1
57. Repair of leaked Lateral L	large	16.87	3.40	1.20	1
58. Desilting of Lateral L	large	16.87	3.40	1.20	1
59. Maintenance of related structure of Lateral L	large	-	-	-	4
60. Repair of damaged Lateral M	large	11.12	2.50	1.00	1
61. Repair of leaked Lateral M	large	11.12	2.50	1.00	1
62. Maintenance of related structure of Lateral M	large	-	-	-	4
63. Repair of damaged Lateral San. Marcos	medium	10.53	0.75	0.70	1
64. Repair of leaked Lateral San. Marcos	medium	10.53	0.75	0.70	1
65. Desilting of Lateral San. Marcos	medium	10.53	0.75	0.70	1
66. Maintenance of related structure of Lateral San. Marco	medium	-	-	-	3

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

2.2.3 Maintenance Cost

The maintenace costs are estimated as follows

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.

2.3 Annual Maintenance Cost for AMRIS

Summary table of Annual Maintenance Cost (Service area: Dam 26,791 ha, Canal 10,129 ha, 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**

< Actural amount: 539 Peso/ha
(see page 4-13 in the Main Report)

3. Rehabilitation and Improvement Plan

3.1 Diversion Dam

3.1.1 Present Conditions of Diversion Dam

The present conditions of diversion dam are picked-up "Severe" from Table A3-8 (1) in the Manual

Summary Table of Present Conditions for Diversion Dam

Part of Facilitity	Present Conditions	Scale	Width (m)	Height (m)	Length (m)	No.(pc.)
1. D/S Apron	severe damaged	medium	525.00	11.50	100.00	1

3.1.2 Rehabilitation and Improvement Cost for Diversion Dam

The rehabilitation and improvement costs are estimated as follows

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 470,000,000.

3.2 Main and Lateral Canal (South Main Canal Area)

3.2.1 Present Conditions of South Main and Lateral Canal

The present conditions of south main and lateral canal are picked-up "Severe"in Table A3-8 (3)

Summary Table of Present Conditions for South Main and Lateral Canals

Part of Facilitity	Present Conditions	Scale	Length (m)	Width (m)	Height (m)	No.(pc.)
1. Impr. of related S. of M.C.	severe damaged/sediment/rus	large	-	-	-	18
2. Impr. of related S. of Lat. Bacao	severe rust	medium	-	-	-	1
3. Impr. of related S. of Lat. E	severe scoured	large	-	-	-	12
4. Impr. of related S. of Lat. F	severe scoured	large	-	-	-	4
5. Impr. of related S. of Lat. H	severe scoured	medium	-	-	-	1
6. Impr. of related S. of J-extra	severe rust	medium	-	-	-	1

3.2.2 Rehabilitation and Improvement Cost for South Main and Lateral Canal

The rehabilitation and improvement costs are estimated as follows

Summary table of Rehabilitation and Improvement Cost for South Main and Lateral Canals (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**

3.3 Rehabilitation and Improvemen Cost for Angat RIS (South Main Canal Area)

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

< Actural amount: 603 Peso/ha/year x 30 years
= 18,100 Peso/ha
(see page 4-13 in the Main Report)

II. Sta. Cruz RIS (Region IV)

1. General and Hydrology Information

The general and hydrology informations of NIS are as follows (refer to Part I to III and Table A2-4 in the Manual

Summary Table of General and Hydrolgy Informations

Description	Unit	Wet Season (Aug.)		Dry Season (Jan.)	
		Designed	Programmed	Designed	Programmed
1. Service area:	ha	2,184	2,070	-	2,010
2. Max. flood discharge:	m^3/sec	750	-	-	-
3. Total Design intake discharge	m^3/sec	3.86	-	-	-
4. Max. available water resources:	m^3/sec	-	11.22	-	21.14
5. Average available water resources:	m^3/sec	-	4.28	-	5.79
6. Max. water requirement:	m^3/sec	-	4.60	-	3.54
7. Revised design intake discharge:	m^3/sec	3.86		3.54	

Note: Maximum unit land soaking irrigation requirement, wet: 2.22 lit/sec/ha, dry: 1.76 lit/sec/ha

2. Maintenance Plan

2.1 Diversion Dam

2.1.1 General and Structural Dimensions

The general and structural deimensions are picked-up from Table A2-4 (1) in the Manual

Summary Table of General and Structural Dimensions for Diversion Dam

Description	Width (m)	Height (m)	Length (m)	No.(pc.)
1. Diversion dam	80.00	7.87	-	1
2. Spillway (weir type)	75.00	2.94	8.50	1
3. Sluice way gate (left)	5.00	3.00	-	1
4. Intake gate (left)	1.80	2.80	-	3
5. Protection sidewall (left)	-	7.00	50.00	1
6. Protection sidewall (right)	-	9.00	43.50	1

2.1.2 Maintenance Plan

The maintenance components and scales are picked-up from Table A3-7 (1) and A3-8 (1) in the Manual

Summary Table of Maintenance Components for Diversion Dam

Maintenance Component	Scale	Width (m)	Height (m)	Length (m)	No.(pc.)
1. Repair of weir	medium	75.00	2.94	8.50	1
2. Repair of sluice way (left)	medium	5.00	3.00	8.50	1
3. Repair of protection sidewall (right)	medium	-	9.00	50.00	1
4. Repair of sluice way gate (left)	medium	5.00	3.00	-	1
5. Replace of seal rubber for sluice way gate (left)	medium	5.00	3.00	-	1
6. Repainting of sluice way gate (left)	medium	5.00	3.00	-	1
7. Greasing of sluice way gate (left)	medium	5.00	3.00	-	1
8. Repair of intake gate (left)	large	1.80	2.80	-	3
9. Repainting of intake gate (left)	large	1.80	2.80	-	3
10. Greasing of intake gate (left)	large	1.80	2.80	-	3

