

JAPAN INTERNATIONAL COOPERATION AGENCY

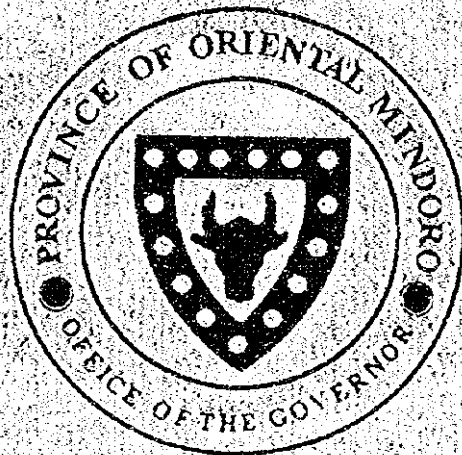
DEPARTMENT OF THE INTERIOR AND LOCAL GOVERNMENT
THE REPUBLIC OF THE PHILIPPINES

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

VOLUME III - 3

SUPPORTING AND DATA REPORT

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



FEBRUARY 1996

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**PROVINCIAL WATER SUPPLY, SEWERAGE AND
SANITATION SECTOR PLAN**

VOLUME III - 3 SUPPORTING AND DATA REPORT

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**PROVINCIAL WATER SUPPLY, SEWERAGE AND
SANITATION SECTOR PLAN**

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PROVINCIAL WATER SUPPLY, SEWERAGE AND SANITATION SECTOR PLAN

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SUPPORTING REPORT

**A. BACKGROUND INFORMATION AND
EXISTING CONDITIONS**




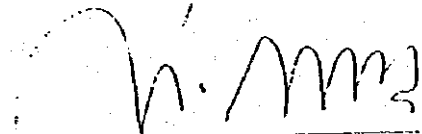
- 1. INTRODUCTION
- 1.3 The Provincial Plan for the Province of Oriental Mindoro
- 1.3.1 Preparation of the Plan

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

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

MANILA, SEPTEMBER 5, 1994


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


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

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

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

1. Objectives and Scope of Work for the Study

- (1) Formulation of long-term provincial development plan for water supply, sewerage and sanitation sector to the year 2010 through technical assistance to the provincial staff; and
- (2) Preparation of medium-term (five year) sector investment plan based on the long-term development plan.

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

2. Study Area

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

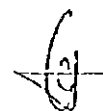
BATCH No. 1

- (1) Zambales
- (2) Rizal
- (3) Mindoro Oriental
- (4) Mindoro Occidental

BATCH No. 2

- (1) Abra
- (2) Ilocos Norte
- (3) Ilocos Sur
- (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.



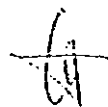
4. Implementation Set-Up for the Study

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.



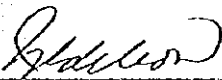
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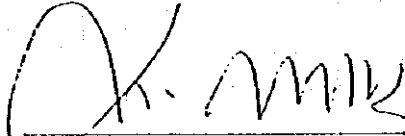
MINUTES OF DISCUSSIONS
ON
THE PROGRESS REPORT I
FOR
STUDY ON PROVINCIAL WATER SUPPLY, SEWERAGE AND
SANITATION SECTOR PLAN
IN
THE REPUBLIC OF THE PHILIPPINES

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.


LIST OF ATTENDANTS

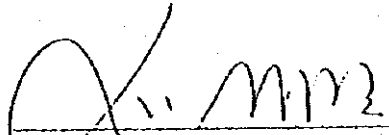
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3. MS. ELLEN I. PASCUA	Chief, Admin. Div., PMO
4. MR. MARIO VERGEL DE DIOS	Chief, Operations Div., PMO
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7. MS. LINA GRIEGO	DILG Coordinator, Occidental Mindoro
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9. MS. VIVIAN BIALA	DILG Coordinator, Zambales
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2. MR. VIRGILIO GACUSANA	Chief, Planning Division, PMO, DPWH
3. MR. VICTOR SABANDEJA	Chief, Environmental Health Division, DOH
4. MR. ANIANO FORNELOS JR.	Sanitary Engineer II, DOH
C. JICA	
1. MR. EIJE 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.

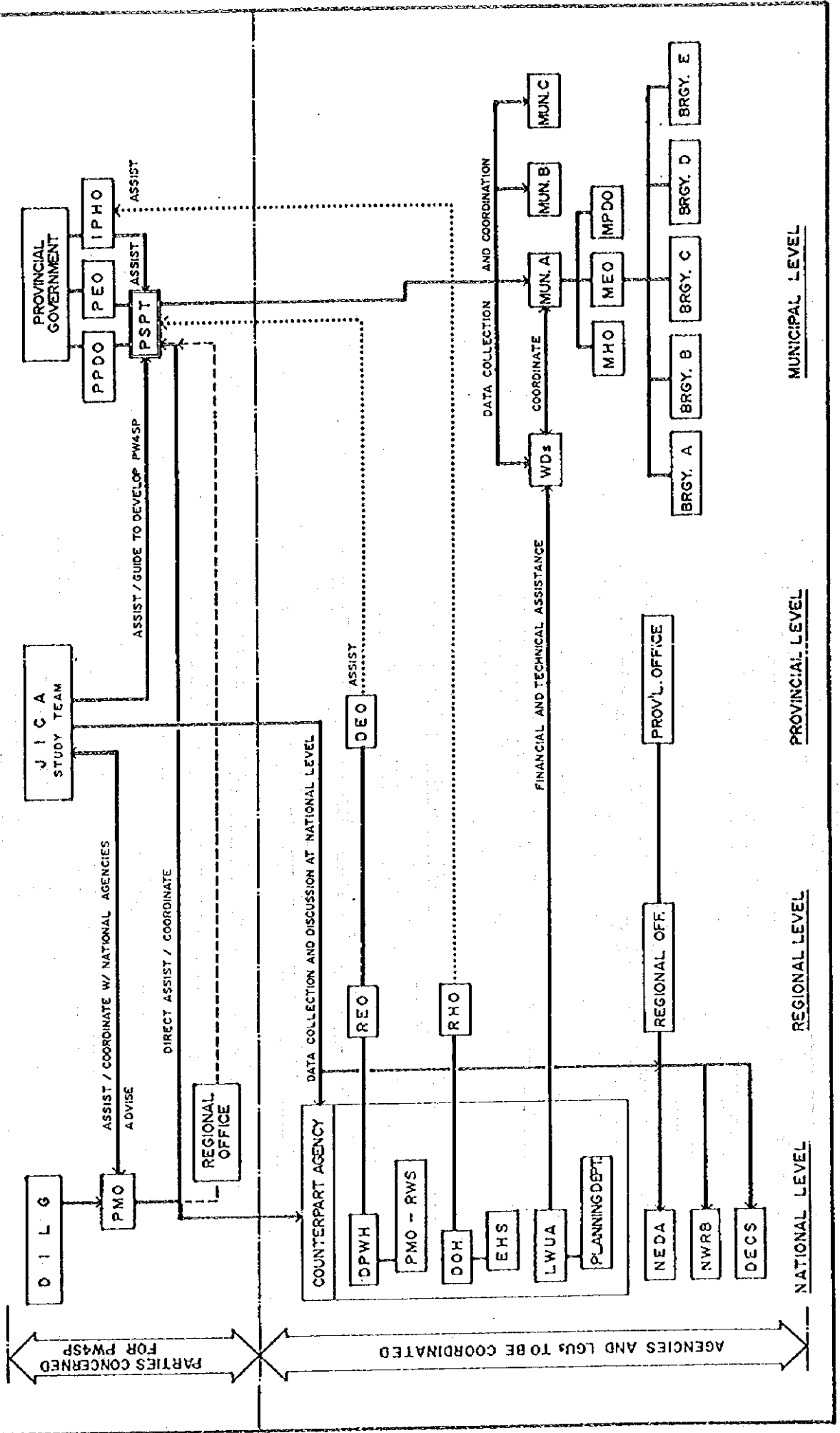
The following are future arrangements required by both parties:

