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 - 9

SUPPORTING AND DATA REPORT

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

NUEVA VIZCAYA

FEBRUARY 1996

NIPPON JOGESUIDO SEKKEI CO., LTD.

EXCHANGE RATE (As of 1 August 1995)

US $ 1.0 = Peso 25.7 = Yen 88.3

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 - 9

SUPPORTING AND DATA REPORT

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

NUEVA VIZCAYA

FEBRUARY 1996

NIPPON JOGESUIDO SEKKEI CO., LTD.

PROVINCIAL WATER SUPPLY, SEWERAGE AND SANITATION SECTOR PLAN

VOLUME III - 9 SUPPORTING AND DATA REPORT

TABLE OF CONTENTS

PROVINCIAL WATER SUPPLY, SEWERAGE AND SANITATION SECTOR PLAN

LIST OF TABLES

PROVINCIAL WATER SUPPLY, SEWERAGE AND SANITATION SECTOR PLAN

LIST OF FIGURES

SUPPORTING REPORT

A. BACKGROUND INFORMATION AND EXISTING CONDITIONS

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 CACUSANA	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.

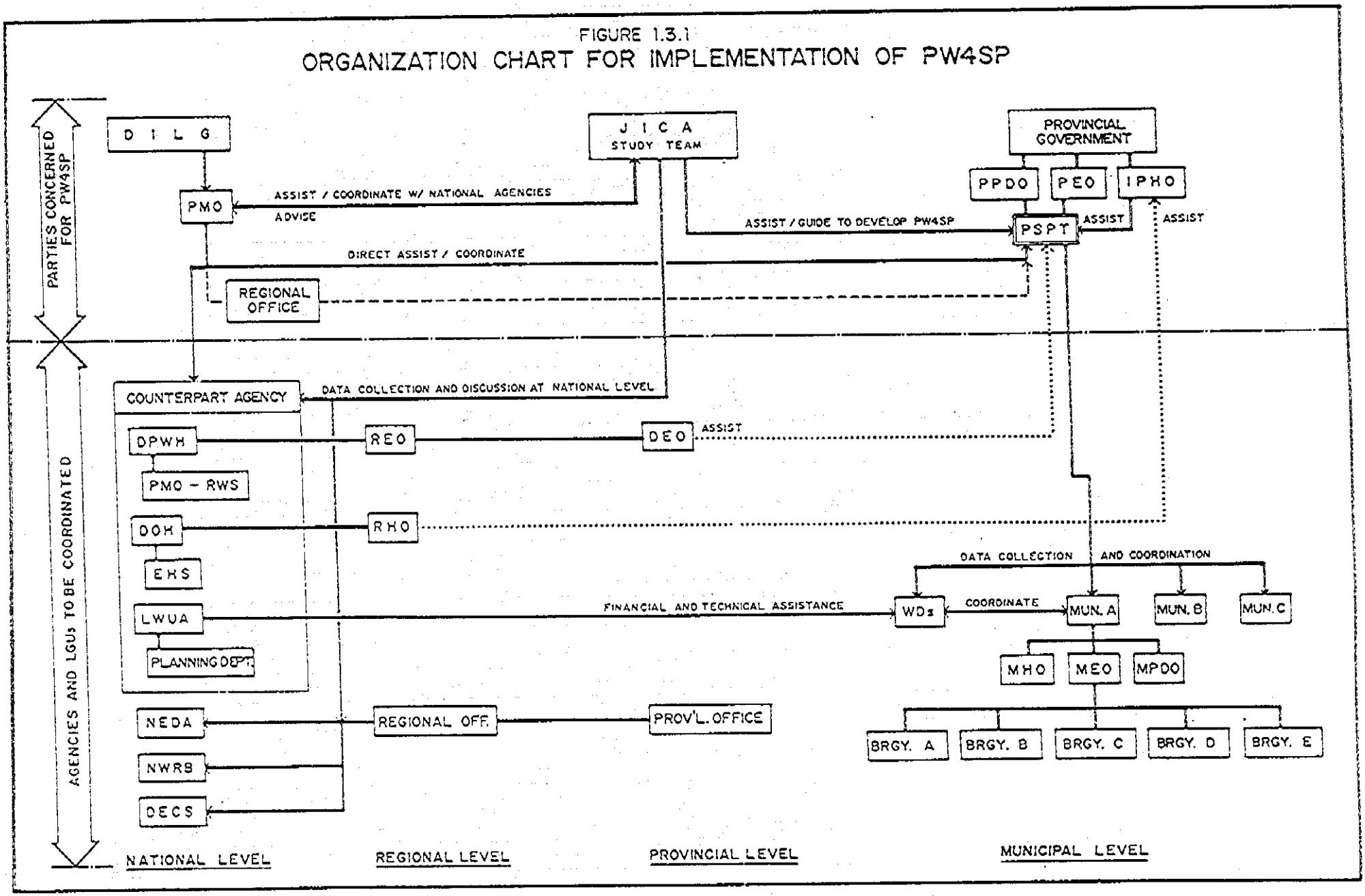
Appendix A

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				
		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				
		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				
		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	Nueva Vizcaya				Region II	
	Total Families[1]		Annual Income		Total Number of Families	Annual Income Average (Pesos)
	Number	Share	Total (P 1,000)	Average (Pesos)		
Under 15,000	5,395	8.33	59,700	11,066	44,117	11,931
15,000 - 19,999	3,042	4.70	49,405	16,240	39,031	17,561
20,000 - 29,999	14,751	22.78	377,957	25,622	117,026	24,969
30,000 - 39,999	12,823	19.80	435,470	33,960	88,207	35,044
40,000 - 59,999	14,452	22.32	728,467	50,407	92,205	48,702
60,000 - 99,999	7,358	11.36	583,461	79,294	57,838	75,354
100,000 - 249,999	6,279	9.70	998,815	159,067	43,920	148,114
250,000 and over	654	1.01	196,202	299,820	7,032	327,920
Total/Average	64,754	100.00	3,429,477	30,576	489,376	50,850
Median	-	-	-	36,123	-	35,480

Source: 1991 Family Income and Expenditures Survey, NSO

Note:

(1) Based on NEDA and other agencies, poverty threshold in Region II in 1991 was estimated at P 42,400. Proportion of families below poverty level was 56 % 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	105,531	62,495	349	4,492	275	3,249
Official of Gov't. & Special Interest Org., Corp. Executives, Managers, Managing Prod. & Supervisors	4,813	9	-	150	10	116
Professional	4,988	10	-	21	30	111
Technicians and Associated Professional	1,262	42	-	41	-	-
Clerks	2,363	-	-	102	51	12
Service & Shop Market Sales Workers	2,827	-	-	37	12	-
Farmers, Forestry Workers & Fishermen	40,119	39,914	-	70	-	-
Craft and Related Workers	6,520	9	139	3,043	100	2,438
Plant & Machine Operators and Assemblers	3,491	341	30	658	30	115
Elementary Occupations	33,773	22,068	180	331	20	436
Other Occupations	4,091	102	-	39	22	21
Occupation Not Stated	1,284	-	-	-	-	-

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	8,021	4,289	703	16,628	4,019	1,011
Official of Gov't. & Special Interest Org., Corp. Executives, Managers, Managing Prod. & Supervisors	3,443	32	40	981	32	-
Professional	32	21	102	4,565	96	-
Technicians and Associated Professional	44	96	162	839	38	-
Clerks	331	132	233	1,351	151	-
Service & Shop Market Sales Workers	1,133	129	120	1,357	39	-
Farmers, Forestry Workers & Fishermen	20	-	-	47	68	-
Craft and Related Workers	21	20	9	690	51	-
Plant & Machine Operators and Assemblers	109	1,913	-	199	96	-
Elementary Occupations	2,835	127	27	5,623	326	-
Other Occupations	53	19	10	965	2,860	-
Occupation Not Stated	-	-	-	11	262	1,011

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	242,342	94,805	27,335	24,963	21,432	17,714	13,026	43,067
No Grade	19,093	6,675	667	898	919	880	880	8,174
Pre-School	1,671	1,575	15	10	10	8	4	49
Elementary	121,629	58,280	8,212	9,064	9,177	8,020	6,133	22,743
1st - 4th Grade	64,499	39,113	2,980	3,246	3,122	2,863	2,116	11,059
5th - 7th Grade	57,130	19,167	5,232	5,818	6,055	5,157	4,017	11,684
High School	63,689	23,635	10,208	7,992	6,173	4,949	3,251	7,481
Undergraduate	36,941	17,865	4,778	3,547	2,820	2,400	1,649	3,882
Graduate	26,748	5,770	5,430	4,445	3,353	2,549	1,602	3,599
Post Secondary	4,974	496	1,289	1,015	821	519	246	588
Undergraduate	1,361	219	321	236	177	155	87	166
Graduate	3,613	277	968	779	644	364	159	422
College Undergraduate	16,615	3,891	4,363	2,655	1,904	1,440	892	1,470
Academic Degree Holder	14,130	47	2,514	3,278	2,384	1,867	1,596	2,444
Not Stated	541	206	67	51	44	31	24	118

Source: NSO Census 1990

3.4 Population

3.4.2 Classification of Urban and Rural Areas

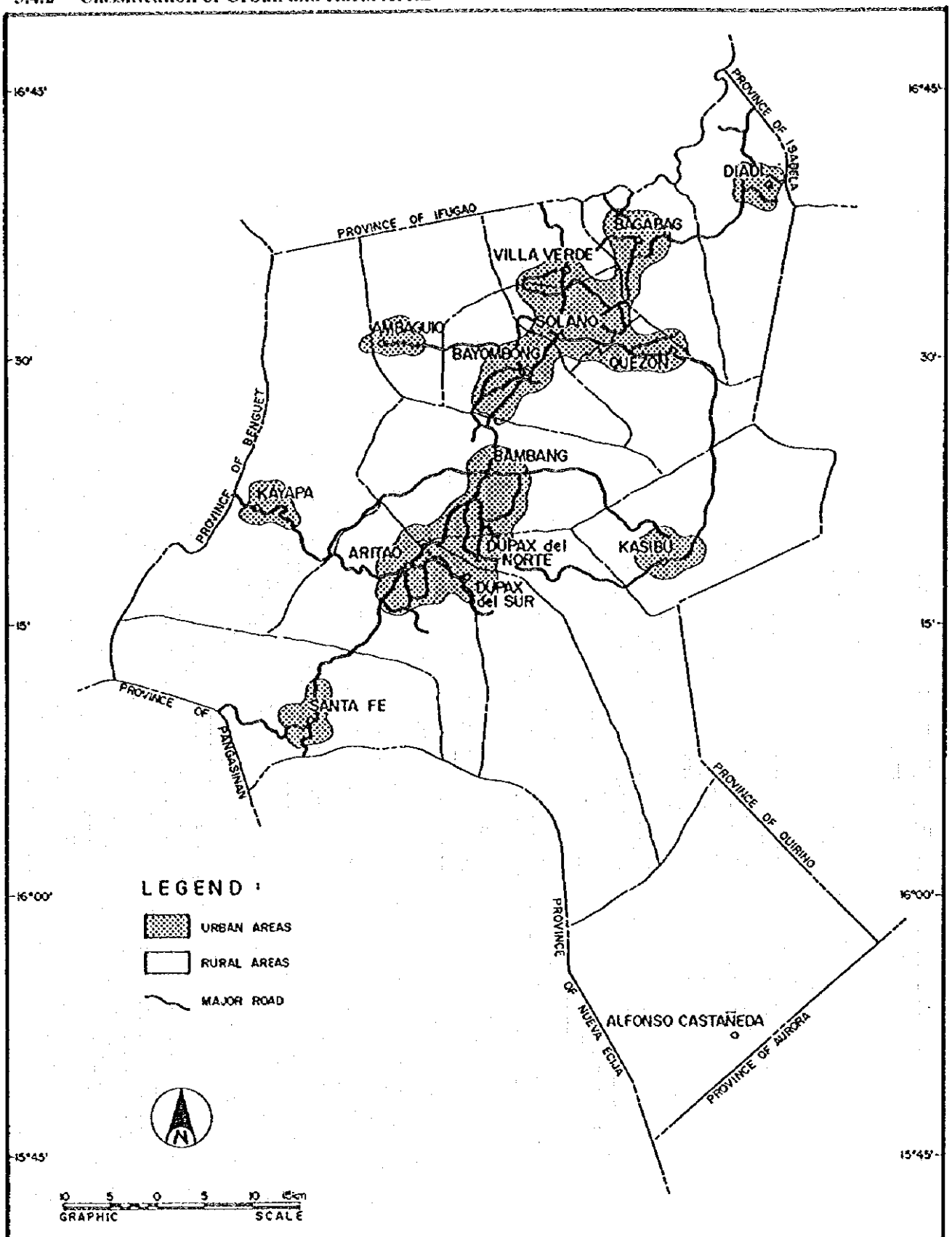


FIGURE 3.4.1
DISTRIBUTION OF URBAN AND RURAL AREAS

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	Nueva Vizcaya		Philippines	
	Number	Ratio	Number	Ratio
Hospitals	5	1:60236	1,733	1:35017
RHUs	15	1:20079	2,295	1:26442
BHSs	96	1:3137	10,151	1:5978
Practitioners				
Doctors	67	1:4495	7,431	1:8166
Nurses	92	1:3274	10,270	1:5909
Midwives	96	1:3137	11,604	1:5230
Dentists	8	1:37647	1,550	1:39152

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 Geographic Code	Municipality	Name of System (Operating Body)	Level III Services								
			Number of Barangays Served			Number of Household Served			Number of Population Served		
			Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
0452002	Aritao	Arwasa, Inc.	1	2	3	271	118	389	1,626	708	2,334
0452003	Bagabag	Bagabag WS	4	0	4	343	0	343	1,818	0	1,818
0452005	Bayombong	Prov. WS	7	3	10	685	225	910	3,836	990	4,826
0452013	Solano	Prov. WS	6	0	6	546	0	546	2,730	0	2,730
Provincial Total			18	5	23	1,845	343	2,188	10,010	1,698	11,708

NEDA Geographic 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
0452002	Aritao	Arwasa, Inc.	0	0	0	0	0	0	0	0	0
0452003	Bagabag	Bagabag WS	0	0	0	0	0	0	0	0	0
0452005	Bayombong	Prov. WS	3	1	11	4	15	5	84	22	106
0452013	Solano	Prov. WS	1	0	4	1	5	0	25	0	25
Provincial Total			4	1	15	5	20	5	109	22	131

NEDA Geographic Code	Municipality	Name of System (Operating Body)	Water Sources			Consumption			
			Type[1]	Number	Production (cu.m/day)	Domestic	Institutional	Commercial	Industrial
						(cu. m/day)			
0452002	Aritao	Arwasa, Inc.		2	300	98	0	0	0
0452003	Bagabag	Bagabag WS	DW	1	455	203	4	32	0
0452005	Bayombong	Prov. WS	SP	1	6,500	1,297	17	41	0
0452013	Solano	Prov. WS				775	11	25	0
Provincial Total				4	11,051	2,373	32	98	0

Note: 1. Type of Water Source: DW - Deep Well, DgW - Dug Well, Surf. - Surface Water (River), SP - Spring, IG - Infiltration Gallery.
2. Provincial total excludes Aritao and Bagabag.

