

CHAPTER I.
INTRODUCTION



CHAPTER I. BACKGROUND AND OBJECTIVES OF THE STUDY

1.1 Background of the Study

The National Irrigation Administration (NIA) of Republic of the Philippines constructed a number of irrigation facilities since its establishment in 1963. At present it manages 205¹ irrigation systems covering a total area of about 634,020 ha being called as National Irrigation Systems (NIS). According to the survey undertaken by the System Management Department (SMD) of NIA, currently in 193 irrigation systems, only 22.4 percent of main canals and 17.9 percent of secondary canals are functioning properly. In this situation, maintenance, rehabilitation and improvement works for the NISs are considered to be the highest priority subjects for the irrigation policy in the Philippines.

Degradation of irrigation facilities and structures of NISs are attributed mainly to old and dilapidated conditions of the irrigation systems due to the lack of proper administration of the facilities. Moreover, this could be also attributed to deforestation in the areas at upper streams of the irrigation systems, which accordingly decreases the amount of water retained by soils affecting a cycling system of water resources. At the time of evaluating safety conditions of irrigation facilities and specification of the operation of construction in the plan formulation for improving the irrigation facilities, it is necessary to evaluate the condition of irrigation water from the source to its end uses at the terminal, as well as the condition of irrigation facilities.

NIA has experiences making an inventory survey by collecting information and monitoring decrepit conditions of irrigation water supply, diversion dams, pump stations and canals for administration of the irrigation systems. But it lacks adequate knowledge and proper skills to make an inventory survey by collecting information of water resources for irrigation. In the current inventory survey of NISs, the required costs, labors and the necessity were not concerned, and it was made specifically for operation of construction to improve individual irrigation systems. Therefore, this Inventory Survey does not contain any method to collect necessary information to evaluate the functional and operational conditions of NIS regularly and synthetically.

Under this situation, the Government of Republic of the Philippines requested the Government of Japan to undertake a developmental study for capacity building of NIA staff, particularly for formulating an efficient improvement plan of NISs, focusing on water resources conditions in the basin.

1.2 Objectives of the Study

The objectives of the Study are to develop capacity building of the NIA staff in formulating plans for maintenance, rehabilitation and improvement of NISs through the following activities:

- Preparation of a manual for formulation and management of the NISs inventory survey
- Preparation of a manual for maintenance, rehabilitation and improvement planning

¹ At the beginning of the first field works, the total number of NISs were 193, but increased to 195 NISs at the end of the first field works. However, these numbers finally identified to 205 NISs by the end of the second field works.

methodology of NISs,

- Carrying out technology transfer to the Philippine counterpart personnel through on-the-job training in the course of the Study.

1.3 Study Areas

Target Study Areas are 205 irrigation systems in the country (refer to Table A2-1). Small-scale irrigation facilities are going to be excluded from the target Study Areas for preparation of the manual aiming at formulating the maintenance, rehabilitation and improvement plans for NISs, because administration of these small irrigation systems have been handed over to Irrigators' Association (IA) under Irrigation Management Transfer (IMT) policy. Since sizes of IAs differ depending on related agencies responsible for IMT of NIS and donors, selection of IAs to be covered by the Study was made through discussion with NIA.

In addition to the Study Areas, following three Pilot NIS areas were selected within NIS areas to test the inventory survey format and formulate the plan for maintenance, rehabilitation and improvement planning methodology of NISs. The detailed descriptions of the Pilot areas will be given in Chapter III.

- Angat-Maasim River Irrigation System (AMRIS) (Region-III)
- Sta. Cruz River Irrigation System (RIS) (Region-IV)
- Aganan RIS (Region-VI)

1.4 Work Schedule

The Study was divided largely into two Stages: Stage-I (started in September 2005) and Stage-II (started in May 2006). Each stage has following phases.

Stage-I (Sept. 2005 – Dec. 2005)

- Domestic Preparation Work
- 1st Field Work

Stage-II (May 2006 – Oct. 2006)

- 1st Home Office Work
- 2nd Field Work-1
- 2nd Field Work-2
- 2nd Home Office Work
- 3rd Field Work
- 3rd Home Office Work

Detailed overall work plan and schedule for each Stage of the Study are shown in Figure 1-1, while Figure 1-2 and Figure 1-3 show a implementation flowchart of the Study. In the periods between Stage-1 and Stage-II, NIA implemented the Inventory Survey for 195 NISs, using the inventory survey formats formulated in collaboration with the Study Team.