2.1.3 Maintenance Cost

The maintenace costs are estimated as follows

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**

2.2 Main and Lateral Canal

2.2.1 General and Structural Dimensions

The general and structural deimensions are picked-up from Table A2-4 (3) in the Manual

Summary Table of General and Structural Dimensions for South Main and Lateral Canal

Name of Canal	Service Area (ha)	Discharge (m3/sec)	Rivised Q (m3/sec)	Length (km)	Width (m)	Height (m)	Related Str. (set)
1. Main Canal	2,184	3.86	3.86	13.34	3.30	3.40	11
2. Lateral A	869	1.54	1.54	25.55	2.05	1.30	13
3. Lateral B	221	0.39	0.39	5.25	1.00	0.80	10
4. Lateral C	182	0.32	0.32	10.17	1.45	0.85	13
5. Lateral D	59	0.10	0.10	10.81	1.00	0.80	21
6. Lateral E	523	0.92	0.92	11.98	1.20	0.85	24

2.2.2 Maintenance Plan

The maintenance components and scales are picked-up from Table A3-7 (3) and A3-8 (3) in the Manual

Summary Table of Maintenance Components for Main and Lateral Canal

Maintenance Component	Scale	Length (km)	Width (m)	Height (m)	No.(pc.)
1. Repair of damaged main canal	medium	3.86	3.30	3.40	1
2. Repair of leaked main canal	medium	3.86	3.30	3.40	1
3. Desilting of main canal	medium	3.86	3.30	3.40	1
4. Maintenance of related structure of main canal	medium	-	-	-	4
5. Repair of damarged Lateral A	large	25.55	2.05	1.30	1
6. Repair of leaked Lateral A	large	25.55	2.05	1.30	1
7. Desilting of Lateral A	large	25.55	2.05	1.30	1
8. Maintenance of related structure of Lateral A	large	-	-	-	2
9. Repair of damaged Lateral B	medium	5.25	1.00	0.80	1
10. Repair of leaked Lateral B	medium	5.25	1.00	0.80	1
11. Desilting of Lateral B	medium	5.25	1.00	0.80	1
12. Repair of damaged Lateral C	medium	10.17	1.45	0.85	1
13. Repair of leaked Lateral C	medium	10.17	1.45	0.85	1
14. Desilting of Lateral C	medium	10.17	1.45	0.85	1
15. Repair of damaged Lateral D	medium	10.81	1.00	0.80	1
16. Repair of leaked Lateral D	medium	10.81	1.00	0.80	1
17. Desilting of Lateral D	medium	10.81	1.00	0.80	1
18. Repair of damaged Lateral E	medium	11.98	1.20	0.85	1
19. Repair of leaked Lateral E	medium	11.98	1.20	0.85	1
20. Desilting of Lateral E	medium	11.98	1.20	0.85	1

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

2.2.3 Maintenance Cost

The maintenace costs are estimated as follows

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**

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

2.3 Annual Maintenance Cost for Sta. Cruz RIS

Summary table of Annual Maintenance Cost (Service area: 2,070 ha, 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**

< Actural amount: 266 Peso/ha

(see page 4-13 in the Main Report)

3. Rehabilitation and Improvement Plan

3.1 Diversion Dam

3.1.1 Present Conditions of Diversion Dam

The present conditions of diversion dam are picked-up "Severe" from Table A3-8 (1)

Summary Table of Present Conditions for Diversion Dam

Part of Facilitity	Present Conditions	Scale	Width (m)	Height (m)	Length (m)	No.(pc.)
1. D/S Apron	severe damaged/scoured	medium	80.00	7.87	8.50	1.00
2. D/S Riverbed protection	severe scoured	medium	80.00	0.70	20.00	1.00
3. Protection sidewall (left	severe washed/scoured/damaged	medium	-	7.00	50.00	1.00

3.1.2 Rehabilitation and Improvement Cost for Diversion Dam

The rehabilitation and improvement costs are estimated as follows

Summary Table of Rehabilitation and Improvement 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					**110,450,000**

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.

3.2 Main and Lateral Canal

3.2.1 Present Conditions of Main and Lateral Canal

The present conditions of main and lateral canal are picked-up "Severe" in Table A3-8 (3) in the Manual.

Howevere, there is no "severe" in Table A3-8 (3) in the Manual

3.2.2 Rehabilitation and Improvement Plan for South Main and Lateral Canal

Therefore, the rehabilitation and improvement plan for main and lateral canals is not necessary

3.2.3 Rehabilitation and Improvement Cost for South Main and Lateral Canal

Therefore, the rehabilitation and improvement cost for main and lateral canals is not necessary

3.3 Rehabilitation and Improvemen Cost for Sta. Cruz RIS

Summary Table of Rehabilitation and Improvement Cost (Service area: 2,184 ha, 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**

< Actural amount: 742 Peso/ha/year x 70 years
= 51,900 Peso/ha
(see page 4-13 in the Main Report)

III. Aganan RIS (Region VI)

1. General and Hydrology Information

The general and hydrology informations of NIS are as follows (refer to Part I to III and Table A2-4 in the Maual

Summary Table of General and Hydrolgy Informations

Description	Unit	Wet Season (June)		Dry Season (Nov.)	
		Designed	Programmed	Designed	Programmed
1. Service area:	ha	5,500	4,472	-	2,000
2. Max. flood discharge:	m^3/sec	830	-	-	-
3. Design intake discharge	m^3/sec	8.25	-	-	-
4. Max. available water resources:	m^3/sec	-	7.52	-	8.56
5. Average available water resources:	m^3/sec	-	1.60	-	2.06
6. Max. water requirement:	m^3/sec	-	7.42	-	1.54
7. Revised design intake discharge:	m^3/sec	7.42		1.54	