NEDA Geographic Code	Municipality	Name of System (Operating Body)	Consumers													
			Domestic House Connections			Domestic Public Faucets			Institutional			Commercial			Industrial		
			Connection		Consumption (cu.m/day)	Connection		Consumption (cu.m/day)	Connection		Consumption (cu.m/day)	Connection		Consumption (cu.m/day)	Connection		Consumption (cu.m/day)
			Metered	Unmetered		Metered	Unmetered		Metered	Unmetered		Metered	Unmetered		Metered	Unmetered	
0452002	Aritao	Arwasa, Inc.	389	0	98	0	0	0	0	0	0	0	0	0	0	0	0
045203	Bagabag	Bagabag WS	343	0	203	0	0	0	1	0	4	21	0	32	0	0	0
0452005	Bayombong	Prov. WS	823	88	1,293	1	3	3.5	11	6	17	26	2	41	0	0	0
0452013	Solano	Prov. WS	493	52	775	0	1	0	7	3	11	16	0	25	0	0	0
Provincial Total[1]			2,048	140	2,369	1	4	4	19	9	32	63	2	98	0	0	0

4.1.4 Level II Systems

Table 4.1.2 Existing Level II Systems

Sheet 1

NEDA Geo-graphic Code	Municipality	Name of System (Operating System)	Water Source		Existing Facilities				
					Length of Transmission Line	Reservoir		Length of Distribution Line	Number of Public Faucets
			Type[1]	Number	(meter)	Number	Q (cu.m)	(meter)	
045215	Alfonso Castañeda	Olong-Olong W.S.S	SP	1	1,500	2	63	500	20
		Piculiat - Amot W.S.S	SP	1	3,800	1	5	1,000	25
		Sitio Marikit W.S.S	SP	1	840	1	8	500	3
	Municipal Total			3	6,140	4	76	2,000	48
045201	Ambaguio	Nadantog W.S	SP	1	60	1	6	3,840	22
045202	Aritao	Anayo W.S.S	SP	1	450	1	2.52	100	8
		Boyot Cueva Cili W.S.S	SP	1	1,650	0	0	0	6
		Calitlitan W.S.S	SP	1	190	1	8	400	20
		Darapidap W.S.S	SP	1	700	1	8.75	1,400	20
		Kaliplip W.S.S	SP	1	900	1	8	500	8
		Lactawan W.S.S	SP	1		1	2.35	0	10
		Lobo-Kirang W.S.S	SP	1	1,343	2	9.7	2,713	25
		Lukib W.S.S	SP	1	2,500	0	0	300	5
		Mansoyosey W.S.S	SP	1	750	0	0	450	5
		Ocao-Capinaan W.S.S	SP	1	24	1	4	310	5
		Tucanon W.S.S	SP	1	750	1	6	402	22
		Yaway W.S.S	SP	1	200	2	1.5	200	3
	Municipal Total			12	9,457	11	50.82	6,775	137
045203	Bagabag	Murong W.S.S	SP	1	60	1	8.3	78	23
		Sta.Cruz W.S.S	SP	1	102	1	8.3	762	14
	Municipal Total			2	162	2	17	840	37
045204	Bambang	Bansing Water System	SP	1	120	1	6	1,176	15
		Manamtam W.S	SP	1	210	1	6	1,080	15
		Pallas Tribal Council W.S.S	SP	1	0		0	2,300	5
		Sto. Domingo W.S.S	SP	1	60	1	4	720	10
	Municipal Total			4	390	3	16.00	5,276	45
045206	Diadi	Dunuarog W.S	SP	1	300		1.5	700	10
		Rosario W.S	SP	1	1,500			0	10
		San Luis W.S	SP	1	300		1.5	400	8
		Villa Aurora W.S	SP	1	500			1,000	15
	Municipal Total			4	2,600	0	3.0	2,100	43
045207	Dupax del Norte	Malasin W.S.S	SP	1	1,500	1	20	2,000	50
		Belance W.W.S	SP	1	200	1	9.3	4,000	24
		Bitnong W.S	SP	1	150	2	35	0	7
		Brgy. Oyao W.S	SP	1	180	1	8	180	2
		Inaban W.S	SP	1	15	1	6	275	6
		Lamo W.S	SP	1	20	1	8	350	14
		Mabasa W.S	SP	1	20	1	8	250	9
		Macabenga W.S	SP	1	20	1	10.8	3,000	5
		Maygoto W.W.S	SP	1	500	0	0	0	8
		Munguia	SP	1	360	1	6	660	10
		Parasi W.S	SP	1	180	1	6	360	20
		Pudi W.S.S	SP	1	500	0	0	1,000	15
		Takbaw W.S	SP	1	55	1	8	805	9
		Tigep W.S	SP	1		1	1	150	5
		Yabbi W.S	SP	1	1,000	1	6	1,750	15
	Municipal Total			15	4,700	14	132.1	14,780	199
045208	Dupax del Sur	Biruk	SP	1	1,000	1	6	600	15
		Gabut R.W.S.S	SP	1	386	1	9.4	974	16
		Ganao W.S	SP	1	90	1	4	414	2
		Kinabuan W.S	SP	1	156	1	8	390	6
		Macaibeng W.S	SP	1	1,000	1	6	2,000	10
		Palabotan W.S	SP	1	774	1	12	1,086	18
	Municipal Total			6	3,406	6	45.40	5,494	67

Table 4.1.2 Existing Level II Systems (Cont'd.)

Sheet 1

NEDA Geo-graphic Code	Municipality	Name of System (Operating System)	Water Source		Existing Facilities				
					Length of Transmission Line	Reservoir		Length of Distribution Line	Number of Public Faucets
			Type[1]	Number	(meter)	Number	Q (cu.m)	(meter)	
045209	Kasibu	Dine W.S	SP	1	500	1	6	1,500	10
		Muta Tribal Council W.S	SP	1	100	1		1,310	5
		Poblacion Water System	SP	1	900	1	6	408	17
		Siguem Tribal Council W.S	SP	1	20	1		1,900	9
		Watwat Tribal Council	SP	1	560	1		1,050	5
	Municipal Total			5	2,080	5	12	6,168	46
045210	Kayapa	Ambalata W.S.S	SP	1				2,540	7
		Babadi W.S.S	SP	1				1,930	6
		Balwang Resettlement Area W	SP	1				1,500	6
		Butulao W.S.S	SP	1				420	5
		Capulang W.S.S	SP	1				1,908	8
		Caritas Village W.S	SP	1	300	1		1,200	6
		Liten W.S.S	SP	1				2,120	7
		Lower Tubong W.S	SP	1				762	12
		Mapayao W.S.S	SP	1				3,552	16
		Nancinkan W.S.S	SP	1				996	10
		Nayao W.S.S	SP	1				6,950	12
		Oliweg W.S.S	SP	1				1,750	3
		Padang W.S.S	SP	1				3,450	6
		Pampang W.S	SP	1	200	1	6	1,380	18
		Patkiaw W.S.S	SP	1				2,562	8
		Salicpan W.S.S	SP	1				3,860	13
		San Fabian W.S.S	SP	1				5,440	19
		Sayuding W.S.S	SP	1				1,182	4
		Tablite W.S.S	SP	1				546	5
		Talecabcab W.S.S	SP	1	90			1,650	6
		Tuppan W.S.S	SP	1				2,048	9
		Tuyongan W.S.S	SP	1	90			3,296	5
	Municipal Total			22	680	2	6	51,042	191
045211	Quezon	Tetong W.S	SP	1	500	1	6	1,000	8
045212	Santa Fe	Baliling W.S.S	SP	1				402	34
		Bantinan W.S	SP	1	222	1	5.20	192	3
		Bayabas W.S.S	SP	1				1,836	4
		Bolilong W.S.S	SP	1				2,800	25
		Butao W.S.S	SP	1				250	9
		Mag-asawang Kahoy W.S.S	SP	1				1,351	6
		Mangcate Tribal Council	SP	1	66	1		1,200	7
		Mangga W.S.S	SP	1				1,180	4
		Melina W.S.S	SP	1				3,552	11
		Pacalbo W.S.S	SP	1				660	3
		Perez Park W.S.S	SP	1	300			1,300	5
		Pulao W.S.S	SP	1				600	2
		Salacsac W.S.S	SP	1				1,341	4
		Tactac W.S.S	SP	1				860	4
		VillaFlores W.S	SP	1		2	6	2,610	8
	Municipal Total			15	588	4	11	20,167	129
045213	Solano	Dadap W.S.S	SP	1	60	1	10.23	192	26
045214	Villaverde	Ocapon W.S.S	SP	1	1,000	1	6	1,500	7
		Brgy. Cabuluan W.S.S	SP	1	800	2	6.75	300	15
	Municipal Total			2	1,800	3	13	1,800	22
Provincial Total				93	32,623	57	404.55	121,474	1,020

Note: 1. Type of Water Source; *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
045215	Alfonso Castañeda	Olong-Olong W.S.S	0	1	1	0	100	100	0	600	600
		Piculiat - Amot W.S.S	0	1	1	0	200	200	0	1,200	1,200
		Sitio Marikit W.S.S	0	1	1	0	15	15	0	90	90
	Municipal Total		0	3	3	0	315	315	0	1,890	1,890
045201	Ambaguio	Nadantog W.S	0	1	1	0	118	118	0	603	603
045202	Aritao	Anayo W.S.S	0	1	1	0	28	28	0	166	166
		Boyot Cueva Cili W.S.S	0	1	1	0	28	28	0	143	143
		Calitlitan W.S.S	0	1	1	0	30	30	0	300	300
		Darapidap W.S.S	0	1	1	0	60	60	0	300	300
		Kalipkip W.S.S	0	1	1	0	40	40	0	240	240
		Lactawan W.S.S	0	1	1	0	30	30	0	148	148
		Lobo-Kirang W.S.S	0	1	1	0	50	50	0	300	300
		Lukib W.S.S	0	1	1	0	22	22	0	121	121
		Mansoyosoy W.S.S	0	1	1	0	22	22	0	126	126
		Ocao-Capinaan W.S.S	0	1	1	0	26	26	0	138	138
		Tucanon W.S.S	0	1	1	0	98	98	0	519	519
		Yaway W.S.S	0	1	1	0	22	22	0	132	132
	Municipal Total		0	12	12	0	574	574	0	3,236	3,236
045203	Bagabag	Murong W.S.S	0	1	1	0	79	79	0	474	474
		Sta.Cruz W.S.S	0	1	1	0	88	88	0	480	480
	Municipal Total		0	2	2	0	167	167	0	954	954
045204	Bambang	Bansing Water System	0	1	1	0	81	81	0	476	476
		Manamtam W.S	0	1	1	0	69	69	0	348	348
		Pallas Tribal Council W.S.S	0	1	1	0	27	27	0	115	115
		Sto. Domingo W.S.S	0	1	1	0	57	57	0	319	319
	Municipal Total		0	4	4	0	234	234	0	1,258	1,258
045206	Diadi	Dumarog W.S	0	1	1	0	30	30	0	150	150
		Rosario W.S	0	1	1	0	0	0			0
		San Luis W.S	0	1	1	0	30	30	0	150	150
		Villa Aurora W.S	0	1	1	0	20	20	0	150	150
	Municipal Total		0	4	4	0	80	80	0	450	450
045207	Dupax del Norte	Malasin W.S.S	1	0	1	250	0	250	1,250	0	1,250
		Belance W.W.S	0	1	1	0	140	140	0	900	900
		Bitneng W.S	0	1	1	0	15	15	0	77	77
		Brgy. Oyao W.S	0	1	1	0	9	9	0	45	45
		Inabaa W.S	0	1	1	0	12	12	0	68	68
		Lamo W.S	0	1	1	0	68	68	0	196	196
		Mabasa W.S	0	1	1	0	32	32	0	130	130
		Macabenga W.S	0	1	1	0	40	40	0	100	100
		Maypuso W.W.S	0	1	1	0	32	32	0	125	125
		Munguia	0	1	1	0	59	59	0	319	319
		Parasi W.S	0	1	1	0	86	86	0	437	437
		Pudi W.S.S	0	1	1	0	30	30	0	120	120
		Takbaw W.S	0	1	1	0	51	51	0	229	229
		Tigep W.S	0	1	1	0	27	27	0	50	50
		Yabbi W.S	0	1	1	0	50	50	0	200	200
	Municipal Total		1	14	15	250	651	901	1,250	2,996	4,246
045208	Dupax del Sur	Biruk	0	1	1	0	29	29	0	56	56
		Gabut R.W.S.S	0	1	1	0	64	64	0	384	384
		Ganao W.S	0	1	1	0	27	27	0	145	145
		Kinabuan W.S	0	1	1	0	80	80	0	320	320
		Macatbeng W.S	0	1	1	0	20	20	0	80	80
		Pakabotan W.S	0	1	1	0	106	106	0	422	422
	Municipal Total		0	6	6	0	326	326	0	1,407	1,407

Table 4.1.2 Existing Level II Systems (Cont'd.)