Figure 1-1

Overall Work Schedule of the Study

	Year		2005						2006							
	Fiscal Year (Japan)		2005						2006							
	Stage		Stage I						Stage II							
	Phase		Phase 1						Phase 2				Phase 3			
	Month		9	10	11	12	1	2	3	4	5	6	7	8	9	10
Domestic Preparation Work	[1-1]	Existing Data/ Information Collection and Analysis on NIS Inventories and Irrigation Water Resources	□													
	[1-2]	Study on Survey Methods/Procedures and Planning of Overall Implementation Plan	□													
	[1-3]	Preparation of Inception Report (IC/R)	□													
	[1-4]	Examination of IC/R and Finalization	□													
1st Field Work	[2-1]	Explanation and Discussion of IC/R to Philippine Side		■												
	[2-2]	Existing Data/Information Collection and Analysis on NIS Inventory Survey and Irrigation Water Resources		■	■											
	[2-3]	Problem Identification and Analysis on Current Collection Methods and Maintenance Systems for NIS Inventory and Irrigation Water Resources Data/Information		■	■											
	[2-4]	Analysis and Problem Identification on Current Planning Methodology for NIS Maintenance, Rehabilitation and Improvement (MRI) (Irrigation Facilities and Water Management)		■	■											
	[2-5]	Selection of Three Sites of Pilot NISs Areas		■												
	[2-6]	Formulation of Implementation and Survey Procedure Plans of NIS Inventory Survey		■												
	[2-7]	Implementation of NIS Inventory Survey at Selected Three Pilot NIS Areas			■	■										
	[2-8]	Modification of Implementation and Survey Procedure Plan of NIS Inventory Survey				■										
	[2-9]	Holding of Seminar Workshop to NIA and Related Organization Staff				■										
	[2-10]	Preparation of Progress Report (Pr/R)				■										
	[3-1]	Implementation of Whole Inventory Survey at 195 NIS Sites by NIA Central and Regional Offices				■	■	■	■	■	■	■	■	■	■	■
	[3-2]	Observation of NIA Inventory Survey Progress by Sanyu Consultant Local Staff				■	■	■	■	■	■	■	■	■	■	■
1st Home Office Work	[4-1]	Preliminary Analysis and Evaluation on Implemented NIS Inventory Survey by NIA									□					
	[4-2]	Formulation of Basic Plan for NIS Inventory Format and Its Data Updating Procedures									□					
	[4-3]	Formulation of Implementation Plan of 2nd Field Work and Preparation of Interim Report (IT/R)									□					
	[4-4]	Preparation of IT/R and Finalization									□					
2nd Field Work-1	[5-1]	Explanation of IT/R to Philippine Side and Discussion									■					
	[5-2]	Analysis of NIS Inventory Survey Results Implemented by NIA									■	■				
	[5-3]	Implementation of Survey at Three Sites of Pilot NIS Areas aiming at Formulation of Planning Methodology of NIS Maintenance, Rehabilitation and Improvement (MRI) Plan									■	■	■			
2nd Field Work-2	[6-1]	Preparation of Manual for NIS Inventory Survey and Its Maintenance Methodology											■	■		
	[6-2]	Preparation of Manual for Formulation of MRI Planning Methodology of NIS											■	■		
2nd Home Office Work	[7-1]	Preparation of Draft Final Report (DF/R) summarizing Study Results												□		
	[7-2]	Explanation and Discussion on DF/R and Finalization of DF/R												□		
3rd Field Work	[8-1]	Explanation of DF/R to Philippines Side and Discussion													■	
	[8-2]	Holding of Workshop/Seminar													■	
3rd Home Office Work	[9-1]	Preparation of Final Report (F/R) and Submission													□	
Reports				IC/R		Pr/R					IT/R			DF/R		F/R