Note: Maximum unit land soaking irrigation requirement, wet: 1.66 lit/sec/ha, dry: 0.77 lit/sec/ha

2. Maintenance Plan

2.1 Diversion Dam

2.1.1 General and Structural Dimensions

The general and structural deimensions are picked-up from Table A2-4 (1) in the Manual

Summary Table of General and Structural Dimensions for Diversion Dam

Description	Width (m)	Height (m)	Length (m)	No.(pc.)
1. Diversion dam	81.50	8.36	-	1
2. Spillway (weir type)	76.90	5.81	52.00	1
3. Sluice way gate (right)	4.60	2.90	-	1
4. Intake gate (right)	1.85	1.45	-	7
5. Protection dike (left)	3.00	5.50	135.70	1
6. Protection dike (right)	3.00	-	-	1
7. Protection sidewall (left)	-	-	-	1
8. Protection sidewall (right)	-	6.25	141.50	1

2.1.2 Maintenance Plan

The maintenance components and scales are picked-up from Table A3-7 (1) and A3-8 (1) in the Manual

Summary Table of Maintenance Components for Diversion Dam

Maintenance Component	Scale	Width (m)	Height (m)	Length (m)	No.(pc.)
1. Repair of D/S riverbed protection	small	81.50	0.70	50.00	1
2. Repair of sluice way pier	medium	1.50	10.00	8.00	2
3. Repair of intake concrete	medium	15.00	3.00	20.00	1
4. Repair of protection dike (left)	medium	3.00	5.50	135.70	1
5. Repair of sluice way gate	medium	4.60	2.90	-	1
6. Replace of seal rubber for sluice way gate	medium	4.60	2.90	-	1
7. Repainting of sluice way gate	medium	4.60	2.90	-	1
8. Greasing of sluice way gate	medium	4.60	2.90	-	1
9. Repainting of intake gate	medium	1.85	1.45	-	7
10. Greasing of intake gate	medium	1.85	1.45	-	7

2.1.3 Maintenance Cost

The maintenace costs are estimated as follows

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**

2.2 Main and Lateral Canal

2.2.1 General and Structural Dimensions

The general and structural deimensions are picked-up from Table A2-4 (3) in the Manual

Summary Table of General and Structural Dimensions for Main and Lateral Canal

Name of Canal	Service Area (ha)	Discharge (m3/sec)	Rivised Q (m3/sec)	Length (km)	Width (m)	Height (m)	Related Str. (set)
1. Main Canal	4,472	8.25	7.42	11.85	3.25	3.50	11
2. Lateral A	1,379	2.55	#DIV/0!	18.31	1.25	1.00	14
3. Lateral B	2,488	4.60	#DIV/0!	21.13	2.25	1.75	14
4. Lateral C	147	0.27	#DIV/0!	1.17	0.40	0.45	2
5. Lateral D	453	0.86	#DIV/0!	5.17	1.15	1.40	4

2.2.2 Maintenance Plan

The maintenance components and scales are picked-up from Table A3-7 (3) and A3-8 (3) in the Manual

Summary Table of Maintenance Components for Main and Lateral Canal

Maintenance Component	Scale	Length (km)	Width (m)	Height (m)	No.(pc.)
1. Repair of damaged main canal	medium	11.85	3.25	3.50	1
2. Repair of leaked main canal	medium	11.85	3.25	3.50	1
3. Maintenance of related structure of main canal	medium	-	-	-	1
4. Repair of damarged Lateral A	large	18.31	1.25	1.00	1
5. Repair of leaked Lateral A	large	18.31	1.25	1.00	1
6. Maintenance of related structure of Lateral A	large	-	-	-	1
7. Repair of damaged Lateral B	large	21.13	2.25	1.75	1
8. Repair of leaked Lateral B	large	21.13	2.25	1.75	1
9. Maintenance of related structure of Lateral B	large	-	-	-	1
10. Repair of damaged Lateral C	small	1.17	0.40	0.45	1
11. Maintenance of related structure of Lateral C	small	-	-	-	1
12. Repair of damaged Lateral D	medium	5.17	1.15	1.40	1
13. Repair of leaked Lateral D	medium	5.17	1.15	1.40	1

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

2.2.3 Maintenance Cost

The maintenace costs are estimated as follows

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**

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

2.3 Annual Maintenance Cost for Aganan RIS

Summary table of Annual Maintenance Cost (Service area: 4,472 ha, 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**

< Actural amount: 225 Peso/ha
(see page 4-13 in the Main Report)

3. Rehabilitation and Improvement Plan

3.1 Diversion Dam

3.1.1 Present Conditions of Diversion Dam

The present conditions of diversion dam are picked-up "Severe" from Table A3-8 (1) in the Manual

Summary Table of Present Conditions for Diversion Dam

Part of Facilitity	Present Conditions	Scale	Width (m)	Height (m)	Length (m)	No.(pc.)
1. Sluice way gate (right)	severe sediment	medium	4.60	2.90	-	1
2. Intake gate (right)	severe sediment	medium	1.85	1.45	-	7

3.1.2 Rehabilitation and Improvement Plan for Diversion Dam

1) Sediment Flushing in Sluice Way

The maintenance plan of sediment flushing in sluice way should be in accordance with the flowchart was shown on page 3-15 in the Manual.

a) Judgement of Sediment Flushing

(1) Sediment depth in the sluice way: 0.80m is more than 0.30m

(2) Sediment depth in main canal: 0.50m is more than 0.14m of 10% of water depth (= 1.44m