Sheet 2

NEDA Geo-graphic 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
045209	Kasibu	Dine W.S	0	1	1	0	30	30	0	120	120
		Muta Tribal Council W.S	0	1	1	0	60	60	0	317	317
		Poblacion Water System	0	1	1	0	106	106	0	573	573
		Siguem Tribal Council W.S	0	1	1	0	49	49	0	247	247
		Watwat Tribal Council	0	1	1	0	24	24	0	120	120
	Municipal Total		0	5	5	0	269	269	0	1,377	1,377
045210	Kayapa	Ambalata W.S.S	0	1	1	0	39	39	0	215	215
		Babadi W.S.S	0	1	1	0	30	30	0	162	162
		Balwang Reset. Area W.S.S	0	1	1	0	30	30	0	162	162
		Butilao W.S.S	1	0	1	30	0	30	162	0	162
		Capulang W.S.S	0	1	1	0	36	36	0	209	209
		Caritas Village W.S	0	1	1	0	32	32	0	156	156
		Liten W.S.S	0	1	1	0	35	35	0	200	200
		Lower Tubong W.S	0	1	1	0	60	60	0	342	342
		Mapayao W.S.S	0	1	1	0	80	80	0	424	424
		Nanciakan W.S.S	0	1	1	0	47	47	0	250	250
		Nayao W.S.S	0	1	1	0	59	59	0	331	331
		Oliweg W.S.S	0	1	1	0	14	14	0	73	73
		Padang W.S.S	0	1	1	0	28	28	0	157	157
		Pampang W.S	1	0	1	95	0	95	505	0	505
		Patkiaw W.S.S	0	1	1	0	40	40	0	232	232
		Salicpan W.S.S	0	1	1	0	62	62	0	360	360
		San Fabian W.S.S	0	1	1	0	94	94	0	564	564
		Sayuding W.S.S	0	1	1	0	20	20	0	108	108
		Tahlite W.S.S	0	1	1	0	10	10	0	53	53
		Talecabcab W.S.S	0	1	1	0	30	30	0	177	177
		Tuppan W.S.S	0	1	1	0	45	45	0	266	266
		Tuyongan W.S.S	0	1	1	0	25	25	0	145	145
	Municipal Total		2	20	22	125	816	941	667	4,586	5,253
045211	Quezon	Totong W.S	0	1	1	0	23	23	0	92	92
045212	Santa Fe	Balding W.S.S	0	1	1	0	200	200	0	1,120	1,120
		Bantinan W.S	0	1	1	0	17	17	0	96	96
		Bayabas W.S.S	0	1	1	0	17	17	0	97	97
		Bollong W.S.S	0	1	1	0	123	123	0	689	689
		Butao W.S.S	0	1	1	0	43	43	0	241	241
		Mag-asawang Kahoy W.S.S	0	1	1	0	29	29	0	151	151
		Mangcate Tribal Council	0	1	1	0	15	15	0	105	105
		Mangga W.S.S	0	1	1	0	18	18	0	107	107
		Melina W.S.S	0	1	1	0	72	72	0	360	360
		Pacalbo W.S.S	0	1	1	0	15	15	0	81	81
		Perez Park W.S.S	0	1	1	0	23	23	0	138	138
		Pulao W.S.S	0	1	1	0	10	10	0	56	56
		Salacsac W.S.S	0	1	1	0	20	20	0	106	106
		Tactac W.S.S	0	1	1	0	14	14	0	73	73
		VillaFlores W.S	0	1	1	0	32	32	0	107	107
	Municipal Total		0	16	16	0	671	671	0	3,619	3,619
045213	Solano	Dadap W.S.S	0	1	1	0	98	98	0	558	558
045214	Villaverde	Ocapon W.S.S	0	1	1	0	20	20	0	106	106
		Brgy. Cabuluan W.S.S	0	1	1	0	25	25	0	133	133
	Municipal Total		0	2	2	0	45	45	0	239	239
Provincial Total			3	91	94	375	4,387	4,762	1,917	23,265	25,182

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)	Dirty Water[1]	Taste/ Smell[2]	Supply Interruption (number/month)				Supply Water Pressure (% of Total)	
						Power Failure	Pump Breakdown	Pipe Burst	Others	Adequate	Inadequate
045215	Alfonso Castañeda	Olong-Olong W.S.S		O							
		Piculiat - Amot W.S.S		O							
		Sitio Marikit W.S.S		O	G						
	Municipal Total		0			0	0	0	0		
045201	Ambaguio	Naduntog W.S	24								
045202	Aritao	Anayo W.S.S	8							100%	
		Boyot Cueva Cili W.S.S									
		Calitlitan W.S.S									
		Darapidap W.S.S	8								
		Kalipkip W.S.S	8								
		Lactawan W.S.S	8							100%	
		Lobo-Kirang W.S.S	24								
		Lukib W.S.S									
		Mansoyosoy W.S.S									
		Ocao-Capinaan W.S.S	24								
		Tucanon W.S.S	24								
		Yaway W.S.S								100%	
	Municipal Total		15			0	0	0	0		
045203	Bagabag	Murong W.S.S	8								
		Sta.Cruz W.S.S	10								
	Municipal Total		9			0	0	0	0		
045204	Bambang	Bansing Water System	24								
		Manamtam W.S	24								
		Pallas Tribal Council W.S.S			G						
		Sto. Domingo W.S.S	24								
	Municipal Total		24			0	0	0	0		
045206	Diadi	Duruarog W.S			G						
		Rosario W.S									

Table 4.1.2 Existing Level II Systems (Cont'd.)

Sheet 3

NEDA Geo-graphic Code	Municipality	Name of System (Operating Body)	Service Conditions During Dry Season								
			Supply (Hrs/day)	Dirty Water[1]	Taste/ Smell[2]	Supply Interruption (number/month)				Supply Water Pressure (% of Total)	
						Power Failure	Pump Breakdown	Pipe Burst	Others	Adequate	Inadequate
045206	Diadi	San Luis W.S			G						
		Villa Aurora W.S			G						
	Municipal Total		0			0	0	0	0		
045207	Dupax del Norte	Belance W.W.S	6							80%	20%
		Bitnong W.S	24							70%	30%
		Brgy. Oyao W.S	24		G						
		Inaban W.S	4							90%	10%
		Lamo W.S	4								
		Mabasa W.S	4								
		Macabenga W.S	2							80%	20%
		Malasin W.S.S			G						
		Mayputo W.W.S	24		G						
		Munguia	24								
		Parasi W.S	24								
		Pudi W.S.S	24								
		Takbaw W.S	24							80%	20%
		Tigep W.S	24							70%	30%
		Yabbi W.S	24							15%	
	Municipal Total		17			0	0	0	0		
045208	Dupax del Sur	Biruk	24								
		Gabut R.W.S.S	24								
		Ganao W.S	24								
		Kinabuan W.S	24								
		Macatbeng W.S	24								
		Palabotan W.S	24								
	Municipal Total		24			0	0	0	0		
045209	Kasibu	Dine W.S	24								
		Muta Tribal Council W.S									

Table 4.1.2 Existing Level II Systems (Cont'd.)

Sheet 3

NEDA Geo-graphic Code	Municipality	Name of System (Operating Body)	Service Conditions During Dry Season								
			Supply (Hrs/day)	Dirty Water[1]	Taste/ Smell[2]	Supply Interruption (number/month)				Supply Water Pressure (% of Total)	
						Power Failure	Pump Breakdown	Pipe Burst	Others	Adequate	Inadequate
045209	Kasibu	Poblacion Water System	24								
		Siguem Tribal Council W.S									
		Watwat Tribal Council									
	Municipal Total		24			0	0	0	0		
045210	Kayapa	Ambalata W.S.S									
		Babadi W.S.S									
		Balwang Reset. Area W.S.S									
		Butilao W.S.S									
		Capulang W.S.S									
		Caritas Village W.S									
		Liten W.S.S									
		Lower Tubong W.S									
		Mapayao W.S.S									
		Nanciakan W.S.S									
		Nayao W.S.S									
		Oliweg W.S.S									
		Padang W.S.S									
		Pampang W.S	24								
		Patkiaw W.S.S									
		Salicpan W.S.S									
		San Fabian W.S.S									
		Sayuding W.S.S									
		Tahlite W.S.S									
		Talecabcab W.S.S									
		Tuppan W.S.S									
		Tuyongan W.S.S									
	Municipal Total		24			0	0	0	0		

Table 4.1.2 Existing Level II Systems (Cont'd.)

Sheet 3

NEDA Geo-graphic Code	Municipality	Name of System (Operating Body)	Service Conditions During Dry Season								
			Supply (Hrs/day)	Dirty Water[1]	Taste/ Smell[2]	Supply Interruption (number/month)				Supply Water Pressure (% of Total)	
						Power Failure	Pump Breakdown	Pipe Burst	Others	Adequate	Inadequate
045211	Quezon	Totong W.S	24							100%	
045212	Santa Fe	Baliling W.S.S									
		Bantinan W.S	24								
		Bayabas W.S.S									
		Bollong W.S.S									
		Butao W.S.S									
		Mag-asawang Kahoy W.S.S									
		Mangcate Tribal Council									
		Mangga W.S.S									
		Melina W.S.S									
		Pacalbo W.S.S									
		Perez Park W.S.S									
		Pulao W.S.S									
		Salacsac W.S.S									
		Tactac W.S.S									
		VillaFlores W.S	24								
	Municipal Total		24			0	0	0	0		
045213	Solano	Dadap W.S.S	10		G						
045214	Villaverde	Brgy. Cabuluan W.S.S		O						46%	54%
		Ocapon W.S.S	24								
	Municipal Total		17			0	0	0	0		

Note: 1. Dirty Water: *E* - Everyday, *OW* - Once a week, *OM* - Once a month, *O* - Occassional.
2. Taste/Smell: *G* - Good taste, *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
045215	Alfonso Castañeda	Olong-Olong W.S.S							
		Piculiat - Amot W.S.S	2			2			
		Sitio Marikit W.S.S	2			2			
		Municipal Total	4	0	0	4	0	0	0
045201	Ambaguio	Naduntog W.S							
045202	Aritao	Anayo W.S.S							
		Boyot Cueva Cili W.S.S							
		Calitlitan W.S.S							
		Darapidap W.S.S							
		Kalipkip W.S.S							
		Lactawan W.S.S							
		Lobo-Kirang W.S.S							
		Lukib W.S.S							
		Mansoyosoy W.S.S							
		Ocao-Capinaan W.S.S							
		Tucanon W.S.S							
		Yaway W.S.S							
		Municipal Total	0	0	0	0	0	0	0
045203	Bagabag	Murong W.S.S							
		Sta.Cruz W.S.S							
		Municipal Total	0	0	0	0	0	0	0
045204	Bambang	Bansing Water System							
		Manamtam W.S							
		Pallas Tribal Council W.S.S							
		Sto. Domingo W.S.S							
		Municipal Total	0	0	0	0	0	0	0

Table 4.1.2 Existing Level II Systems (Cont'd.)

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
045206	Diadi	Duruarog W.S							
		Rosario W.S							
		San Luis W.S							
		Villa Aurora W.S							
		Municipal Total	0	0	0	0	0	0	0
045207	Dupax del Norte	Belance W.W.S							
		Bitnong W.S							
		Brgy. Oyao W.S							
		Inaban W.S							
		Lamo W.S							
		Mabasa W.S							
		Macabenga W.S							
		Malasin W.S.S							
		Mayputo W.W.S							
		Munguia							
		Parasi W.S							
		Pudi W.S.S							
		Takbaw W.S							
		Tigep W.S							
		Yabbi W.S							
		Municipal Total	0	0	0	0	0	0	0
045208	Dupax del Sur	Biruk							
		Gabut R.W.S.S							
		Ganao W.S							
		Kinabuan W.S							
		Macatbeng W.S							
		Palabotan W.S							
		Municipal Total	0	0	0	0	0	0	0

Table 4.1.2 Existing Level II Systems (Cont'd.)

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
045209	Kasibu	Dine W.S							
		Muta Tribal Council W.S							
		Poblacion Water System							
		Siguem Tribal Council W.S							
		Watwat Tribal Council							
	Municipal Total		0	0	0	0	0	0	0
045210	Kayapa	Ambalata W.S.S							
		Babadi W.S.S							
		Balwang Reset. Area W.S.S							
		Butilao W.S.S							
		Capulang W.S.S							
		Caritas Village W.S							
		Liten W.S.S							
		Lower Tubong W.S							
		Mapayao W.S.S							
		Nanciakan W.S.S							
		Nayao W.S.S							
		Oliweg W.S.S							
		Padang W.S.S							
		Pampang W.S							
		Patkiaw W.S.S							
		Salicpan W.S.S							
		San Fabian W.S.S							
		Sayuding W.S.S							
		Tahlite W.S.S							
		Talecabcab W.S.S							
		Tuppan W.S.S							
		Tuyongan W.S.S							
	Municipal Total		0	0	0	0	0	0	0

Table 4.1.2 Existing Level II Systems (Cont'd.)

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
045211	Quezon	Totong W.S							
045212	Santa Fe	Balíling W.S.S							
		Bantinan W.S							
		Bayabas W.S.S							
		Bollong W.S.S							
		Butao W.S.S							
		Mag-asawang Kahoy W.S.S							
		Mangcate Tribal Council							
		Mangga W.S.S							
		Melina W.S.S							
		Pacalbo W.S.S							
		Perez Park W.S.S							
		Pulao W.S.S							
		Salaesae W.S.S							
		Tactac W.S.S							
		VillaFlores W.S							
	Municipal Total		0	0	0	0	0	0	0
045213	Solano	Dadap W.S.S							
045214	Villaverde	Brgy. Cabuluan W.S.S							
		Ocapon W.S.S							
	Municipal 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)				(%)
045215	Alfonso Castaneda	Olong-Olong W.S.S													
		Piculiat - Amot W.S.S													
		Sitio Marikit W.S.S													
	Municipal Total		0	0	0	0	0	0	0	0	0	0	0	0	0
045201	Ambaguio	Naduntog W.S													
045202	Aritao	Anayo W.S.S											2.00		
		Boyot Cueva Cili W.S.S													
		Calitlitan W.S.S													
		Darapidap W.S.S													
		Kalipkip W.S.S													
		Lactawan W.S.S											5.00		
		Lobo-Kirang W.S.S													
		Lukib W.S.S													
		Mansoyosoy W.S.S													
		Ocao-Capinaan W.S.S													
		Tucanon W.S.S													
		Yaway W.S.S											5.00		
	Municipal Total		0	0	0	0	0	0	0	0	0	0	12.00	0	0
045203	Bagabag	Murong W.S.S													
		Sta.Cruz W.S.S													
	Municipal Total		0	0	0	0	0	0	0	0	0	0	0	0	0
045204	Bambang	Bansing Water System													
		Manamtam W.S													
		Pallas Tribal Council W.S.S													
		Sto. Domingo W.S.S													
	Municipal Total		0	0	0	0	0	0	0	0	0	0	0	0	0

Table 4.1.2 Existing Level II Systems (Cont'd.)

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)				(%)
045206	Diadi	Duruarog W.S													
		Rosario W.S													
		San Luis W.S													
		Villa Aurora W.S													
	Municipal Total		0	0	0	0	0	0	0	0	0	0	0	0	0
045207	Dupax del Norte	Belance W.W.S													
		Bitnong W.S													
		Brgy. Oyao W.S													
		Inaban W.S													
		Lamo W.S													
		Mabasa W.S													
		Macabenga W.S													
		Malasin W.S.S													
		Mayputo W.W.S													
		Munguia													
		Parasi W.S													
		Pudi W.S.S													
		Takbaw W.S													
		Tigep W.S													
		Yabbi W.S													
	Municipal Total		0	0	0	0	0	0	0	0	0	0	0	0	0
045208	Dupax del Sur	Biruk											10.95		
		Gabut R.W.S.S													
		Ganao W.S													
		Kinabuan W.S											6.95		
		Macatbeng W.S											6.45		
		Palabotan W.S													
	Municipal Total		0	0	0	0	0	0	0	0	0	0	24.35	0	0

Table 4.1.2 Existing Level II Systems (Cont'd.)