Figure 1-2 Flowchart of the Stage-I Study

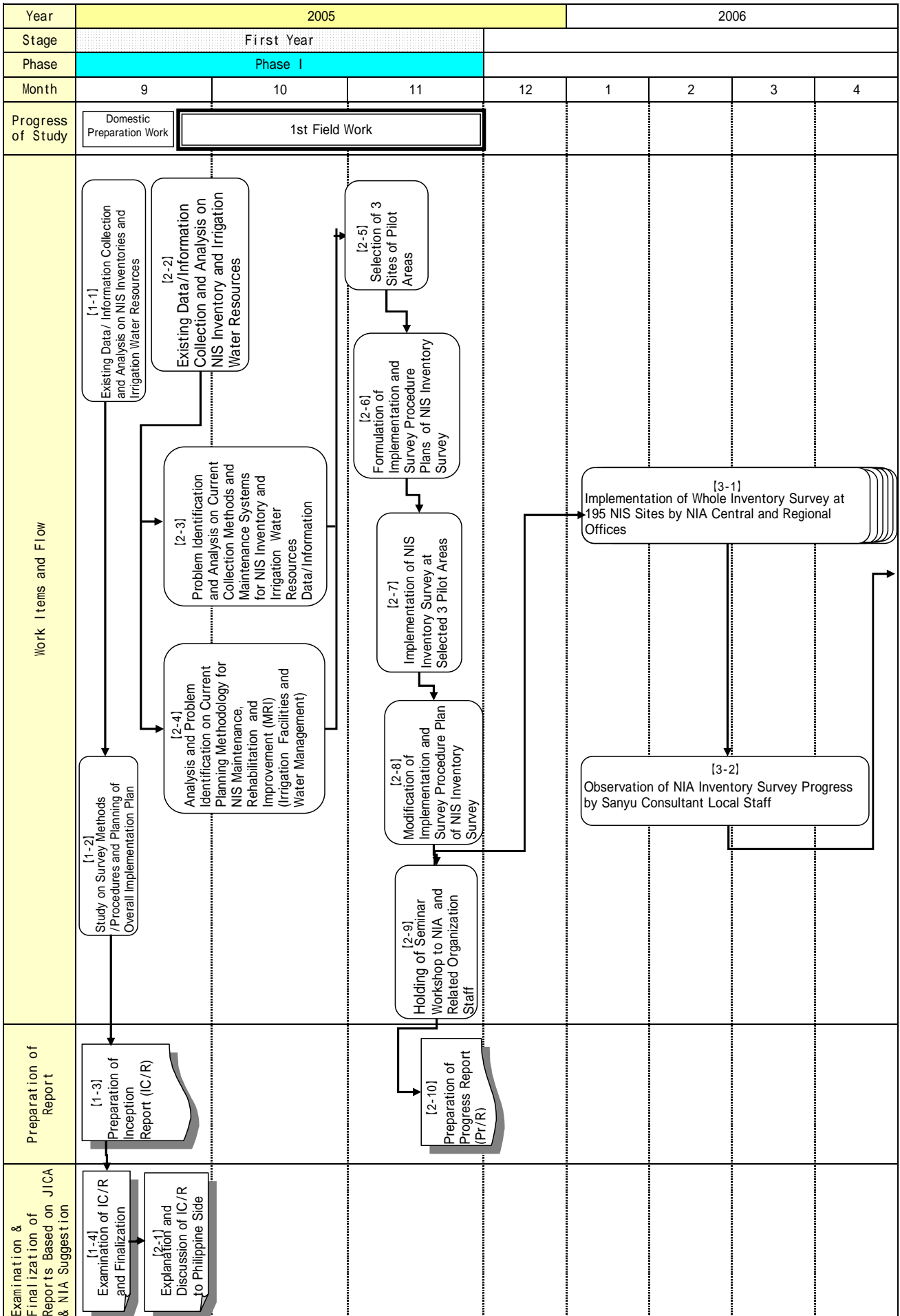
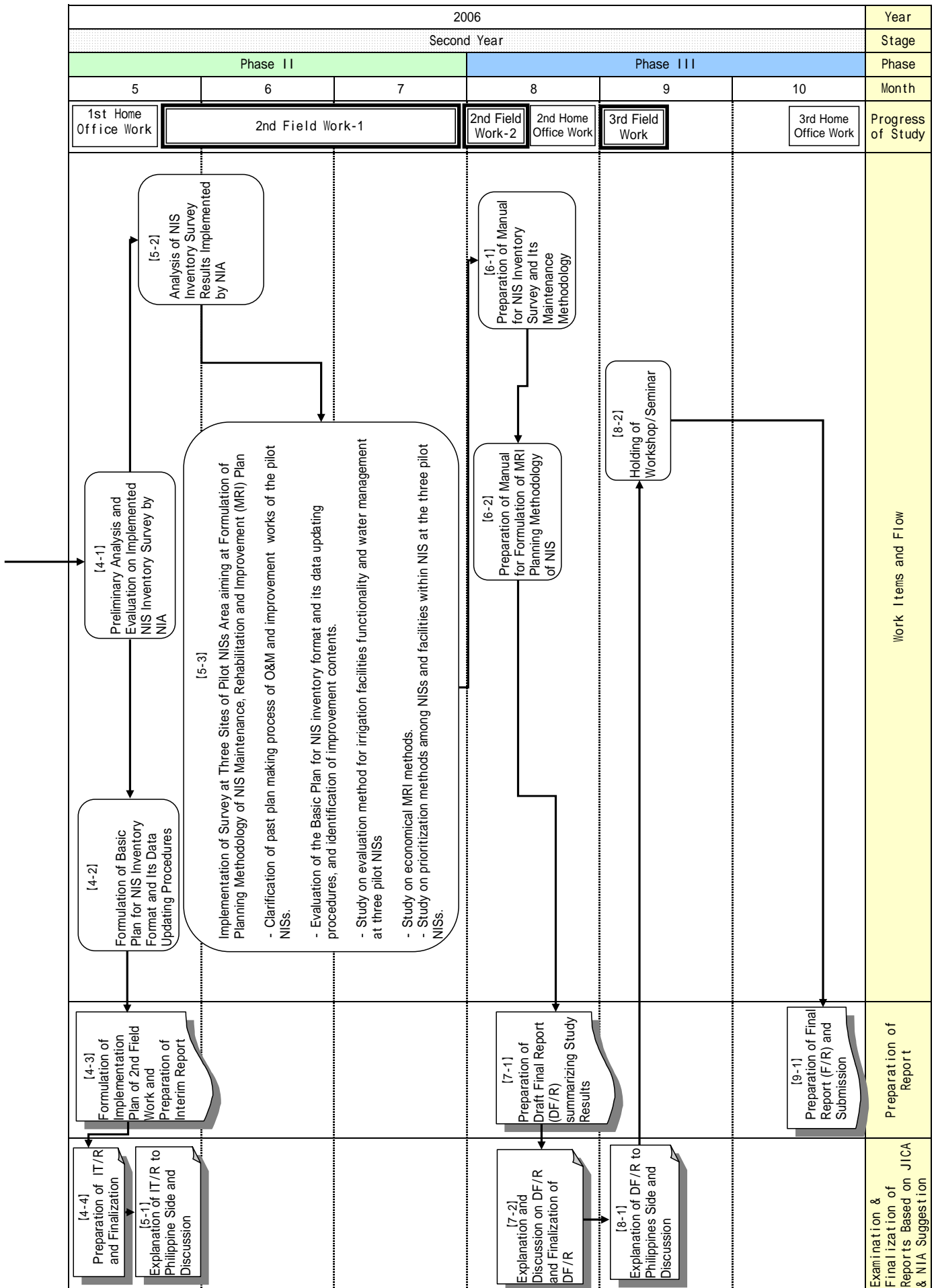


Figure 1-3 Flowchart of the Stage-II Study



CHAPTER II.
GENERAL CONDITIONS AND PROBLEMS OF NISs



CHAPTER II. GENERAL CONDITIONS AND PROBLEMS OF NISs

2.1 Present Numbers of NISs and Related Areas

According to the Inventory Survey in this Study, there exist 205 NISs in total and their total firmied-up service areas (FUSA) are about 634,070 ha as shown below.