- (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.

LIST OF ATTENDEES

<u>Attendees</u>	<u>Designation</u>
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

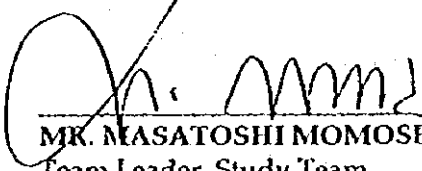


MINUTES OF DISCUSSIONS
ON
THE DRAFT FINAL REPORT
FOR
STUDY ON PROVINCIAL WATER SUPPLY, SEWERAGE AND
SANITATION SECTOR PLAN
IN
THE REPUBLIC OF THE PHILIPPINES

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.



LIST OF ATTENDEES

<u>Attendees</u>	<u>Designation</u>
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
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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.

<u>Advantage</u>	<u>Disadvantage</u>
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 2.6.2 Key Parameter

No.	Description of Key Parameter		Unit	Values					
1.	Service Level	<i>Water Supply</i> Number of household to be served by Level I Facility Water Consumption Rate for Level III System	HH/Well Liter/capita/day						
		<i>Sanitation</i> Std. number of student to be served by a unit of sanitary toilet Standard number of toilets for a public utility	Student/Toilet Toilet/Public Facility						
2.	Provincial Sector Target	Medium Term Plan	<i>Water Supply</i> Urban Water Supply Rural Water Supply	% of Population % of Population					
			<i>Sanitation</i> Household Toilet Urban Household Toilet Flush Pour Flush VIP Latrine Rural Household Toilet Flush Pour Flush VIP Latrine School Toilet Public Toilet Solid Waste	% of Household % of Household % of Household % of Household % of Household % of Household % of Household % of Household % of Public Student % of Public Utility % of Urban Population					
				Long Term Plan	<i>Water Supply</i> Urban Water Supply Rural Water Supply	% of Population % of Population			
					<i>Sanitation</i> Household Toilet Urban Household Toilet Flush Pour Flush VIP Latrine Urban Household Toilet Flush Pour Flush VIP Latrine School Toilet Public Toilet Urban Sewerage	% of Household % of Household % of Household % of Household % of Household % of Household % of Household % of Household % of Public Student % of Public Utility % of Urban Population			
						3. Percentage of Level I Wells to be Rehabilitation		%	
						4. Percentage of Sector Management Cost to Construction Cost Feasibility and Detail Design Construction Supervision		% of Construction Cost % of Construction Cost	
		5. Contingencies Physical Contingency Price Contingency				% of Construction Cost Percent per annum			
		6. Community Development and Training Cost Level III Level I and II				% of Construction Cost % 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 Public Utility Toilet Maintenance Cost	Pesos/Toilet/year Pesos/Toilet/year								
8.	Allocation factors/Percentages of IRA From Provincial From Municipality and Brgy.		% %						
	9. Funding Levels/Percentages for Different Financing Scenarios 1st Scenario 2nd Scenario 3rd Scenario 4th Scenario 5th Scenario		% Funding Available % Funding Available % Funding Available % Funding Available % 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				
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	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 2.6.5 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					
<i>Level III - New System</i>					
For 5000 Population					
For 10000 Population					
For 15000 Population					
<i>Level III - Expansion</i>					
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					
<i>Rehabilitation Cost for Level I Deep Well</i>					
<i>Disinfection of Level I Wells</i>					
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 Underserved Population in Base Year	Underserved and Underserved Population in Phase I	Population Underserved 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	Oriental Mindoro				Region IV
	Total families		Annual Income		Average Annual Income
	Number	Share	Total (P 1,000)	Average (Pesos)	(Pesos)
Under 15,000	7,716	6.8	83,504	10,822	11,925
15,000 - 19,999	13,056	11.5	228,890	17,531	17,620
20,000 - 29,999	32,239	28.3	798,430	24,766	24,944
30,000 - 39,999	23,291	20.4	810,650	34,806	34,719
40,000 - 59,999	17,896	15.7	874,183	48,847	49,230
60,000 - 99,999	12,109	10.6	879,859	72,659	76,978
100,000 - 249,999	7,216	6.3	1,103,260	152,899	145,117
250,000 and over	420	0.4	1,114,946	2,656,530	437,341
Total	113,943	100.0	5,893,721	51,725	68,960
Median				31,636	47,552

