JAPAN INTERNATIONAL COOPERATION AGENCY

DEPARTMENT OF THE INTERIOR AND LOCAL GOVERNMENT
THE REPUBLIC OF THE PHILIPPINES

STUDY ON THE PROVINCIAL WATER SUPPLY, SEWERAGE AND SANITATION SECTOR PLAN IN THE REPUBLIC OF THE PHILIPPINES

VOLUME III - 7

DRAFT SUPPORTING AND DATA REPORT

PROVINCIAL WATER SUPPLY, SEWERAGE AND SANITATION SECTOR PLAN FOR THE PROVINCE OF

ILOCOS SUR

FEBRUARY 1996

NIPPON JOGESUIDO SEKKEI CO., LTD.

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VOLUME III - 7 SUPPORTING AND DATA REPORT

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PROVINCIAL WATER SUPPLY, SEWERAGE AND SANITATION SECTOR PLAN

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SUPPORTING REPORT

A. BACKGROUND INFORMATION AND EXISTING CONDITIONS

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1.3 The Provincial Plan for the Province of Ilocos Sur
1.3.1 Preparation of the Plan

MINUTES OF DISCUSSIONS
ON
THE INCEPTION REPORT
FOR
STUDY ON PROVINCIAL WATER SUPPLY, SEWERAGE AND SANITATION SECTOR PLAN
IN
THE REPUBLIC OF THE PHILIPPINES

AGREED UPON BETWEEN
THE DEPARTMENT OF THE INTERIOR AND
LOCAL GOVERNMENT
AND
STUDY TEAM OF
JAPAN INTERNATIONAL COOPERATION AGENCY

MANILA, SEPTEMBER 5, 1994

HON. YOLANDA MA. L. DE LEON
Assistant Secretary
Dept. of the Interior and Local Government

MR. MASATOSHI MOMOSE
Team Leader, Study Team
Japan Int'l Cooperation Agency

Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programs of the Government of Japan, dispatched the Study Team to the Republic of the Philippines on August 31, 1994 to conduct "the Study on Provincial Water Supply, Sewerage and Sanitation Sector Plan" (hereinafter referred to as "the Study") in accordance with the Implementing Arrangement for the Study between the JICA and the Department of the Interior and Local Government (hereinafter referred to as "DILG") on November 19, 1993.

A series of discussions was made on the Inception Report for the Study between the Study Team and officials of DILG. In the course of discussions, both parties have agreed to the main items described in the Inception Report. The list of attendants in the series of discussions is presented in Appendix A.

1. Objectives and Scope of Work for the Study

(1) Formulation of long-term provincial development plan for water supply, sewerage and sanitation sector to the year 2010 through technical assistance to the provincial staff; and

(2) Preparation of medium-term (five year) sector investment plan based on the long-term development plan.

The Study will be conducted in two stages for the two batches.

2. Study Area

The study area covers the following nine (9) provinces and are grouped as follows:

BATCH No. 1	BATCH No. 2
(1) Zambales	(1) Abra
(2) Rizal	(2) Ilocos Norte
(3) Mindoro Oriental	(3) Ilocos Sur
(4) Mindoro Occidental	(4) Nueva Vizcaya
	(5) Batanes

For Rizal province, four (4) municipalities covered by the MWSS will be excluded in the future plan. The conduct of the Study for Batch No. 2 shall be finally determined after ascertaining the peace and order conditions in the subject provinces by the end of the Batch No. 1 Study.

3. General Approach and Methodology to the Study

(1) Planning framework for future sector development

a. Base years shall be determined after discussion with NEDA to conform with national plans and programs.

b. The PW4SP shall be prepared within the context of existing plans and projects. However some modifications may be made where appropriate to reflect the updated information.

c. Conformity and consistency of the Study with the national plans and programs such as the NEDA Board Resolutions Nos. 4 and 5 - Series 1994; the Water Sector Reforms Study and the National Urban Sewerage and Sanitation Strategy Plan for the Philippines.

(2) Establishment of data base

To maintain consistency and compatibility with the existing data base of previously developed PW4SPs, the Study will adopt the same in principle and will be modified if needed.

(3) Water source development

Water Availability Maps will be developed through update of the NWRB's Rapid Assessment Report and other studies.

(4) Community development and training

Training needs assessment will be undertaken to guide the Study in identifying manpower development strategies and programs. Existing local training resources and activities will be evaluated. A community development study will be undertaken entailing model studies for each of the three service levels in every province.

(5) Technology Transfer

Capacity building and technology transfer are important elements of the Study. To the extent possible, counterpart staff at the local and national levels shall participate actively in data collection and analysis, formulation of strategic recommendations, and the preparation of the PW4SP.

4. Implementation Set-Up for the Study

In accordance with the Implementing Arrangements between the DILG and the JICA, the DILG shall:

(1) secure the safety of the JICA Study Team;

(2) assign DILG counterpart staff members who will coordinate and assist PSPTs at the provincial level;

(3) Set-up PSPTs by respective provincial governments in the study area and secure budget to carry out the Study;

(4) through PSPT in each study area province; facilitate and coordinate in data gathering with municipal government and other agencies concerned, and participate in workshops and preparation of PW4SP.

(5) facilitate coordination with concerned agencies like DPWH, DOH, NEDA, LWUA and with appropriate bodies such as PCC (FW4SP) and the like.

The JICA shall:

(1) pursue technology transfer to the Philippine counterpart personnel in the course of the Study and;

(2) assist PSPTs in the preparation of the PW4SP.

Appendix A

LIST OF ATTENDANTS IN THE SERIES OF DISCUSSIONS

ATTENDANTS	DESIGNATION
A. DILG	
1. HON. YOLANDA MA. L. DE LEON	Assistant Secretary, Plans and Programs
2. MR. ORVILLE M. ROQUE	Project Manager I, PMO
3. MR. ROGELIO B. OCAMPO	Chief, Planning Div., PMO
4. MS. ELLEN I. PASCUA	Chief, Admin. Div., PMO
5. MS. FE CRISILLA M. BANLUTA	PW4SP Overall Coordinator, PMO
B. OTHER AGENCIES	
1. MR. ANTONIO DE VERA	Administrator, LWUA
2. MR. ROGELIO A. FLORES	Director, PMO-RWS, DPWH
3. DR. MARIO VILLAVERDE	Director, EHS, DOH
C. JICA	
1. MR. MASAO TATEBA	Supervisor, Second Dev't. Study Div., Social Dev't. Study Dept.
2. MR. EIJI IWASAKI	Asst. Resident Representative, Phil. Office
D. JICA STUDY TEAM	
1. MR. MASATOSHI MOMOSE	Team Leader
2. MR. MASUOMI HIROYAMA	Water Supply Engr.
3. MR. KENSUKE ICHIKAWA	Hydrogeologist
4. MS. YOLANDA M. MINGOA	Sanitary Engr.
5. MR. WILFRIDO C. BARREIRO	Institutional/CD/T Specialist
6. MR. ALLEN M. LOWE	System Engr.
7. KENJI KASAMATU	Coordinator

MINUTES OF DISCUSSIONS

ON

THE PROGRESS REPORT I

FOR

STUDY ON PROVINCIAL WATER SUPPLY, SEWERAGE AND SANITATION SECTOR PLAN

IN

THE REPUBLIC OF THE PHILIPPINES

AGREED UPON BETWEEN

THE DEPARTMENT OF THE INTERIOR AND LOCAL GOVERNMENT

AND

STUDY TEAM OF

JAPAN INTERNATIONAL COOPERATION AGENCY

MANILA, DECEMBER 20, 1994

HON. YOLANDA MA. L. DE LEON
Assistant Secretary
Dept. of the Interior and Local Government

MR. MASATOSHI MOMOSE
Team Leader, Study Team
Japan Int'l. Cooperation Agency

The Stage I field work for "the Study on Provincial Water Supply, Sewerage and Sanitation Sector Plan" (hereinafter referred to as "the Study") started on August 31, 1994 and completed on December 28, 1994.

A series of discussions was held, through the course of the Study, between JICA Study Team and officials concerned including DILG, NEDA, DPWH, LWUA, other central agencies and provinces. General approach and methodologies, as presented in the Inception Report, have been employed for the planning work.

Progress Report I, which covers all outputs during the work period, was prepared entailing part of PW4SP for respective provinces. The contents of the report were basically agreed upon on December 20, 1994 between JICA Study Team and officials concerned in the Philippine side. The list of attendees to the meeting is presented in Appendix A. The following were confirmed and/or agreed upon by both parties.

1. Study Area Coverage

For Rizal province, four (4) municipalities covered by the MWSS were initially agreed to be excluded from the sector plan. However, inclusion of the Talim Island, part of Binangonan (rural area) which is one of the four municipalities, has been reconsidered upon request by the Governor.

2. Planning Conditions

(1) Table of Contents for PW4SP: referring to previous PW4SPs, some modifications were made.

(2) Planning Conditions:

a. Conformity and consistency of the Study shall be ensured especially with "Medium-Term Philippine Development Plan 1993-1998."

b. Planning base year is 1994, while target years are 2000 and 2010 for medium-term and long-term purposes, respectively. The start year of 5-year medium-term development is set to be 1996.

c. Population projection: NSO projection was basically adopted. However, some modifications on urban and rural population by municipality were made with reference to re-classification of barangays reviewed by respective PSPTs.

d. Data management: outputs in tables and graphics are prepared in EXCEL spreadsheets for final analysis and presentation.

e. Sector arrangements and institutional capacity: previous arrangements adopted and experiences learned by the central government agencies are discussed in detail for reference/basis of LGUs in coming up with sector plan.

(3) Future Arrangements by DILG

a. Further arrangements with PSPTs will be done by DILG to catch up with the schedule to complete PW4SP within one month during February, 1995 after holding workshop at respective provinces.

b. Arrangements with Batch No. 2 provinces will be initiated based on the experience in Batch No. 1 study, ascertaining the peace and order in the provinces.

c. To ensure timely completion/finalization of the Plans, DILG shall work closely with the LGUs and other agencies in getting the comments and recommendations on the Draft Plans.

d. Adoption of the Plans by the Provincial Council (Sangguniang Panlalawigan) shall also be facilitated by DILG.

Appendix A

LIST OF ATTENDANTS

Attendants	Designation
A. DILG	
1. MR. ORVILLE M. ROQUE	Project Manager, PMO
2. MR ROGELIO B. OCAMPO	Chief, Planning Div., PMO
3. MS. ELLEN I. PASCUA	Chief, Admin. Div., PMO
4. MR. MARIO VERGEL DE DIOS	Chief, Operations Div., PMO
5. MS. FE CRISILLA M. BANLUTA	PW4SP Overall Coordinator, PMO
6. MS. JOSEPHINE RAMOS	DILG Coordinator, Oriental Mindoro
7. MS. LINA GRIEGO	DILG Coordinator, Occidental Mindoro
8. MS. MA. CONTESSA NAVARRO	DILG Coordinator, Rizal
9. MS. VIVIAN BIALA	DILG Coordinator, Zambales
B. OTHER AGENCIES	
1. MR. ROGELIO FLORES	Director, PMO-RWS, DPWH
2. MR. VIRGILIO GACUSANA	Chief, Planning Division, PMO, DPWH
3. MR. VICTOR SABANDEJA	Chief, Environmental Health Division, DOH
4. MR. ANIANO FORNELOS JR.	Sanitary Engineer II, DOH
C. JICA	
1. MR. EIJIE IWASAKI	Asst. Resident Representative, Philippine Office
D. JICA Study Team	
1. MR. MASATOSHI MOMOSE	Team Leader
2. MR. MASUOMI HIROYAMA	Water Supply Engineer
3. MS. YOLANDA M. MINGOA	Sanitary Engineer
4. MR. WILFRIDO C. BARREIRO	Institutional/CD/T Specialist
5. MR. ALLEN LOWE	System Engineer

MINUTES OF DISCUSSIONS

ON

THE PROGRESS REPORT II

FOR

STUDY ON PROVINCIAL WATER SUPPLY, SEWERAGE AND SANITATION SECTOR PLAN

IN

THE REPUBLIC OF THE PHILIPPINES

AGREED UPON BETWEEN

THE DEPARTMENT OF THE INTERIOR AND LOCAL GOVERNMENT

AND

STUDY TEAM OF

JAPAN INTERNATIONAL COOPERATION AGENCY

MANILA, MARCH 8, 1995

HON. YOLANDA MA. L. DE LEON
Assistant Secretary
Dept. of the Interior and Local Government

MR. MASATOSHI MOMOSE
Team Leader, Study Team
Japan Int'l. Cooperation Agency

The Stage II field work for "the Study on Provincial Water Supply, Sewerage and Sanitation Sector Plan" (hereinafter referred to as "the Study") resumed on January 14, 1995 and completed on March 14, 1995.

Conditions and assumptions for development of Medium-Term and Long-Term sector plans were discussed and finalized between respective PSPTs and JICA Study Team through the conduct of Workshop No. 3.

Progress Report II, as a draft of PW4SP, was prepared. In this connection, contents of the report were basically agreed upon on March 8, 1995 between JICA Study Team and officials concerned in the Philippine side. The list of attendees to the meeting is presented in Appendix A.

The following are future arrangements required by both parties:

(1) DILG will follow-up Batch No. 2 provinces for implementation of the PW4SPs, ascertaining the peace and order situation in the provinces.

(2) The starting date of the third field work by JICA Study Team for Batch No. 2 will be informed to DILG through JICA Philippine Office.

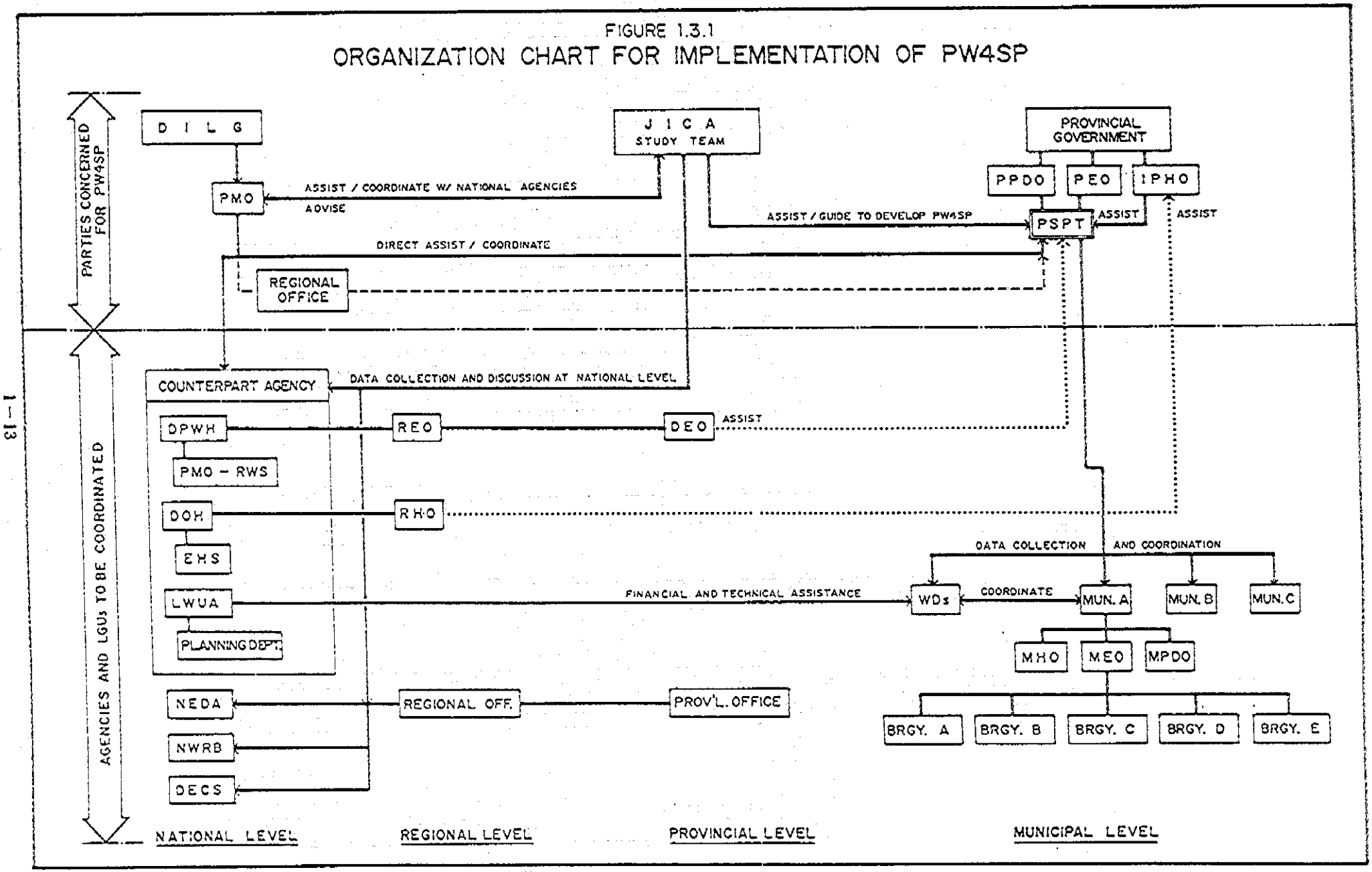
Appendix A

LIST OF ATTENDEES

Attendees	Designation
A. DILG	
1. MR. ORVILLE M. ROQUE	Project Manager, PMO
2. MS. ELLEN I. PASCUA	Assistant Project Manager, PMO
3. MR. ROGELIO B. OCAMPO	Chief, Planning Div., PMO
4. MS. FE CRISILLA M. BANLUTA	PW4SP Overall Coordinator, PMO
5. MS. JOSEPHINE RAMOS	DILG Coordinator, Oriental Mindoro
6. MS. LINA GRIEGO	DILG Coordinator, Occidental Mindoro
7. MS. MA. CONTESSA NAVARRO	DILG Coordinator, Rizal
8. MS. VIVIAN BIALA	DILG Coordinator, Zambales
B. OTHER AGENCIES	
1. MR. VIRGILIO GACUSANA	Chief, Planning Division, PMO, DPWH
C. JICA	
1. MR. EIJI IWASAKI	Asst. Resident Representative, Philippine Office
2. MR. NOBUAKI MIYATA	Second Development Study Div., Social Development Study Dept.
D. JICA Study Team	
1. MR. MASATOSHI MOMOSE	Team Leader
2. MR. MASUOMI HIROYAMA	Water Supply Engineer
3. MS. YOLANDA M. MINGOA	Sanitary Engineer
4. MR. WILFREDO C. BARREIRO	Institutional/CD/T Specialist
5. MR. MANABU FUJIKAWA	Financial Specialist
6. MR. ALLEN LOWE	System Engineer

FIGURE 1.3.1

ORGANIZATION CHART FOR IMPLEMENTATION OF PW4SP



MINUTES OF DISCUSSIONS

ON

THE DRAFT FINAL REPORT

FOR

STUDY ON PROVINCIAL WATER SUPPLY, SEWERAGE AND SANITATION SECTOR PLAN

IN

THE REPUBLIC OF THE PHILIPPINES

AGREED UPON BETWEEN

THE DEPARTMENT OF THE INTERIOR AND LOCAL GOVERNMENT

AND

STUDY TEAM OF

JAPAN INTERNATIONAL COOPERATION AGENCY

MANILA, DECEMBER 7, 1995

HON. YOLANDA MA. L. DE LEON
Assistant Secretary
Dept. of the Interior and Local Government

MR. MASATOSHI MOMOSE
Team Leader, Study Team
Japan Int'l. Cooperation Agency

The Stage III field work for Batch II for "the Study on Provincial Water Supply, Sewerage and Sanitation Sector Plan" (hereinafter referred to as "the Study") started on May 22, 1995 and will be completed on December 15, 1995.

Major conditions and assumptions for the development of Medium-Term and Long Term sector plans for the remaining five (5) provinces under Batch II were discussed and finalized between respective PSPTs and JICA Study Team through the conduct of Workshop No. 3.

The Draft Final Reports for the nine (9) provinces, which cover all outputs during the study period, were prepared for respective provinces. The contents of the report were basically agreed upon on December 7, 1995 between JICA Study Team and officials concerned in the Philippine side. The list of attendees to the meeting is presented in Appendix A. The following were confirmed and/or agreed upon by both parties.

1. Correction of typographical errors of the Draft Final Report will be undertaken by the Study Team prior to printing of the Final Report.

2. Adoption of the Plans (Batch II) by the Provincial Council (Sangguniang Panlalawigan) shall be facilitated by DILG in the same manner as Batch I.

3. Inclusion of the Message of the Governor in the Main Report of respective PW4SPs.

Appendix A

LIST OF ATTENDEES

Attendees	Designation
A. DILG	
1. HON. YOLANDA MA. L. DE LEON	Assistant Secretary
2. MR. ORVILLE M. ROQUE	Program Manager, PMO
3. MS. ELLEN I. PASCUA	Asst. Program Manager, PMO
4. MR. ROGER OCAMPO	Chief, Planning Div., PMO
5. MR. MARIO VERGEL DE DIOS	Chief, Operations Div., PMO
6. MS. FE CRISILLA M. BANLUTA	PW4SP Overall & Ilocos Norte Coordinator
7. MS. JOSEPHINE RAMOS	DILG Coordinator, Abra & Or. Mindoro
8. MS. LINA GRIEGO	DILG Coordinator, Batanes & Occ. Mindoro
9. MS. MA. CONTESSA NAVARRO	DILG Coordinator, Nueva Vizcaya & Rizal
10. MS. VIVIAN BIALA	DILG Coordinator, Ilocos Sur & Zambales
B. OTHER AGENCIES	
1. MR. ROGELIO A. FLORES	Director, PMO-RWS, DPWH
2. MR. VIRGILIO GACUSANA	Chief, Planning Division, PMO, DPWH
3. MR. VICTOR SABANDEJA	Chief, Environmental Health Division, DOH
4. MR. ANIANO FORNELOS JR.	Sanitary Engineer II, DOH
5. MR. JOSE RENE RONCESVALLES	Program Manager, LWUA
C. JICA	
1. MR. SHIGEYUKI MATSUMOTO	2nd Development Study Div., Social Development Study Dept.
D. JICA Study Team	
1. MR. MASATOSHI MOMOSE	Team Leader
2. MR. MASUOMI HIROYAMA	Water Supply Engineer
3. MS. YOLANDA M. MINGOA	Sanitary Engineer
4. MR. WILFRIDO C. BARREIRO	Institutional/CD/T Specialist
5. MR. ALLEN LOWE	System Engineer

2. PLANNING APPROACH FOR FUTURE SECTOR DEVELOPMENT
2.6 Planning Principles and Data Management
2.6.2 Data Management

(1) Computer-based System

The data management system was established to support the Provincial Sector Planning Team (PSPT) in the preparation of the Provincial Water Supply, Sewerage and Sanitation Sector Plan (PW4SP). An essential task of data management is to organize various kind of data into an effective and efficient information base.