Total Numbers of NISs and Related Areas

Region	No. of NISs	Related Area (ha)				
		Firmed-UP Service Areas	Irrigated Area in CY 2004-2005		Average Benefited Areas	
			Dry Season	Wet Season	Dry Season	Wet Season
CAR	3	22,622	13,601	13,499	11,251	11,716
I	29	48,267	22,186	30,844	22,696	31,539
II	17	46,752	37,035	30,079	27,954	24,440
MRIIS	4	84,795	75,455	74,152	62,655	58,198
III	15	58,218	34,458	36,508	35,880	39,767
UPRIIS	5	88,744	77,780	77,633	77,247	77,634
IV	45	41,543	27,460	32,616	24,230	29,484
V	15	18,732	14,610	13,935	13,778	11,355
VI	13	48,282	31,381	41,052	26,335	36,360
VII	2	5,512	2,583	2,312	2,526	2,211
VIII	16	17,295	11,920	13,661	9,371	10,679
IX	4	13,418	12,116	12,484	8,468	8,859
X	7	22,215	18,130	17,699	11,798	12,147
XI	9	29,290	28,790	29,340	18,264	20,757
XII	18	72,528	55,439	61,861	36,250	43,291
XIII	6	15,804	12,914	13,274	8,191	9,604
Total	205	634,017	475,858 (75%)	500,949 (79%)	396,894 (63%)	428,041 (68%)

Data Source: Inventory Survey, Management Action Plan by NIA-SMD, and Quarterly Report of SOME A1-AQ in 2005 (Master List)

Note: Detailed descriptions are shown in Table A2-2 in Appendices

As seen in the above table, the ratio of irrigated areas against the firmied-up service areas (FUSA) is 75 percent during the dry season and 79 percent during the wet season, while that of average benefited areas against the FUSA is 63 and 68 percent during the dry and wet seasons, respectively.

2.2 Problems facing NISs

1) Linkage of the Problems

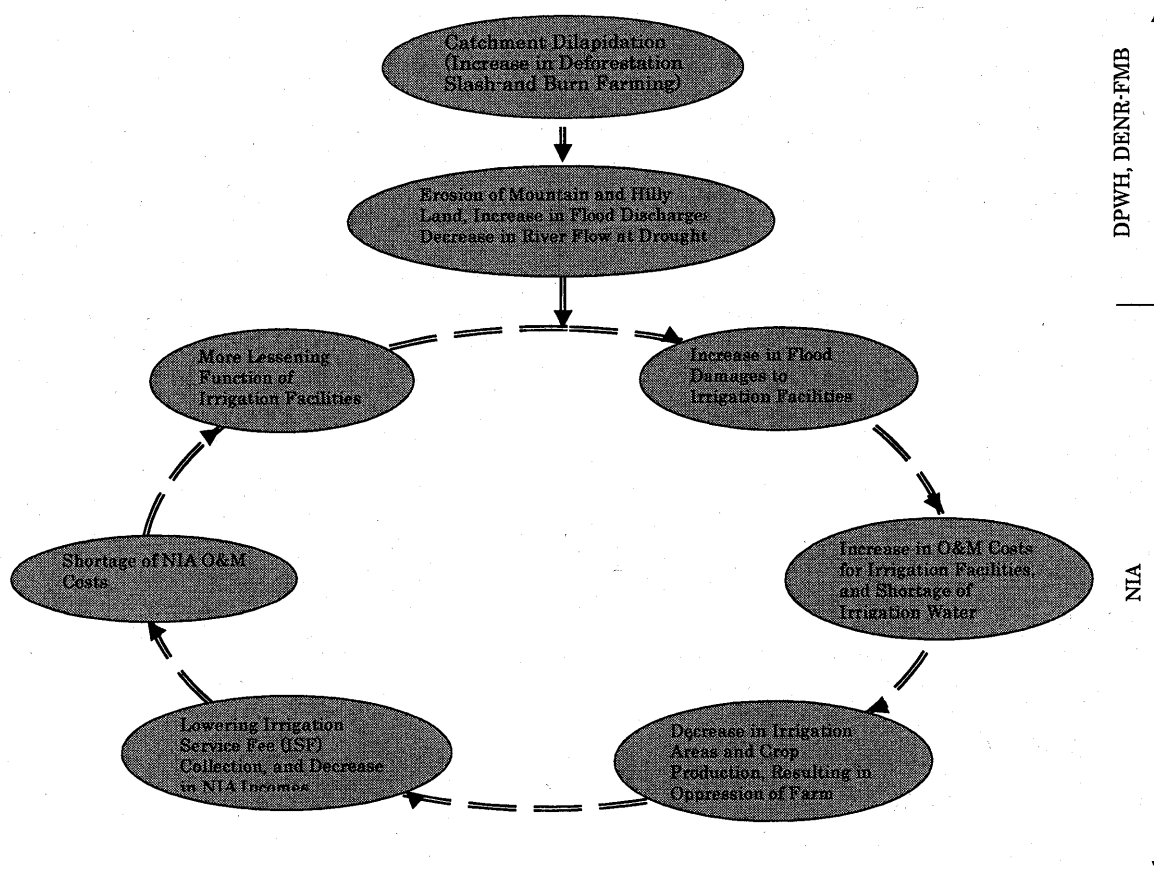
Out of the 205 NISs, many have been constructed since the late 1960s, which was the initial stage of the project. Generally, most of those NISs have not reached its targeted irrigation area, and expansion of irrigation areas is retarded with lessening functions of the related facilities. Under these situations of NISs, NIA had made efforts to objectively secure the targeted irrigation areas

through rehabilitation of irrigation hardware, as well enhancement of irrigation efficiency through irrigation management transfer (IMT) to irrigators' associations (IA) as an software approach.