Source: 1991 Family Income and Expenditures Survey, NSO

Notes:

- (1) Based on NEDA and other agencies, poverty threshold in Region IV in 1991 was estimated at P 51,486. Proportion of families below poverty level was 75% 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	Manufacturing	Electricity, Gas and Water	Construction
Total	161,551	93,869	316	6,087	507	6,473
Officials of the Gov't. & Special Interest Org. Corp Exec, Managers, Managing Prop & Supervisors	2,590	109	-	189	31	92
Professionals	7,504	10	-	10	41	189
Technicians & Associated Professionals	2,054	71	-	70	32	39
Clerks	6,673	11	-	60	79	10
Service & Shop Market Sales Workers	5,266	19	21	63	44	-
Farmers, Forestry Workers & Fishermen	85,682	85,168	11	70	-	-
Craft and Related Workers	11,298	11	267	3,920	215	4,930
Plant & Machine Operators & Assemblers	6,483	129	-	908	65	69
Elementary Occupations	25,758	7,915	17	680	-	1,074
Other Occupations	3,672	426	-	117	-	70
Occupation Not Stated	4,571	-	-	-	-	-

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	17,314	7,061	1,609	20,534	6,319	1,462
Officials of the Gov't. & Special Interest Org. Corp Exec, Managers, Managing Prop & Supervisors	999	94	52	976	48	-
Professionals	42	30	189	6,904	89	-
Technicians & Associated Professionals	205	162	256	1,150	69	-
Clerks	4,081	153	495	1,647	137	-
Service & Shop Market Sales Workers	2,459	420	441	1,682	117	-
Farmers, Forestry Workers & Fishermen	165	-	-	43	225	-
Craft and Related Workers	498	76	20	1,202	159	-
Plant & Machine Operators & Assemblers	57	4,959	11	241	44	-
Elementary Occupations	8,663	1,109	103	5,922	275	-
Other Occupations	145	58	42	767	2,047	-
Occupation Not Stated	-	-	-	-	3,109	1,462

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	428,817	183,831	46,795	39,346	34,808	28,777	22,763	72,497
No Grade Completed	28,285	12,661	1,508	1,539	1,122	1,164	1,085	9,206
Pre-School	3,964	3,688	42	17	20	21	12	164
Elementary	256,864	120,550	17,828	18,049	19,376	17,195	14,716	49,150
1st - 4th Grade	127,939	75,528	4,983	5,302	5,676	5,585	5,185	25,680
5th - 7th Grade	128,925	45,022	12,845	12,747	13,700	11,610	9,531	23,470
High School	95,747	40,978	16,532	11,502	8,317	6,200	3,859	8,359
Undergraduate	55,931	30,519	7,332	4,946	3,770	3,028	1,982	4,354
Graduate	39,816	10,459	9,200	6,556	4,547	3,172	1,877	4,005
Post Secondary	5,567	523	1,566	1,230	941	605	250	452
Undergraduate	1,313	167	357	296	192	122	69	110
Graduate	4,254	356	1,209	934	749	483	181	342
College Undergraduate	22,706	5,009	6,392	3,764	2,628	1,715	1,175	2,023
Academic Degree Holder	14,831	81	2,804	3,153	2,323	1,835	1,622	3,013
Not Stated	853	341	123	92	81	42	44	130