A computer-based system was applied as a viable solution to process large amount of data and to minimize the human-error in calculation. For this particular project, a dynamic system is designed to allow the planner to adjust planning factors and update the information when further data becomes available.

It is viable and economical to choose the microcomputer with software suitable for the average skills of the common user. In this connection, of the two types of software package available, ***database*** and ***spreadsheet***, the latter method was selected. Among the available spreadsheet-type software, EXCEL was used. EXCEL supports file conversion (opening and saving), multiple file opening, graphic presentation of data, What-You-See-Is-What-You-Get (WYSIWYG) formatting, scaleable font and view, etc. The following are the advantages and disadvantages of the spreadsheet method with reference to database method.

Advantage	Disadvantage
1. Minimum programming skills	1. Repeated entry of same formula
2. Friendly environment to users	2. Sorting or indexing is done manually
3. Graphic presentation of data at user's option	3. All data are loaded in memory, which require huge amount of memory
4. Execution of data linkage at formula level entry	4. Limited to static data linkages
5. Guided formula creation using function wizard	

Data management task starts from the collection of data using the questionnaire forms. The existence and accuracy of data are major concern at this stage to prepare main information bases. Using the microcomputer provided with EXCEL spreadsheet, data in the questionnaire forms are transferred into the forms constructed in EXCEL. Applicable policy, criteria and assumptions are entered into key parameter tables. These data are then processed and finally consolidated into target forms. These final forms provide a map of provincial profile, service coverage, future requirements, cost estimates for future sector development, and funding requirements.

Table 2.6.1 Key Parameter

No.	Description of Key Parameter			Unit	Values
1.	Service Level	*Water Supply*			
		Number of household to be served by Level I Facility		HH/Facility	
		Water Consumption Rate for Level III System		Liter/capita/day	
		Sanitation			
		Std. number of student to be served by a unit of sanitary toilet		Student/Toilet	
		Standard number of toilets for a public utility		Toilet/Public Facility	
2	Provincial Sector Target	Medium Term Plan	*Water Supply*		
			UrbanWater Supply	% of Population	
			Rural Water Supply	% of Population	
			Sanitation		
			Household Toilet	% of Household	
			Urban Household Toilet		
			Flush	% of Household	
			Pour Flush	% of Household	
			VIP Latrine	% of Household	
			Rural Household Toilet		
			Flush	% of Household	
			Pour Flush	% of Household	
			VIP Latrine	% of Household	
			School Toilet	% of Public Student	
			Public Toilet	% of Public Utility	
			Solid Waste	% of Population	
		Long Term Plan	*Water Supply*		
			UrbanWater Supply	% of Population	
			Rural Water Supply	% of Population	
			Sanitation		
			Household Toilet	% of Household	
			Urban Household Toilet		
			Flush	% of Household	
			Pour Flush	% of Household	
			VIP Latrine	% of Household	
			Rural Household Toilet		
			Flush	% of Household	
			Pour Flush	% of Household	
			VIP Latrine	% of Household	
			School Toilet	% of Public Student	
			Public Toilet	% of Public Utility	
			Urban Sewerage	% of Urban Population	
3.	**Percentage of Level I Wells for Rehabilitation**			%	
4.	**Percentage of Sector Management Cost to Construction Cost**				
		Feasibility and Detail Design		% of Construction Cost	
		Construction Supervision		% of Construction Cost	
5.	**Contingencies**				
		Physical Contingency		% of Construction Cost	
		Price Contingency		Percent per annum	
6.	**Community Development and Training Cost**				
		Level III		% of Construction Cost	
		Level I and II		% of Construction Cost	
7.	Recurrent Cost	Level III System (Operating Cost)		Pesos/HH/year	
		Level III System (Spare Parts/Equipment)		% of Construction Cost	
		Level II System (Spare Parts/Equipment)		Pesos/HH/year	
		Level I System (Spare Parts/Equipment)		Pesos/HH/year	
		Public School Toilet Maintenance Cost		Pesos/Toilet/year	
		Public Utility Toilet Maintenance Cost		Pesos/Toilet/year	
8.	**Allocation factors/Percentages of IRA**				
		From Provincial		%	
		From Municipality and Brgy.		%	
9.	**Funding Levels/Percenatges for Different Financing Scenarios**				
		1st Scenario		% Funding Available	
		2nd Scenario		% Funding Available	
		3rd Scenario		% Funding Available	
		4th Scenario		% Funding Available	
		5th Scenario		% Funding Available	

Table 2.6.2 Composition of Well Sources and Specific Capacity

Municipality	Area	Source	Proportion (%)	Standard Specification Depth (m)	SWL (m)	Specific Capacity (lit/sec/m)
	Rural	Shallow Well				
		Deep Well				
	Urban	Shallow Well				
		Deep Well				
	Rural	Shallow Well				
		Deep Well				
	Urban	Shallow Well				
		Deep Well				
	Rural	Shallow Well				
		Deep Well				
	Urban	Shallow Well				
		Deep Well				
	Rural	Shallow Well				
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	Urban	Shallow Well				
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	Rural	Shallow Well				
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	Rural	Shallow Well				
		Deep Well				
	Urban	Shallow Well				
		Deep Well				
	Rural	Shallow Well				
		Deep Well				
	Urban	Shallow Well				
		Deep Well				
	Rural	Shallow Well				
		Deep Well				
	Urban	Shallow Well				
		Deep Well				

Table 2.6.3 Annual Distribution of Investment Cost Required by Sub-sector for Medium-Term Development Plan

Unit: Percent

Sub-Sector	Component	1996	1997	1998	1999	2000	Total
Urban Water Supply	**Level III System**						
	Feasibility Study and Detail Design						
	Construction & Supervision						
	Community Development & Training						
Rural Water Supply	**Level I Facility**						
	Detail Design						
	Construction & Supervision						
	Community Development & Training						
	Level II System						
	Detail Design						
	Construction & Supervision						
	Community Development & Training						
Sanitation	Urban Household Toilet						
	Rural Household Toilet						
	Public School Toilet						
	Public Toilet						
	Disinfection of Level I Wells						
	Detail Design						
	Construction & Supervision						
	Community Development & Training						

Table 2.6.4 Level I Safe and Unsafe Percentage

Municipality	Safe Source (%)	Unsafe Source (%)
Provincial Average		

Table 2.6.5 Unit Construction Cost of Different Facilities

Description	Unit Construction Cost (Pesos)	Service Coverage		Unit Cost	
		Served Population	Served Household	Pesos/ Person	Pesos/ Household
Water Supply					
Level III - New System					
For 5000 Population					
For 10000 Population					
For 15000 Population					
Level III - Expansion					
For 5000 Population					
For 10000 Population					
For 15000 Population					
Level II					
Level I					
Deep Well - 30 meter depth					
Deep Well - 50 meter depth					
Deep Well - 70 meter depth					
Shallow Well					
Spring Development					
Rehabilitation Cost for Level I Deep Well					
Disinfection of Level I Wells					
Sanitation					
Flush					
Pour Flush					
VIP Latrine					
School Toilet					
Public Toilet					
Urban Sewerage					

Table 2.6.6 Scoring Factor for Municipal Investment Ranking for Urban Water Supply

Unit: Percent

Score	Underserved and Unserved Population in Base Year	Underserved and Unserved Population in Phase I	Population Unserved by Level III Systems in Base Year
1.0	< %	< %	< %
0.8	< % <	< % <	< % <
0.6	< % <	< % <	< % <
0.4	< % <	< % <	< % <
0.2	% <	% <	% <
Weight Allocation Score			

Table 2.6.7 Scoring Factor for Municipal Comprehensive Investment Ranking

Unit: Percent

Score	Urban Water Supply	Rural Water Supply	Urban Sanitation	Rural Sanitation
1.0	N.A.	< %	< %	< %
0.8	N.A.	< % <	< % <	< % <
0.6	N.A.	< % <	< % <	< % <
0.4	N.A.	< % <	< % <	< % <
0.2	N.A.	% <	% <	% <
Weight Allocation Score				

3. PROVINCIAL PROFILE

3.3 Socio-economic Conditions

3.3.1 Economic Activities and Household Income

Table 3.3.1 Distribution of Household by Income Class

Income Class	Ilocos Sur				Region I	
	Total Families[2]		Annual Income		Total Number of Families	Annual Income Average (Pesos)
	Number	Share	Total (P 1,000)	Average (Pesos)		
Under 15,000	9,241	8.72	112,528	12,177	39,905	11,560
15,000 - 19,999	5,746	5.42	102,004	17,753	44,018	17,628
20,000 - 29,999	23,619	22.29	608,148	25,748	134,728	25,132
30,000 - 39,999	15,005	14.15	505,444	33,684	114,843	34,502
40,000 - 59,999	24,654	23.27	1,189,928	48,264	143,584	48,926
60,000 - 99,999	13,552	12.79	1,052,709	77,677	122,295	76,111
100,000 - 249,999	12,100	11.42	1,845,203	152,502	62,116	142,519
250,000 and over	2,051	1.94	810,615	395,152	10,038	427,302
Total/Average	105,968	100.00	6,226,579	30,576	671,527	58,759
Median	-	-	-	39,050	-	40,253

Source: 1991 Family Income and Expenditures Survey, NSO

Note:

(1) Based on NEDA and other agencies, poverty threshold in Region I in 1991 was estimated at P 48,700. Proportion of families below poverty level was 62 % in the same year.

(2) For purposes of the survey, a family is defined as a group of persons usually living together and composed of the head and other persons related to the head by blood, marriage or adoption. A single person living alone is considered as a separate family.

Table 3.3.2 Gainful Workers by Occupation Group and Major Industry Group

Major Occupation Group	Gainful Workers 15 Years Old and Over	MAJOR INDUSTRY GROUP				
		Agriculture, Fishery and Forestry	Mining and Quarrying	Manu-facturing	Electricity, Gas and Water	Construction
Total	174,251	87,793	245	8,588	386	7,035
Official of Gov't. & Special Interest Org., Corp. Executives, Managers, Managing Prod. & Supervisors	3,222	11	9	95	19	160
Professional	8,245	-	-	22	19	107
Technicians and Associated Professional	2,237	19	-	31	20	41
Clerks	3,780	11	-	124	89	21
Service & Shop Market Sales Workers	4,612		11	71		11
Farmers, Forestry Workers & Fishermen	78,956	78,402	-		9	-
Craft and Related Workers	13,373	20	123	5,436	189	6,045
Plant & Machine Operators and Assemblers	7,860	29	-	915	20	63
Elementary Occupations	30,543	8,606	61	360	-	320
Other Occupations	11,818	695	41	1,534	21	267
Occupation Not Stated	9,605	-	-	-	-	-

Major Occupation Group	MAJOR INDUSTRY GROUP					
	Wholesale and Retail Trade	Transportation and Communication	Financing, Insurance, Real Estate and Business Services	Community, Social and Personal Services	Activities Not Adequately Defined	Not Stated
Total	12,128	8,055	1,356	29,157	9,913	9,595
Official of Gov't. & Special Interest Org., Corp. Executives, Managers, Managing Prod. & Supervisors	1,514	43	46	1,134	191	-
Professional	19	25	252	6,745	1,056	-
Technicians and Associated Professional	568	101	210	968	279	-
Clerks	973	174	285	1,408	695	-
Service & Shop Market Sales Workers	1,098	580	383	2,133	325	-
Farmers, Forestry Workers & Fishermen	87	-	11	18	429	-
Craft and Related Workers	88	113		881	478	-
Plant & Machine Operators and Assemblers	71	6,188	21	350	203	-
Elementary Occupations	6,861	644	21	12,370	1,300	-
Other Occupations	849	187	127	3,150	4,947	-
Occupation Not Stated	-	-	-	-	10	9,595

Source: NSO Census 1990

3.3.3 Education

Table 3.3.3 Household Population by Highest Educational Attainment

Highest Educational Attainment	Household Population 7 Years Old and Over	Age Group						
		Below 20	20-24	25-29	30-34	35-39	40-44	45 & Over
Total	434,462	154,069	47,926	41,484	34,196	29,153	23,526	104,108
No Grade	19,949	4,619	360	380	396	461	473	13,260
Pre-School	3,739	3,441	23	23	19	13	11	209
Elementary	220,470	90,581	10,435	11,714	13,229	13,837	13,222	67,452
1st - 4th Grade	104,568	56,987	2,240	2,379	2,889	3,390	3,345	33,338
5th - 7th Grade	115,902	33,594	8,195	9,335	10	10,447	9,877	34,114
High School	118,701	45,629	20,008	14,698	11,074	8,130	5,320	13,842
Undergraduate	57,473	31,671	6,430	4,431	3,606	2,795	2,168	6,372
Graduate	61,228	13,958	13,578	10,267	7,468	5,335	3,152	7,470
Post Secondary	11,020	1,128	2,934	2,409	1,772	1,067	454	1,256
Undergraduate	2,222	380	552	446	279	205	102	258
Graduate	8,798	748	2,382	1,963	1,493	862	352	998
College Undergraduate	31,235	7,954	8,503	5,273	3,212	2,370	1,435	2,488
Academic Degree Holder	27,408	157	54,808	6,753	4,316	3,145	2,523	5,106
Not Stated	1,940	560	255	234	178	130	88	495

Source: NSO Census 1990

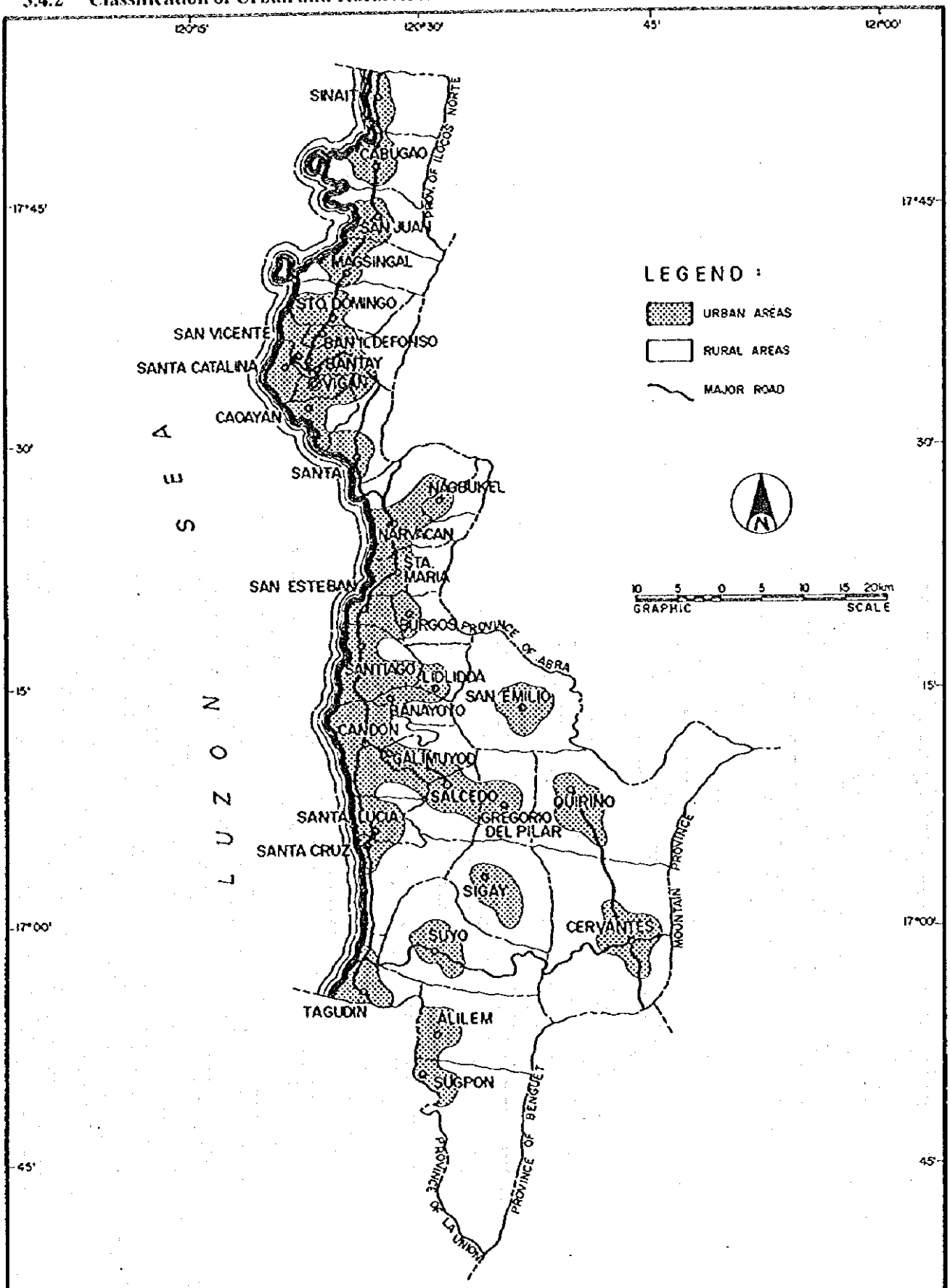


FIGURE 3.4.1

DISTRIBUTION OF URBAN AND RURAL AREAS

3.5 Health Status

3.5.3 Health Facilities and Practitioners

Table 3.5.1 Number and Ratio to Population of Health Facilities and/or Medical Practitioners

Health Facilities	Ilocos Sur		Philippines	
	Number	Ratio	Number	Ratio
Hospitals	23	1:24,501	1,733	1:35,017
RHUs	34	1:16,574	2,295	1:26,442
BHSs	157	1:3,589	10,151	1:5,978
Practitioners				
Doctors	206	1:2,736	7,431	1:8,166
Nurses	189	1:2,982	10,270	1:5,909
Midwives	305	1:1,848	11,604	1:5,230
Dentists	107	1:5,267	1,550	1:39,152

3.6 Environmental Conditions

3.6.2 Water Pollution

Table 3.6.1 DENR Water Quality Criteria/Water Usage and Classification for Fresh Water

PARAMETER	UNIT	CLASS AA	CLASS A	CLASS B	CLASS C	CLASS D
Color	PCU	15	50	(C)	(C)	(C)
Temperature [D] (max. rise in deg. Celsius)	°C rise	--	3	3	3	3
pH (range)		6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.0-9.0
Dissolved Oxygen [B] (Minimum)	%satn	70	70	70	60	40
	mg/L	5.0	5.0	5.0	5.0	3.0
5-Day 20°C BOD	mg/L	1	5	5	7(10)	10(15)
Total Suspended Solids	mg/L	25	50			
Total Dissolved Solids	mg/L	500	1,000	--	--	1,000
Surfactants (MBAS)	mg/L	nil	0.2(0.5)	0.3(0.5)	0.5	--
Oil/Grease (Petroleum Ether Extract)	mg/L	nil	1	1	2	5
Nitrate as Nitrogen	mg/L	1	10	NR	10	--
Phosphate as Phosporous	mg/L	nil	0.1	0.2	0.4	--
Phenolic Substances as Phenols	mg/L	nil	0.002	0.005	0.02	--
Total Coliforms	MPN/100mL	50	1,000	1,000	5,000	--
or Fecal Coliforms	MPN/100mL	20	100	200	--	--
Chloride as Cl	mg/l	250	250	--	350	--
Copper	mg/L	1	1	--	0.05	--

Notes:

Class AA - Public Water Supply Class I. Intended for waters having watersheds which are uninhabited and otherwise protected and which require only approved disinfection in order to meet the national standards for drinking water.

Class A - Public Water Supply Class II. Sources of water supply that will require complete treatment (coagulation, sedimentation, filtration and disinfection) in order to meet drinking water standards.

Class B - Recreational Water Class I. For primary contect recreation such as bathing, swimming, skin diving, etc. (particularly for tourism purposes).

Class C - Fishery Water for the propagation and growth of fish and other agnatic resources; recreational (for boating, etc.); industrial water supply class I for manufacturing processes after treatment.

Class D - For agriculture, irrigation, livestock watering, etc.; for industrial water supply class II (cooling, etc.); other inland waters by their quality, belong to this specification.

4. EXISTING FACILITIES AND SERVICE COVERAGE

4.1 Water Supply

4.1.3 Level III Systems

Table 4.1.1 Details on Existing Level III Systems

NEDA Geog-graphic Code	Municipality	Name of System (Operating Body)	Level III Services								
			Number of Barangays Served			Number of Households Served			Number of Population Served		
			Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
012903	Bantay	Metro Vigan W.D	6	9	15	230	520	750	1,150	3,750	4,900
012905	Cabugao	Cabugao Waterworks System	5	11	16	970	342	1,312	850	1,710	2,560
012907	Caoayan	Metro Vigan W.D	7	2	9	214	126	340	630	1,700	2,330
012910	G. del Pilar	Barangay Alfonso W.S	0	1	1	0	108	108	0	540	540
		Barangay Dapdapig W.S	0	1	1	0	52	52	0	260	260
		Barangay Concepcion W.S	1	0	1	120	0	120	600	0	600
		Municipal Total	1	2	3	120	160	280	600	800	1,400
012914	Narvacan	Narvacan W.D	2	0	2	168	0	168	840	0	840
012922	Santa	Santa W.D	4	5	9	151	19	170	755	95	850
012925	Santa Lucia	Santa Lucia W.D	3	2	5	184	129	313	920	645	1,565
012926	Santa Maria	Nalvo Water System	0	1	1	0	50	50	0	250	250
012927	Santiago	Santiago Water System	2	0	2	67	0	67	335	0	335
012928	Santo Domingo	Sto. Domingo Water System	1	1	2	5	2	7	25	10	35
012930	Sinait	Sinait Waterworks	4	0	4	199	0	199	995	0	995
012933	Tagudin	Tagudin W.D	5	18	23	532	511	1,043	2,660	2,555	5,215
012934	Vigan	Metro Vigan W.D	12	0	12	1,260	0	1,260	6,300	0	6,300
Provincial Total			52	51	103	4,100	1,859	5,959	16,060	11,515	27,575

NEDA Geo-graphic Code	Municipality	Name of System (Operating Body)	Level II Services								
			Number of Public Faucets			Number of Households Served			Number of Population Served		
			Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
012903	Bantay	Metro Vigan W.D	0	0	0	0	0	0	0	0	0
012905	Cabugao	Cabugao Waterworks System	0	0	0	0	0	0	0	0	0
012907	Caoayan	Metro Vigan W.D	0	0	0	0	0	0	0	0	0
012910	G. del Pilar	Barangay Alfonso W.S	0	0	0	0	0	0	0	0	0
		Barangay Dapdapig W.S	0	0	0	0	0	0	0	0	0
		Barangay Concepcion W.S	0	0	0	0	0	0	0	0	0
		Municipal Total	0	0	0	0	0	0	0	0	0
012914	Narvacan	Narvacan W.D	0	0	0	0	0	0	0	0	0
012922	Santa	Santa W.D	0	0	0	0	0	0	0	0	0
012925	Santa Lucia	Santa Lucia W.D	0	0	0	0	0	0	0	0	0
012926	Santa Maria	Nalvo Water System	0	0	0	0	0	0	0	0	0
012927	Santiago	Santiago Water System	1	0	1	15	0	15	75	0	75
012928	Santo Domingo	Sto. Domingo Water System	0	2	2	0	70	70	0	350	350
012930	Sinait	Sinait Waterworks	0	0	0	0	0	0	0	0	0
012933	Tagudin	Tagudin W.D	0	0	0	0	0	0	0	0	0
012934	Vigan	Metro Vigan W.D	0	0	0	0	0	0	0	0	0
Provincial Total			1	2	3	15	70	85	75	350	425

Table 4.1.1 Details on Existing Level III Systems (Cont.)