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)				(%)
045209	Kasibu	Dine W.S													
		Muta Tribal Council W.S													
		Poblacion Water System													
		Siguem Tribal Council W.S													
		Watwat Tribal Council													
	Municipal Total		0	0	0	0	0	0	0	0	0	0	0	0	0
045210	Kayapa	Ambalata W.S.S													
		Babadi W.S.S													
		Balwang Reset. Area W.S.S													
		Butilao W.S.S													
		Capulang W.S.S													
		Caritas Village W.S													
		Liten W.S.S													
		Lower Tubong W.S													
		Mapayao W.S.S													
		Nanciakan W.S.S													
		Nayao W.S.S													
		Oliweg W.S.S													
		Padang W.S.S													
		Pampang W.S													
		Patkiaw W.S.S													
		Salicpan W.S.S													
		San Fabian W.S.S													
		Savuding W.S.S													
		Tahlite W.S.S													
		Talecabcab W.S.S													
		Tuppan W.S.S													
		Tuyongan W.S.S													
	Municipal Total		0	0	0	0	0	0	0	0	0	0	0	0	0

Table 4.1.2 Existing Level II Systems (Cont'd.)

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)				(%)
045211	Quezon	Totong W.S													
045212	Santa Fe	Baliling W.S.S													
		Bantinan W.S													
		Bayabas W.S.S													
		Bollong W.S.S													
		Butao W.S.S													
		Mag-asawang Kahoy W.S.S													
		Mangcate Tribal Council													
		Mangga W.S.S													
		Melina W.S.S													
		Pacalbo W.S.S													
		Perez Park W.S.S													
		Pulao W.S.S													
		Salacsac W.S.S													
		Tactac W.S.S													
		VillaFlores W.S													
	Municipal Total		0	0	0	0	0	0	0	0	0	0	0	0	0
045213	Solano	Dadap W.S.S													
045214	Villaverde	Brgy. Cabuluan W.S.S													
		Ocapon W.S.S													
	Municipal 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	Public Faucet Consumers	House Connection Consumers	Expected Subsidies	Other	Annual Income	Payment by Public Faucet Consumers	Payment by House Connection Consumer	Subsidies	Others
			(Number)	(Thousand of Pesos/year)								
045215	Alfonso Castaneda	Olong-Olong W.S.S										
		Piculiat - Amot W.S.S										
		Situo Marikit W.S.S										
	Municipal Total											
045201	Ambaguio	Naduntog W.S										
045202	Aritao	Anayo W.S.S										
		Boyot Cueva Cili W.S.S										
		Calitlitan W.S.S										
		Darapidap W.S.S										
		Kalipkip W.S.S										
		Lactawan W.S.S										
		Lobo-Kirang W.S.S										
		Lukib W.S.S										
		Mansoyosoy W.S.S										
		Ocao-Capinaan W.S.S										
		Tucanon W.S.S										
		Yaway W.S.S										
	Municipal Total											
045203	Bagabag	Murong W.S.S										
		Sta.Cruz W.S.S										
	Municipal Total											
045204	Bambang	Bansing Water System										
		Manamtam W.S										
		Pallas Tribal Council W.S.S										
		Sto. Domingo W.S.S										
	Municipal Total											

Table 4.1.2 Existing Level II Systems (Cont'd.)

Sheet 6

NEDA Geo-graphic Code	Municipality	Name of System (Operating Body)	Billings					Revenues				
			Annual	Public Faucet Consumers	House Connection Consumers	Expected Subsidies	Other	Annual Income	Payment by Public Faucet Consumers	Payment by House Connection Consumer	Subsidies	Others
			(Number)	(Thousand of Pesos/year)								
045206	Diadi	Duruarog W.S										
		Rosario W.S										
		San Luis W.S										
		Villa Aurora W.S										
	Municipal Total											
045207	Dupax del Norte	Belance W.W.S										
		Bitnong W.S										
		Brgy. Oyao W.S										
		Inaban W.S										
		Lamo W.S										
		Mabasa W.S										
		Macabenga W.S										
		Malasin W.S.S										
		Mayputo W.W.S										
		Munguia										
		Parasi W.S										
		Pudi W.S.S										
		Takbaw W.S										
		Tigep W.S										
		Yabbi W.S										
	Municipal Total											
045208	Dupax del Sur	Biruk										
		Gabut R.W.S.S										
		Ganao W.S										
		Kinabuan W.S										
		Macatbeng W.S										
		Palabotan W.S										
	Municipal Total											

Table 4.1.2 Existing Level II Systems (Cont'd.)

Sheet 6

NEDA Geo-graphic Code	Municipality	Name of System (Operating Body)	Billings					Revenues				
			Annual	Public Faucet Consumers	House Connection Consumers	Expected Subsidies	Other	Annual Income	Payment by Public Faucet Consumers	Payment by House Connection Consumer	Subsidies	Others
			(Number)	(Thousand of Pesos/year)								
045209	Kasibu	Dine W.S										
		Muta Tribal Council W.S										
		Poblacion Water System										
		Siguem Tribal Council W.S										
		Watwat Tribal Council										
	Municipal Total											
045210	Kayapa	Ambalata W.S.S										
		Babadi W.S.S										
		Balwang Reset. Area W.S.S										
		Butilao W.S.S										
		Capulang W.S.S										
		Caritas Village W.S										
		Liten W.S.S										
		Lower Tubong W.S										
		Mapayao W.S.S										
		Nanciakan W.S.S										
		Nayao W.S.S										
		Oliweg W.S.S										
		Padang W.S.S										
		Pampang W.S										
		Patkiaw W.S.S										
		Salicpan W.S.S										
		San Fabian W.S.S										
		Sayuding W.S.S										
		Tahlite W.S.S										
		Talecabcab W.S.S										
		Tuppan W.S.S										
		Tuyongan W.S.S										
	Municipal Total											

Table 4.1.2 Existing Level II Systems (Cont'd.)

Sheet 6

NEDA Geo-graphic Code	Municipality	Name of System (Operating Body)	Billings					Revenues				
			Annual	Public Faucet Consumers	House Connection Consumers	Expected Subsidies	Other	Annual Income	Payment by Public Faucet Consumers	Payment by House Connection Consumer	Subsidies	Others
			(Number)	(Thousand of Pesos/year)								
045211	Quezon	Totong W.S										
045212	Santa Fe	Baliling W.S.S										
		Bantinan W.S										
		Bayabas W.S.S										
		Bollong W.S.S										
		Butao W.S.S										
		Mag-asawang Kahoy W.S.S										
		Mangcate Tribal Council										
		Mangga W.S.S										
		Melina W.S.S										
		Pacalbo W.S.S										
		Perez Park W.S.S										
		Pulao W.S.S										
		Salaesac W.S.S										
		Tactac W.S.S										
		VillaFlores W.S										
	Municipal Total											
045213	Solano	Dadap W.S.S										
045214	Villaverde	Brgy. Cabuluan W.S.S										
		Ocapon W.S.S										
	Municipal Total											

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.

The results of water quality analysis indicate that about 17% of existing wells in a provincial average are classified unsafe sources. Since the total number of shallow wells (14,843) occupies 91% of the total number of Level I wells (16,297) 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 4.1.3 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 Number of Level I Facilities by Safe and Unsafe Classification

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	Unde-veloped Spring	Sub-total	Shallow Well	Open Dug Well	Rain Water Collector	Sub-total		
045201	Alfonso Castañeda	Urban	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Rural	8	5	0	9	22	2	4	0	6	28	1	0	0	1	1	0	0	1	2	30
		Total	8	5	0	9	22	2	4	0	6	28	1	0	0	1	1	0	0	1	2	30
045202	Ambaguio	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	30	30	0	0	0	0	30	0	2	0	2	0	5	13	18	20	50
		Total	0	0	0	30	30	0	0	0	0	30	0	2	0	2	0	5	13	18	20	50
045203	Aritao	Urban	3	0	0	0	3	5	256	0	261	264	0	0	0	0	52	4	0	56	56	320
		Rural	31	15	0	12	58	53	113	0	166	224	3	40	0	43	23	30	0	53	96	320
		Total	34	15	0	12	61	58	369	0	427	488	3	40	0	43	75	34	0	109	152	640
045204	Bagabag	Urban	1	2	0	0	3	64	294	0	358	361	0	0	1	1	60	0	0	60	61	422
		Rural	0	32	0	5	37	141	530	0	671	708	6	3	2	11	109	2	0	111	122	830
		Total	1	34	0	5	40	205	824	0	1,029	1,069	6	3	3	12	169	2	0	171	183	1,252
045205	Bambang	Urban	3	8	0	0	11	1	691	0	692	703	2	0	0	2	141	0	0	141	143	846
		Rural	40	27	0	6	73	126	736	0	862	935	5	0	0	5	151	16	0	167	172	1,107
		Total	43	35	0	6	84	127	1,427	0	1,554	1,638	7	0	0	7	292	16	0	308	315	1,953
045206	Bayombong	Urban	2	2	0	0	4	2	3,087	0	3,089	3,093	1	0	0	1	632	0	0	632	633	3,726
		Rural	19	0	0	16	35	5	706	0	711	746	0	0	0	0	145	17	0	162	162	908
		Total	21	2	0	16	39	7	3,793	0	3,800	3,839	1	0	0	1	777	17	0	794	795	4,634
045207	Diadi	Urban	21	2	0	1	24	15	19	0	34	58	1	0	1	2	4	0	0	4	6	64
		Rural	28	14	0	15	57	9	52	0	61	118	3	0	15	18	11	23	0	34	52	170
		Total	49	16	0	16	81	24	71	0	95	176	4	0	16	20	15	23	0	38	58	234
045208	Dupax del Norte	Urban	8	0	0	1	9	7	108	0	115	124	0	0	2	2	22	16	0	38	40	164
		Rural	2	11	0	22	35	5	203	0	208	243	2	0	12	14	42	160	0	202	216	459
		Total	10	11	0	23	44	12	311	0	323	367	2	0	14	16	64	176	0	240	256	623
045209	Dupax del Sur	Urban	6	0	0	2	8	0	32	0	32	40	0	0	0	0	7	0	0	7	7	47
		Rural	10	6	0	17	33	10	53	0	63	96	1	0	0	1	11	0	40	51	52	148
		Total	16	6	0	19	41	10	85	0	95	136	1	0	0	1	18	0	40	58	59	195

Table 4.1.3 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	Unde-veloped Spring	Sub-total	Shallow Well	Open Dug Well	Rain Water Collector	Sub-total		
045210	Kasibu	Urban	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	3	3
		Rural	2	5	0	58	65	30	446	0	476	541	1	0	1	2	91	52	143	286	288	829
		Total	2	5	0	58	65	30	446	0	476	541	1	0	1	2	91	55	143	289	291	832
045211	Kayapa	Urban	0	0	0	7	7	0	0	0	0	7	0	0	0	0	0	0	0	0	0	7
		Rural	2	2	0	54	58	0	1	0	1	59	1	0	0	1	0	0	0	0	1	60
		Total	2	2	0	61	65	0	1	0	1	66	1	0	0	1	0	0	0	0	1	67
045212	Quezon	Urban	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Rural	6	12	0	15	33	112	276	0	388	421	2	127	10	139	56	141	0	197	336	757
		Total	6	12	0	15	33	112	276	0	388	421	2	127	10	139	56	141	0	197	336	757
045213	Santa Fe	Urban	0	2	0	4	6	0	2	0	2	8	1	0	0	1	1	0	0	1	2	10
		Rural	3	0	0	27	30	0	3	0	3	33	0	0	0	0	1	3	0	4	4	37
		Total	3	2	0	31	36	0	5	0	5	41	1	0	0	1	2	3	0	5	6	47
045214	Solano	Urban	0	6	0	0	6	0	1,453	0	1,453	1,459	1	0	0	1	298	0	0	298	299	1,758
		Rural	19	61	0	9	89	1	2,063	0	2,064	2,153	12	0	0	12	422	4	0	426	438	2,591
		Total	19	67	0	9	95	1	3,516	0	3,517	3,612	13	0	0	13	720	4	0	724	737	4,349
045215	Villaverde	Urban	2	2	0	0	4	0	654	0	654	658	0	0	0	0	134	0	0	134	134	792
		Rural	2	25	0	11	38	0	299	0	299	337	5	0	1	6	61	0	0	61	67	404
		Total	4	27	0	11	42	0	953	0	953	995	5	0	1	6	195	0	0	195	201	1,196
Provincial Total		Urban	46	24	0	15	85	94	6,596	0	6,690	6,775	6	0	4	10	1,351	23	0	1,374	1,384	8,159
		Rural	172	215	0	306	693	494	5,485	0	5,979	6,672	42	172	41	255	1,124	453	196	1,773	2,028	8,700
		Total	218	239	0	321	778	588	12,081	0	12,669	13,447	48	172	45	265	2,475	476	196	3,147	3,412	16,859

- 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 4.1.4. Table 4.1.5 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 4.1.4 Estimation of Unserved Population by Municipality

NEDA Geo-graphic Code	Municipality	Type	Population and Household Size		Served Population			Unserved Population				Population Covered by Level I Facilities
								Unserved Percentage (1990)			Unserved Population (1995)	
			Number	HH Size	Level III	Level II	Total	Total No. of HHs	Number of Unserved HHs	%		
045201	Alfonso Castañeda	Urban	0	0.0	0	0	0	0	0	0.0	0	0
		Rural	4,344	5.3	0	1,890	1,890	710	298	42.0	1,823	631
		Total	4,344	5.3	0	1,890	1,890	710	298	42.0	1,823	631
045202	Ambaguio	Urban	0	0.0	0	0	0	0	0	0.0	0	0
		Rural	9,923	5.6	0	603	603	1,294	1,081	83.5	8,290	1,030
		Total	9,923	5.6	0	603	603	1,294	1,081	83.5	8,290	1,030
045203	Aritao	Urban	11,204	5.2	1,626	0	1,626	1,990	9	0.5	51	9,527
		Rural	16,964	5.2	708	2,633	3,341	3,030	591	19.5	3,309	10,314
		Total	28,168	5.2	2,334	2,633	4,967	5,020	600	12.0	3,360	19,841
045204	Bagabag	Urban	14,942	5.3	2,035	0	2,035	2,336	3	0.1	19	12,888
		Rural	14,310	5.1	0	954	954	2,668	202	7.6	1,083	12,273
		Total	29,252	5.2	2,035	954	2,989	5,004	205	4.1	1,102	25,161
045205	Bambang	Urban	13,190	5.0	0	0	0	2,353	6	0.3	34	13,156
		Rural	24,974	5.1	0	1,258	1,258	4,322	359	8.3	2,074	21,642
		Total	38,164	5.0	0	1,258	1,258	6,675	365	5.5	2,108	34,798
045206	Bayombong	Urban	25,140	5.6	6,599	275	6,874	4,267	4	0.1	24	18,242
		Rural	19,643	4.4	2,268	0	2,268	3,712	217	5.8	1,148	16,227
		Total	44,783	5.0	8,867	275	9,142	7,979	221	2.8	1,172	34,469
045207	Diadi	Urban	1,931	5.3	0	0	0	312	7	2.2	43	1,888
		Rural	11,107	5.2	0	450	450	1,873	410	21.9	2,431	8,226
		Total	13,038	5.2	0	450	450	2,185	417	19.1	2,474	10,114
045208	Dupax del Norte	Urban	6,084	5.1	0	1,250	1,250	1,119	18	1.6	98	4,736
		Rural	17,316	5.1	0	2,996	2,996	2,953	1,056	35.8	6,192	8,128
		Total	23,400	5.1	0	4,246	4,246	4,072	1,074	26.4	6,290	12,864

Table 4.1.4 Estimation of Unserved Population by Municipality (Cont'd.)