Source: NSO Census 1990

3.4 Population
 3.4.2 Classification of Urban and Rural Areas

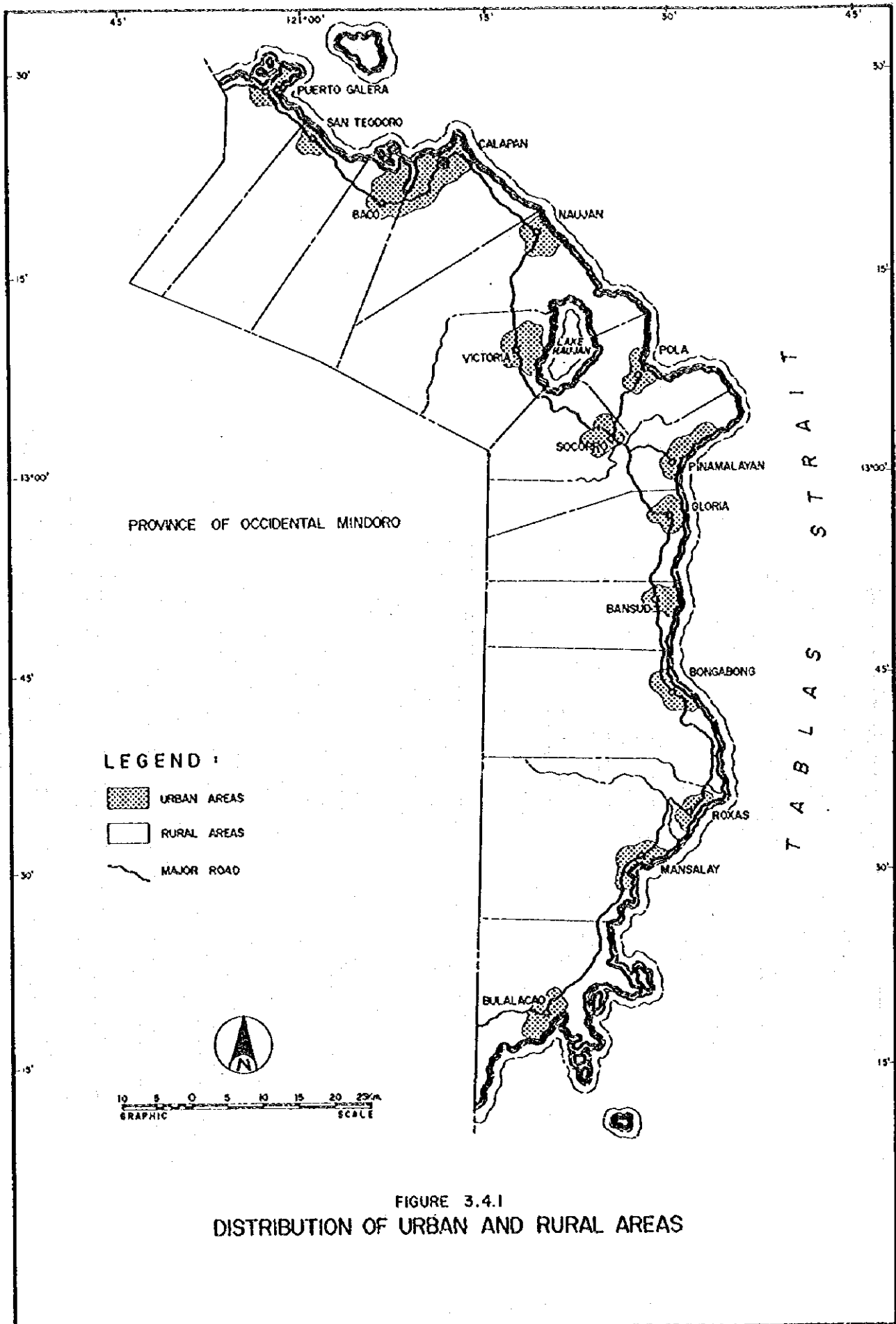


FIGURE 3.4.1
 DISTRIBUTION OF URBAN AND RURAL AREAS

3.5 Health Status

3.5.3 Health Facilities and Practitioners

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

Health Facilities	Oriental Mindoro		Philippines	
	Number	Ratio	Number	Ratio
Hospitals	18	1 : 30558	1,733	1 : 35017
RHUs	25	1 : 22002	2,295	1 : 26442
BHSs	316	1 : 1741	10,151	1 : 5978
Practitioners				
Doctors	135	1 : 4074	7,431	1 : 8166
Nurses	300	1 : 1833	10,270	1 : 5909
Midwives	393	1 : 1400	11,604	1 : 5230
Dentists	96	1 : 5730	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 (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 (Minimum)	%sato	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 Phosphorous	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 contact 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 Households Served			Number of Population Served		
			Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
045201	Baco	Municipal Gov't.	0	1	1	0	265	265	0	1,431	1,431
045205	Calapan (Capital)	Calapan WSS	13	5	18	4,201	2,357	6,558	22,685	12,964	35,649
045208	Naujan	Naujan WD	3	0	3	410	0	410	2,009	0	2,009
		Brgy. San Agustin I	0	1	1	0	90	90	0	486	486
		Brgy. San Agustin II	0	1	1	0	50	50	0	270	270
		Municipal Total	3	2	5	410	140	550	2,009	756	2,765
045209	Pinamalayan	Pinamalayan WD	4	11	15	1,586	4,497	6,083	7,420	24,284	31,704
045210	Pola	Pola WD	2	3	5	238	344	582	1,142	1,754	2,896
045212	Roxas	Roxas WD	1	0	1	293	0	293	1,582	0	1,582
Provincial Total			23	22	45	6,728	7,603	14,331	34,838	41,189	76,027

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
045201	Baco	Municipal Gov't.	0	6	6	0	50	50	0	275	275
045205	Calapan (Capital)	Calapan WSS	0	0	0	0	0	0	0	0	0
045208	Naujan	Naujan WD	9	0	9	45	0	45	221	0	221
		Brgy. San Agustin I	0	0	0	0	0	0	0	0	0
		Brgy. San Agustin II	0	0	0	0	0	0	0	0	0
		Municipal Total	9	0	9	45	0	45	221	0	221
045209	Pinamalayan	Pinamalayan WD	0	20	20	0	100	100	0	540	540
045210	Pola	Pola WD	0	0	0	0	0	0	0	0	0
045212	Roxas	Roxas WD	0	0	0	0	0	0	0	0	0
Provincial Total			9	26	35	45	150	195	221	815	1,036

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)
045201	Baco	Municipal Gov't.	DW	1	24	5	3	16	0
045205	Calapan (Capital)	Calapan WSS	DW	5	6,336	3,181	0	927	0
045208	Naujan	Naujan WD	DW	1	336	291	20	50	0
		Brgy. San Agustin I	DW	1	173	129	0	8	0
		Brgy. San Agustin II	DW	1	14	0	0	0	0
		Municipal Total		3	523	420	20	58	0
045209	Pinamalayan	Pinamalayan WD	Surf.	1	2,073	1,053	0	92	45
045210	Pola	Pola WD	SP	2	835	318	11	19	0
045212	Roxas	Roxas WD	DW	1	251	164	0	35	0
Provincial Total				13	10,042	5,141	34	1,147	45

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

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)			
			Metered	Un-metered		Metered	Un-metered	Metered	Un-metered	Metered	Un-metered	Metered	Un-metered				
045201	Baco	Municipal Gov't.	10	0	2	0	6	3	1	0	3	40	0	16	0	0	0
045205	Calapan (Capital)	Calapan WSS	4,208	0	3,181	0	0	0	0	0	741	0	927	0	0	0	0
045208	Naujan	Naujan WD	410	0	271	9	0	20	3	0	20	15	0	50	0	0	0
		Brgy. San Agustin I	0	86	129	0	0	0	0	0	0	4	8	0	0	0	0
		Brgy. San Agustin II	0	50	0	0	0	0	0	0	0	0	0	0	0	0	0
		Municipal Total	410	136	401	9	0	20	3	0	20	15	4	58	0	0	0
045209	Pinamalayan	Pinamalayan WD	1,654	1	1,041	20	0	12	0	0	4	152	0	92	69	0	45
045210	Pola	Pola WD	590	0	318	0	0	0	4	0	11	40	0	19	0	0	0
045212	Roxas	Roxas WD	293	0	164	0	0	0	0	0	0	23	0	35	0	0	0
Provincial Total			7,185	137	5,106	29	0	35	4	0	34	1,011	4	1,147	69	0	45

4.1.4 Level II Systems

Table 4.1.2 Existing Level II Systems

NEDA Geographic Code	Municipality	Name of System (Operating Body)	Water Source		Existing Facilities				
					Length of Transmission Line (meter)	Reservoir		Length of Distribution Line (meter)	Number of Public Faucets
			Type ¹	Number		Number	Q (cu.m)		
045201	Bansud	Bansud BWSA	DW	1	500	1	3	1,800	12
045215	Victoria	Brgy. San Antonio	SP	1	3,000	1	1	0	6
Provincial Total				2	3,500	2	4	1,800	18

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

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
045201	Bansud	Bansud BWSA	1	0	1	60	0	60	318	0	318
045215	Victoria	Brgy. San Antonio	0	1	1	0	30	30	0	165	165
Provincial Total			1	1	2	60	30	90	318	165	483

NEDA Geographic 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	
045201	Bansud	Bansud BWSA	24	OM	G			1	1		80	20
045215	Victoria	Brgy. San Antonio	24	OM	G						50	50

Note: 1. Dirty Water; E - Everyday, OW - Once a week, OM - Once a month, O - Occasional.