NEDA Geo-graphic Code	Municipality	Name of System (Operating Body)	Water Sources			Consumption			
			Type[1]	Number	Production (cu.m/day)	Domestic	Institutional	Commercial	Industrial
						(cu. m/day)			
012903	Bantay	Metro Vigan W.D	SP	1	1,406.29	0	0	0	0
012905	Cabugao	Cabugao Waterworks Sys.	SP	1	272.52	0	0	0	0
012907	Caoayan	Metro Vigan W.D	DW	1	N.A.	0	0	0	0
012910	G. del Pilar	Barangay Alfonso W.S	SP	3	360	0	0	0	0
		Barangay Dapdapig W.S	SP	2	194.4	0	0	0	0
		Barangay Concepcion W.S	SP	1	172.80	0	0	0	0
	Municipal Total			6	727.20	0	0	0	0
012914	Narvacan	Narvacan W.D	DW	1	600	70	26	18	0
012922	Santa	Santa W.D	SP	1	864	260	0	0	0
012925	Santa Lucia	Santa Lucia W.D	SW	3	442	0	0	0	0
012926	Santa Maria	Nalvo Water System	DW	3	29	0	0	0	0
012927	Santiago	Santiago Water System	DW	1	N.A.	70	40	0	0
012928	Sto. Domingo	Sto. Domingo Water Sys.	SP	1	981	0	0	0	0
012930	Sinait	Sinait Waterworks	DW	2	1,764	103	0	0	0
012933	Tagudin	Tagudin W.D	DW	1	1,000	30	0	50	0
012934	Vigan	Metro Vigan W.D	DW	1	2,023.68	0	0	0	0
Provincial Total				23	10,949.69	533	66	68	0

Note: 1. Type of Water Source: *DW* - Deep Well, *DgW* - Dug Well, *Surf.* - Surface Water (River), *Sp* - Spring, *IG* - Infiltration Gallery.

NEDA Geo-graphic Code	Municipality	Name of System (Operating Body)	Consumers													
			Domestic House Connections			Domestic Public Faucets			Institutional			Commercial			Industrial		
			Connection		Con-sumption	Connection		Con-sumption	Connection		Con-sumption	Connection		Con-sumption	Connection		Con-sumption
			Metered	Unmetered	(cu.m/day)	Metered	Unmetered	(cu.m/day)	Metered	Unmetered	(cu.m/day)	Metered	Unmetered	(cu.m/day)	Metered	Unmetered	(cu.m/day)
012903	Bantay	Metro Vigan W.D	750	0	0	0	0	0	0	0	0	50	0	0	2	0	0
012905	Cabugao	Cabugao Waterworks System	1,332	0	0	0	0	0	0	0	0	0	0	0	0	0	0
012907	Caoayan	Metro Vigan W.D	340	0	0	0	0	0	0	0	0	34	0	0	0	0	0
012910	G. del Pilar	Brgy. Alfonso W.S.		108	0	0	0	0	0	0	0	0	0	0	0	0	0
		Brgy. Dapdapig W.S		52	0	0	0	0	0	0	0	0	0	0	0	0	0
		Brgy. Concepcion W.S.		120	0	0	0	0	0	0	0	0	0	0	0	0	0
	Municipal Total		0	280	0	0	0	0	0	0	0	0	0	0	0	0	0
012914	Narvacan	Narvacan W.D	168	0	70	0	0	0	2	0	26	4	0	18	0	0	0
012922	Santa	Santa W.D	120	0	260	0	0	0	0	0	0	0	0	0	0	1	0
012925	Santa Lucia	Santa Lucia W.D	333	0	0	0	0	0	2	0	0	8	0	0	0	0	0
012926	Santa Maria	Nalvo Water System	0	50	0	0	0	0	0	0	0	0	0	0	0	0	0
012927	Santiago	Santiago Water System	67	0	70	3	0	50	8	0	40	0	0	0	0	0	0
012928	Sto. Domingo	Sto. Domingo Water Sys.	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0
012930	Sinait	Sinait Waterworks	499	0	103	0	0	0	0	0	0	0	0	0	0	0	0
012933	Tagudin	Tagudin W.D	1,043	0	30.24	0	0	0	0	0	0	103	0	50.4	0	0	0
012934	Vigan	Metro Vigan W.D	1,260	0	0	0	0	0	0	0	0	101	0	0	4	0	0
Provincial Total			5,622	337	533.24	3	0	50	11	0	66	300	0	68.4	6	0	0

Table 4.1.2 Existing Level II Systems

Sheet 1

NEDA Geo-graphic Code	Municipality	Name of System (Operating System)	Water Source		Existing Facilities				
			Type[1]	Number	Length of Transmission Line (meter)	Reservoir Number	Reservoir Q (cu.m)	Length of Distribution Line (meter)	Number of Public Faucets
012904	Burgos	Brgy. Balugang W.S	SP	2				1,500	8
		Brgy. Bessang W.S	SP	2				1,000	5
		Brgy. Lubing W.S	SP	2				1,200	9
		Brgy. Manaboc W.S	SP	1				3,200	8
		Brgy. Mapanit W.S	SP	1				1,500	3
		Brgy. Taliao W.S	SP	1				1,500	6
	Municipal Total			9	0	0	0	9,900	39
012906	Candon	Brgy. Bugnay	SP	1	4,300	2	12	864	22
012910	G. del Pilar	Brgy. Matue-Butaray	SP	2				6,000	22
012913	Nagbukel	Brgy. Taleb	SP	1				500	2
012914	Narvacan	Brgy. Marozo	SP	1				2,550	18
012915	Quirino	Municipal W.S	SP	14	1,400			15,000	120
012918	San Esteban	Poblacion W.S.	DW	1					10
		Brgy. Villa Quirino	DW	1					6
	Municipal Total			2	0	0	0	0	16
012920	San Juan	San Juan Waterworks	SP	2				10,500	13
012922	Santa	Barasibis W.S.	SP	1	100			7,000	12
		Banari W.S.	SP/DW	1/1	200			2,500	7
	Municipal Total			2/1	300	0	0	9,500	19
012924	Santa Cruz	Brgy. Buybuga W.S	SP	1		1			6
		Brgy. Daliga W.S	SP	1		1			13
		Brgy. Paratong W.S	SP	1	1,250	1			5
		Brgy. Pidpid W.S	SP	1		1			19
	Municipal Total			4	1,250	4	0	0	43
012925	Santa Lucia	Barangay W.S	SP	1		1		2,000	5
012928	Santo Domingo	Brgy. Lussoc	SP	1	500	1	27	1,350	5
012929	Sigay	Municipal W.S	SP	7	15,200	7			65
012931	Sugpon	Municipal W.S	SP	9				5,500	56
012932	Suyo	Brgy. Baringcucurong W.S	SP	1		1		3,570	38
		Brgy. Cabugao W.S	SP	1		1		3,000	30
		Brgy. Man-Atong W.S	SP	5		5		5,250	52
		Brgy. Patoc-Ao W.S	SP	1		1		2,510	17
		Brgy. Poblacion W.S	SP	5		5		2,570	51
		Brgy. Urdazan W.S	SP	2		2		3,570	16
		Brgy. Uso W.S	SP	1		1		3,750	33
	Municipal Total			16	0	16	0	24,220	237
012933	Tagudin	Barangay W.S	SP	3				2,500	27
Provincial Total				76	22,950	31	39	90,384	709

Note: 1. Type of Water Sources: *DW* - Deep Well, *Surf.* - Surface Water (River), *SP* - Spring, *IG* - Infiltration Gallery.

Table 4.1.2 Existing Level II Systems

Sheet 2

NEDA Geographic Code	Municipality	Name of System (Operating Body	Number of Barangays Served			Number of Households Served			Number of Population Served		
			Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
012904	Burgos	Brgy. Balugang W.S		1	1		40	40		200	200
		Brgy. Bessang W.S		1	1		25	25		125	125
		Brgy. Lubing W.S		1	1		45	45		225	225
		Brgy. Manaboc W.S		1	1		40	40		200	200
		Brgy. Mapanit W.S		1	1		15	15		75	75
		Brgy. Talnao W.S		1	1		30	30		150	150
		Municipal Total	0	6	6	0	195	195	0	975	975
012906	Candon	Brgy. Bugnay		1	1		110	110		550	550
012910	G. del Pilar	Brgy. Matue-Butaray		1	1		110	110		550	550
012913	Nagbukel	Brgy. Taleb		1	1		10	10		50	50
012914	Narvacan	Brgy. Marozo		1	1		90	90		450	450
012915	Quirino	Municipal W.S	1	6	7	200	420	620	1,020	2,226	3,246
012918	San Esteban	Poblacion W.S	1		1	50		50	255		255
		Brgy. Villa Quirino		1	1		30	30		149	149
		Municipal Total	1	1	2	50	30	80	255	149	404
012920	San Juan	San Juan Waterworks		4	4		65	65		325	325
012922	Santa	Barasibis W.S		1	1		60	60		312	312
		Banari W.S		1	1		35	35		182	182
		Municipal Total	0	2	2	0	95	95	0	494	494
012924	Santa Cruz	Brgy. Bugbuga W.S		1	1		30	30		150	150
		Brgy. Daligan W.S		1	1		65	65		325	325
		Brgy. Paratong W.S		1	1		25	25		125	125
		Brgy. Pidpid W.S		1	1		95	95		475	475
		Municipal Total	0	4	4	0	215	215	0	1,075	1,075
012925	Santa Lucia	Barangay W.S		2	2		25	25		125	125
012928	Sto. Domingo	Brgy. Lussoc		1	1		25	25		125	125
012929	Sigay	Municipal W.S		7	7		325	325		1,625	1,625
012931	Sugpon	Municipal W.S	1	5	6	45	235	280	225	1,175	1,400
012932	Suyo	Brgy. Baringcucurong W.S		1	1		190	190		950	950
		Brgy. Cabugao W.S		1	1		150	150		750	750
		Brgy. Man-Atong W.S		1	1		260	260		1,300	1,300
		Brgy. Patoc-Ao W.S		1	1		85	85		425	425
		Brgy. Poblacion W.S	1		1	225		225	1,275		1,275
		Brgy. Udazan W.S		1	1		90	90		450	450
		Brgy. Uso W.S		1	1		165	165		825	825
		Municipal Total	1	6	7	225	940	1,165	1,275	4,700	5,975
012933	Tagudin	Barangay W.S		3	3		135	135		675	675
Provincial Total			4	51	55	520	3,025	3,545	2,775	15,269	18,044

Table 4.1.2 Existing Level II Systems

Sheet 3

NEDA Geo-graphic Code	Municipality	Name of System (Operating Body	Service Conditions During Dry Season									
			Supply (Hrs/day)	Ditry Water[1]	Taste or Smell[2]	Supply Interruption (number/month)				Supply Water Pressure (% of Total)	
						Power Failure	Pump Breakdown	Pipe Burst	Others	Adequate	Inadequate
012904	Burgos	Brgy. Balugang W.S	24		G						
		Brgy. Bessang W.S	24		G						
		Brgy. Lubing W.S	24		G						
		Brgy. Manaboc W.S	24		G						
		Brgy. Mapanut W.S	24		G						
		Brgy. Taliao W.S	24		G						
	Municipal Total		24	0		0	0	0	0	0	0
012906	Candon	Brgy. Bugnay	24	0	G						
012910	G. del Pilar	Brgy. Matue-Butaray	24		G						
012913	Nagbukel	Brgy. Taleb	24		G						
012914	Narvacan	Brgy. Marozo	24	0	G						
012915	Quirino	Municipal W.S	24		G						
012918	San Esteban	Poblacion W.S	24		G						
		Brgy. Villa Quirino	24		G						
	Municipal Total		24								
012920	San Juan	San Juan Waterworks	24		G						
012922	Santa	Barasibis W.S	24		G						
		Banari W.S	24		G						
	Municipal Total		24								
012924	Santa Cruz	Brgy. Bugbuga W.S	24		G						
		Brgy. Daligan W.S	24		G						
		Brgy. Paratong W.S	24		G						
		Brgy. Pidpid W.S	24		G						
	Municipal Total		24	0		0	0	0	0	0	0
012925	Santa Lucia	Barangay W.S	24		G						
012928	Santo Domingo	Brgy. Lussoc	24	0	G						
012929	Sigay	Municipal W.S	24		G						
012931	Sugpon	Municipal W.S	24		G						
012932	Suyo	Brgy. Baringcucurong W.S	24		G						
		Brgy. Cabugao W.S	24		G						
		Brgy. Man-Atong W.S	24		G						
		Brgy. Patoc-Ao W.S	24		G						
		Brgy. Poblacion W.S	24		G						
		Brgy. Udazan W.S	24		G						
		Brgy. Uso W.S	24		G						
	Municipal Total		24	0		0	0	0	0	0	0
012933	Tagudin	Barangay W.S	24		G						
	Provincial Total		24	0		0	0	0	0	0	0

Note: 1. Ditry Water: *E* - Everyday, *OW* - Once a week, *OM* - Once a month, *O* - Occassional.
2. Taste/Smell: *G* - Good tase, *S* - Salty, *W* - Wood taste, *M* - Metallic taste, *O* - Others.

Table 4.1.2 Existing Level II Systems

Sheet 4

NEDA Geo-graphic Code	Municipality	Name of System (Operating Body)	Number of Staff						
			Technical Professional	Administrative Staff	Collector	Total Number of Staff	Repair Work		
							Local Trademan	MEO/CEO	DEO
012904	Burgos	Brgy. Balugang W.S							
		Brgy. Bessang W.S							
		Brgy. Lubing W.S							
		Brgy. Manaboc W.S							
		Brgy. Mapanit W.S							
		Brgy. Tahao W.S							
	Municipal Total		0	0	0	0			
012906	Candon	Brgy. Bugnay							
012910	G. del Pilar	Brgy. Matue-Butaray							
012913	Nagbukel	Brgy. Taleb							
012914	Narvacan	Brgy. Marozo							
012915	Quirino	Municipal W.S							
012918	San Esteban	Poblacion W.S							
		Brgy. Villa Quirino							
	Municipal Total		0	0	0	0			
012920	San Juan	San Juan Waterworks							
012922	Santa	Barasibis W.S							
		Banan W.S							
	Municipal Total		0	0	0	0			
012924	Santa Cruz	Brgy. Bugbuga W.S							
		Brgy. Daligan W.S							
		Brgy. Paratong W.S							
		Brgy. Pidpid W.S							
	Municipal Total		0	0	0	0			
012925	Santa Lucia	Barangay W.S							
012928	Santo Domingo	Brgy. Lussoc							
012929	Signy	Municipal W.S							
012931	Sugpon	Municipal W.S							
012932	Suyo	Brgy. Baringcucurong W.S							
		Brgy. Cabugao W.S							
		Brgy. Man-Atong W.S							
		Brgy. Patoc-Ao W.S							
		Brgy. Poblacion W.S							
		Brgy. Udazan W.S							
		Brgy. Uso W.S							
	Municipal Total		0	0	0	0			
012933	Tagudin	Barangay W.S							
Provincial Total			0	0	0	0	0	0	0

Table 4.1.2 Existing Level II Systems

Sheet 5

NEDA Geo-graphic Code	Municipality	Name of System (Operating Body)	Expenditures							Tariff					
			Annual	Wages	Fuel, Chem, Mat'l.	Transport	Repairs	Loan Repayment	Other	Consumer Payment	Cost per Pail	Cost per Cubic Meter	Cost Per Household	Other	Average Collection Efficiency
			(Thousand of Pesos/year)							(Year)	(Pesos)				(%)
012904	Burgos	Brgy. Balugang W.S													
		Brgy. Bessang W.S													
		Brgy. Lubing W.S													
		Brgy. Manaboc W.S													
		Brgy. Mapanit W.S													
		Brgy. Tahao W.S													
	Municipal Total		0	0	0	0	0	0	0	0	0	0	0	0	0
012906	Candon	Brgy. Bugnay													
012910	G. del Pilar	Brgy. Matue-Butaray													
012913	Nagbukel	Brgy. Taleb													
012914	Narvacan	Brgy. Marozo													
012915	Quirino	Municipal W.S													
012918	San Esteban	Poblacion W.S													
		Brgy. Villa Quirino													
	Municipal Total		0	0	0	0	0	0	0	0	0	0	0	0	0
012920	San Juan	San Juan Waterworks													
012922	Santa	Barasibis W.S													
		Banari W.S													
	Municipal Total		0	0	0	0	0	0	0	0	0	0	0	0	0
012924	Santa Cruz	Brgy. Bugbuga W.S													
		Brgy. Dalngan W.S													
		Brgy. Paratong W.S													
		Brgy. Pidpid W.S													
	Municipal Total		0	0	0	0	0	0	0	0	0	0	0	0	0
012925	Santa Lucia	Barangay W.S													
012928	Santo Domingo	Brgy. Lussoc													
012929	Sigay	Municipal W.S													
012931	Sugpon	Municipal W.S													
012932	Suyo	Brgy. Baringcucurong W.S													
		Brgy. Cabugao W.S													
		Brgy. Man-Atong W.S													
		Brgy. Patoc-Ao W.S													
		Brgy. Poblacion W.S													
		Brgy. Udazan W.S													
		Brgy. Uso W.S													
	Municipal Total		0	0	0	0	0	0	0	0	0	0	0	0	0
012933	Tagudin	Barangay W.S													
Provincial Total			0	0	0	0	0	0	0	0	0	0	0	0	0

Table 4.1.2 Existing Level II Systems

Sheet 6

NEDA Geo-graphic Code	Municipality	Name of System (Operating Body)	Billings					Revenues				
			Annual Billing	Public Faucet Consumers	House Connection Consumers	Expected Subsidies	Others	Annual Income	Payment by Public Faucet Consumers	Payment by House Connection Consumer	Subsidies	Others
			(Number)	(Thousand of Pesos/Year)								
012904	Burgos	Brgy. Balugang W.S										
		Brgy. Bessang W.S										
		Brgy. Lubing W.S										
		Brgy. Manaboc W.S										
		Brgy. Mapanit W.S										
		Brgy. Taliao W.S										
	Municipal Total		0	0	0	0	0	0	0	0	0	0
012909	Candon	Bugnay										
012910	G. del Pilar	Brgy. Matuc-Butaray										
012913	Nagbukel	Brgy. Taleb										
012914	Narvacan	Brgy. Marozo										
012915	Quirino	Municipal W.S										
012918	San Esteban	Poblacion W.S										
		Brgy. Villa Quirino										
	Municipal Total		0	0	0	0	0	0	0	0	0	0
012920	San Juan	San Juan Waterworks										
012922	Santa	Barasibis W.S										
		Banan W.S										
	Municipal Total		0	0	0	0	0	0	0	0	0	0
012924	Santa Cruz	Brgy. Bugbuga W.S										
		Brgy. Daligan W.S										
		Brgy. Paratong W.S										
		Brgy. Pidpid W.S										
	Municipal Total		0	0	0	0	0	0	0	0	0	0
012925	Santa Lucia	Barangay W.S										
012928	Santo Domingo	Brgy. Lussoc										
012929	Sigay	Municipal W.S										
012931	Sugpon	Municipal W.S										
012932	Suyo	Brgy. Baringcucurong W.S										
		Brgy. Cabugao W.S										
		Brgy. Man-Atong W.S										
		Brgy. Patoc-Ao W.S										
		Brgy. Poblacion W.S										
		Brgy. Udazan W.S										
		Brgy. Uso W.S										
	Municipal Total		0	0	0	0	0	0	0	0	0	0
012933	Tagudin	Barangay W.S										
Provincial Total			0	0	0	0	0	0	0	0	0	0

4.1.5 Level I Facilities

Safe and Unsafe Classification of Level I Facilities

The PHO conducted water quality analysis of samples collected from public and private Level I wells and classified into safe and unsafe sources/facilities as shown in Table 4.1.3.

The results of water quality analysis indicate that about 35% of existing wells in a provincial average are classified unsafe sources. Since the total number of shallow wells (28,049) occupies 96% of the total number of Level I wells (29,136) and the deep well is rarely exposed to contamination by seepage of wastewater, PHO analysis results (unsafe percentages) were applied to classify all shallow wells (drilled and driven) into safe and unsafe sources.

The unsafe percentage of provincial average is applied common to urban and rural areas both for public and private shallow wells. While, those sources other than shallow wells are processed as classified in the questionnaire. Table 4.1.4 presents number of Level I facilities by safe and unsafe classification.

4.1.6 Water Supply Service Coverage

Estimation of Service Coverage in Terms of Safe, Unsafe and Unserved Classification

Through the quick review of the number of water supply systems/facilities and the number of households derived from questionnaire, it was found that a great number of unserved population would be figured out as a balance between the total population and population with any levels of services (including unsafe facilities) in application of the service level standard for Level I and II. To come up with more realistic service coverage, the unserved population in 1995 was prefixed referring to the profile in 1990 population census data, "Households by Main Source of Drinking Water and City/Municipality." Of the rest of the population those who are not served by Level III and/or II systems were considered to be covered by shared or own use of Level I facilities. The calculation procedure is as follows:

- Service percentage/population of Level III and Level II systems was estimated based on the questionnaire survey results.
- Percentage of unserved population (using undeveloped spring, lake, river, peddler, etc.) reported in the 1990 population census was assumed to have unchanged up to present.