Major reasons necessarily to be taken place as countermeasures mentioned above are flood damages caused by deforestation in the river catchment area, lessening function of irrigation canals due to heavy sedimentation in canals, aside from the deteriorated irrigation facilities, and inadequate operation and maintenance works.

Soil erosion and sedimentation, which are consequences of deforestation in the areas, bring about huge influences to irrigation facilities, such as lessening facility function and decreases in irrigation areas. To cope with these situations in and around NISs, NIA has imposed countermeasures such as provision of settling basins, introduction of equipments, staff, and budgets to eliminate these sediment materials. With these countermeasures, it resulted in depletion of the NIA budgets. Furthermore, an increase in flood discharges caused by deforestation directly bring about damages not only to irrigation facilities of diversion dams, canals, but also decrease in cropping areas, due to water shortages owing to sedimentation in canal systems, leading to lowering farm household economy and irrigation service fee (ISF) collection ratio, and decrease in NIA income (refer to following figure).

Effect on Irrigated Agriculture caused by Catchment Dilapidation



2) Necessity to undertake a Comprehensive Inventory Survey

Currently, NIA sets forth a reservation of irrigation areas as an important policy by means of irrigation facility improvements. However, targeted NIS areas and their priorities for improvement works are usually approved depending on availability of budgets at NIA Central Office and Regional Irrigation Office (RIO) levels.

On the other hand, in order to establish adequate procedures for the fundamental improvement plan of NISs with lessening function, comprehensive NISs improvement plan, including the findings of current problems facing NISs and prioritized improvement works would be essential. However, it can be considered to be difficult to undertake these works under the severe situations of NIA in terms of limited budgets and manpower resources.

With such situation, NIA has been implementing NISs improvement studies and projects with assistances from WB and ADB. Therefore, the comprehensive inventory surveys in entire NISs to be implemented by the JICA Study Team are considered as a prioritized study.

2.3 Current Inventory Surveys for NISs

2.3.1 Master List

The Master List is a very fundamental information, including the number of farm lots, areas and the landowners. It corresponds to a parcellary map (refer to the right figure). Parcellary maps were made by NIA, based on the land maps of the Bureau of Land. In addition to the information of the map, the Master List includes name of actual tiller and status of Irrigation Service Fee (ISF) payment. The collectors collect ISF from landowners or tillers, based on the Master List. This is at the same time, basic data for various areas, cropping intensity, collection efficiency, etc. The ISF computerized system has been introduced to many NISOs since 2005, and it contributes to rationalization of ISF collection process due to the electronically filed Master List.



Parcellary Map

The Master List should be updated reflecting land conversion from farm lots to residential lots and commercial land. Especially in the area where urbanization is progressing rapidly, the converted areas are increasing year by year, and the gap between service area and actually irrigable areas is increasing, two. Therefore, the SMD is working on a program,

Region	SA	FUSA	Farmers
CAR	17,551	15,258	9,956
1	55,872	48,116	37,034
2	48,422	43,722	25,810
MRIIS	88,370	85,057	73,403
3	67,288	58,119	72,654
UPRIIS	102,532	88,744	19,205
4	52,410	47,993	13,237
5	20,496	9,156	19,644
6	52,216	48,996	34,199
7&8	21,948	20,903	9,042
9	15,162	13,358	2,782
10	28,123	21,716	7,846
11	32,391	29,064	10,415
12	68,539	64,944	15,459
13	18,412	15,228	11,197
Total	689,732	610,376	361,883
	Difference	79,356	-
	% of SA	12	-

called Management Action Plan (MAP), to update the actually irrigable areas or “Firmed-Up Service Area (FUSA)”. As of November 2005, the MAP has covered most of the NISs. The nationwide FUSA (610,376 ha) is 12 percent smaller than the Service Area (SA; 689,732 ha, refer to the above table). A major decrease was caused by the exception of high land and low lying area, and conversion to residential and commercial land. The SMD is proposing a plan with 11 billion Pesos for five years, to fill the gap between the FUSA and irrigated areas.

Difficulty with updating the Master List is caused by unstable land use. In the case that a landowner and tiller are different persons, they are supposed to agree on ways of profit share, payment of ISF, etc., in advance. But in some areas, tillers lend land to others without the consent of the landowner, or tillers give up farming due to lack of fund to purchase agricultural inputs. In the case that landowners live far away from cultivation land, it is very difficult to identify a payer of ISF. NIA is trying to identify such situations through observation of field officers on farming conditions.

As the Master List is huge and much detailed, it is not reported to Regional or Central Offices but stored at the NISO level. Then summarized information on irrigated area or ISF collection efficiency is reported to core offices as NISO’s O&M information. Therefore, this Inventory Survey does not include information of the Master List.

2.3.2 O&M Performance Evaluation Report

Major contents of this report are NIS staff number, irrigated areas, ISF status, NIS viability index, O&M costs per hectare. This report started since the first half of 1990s. The report on NISs and CISs are compiled to manage budgets and to evaluate the O&M performances at the level of NIA Regional and Central Offices. The reports are submitted to SMD through the Regional Offices annually, before May 15th. The contents in this report are as follows:

Contents of O&M Performance Evaluation Report

Surveying NIA Office	Compiling NIA Office	Started	Interval	Contents
NISO	SMD	First Half of 1990s	Annual	<ul style="list-style-type: none"> - Number of NIS staff - Service Area (ha) - Irrigated Area (ha) <ul style="list-style-type: none"> Wet Season Dry Season - Benefited Area (ha) <ul style="list-style-type: none"> Wet Season Dry Season - Billed Area (ha) <ul style="list-style-type: none"> Wet Season Dry Season - Average Yield (cavan/ha) <ul style="list-style-type: none"> Wet Season Dry Season - Expenses (peso) - Income (peso) - Cropping Intensity (%) - Collection Efficiency of ISF (%) - Viability Index (%) (Income/Expense) - O/M Cost (peso/ha)

This report is continuous and effective from NISO through RIO to NIA-SMD, and is expected to continue in the future to make good Programs of Work (PoW) and to increase collection of ISF.