Then the judgement of sediment flushing is "Yes", go to "2-2 Need Flushing"

b) Judgement of Sand Settling in Sluice Way

Vs = Qs / (W x hs)

Where, Vs: Velocity in sluice way (m/sec)
Qs: Maximum available water resources, Qs = 8.56 m3/sec
W: Width of sluice way, W = 4.60 m
hs: Water depth in sluice way, hs = 2.50 m

Vs = 8.56 / (4.60 x 2.50) = 0.74 m/sec > 0.40 m/sec

Then the judgement of sand settling is "No", go to "4 To be improved sluice way"

2) Improvement of Sluice Way

a) Required Width of Sluice Way

Wr = Qs / (Vs x hs)

Where, Wr: Required width of sluice way (m)
Qs: Maximum available water resources, Qs = 8.56 m3/sec
Vs: Velocity in sluice way, Vs = 0.40 m/sec
hs: Water depth in sluice way, hs = 2.50 m

Wr = 8.56 / (0.40 x 2.50) = 8.56 m > 4.60 m (existing width of sluice way)

Therefore, the additional sluice way with 4.60m width will be provided for sand settling

b) Minimum Diameter of Sediment in Main Canal

The situation of sediment in sluice way are as follows

Description	unit	Original	Present	Proposed
Design Discharge	m3/sec	8.25	7.52	7.42
Water Depth	m	2.50	2.00	2.50
Sediment Depth	m	0.00	0.50	0.00
Velocity	m/sec	0.36	0.41	0.32
Critical Tractive Particle Size	mm	0.6	0.8	0.5

Therefore, minimum diameter of sediment in main canal is 0.3 mm

3) Inprovement of Intake Mouth

a) Judgement of Intake Mouth

(1) Gap between sluice way sill and intake sill

$\Delta H = 2.50 - 1.45 = 1.05$ m > Minimum $\Delta H = 1.00$m O.K.

(2) Velocity through the intake mouth

Vi = Qi / (Wi x hi)

Where, Vi: Velocity through the intake mouth, Standard Vi = 0.60m/sec to 1.00m/sec
Qi: Reviced design intake discharge, Qi = 7.42 m3/sec
Wi: Width of intake mouth, Wi = 1.85m x 7sets = 12.95 m
hi: Water depth in intake mouth, hi = 1.45m

Vi = 7.42 / (12.95 x 1.45) = 0.40 m/sec < Standard Vi = 0.60 to 1.00m/sec O.K.

Therefore, the existing intake mouth is good design to prevent sediment into the intake

4) Proposed Sand Settling Basin

a) Maximum Diameter of Sediment in Main canal

The situation of sediment in main canal are as follows

Description	unit	Original	Present	Proposed
Design Discharge	m3/sec	8.25	5.43	7.42
Water Depth	m	1.44	1.01	1.31
Sediment Depth	m	0.00	0.43	0.13
Velocity	m/sec	0.81	0.69	0.77
Critical Tractive Particle Size	mm	3.2	2.5	3.0

Therefore, maximum diameter of sediment in main canal is 2.5 mm

b) Width and Depth in Sedimentation Ditch

W = Q / (U x h)

Where, W: Required width of sedimentation ditch (m)
Q: Proposed design discharge, Q = 7.42 m3/sec
U: Velocity in sedimentation ditch, U = 0.25 m/sec
h: Water depth in sedimentation ditch, h = 2.50 m

W = 7.42 / (0.25 x 2.50) = 11.87 m < 4.00m x 3 rows = 12.00 m

c) Length of Settling Basin

L = K · h / Vg · U

Where, L: Required length of settling basin (m)
K: Safety factor, K = 1.5 to 2.0
h: Water depth in sedimentation ditch, h = 2.50 m
Vg: Critical settling velocity, dmin. = 0.3 mm, then Vg = 0.025 m/sec
U: Velocity in sedimentation ditch, U = 0.25 m/sec

L = (1.5 to 2.0) x 2.50 / 0.025 x 0.25 = 37.50 to 50.00 m

Therefore, the length of settling basin will provided 40.00m

5) Summary of Rehabilitation and Improvement Plan for Diversion Dam

The summary of rehabilitation and improvement plan for diversion dam are as follows

Summary Table of rehabilitation and Improvement for Diversion Dam

Rehabilitation and Improvement Component	Scale	Width (m)	Height (m)	Length (m)	No.(lot)
1. Improvement of sluice way	medium	4.60	2.90	10.00	1
2. Proposed sand settling basin	medium	4.00m x 3rows	4.40	65.60	1

6) Rehabilitation and Improvement Cost

The rehabilitation and improvement costs are estimated as follows

Summary Table of Rehabilitation and Improvement 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.

3.2 Main and Lateral Canal

3.2.1 Present Conditions of Main and Lateral Canal

The present conditions of main and lateral canal are picked-up "Severe"in Table A3-8 (3) in the Manual

Summary Table of Present Conditions for Main and Lateral Canals

Part of Facilitity	Present Conditions	Scale	Length (m)	Width (m)	Height (m)	No.(pc.)
1. Desilting of main canal	severe sediment	medium	11.85	3.25	3.50	1
2. Impr. of related structure of M.C	severe sediment and rust	medium	-	-	-	10
3. Desilting of Lat. A	severe sediment	large	18.31	1.25	1.00	1
4. Impr. of related structure of Lat.	severe sediment and rust	large	-	-	-	9
5. Desilting of Lat. B	severe sediment	large	21.13	2.25	1.75	1
6. Impr. of related structure of Lat.	severe sediment and rust	large	-	-	-	13
7. Desilting of Lat. D	severe sediment	medium	5.17	1.15	1.40	1
8. Impr. of related structure of Lat.	severe sediment and rust	medium	-	-	-	4