Table 4.1.3 Percentage of Unsafe Water Sources by PHO

Municipality	No. of Level I Sources Sampled	No. of Unsafe Sources	Percentage of Unsafe Sources
Alilem	2	0	* 35.0
Banayoyo	7	1	14.3
Bantay	63	23	36.5
Burgos	95	37	38.9
Cabugao	27	8	23.6
Candon	101	38	37.6
Caoayan	67	27	40.3
Cervantes	0	0	* 35.0
Galimuyod	6	1	16.7
G. del Pilar	0	0	* 35.0
Lidlidda	8	1	12.5
Magsingal	37	10	27.0
Nagbukel	45	18	40.0
Narvacan	105	47	44.8
Quirino	0	0	* 35.0
Salcedo	4	1	25.0
San Emilio	18	6	33.3
San Esteban	84	30	35.7
San Ildelfonso	11	2	18.2
San Juan	16	4	25.0
San Vicente	58	18	31.0
Santa	51	20	39.2
Santa Catalina	60	16	26.7
Santa Cruz	30	9	30.0
Santa Lucia	69	23	33.3
Santa Maria	102	45	47.1
Santiago	99	31	31.3
Santo Domingo	10	2	20.0
Sigay	0	0	* 35.0
Sinait	18	6	33.3
Sugpon	3	0	* 35.0
Suyo	10	2	20.0
Tagudin	49	11	22.4
Vigan (Capital)	117	40	34.2
Provincial Total	1,372	477	34.8

Note: * - Applied provincial average

Table 4.1.4 Number of Level I Facilities by Safe and Unsafe Classification

NEDA Geographic Code	Municipality	Type	Safe Sources										Unsafe Sources									Grand Total
			Public					Private				Total	Public				Private				Total	
			Deep Well	Shallow Well	Covered/ Improved Dug Well	Developed Spring	Sub-total	Deep Well	Shallow Well	Covered/ Improved Dug Well	Sub-total		Shallow Well	Open Dug Well	Un-developed Spring	Sub-total	Shallow Well	Open Dug Well	Rain Water Collector	Sub-total		
045201	Alilem	Urban	0	5	0	0	5	0	0	0	0	5	2	0	0	2	0	0	0	0	2	7
		Rural	0	13	0	15	28	0	3	0	3	31	7	0	0	7	1	0	0	1	8	39
		Total	0	18	0	15	33	0	3	0	3	36	9	0	0	9	1	0	0	1	10	46
045202	Banayoyo	Urban	0	7	0	0	7	0	90	0	90	97	1	0	0	1	15	3	0	18	19	116
		Rural	0	20	0	0	20	0	446	0	446	466	3	0	0	3	74	12	0	86	89	555
		Total	0	27	0	0	27	0	536	0	536	563	4	0	0	4	89	15	0	104	108	671
045203	Bantay	Urban	7	16	5	0	28	7	222	5	234	262	9	0	0	9	127	0	0	127	136	398
		Rural	10	91	9	0	110	8	448	17	473	583	52	0	0	52	257	0	0	257	309	892
		Total	17	107	14	0	138	15	670	22	707	845	61	0	0	61	384	0	0	384	445	1,290
045204	Burgos	Urban	0	6	0	0	6	0	28	0	28	34	4	0	0	4	18	0	0	18	22	56
		Rural	7	26	0	6	39	6	426	0	432	471	16	0	0	16	272	0	0	272	288	759
		Total	7	32	0	6	45	6	454	0	460	505	20	0	0	20	290	0	0	290	310	815
045205	Cabugao	Urban	0	12	5	0	17	0	17	10	27	44	4	10	0	14	5	5	0	10	24	68
		Rural	13	129	5	3	150	1	49	10	60	210	40	10	0	50	15	7	0	22	72	282
		Total	13	141	10	3	167	1	66	20	87	254	44	20	0	64	20	12	0	32	96	350
045206	Candon	Urban	0	42	3	0	45	0	110	6	116	161	25	2	0	27	66	0	0	66	93	254
		Rural	31	163	7	3	204	0	1,127	9	1,136	1,340	99	9	0	108	679	0	0	679	787	2,127
		Total	31	205	10	3	249	0	1,237	15	1,252	1,501	124	11	0	135	745	0	0	745	880	2,381
045207	Caoayan	Urban	0	38	2	0	40	0	63	0	63	103	25	0	0	25	42	24	0	66	91	194
		Rural	0	41	2	0	43	0	309	0	309	352	28	0	0	28	209	93	0	302	330	682
		Total	0	79	4	0	83	0	372	0	372	455	53	0	0	53	251	117	0	368	421	876
045208	Cervantes	Urban	0	2	0	0	2	0	1	1	2	4	1	0	0	1	0	0	0	0	1	5
		Rural	0	7	0	30	37	0	0	22	22	59	4	0	0	4	0	1	0	1	5	64
		Total	0	9	0	30	39	0	1	23	24	63	5	0	0	5	0	1	0	1	6	69
045209	Galimuyod	Urban	3	2	0	0	5	0	12	0	12	17	0	0	0	0	3	0	0	3	3	20
		Rural	38	27	0	6	71	4	157	0	161	232	6	3	2	11	32	0	0	32	43	275
		Total	41	29	0	6	76	4	169	0	173	249	6	3	2	11	35	0	0	35	46	295
045210	G. del Pilar	Urban	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Rural	0	1	0	11	12	0	0	0	0	12	1	0	1	2	0	0	0	0	2	14
		Total	0	1	0	11	12	0	0	0	0	12	1	0	1	2	0	0	0	0	2	14
045211	Lidlidda	Urban	2	0	0	0	2	18	0	0	18	20	0	0	1	1	0	0	0	0	1	21
		Rural	7	0	0	11	18	42	0	0	42	60	0	0	0	0	0	0	0	0	0	60
		Total	9	0	0	11	20	60	0	0	60	80	0	0	1	1	0	0	0	0	1	81
045212	Magsingal	Urban	0	15	12	0	27	0	281	0	281	308	6	0	0	6	104	0	0	104	110	418
		Rural	7	89	31	0	127	0	719	0	719	846	33	8	0	41	266	5	0	271	312	1,158
		Total	7	104	43	0	154	0	1,000	0	1,000	1,154	39	8	0	47	370	5	0	375	422	1,576
045213	Nagbukel	Urban	6	0	0	0	6	0	42	0	42	48	0	0	0	0	28	0	0	28	28	76
		Rural	14	0	0	2	16	0	192	0	192	208	0	0	3	3	128	1	0	129	132	340
		Total	20	0	0	2	22	0	234	0	234	256	0	0	3	3	156	1	0	157	160	416

Table 4.1.4 Number of Level I Facilities by Safe and Unsafe Classification (Cont'd.)

NEDA Geo-graphic Code	Municipality	Type	Safe Sources										Unsafe Sources									Grand Total
			Public					Private					Public				Private					
			Deep Well	Shallow Well	Covered/ Improved Dug Well	Developed Spring	Sub-total	Deep Well	Shallow Well	Covered/ Improved Dug Well	Sub-total	Total	Shallow Well	Open Dug Well	Un-developed Spring	Sub-total	Shallow Well	Open Dug Well	Rain Water Collector	Sub-total	Total	
045214	Narvacan	Urban	0	7	0	0	7	0	215	9	224	231	6	0	0	6	175	0	0	175	181	412
		Rural	0	47	0	0	47	0	2,390	10	2,400	2,447	38	0	0	38	1,940	0	0	1,940	1,978	4,425
		Total	0	54	0	0	54	0	2,605	19	2,624	2,678	44	0	0	44	2,115	0	0	2,115	2,159	4,837
045215	Quirino	Urban	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1
		Rural	0	0	0	0	0	0	0	0	0	0	0	0	11	11	0	0	0	0	11	11
		Total	0	0	0	0	0	0	0	0	0	0	0	0	12	12	0	0	0	0	12	12
045216	Salcedo	Urban	2	16	0	0	18	0	25	0	25	43	5	0	0	5	8	0	0	8	13	56
		Rural	2	27	0	14	43	0	68	0	68	111	9	0	0	9	22	5	0	27	36	147
		Total	4	43	0	14	61	0	93	0	93	154	14	0	0	14	30	5	0	35	49	203
045217	San Emilio	Urban	0	0	0	6	6	2	1	0	3	9	0	0	0	0	1	0	0	1	1	10
		Rural	0	0	0	7	7	4	4	0	8	15	0	0	0	0	2	0	0	2	2	17
		Total	0	0	0	13	13	6	5	0	11	24	0	0	0	0	3	0	0	3	3	27
045218	San Esteban	Urban	0	3	0	0	3	0	61	0	61	64	1	0	0	1	34	1	0	35	36	100
		Rural	2	30	0	0	32	0	406	0	406	438	17	0	0	17	225	4	0	229	246	684
		Total	2	33	0	0	35	0	467	0	467	502	18	0	0	18	259	5	0	264	282	784
045219	San Ildelfonso	Urban	1	3	0	0	4	0	97	1	98	102	1	4	0	5	22	0	0	22	27	129
		Rural	2	20	0	0	22	0	154	0	154	176	5	8	0	13	34	0	0	34	47	223
		Total	3	23	0	0	26	0	251	1	252	278	6	12	0	18	56	0	0	56	74	352
045220	San Juan	Urban	6	9	0	0	15	0	332	8	340	355	3	0	0	3	110	0	0	110	113	468
		Rural	6	136	0	0	142	0	442	9	451	593	45	0	3	48	147	0	0	147	195	788
		Total	12	145	0	0	157	0	774	17	791	948	48	0	3	51	257	0	0	257	308	1,256
045221	San Vicente	Urban	0	9	0	0	9	0	79	0	79	88	4	3	0	7	36	6	0	42	49	137
		Rural	0	57	0	0	57	0	263	0	263	320	25	5	0	30	118	10	0	128	158	478
		Total	0	66	0	0	66	0	342	0	342	408	29	8	0	37	154	16	0	170	207	615
045222	Santa	Urban	1	0	0	0	1	0	36	0	36	37	0	0	0	0	23	0	0	23	23	60
		Rural	8	60	0	0	68	3	184	0	187	255	38	0	0	38	119	0	0	119	157	412
		Total	9	60	0	0	69	3	220	0	223	292	38	0	0	38	142	0	0	142	180	472
045223	Santa Catalina	Urban	0	9	0	0	9	0	53	7	60	69	3	0	0	3	19	0	0	19	22	91
		Rural	0	43	0	0	43	0	454	3	457	500	16	0	0	16	166	1	0	167	183	683
		Total	0	52	0	0	52	0	507	10	517	569	19	0	0	19	185	1	0	186	205	774
045224	Santa Cruz	Urban	0	18	1	0	19	1	197	0	198	217	8	0	0	8	85	4	0	89	97	314
		Rural	2	146	1	2	151	0	698	0	698	849	62	0	0	62	299	6	0	305	367	1,216
		Total	2	164	2	2	170	1	895	0	896	1,066	70	0	0	70	384	10	0	394	464	1,530
045225	Santa Lucia	Urban	0	4	3	0	7	0	77	0	77	84	2	0	0	2	39	1	0	40	42	126
		Rural	0	121	2	2	125	0	248	1	249	374	60	0	0	60	124	1	0	125	185	559
		Total	0	125	5	2	132	0	325	1	326	458	62	0	0	62	163	2	0	165	227	685
045226	Santa Maria	Urban	0	16	0	0	16	0	112	3	115	131	14	0	0	14	99	0	0	99	113	244
		Rural	13	75	0	0	88	7	731	0	738	826	66	3	0	69	650	2	0	652	721	1,547
		Total	13	91	0	0	104	7	843	3	853	957	80	3	0	83	749	2	0	751	834	1,791

Table 4.1.4 Number of Level I Facilities by Safe and Unsafe Classification (Cont'd.)

NEDA Geo-graphic Code	Municipality	Type	Safe Sources										Unsafe Sources									Grand Total
			Public					Private				Total	Public				Private				Total	
			Deep Well	Shallow Well	Covered/ Improved Dug Well	Developed Spring	Sub-total	Deep Well	Shallow Well	Covered/ Improved Dug Well	Sub-total		Shallow Well	Open Dug Well	Un-developed Spring	Sub-total	Shallow Well	Open Dug Well	Rain Water Collector	Sub-total		
045227	Santiago	Urban	2	0	0	0	2	0	38	0	38	40	0	0	0	0	17	0	0	17	17	57
		Rural	51	8	6	2	67	0	590	15	605	672	3	6	3	12	269	3	0	272	284	956
		Total	53	8	6	2	69	0	628	15	643	712	3	6	3	12	286	3	0	289	301	1,013
045228	Santo Domingo	Urban	0	14	0	0	14	0	209	5	214	228	3	0	0	3	52	2	0	54	57	285
		Rural	0	117	0	0	117	0	902	3	905	1,022	29	0	0	29	225	1	0	226	255	1,277
		Total	0	131	0	0	131	0	1,111	8	1,119	1,250	32	0	0	32	277	3	0	280	312	1,562
045229	Sigay	Urban	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Rural	0	0	0	0	0	0	0	4	4	4	0	0	0	0	0	0	0	0	0	4
		Total	0	0	0	0	0	0	0	4	4	4	0	0	0	0	0	0	0	0	0	4
045230	Sinait	Urban	1	9	0	0	10	0	88	4	92	102	4	0	0	4	44	5	0	49	53	155
		Rural	0	90	0	0	90	0	1,043	1	1,044	1,134	45	0	0	45	520	0	0	520	565	1,699
		Total	1	99	0	0	100	0	1,131	5	1,136	1,236	49	0	0	49	564	5	0	569	618	1,854
045231	Sugpon	Urban	3	0	0	0	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3
		Rural	0	0	0	0	0	0	12	0	12	12	0	0	6	6	7	0	0	7	13	25
		Total	3	0	0	0	3	0	12	0	12	15	0	0	6	6	7	0	0	7	13	28
045232	Suyo	Urban	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Rural	0	18	0	17	35	0	72	0	72	107	4	0	5	9	18	0	0	18	27	134
		Total	0	18	0	17	35	0	72	0	72	107	4	0	5	9	18	0	0	18	27	134
045233	Tagudin	Urban	0	6	3	0	9	0	154	4	158	167	2	0	0	2	44	0	0	44	46	213
		Rural	16	134	2	0	152	0	715	7	722	874	39	0	0	39	206	0	0	206	245	1,119
		Total	16	140	5	0	161	0	869	11	880	1,041	41	0	0	41	250	0	0	250	291	1,332
045234	Vigan (Capital)	Urban	7	226	0	0	233	1	477	15	493	726	117	0	0	117	248	0	0	248	365	1,091
		Rural	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Total	7	226	0	0	233	1	477	15	493	726	117	0	0	117	248	0	0	248	365	1,091
Provincial Total		Urban	41	494	34	6	575	29	3,117	78	3,224	3,799	250	19	2	271	1,464	51	0	1,515	1,786	5,585
		Rural	229	1,736	65	131	2,161	75	13,252	111	13,438	15,599	790	52	34	876	7,024	152	0	7,176	8,052	23,651
		Total	270	2,230	99	137	2,736	104	16,369	189	16,662	19,398	1,040	71	36	1,147	8,488	203	0	8,691	9,838	29,236

- Population covered by Level I facilities were calculated as a balance figure between the total population, and the population served by Level III & II systems and the unserved population.
- Level I population coverage was estimated in assumption that 50% of the private facilities were shared by neighbors.

Unserved population and the population covered by Level I facilities are presented in Table 4.1.5. Table 4.1.6 presents overall population covered by Level I facilities and number of households.

Number of households per shared public/private facility ranges from 1 to 15 households, which are considered within the reasonable level, as more or less equivalent to the service level standard of Level I public facility (15 households/facility) and Level II system (5 household/public faucet).

Table 4.1.5 Estimation of Unserved Population by Municipality

NEDA Geo-graphic Code	Municipality	Type	Population and Households		Served Population			Unserved Population				Population Covered by Level I Facilities
								Unserved Percentage (1990)			Unserved Population (1995)	
			Number	HHs Size	Level III	Level II	Total	Total No. of HHs	Number of Unserved HHs	%		
045201	Alilem	Urban	1,411	5.3	0	0	0	265	27	10.2	144	1,267
		Rural	4,307	5.6	0	0	0	773	377	48.8	2,101	2,206
		Total	5,718	5.5	0	0	0	1,038	404	38.9	2,245	3,473
045202	Banayoyo	Urban	818	5.0	0	0	0	163	0	0.0	0	818
		Rural	5,510	5.6	0	0	0	991	0	0.0	0	5,510
		Total	6,328	5.5	0	0	0	1,154	0	0.0	0	6,328
045203	Bantay	Urban	10,098	5.2	1,150	0	1,150	1,927	1	0.1	5	8,943
		Rural	18,037	5.4	3,750	0	3,750	3,340	18	0.5	97	14,190
		Total	28,135	5.3	4,900	0	4,900	5,267	19	0.4	102	23,133
045204	Burgos	Urban	1,494	5.1	0	0	0	295	2	0.7	10	1,484
		Rural	8,793	5.2	0	975	975	1,678	34	2.0	178	7,640
		Total	10,287	5.2	0	975	975	1,973	36	1.8	188	9,124
045205	Cabugao	Urban	7,904	5.0	850	0	850	1,568	39	2.5	197	6,857
		Rural	22,091	5.3	1,710	0	1,710	4,152	136	3.3	724	19,657
		Total	29,995	5.2	2,560	0	2,560	5,720	175	3.1	921	26,514
045206	Candon	Urban	7,229	5.2	0	0	0	1,398	3	0.2	16	7,213
		Rural	40,042	5.4	0	550	550	7,484	50	0.7	268	39,224
		Total	47,271	5.3	0	550	550	8,882	53	0.6	284	46,437
045207	Caoayan	Urban	6,787	5.0	630	0	630	1,344	0	0.0	0	6,157
		Rural	9,700	5.1	1,700	0	1,700	1,895	0	0.0	0	8,000
		Total	16,487	5.1	2,330	0	2,330	3,239	0	0.0	0	14,157
045208	Cervantes	Urban	2,608	5.7	0	0	0	454	22	4.8	126	2,482
		Rural	11,603	5.4	0	0	0	2,145	313	14.6	1,693	9,910
		Total	14,211	5.5	0	0	0	2,599	335	12.9	1,819	12,392
045209	Galimuyod	Urban	430	5.3	0	0	0	81	0	0.0	0	430
		Rural	8,298	5.4	0	0	0	1,528	0	0.0	0	8,298
		Total	8,728	5.4	0	0	0	1,609	0	0.0	0	8,728

Table 4.1.5 Estimation of Unserved Population by Municipality (Cont'd.)

NEDA Geo-graphic Code	Municipality	Type	Population and Households		Served Population			Unserved Population				Population Covered by Level I Facilities
								Unserved Percentage (1990)			Unserved Population (1995)	
			Number	HHs Size	Level III	Level II	Total	Total No. of HHs	Number of Unserved HHs	%		
045210	G. del Pilar	Urban	607	5.1	600	0	600	119	0	0.0	0	7
		Rural	2,992	5.5	800	550	1,350	541	0	0.0	0	1,642
		Total	3,599	5.5	1,400	550	1,950	660	0	0.0	0	1,649
045211	Lidlidda	Urban	1,247	5.1	0	0	0	245	4	1.6	20	1,227
		Rural	2,739	5.3	0	0	0	519	54	10.4	285	2,454
		Total	3,986	5.2	0	0	0	764	58	7.6	305	3,681
045212	Magsingal	Urban	5,278	4.9	0	0	0	1,082	0	0.0	0	5,278
		Rural	18,723	5.3	0	0	0	3,539	0	0.0	0	18,723
		Total	24,001	5.2	0	0	0	4,621	0	0.0	0	24,001
045213	Nagbukel	Urban	732	5.1	0	0	0	143	1	0.7	5	727
		Rural	3,216	5.2	0	50	50	624	23	3.7	119	3,047
		Total	3,948	5.1	0	50	50	767	24	3.1	124	3,774
045214	Narvacan	Urban	2,816	5.2	874	0	874	542	17	3.1	88	1,854
		Rural	34,821	5.1	0	450	450	6,801	234	3.4	1,198	33,173
		Total	37,637	5.1	874	450	1,324	7,343	251	3.4	1,286	35,027
045215	Quirino	Urban	1,381	5.1	0	1,020	1,020	269	7	2.6	36	325
		Rural	6,034	5.3	0	2,226	2,226	1,132	107	9.5	570	3,238
		Total	7,415	5.3	0	3,246	3,246	1,401	114	8.1	606	3,563
045216	Salcedo	Urban	1,344	4.9	0	0	0	273	0	0.0	0	1,344
		Rural	8,655	5.1	0	0	0	1,707	10	0.6	51	8,604
		Total	9,999	5.1	0	0	0	1,980	10	0.5	51	9,948
045217	San Emilio	Urban	2,303	5.5	0	0	0	416	3	0.7	17	2,286
		Rural	4,104	5.4	0	0	0	766	40	5.2	214	3,890
		Total	6,407	5.4	0	0	0	1,182	43	3.6	231	6,176
045218	San Esteban	Urban	752	5.1	0	255	255	148	0	0.0	0	497
		Rural	6,033	4.9	0	149	149	1,221	0	0.0	0	5,884
		Total	6,785	5.0	0	404	404	1369	0	0.0	0	6,381

Table 4.1.5 Estimation of Unserved Population by Municipality (Cont'd.)