2.3.3 Program of Works for Repair/Rehabilitation

The Program of Works (PoWs) is made for every project of NISs and CISs. Regular programs for existing NISs have been Repair and Rehabilitation of Existing National Irrigation Systems (RRENIS), Repair, Rehabilitation and Improvement of Drainage and Flood Protection System (RRIDFPS) and Repair, Rehabilitation and Construction of Farm-to-Market Roads (RRCFMR), although the last two were terminated in 2002.

Program of Works have been made since the establishment of NIA in 1963. They are submitted to NIA Regional and Central Offices for validation, evaluation and approval. In the Central Office, SMD receives them every year, and the manner of this report is as follows:

- 1) Selection of detailed items for Program of Works
- 2) Computation of quantity of the detailed work items
- 3) Estimation of repair/rehabilitation for the detailed items of Program of Works
- 4) Submission of the reports from NISOs to NIA Region and Central Office for approval

A problem of this report is that there are no criteria to select detailed items for each Program of Works. The document is used to plan the NIS repair/rehabilitation works continuously and effectively from NISO through RIO to NIA-SMD. It is expected to continue in the future to plan good Program of Work.

2.3.4 NIS Status of Service and Irrigated Area

This inventory survey is undertaken by each NISO to grasp and monitor the actual irrigated and benefited areas of whole NISs and CISs since 1990, and all gathered data through NIA-SMD are compiled annually by the Corporate Planning Department (CPD). Major survey items of this inventory are as follows.

- Service Area (ha)
- Irrigated and Planted Area (Dry and Wet) (ha)
- Benefited Area (Dry and Wet) (ha)
- Yield (Dry and Wet) (cavan)
- Cropping Intensity (%)

This inventory is presently utilized in the subjects of "Operation and Maintenance" in the report of "Performance and Evaluation/Commitment" prepared by the Sector of the System Operation and Equipment Management (SOEM).

2.3.5 IA Profile

The IA Profile has been filed since 1996. It is a data book of IAs, including IA's names, addresses, areas, number of potential farmers and members, registered date, registration number and type of contract with NIA. IAs are at first organized with support from Institutional Development Officer (IDO), and registered to Securities and Exchange Commission (SEC), after selection of board members and bylaw making. Many IAs have contract with NIA for better O&M of the irrigation system in terms of canal clearing and ISF collection.

National statistics in 2005 on IAs are shown in the right table. The table shows that organization rate reaches almost 100 percent in the service area (SA) and 80 percent in the number of farmers. The farmers with contracts account for about 70 percent.

Most of the updated information of this profile are the number of members and status of the contracts. It is considered that fluctuation of the number of the members is caused by unstable land use and status of membership. Status of the contract is monitored two, because the contract is made every year. The main contents of the contracts are shown in the table below. Type 1 and 2 are dominant these days.

Total S.A.	(1)		702,538
Organized	(2)	No.	2,474
	(3)	Area	699,068
	(4)	Pot-Far	541,533
	(5)	Actl-Far	435,279
Registered	(6)	No.	2,387
	(7)	Area	676,847
	(8)	Actl-Far	420,603
With Contract	(9)	No.	1,981
	(10)	Area	556,341
	(11)	Actl-Far	361,974
Organized Area Rate, (3)/(1) %			100
Organized Member Rate, (5)/(4) %			80
Registered Area Rate, (7)/(1) %			96
Registered Member Rate, (8)/(4) %			78
Contracted Area Rate, (10)/(1) %			79
Contracted Member Rate, (11)/(4) %			67

Contents of Contracts

1983-87	1987-Present																				
Stage 1: IA is responsible for canal clearing with the remuneration of 660 Pesos/ 3.5km/ month, which is paid by NIA.	Type 1: IA is responsible for canal clearing with the remuneration of P200 (lined) and P400 (unlined) /km /month, which is paid by NIA.																				
Stage 2: IA is responsible for ISF collection with the share of collected ISF indicated below.	Type 2: IA is responsible for ISF collection with the share of collected ISF indicated below.																				
<table border="0"> <thead> <tr> <th>CE*</th> <th>Share</th> </tr> </thead> <tbody> <tr> <td>50%></td> <td>40%</td> </tr> <tr> <td>50%<</td> <td>60%</td> </tr> </tbody> </table> <p>*CE: Collection Efficiency</p>	CE*	Share	50%>	40%	50%<	60%	<table border="0"> <thead> <tr> <th>CE</th> <th>Share</th> </tr> </thead> <tbody> <tr> <td>50%></td> <td>0%</td> </tr> <tr> <td>51-60%</td> <td>2%</td> </tr> <tr> <td>61-70%</td> <td>5%</td> </tr> <tr> <td>71-90%</td> <td>10%</td> </tr> <tr> <td>91-100%</td> <td>15%</td> </tr> <tr> <td>BA*</td> <td>25%</td> </tr> </tbody> </table> <p>*BA: Back Account</p>	CE	Share	50%>	0%	51-60%	2%	61-70%	5%	71-90%	10%	91-100%	15%	BA*	25%
CE*	Share																				
50%>	40%																				
50%<	60%																				
CE	Share																				
50%>	0%																				
51-60%	2%																				
61-70%	5%																				
71-90%	10%																				
91-100%	15%																				
BA*	25%																				
Stage 3: Full turnover	Type 3: Full turnover																				

It is expected that the FUSA will be noted with SA, so that more practical target areas can be comprehended. Accordance of SA with the figure of SMD is advisable, two. As this profile is the fundamental information of IAs, renewal of necessary information should be continued.