NEDA Geo-graphic Code	Municipality	Type	Population and Household Size		Served Population			Unserved Population				Population Covered by Level I Facilities
								Unserved Percentage (1990)			Unserved Population (1995)	
			Number	HH Size	Level III	Level II	Total	Total No. of HHs	Number of Unserved HHs	%		
045209	Dupax del Sur	Urban	3,423	5.4	0	0	0	597	17	2.8	97	3,326
		Rural	10,505	5.4	0	1,407	1,407	1,675	950	56.7	5,958	3,140
		Total	13,928	5.4	0	1,407	1,407	2,272	967	42.6	6,055	6,466
045210	Kasibu	Urban	0	0.0	0	0	0	0	0	0.0	0	0
		Rural	25,581	5.2	0	1,377	1,377	4,151	3,084	74.3	19,005	5,199
		Total	25,581	5.2	0	1,377	1,377	4,151	3,084	74.3	19,005	5,199
045211	Kayapa	Urban	744	5.4	0	667	667	125	31	24.8	77	0
		Rural	20,119	5.4	0	4,586	4,586	3,365	1,804	53.6	10,786	4,747
		Total	20,863	5.4	0	5,253	5,253	3,490	1,835	52.6	10,863	4,747
045212	Quezon	Urban	0	0.0	0	0	0	0	0	0.0	0	0
		Rural	13,681	5.1	0	92	92	2,408	676	28.1	3,841	9,748
		Total	13,681	5.1	0	92	92	2,408	676	28.1	3,841	9,748
045213	Santa Fe	Urban	1,366	5.7	0	0	0	227	17	7.5	102	1,264
		Rural	11,216	5.2	0	3,527	3,527	1,669	973	58.3	6,539	1,150
		Total	12,582	5.2	0	3,527	3,527	1,896	990	52.2	6,641	2,414
045214	Solano	Urban	27,494	5.0	4,970	100	5,070	5,257	3	0.1	16	22,408
		Rural	21,282	5.0	0	558	558	3,616	182	5.0	1,071	19,653
		Total	48,776	5.0	4,970	658	5,628	8,873	185	2.1	1,087	42,061
045215	Villaverde	Urban	4,300	5.5	0	0	0	680	3	0.4	19	4,281
		Rural	11,064	5.3	0	239	239	1,849	182	9.8	1,089	9,736
		Total	15,364	5.4	0	239	239	2,529	185	7.3	1,108	14,017
Provincial Total		Urban	109,818	5.2	15,230	2,292	17,522	19,263	118	0.6	580	91,716
		Rural	232,029	5.1	2,976	22,570	25,546	39,295	12,065	30.7	74,639	131,844
		Total	341,847	5.1	18,206	24,862	43,068	58,558	12,183	20.8	75,219	223,560

Table 4.1.5 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	Alfonso Castañeda	Urban	0	0	0	0	0	0	0	0	0	0	0	0	0
		Rural	631	22	1	23	6	1	7	3	1	4	16	3	19
		Total	631	22	1	23	6	1	7	3	1	4	16	3	19
045202	Ambaguio	Urban	0	0	0	0	0	0	0	0	0	0	0	0	0
		Rural	1,030	30	2	32	0	18	18	0	9	9	0	50	50
		Total	1,030	30	2	32	0	18	18	0	9	9	0	50	50
045203	Aritao	Urban	9,527	3	0	3	261	56	317	131	28	159	679	146	825
		Rural	10,314	58	43	101	166	53	219	83	27	110	432	138	570
		Total	19,841	61	43	104	427	109	536	214	55	268	1,111	284	1,395
045204	Bagabag	Urban	12,888	3	1	4	358	60	418	179	30	209	949	159	1,108
		Rural	12,273	37	11	48	671	111	782	336	56	391	1,711	283	1,994
		Total	25,161	40	12	52	1,029	171	1,200	515	86	600	2,660	442	3,102
045205	Bambang	Urban	13,156	11	2	13	692	141	833	346	71	417	1,730	353	2,083
		Rural	21,642	73	5	78	862	167	1,029	431	84	515	2,198	426	2,624
		Total	34,798	84	7	91	1,554	308	1,862	777	155	931	3,928	779	4,707
045206	Bayombong	Urban	18,242	4	1	5	3,089	632	3,721	1,545	316	1,861	8,649	1,770	10,419
		Rural	16,227	35	0	35	711	162	873	356	81	437	1,564	356	1,920
		Total	34,469	39	1	40	3,800	794	4,594	1,901	397	2,297	10,213	2,126	12,339
045207	Diadi	Urban	1,888	24	2	26	34	4	38	17	2	19	90	11	101
		Rural	8,226	57	18	75	61	34	95	31	17	48	159	88	247
		Total	10,114	81	20	101	95	38	133	48	19	67	249	99	348
045208	Dupax del Norte	Urban	4,736	9	2	11	115	38	153	58	19	77	293	97	390
		Rural	8,128	35	14	49	208	202	410	104	101	205	530	515	1,045
		Total	12,864	44	16	60	323	240	563	162	120	282	823	612	1,435

Table 4.1.5 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
045209	Dupax del Sur	Urban	3,326	8	0	8	32	7	39	16	4	20	86	19	105
		Rural	3,140	33	1	34	63	51	114	32	26	57	170	138	308
		Total	6,466	41	1	42	95	58	153	48	30	77	256	157	413
045210	Kasibu	Urban	0	0	0	0	0	3	3	0	2	2	0	0	0
		Rural	5,199	65	2	67	476	286	762	238	143	381	1,238	744	1,982
		Total	5,199	65	2	67	476	289	765	238	145	383	1,238	744	1,982
045211	Kayapa	Urban	0	7	0	7	0	0	0	0	0	0	0	0	0
		Rural	4,747	58	1	59	1	0	1	1	0	1	3	0	3
		Total	4,747	65	1	66	1	0	1	1	0	1	3	0	3
045212	Quezon	Urban	0	0	0	0	0	0	0	0	0	0	0	0	0
		Rural	9,748	33	139	172	388	197	585	194	99	293	989	502	1,491
		Total	9,748	33	139	172	388	197	585	194	99	293	989	502	1,491
045213	Santa Fe	Urban	1,264	6	1	7	2	1	3	1	1	2	6	3	9
		Rural	1,150	30	0	30	3	4	7	2	2	4	8	10	18
		Total	2,414	36	1	37	5	5	10	3	3	5	14	13	27
045214	Solano	Urban	22,408	6	1	7	1,453	298	1,751	727	149	876	3,633	745	4,378
		Rural	19,653	89	12	101	2,064	426	2,490	1,032	213	1,245	5,160	1,065	6,225
		Total	42,061	95	13	108	3,517	724	4,241	1,759	362	2,121	8,793	1,810	10,603
045215	Villaverde	Urban	4,281	4	0	4	654	134	788	327	67	394	1,799	369	2,168
		Rural	9,736	38	6	44	299	61	360	150	31	180	792	162	954
		Total	14,017	42	6	48	953	195	1,148	477	98	574	2,591	531	3,122
Provincial Total		Urban	91,716	85	10	95	6,690	1,374	8,064	3,347	689	4,036	17,914	3,672	21,586
		Rural	131,844	693	255	948	5,979	1,773	7,752	2,993	890	3,880	14,970	4,480	19,450
		Total	223,560	778	265	1,043	12,669	3,147	15,816	6,340	1,579	7,916	32,884	8,152	41,036

Table 4.1.5 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	Alfonso Castañeda	Urban	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Rural	631	577	35	612	109	7	116	4	593	14	38	1	631	15
		Total	631	577	35	612	109	7	116	4	593	14	38	1	631	15
045202	Ambaguio	Urban	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Rural	1,030	717	263	980	128	47	175	4	717	7	313	3	1,030	10
		Total	1,030	717	263	980	128	47	175	4	717	7	313	3	1,030	10
045203	Aritao	Urban	9,527	7,193	1,509	8,702	1,383	290	1,673	10	7,872	70	1,655	15	9,527	85
		Rural	10,314	6,527	3,217	9,744	1,255	619	1,874	9	6,959	41	3,355	20	10,314	61
		Total	19,841	13,611	4,726	18,446	2,638	909	3,547	10	14,831	53	5,010	18	19,841	70
045204	Bagabag	Urban	12,888	10,066	1,714	11,780	1,899	323	2,222	10	11,015	74	1,873	13	12,888	86
		Rural	12,273	8,722	1,557	10,279	1,710	305	2,015	5	10,433	73	1,840	13	12,273	86
		Total	25,161	18,760	3,271	22,059	3,609	628	4,237	6	21,448	73	3,713	13	25,161	86
045205	Bambang	Urban	13,156	9,204	1,869	11,073	1,841	374	2,215	5	10,934	83	2,222	17	13,156	100
		Rural	21,642	16,177	2,841	19,018	3,172	557	3,729	6	18,375	74	3,267	13	21,642	87
		Total	34,798	25,351	4,710	30,091	5,013	931	5,944	6	29,309	77	5,489	14	34,798	91
045206	Bayombong	Urban	18,242	6,494	1,329	7,823	1,160	237	1,397	1	15,143	60	3,099	12	18,242	73
		Rural	16,227	11,849	2,458	14,307	2,693	559	3,252	7	13,413	68	2,814	14	16,227	83
		Total	34,469	18,361	3,787	22,130	3,853	796	4,649	2	28,556	64	5,913	13	34,469	77
045207	Diadi	Urban	1,888	1,628	159	1,787	307	30	337	7	1,718	89	170	9	1,888	98
		Rural	8,226	5,699	2,280	7,979	1,096	438	1,534	13	5,858	53	2,368	21	8,226	74
		Total	10,114	7,492	2,439	9,766	1,403	468	1,871	11	7,576	58	2,538	19	10,114	78
045208	Dupax del Norte	Urban	4,736	3,303	1,043	4,346	648	205	853	10	3,596	59	1,140	19	4,736	78
		Rural	8,128	3,876	3,207	7,083	760	629	1,389	5	4,406	25	3,722	21	8,128	47
		Total	12,864	6,877	4,250	11,429	1,408	834	2,242	7	8,002	34	4,862	21	12,864	55

Table 4.1.5 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.	%
045209	Dupax del Sur	Urban	3,326	2,811	410	3,221	521	76	597	22	2,897	85	429	13	3,326	97
		Rural	3,140	2,007	825	2,832	372	153	525	6	2,177	21	963	9	3,140	30
		Total	6,466	4,521	1,235	6,053	893	229	1,122	9	5,074	36	1,392	10	6,466	46
045210	Kasibu	Urban	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Rural	5,199	2,176	1,041	3,217	418	200	618	1	3,414	13	1,785	7	5,199	20
		Total	5,199	2,169	1,041	3,217	418	200	618	1	3,414	13	1,785	7	5,199	20
045211	Kayapa	Urban	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Rural	4,747	4,664	80	4,744	864	15	879	15	4,667	23	80	0	4,747	24
		Total	4,747	4,673	80	4,744	864	15	879	13	4,667	22	80	0	4,747	23
045212	Quezon	Urban	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Rural	9,748	4,035	4,222	8,257	791	828	1,619	3	5,024	37	4,724	35	9,748	71
		Total	9,748	4,035	4,222	8,257	791	828	1,619	3	5,024	37	4,724	35	9,748	71
045213	Santa Fe	Urban	1,264	1,034	221	1,255	181	39	220	26	1,040	76	224	16	1,264	93
		Rural	1,150	1,064	68	1,132	205	13	218	7	1,072	10	78	1	1,150	10
		Total	2,414	2,188	289	2,387	386	52	438	10	2,112	17	302	2	2,414	19
045214	Solano	Urban	22,408	14,965	3,065	18,030	2,993	613	3,606	4	18,598	68	3,810	14	22,408	82
		Rural	19,653	11,183	2,245	13,428	2,237	449	2,686	2	16,343	77	3,310	16	19,653	92
		Total	42,061	26,164	5,310	31,458	5,230	1,062	6,292	3	34,941	72	7,120	15	42,061	86
045215	Villaverde	Urban	4,281	1,757	356	2,113	319	65	384	1	3,556	83	725	17	4,281	100
		Rural	9,736	7,351	1,431	8,782	1,387	270	1,657	7	8,143	74	1,593	14	9,736	88
		Total	14,017	9,082	1,787	10,895	1,706	335	2,041	3	11,699	76	2,318	15	14,017	91
Provincial Total		Urban	91,716	58,455	11,675	70,130	11,252	2,252	13,504	3	76,369	70	15,347	14	91,716	84
		Rural	131,844	86,624	25,770	112,394	17,197	5,089	22,286	5	101,594	44	30,250	13	131,844	57
		Total	223,560	145,079	37,445	182,524	28,449	7,341	35,790	4	177,963	52	45,597	13	223,560	65