NEDA Geo-graphic Code	Municipality	Type	Population and Households		Served Population			Unserved Population				Population Covered by Level I Facilities
								Unserved Percentage (1990)			Unserved Population (1995)	
			Number	HHs Size	Level III	Level II	Total	Total No. of HHs	Number of Unserved HHs	%		
045219	San Ildelfonso	Urban	1,024	5.2	0	0	0	198	0	0.0	0	1,024
		Rural	4,046	5.4	0	0	0	753	5	0.7	27	4,019
		Total	5,070	5.3	0	0	0	951	5	0.5	27	5,043
045220	San Juan	Urban	3,400	4.8	0	0	0	707	0	0.0	0	3,400
		Rural	18,565	5.1	0	325	325	3,612	0	0.0	0	18,240
		Total	21,965	5.1	0	325	325	4,319	0	0.0	0	21,640
045221	San Vicente	Urban	1,193	5.4	0	0	0	219	0	0.0	0	1,193
		Rural	9,643	5.0	0	0	0	1,913	0	0.0	0	9,643
		Total	10,836	5.1	0	0	0	2,132	0	0.0	0	10,836
045222	Santa	Urban	1,731	4.8	755	0	755	363	0	0.0	0	976
		Rural	11,497	5.2	95	494	589	2,194	0	0.0	0	10,908
		Total	13,228	5.2	850	494	1,344	2,557	0	0.0	0	11,884
045223	Santa Catalina	Urban	1,242	5.3	0	0	0	233	0	0.0	0	1,242
		Rural	11,068	5.4	0	0	0	2,031	0	0.0	0	11,068
		Total	12,310	5.4	0	0	0	2,264	0	0.0	0	12,310
045224	Santa Cruz	Urban	4,461	5.1	0	0	0	868	3	0.3	15	4,446
		Rural	27,697	5.4	0	1,075	1,075	5,101	45	0.9	244	26,378
		Total	32,158	5.4	0	1,075	1,075	5,969	48	0.8	259	30,824
045225	Santa Lucia	Urban	2,256	5.2	920	0	920	431	0	0.0	0	1,336
		Rural	20,045	5.5	645	125	770	3,651	0	0.0	0	19,275
		Total	22,301	5.5	1,565	125	1,690	4,082	0	0.0	0	20,611
045226	Santa Maria	Urban	3,644	5.0	0	0	0	732	3	0.4	15	3,629
		Rural	21,543	5.2	250	0	250	4,175	52	1.2	268	21,025
		Total	25,187	5.1	250	0	250	4,907	55	1.1	283	24,654
045227	Santiago	Urban	2,385	5.4	335	75	410	442	11	2.5	59	1,916
		Rural	13,543	5.4	0	0	0	2,485	19	0.8	104	13,439
		Total	15,928	5.4	335	75	410	2,927	30	1.0	163	15,355

Table 4.1.5 Estimation of Unserved Population by Municipality (Cont'd.)

NEDA Geo-graphic Code	Municipality	Type	Population and Households		Served Population			Unserved Population				Population Covered by Level I Facilities
								Unserved Percentage (1990)			Unserved Population (1995)	
			Number	HHs Size	Level III	Level II	Total	Total No. of HHs	Number of Unserved HHs	%		
045228	Santo Domingo	Urban	2,951	5.1	25	0	25	577	0	0.0	0	2,926
		Rural	19,450	5.2	10	475	485	3,705	0	0.0	0	18,965
		Total	22,401	5.2	35	475	510	4,282	0	0.0	0	21,891
045229	Sigay	Urban	0	0.0	0	0	0	0	0	0.0	0	0
		Rural	2,086	5.8	0	1,625	1,625	361	1	0.3	6	455
		Total	2,086	5.8	0	1,625	1,625	361	1	0.3	6	455
045230	Sinait	Urban	2,891	5.2	995	0	995	561	5	0.9	26	1,870
		Rural	20,401	4.8	0	0	0	4,250	71	1.7	341	20,060
		Total	23,292	4.8	995	0	995	4,811	76	1.6	367	21,930
045231	Sugpon	Urban	976	5.1	0	225	225	192	12	6.3	61	690
		Rural	1,810	5.6	0	1,175	1,175	323	164	50.8	635	0
		Total	2,786	5.4	0	1,400	1,400	515	176	34.2	696	690
045232	Suyo	Urban	1,790	5.8	0	1,275	1,275	309	27	8.7	156	359
		Rural	7,047	5.3	0	4,700	4,700	1,335	375	28.1	1,979	368
		Total	8,837	5.4	0	5,975	5,975	1,644	402	24.5	2,135	727
045233	Tagudin	Urban	4,853	5.5	2,660	0	2,660	889	11	1.2	60	2,133
		Rural	27,951	5.6	2,555	675	3,230	5,009	153	3.1	854	23,867
		Total	32,804	5.6	5,215	675	5,890	5,898	164	2.8	914	26,000
045234	Vigan (Capital)	Urban	41,403	5.3	0	0	0	7,768	17	0.2	91	41,312
		Rural	0	0.0	0	0	0	0	0	0.0	0	0
		Total	41,403	5.3	0	0	0	7,768	17	0.2	91	41,312
Provincial Total		Urban	131,439	5.2	9,794	2,850	12,644	25,221	215	0.9	1,147	117,648
		Rural	432,090	5.3	11,515	15,619	27,134	81,734	2,281	2.8	11,956	393,000
		Total	563,529	5.3	21,309	18,469	39,778	106,955	2,496	2.3	13,103	510,648

Table 4.1.6 Estimation of Population Covered by Safe and Unsafe Source by Municipality

Sheet 1

NEDA Geo-graphic Code	Municipality	Type	Pop. Covered by Level I Facilities	Number of Facilities						Coverage of Own Use					
				Public Facilities			Private Facilities			Number of Private Facilities			(1) Population Covered		
				Safe	Unsafe	Total	Safe	Unsafe	Total	Safe	Unsafe	Total	Safe	Unsafe	Total
045201	Alitem	Urban	1,267	5	2	7	0	0	0	0	0	0	0	0	0
		Rural	2,206	28	7	35	3	1	4	2	1	3	8	3	11
		Total	3,473	33	9	42	3	1	4	2	1	3	8	3	11
045202	Banayoyo	Urban	818	7	1	8	90	18	108	45	9	54	225	45	270
		Rural	5,510	20	3	23	446	86	532	223	43	266	1,249	241	1,490
		Total	6,328	27	4	31	536	104	640	268	52	320	1,474	286	1,760
045203	Bantay	Urban	8,943	28	9	37	234	127	361	117	64	181	608	330	938
		Rural	14,190	110	52	162	473	257	730	237	129	366	1,277	694	1,971
		Total	23,133	138	61	199	707	384	1,091	354	193	547	1,885	1,024	2,909
045204	Burgos	Urban	1,484	6	4	10	28	18	46	14	9	23	71	46	117
		Rural	7,640	39	16	55	432	272	704	216	136	352	1,123	707	1,830
		Total	9,124	45	20	65	460	290	750	230	145	375	1,194	753	1,947
045205	Cabugao	Urban	6,857	17	14	31	27	10	37	14	5	19	68	25	93
		Rural	19,657	150	50	200	60	22	82	30	11	41	159	58	217
		Total	26,514	167	64	231	87	32	119	44	16	60	227	83	310
045206	Candon	Urban	7,213	45	27	72	116	66	182	58	33	91	302	172	474
		Rural	39,224	204	108	312	1,136	679	1,815	568	340	908	3,067	1,833	4,900
		Total	46,437	249	135	384	1,252	745	1,997	626	373	999	3,369	2,005	5,374
045207	Caoayan	Urban	6,157	40	25	65	63	66	129	32	33	65	158	165	323
		Rural	8,000	43	28	71	309	302	611	155	151	306	788	770	1,558
		Total	14,157	83	53	136	372	368	740	187	184	371	946	935	1,881
045208	Cervantes	Urban	2,482	2	1	3	2	0	2	1	0	1	6	0	6
		Rural	9,910	37	4	41	22	1	23	11	1	12	59	3	62
		Total	12,392	39	5	44	24	1	25	12	1	13	65	3	68
045209	Galimuyod	Urban	430	5	0	5	12	3	15	6	2	8	32	8	40
		Rural	8,298	71	11	82	161	32	193	81	16	97	435	86	521
		Total	8,728	76	11	87	173	35	208	87	18	105	467	94	561
045210	G. del Pilar	Urban	7	0	0	0	0	0	0	0	0	0	0	0	0
		Rural	1,642	12	2	14	0	0	0	0	0	0	0	0	0
		Total	1,649	12	2	14	0	0	0	0	0	0	0	0	0
045211	Lidlidda	Urban	1,227	2	1	3	18	0	18	9	0	9	46	0	46
		Rural	2,454	18	0	18	42	0	42	21	0	21	111	0	111
		Total	3,681	20	1	21	60	0	60	30	0	30	157	0	157
045212	Magsingal	Urban	5,278	27	6	33	281	104	385	141	52	193	688	255	943
		Rural	18,723	127	41	168	719	271	990	360	136	496	1,905	718	2,623
		Total	24,001	154	47	201	1,000	375	1,375	501	188	689	2,593	973	3,566

Table 4.1.6 Estimation of Population Covered by Safe and Unsafe Source by Municipality (Cont'd.)

Sheet 1

NEDA Geo-graphic Code	Municipality	Type	Pop. Covered by Level I Facilities	Number of Facilities						Coverage of Own Use					
				Public Facilities			Private Facilities			Number of Private Facilities			(1) Population Covered		
				Safe	Unsafe	Total	Safe	Unsafe	Total	Safe	Unsafe	Total	Safe	Unsafe	Total
045213	Nagbukel	Urban	727	6	0	6	42	28	70	21	14	35	107	71	178
		Rural	3,047	16	3	19	192	129	321	96	65	161	499	335	834
		Total	3,774	22	3	25	234	157	391	117	79	196	606	406	1,012
045214	Narvacan	Urban	1,854	7	6	13	224	175	399	112	88	200	582	455	1,037
		Rural	33,173	47	38	85	2,400	1,940	4,340	1,200	970	2,170	6,120	4,947	11,067
		Total	35,027	54	44	98	2,624	2,115	4,739	1,312	1,058	2,370	6,702	5,402	12,104
045215	Quirino	Urban	325	0	1	1	0	0	0	0	0	0	0	0	0
		Rural	3,238	0	11	11	0	0	0	0	0	0	0	0	0
		Total	3,563	0	12	12	0	0	0	0	0	0	0	0	0
045216	Salcedo	Urban	1,344	18	5	23	25	8	33	13	4	17	61	20	81
		Rural	8,604	43	9	52	68	27	95	34	14	48	173	69	242
		Total	9,948	61	14	75	93	35	128	47	18	65	234	89	323
045217	San Emilio	Urban	2,286	6	0	6	3	1	4	2	1	3	8	3	11
		Rural	3,890	7	0	7	8	2	10	4	1	5	22	5	27
		Total	6,176	13	0	13	11	3	14	6	2	8	30	8	38
045218	San Esteban	Urban	497	3	1	4	61	35	96	31	18	49	156	89	245
		Rural	5,884	32	17	49	406	229	635	203	115	318	995	561	1,556
		Total	6,381	35	18	53	467	264	731	234	133	367	1,151	650	1,801
045219	San Ildelfonso	Urban	1,024	4	5	9	98	22	120	49	11	60	255	57	312
		Rural	4,019	22	13	35	154	34	188	77	17	94	416	92	508
		Total	5,043	26	18	44	252	56	308	126	28	154	671	149	820
045220	San Juan	Urban	3,400	15	3	18	340	110	450	170	55	225	816	264	1,080
		Rural	18,240	142	48	190	451	147	598	226	74	300	1,150	375	1,525
		Total	21,640	157	51	208	791	257	1,048	396	129	525	1,966	639	2,605
045221	San Vicente	Urban	1,193	9	7	16	79	42	121	40	21	61	213	113	326
		Rural	9,643	57	30	87	263	128	391	132	64	196	658	320	978
		Total	10,836	66	37	103	342	170	512	172	85	257	871	433	1,304
045222	Santa	Urban	976	1	0	1	36	23	59	18	12	30	86	55	141
		Rural	10,908	68	38	106	187	119	306	94	60	154	486	309	795
		Total	11,884	69	38	107	223	142	365	112	72	184	572	364	936
045223	Santa Catalina	Urban	1,242	9	3	12	60	19	79	30	10	40	159	50	209
		Rural	11,068	43	16	59	457	167	624	229	84	313	1,234	451	1,685
		Total	12,310	52	19	71	517	186	703	259	94	353	1,393	501	1,894
045224	Santa Cruz	Urban	4,446	19	8	27	198	89	287	99	45	144	505	227	732
		Rural	26,378	151	62	213	698	305	1,003	349	153	502	1,885	824	2,709
		Total	30,824	170	70	240	896	394	1,290	448	198	646	2,390	1,051	3,441

Table 4.1.6 Estimation of Population Covered by Safe and Unsafe Source by Municipality (Cont'd.)

Sheet 1

NEDA Geo-graphic Code	Municipality	Type	Pop. Covered by Level I Facilities	Number of Facilities						Coverage of Own Use					
				Public Facilities			Private Facilities			Number of Private Facilities			(1) Population Covered		
				Safe	Unsafe	Total	Safe	Unsafe	Total	Safe	Unsafe	Total	Safe	Unsafe	Total
045225	Santa Lucia	Urban	1,336	7	2	9	77	40	117	39	20	59	200	104	304
		Rural	19,275	125	60	185	249	125	374	125	63	188	685	344	1,029
		Total	20,611	132	62	194	326	165	491	164	83	247	885	448	1,333
045226	Santa Maria	Urban	3,629	16	14	30	115	99	214	58	50	108	288	248	536
		Rural	21,025	88	69	157	738	652	1,390	369	326	695	1,919	1,695	3,614
		Total	24,654	104	83	187	853	751	1,604	427	376	803	2,207	1,943	4,150
045227	Santiago	Urban	1,916	2	0	2	38	17	55	19	9	28	103	46	149
		Rural	13,439	67	12	79	605	272	877	303	136	439	1,634	734	2,368
		Total	15,355	69	12	81	643	289	932	322	145	467	1,737	780	2,517
045228	Santo Domingo	Urban	2,926	14	3	17	214	54	268	107	27	134	546	138	684
		Rural	18,965	117	29	146	905	226	1,131	453	113	566	2,353	588	2,941
		Total	21,891	131	32	163	1,119	280	1,399	560	140	700	2,899	726	3,625
045229	Sigay	Urban	0	0	0	0	0	0	0	0	0	0	0	0	0
		Rural	455	0	0	0	4	0	4	2	0	2	12	0	12
		Total	455	0	0	0	4	0	4	2	0	2	12	0	12
045230	Sinait	Urban	1,870	10	4	14	92	49	141	46	25	71	239	127	366
		Rural	20,060	90	45	135	1,044	520	1,564	522	260	782	2,506	1,248	3,754
		Total	21,930	100	49	149	1,136	569	1,705	568	285	853	2,745	1,375	4,120
045231	Sugpon	Urban	690	3	0	3	0	0	0	0	0	0	0	0	0
		Rural	0	0	6	6	12	7	19	6	4	10	0	0	0
		Total	690	3	6	9	12	7	19	6	4	10	0	0	0
045232	Suyo	Urban	359	0	0	0	0	0	0	0	0	0	0	0	0
		Rural	368	35	9	44	72	18	90	36	9	45	191	48	239
		Total	727	35	9	44	72	18	90	36	9	45	191	48	239
045233	Tagudin	Urban	2,133	9	2	11	158	44	202	79	22	101	435	121	556
		Rural	23,867	152	39	191	722	206	928	361	103	464	2,022	577	2,599
		Total	26,000	161	41	202	880	250	1,130	440	125	565	2,457	698	3,155
045234	Vigan (Capital)	Urban	41,312	233	117	350	493	248	741	247	124	371	1,306	657	1,963
		Rural	0	0	0	0	0	0	0	0	0	0	0	0	0
		Total	41,312	233	117	350	493	248	741	247	124	371	1,306	657	1,963
Provincial Total		Urban	117,648	575	271	846	3,224	1,515	4,739	1,617	763	2,380	8,269	3,891	12,160
		Rural	393,000	2,161	876	3,037	13,438	7,176	20,614	6,725	3,595	10,320	35,141	18,635	53,776
		Total	510,648	2,736	1,147	3,883	16,662	8,691	25,353	8,342	4,358	12,700	43,410	22,526	65,936

Table 4.1.6 Estimation of Population Covered by Safe and Unsafe Source by Municipality

Sheet 2

NEDA Geo-graphic Code	Municipality	Type	Pop. Covered by Level I Facilities	Coverage of Shared Use							Level I Coverage (1) + (2)					
				(2) Population Covered by Public and Private			Number of Households			No. of HHs per Shared Facility	Safe		Unsafe		Total	
				Safe	Unsafe	Total	Safe	Unsafe	Total		Pop.	%	Pop.	%	Pop.	%
045201	Ahlem	Urban	1,267	905	362	1,267	171	68	239	34	905	64	362	26	1,267	90
		Rural	2,206	1,750	445	2,195	313	79	392	11	1,758	41	448	10	2,206	51
		Total	3,473	2,655	807	3,462	484	147	631	14	2,663	47	810	14	3,473	61
045202	Banayoyo	Urban	818	460	88	548	92	18	110	2	685	84	133	16	818	100
		Rural	5,510	3,380	640	4,020	604	114	718	2	4,629	84	881	16	5,510	100
		Total	6,328	3,840	728	4,568	696	132	828	2	5,314	84	1,014	16	6,328	100
045203	Bantay	Urban	8,943	5,337	2,668	8,005	1,026	513	1,539	7	5,945	59	2,998	30	8,943	89
		Rural	14,190	8,034	4,185	12,219	1,488	775	2,263	4	9,311	52	4,879	27	14,190	79
		Total	23,133	13,371	6,853	20,224	2,514	1,288	3,802	5	15,256	54	7,877	28	23,133	82
045204	Burgos	Urban	1,484	828	539	1,367	162	106	268	8	899	60	585	39	1,484	99
		Rural	7,640	3,640	2,170	5,810	700	417	1,117	3	4,763	54	2,877	33	7,640	87
		Total	9,124	4,468	2,709	7,177	862	523	1,385	3	5,662	55	3,462	34	9,124	89
045205	Cabugao	Urban	6,857	4,168	2,596	6,764	834	519	1,353	27	4,236	54	2,621	33	6,857	87
		Rural	19,657	14,520	4,920	19,440	2,740	928	3,668	15	14,679	66	4,978	23	19,657	89
		Total	26,514	18,688	7,516	26,204	3,574	1,447	5,021	17	18,915	63	7,599	25	26,514	88
045206	Candon	Urban	7,213	4,258	2,481	6,739	819	477	1,296	8	4,560	63	2,653	37	7,213	100
		Rural	39,224	21,729	12,595	34,324	4,024	2,332	6,356	5	24,796	62	14,428	36	39,224	98
		Total	46,437	25,987	15,076	41,063	4,843	2,809	7,652	6	29,356	62	17,081	36	46,437	98
045207	Caoayan	Urban	6,157	3,221	2,613	5,834	644	523	1,167	9	3,379	50	2,778	41	6,157	91
		Rural	8,000	3,379	3,063	6,442	663	601	1,264	3	4,167	43	3,833	40	8,000	82
		Total	14,157	6,600	5,676	12,276	1,307	1,124	2,431	5	7,546	46	6,611	40	14,157	86
045208	Cervantes	Urban	2,482	1,857	619	2,476	326	109	435	109	1,863	71	619	24	2,482	95
		Rural	9,910	9,004	844	9,848	1,667	156	1,823	35	9,063	78	847	7	9,910	85
		Total	12,392	10,861	1,463	12,324	1,993	265	2,258	40	10,926	77	1,466	10	12,392	87
045209	Galimuyod	Urban	430	343	47	390	65	9	74	6	375	87	55	13	430	100
		Rural	8,298	6,601	1,176	7,777	1,222	218	1,440	8	7,036	85	1,262	15	8,298	100
		Total	8,728	6,944	1,223	8,167	1,287	227	1,514	8	7,411	85	1,317	15	8,728	100
045210	G. del Pilar	Urban	7	0	7	7	0	1	1	0	0	0	7	1	7	1
		Rural	1,642	1,407	235	1,642	256	43	299	21	1,407	47	235	8	1,642	55
		Total	1,649	1,407	242	1,649	256	44	300	21	1,407	39	242	7	1,649	46
045211	Lidlidda	Urban	1,227	1,083	98	1,181	212	19	231	19	1,129	91	98	8	1,227	98
		Rural	2,454	2,343	0	2,343	442	0	442	11	2,454	90	0	0	2,454	90
		Total	3,681	3,426	98	3,524	654	19	673	13	3,583	90	98	2	3,681	92
045212	Magsingal	Urban	5,278	3,220	1,115	4,335	657	228	885	4	3,908	74	1,370	26	5,278	100
		Rural	18,723	11,814	4,286	16,100	2,229	809	3,038	5	13,719	73	5,004	27	18,723	100
		Total	24,001	15,034	5,401	20,435	2,886	1,037	3,923	4	17,627	73	6,374	27	24,001	100

Table 4.1.6 Estimation of Population Covered by Safe and Unsafe Source by Municipality (Cont'd.)