Information on areas, number of farmers and contract type are used to this inventory survey, while others will be just referred. The size of IAs is considered as an important factor for better IA management, referring to the successful example of IA separation from the size of 1,000 ha to 300 ha in LALIK Irrigation System in Region-XI, and this is also one of the survey items. Membership rate is another important survey items.

2.3.6 IA O&M Performance Report

The IA O&M Performance Report has been started since early 1990s. At every cropping season (twice a year), mainly to update status of ISF collection, information on irrigated area, cropping intensity, and yield is reported as well. The table below shows the sample of Sta.Cruz-Mabacan RIS.

IA O&M Performance Report

Name of IA	Service Area, ha.	No. of Farmers	Irrigated/Planted Area, ha.	Season's O&M Performance								
				C.I. %	Prod'n. cav/ha	Curr. ISF Due, P	Curr ISF Coll'd, P	Back ISF Coll'd, P	CE %	Cumm. BA Collectible, P	Cumm. BA Collected,P	IA Share P
1 BRISIA	1,055	928	850	81	100	728,796	318,443	15,000	44			159,221
2 LUCIA	102	76	35	34	80	16,155	10,323	0	64			
3 SANDIWA (SCRIS I)	225	180	227	101	75	189,000	73,500	0	39			
4 WATISA (SCRIS II)	531	325	347	65	65	223,096	21,000	0	9			
5 MSMI	90	60	80	89	75	70,480	37,915	0	54			
6 MARILIA	227	134	170	75	85	108,900	51,093	0	47			
Total	2,230	1,703	1,709	77	80	1,336,427	512,274	0	38	0	0	159,221

This inventory survey is targeting information collection at each NIS and this information at the NIS level is summarized. The detailed information of each IA is not collected through the survey.

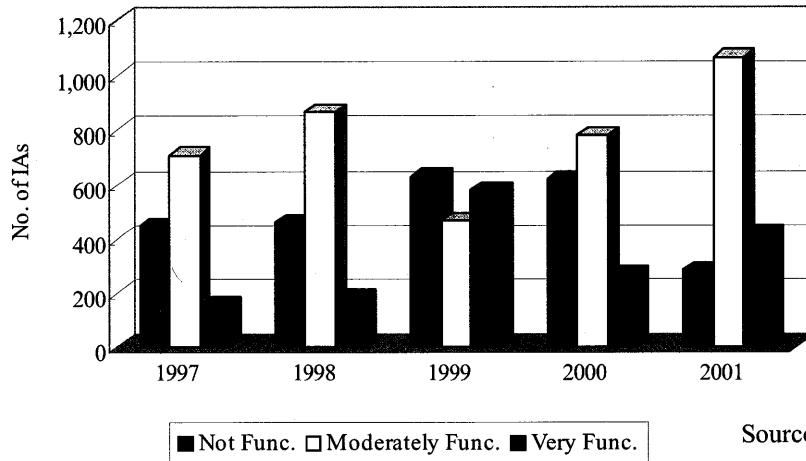
2.3.7 IA Functionality Survey

The IA Functionality Survey started in 1996. In order to measure IAs' status on functionality and weak points, details of; 1) maintenance, 2) organization, 3) financial and 4) activity and others are surveyed every year. The result is recorded as scores and finally graded in five adjective evaluations, respectively Outstanding, Very Satisfactory, Satisfactory, Fair, Poor. With a guideline for evaluation and scoring designates details, objectivity of the evaluation can be well secured.

Although the data are a little old, the table and figure below show the nationwide functionality status of IAs. According to them, "Very Functional" IAs account for about 20 percent, while "Moderately Functional" about 50 percent and "Not Functional" about 30 percent. However, chronological improvement is not observed in the graph.

Status of Nationwide Functionality of IA

Grade	1997	1998	1999	2000	2001	Ave. (%)
Not Func.	448	464	629	621	282	489
%	34	31	37	37	16	31
Moderately Func.	709	863	469	778	1,064	777
%	54	57	28	47	60	49
Very Func.	159	186	581	268	421	323
%	12	12	35	16	24	20
Total	1,316	1,513	1,679	1,667	1,767	1,588



Source: IDD, NIA

Since surveyed items are comprehensive and their objectivity is secured considerably, the survey is deemed appropriate. However the survey condition in the field is not desirable. Originally, the survey should be conducted by trained IDOs. However due to the insufficient number of IDOs derived from NIA's financial constraints, various staff such as water masters, ISF collectors and regional office staff are conducting the survey in the field. Therefore, the survey results may not be uniform. The Institutional Development Department (IDD) states that they try to secure uniformity and objectivity through more active use of the guideline. Introduction of self-evaluation by IAs is also considered to rationalize the surveying works as well.

Although the Study on the Irrigators Association Strengthening Project (2003, NIA-JICA) notified the problems on the IA Functionality Survey, such as difficulty to secure uniformity and bureaucratic implementation, this is the only evaluation for IAs' functionality and objectivity can be expected through the use of the guideline. Therefore the results of the IA Functionality Survey are used for the inventory survey. Based on the results of the functionality survey, the information of this inventory should be also updated.