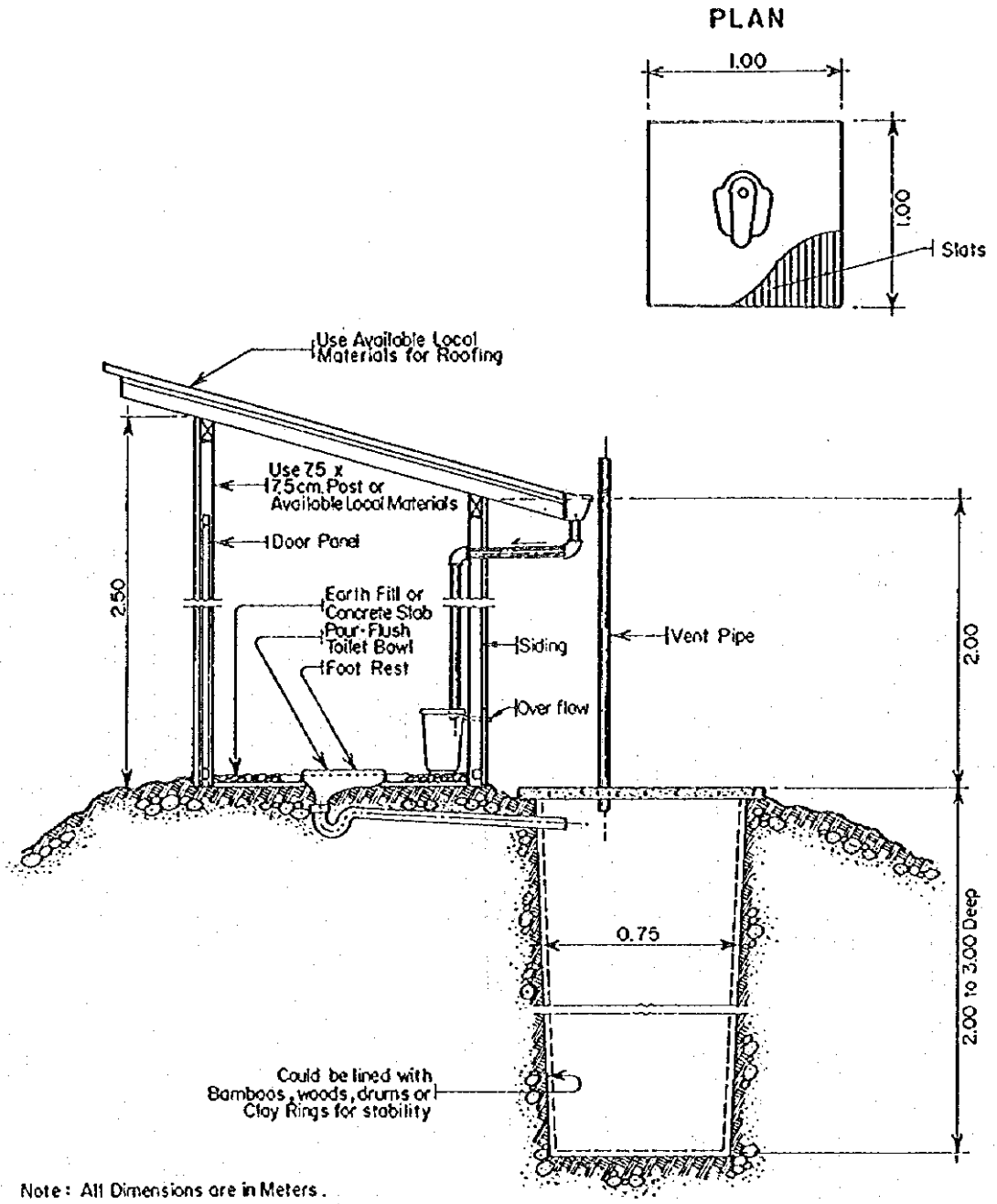
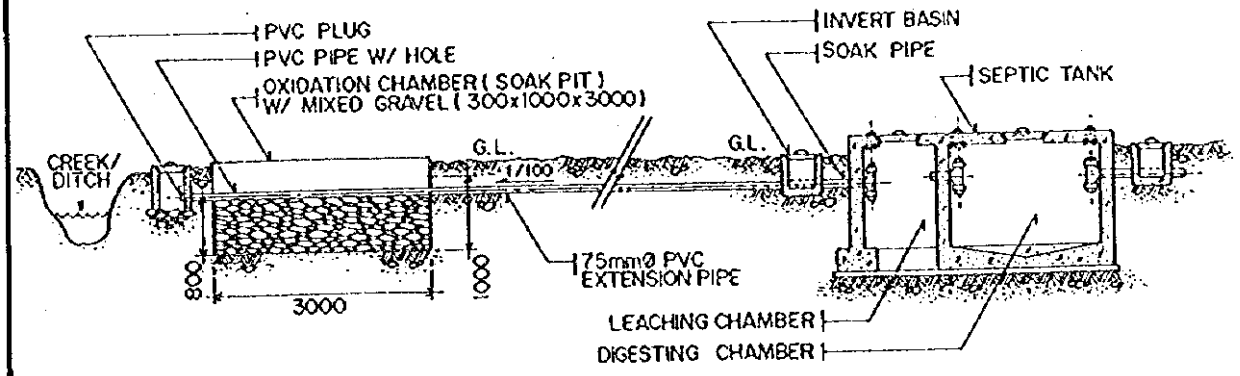


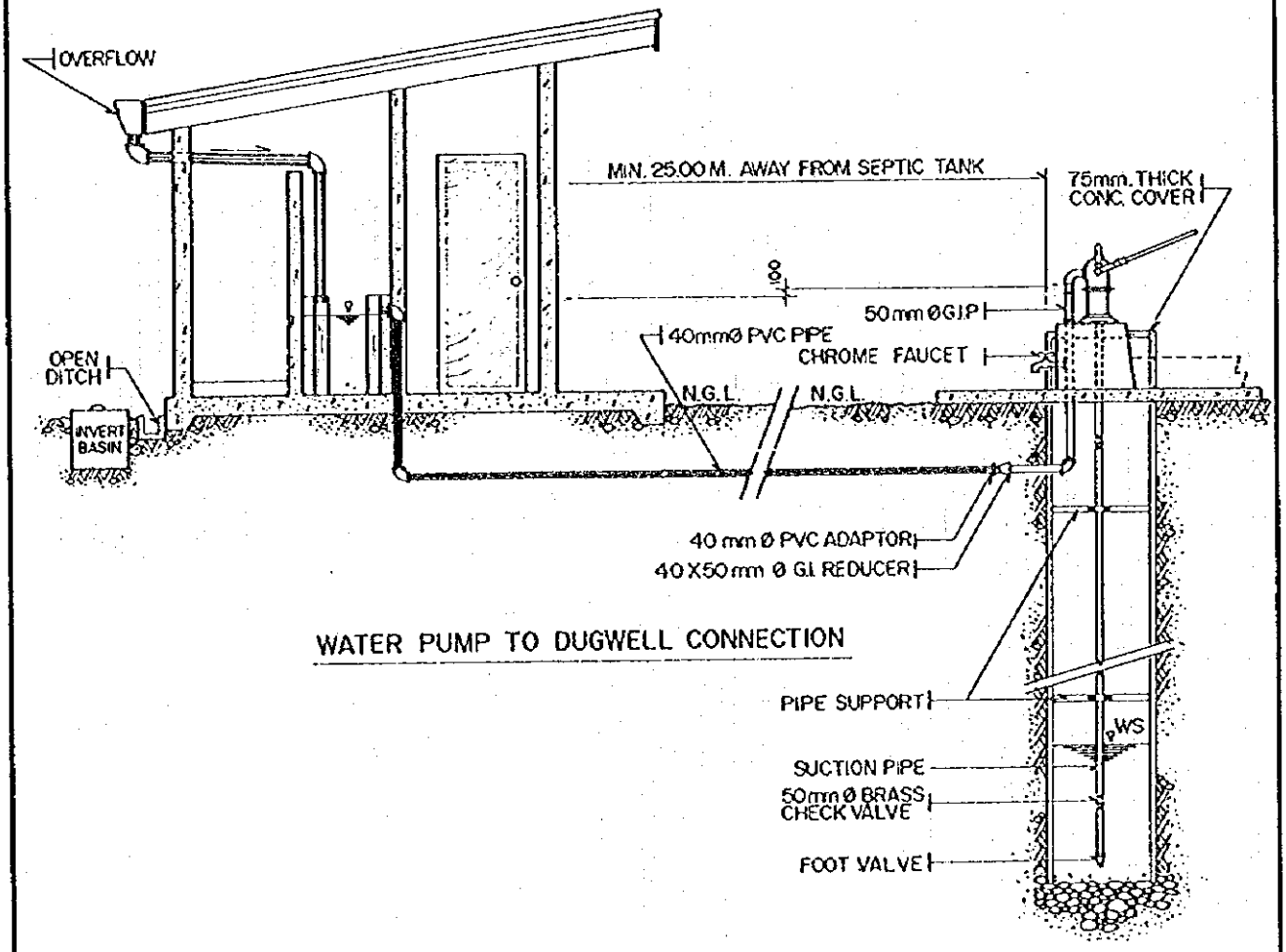
FIGURE 4.2.1

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		Pour Flush		VIP		Total		Unsanitary		No Facility	
			Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Alfonso Castañeda	Urban	0	0	0	0	0	0	0	0	0	0	0	0	0
	Rural	822	0	0	341	41	137	17	478	58	227	28	117	14
	Total	822	0	0	341	41	137	17	478	58	227	28	117	14
Ambaguio	Urban	0	0	0	0	0	0	0	0	0	0	0	0	0
	Rural	1,773	0	0	164	9	541	31	705	40	336	19	732	41
	Total	1,773	0	0	164	9	541	31	705	40	336	19	732	41
Aritao	Urban	2,164	50	2	1,678	78	0	0	1,728	80	130	6	306	14
	Rural	3,287	5	0	2,210	67	0	0	2,215	67	415	13	657	20
	Total	5,451	55	1	3,888	71	0	0	3,943	72	545	10	963	18
Bagabag	Urban	2,799	58	2	2,249	80	264	9	2,571	91	121	5	107	4
	Rural	2,816	0	0	1,964	70	192	7	2,156	77	358	12	302	11
	Total	5,615	58	1	4,213	75	456	8	4,727	84	479	9	409	7
Bambang	Urban	2,623	58	2	2,129	81	0	0	2,187	83	121	5	315	12
	Rural	4,944	14	0	3,354	68	358	7	3,726	75	642	13	576	12
	Total	7,567	72	1	5,483	72	358	5	5,913	78	763	10	891	12
Bayombong	Urban	4,522	153	3	3,812	84	24	1	3,989	88	158	4	375	8
	Rural	4,511	26	1	2,526	56	143	3	2,695	60	646	14	1,170	26
	Total	9,033	179	2	6,338	70	167	2	6,684	74	804	9	1,545	17
Diadi	Urban	366	0	0	124	34	117	32	241	66	75	20	50	14
	Rural	2,144	0	0	817	38	333	16	1,150	54	218	10	776	36
	Total	2,510	0	0	941	37	450	18	1,391	55	293	12	826	33
Dupax del Norte	Urban	1,184	0	0	1,097	93	0	0	1,097	93	48	4	39	3
	Rural	3,374	0	0	2,960	88	0	0	2,960	88	184	5	230	7
	Total	4,558	0	0	4,057	89	0	0	4,057	89	232	5	269	6
Dupax del Sur	Urban	632	6	1	622	98	0	0	628	99	4	1	0	0
	Rural	1,942	0	0	802	41	85	4	887	45	159	8	895	47
	Total	2,574	6	0	1,424	55	85	3	1,515	58	163	6	895	36
Kasibu	Urban	0	0	0	0	0	0	0	0	0	0	0	0	0
	Rural	4,956	0	0	2,104	42	663	13	2,767	55	1,652	34	537	11
	Total	4,956	0	0	2,104	42	663	13	2,767	55	1,652	34	537	11
Kayapa	Urban	139	4	3	135	97	0	0	139	100	0	0	0	0
	Rural	3,757	2	0	1,315	35	387	10	1,704	45	361	10	1,692	45
	Total	3,896	6	0	1,450	37	387	10	1,843	47	361	9	1,692	44
Quezon	Urban	0	0	0	0	0	0	0	0	0	0	0	0	0
	Rural	2,699	0	0	1,268	47	707	26	1,975	73	421	16	303	11
	Total	2,699	0	0	1,268	47	707	26	1,975	73	421	16	303	11
Santa Fe	Urban	239	25	10	155	65	8	3	188	78	12	5	39	17
	Rural	2,161	0	0	888	41	190	9	1,078	50	539	25	544	25
	Total	2,400	25	1	1,043	43	198	8	1,266	52	551	23	583	25
Solano	Urban	5,539	358	6	3,838	69	646	12	4,842	87	318	6	379	7
	Rural	4,240	7	0	3,396	80	364	9	3,767	89	363	8	110	3
	Total	9,779	365	4	7,234	74	1,010	10	8,609	88	681	7	489	5
Villaverde	Urban	778	25	3	650	84	0	0	675	87	28	4	75	9
	Rural	2,080	14	1	939	45	480	23	1,433	69	366	18	281	13
	Total	2,858	39	1	1,589	56	480	17	2,108	74	394	14	356	12
Provincial Total	Urban	20,985	737	4	16,489	79	1,059	5	18,285	87	1,015	5	1,685	8
	Rural	45,506	68	0	25,048	55	4,580	10	29,696	65	6,887	15	8,922	20
	Total	66,491	805	1	41,537	62	5,639	8	47,981	72	7,902	12	10,607	16