Sheet 2

NEDA Geo-graphic Code	Municipality	Type	Pop. Covered by Level I Facilities	Coverage of Shared Use						No. of HHs per Shared Facility	Level I Coverage (1) + (2)					
				(2) Population Covered by Public and Private			Number of Households				Safe		Unsafe		Total	
				Safe	Unsafe	Total	Safe	Unsafe	Total		Pop.	%	Pop.	%	Pop.	%
045213	Nagbukel	Urban	727	362	187	549	71	37	108	3	469	64	258	35	727	99
		Rural	3,047	1,381	832	2,213	266	160	426	2	1,880	58	1,167	36	3,047	95
		Total	3,774	1,743	1,019	2,762	337	197	534	2	2,349	59	1,425	36	3,774	96
045214	Narvacan	Urban	1,854	458	359	817	88	69	157	1	1,040	37	814	29	1,854	66
		Rural	33,173	12,224	9,882	22,106	2,397	1,938	4,335	2	18,344	53	14,829	43	33,173	95
		Total	35,027	12,682	10,241	22,923	2,485	2,007	4,492	2	19,384	52	15,643	42	35,027	93
045215	Quirino	Urban	325	0	325	325	0	64	64	64	0	0	325	24	325	24
		Rural	3,238	0	3,238	3,238	0	611	611	56	0	0	3,238	54	3,238	54
		Total	3,563	0	3,563	3,563	0	675	675	56	0	0	3,563	48	3,563	48
045216	Salcedo	Urban	1,344	975	288	1,263	199	59	258	7	1,036	77	308	23	1,344	100
		Rural	8,604	6,471	1,891	8,362	1,269	371	1,640	16	6,644	77	1,960	23	8,604	99
		Total	9,948	7,446	2,179	9,625	1,468	430	1,898	14	7,680	77	2,268	23	9,948	99
045217	San Emilio	Urban	2,286	2,133	142	2,275	388	26	414	52	2,141	93	145	6	2,286	99
		Rural	3,890	3,541	322	3,863	656	60	716	60	3,563	87	327	8	3,890	95
		Total	6,176	5,674	464	6,138	1,044	86	1,130	57	5,704	89	472	7	6,176	96
045218	San Esteban	Urban	497	162	90	252	32	18	50	1	318	42	179	24	497	66
		Rural	5,884	2,775	1,553	4,328	566	317	883	2	3,770	62	2,114	35	5,884	98
		Total	6,381	2,937	1,643	4,580	598	335	933	2	4,088	60	2,293	34	6,381	94
045219	San Ildefonso	Urban	1,024	547	165	712	105	32	137	2	802	78	222	22	1,024	100
		Rural	4,019	2,694	817	3,511	499	151	650	5	3,110	77	909	22	4,019	99
		Total	5,043	3,241	982	4,223	604	183	787	4	3,912	77	1,131	22	5,043	99
045220	San Juan	Urban	3,400	1,766	554	2,320	368	115	483	2	2,582	76	818	24	3,400	100
		Rural	18,240	12,562	4,153	16,715	2,463	814	3,277	7	13,712	74	4,528	24	18,240	98
		Total	21,640	14,328	4,707	19,035	2,831	929	3,760	5	16,294	74	5,346	24	21,640	99
045221	San Vicente	Urban	1,193	550	317	867	102	59	161	2	763	64	430	36	1,193	100
		Rural	9,643	5,782	2,883	8,665	1,156	577	1,733	6	6,440	67	3,203	33	9,643	100
		Total	10,836	6,332	3,200	9,532	1,258	636	1,894	5	7,203	66	3,633	34	10,836	100
045222	Santa	Urban	976	520	315	835	108	66	174	6	606	35	370	21	976	56
		Rural	10,908	6,306	3,807	10,113	1,213	732	1,945	8	6,792	59	4,116	36	10,908	95
		Total	11,884	6,826	4,122	10,948	1,321	798	2,119	7	7,398	56	4,486	34	11,884	90
045223	Santa Catalina	Urban	1,242	782	251	1,033	148	47	195	4	941	76	301	24	1,242	100
		Rural	11,068	6,867	2,516	9,383	1,272	466	1,738	5	8,101	73	2,967	27	11,068	100
		Total	12,310	7,649	2,767	10,416	1,420	513	1,933	5	9,042	73	3,268	27	12,310	100
045224	Santa Cruz	Urban	4,446	2,570	1,144	3,714	504	224	728	4	3,075	69	1,371	31	4,446	100
		Rural	26,378	16,563	7,106	23,669	3,067	1,316	4,383	6	18,448	67	7,930	29	26,378	95
		Total	30,824	19,133	8,250	27,383	3,571	1,540	5,111	6	21,523	67	9,301	29	30,824	96

Table 4.1.6 Estimation of Population Covered by Safe and Unsafe Source by Municipality (Cont'd.)

Sheet 2

NEDA Geo-graphic Code	Municipality	Type	Pop. Covered by Level I Facilities	Coverage of Shared Use							Level I Coverage (1) + (2)					
				(2) Population Covered by Public and Private			Number of Households			No. of HHs per Shared Facility	Safe		Unsafe		Total	
				Safe	Unsafe	Total	Safe	Unsafe	Total		Pop.	%	Pop.	%	Pop.	%
045225	Santa Lucia	Urban	1,336	696	336	1,032	134	65	199	3	896	40	440	20	1,336	59
		Rural	19,275	12,238	6,008	18,246	2,225	1,092	3,317	9	12,923	64	6,352	32	19,275	96
		Total	20,611	12,934	6,344	19,278	2,359	1,157	3,516	8	13,819	62	6,792	30	20,611	92
045226	Santa Maria	Urban	3,629	1,659	1,434	3,093	332	287	619	5	1,947	53	1,682	46	3,629	100
		Rural	21,025	9,339	8,072	17,411	1,796	1,552	3,348	4	11,258	52	9,767	45	21,025	98
		Total	24,654	10,998	9,506	20,504	2,128	1,839	3,967	4	13,205	52	11,449	45	24,654	98
045227	Santiago	Urban	1,916	1,258	509	1,767	233	94	327	11	1,361	57	555	23	1,916	80
		Rural	13,439	7,905	3,166	11,071	1,464	586	2,050	4	9,539	70	3,900	29	13,439	99
		Total	15,355	9,163	3,675	12,838	1,697	680	2,377	4	10,900	68	4,455	28	15,355	96
045228	Santo Domingo	Urban	2,926	1,797	445	2,242	352	87	439	3	2,343	79	583	20	2,926	99
		Rural	18,965	12,826	3,198	16,024	2,467	615	3,082	4	15,179	78	3,786	19	18,965	98
		Total	21,891	14,623	3,643	18,266	2,819	702	3,521	4	17,522	78	4,369	20	21,891	98
045229	Sigay	Urban	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Rural	455	443	0	443	76	0	76	38	455	22	0	0	455	22
		Total	455	443	0	443	76	0	76	38	455	22	0	0	455	22
045230	Sinait	Urban	1,870	997	507	1,504	192	98	290	3	1,236	43	634	22	1,870	65
		Rural	20,060	10,883	5,423	16,306	2,267	1,130	3,397	4	13,389	66	6,671	33	20,060	98
		Total	21,930	11,880	5,930	17,810	2,459	1,228	3,687	4	14,625	63	7,305	31	21,930	94
045231	Sugpon	Urban	690	690	0	690	135	0	135	45	690	71	0	0	690	71
		Rural	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Total	690	690	0	690	135	0	135	7	690	25	0	0	690	25
045232	Suyo	Urban	359	0	359	359	0	62	62	0	0	0	359	20	359	20
		Rural	368	103	26	129	19	5	24	0	294	4	74	1	368	5
		Total	727	103	385	488	19	67	86	1	294	3	433	5	727	8
045233	Tagudin	Urban	2,133	1,239	338	1,577	225	61	286	3	1,674	34	459	9	2,133	44
		Rural	23,867	16,657	4,611	21,268	2,974	823	3,797	6	18,679	67	5,188	19	23,867	85
		Total	26,000	17,896	4,949	22,845	3,199	884	4,083	5	20,353	62	5,647	17	26,000	79
045234	Vigan (Capital)	Urban	41,312	26,187	13,162	39,349	4,941	2,483	7,424	10	27,493	66	13,819	33	41,312	100
		Rural	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Total	41,312	26,187	13,162	39,349	4,941	2,483	7,424	10	27,493	66	13,819	33	41,312	100
Provincial Total		Urban	117,648	71,028	34,460	105,488	13,665	6,643	20,308	6	79,297	60	38,351	29	117,648	90
		Rural	393,000	235,161	104,063	339,224	44,460	19,788	64,248	5	270,302	63	122,698	28	393,000	91
		Total	510,648	306,189	138,523	444,712	58,125	26,431	84,556	5	349,599	62	161,049	29	510,648	91

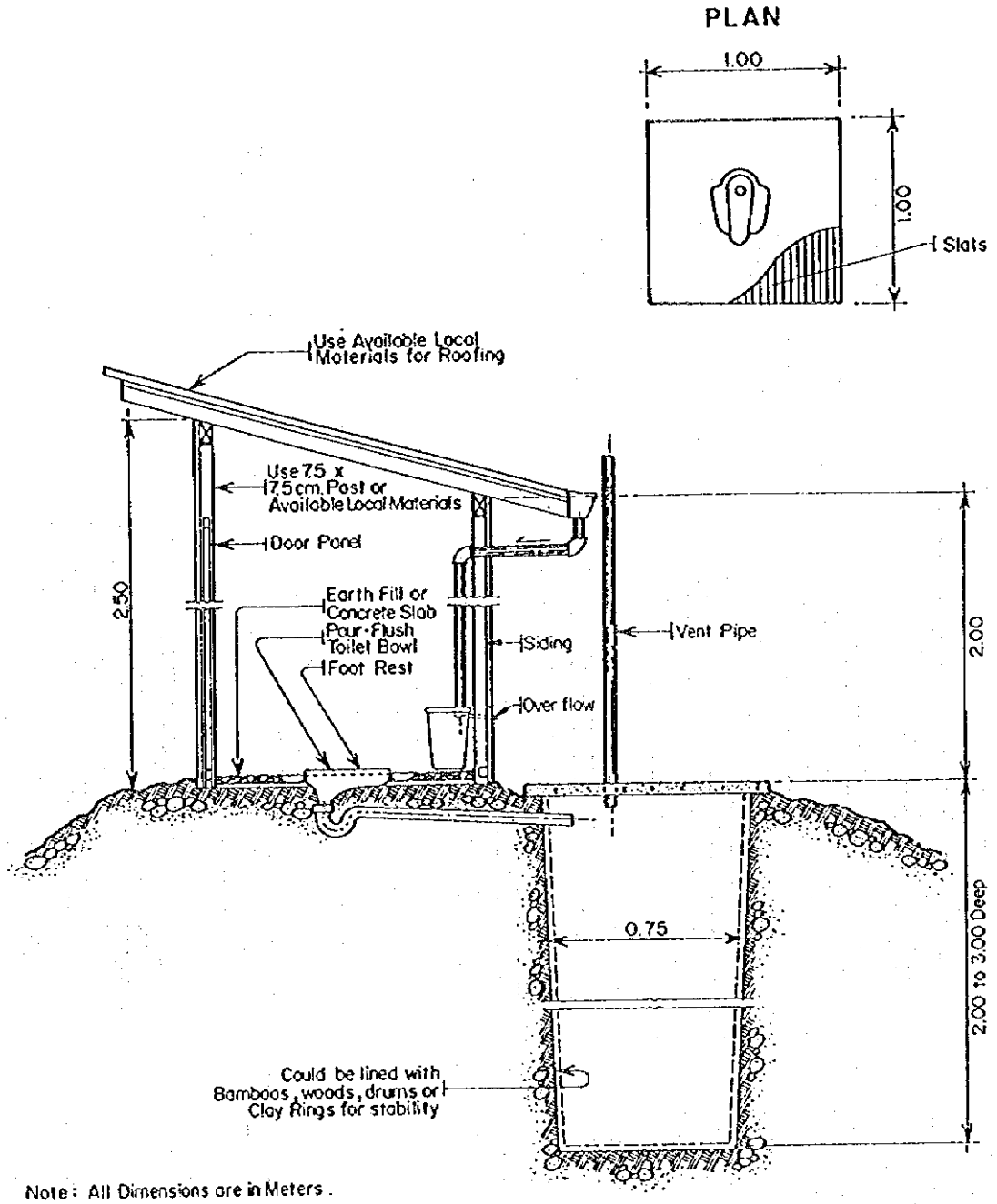
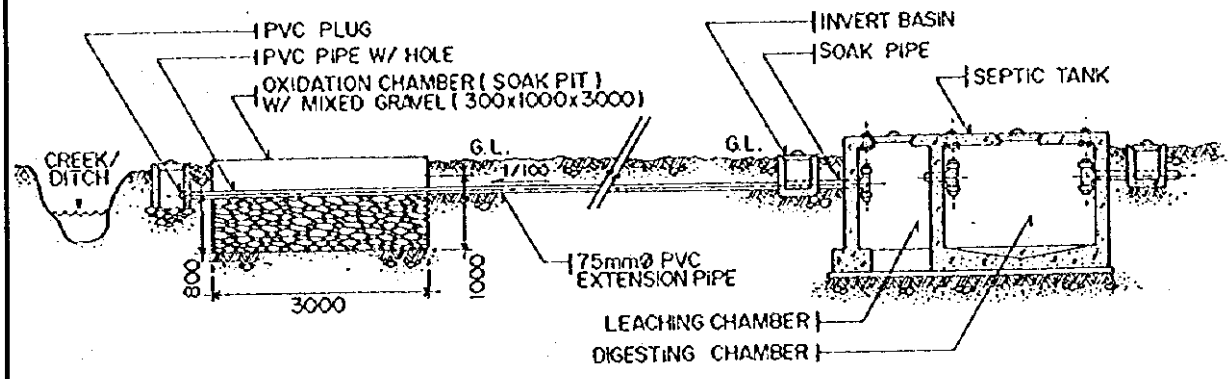
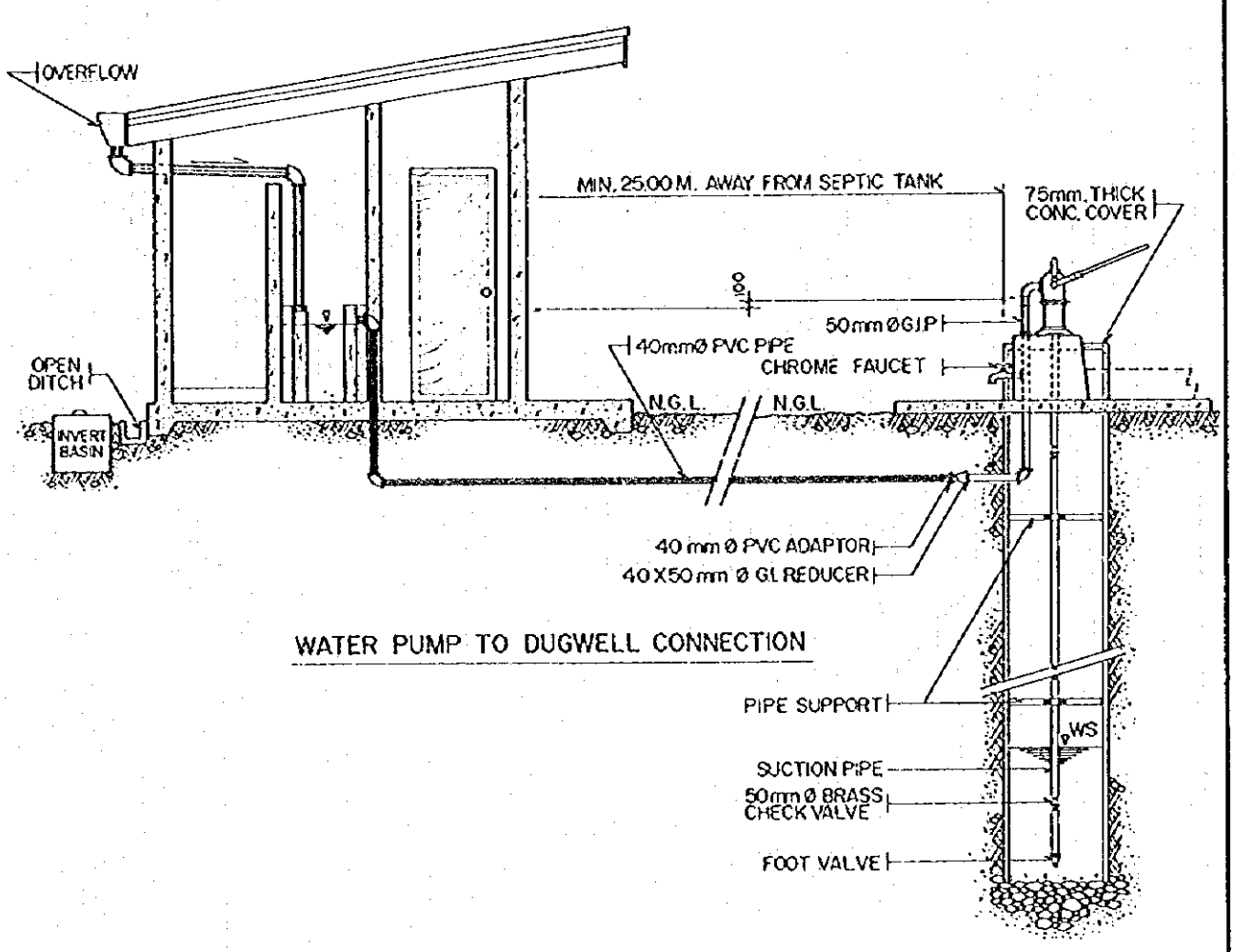


FIGURE 4.2.1
STANDARD STRUCTURE OF PRIVATE TOILET FACILITY

SOURCE : DEPARTMENT OF HEALTH



LAYOUT PLAN OF HIGH GROUND WATER SITE



WATER PUMP TO DUGWELL CONNECTION

FIGURE 4.2.2

STANDARD STRUCTURE OF SCHOOL TOILET FACILITY

SOURCE : JICA - DPWH RURAL ENVIRONMENTAL SANITATION PROJECT .

4.2.3 Sanitation Facilities and Service Coverage

Table 4.2.1 Sanitation Facilities and Service Coverage of Household Toilets by Type, by Municipality, Urban and Rural, 1995

Municipality	Type	HHs No. 1995	Households Served by Sanitary Toilets								Underserved/Unserved HHs			
			Flush		Poor Flush		VIP		Total		Unsanitary		No Facility	
			Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Ablem	Urban	265	7	3	145	55	59	22	211	80	0	0	54	20
	Rural	773	0	0	411	53	199	26	610	79	0	0	163	21
	Total	1,038	7	1	556	54	258	25	821	79	0	0	217	21
Banayoyo	Urban	163	0	0	163	100	0	0	163	100	0	0	0	0
	Rural	991	0	0	916	92	28	3	944	95	0	0	47	5
	Total	1,154	0	0	1,079	94	28	2	1,107	96	0	0	47	4
Bantay	Urban	1,927	562	29	1,064	55	276	14	1,902	99	0	0	25	1
	Rural	3,340	170	5	2,468	74	137	4	2,775	83	0	0	565	17
	Total	5,267	732	14	3,532	67	413	8	4,677	89	0	0	590	11
Burgos	Urban	295	4	1	136	46	146	49	286	97	0	0	9	3
	Rural	1,678	49	3	1,358	81	73	4	1,480	88	0	0	198	12
	Total	1,973	53	3	1,494	76	219	11	1,766	90	0	0	207	10
Cabugao	Urban	1,568	205	13	1,299	83	39	2	1,543	98	0	0	25	2
	Rural	4,152	11	0	3,815	92	244	6	4,070	98	0	0	82	2
	Total	5,720	216	4	5,114	89	283	5	5,613	98	0	0	107	2
Candon	Urban	1,398	74	5	1,272	91	31	2	1,377	98	0	0	21	2
	Rural	7,484	147	2	6,983	93	250	3	7,380	99	0	0	101	1
	Total	8,882	221	2	8,255	93	281	3	8,757	99	0	0	125	1
Caoayan	Urban	1,344	172	13	883	66	189	14	1,244	93	12	1	88	7
	Rural	1,895	101	5	1,048	55	0	0	1,149	61	92	5	654	35
	Total	3,239	273	8	1,931	60	189	6	2,393	74	104	3	742	23
Cervantes	Urban	454	180	40	205	45	66	15	451	99	0	0	3	1
	Rural	2,145	404	19	741	35	773	36	1,918	89	14	1	213	10
	Total	2,599	584	22	946	36	839	32	2,369	91	14	1	216	8
Galimuyod	Urban	81	0	0	65	80	16	20	81	100	0	0	0	0
	Rural	1,528	4	0	1,499	98	23	2	1,526	100	0	0	2	0
	Total	1,609	4	0	1,564	97	39	2	1,607	100	0	0	2	0
G. del Pilar	Urban	119	30	25	76	64	13	11	119	100	0	0	0	0
	Rural	541	2	0	390	72	95	18	487	90	0	0	54	10
	Total	660	32	5	466	71	108	16	606	92	0	0	54	8
Lidlidda	Urban	245	0	0	224	91	11	4	235	96	0	0	10	4
	Rural	519	0	0	482	93	20	4	502	97	0	0	17	3
	Total	764	0	0	706	92	31	4	737	96	0	0	27	4
Magsingal	Urban	1,082	100	9	893	83	89	8	1,082	100	0	0	0	0
	Rural	3,539	110	3	2,680	76	746	21	3,536	100	0	0	3	0
	Total	4,621	210	5	3,573	77	835	18	4,618	100	0	0	3	0
Nagbukel	Urban	143	4	3	131	92	0	0	135	94	0	0	8	6
	Rural	624	0	0	327	52	23	4	350	56	23	4	251	40
	Total	767	4	1	458	60	23	3	485	63	23	3	259	34
Narvacan	Urban	542	90	17	440	81	0	0	530	98	0	0	12	2
	Rural	6,801	360	5	5,524	81	0	0	5,884	87	0	0	917	13
	Total	7,343	450	6	5,964	81	0	0	6,414	87	0	0	929	13
Quirino	Urban	269	1	0	225	84	40	15	266	99	0	0	3	1
	Rural	1,132	0	0	640	57	414	37	1,054	93	0	0	78	7
	Total	1,401	1	0	865	62	454	32	1,320	94	0	0	81	6
Salcedo	Urban	273	5	2	261	96	7	3	273	100	0	0	0	0
	Rural	1,707	19	1	1,584	93	104	6	1,707	100	0	0	0	0
	Total	1,980	24	1	1,845	93	111	6	1,980	100	0	0	0	0
San Emilio	Urban	416	0	0	296	71	29	7	325	78	82	20	9	2
	Rural	766	0	0	307	40	0	0	307	40	416	54	43	6
	Total	1,182	0	0	603	51	29	2	632	53	498	42	52	4
San Esteban	Urban	148	10	7	128	86	0	0	138	93	0	0	10	7
	Rural	1,221	24	2	983	81	0	0	1,007	82	0	0	214	18
	Total	1,369	34	2	1,111	81	0	0	1,145	84	0	0	224	16

Table 4.2.1 Sanitation Facilities and Service Coverage of Household Toilets by Type, by Municipality, Urban and Rural, 1995 (Cont'd.)