3.2.2 Rehabilitation and Improvement Plan for Main and Lateral Canal

1) Desilting in Main and Lateral Canals

The desilting in main and lateral canals should be in accordance with the flowchart was shown on page 3-19 in th Manual.

a) Judgement of Desilting

(1) Sediment depth in main canal: 0.53m is more than 0.17m of 10% of water depth (= 1.73m

(2) Sediment depth in Lateral canal (large): 0.29m is more than 0.087m of 10% of water depth (= 0.87m

(3) Sediment depth in Lateral canal (medium): 0.25m is more than 0.077m of 10% of water depth (= 0.77m

(4) Sediment depth in Lateral canal (small): 0.24m is more than 0.066m of 10% of water depth (= 0.66m

Then the judgement of desilting is "Yes", go to "2. Revised Design Discharge"

b) Revised Design Discharge

The revised design discharges are as follows

Canal Name	Original Design Discharge Qo (m^3/sec)	Avaiable Discharge Qa (m^3/sec)	Max. Water Requirement Qr (m^3/sec)	Revised Design Discharge Qd (m^3/sec)
(1) Main Canal	8.25	7.52	7.42	7.42
(2) Lateral A	2.55	0.00	2.29	2.29
(3) Lateral B	4.60	0.00	4.13	4.13
(4) Lateral C	0.27	0.00	0.24	0.24
(5) Lateral D	0.86	0.00	0.75	0.75

c) Present Canal Capacities

The present canal capacities are as follows

(1) Main Canal (large scale)

Canal Capacities of Main Canal (large scale)

Description	unit	Original Design	Present Situation	Proposed Design
Design discharge	m^3/sec	30.00	20.00	27.00
Bottom width	m	8.00	10.00	8.65
Water depth	m	2.35	1.68	2.13
Flow area	m^2	27.03	21.03	25.23
Velocity	m/sec	1.11	0.96	1.07

The present sedimentation is 6.00 m^3/m (= 27.03 - 21.03) and the desilting volume is 4.20 m^3/m (= 25.23 - 21.03).

(2) Main Canal (medium scale)

Canal Capacities of Main Canal (medium scale)

Description	unit	Original Design	Present Situation	Proposed Design
Design discharge	m^3/sec	8.00	5.00	7.20
Bottom width	m	3.00	4.59	3.57
Water depth	m	1.73	1.20	1.54
Flow area	m^2	9.68	7.67	9.06
Velocity	m/sec	0.83	0.72	0.80

The present sedimentation is 2.01 m^3/m (= 9.68 - 7.67) and the desilting volume is 1.39 m^3/m (= 9.06 - 7.67).

(3) Main Canal (small scale)

Canal Capacities of Main Canal (small scale)

Description	unit	Original Design	Present Situation	Proposed Design
Design discharge	m^3/sec	2.00	1.30	1.80
Bottom width	m	1.50	2.51	1.79
Water depth	m	0.96	0.62	0.86
Flow area	m^2	2.81	2.13	2.65
Velocity	m/sec	0.71	0.61	0.69

The present sedimentation is 0.68 m^3/m (= 2.81 - 2.13) and the desilting volume is 0.52 m^3/m (= 2.65 - 2.13).

(4) Lateral Canal (large scale)

Canal Capacities of Lateral Canal (large scale)

Description	unit	Original Design	Present Situation	Proposed Design
Design discharge	m^3/sec	2.00	1.30	1.80
Bottom width	m	2.00	2.87	2.27
Water depth	m	0.87	0.58	0.78
Flow area	m^2	2.88	2.17	2.68
Velocity	m/sec	0.70	0.60	0.67

The present sedimentation is 0.71 m^3/m (= 2.88 - 2.17) and the desilting volume is 0.51 m^3/m (= 2.68 - 2.17).

(5) Lateral Canal (medium scale)

Canal Capacities of Lateral Canal (medium scale)

Description	unit	Original Design	Present Situation	Proposed Design
Design discharge	m^3/sec	1.00	0.70	0.90
Bottom width	m	1.00	1.75	1.27
Water depth	m	0.77	0.52	0.68
Flow area	m^2	1.66	1.32	1.56
Velocity	m/sec	0.60	0.53	0.58

The present sedimentation is 0.34 m^3/m (= 1.66 - 1.32) and the desilting volume is 0.24 m^3/m (= 1.56 - 1.32).

(6) Lateral Canal (small scale)

Canal Capacities of Lateral Canal (small scale)

Description	unit	Original Design	Present Situation	Proposed Design
Design discharge	m^3/sec	0.50	0.35	0.45
Bottom width	m	0.50	1.22	0.83
Water depth	m	0.66	0.42	0.55
Flow area	m^2	0.98	0.78	0.91
Velocity	m/sec	0.50	0.45	0.49

The present sedimentation is 0.20 m^3/m (= 0.98 - 0.78) and the desilting volume is 0.13 m^3/m (= 0.91 - 0.78).

d) Selection of Desilting Method

The criteria of selection of desilting method are as follows

(1) Manual: desilting volume is small (less than 0.50 m^3/m).