5. EXISTING SECTOR ARRANGEMENTS AND INSTITUTIONAL CAPACITY

5.5 Sector Agencies at the Local Level

FIGURE 5.5.1
ORGANIZATIONAL CHART
PROVINCIAL PLANNING AND DEVELOPMENT OFFICE
PROVINCE OF NUEVA VIZCAYA

FIGURE 5.5.2
ORGANIZATIONAL CHART
PROVINCIAL ENGINEER'S OFFICE
PROVINCE OF NUEVA VIZCAYA

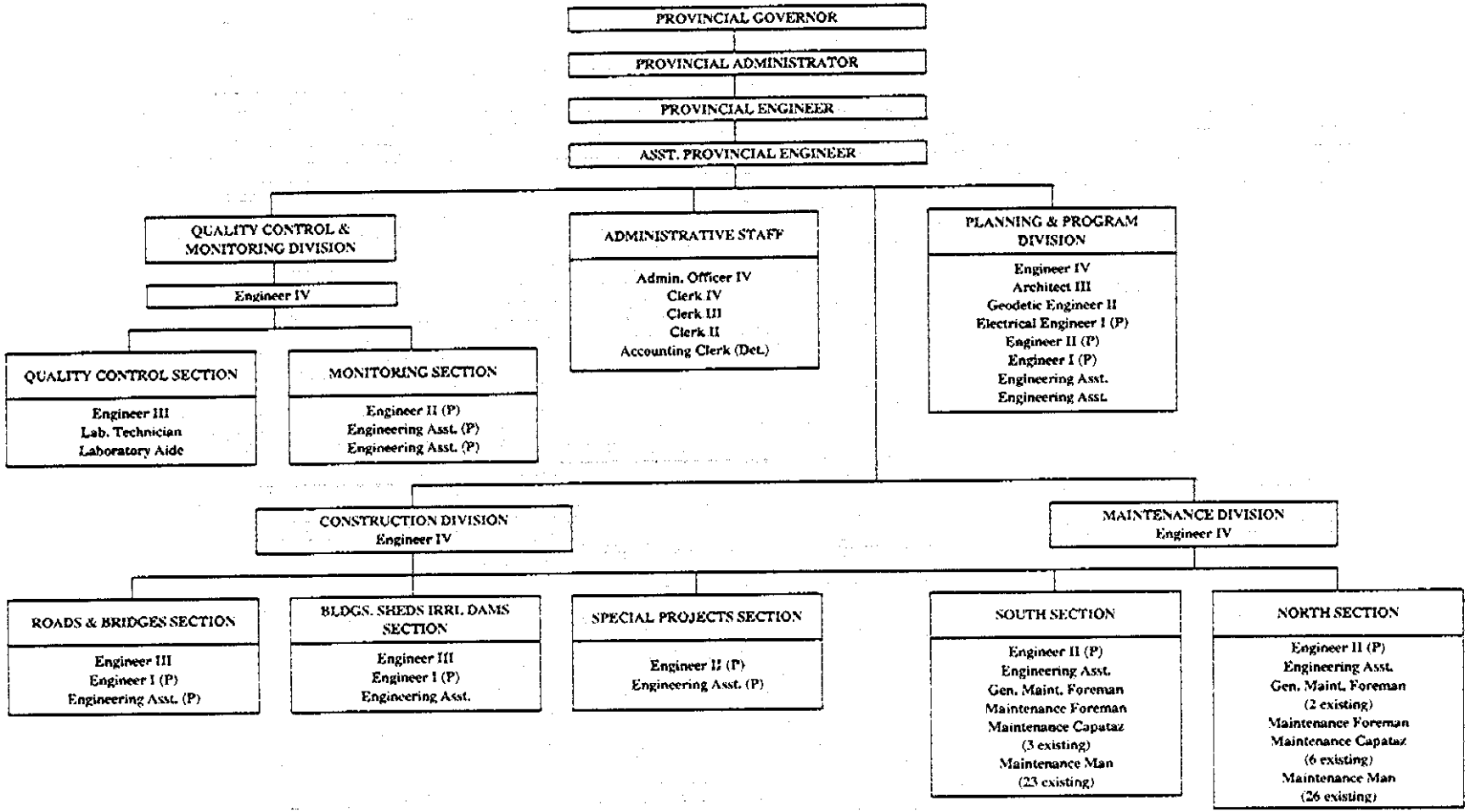
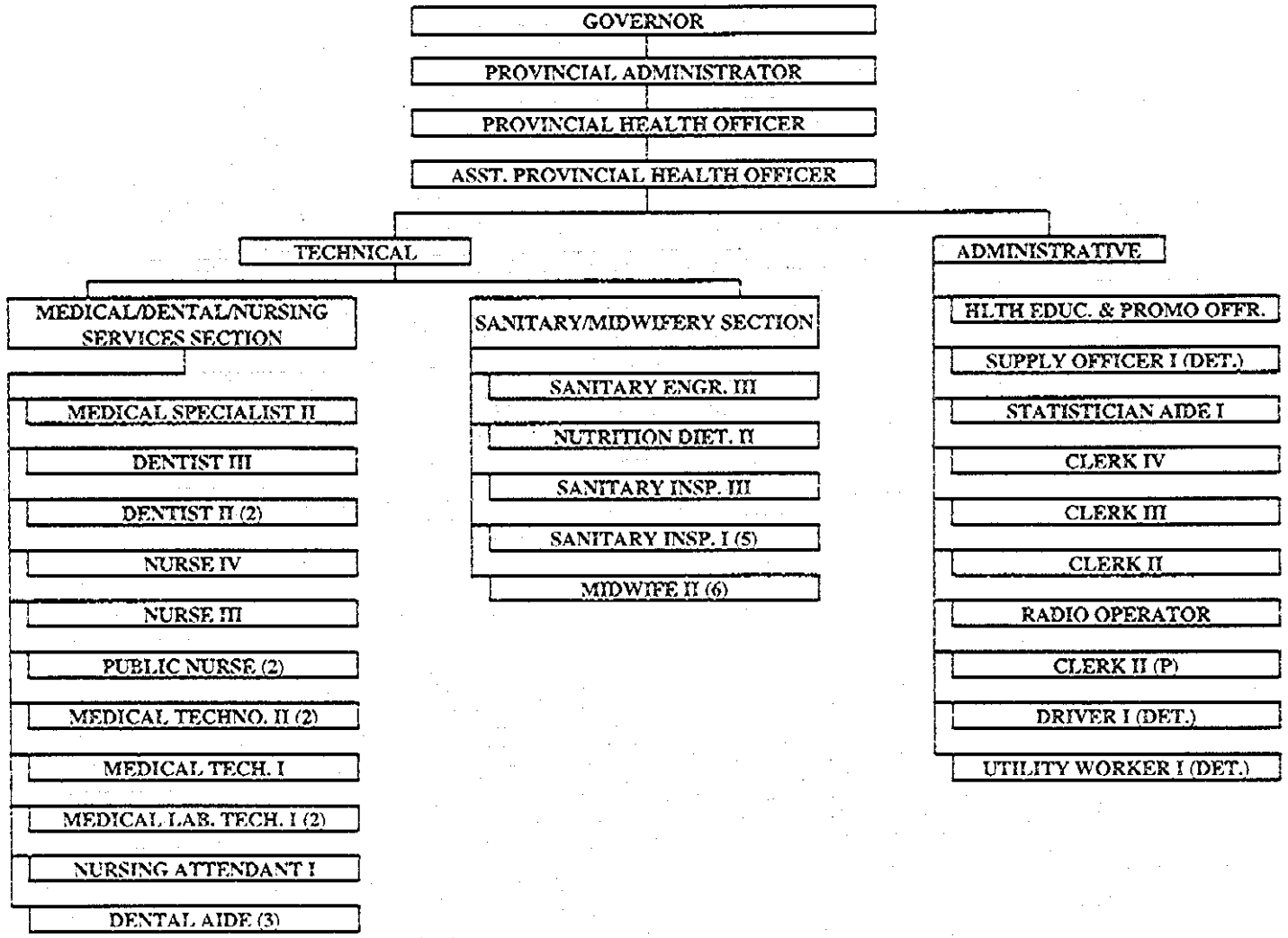


FIGURE 5.5.3
ORGANIZATIONAL CHART
PROVINCIAL HEALTH OFFICE
PROVINCE OF NUEVA VIZCAYA



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 Nueva Vizcaya 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	24,961,115	33,014,294	65,407,599	112,865,620	145,765,170
1. Alfonso Castaneda	1,045,377	1,440,102	3,867,584	6,656,801	8,331,975
2. Ambaguio	790,804	1,184,568	2,990,091	5,019,821	6,392,022
3. Aritao	1,976,892	2,544,905	4,817,201	8,351,006	10,913,964
4. Bagabag	1,763,735	2,333,784	4,339,577	7,460,924	9,701,824
5. Bambang	2,412,330	3,242,970	5,827,712	10,237,915	13,249,796
6. Bayombong	2,309,451	3,040,151	5,034,351	8,746,957	11,636,212
7. Diadi	1,272,776	1,652,549	3,272,897	5,509,418	7,164,803
8. Dupax del Norte	1,778,737	2,389,800	4,931,551	8,592,703	11,010,638
9. Dupax del Sur	1,606,865	2,124,047	4,465,250	7,768,040	9,855,871
10. Kasibu	1,691,689	2,393,127	4,752,481	8,346,498	10,497,204
11. Kayapa	2,458,845	2,869,237	5,580,334	9,798,147	12,452,329
12. Quezon	1,130,622	1,498,910	3,349,089	5,566,205	7,257,979
13. Santa Fe	1,207,600	1,713,617	3,971,742	6,748,255	8,678,337
14. Solano	2,546,057	3,287,216	5,378,724	9,359,753	12,216,634
15. Villa Verde	969,335	1,299,311	2,829,015	4,703,177	6,405,582
III Shares (%) in national total					
Total	0.817	0.816	0.918	0.904	0.893
1. Alfonso Castaneda	0.034	0.036	0.054	0.053	0.051
2. Ambaguio	0.026	0.029	0.042	0.040	0.039
3. Aritao	0.065	0.063	0.068	0.067	0.067
4. Bagabag	0.058	0.058	0.061	0.060	0.059
5. Bambang	0.079	0.080	0.082	0.082	0.081
6. Bayombong	0.076	0.075	0.071	0.070	0.071
7. Diadi	0.042	0.041	0.046	0.044	0.044
8. Dupax del Norte	0.058	0.059	0.069	0.069	0.067
9. Dupax del Sur	0.053	0.052	0.063	0.062	0.060
10. Kasibu	0.055	0.059	0.067	0.067	0.064
11. Kayapa	0.080	0.071	0.078	0.078	0.076
12. Quezon	0.037	0.037	0.047	0.045	0.044
13. Santa Fe	0.040	0.042	0.056	0.054	0.053
14. Solano	0.083	0.081	0.075	0.075	0.075
15. Villa Verde	0.032	0.032	0.040	0.038	0.039

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.

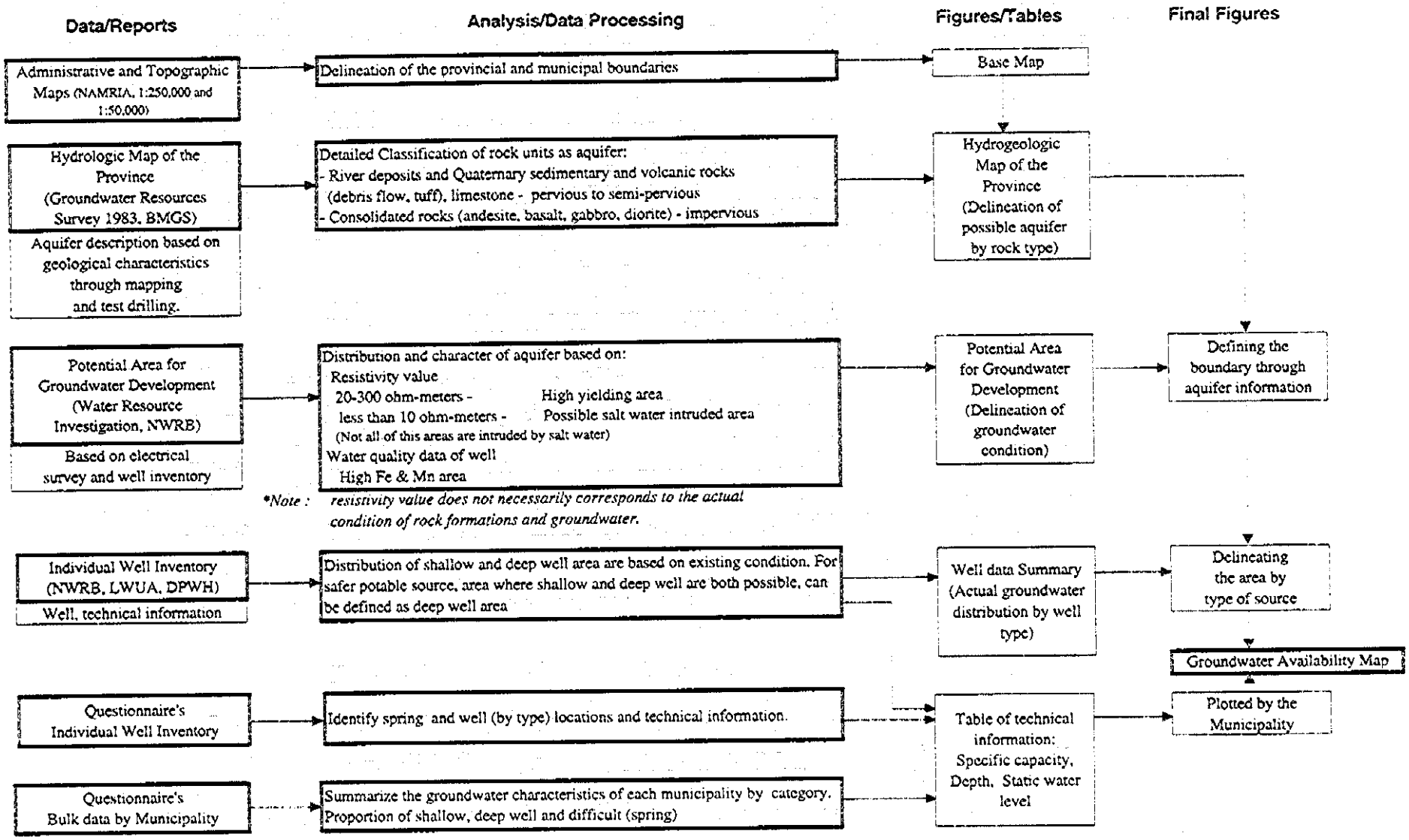
1) Prepare a base map with a scale of 1:400,000. The Administrative Map of NAMRIA (1:150,000) is used as reference map and details are verified from the Topographical Map (1:50,0000). Basic information including rivers and provincial and municipal boundaries are indicated in the prepared base map.