Municipality	Type	HHs No. 1995	Households Served by Sanitary Toilets								Underserved/Unserved HHs			
			Flush		Pour Flush		VIP		Total		Unsanitary		No Facility	
			Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
San Ildefonso	Urban	198	24	12	151	76	0	0	175	88	0	0	23	12
	Rural	753	17	2	680	90	0	0	697	93	0	0	56	7
	Total	951	41	4	831	87	0	0	872	92	0	0	79	8
San Juan	Urban	707	25	4	616	87	53	7	694	98	0	0	13	2
	Rural	3,612	174	5	2,711	75	0	0	2,885	80	30	1	697	19
	Total	4,319	199	5	3,327	77	53	1	3,579	83	30	1	710	16
San Vicente	Urban	219	21	10	188	86	10	5	219	100	0	0	0	0
	Rural	1,913	80	4	1,200	63	144	8	1,424	74	0	0	489	26
	Total	2,132	101	5	1,388	65	154	7	1,643	77	0	0	489	23
Santa	Urban	363	28	8	279	77	48	13	355	98	0	0	8	2
	Rural	2,194	5	0	1,948	89	0	0	1,953	89	0	0	241	11
	Total	2,557	33	1	2,227	87	48	2	2,308	90	0	0	249	10
Santa Catalina	Urban	233	20	9	204	88	0	0	224	96	0	0	9	4
	Rural	2,031	124	6	1,797	88	7	0	1,928	95	0	0	103	5
	Total	2,264	144	6	2,001	88	7	0	2,152	95	0	0	112	5
Santa Cruz	Urban	868	11	1	724	83	77	9	812	94	0	0	56	6
	Rural	5,101	43	1	4,420	87	322	6	4,785	94	0	0	316	6
	Total	5,969	54	1	5,144	86	399	7	5,597	94	0	0	372	6
Santa Lucia	Urban	431	40	9	252	58	24	6	316	73	0	0	115	27
	Rural	3,651	47	1	2,732	75	497	14	3,276	90	0	0	375	10
	Total	4,082	87	2	2,984	73	521	13	3,592	88	0	0	490	12
Santa Maria	Urban	732	36	5	653	89	25	3	714	98	0	0	18	2
	Rural	4,175	32	1	3,782	91	53	1	3,867	93	0	0	308	7
	Total	4,907	68	1	4,435	90	78	2	4,581	93	0	0	326	7
Santiago	Urban	442	5	1	419	95	12	3	436	99	0	0	6	1
	Rural	2,485	593	24	1,322	53	227	9	2,142	86	0	0	343	14
	Total	2,927	598	20	1,741	59	239	8	2,578	88	0	0	349	12
Santo Domingo	Urban	577	14	2	550	95	0	0	564	98	0	0	13	2
	Rural	3,705	58	2	3,291	89	0	0	3,349	90	0	0	356	10
	Total	4,282	72	2	3,841	90	0	0	3,913	91	0	0	369	9
Sigay	Urban	0	0	0	0	0	0	0	0	0	0	0	0	0
	Rural	361	0	0	267	74	0	0	267	74	61	17	33	9
	Total	361	0	0	267	74	0	0	267	74	61	17	33	9
Sinait	Urban	561	35	6	519	93	7	1	561	100	0	0	0	0
	Rural	4,250	3	0	3,266	77	423	10	3,692	87	0	0	558	13
	Total	4,811	38	1	3,785	79	430	9	4,253	88	0	0	558	12
Sugpon	Urban	192	0	0	83	43	87	45	170	89	0	0	22	11
	Rural	323	0	0	118	37	162	50	280	87	0	0	43	13
	Total	515	0	0	201	39	249	48	450	87	0	0	65	13
Suyo	Urban	309	5	2	198	64	106	34	309	100	0	0	0	0
	Rural	1,335	11	1	697	52	303	23	1,011	76	0	0	324	24
	Total	1,644	16	1	895	54	409	25	1,320	80	0	0	324	20
Tagudin	Urban	889	146	16	583	66	66	7	795	89	0	0	94	11
	Rural	5,009	195	4	3,814	76	418	8	4,427	88	0	0	582	12
	Total	5,898	341	6	4,397	75	484	8	5,222	89	0	0	676	11
Vigan (Capital)	Urban	7,768	1,005	13	5,618	72	448	6	7,071	91	0	0	697	9
	Rural	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	7,768	1,005	13	5,618	72	448	6	7,071	91	0	0	697	9
Provincial Total	Urban	25,221	2,859	11	18,943	75	1,974	8	23,776	94	94	0	1,351	6
	Rural	81,734	2,783	3	64,201	79	5,685	7	72,669	89	636	1	8,429	10
	Total	106,955	5,642	5	83,143	78	7,659	7	96,445	90	730	1	9,780	9

5. EXISTING SECTOR ARRANGEMENTS AND INSTITUTIONAL CAPACITY

5.5 Sector Agencies at the Local Level

FIGURE 5.5.1
ORGANIZATIONAL CHART
PROVINCIAL PLANNING & DEVELOPMENT OFFICE
PROVINCE OF ILOCOS SUR

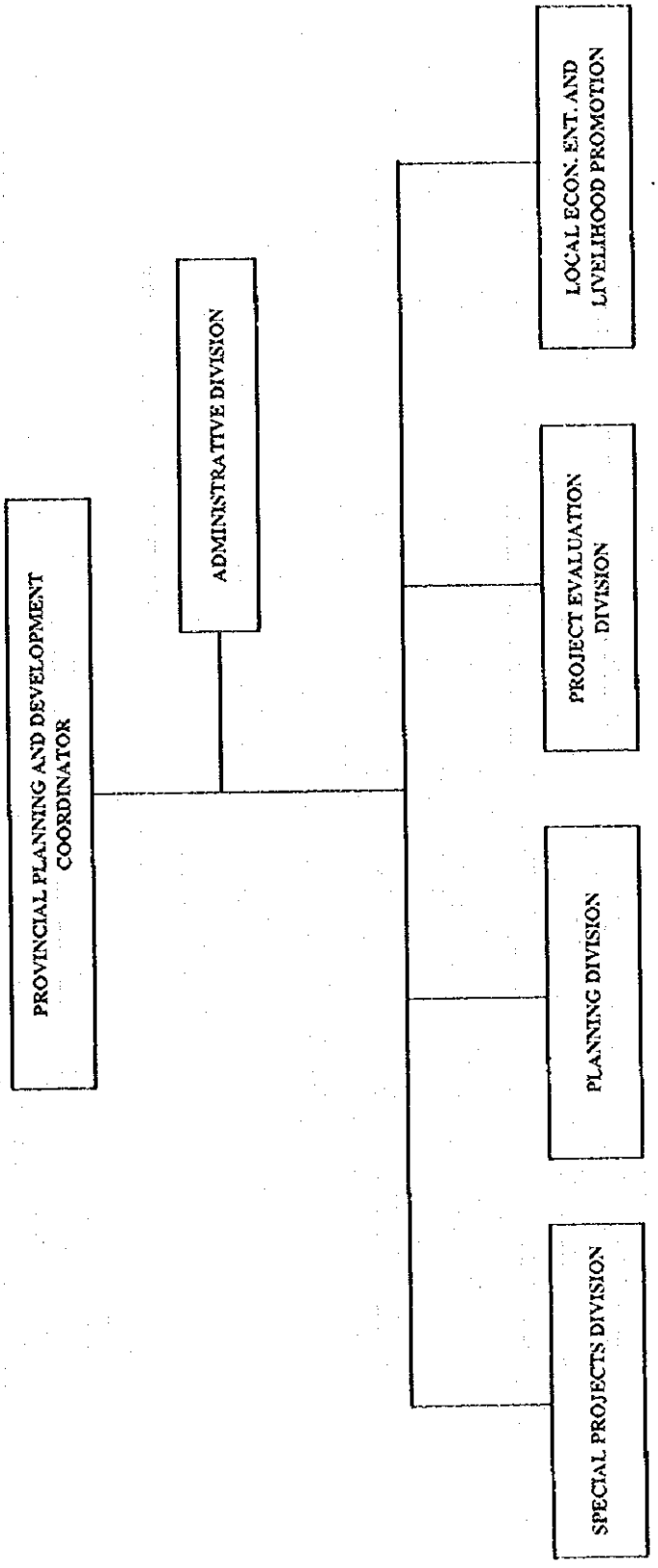


FIGURE 5.5.2
ORGANIZATIONAL CHART
PROVINCIAL ENGINEER'S OFFICE
PROVINCE OF ILOCOS SUR

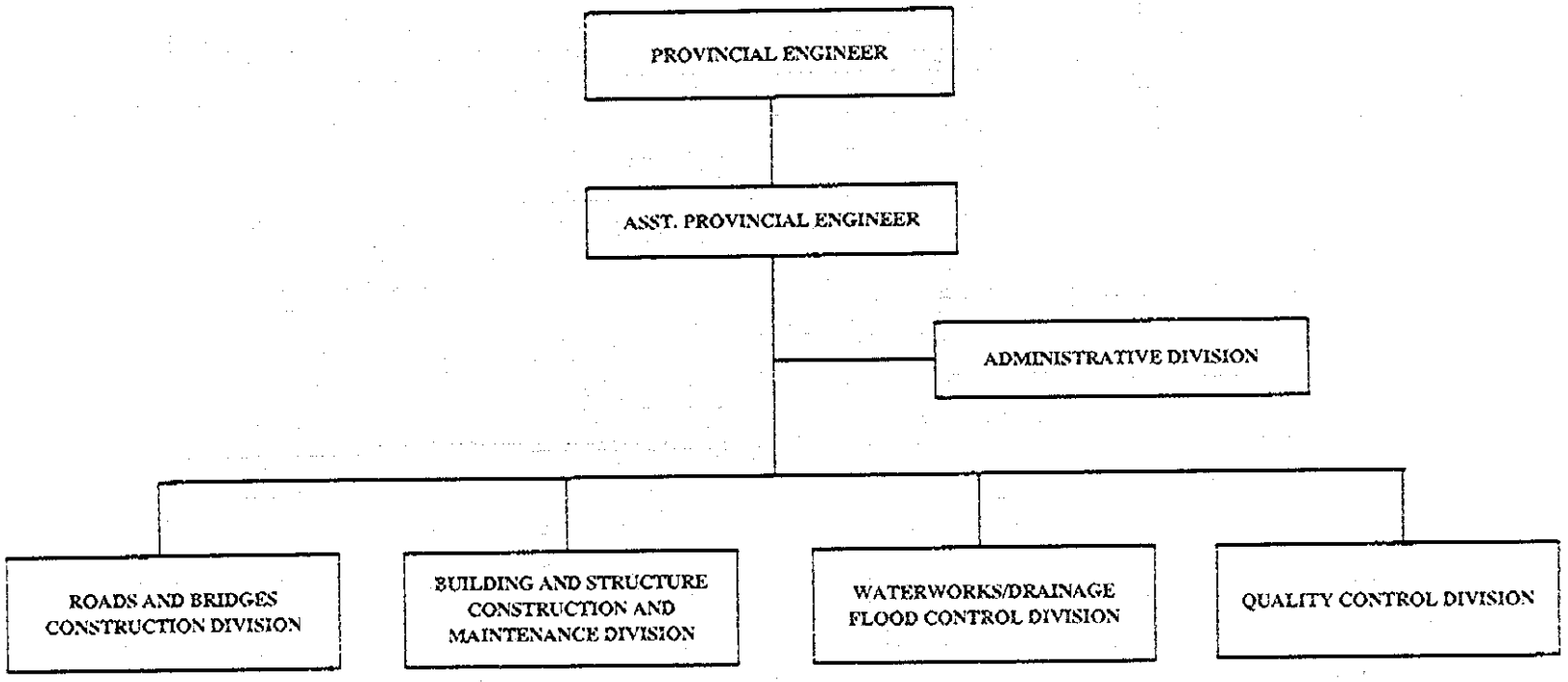
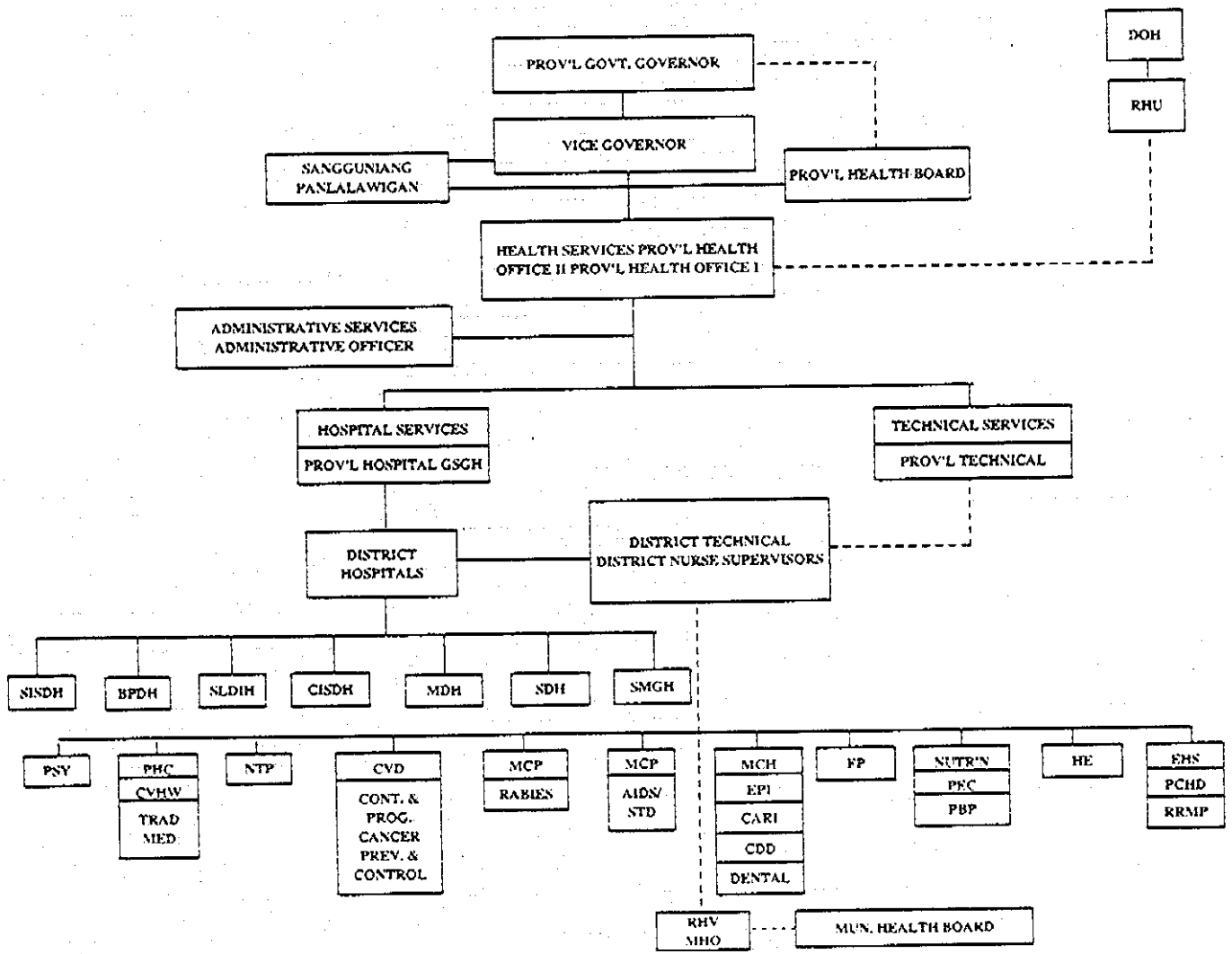


FIGURE 5.5.3
ORGANIZATIONAL CHART
PROVINCIAL HEALTH OFFICE
PROVINCE OF ILOCOS SUR



6. PAST FINANCIAL PERFORMANCE IN WATER SUPPLY AND SANITATION

6.2 Past Public Investment

Table 6.2.1 Past Internal Revenue Allotment to Municipalities in Ilocos Sur Province in 1990-94

Unit: Pesos

	1990	1991	1992	1993	1994
I. IRA to All Municipalities (National Total)	3,054,601,475	4,046,837,742	7,127,522,550	12,484,800,000	16,325,288,074
II. IRA to Municipalities					
Total	37,272,818	47,477,437	100,713,042	165,355,793	220,258,946
1. Alilem	783,647	1,017,910	2,658,407	4,443,161	5,698,615
2. Banayoyo	552,540	706,506	2,425,706	3,136,131	4,280,145
3. Bantay	1,618,108	2,043,679	3,662,291	6,276,629	8,459,935
4. Burgos	767,172	967,692	2,285,244	3,769,955	5,036,455
5. Cabugao	1,711,161	2,126,682	3,705,463	6,359,547	8,529,532
6. Candon	2,430,959	3,082,585	4,925,405	8,564,606	11,282,205
7. Caoayan	1,041,290	1,275,711	2,625,124	4,358,380	5,944,314
8. Cervantes	1,258,970	1,681,869	3,607,664	6,202,819	7,949,820
9. Galimuyod	645,768	837,396	2,595,577	3,443,385	4,678,651
10. G. del Pilar	586,385	757,430	2,666,621	3,621,096	4,738,991
11. Lidlidda	412,612	552,158	1,765,206	2,812,018	3,714,171
12. Magsingal	1,455,225	1,837,360	3,452,455	5,877,906	7,900,951
13. Nagbukel	477,901	597,293	1,821,621	2,907,489	4,011,330
14. Narvacan	2,140,806	2,661,481	4,430,886	7,712,436	10,116,605
15. Quirino	983,422	1,314,656	3,228,874	5,540,167	6,983,259
16. Salcedo	748,581	926,715	2,166,803	3,512,668	4,828,873
17. San Emilio	732,658	978,356	2,524,617	4,228,866	5,519,073
18. San Esteban	557,671	708,269	1,954,009	3,110,701	4,258,387
19. San Ildefonso	440,989	582,419	1,773,989	2,806,750	3,909,193
20. San Juan	1,292,947	1,631,930	3,143,636	5,260,536	7,121,922
21. San Vicente	707,387	903,100	2,147,574	3,498,613	4,780,493
22. Santa	952,858	1,171,615	2,547,749	4,239,234	5,663,703
23. Santa Catalina	775,198	982,870	2,227,514	3,664,138	5,027,481
24. Santa Cruz	1,709,037	2,260,837	3,990,850	6,911,197	9,001,757
25. Santa Lucia	1,276,546	1,627,755	3,115,700	5,256,000	7,107,735
26. Santa Maria	1,503,242	1,839,971	3,362,694	5,693,617	7,727,957
27. Santiago	1,024,359	1,334,884	2,831,888	4,735,019	6,285,385
28. Santo Domingo	1,319,582	1,669,708	3,181,797	5,374,747	7,324,430
29. Sigay	537,155	703,058	2,635,798	3,545,586	4,502,868
30. Sinait	1,445,334	1,804,094	3,395,199	5,766,046	7,775,710
31. Suggon	760,430	959,747	2,611,240	4,413,214	5,540,765
32. Suyo	844,859	1,107,031	3,128,362	4,433,061	5,781,883
33. Tagudin	1,639,125	2,169,373	3,784,369	6,503,022	8,618,830
34. Vigan	2,138,888	2,655,306	4,321,710	7,377,059	10,157,518
III. Shares (%) in national total					
Total	1.220	1.173	1.413	1.324	1.349
1. Alilem	0.026	0.025	0.037	0.036	0.035
2. Banayoyo	0.018	0.017	0.034	0.025	0.026
3. Bantay	0.053	0.051	0.051	0.050	0.052
4. Burgos	0.025	0.024	0.032	0.030	0.031
5. Cabugao	0.056	0.052	0.052	0.051	0.052
6. Candon	0.080	0.076	0.069	0.069	0.069
7. Caoayan	0.034	0.032	0.037	0.035	0.036
8. Cervantes	0.041	0.042	0.051	0.050	0.049
9. Galimuyod	0.021	0.021	0.036	0.028	0.029
10. G. del Pilar	0.019	0.019	0.037	0.029	0.029
11. Lidlidda	0.014	0.014	0.025	0.023	0.023
12. Magsingal	0.048	0.045	0.048	0.047	0.048
13. Nagbukel	0.016	0.015	0.026	0.023	0.025
14. Narvacan	0.070	0.066	0.062	0.062	0.062
15. Quirino	0.032	0.032	0.045	0.044	0.043
16. Salcedo	0.025	0.023	0.030	0.028	0.030
17. San Emilio	0.024	0.024	0.035	0.034	0.034
18. San Esteban	0.018	0.018	0.027	0.025	0.026
19. San Ildefonso	0.014	0.014	0.025	0.022	0.024
20. San Juan	0.042	0.040	0.044	0.042	0.044
21. San Vicente	0.023	0.022	0.030	0.028	0.029
22. Santa	0.031	0.029	0.036	0.034	0.035
23. Santa Catalina	0.025	0.024	0.031	0.029	0.031
24. Santa Cruz	0.056	0.056	0.056	0.055	0.055
25. Santa Lucia	0.042	0.040	0.044	0.042	0.044
26. Santa Maria	0.049	0.045	0.047	0.046	0.047
27. Santiago	0.034	0.033	0.040	0.038	0.039
28. Santo Domingo	0.043	0.041	0.045	0.043	0.045
29. Sigay	0.018	0.017	0.037	0.028	0.028
30. Sinait	0.047	0.045	0.048	0.046	0.048
31. Suggon	0.025	0.024	0.037	0.035	0.034
32. Suyo	0.028	0.027	0.044	0.036	0.035
33. Tagudin	0.054	0.054	0.053	0.052	0.053
34. Vigan	0.070	0.066	0.061	0.052	0.062

Sources: (1) Department of Budget and Management and (2) Bureau of Local Government Finance (DOF)

7. WATER SOURCE DEVELOPMENT

7.3 Groundwater Sources

7.3.2 Groundwater Availability in the Province

(1) Major Information and References

The Groundwater Availability Map was prepared using the following information and references (detailed list of references is presented in Table 7.3.1, Data Report):

- Administrative and Topographical Maps of the Province published by NAMRIA with scale of 1:150,000 and 1:50,000, respectively.
- Geological Map of the Philippines published by then BMGS with a scale of 1:1,000,000.
- Water Resource Investigation conducted by NWRB, 1986.
- Well Inventory Database prepared by NWRB, LWUA, DPWH.
- Well Inventory Database in the province.

(2) Approach and Methodology

The procedure in preparing the Groundwater Availability Map is explained below with work flow depicted in Figure 7.3.1.