(2) Equipment: desilting volume is medium or large (more than 0.50m^3/m)

Canal Name	Sedimentation		Desilting		Desilting Method
	Depth (m)	Volume (m^3/m)	Depth (m)	Volume (m^3/m)	
(1) Main Canal (large)	0.67	**6.00**	0.45	4.20 (70 %)	by Equipment
(2) Main Canal (mediun	0.53	**2.01**	0.34	1.39 (69 %)	by Equipment
(3) Main Canal (small)	0.34	**0.68**	0.24	0.52 (76 %)	by Equipment
(4) Lateral Canal (large	0.29	**0.71**	0.20	0.51 (72 %)	by Equipment
(5) Lateral Canal (medi	0.25	**0.34**	0.16	0.24 (71 %)	by Manual
(6) Lateral Canal (small	0.24	0.20	0.13	0.13 (65 %)	by Manual

2) Summary of Rehabilitation and Improvement Plan for Main and Lateral Cana

The summary of rehabilitation and improvement plan for main and lateral canals are as follows

Summary of Rehabilitation and Improvement Plan for Main and Lateral Canals

Rehabilitation and Improvement Component	Scale	Length (m)	Width (m)	Height (m)	No.(pc.)
1. Desilting of main canal (R/ I)	medium	11.85	3.25	3.50	1
2. Improvement of related structure of main canal (R/I)	medium	-	-	-	4
3. Desilting of Lat. A (R/I)	large	18.31	1.25	1.00	1
4. Improvement of related structure of Lat. A (R/I)	large	-	-	-	3
5. Desilting of Lat. B	large	21.13	2.25	1.75	1
6. Impr. of related structure of Lat. B	large	-	-	-	5
7. Desilting of Lat. D	medium	5.17	1.15	1.40	1
8. Impr. of related structure of Lat. D	medium	-	-	-	2

6) Rehabilitation and Improvement Cost

The rehabilitation and improvement costs are estimated as follows

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**

3.3 Rehabilitation and Improvemen Cost for Aganan RIS

Summary Table of Rehabilitation and Improvement Cost (Service area: 4,472 ha, 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**

< Actural amount: 462 Peso/ha/year x 25 years
= 11,600 Peso/ha (see page 4-13 in the Main Report)

Appendix TA-9 List of Collected Data

In the courses of the Phase-1 Filed Work, following data on the NISs are collected by the Study Team.

3.1 Collected Data for Related NISs

Topographic Map

1. Topographic Maps of Three Pilot Areas (1/50,000), National Mapping and Resources Information Authority (NAMRIA)
2. Administrative Map of Three Pilot Areas (1/250,000), NAMRIA

Reports

1. The Study on Jalaur Irrigation Systems and Rural Area Development Project in The Republic of the Philippines, June 1998, JICA
2. The Study on the Irrigators Association Strengthening Project in National Irrigation Systems, Operation and Maintenance Manual for GIS Database, May 2003, JICA
3. Stream flow Data (1980-2000 in July 2001, January 2002, July 2002) published by DPWH-BRS
4. The Study on Strengthening of NIA's Management System, JICA, October 2001
5. The Study on the Irrigators Association Strengthening Project, JICA, July 2003
6. NIA 2002 Annual Report、NIA
7. General Operation and Maintenance Manual, Volume I (Operation and Maintenance) and Volume II (Organization and Administration), prepared by NIA, Jan. 1991
8. Specific Operation and Maintenance Manual Volumes I and II (AMRIS, Sta. Cruz, and Aganan-Sta. Barbara RIS)
9. Manual of Procedures for Irrigation Management Information System (IMIS), NIA-SOME Sector
10. Review of Cost Recovery Mechanisms for National Irrigation Systems, NIA-ADB, 2000
11. Manual of Procedures for Participatory Irrigation Projects, IDD, NIA

Others

1. General Appropriate Act (1998-2006), SMD, NIA
2. NIS Performance Survey (2002-2005) , SMD, NIA
3. Management Action Plan, SMD, NIA
4. IA Functionality Survey Result, IDD, NIA
5. Year End Report to the President, Corplan, NIA
6. Corporate Appraisal (Draft) , Corplan, NIA
7. Memorandum of Circulars, SMD, NIA

3.2 Collected Data at Related Pilot Areas

3.2.1 Angat-Maasim RIS (AMRIS) (Region III)

1. General Layout Map (S = 1/50,000) covered by Working Station-2
2. Monthly Rainfall Data (1981-2005)
3. Monthly Average Discharge Records (Outflow at Angat Main units (1975-2005)
4. Monthly Average Diverted Intake Discharge Records (1980-2001)

5. Irrigated and Benefited Areas (1974-2002)
6. Operation and Maintenance Plan
7. Service Areas, Total No. of Lots and Land Owners by Working Station
8. Performance Evaluation Report (Oct. 2005)
9. Salient Features of Region III
10. Organizational Chart Bulacan Provincial Irrigation Management Office
11. General Information of Irrigators' Association
12. Summary of IA Functionality CY 2004
13. Program of Works (2000-2006)

3.2.2 Sta. Cruz RIS (Region IV)

1. General Layout Map of Sta. Cruz RIS (S = 1/50,000)
2. Monthly Rainfall Data (1956-1986) and Estimated Monthly Effective Rainfall (1971-1986)
3. Monthly Average Discharge Records at Diversion Dam Site (1946-1974)
4. Monthly Average Diverted Intake Discharge Records (1980-1984)
5. Irrigated and Benefited Areas (1977-2005)
6. Operation and Maintenance Plan (CY 2005-2006)
7. General Information
8. Profile of Irrigation Development
9. Performance Evaluation
10. Organizational Chart
11. IA Profile
12. IA Functionality Survey Summary CY2004
13. Program of Works (2000-2006)

3.2.3 Aganan RIS (Region VI)

1. General Layout Map of Aganan-Sta. Barbara RIS (S = 1/33.333)
2. Monthly Rainfall Data (1956-1986) and Estimated Monthly Effective Rainfall (1971-1986)
3. Monthly Average Discharge Records at Diversion Dam Site (1946-1974)
4. Monthly Average Diverted Intake Discharge Records (1980-1984)
5. Irrigated and Benefited Areas (1977-2005)
6. Operation and Maintenance Plan (CY 2005-2006)
7. System Features (as of October 2005)
8. ASBRIS Profile, Accomplishments and Programs
9. Repair/ Rehabilitation Programs (Implemented CY 1998-2004)
10. Project Proposal (Rehabilitation of the Aganan River Irrigation System)
11. Present Organizational Set-up
12. IA Profile
13. NIS Functionality Survey Summary, 2004
14. Program of Works (2000-2006)

Appendix TA-10 Government and Local Staff Interviewed By the Study Team

Study Team interviewed the following Philippines Government staff and related local staff during the Phase-I, Phase-II and III field works.