2. Taste/Smell; G - Good taste, S - Salty, W - Wood taste, M - Metallic taste, O - Others.

NEDA Geographic Code	Municipality	Name of System (Operating Body)	Number of Staff						
			Technical Professional	Administrative Staff	Collector	Total Number of Staff	Repair Work		
							Local Trueman	MEO/CEO	DEO
045201	Bansud	Bansud BWSA			1	1			
045215	Victoria	Brgy. San Antonio			1	1			

NEDA Geographic Code	Municipality	Name of System (Operating Body)	Expenditures							Tariff				Average Collection Efficiency (%)	
			Annual	Wages	Fuel, Chem, Mat'l	Transport	Repairs	Loan Repayment	Other	Consumer Payment (Year)	Cost per Fall	Cost per Cubic Meter	Cost Per Household		Other
045201	Bansud	Bansud BWSA	14	0	0	0	0	0	0	277	0	0	23	0	100
045215	Victoria	Brgy. San Antonio	0	0	0	0	0	0	0	6,000	0	0	10	0	50

NEDA Geographic Code	Municipality	Name of System (Operating Body)	Billings					Revenues						
			Annual Billing (Number)	Public Faucet Consumers	House Connection Consumers	Expected Subsidies	Others	Annual Income	Payment by Public Faucet Consumers	Payment by House Connection Consumer	Subsidies	Others		
													(Thousand of Pesos/year)	
045201	Bansud	Bansud BWSA	0	0	0	0	0	0	0	0	0	0	0	0
045215	Victoria	Brgy. San Antonio	0	0	0	0	0	0	0	0	0	0	0	0

4.1.5 Level I Facilities

Safe and Unsafe Classification of Level I Facilities

In 1993, the PHO conducted field inspection and water quality analysis of samples collected from public and private Level I wells, and classified into safe and unsafe sources/facilities as shown in Table 4.1.3.

Table 4.1.3 Percentage of Unsafe Water Sources by PHO

Municipality	No. of Existing Wells	No. of Unsafe Sources	% of Unsafe Sources
Baco	2,360	26	1
Bansud	2,809	593	21
Bongabong	1,164	462	40
Bulalacao	326	282	87
Calapan	3,889	1,142	29
Gloria	4,052	1,702	42
Mansalay	1,838	712	39
Naujan	3,516	964	27
Panamalayan	3,144	232	7
Pola	425	114	27
Puerto Galera	428	17	4
Roxas	3,377	920	27
San Teodoro	1,084	136	13
Socorro	1,924	312	16
Victoria	2,569	174	7
Total	32,905	7,788	24

The results of PHO survey indicated that about 24% of existing wells in a provincial average were contaminated. Since the total number of shallow wells (26,947) occupied 95% of the total number of Level I sources (28,217) 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. (Number of existing wells surveyed by PHO does not meet the reported figures in PW4SP due to differences on source and time of data collection).