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



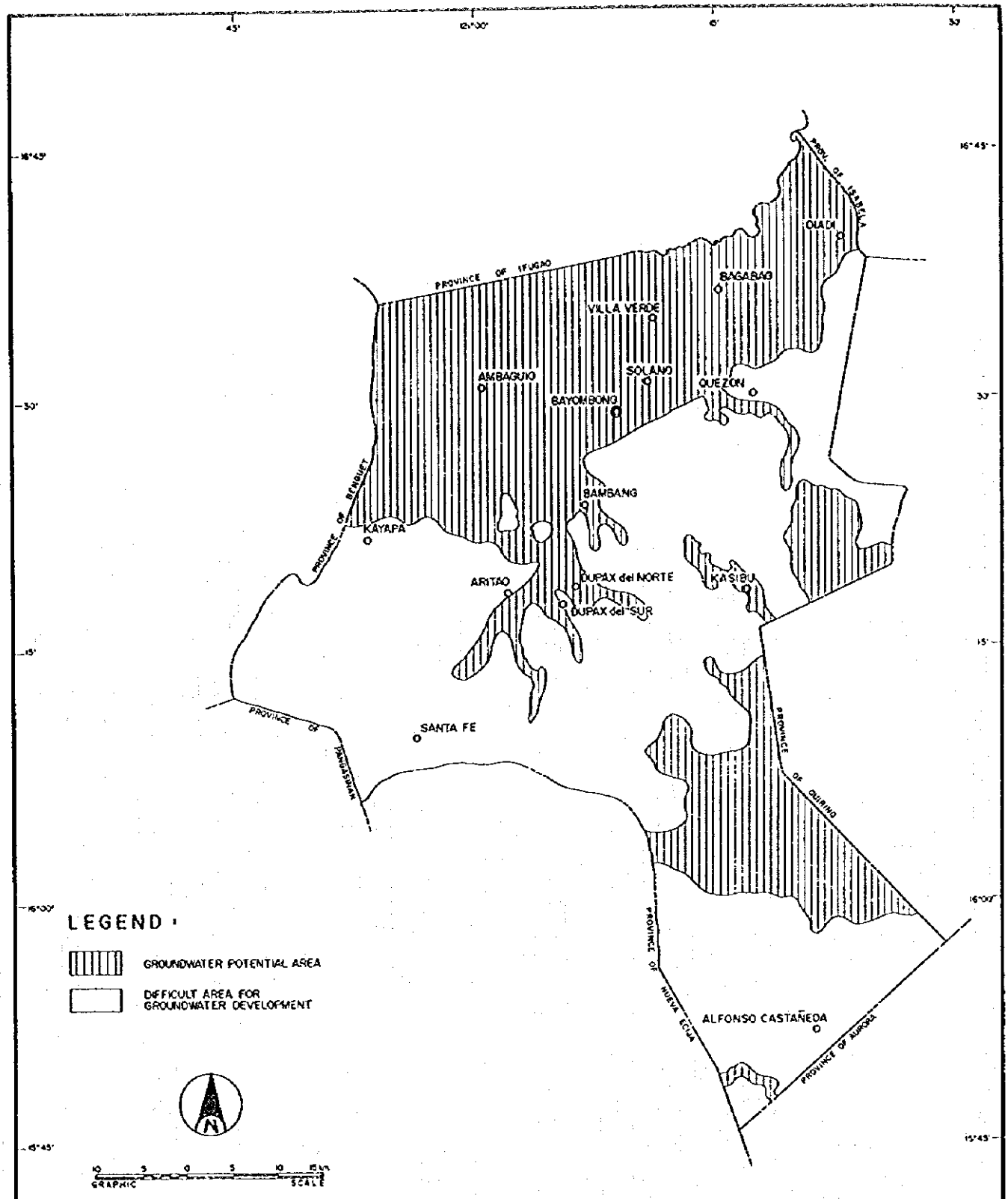


FIGURE 7.3.2

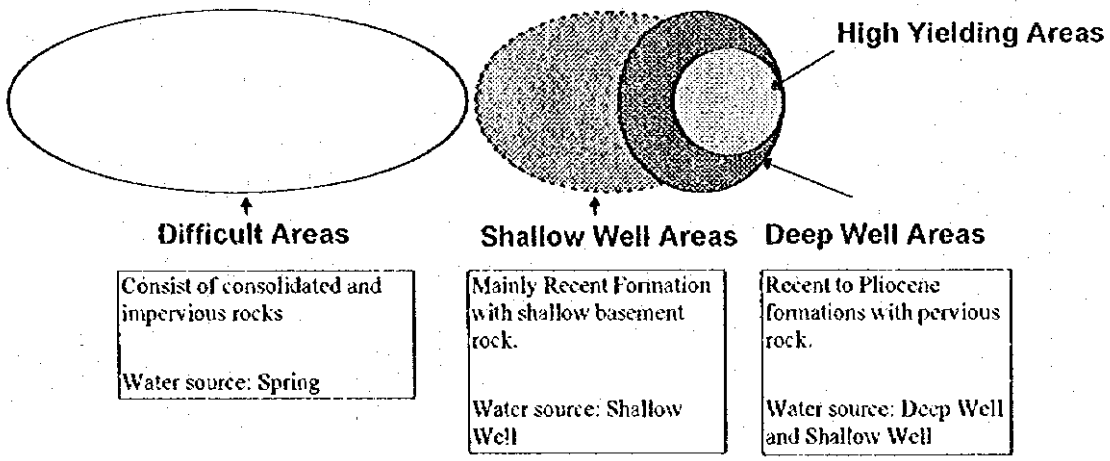
GROUNDWATER POTENTIAL AREA IN THE PROVINCE

(SOURCE : GROUNDWATER RESOURCES SURVEY, BMGS)

Considering the results of geo-electrical survey of the above investigation, resistivity values of more than 12 ohm-meter indicate a potential high yielding formation. Values less than 6 ohm-meters 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.

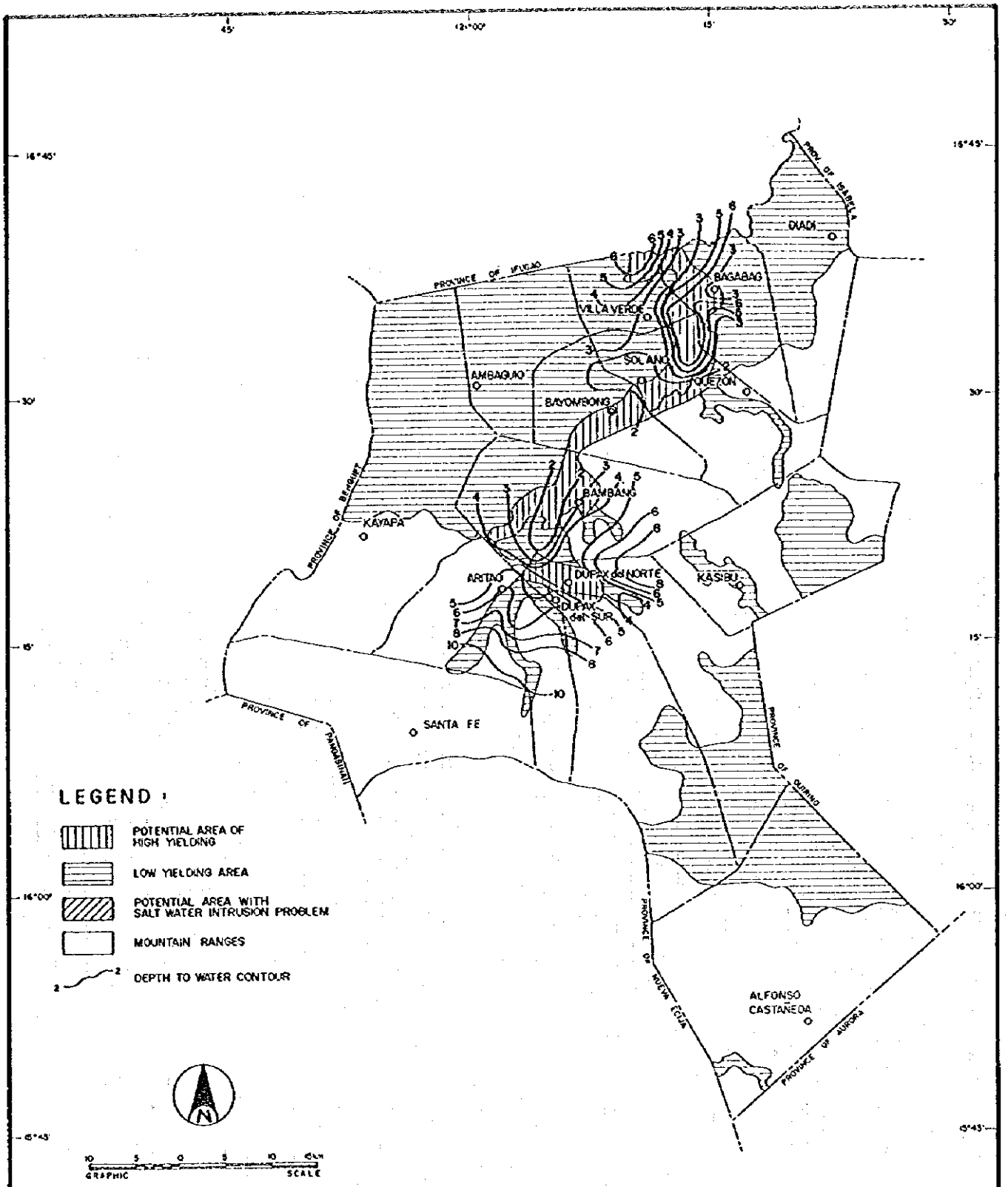


FIGURE 7.3.3

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
Alfonso Castañeda	12	0.05	0.04 - 0.06						
Ambaguio	31								
Aritao	26	0.99	0.30 - 2.00						
Bagabag	7			3	1.54	0.33 - 3.79			
Bambang	11								
Bayombong	17								
Diadi	20	3.25	3.00 - 3.50	12	3.46	0.50 - 10.00	4	3.00	3.00 - 3.00
Dupax del Norte	38	0.93	0.50 - 2.00	11	0.38	0.05 - 2.00	2	0.75	0.50 - 1.00
Dupax del Sur	28	0.41	0.21 - 1.00						
Kasibu	61	0.61	0.21 - 1.00	1	4.00				
Kayapa	86	0.97	0.30 - 5.00						
Quezon	17			10	2.94	0.06 - 4.54			
Santa Fe	47	0.95	0.07 - 8.00						
Solano	10								
Villaverde	14			3	4.50	2.50 - 3.40			
TOTAL	425			40			6		

Source: PPDO/PSPT

7.5 Surface Water Sources

(1) Study Rivers

Magat river is the main river draining most part of the northwestern half of Nueva Vizcaya, while Casecnan and Tubo are the prominent rivers on the southwestern half section. In addition, the Pampang river drains a small portion on the southwest. In this study, Magat river is given emphasis because majority of the municipalities are located within its basin. It has four major tributaries, namely, Matuno, Sta. Cruz, Sta Fe, and Marang. Magat and its tributary rivers can be categorized into two types based on drainage area and flow rate. The first type has narrow and relatively small drainage area (25-300km^2) with lower flow rate (less than 10 cum./sec in average). The second type has an area of more than 500 km^2 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. Sta. Cruz, Sta. Fe and Marang rivers fall under the first type, while Magat and Matuno rivers represent the second type. Magat and Matuno rivers are considered potential sources of water supply since the densely populated municipalities in Nueva Viscaya are located within their catchment areas. These rivers were selected for further study. Fig. 7.5.1 shows the river basins in the province and Table 7.5.1 present basic information on the selected rivers.

Table 7.5.1 River Information and Related Data

River/Spring	Drainage Area (km^2)	Flow Rate (cu. m/sec)			Relevant Information in the Basin	
		Minimum	Average	Maximum	Major Mun. & Population 1/	Water District
Magat	1,740	14.07	54.42	348..25	Solano 44,246	Provincial Waterworks System
Matuno	558	11.32	68.15	467.00	Bambang 33,663	None

1/ 1990 Population,NSO

2) Sampling Points and Examination procedures

Water quality analysis of the Magat river was undertaken to determine the general characteristics of surface water in the province. The location of sampling points is shown in Figure 7.5.1.

Water sampling was carried out 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.

The water quality analysis considered twelve (12) parameters and was performed in accordance to the Philippine Standard Method for Analysis of Air and Water.

(3) Results of Water Quality Analysis

Table 7.5.2 summarizes the results of analysis (refer to MWSS Central Laboratory Examination Results, 7.5 Data Report). Flow rates of Magat and Matuno rivers at the time of sampling were 73 and 74 m^3/sec, respectively. The discharge rates are close to the recorded minimum flow of the rivers.

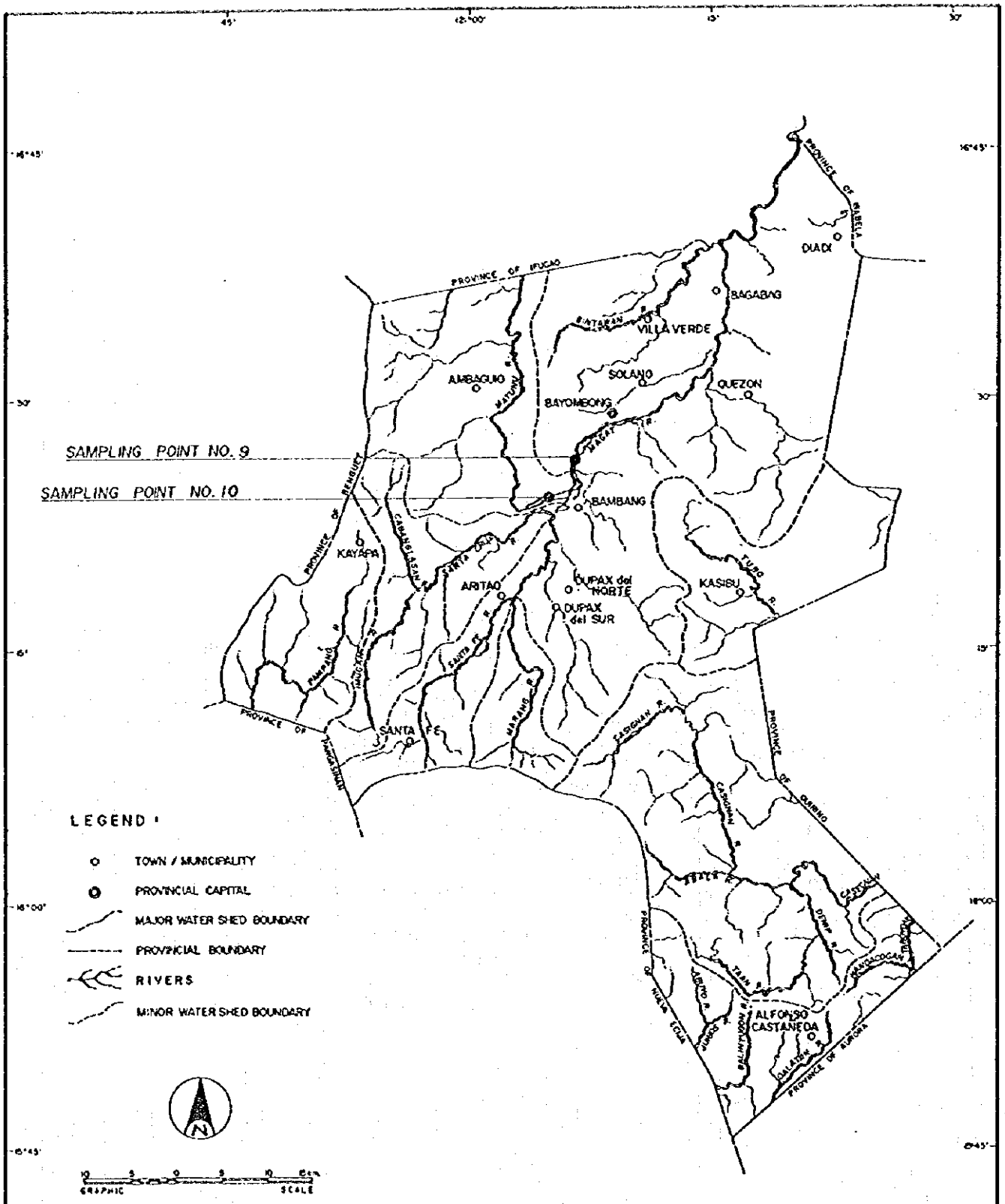


FIGURE 7.5.1

STUDY RIVER BASIN AND WATER SAMPLING POINTS