Name	Office Name/Position
A. Philippines Government	
1) National Irrigation Administration (NIA Central Office)	
Administration Board	
1. Mr. Processo T. Domingo	Administrator, NIA
2. Mr. Balcazar H. Usis	Administrator, NIA
3. Mr. Arturo C. Lomibao	Administrator, NIA
4. Mr. Marcelino V. Tugaoen Jr. PhD	Deputy Administrator, NIA
System Management Department (SMD)	
1. Mr. Edilberto B. Payawal	Manager, SMD
2. Mr. Leonardo E. Balite	Division Manager, Operation and Management Division (O&M), SMD
3. Mr. Augustrese S. Torres	Division Manager A, Repair and Rehabilitation (R&R) Division, SMD
4. Mr. Mario M. Sagum	Chief, Researcher Analyst, R&D Division, SMD
5. Mr. Ildelfonso E. Custodio Jr.	Principal, O&M Division, SMD
6. Mr. Arthur R. Dela Cruz	Principal A, O&M Division, SMD
7. Mr. Celso G. Bernardo	Supervising Engineer A, O&M Division, SMD
8. Mr. Romeo F. Solis	Supervising Soil Technologist, O&M Division,
9. Mr. Cesar Melenab	Senior Engineer A, O&M Division, SMD
10. Mr. Fidel O. Ramos	Engineer A, Repair & Rehabilitation Division, SMD
11. Ms. Maria Gracia A. Ramos	Engineer A, O&M Division, SMD
12. Mr. Jonny A. Garcia	Engineer A
13. Mr. Rodelito I. Caachay	
Project Development Department (PDD)	
1. Mr. Edilberto B. Punzal	Manager, PDD
2. Mr. Wilfredo D. Silva	Manager, PDD
3. Mr. Reynaldo L. Baloloy	Principal Engineer A, IEWND, PDD
4. Mr. Silvino A. Alonzo, Jr	Principal Engineer A, WRUD, PDD
5. Ms. Ishidora M. Camaya	Senior Hydrologist, WRUD, PDD
Equipment Management Department (EMD)	
1. Mr. Gregorio S. Dumandan	Manager, EMD
Design and Specifications Department (DSD)	
1. Mr. Dodolfo D. Gales	OIC, DSD
2. Mr. Frumencio A. Abaya	OIC, Design Division, DSD
Institutional Development Department (IDD)	
1. Mr. Billy M. Mejia	Manager, IDD
2. Mr. Enrique A. Sabio, JR.	Division Manager, Irrigators Assistance Division, IDD
3. Ms. Candida O. Ginez	Irrigators Development Chief, IDD
4. Mr. Bayani P. Ofrecio	Irrigators Development Chief, IDD

5. Mr. Carmelo M. Cablayan	Irrigators Development Chief, IDD
6. Ms. Heartie E. Navarro	Supervising Irrigators Development Officer, IDD
7. Ms. Loida C. Ofrecio	Supervising Irrigators Development Officer, IDD

Corporate Planning (Corplan)

1. Mr. Dominador D. Pascua	Manager, Corporate Planning Staff
2. Ms. Yeng Castell	Manager, Electric Data Processing (EDP) Section

Management Services Department (MSD)

1. Mr. Guillermo Mercado	OIC, Organization & Methods Division
2. Ms. Josephine Peres	Management Aanalyst, Organization & Methods Division

Personnel and Record Management Department (PRMD)

1. Ms. Aurora L. Sison	Manager, Training & Manpower Developmment Division

2) National Irrigation Office (Regional Irrigation Office, RIO)

CAR

1. Mr. Travis A. Gawigawen	Division Manager A, CAR
2. Mr. Liza Jane C. Chugsayan	Senior Engineer A, CAR

Region I

1. Mr. Roberto Q. Abule	Division Manager A, Region I
2. Mr. Gaudencio M. De. Vera	Senior Engineer A, region I

Region II

1. Mr. Tranquilino Agtarao	Supervising Engineer A, Region II

MRIIS

1. Mr. Mariano G. Dancel	OIC, Engineering & Operation Division, MRIIS
2. Ms. Wifredo C. Gloria	Supervising Engineer A, MRIIS

Region III

1. Mr. Manuel L. Collado	Regional Irrigation Manager, Region III
2. Mr. Oscar M. Mercado	Division Manager, RIO, Region III
3. Mr. Leonardo S. Gonzales	Davison Manager, RIO, Region III
4. Mr. Roberto V. Delacruz	Head, O&M, Region III
5. Mr. Elmer Santo Tomas	O&M, Region III
6. Mr. Roberto E. Pascual	Manager, Provincial Irrigation Office, Region-III
7. Mr. Enrique R. Reyes	Chief, O&M Section, AMRIS
8. Mr. Marcelino S. Santos	Provincial Irrigation Manager (PIM), AMRIS
9. Mr. Santiago N. Yalong	Zone Engineer, South Area, Region III
10. Mr. Amiel S. Mercado	Engineer A, Water Control Coordinating Unit (WCCU), O&M Section, AMRIS
11. Mr. Felix Y. Robles	Supervising Water Facility Technician (SWFT), Working Station 9
12. Miss Genalene Caliuag	Secretary/Accounting Processor
13. Mr. Preciose Punzalan	Chief, Design Section, AMRIS