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

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

NEDA Geo-graphic Code	Municipality	Type	Safe Sources										Unsafe Sources							Grand Total	
			Public					Private					Public				Private				Total
			Deep Well	Shallow Well	Covered/Improved Dug Well	Developed Spring	Sub-total	Shallow Well	Private Well	Total	Shallow Well	Open Dug Well	Un-developed Springs	Sub-total	Shallow Well	Open Dug Well	Rain Water Collector	Sub-total			
045201	Ibaco	Urban	2	0	0	1	3	198	201	0	0	2	0	0	0	0	0	2	203		
		Rural	15	13	28	5	61	1,156	1,217	0	0	7	7	12	0	0	4	16	1,240		
		Total	17	13	28	6	64	1,354	1,418	0	0	7	7	14	0	0	4	18	1,443		
045202	Bansud	Urban	2	0	0	0	2	237	239	0	0	0	0	0	0	0	0	0	65	304	
		Rural	16	3	18	3	40	1,215	1,255	1	10	0	11	32	0	0	0	329	1,595		
		Total	18	3	18	3	42	1,452	1,494	1	10	0	11	386	0	0	0	394	1,899		
045203	Isongabong	Urban	7	1	0	0	8	61	69	0	0	0	0	0	0	0	0	0	41	110	
		Rural	27	10	64	6	107	644	687	6	6	0	6	430	0	0	0	481	1,174		
		Total	34	11	74	6	121	705	756	6	6	0	6	471	0	0	0	522	1,283		
045204	Sulalacao	Urban	0	0	0	0	0	3	3	0	0	0	0	1	17	0	0	0	17	20	
		Rural	2	1	2	4	9	16	25	5	30	10	46	108	0	0	0	11	157	182	
		Total	2	1	2	6	11	19	30	7	30	10	47	125	0	0	0	128	175	205	
045205	Calapan (Capital)	Urban	2	1	0	0	3	118	121	1	0	0	1	48	0	0	0	48	49	170	
		Rural	29	16	0	2	47	922	969	6	3	0	9	371	1	0	0	382	391	1,360	
		Total	31	17	0	2	50	1,040	1,090	7	3	0	10	425	1	0	0	410	440	1,530	
045206	Gloria	Urban	1	0	0	0	1	121	122	0	0	0	0	88	0	0	0	88	88	210	
		Rural	24	6	0	0	30	2,916	2,946	4	0	0	4	2,111	23	0	0	2,134	2,138	5,084	
		Total	25	6	0	0	31	3,037	3,068	4	0	0	4	2,199	23	0	0	2,222	2,226	5,294	
045207	Mansalay	Urban	0	0	0	1	1	45	46	0	0	0	2	28	1	0	0	39	41	87	
		Rural	22	11	1	7	31	307	338	0	0	6	6	196	13	0	0	211	217	555	
		Total	22	11	1	8	32	352	384	0	0	6	8	224	14	0	0	230	258	642	
045208	Naujan	Urban	5	0	0	0	5	190	190	0	0	0	0	69	0	0	0	69	69	259	
		Rural	35	11	0	9	55	4,711	4,766	4	0	12	16	1,743	0	0	0	1,743	1,759	6,525	
		Total	40	11	0	9	60	4,896	4,956	4	0	12	16	1,812	0	0	0	1,812	1,828	6,784	
045209	Pinamalayan	Urban	0	0	0	0	0	281	281	0	0	0	0	0	0	0	0	0	0	281	
		Rural	31	7	6	5	49	968	1,017	0	0	3	19	22	73	19	0	40	43	324	
		Total	31	7	6	5	49	1,249	1,298	0	0	6	19	25	94	19	0	33	183	205	1,272
045210	Pala	Urban	0	0	0	0	0	7	7	0	0	0	0	0	0	0	0	0	0	7	
		Rural	17	39	0	4	60	30	90	15	29	72	116	11	0	0	0	0	21	21	28
		Total	17	39	0	4	60	37	97	15	29	72	116	11	0	0	0	0	67	183	273
045211	Puerto Galera	Urban	1	0	0	1	2	35	37	0	0	0	0	0	0	0	0	0	1	1	38
		Rural	9	11	9	6	35	255	290	0	8	0	8	11	0	0	0	3	23	31	
		Total	10	11	9	7	37	290	327	0	8	0	8	12	0	0	0	3	24	32	359
045212	Romas	Urban	4	0	0	4	4	252	256	0	0	0	0	93	0	0	0	93	93	349	
		Rural	17	2	0	2	21	2,310	2,331	1	0	3	4	855	0	0	0	856	860	3,191	
		Total	21	2	0	2	25	2,562	2,587	1	0	3	4	948	0	0	0	949	953	3,540	
045213	San Teodoro	Urban	2	0	0	0	2	43	45	0	2	0	2	0	0	0	0	0	0	55	
		Rural	19	5	0	8	32	64	96	1	0	41	42	9	1	0	0	0	10	52	148
		Total	21	5	0	8	34	107	141	1	0	41	44	15	0	0	0	0	18	62	203
045214	Socorro	Urban	1	0	0	0	1	403	404	0	0	0	0	77	0	0	0	77	77	481	
		Rural	22	1	0	3	26	638	664	0	32	38	70	122	64	17	0	203	273	937	
		Total	23	1	0	3	27	1,041	1,068	0	32	38	70	199	64	17	0	280	350	1,418	
045215	Victoria	Urban	1	0	0	0	1	805	806	0	0	0	0	61	0	0	0	61	61	867	
		Rural	23	7	0	8	38	764	802	1	9	4	14	57	29	0	0	86	100	902	
		Total	24	7	0	8	39	1,569	1,608	1	9	4	14	114	29	0	0	147	161	1,769	
Provincial Total		Urban	28	2	0	5	35	2,794	2,829	2	5	2	9	617	41	0	0	12	670	3,508	
		Rural	308	133	64	72	577	16,916	17,494	45	124	212	381	6,438	312	85	0	6,835	7,216	24,709	
		Total	336	135	64	77	612	19,710	20,322	47	129	214	390	7,055	353	85	0	7,505	7,895	28,217	

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 a more realistic service coverage, the unserved population in 1994 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 by 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 be unchanged up to the present.
- Population covered by Level I facilities were calculated as a balance figure between the total population, and the population served by Level III & II systems and the unserved population.
- Level I population coverage was estimated in assumption that 50% of the private facilities were shared by neighbors.

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

Number of households per shared public/private facility ranges from 2 to 25 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 households/communal faucet).