2.3.8 Inventory Survey in the Study on Strengthening NIA's Management System

This inventory was formulated in the Study on Strengthening NIA's Management System undertaken in October 2001 by JICA Study, aiming at updating the data on the existing irrigation systems for all NISs and some CISs. Annually updated data and information were supposed to be

stored in the GIS database prepared by the JICA Study. The inventory survey items are planned as follows;

- a) General
- b) Engineering
 - Topography, Soil and Land Classification
 - Water Source
 - Irrigation Water
 - Irrigation Facilities
 - Drainage Facilities
 - Drainage and Flood Conditions
 - Service and Access Roads
 - Construction Costs at Time of Completion
 - Water Management and Operation and Maintenance Office
- c) Office Facilities and Equipment in the Responsible Office
- d) Agriculture and Agro-Economy
 - Socio-economic Background
 - Cultivation Area
 - Crop Production
 - Production Cost
 - Farmers' Income
- e) Environmental Issues

However, inventory data as mentioned above in the proposed systems have not been updated so far, because of the following reasons; that is, a) difficulty with collecting new data due to the NIA financial situations, b) shortages in application licenses of software (Arc View), c) only a few skilled technical experts to the Arc View, etc. In addition to the reasons mentioned above, there were no observation points of NIA staff to identify the priority improvement projects among NISs, and also outlet to lead to effective utilization of this inventory survey. That is why it was not clearly ensured between the NIA and JICA sides that these conditions could be considered as no activities conducted in updating works.

Under such situations, although the potentiality for utilization of system improvement of the formulated GIS¹ indicating effective information at each canal system is not fully recognized by NIA staff, this GIS is considered as effective data in the Study at this stage. Therefore, established data under the GIS will be utilized in the Study with usages of applied code numbers of main and lateral canals, although utilization of GIS itself will be principally disconnected from the Study considering the hard situations around the GIS circumstances as mentioned above.

¹ The GIS database is divided into two main systems: System A and System B. System A's database has a primary source of geographic information of existing NAMRIA's 1:50,000 scale topographic maps. Approximately 330 of these topographic maps were digitized to serve as the base data for the GIS system. As well, System B's data base is based on the 1:50,000 scale topographic maps, including a 1:4,000 scale topographic and parcelary map covering a pilot area of 1,000 ha located in UPRIS Division 3.

GIS database were distributed to four NIA Department s; Corplan, SMD, PDD, and the UPRISS Regional Office.

2.3.9 Inventory Survey in the Study on the Irrigators Association Strengthening Project

The GIS database designed in the above inventory survey in paragraph 2.3.8 “Inventory Survey in the Study on Strengthening NIA’s Management System” by JICA Study in 2001 was reconfigured in this Study (July 2003) to include batches of data named “IA Inventory Matrix” and “Facility Status Survey”. The new functions added to the existing GIS systems are “Display” and “Query Data relating to IA Boundaries”, and two new attribute tables for IA Inventory Matrix and Facilities Status Survey.

Further, for full utilization of GIS database, NIA institute a program to acquire application licenses of Software (Arc View) and corresponding training for distribution to RO and NISO where the GIS database is needed for their day-to-day functions.

- NIA reporting system dose not rely on the “MS Access” database software
- Departments distributing GIS database systems do not need a full GIS database for their day-to-day functions
- Insufficient number of software licenses
- Not fully utilizing the existing Local Area Network (LAN) for the GIS database

2.3.10 Inventory Survey by JICA Short-Term Expert Program

The NIS Major Facility Survey was conducted in 2004 by a JICA Short-Term Expert. The main purpose of the survey was to collect basic information of major irrigation structures and conditions of those facilities. Annual update was expected, but it was not institutionalized.

The information consists of three types; major facility information including operation and maintenance (O&M), digital photos of those facilities and capacity of provincial government for O&M of irrigation facilities. Major surveyed items are tabulated below. Information of major facilities and pictures were collected on nine types of large scale structures, which require intensive maintenance, including general information, O&M conditions, damages on structures, etc. Information of provincial government was collected to measure its capacity over O&M of the irrigation systems, under the current movement to decentralization and irrigation management transfer (IMT).

Collected Information by Survey

Item	Facility, etc.
Major Facility Information and Pictorial Information	1. Diversion Dam
	2. Reservoir Dam
	3. Pump Station
	4. Siphon
	5. Aqueduct
	6. Bridge (L>15m, over canal)
	7. Flap Gate
	8. Slope (H>10m, along canal)
	9. Tunnel
Information of Provincial Gov.	A. General Information
	B. O&M

By the end of the expert's assignment in July 2004, 11 Regional Offices had submitted data among 15 Offices, and filing of eight Offices was completed. Remaining works were completed by field offices and SMD with strong commitment.

Although the survey collected huge amount of information for the nationwide irrigation systems, there are some concerns. Firstly, information of some NISOs was not collected, although all 15 Regional Offices submitted the data. The information on intake structures, one of the most important facilities of the system, was collected for 132 systems among 195, in other words, 68 percent. Information on both Magat and Pantabangan dams, large reservoir dams under NIA management, is not collected either. Some have only facility information without pictures, and some are opposite.

Secondly, as the survey does not cover information on canal systems, the information for canal structures such as siphon, aqueduct, and so on, is not systematically collected.

The result of this survey is utilized as the supporting data of this Inventory Survey. Here graphic information is useful to refer the structure and condition of facilities.