UPRIIS

1. Mr. Carlito M. Gapasin	Division Manager A, UPRIIS
2. Mr. Santos B. Viernes	Supervising Engineer A, UPRIIS

Region IV

1. Mr. Alberto G. Delacruz	OIC, Regional Irrigation Manager

2. Mr. Florentino R. David	Manager, Operation Division, Region IV
3. Mr. Epren S. Roqueza	OIC, Engineering Division, Region-IV
4. Mr. Romeo R. Anonuevo	Provincial Irrigation Officer (PIO), Region IV
5. Mr. Romeo M. Lopez	Provincial Irrigation Officer (PIO), Region IV
5. Mr. Cesar M. Pobre	Supervising Engineer A. Region IV
7. Mr. Virgilio M. Yorro	Civil Engineer, Laguna Irrigation Systems Office (LISO)
8. Ms. Lutgarda C. Caniamo	Senior Water Resource Facility Technician (SWRFT), LISO
9. Mr. Emmanuel S. Sunga	Irrigation Super Intendment, Sta. Maria-Mayor RIS
10. Ms. Marietta C. Dela Cruz	Institutional Development Officer, LISO
11. Mr. Hermie Joya	Water Master, Division-I, Sta. Cruz RIS
12. Mr. Emeterio B. Balatibat	Water Master, Division-II, Sta. Cruz RIS
13. Mr. Isagani O. Violanta	Water Master, Balanac RIS
14. Mr. Petronio Macalalag	President, Balanac IA

Region V

1. Mr. Cezar F. Garcia	OIC, O&M Division, Region V
2. Mr. Luzviminda N. Martinez	Supervising Engineer A, Region V

Region VI

1. Mr. Felix M. Razo	Division Manage, RIO, Region VI
2. Mr. Oliver A. Cervantes	OIC, System Management Division, Region VI
3. Mr. Edilberto F. Lomigo	Irrigation Superintendent II, Aganan-Sta. Babala RIS
4. Mr. Lourdes M. Arjona	Senior Engineer A,
5. Mr. Henry S. Venturanza	Provincial Irrigation Officer
6. Mr. Melchor I. Bajande	Senior Engineer B, Aganan-Sta. Babala RIS
7. Ms. Ruth Cely Jamelo	Water Resources Facility Technician, Aganan-Sta. Babala RIS
8. Ms. Cristina R. Alebusa	Engineer A, Aganan-Sta. Babala RIS
9. Miss. Sharon Rose F. Jucaban	Irrigators' Development Officer A
10. Ms. Edua Senadoza	Engineer B. Aganan-Sta. Babala RIS
11. Mr. Orland P. Belonio	Agriculturist-A, Jalaur-Suage RIS

Region VII & VIII

1. Ms. Aniceta G. Paloma	Engineer A
2. Mr. Conrado M. Samson	Water Resources Facility Technician

Region IX

1. Mr. Amplela A. Orong	OIC, O&M/IDD, Region IX
2. Mr. Vivren B. Apatan	Senior Engineer A, Region IX

Region X

1. Mr. Romulo M. Silvrstre	Division Manager A, Region X
2. Mr. Nelia M. Apale	Senior Engineer A, Region X

Region XI

1. Mr. Rolando R. Zacarias	Senior Engineer A, Region XI
2. Ms. Virgia L. Ong	Senior Engineer A, Region XI

Region XII

1. Mr. Ramon A. Bugacia	Division Manager A, Region XII
2. Mr. Anastacio D. Racelis Jr.	Supervising Engineer A, Region XII

Region XIII

1. Mr. Rafael A. Alas Jr.	OIC, Operation Division, Region XIII
2. Mr. Ramon B. Colipapa	Information Officer B, Region XIII

3) Department of Public Works and Highway (DPWH)

1. Mr. Antonio V. Molano Jr.	Director, Region IV, Bureau of Research and Standard (BRS), DPWH

4) Philippine Atmospheric, Geophysical and Astronomical Service Administration (PAGASA)

1. Ms. Lourdec V. Tibig	Chief, Climate Data Section, CAB, PAGASA

B. Related Donors

1) Asian Development Bank (ADB)

1. Mr. Koji Kitamura	Project Specialist, Agriculture, Environment, and Natural Resources
2. Mr. Kenichi Yokoyama	Senior Water resources Specialist Agriculture, Environment, and Natural Resources

2) Japan Bank for International Cooperation (JBIC)

1. Mr. Masanori Yoshikawa	Representative, Representative Office in Manila

C. Related Japanese Agencies

1) Embassy of Japan

1. Mr. Katsuyoshi Ishii	First Secretary
2. Mr. Mitsuhiro Ito	First Secretary

2) JICA Philippine Office

1. Mr. Shozo Matsuura	Resident Representative
2. Mr. Hirihiko Takata	Deputy Resident Representative
3. Mr. Kenzo Iwakami	Deputy Resident Representative
4. Mr. Kiyofumi Takashima	Assistant Resident Representative
5. Ms. Kristine San Juan	Program Assistant

3) JICA Expert to NIA

1. Mr. Tadashi Kunieda	JICA Expert to NIA-PDD
2. Mr. Hideki Furihata	JICA Expert to NIA-IDD
3. Mr. Kuniyoshi Ishizaka	JICA Expert to NIA-IDD

4) JICA-JOCV

1. Mr. Ichiro Owa	JICA-JVC Staff, ASB RIS
2. Miss Eriko Ito	JICA-JVC Staff, ASB RIS