Table 4.1.5 Estimation of Unserved Population by Municipality

NEDA Geo- graphic Code	Municipality	Type	Population and Households		Served Population			Unserved Population			Unserved Population (1994)	Population Covered by Level I Facilities
					Level III	Level II	Total	Unserved Percentage (1990)				
			Number	HHs Size				Total No. of HHs	Number of Unserved HHs	%		
045201	Baco	Urban	1,893	5.0	0	0	0	345	30	8.7	165	1,733
		Rural	24,654	5.5	1,431	275	1,706	3,990	513	12.9	3,170	19,778
		Total	26,552	5.5	1,431	275	1,706	4,335	543	12.5	3,335	21,511
045202	Bansud	Urban	4,299	5.3		318	318	758	42	5.5	238	3,743
		Rural	23,771	5.2		0	0	4,234	724	17.1	4,065	19,706
		Total	28,070	5.2		318	318	4,992	766	15.3	4,303	23,449
045203	Bongabong	Urban	4,278	5.3				855	80	9.4	400	3,878
		Rural	51,321	5.3				8,610	1,361	15.8	8,112	43,209
		Total	55,599	5.3				9,465	1,441	15.2	8,512	47,087
045204	Bulalacao	Urban	2,829	5.9				451	57	12.6	358	2,471
		Rural	21,317	5.4				3,433	978	28.5	6,073	15,244
		Total	24,146	5.5				3,884	1,035	26.6	6,431	17,715
045205	Calapan (Capital)	Urban	34,616	5.4	22,685	0	22,685	5,802	7	0.1	42	11,889
		Rural	61,548	5.5	12,964	0	12,964	9,885	116	1.2	722	47,862
		Total	96,164	5.5	35,649	0	35,649	15,687	123	0.8	764	59,751
045206	Gloria	Urban	2,204	5.4				331	12	3.1	69	2,135
		Rural	30,555	5.3				5,306	198	3.7	1,140	29,415
		Total	32,759	5.3				5,637	210	3.7	1,209	31,550
045207	Mansalay	Urban	2,561	5.5				437	58	13.3	340	2,221
		Rural	27,707	5.4				4,686	987	21.1	5,836	21,871
		Total	30,268	5.4				5,123	1,045	20.4	6,176	24,092
045208	Naujan	Urban	5,143	4.9	2,009	221	2,230	965	60	6.2	320	2,593
		Rural	72,797	5.4	756	0	756	12,591	1,031	8.2	5,961	66,080
		Total	77,940	5.4	2,765	221	2,986	13,556	1,091	8.0	6,281	68,673
045209	Pimamlayan	Urban	7,582	5.3	7,420	0	7,420	1,361	92	6.8	162	0
		Rural	56,217	5.4	24,284	540	24,824	9,620	1,579	16.4	9,227	22,166
		Total	63,799	5.4	31,704	540	32,244	10,981	1,671	15.2	9,389	22,166
045210	Pela	Urban	1,637	4.8	1,142	0	1,142	322	103	32.0	495	0
		Rural	27,262	5.1	1,754	0	1,754	4,913	1,758	35.8	9,755	15,753
		Total	28,899	5.1	2,896	0	2,896	5,235	1,861	35.5	10,250	15,753
045211	Puerto Galera	Urban	3,024	5.0				487	28	5.7	174	2,850
		Rural	16,889	5.3				2,810	483	17.2	2,903	13,986
		Total	19,913	5.3				3,297	511	15.5	3,077	16,836
045212	Roxas	Urban	3,836	5.4	1,582	0	1,582	629	19	3.0	116	2,138
		Rural	33,475	5.5	0	0	0	5,456	317	5.8	1,945	31,530
		Total	37,311	5.5	1,582	0	1,582	6,085	336	5.5	2,061	33,668
045213	San Teodoro	Urban	2,685	5.5				466	38	8.2	219	2,466
		Rural	10,253	5.6				1,722	642	37.3	3,823	6,430
		Total	12,938	5.6				2,188	680	31.1	4,042	8,896
045214	Socorro	Urban	4,328	5.4				696	66	9.5	410	3,918
		Rural	28,506	5.2				4,976	1,121	22.5	6,422	22,084
		Total	32,834	5.2				5,672	1,187	20.9	6,832	26,002
045215	Victoria	Urban	7,569	5.6		0	0	1,211	40	3.3	250	7,319
		Rural	31,800	5.5		165	165	5,114	687	13.4	4,272	27,363
		Total	39,369	5.5		165	165	6,325	727	11.5	4,522	34,692
Provincial Total		Urban	88,489	5.4	34,835	539	35,377	15,166	732	4.8	3,758	49,351
		Rural	518,022	5.4	41,189	980	42,169	87,346	12,495	14.3	73,426	402,477
		Total	606,561	5.4	76,027	1,519	77,546	102,512	13,227	12.9	77,184	451,831

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

Sheet 1

NEDA Geo- graphic Code	Municipality	Typed	Pop. Covered by Level I Facilities	Number of Facilities						Coverage of Own Use					
				Public Facilities			Private Facilities			Number of Private Facilities			(I) Population Covered		
				Safe	Unsafe	Total	Safe	Unsafe	Total	Safe	Unsafe	Total	Safe	Unsafe	Total
045201	Baco	Urban	1,733	3	0	3	198	2	200	99	1	100	495	5	500
		Rural	19,778	61	7	68	1,156	16	1,172	578	8	586	3,179	44	3,223
		Total	21,511	64	7	71	1,354	18	1,372	677	9	686	3,674	49	3,723
045202	Bansud	Urban	3,743	2	0	2	237	65	302	119	33	151	628	172	800
		Rural	19,706	40	11	51	1,215	329	1,544	608	165	772	3,159	855	4,014
		Total	23,449	42	11	53	1,452	394	1,846	727	198	923	3,787	1,028	4,815
045203	Bongabong	Urban	3,878	8	0	8	61	41	102	31	21	51	162	109	270
		Rural	41,209	43	6	49	644	431	1,125	322	241	563	1,707	1,275	2,981
		Total	47,087	51	6	57	705	522	1,227	353	262	614	1,868	1,383	3,252
045204	Bulalacao	Urban	2,471	2	1	3	3	17	20	2	9	10	9	50	59
		Rural	15,243	9	46	55	16	111	127	8	56	64	43	300	343
		Total	17,715	11	47	58	19	128	147	10	65	74	52	350	402
045205	Calapan (Capital)	Urban	11,889	3	1	4	148	48	166	59	24	83	319	170	488
		Rural	47,862	47	9	56	922	382	1,301	461	191	652	2,536	1,051	3,586
		Total	59,751	50	10	60	1,040	430	1,470	520	215	735	2,854	1,180	4,034
045206	Gloria	Urban	2,135	1	0	1	121	88	209	61	44	105	327	238	564
		Rural	29,415	30	4	34	2,916	2,134	5,050	1,458	1,067	2,525	7,727	5,655	13,383
		Total	31,550	31	4	35	3,037	2,222	5,259	1,519	1,111	2,630	8,054	5,893	13,947
045207	Mansalay	Urban	2,221	1	2	3	45	39	84	23	20	42	124	107	231
		Rural	21,871	31	6	37	307	211	518	154	106	259	829	570	1,399
		Total	24,092	32	8	40	352	250	602	177	126	301	953	677	1,630
045208	Naujan	Urban	2,593	5	0	5	185	69	254	93	35	127	453	169	622
		Rural	66,080	55	16	71	4,711	1,743	6,454	2,356	872	3,227	12,720	4,706	17,426
		Total	68,673	60	16	76	4,896	1,812	6,708	2,449	907	3,354	13,173	4,875	18,048
045209	Pinaralayan	Urban	0	0	3	3	281	40	321	141	20	161	0	0	0
		Rural	22,166	49	22	71	968	183	1,151	484	92	576	2,614	491	3,105
		Total	22,166	49	25	74	1,249	223	1,472	625	112	736	2,614	491	3,105
045210	Pola	Urban	0	0	0	0	7	21	28	4	11	14	0	0	0
		Rural	15,753	60	116	176	30	67	97	15	34	49	77	171	247
		Total	15,753	60	116	176	37	88	125	19	45	63	77	171	247
045211	Puerto Galera	Urban	2,850	2	0	2	35	1	36	18	1	18	88	3	90
		Rural	13,986	35	8	43	255	23	278	128	12	139	676	61	737
		Total	16,836	37	8	45	290	24	314	146	13	157	763	63	827
045212	Roxas	Urban	2,138	4	0	4	252	93	345	126	47	173	680	251	932
		Rural	31,530	21	4	25	2,310	856	3,166	1,155	428	1,583	6,353	2,354	8,707
		Total	33,668	25	4	29	2,562	949	3,511	1,281	475	1,756	7,033	2,605	9,638
045213	San Teodoro	Urban	2,466	2	2	4	43	8	51	22	4	26	118	22	140
		Rural	6,430	32	42	74	64	10	74	32	5	37	179	28	207
		Total	8,896	34	44	78	107	18	125	54	9	63	297	50	347
045214	Socorro	Urban	3,918	1	0	1	403	77	480	202	39	240	1,088	208	1,296
		Rural	22,084	26	70	96	638	203	841	319	102	421	1,659	528	2,187
		Total	26,002	27	70	97	1,041	280	1,321	521	141	661	2,747	736	3,483
045215	Victoria	Urban	7,319	1	0	1	805	61	866	403	31	433	2,254	171	2,425
		Rural	27,363	38	14	52	764	86	850	382	43	425	2,101	237	2,338
		Total	34,682	39	14	53	1,569	147	1,716	785	74	858	4,355	407	4,762
Provincial Total	Urban	49,354	35	9	41	2,791	670	3,464	1,403	340	1,742	6,744	1,634	8,378	
	Rural	402,477	577	381	958	16,916	6,835	23,751	8,460	3,422	11,876	45,557	18,327	63,884	
	Total	451,831	612	390	1,002	19,710	7,505	27,215	9,863	3,762	13,608	52,301	19,961	72,262	