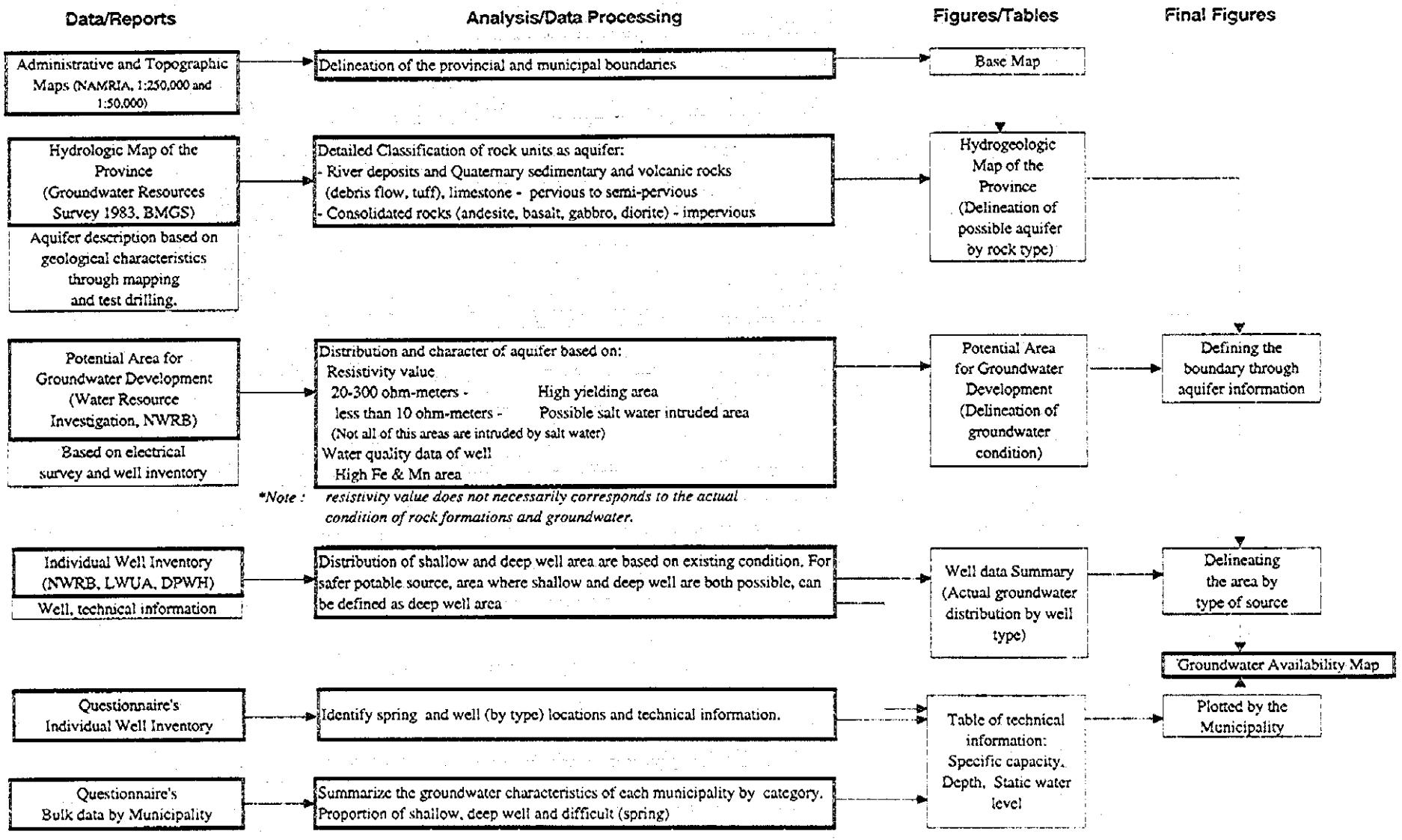
1) Prepare a base map with a scale of 1:400,000. The Administrative Map of NAMRIA (1:150,000) is used as reference map and details are verified from the Topographical Map (1:50,0000). Basic information including rivers and provincial and municipal boundaries are indicated in the prepared base map.

2) The groundwater potential areas, based on the geology of the province, are delineated on the base map. The Recent alluvial and/or beach deposits, Pliocene-Pleistocene rocks (sandstone, conglomerate and volcanic pyroclastics) and Miocene sediments are regarded as possible aquifers considering their high porosity and permeability relative to older formations.

Aside from the defined boundaries of the areas underlain by pervious or groundwater bearing formations, difficult areas for the groundwater development are also delineated as presented in Figure 7.3.2.

3) Areas with potential high yielding aquifer and/or with saline water problem, as established in the Water Resources Investigation of NWRB, is reflected in the defined groundwater potential areas.

Figure 7.3.1 WORK FLOW OF GROUNDWATER AVAILABILITY MAP



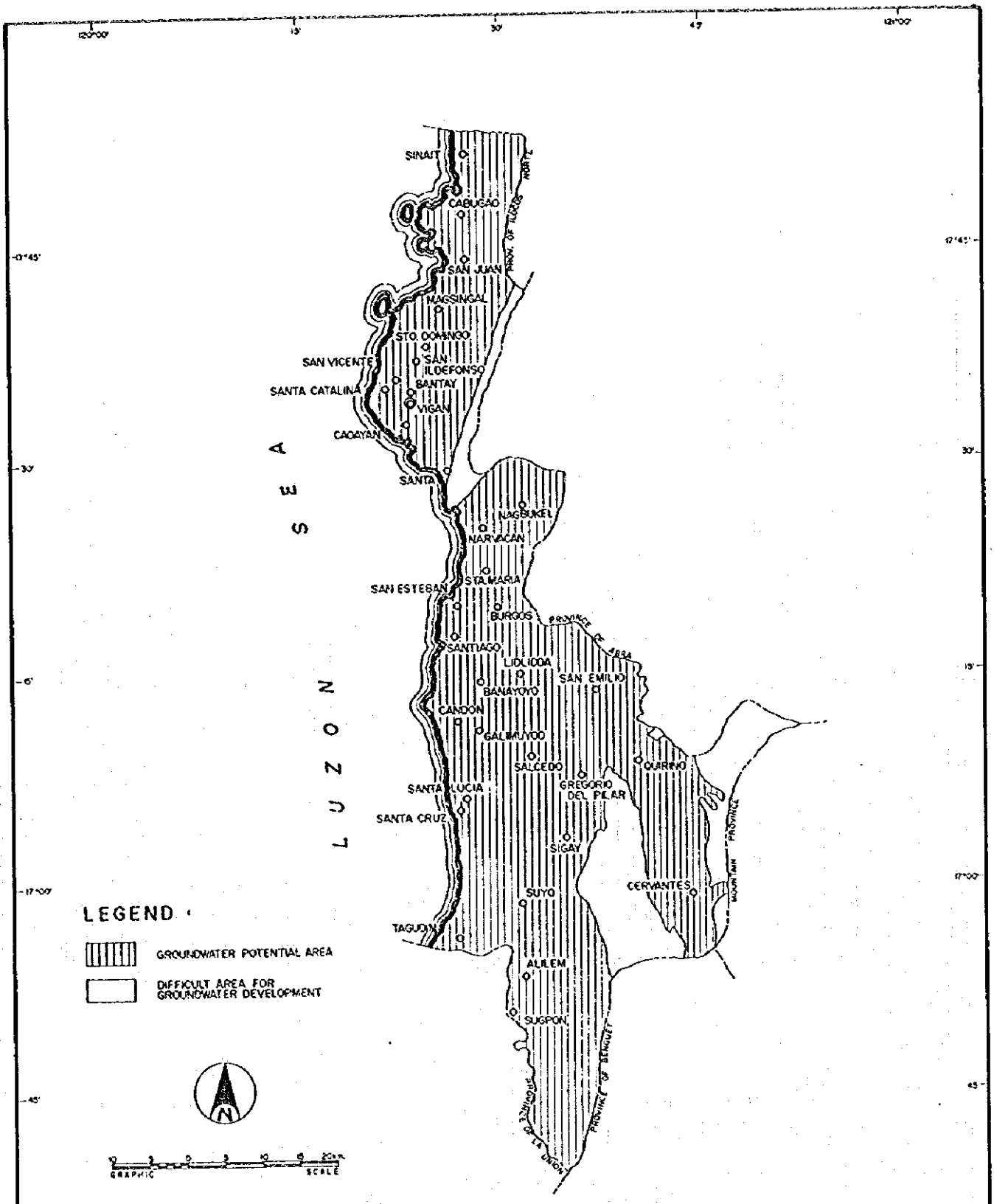


FIGURE 7.3.2

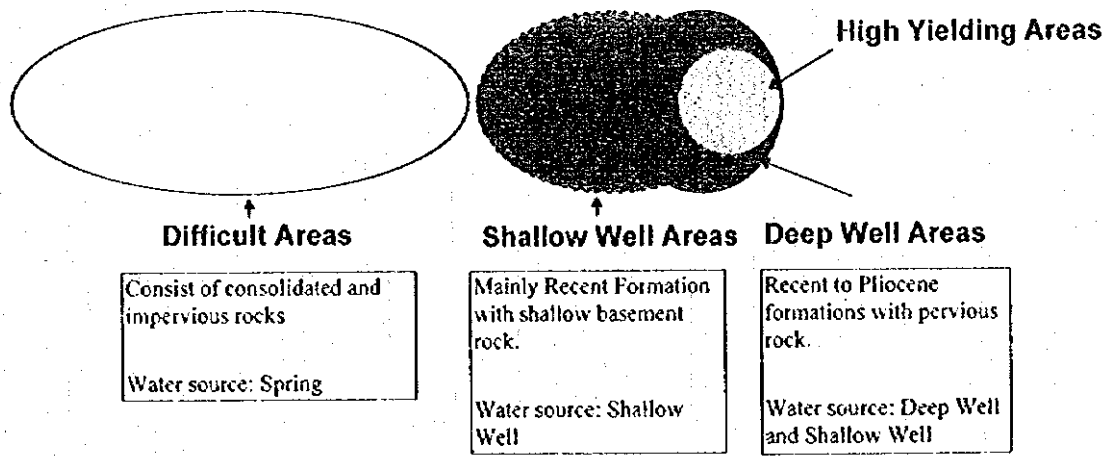
GROUNDWATER POTENTIAL AREA IN THE PROVINCE

(SOURCE : GROUNDWATER RESOURCES SURVEY, BMGS)

Based on the results of geo-electrical survey of the above investigation, resistivity values from 20 to 210 ohm-meter indicate a potential high yielding formation. Values less than 10 ohm-meters suggest clayey layer or saturated formation with high salinity. Figure 7.3.3 shows the boundaries of areas with high and low yielding aquifers, and high chloride concentration. In addition, considering the results of water quality examination of wells, areas with high iron and manganese contents are indicated on the map.

4) Delineate shallow and deep well areas based on the well inventory in each municipality (refer to Table 7.3.1, Data report) and rock distribution. Figure 7.3.4 presents the categorization in terms of groundwater utilization.

Figure 7.3.4 Area Category by Groundwater Utilization



Shallow well areas are defined on the following basis:

(a) Predominance of serviceable shallow wells and presence of deep wells with water quality problem and/or low yielding aquifers.

(b) Occurrence of impervious rocks beneath the Recent formation at shallow depth.

5) Based on the information provided by NWRBs well inventory and the data obtained through the questionnaires, well specifications for each municipality are established as shown in the map. These specifications are used as references in evaluating the groundwater availability in each locality. Individual well locations with technical information are presented in Figure 7.6.1, Data Report.

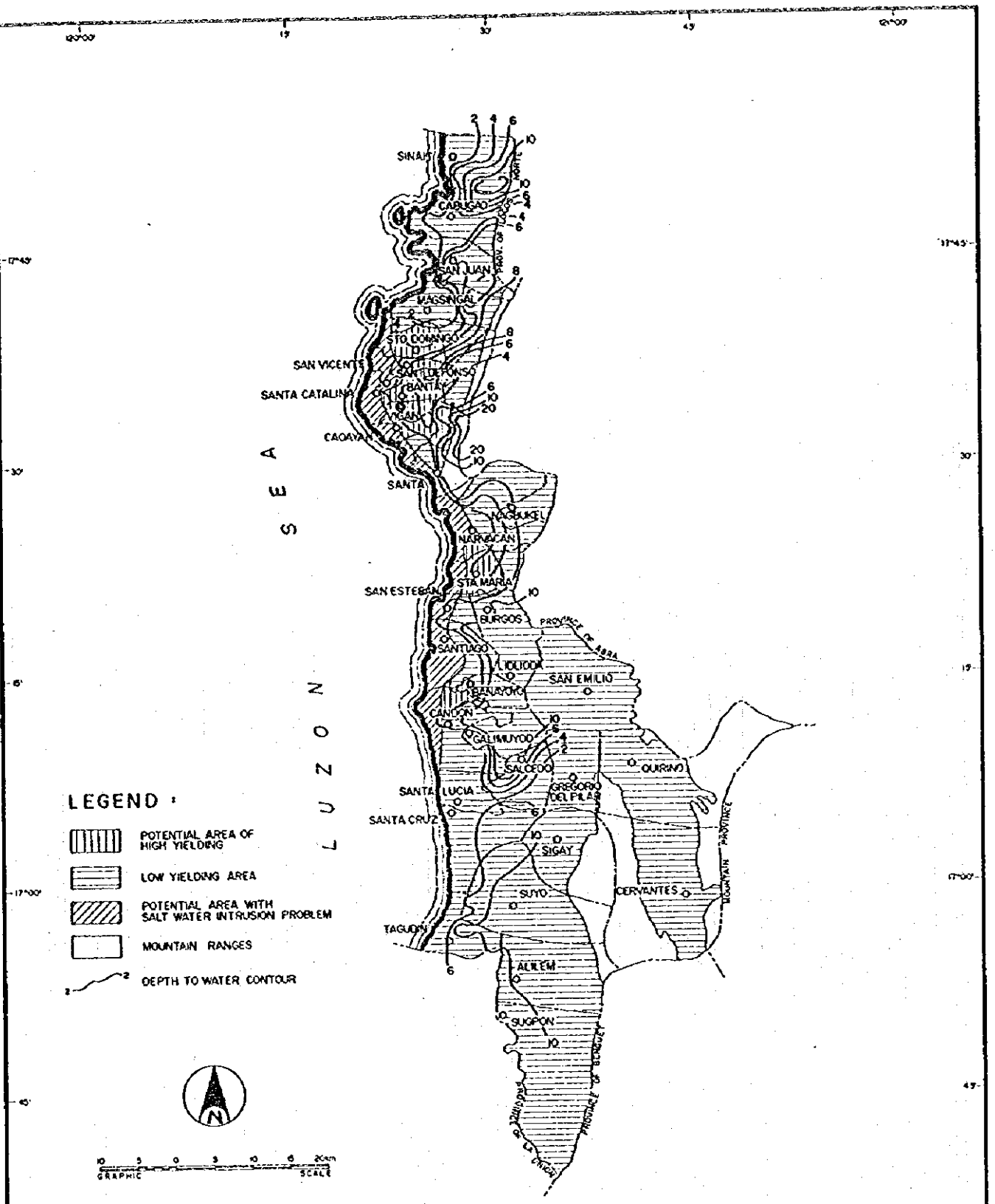


FIGURE 7.3.3

POTENTIAL AREAS OF HIGH YIELDING & WITH SALT WATER INTRUSION PROBLEM

(SOURCE : WATER RESOURCE INVESTIGATION , NWRB)

(3) Future updating and utilization of the map

For future updating of the map, the following procedure shall be employed:

1) Referring to the results of any supplementary water sources investigation by various agencies, redefine the potential area for groundwater development by applying the aforementioned procedures.

2) Update the provincial database using the questionnaires made for the study to make necessary revision of the delineated boundaries of groundwater categories.

7.4 Spring Sources

Table 7.4.1 Existing Spring Sources

Municipality	Developed Spring			Undeveloped Spring			Untapped Spring		
		Discharge (l/sec)			Discharge (l/sec)			Discharge (l/sec)	
	Number	Ave.	Range	Number	Ave.	Range	Number	Ave.	Range
Alilem	15								
Banayoyo									
Bantay	1	18.00							
Burgos	15	0.73	0.25 - 1.33				1	3.00	
Cabugao	4								
Candon	4								
Caoyan									
Cervantes	30								
Galimuyod	6			2	0.17	0.01 - 0.33			
Gregorio del Pilar	19	1.32	0.97 - 2.00	1	4.00		1	1.50	
Lidlidda	11			1	0.67				
Magsingal							1	3.00	
Nagbukel	3			3	0.10	0.06 - 0.13	1	0.50	
Narvacan	1								
Quirino	14			12	1.60	0.03 - 8.00	3	3.00	2.33 - 20.33
Salcedo	14								
San Emilio	13								
San Esteban									
San Ildefonso									
San Juan	2			3	0.37	0.30 - 0.41			
San Vicente									
Santa	1						1	2.00	
Santa Catalina									
Santa Cruz	6	1.07	0.97 - 1.25						
Santa Lucia	3								
Santa Maria									
Santiago	2			3	0.70	0.58 - 0.83			
Santo Domingo	2	0.56	0.33 0.79						
Sigay	7								
Sinait									
Sugpon	9			6	0.64	0.01 - 1.00			
Suyo	33			5	0.38	0.33 - 0.48			
Tagudin	3	0.70	0.58 - 0.83						
Vigan									
TOTAL	218			36			8		

Source: PPDO/PSPT

7.5 Surface Water Sources

(1) Study Rivers

The province has several major rivers, namely, Abra, Amburayan, Buaya, Santa Maria, Bucong, Oaig Daya, Narvacan, San Ildefonso and Cabugao. These rivers are generally flowing westward and empty into the Luzon Sea. They are currently used for irrigation. These rivers may be categorized into two types based on drainage area and flow rate. The first type has narrow and relatively small drainage area (25-250km^2) with lower flow rate (less than 10 cum./sec in average). The second type has more than 500 km^2 area with relatively higher flow rate (more than 50 cum./sec in average). This type of rivers is generally characterized by a long winding stream with numerous tributaries. Buaya, Santa Maria, Bucong, Narvacan, San Ildefonso, Oaig Daya and Cabuyao rivers represent the first type, while Abra and Amburayan rivers fall under the second type. Among these rivers, Abra and Santa Maria rivers are considered potential sources of domestic water supply considering their perennial flow and proximity to highly populated municipalities. These rivers were selected for further study. Figure 7.5.1 shows the river basins in the province and Table 7.5.1 presents basic information on the selected rivers.

Table 7.5.1 River Information and Related Data

River	Drainage Area (km^2)	Flow Rate (cu. m/sec)			Relevant Information in the Basin	
		Minimum	Average	Maximum	Major Mun. & Population 1/	Water District
Abra	4,813	53.53	240.28	4,271.71	Vigan 26,032	Metro Vigan WD
Santa Maria	123	0.12	1.31	30.45	Sta. Maria 23,821	None

1/ 1990 Population, NSO

(2) Sampling Points and Examination procedures

Water quality analysis of the two selected rivers was undertaken to determine the general characteristics of surface water in the province. Locations of sampling points were set at a minimum of 5 kilometers from the river mouth to avoid tidal effect (refer to Figure 7.5.1).

Water sampling was conducted on June 29, 1995 at different points across the courses of selected rivers. The samples were sent to MWSS laboratory within 24 hours after they were taken. Flow rates were also measured at the same points of sampling. A composite sample for each rivers was prepared in proportion to the flow rates of the rivers.

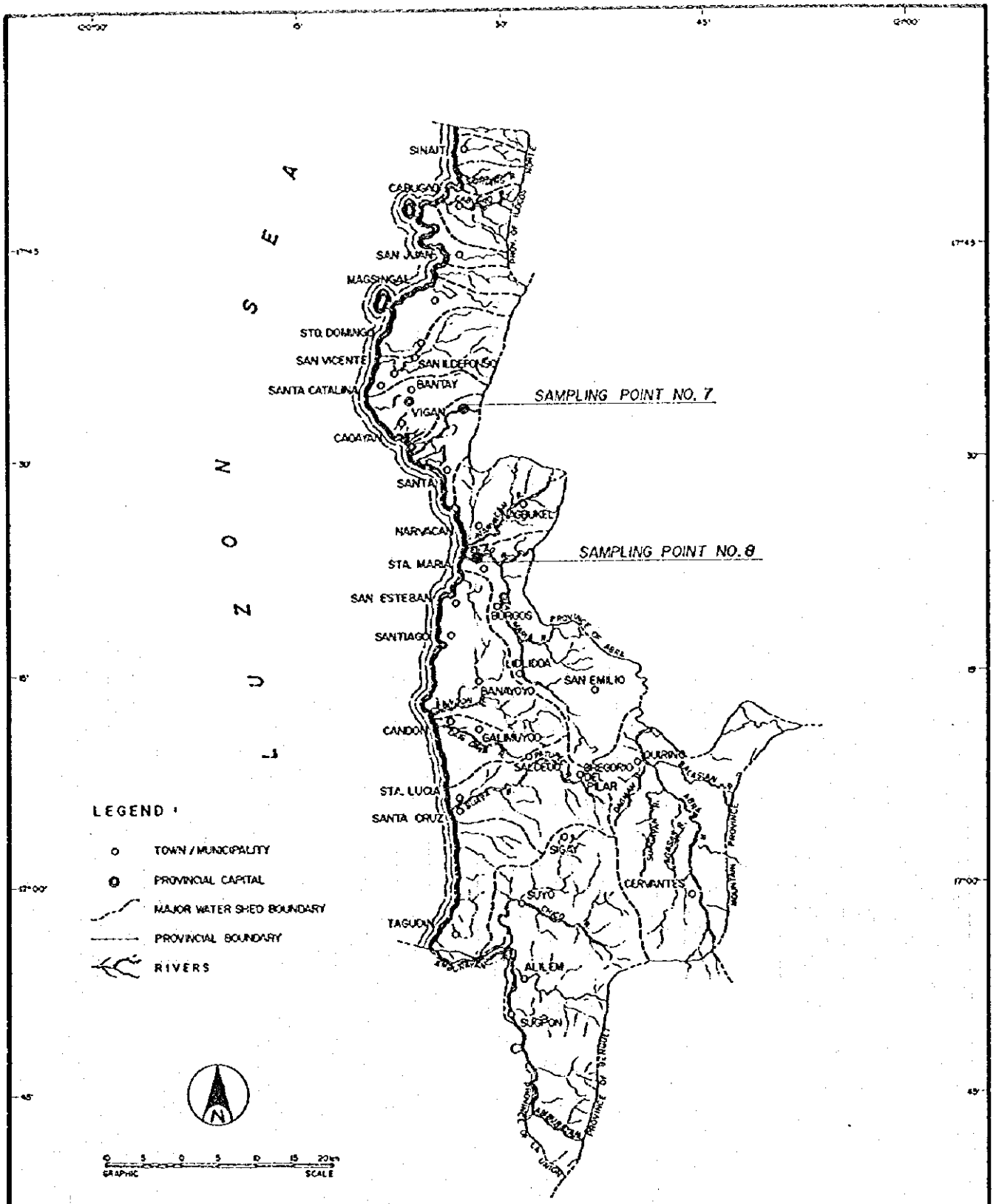


FIGURE 7.5.1

STUDY RIVER BASIN AND WATER SAMPLING POINTS