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

Sheet 2

NERA Geographic 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 H/Hs per Shared Facility	Safe		Unsafe		Total	
				Safe	Unsafe	Total	Safe	Unsafe	Total		Pop.	%	Pop.	%	Pop.	%
045201	Baco	Urban	1,333	1,221	12	1,233	244	2	246	2	1,716	90	17	1	1,233	91
		Rural	19,378	16,175	380	16,555	2,941	69	3,010	5	19,354	79	424	2	19,778	80
		Total	21,511	17,396	392	17,788	3,185	71	3,256	4	21,070	79	441	2	21,511	81
045202	Bansud	Urban	3,743	2,318	625	2,943	437	118	555	4	2,946	69	797	19	3,743	87
		Rural	19,706	12,345	3,347	15,692	2,374	644	3,018	4	15,504	65	4,202	18	19,706	83
		Total	23,449	14,663	3,972	18,634	2,811	762	3,573	4	18,450	66	4,999	18	23,449	84
045203	Bungabong	Urban	3,878	2,354	1,254	3,608	444	237	681	12	2,516	59	1,362	32	3,878	91
		Rural	43,209	24,012	16,216	40,228	4,531	3,060	7,591	12	25,719	59	17,488	34	43,209	84
		Total	47,087	26,366	17,469	43,835	4,975	3,297	8,272	12	28,234	51	18,853	34	47,087	85
045204	Bulacuan	Urban	2,471	649	1,763	2,412	110	299	409	31	658	23	1,813	64	2,471	87
		Rural	15,244	2,138	12,763	14,901	396	2,364	2,760	23	2,181	10	13,063	61	15,244	72
		Total	17,715	2,787	14,526	17,313	506	2,663	3,169	24	2,839	12	14,876	62	17,715	73
045205	Calapan (Capital)	Urban	11,889	8,153	3,288	11,441	1,510	699	2,119	24	8,472	24	3,417	10	11,889	34
		Rural	47,862	31,769	12,507	44,276	5,726	2,274	8,000	11	34,305	56	13,558	22	47,862	78
		Total	59,751	39,922	15,795	55,717	7,236	2,973	10,119	13	42,776	41	16,975	18	59,751	62
045206	Gloria	Urban	2,135	916	655	1,571	170	121	291	3	1,243	56	392	40	2,135	97
		Rural	29,415	9,323	6,716	16,033	1,759	1,266	3,025	1	17,050	56	12,365	40	29,415	96
		Total	31,550	10,239	7,371	17,603	1,929	1,387	3,316	1	18,293	56	13,257	40	31,550	96
045207	Mansalay	Urban	2,221	1,039	951	1,990	189	173	362	8	1,163	45	1,058	41	2,221	87
		Rural	21,871	12,761	7,711	20,472	2,363	1,828	3,791	13	13,590	49	8,281	30	21,871	79
		Total	24,092	13,800	8,662	22,462	2,552	1,601	4,153	12	14,753	49	9,339	31	24,092	80
045208	Naujan	Urban	2,593	1,456	515	1,971	297	105	402	3	1,909	37	684	13	2,593	50
		Rural	66,080	35,561	13,093	48,654	6,585	2,425	9,010	3	48,281	66	17,799	24	66,080	91
		Total	68,673	37,017	13,608	50,625	6,882	2,530	9,412	3	50,190	64	18,483	24	68,673	88
045209	Panamalayan	Urban	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Rural	22,166	15,712	3,346	19,058	2,910	620	3,530	5	18,326	33	3,840	7	22,166	39
		Total	22,166	15,712	3,346	19,058	2,910	620	3,530	4	18,326	29	3,840	6	22,166	35
045210	Pola	Urban	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Rural	15,753	5,180	10,326	15,506	1,016	2,025	3,041	14	5,257	19	10,497	39	15,753	58
		Total	15,753	5,180	10,326	15,506	1,016	2,025	3,041	13	5,257	18	10,497	36	15,753	55
045211	Puerto Galera	Urban	2,850	2,691	69	2,760	538	14	552	28	2,779	92	72	2	2,850	94
		Rural	13,986	11,830	1,419	13,249	2,232	268	2,500	14	12,506	74	1,480	9	13,986	83
		Total	16,836	14,521	1,488	16,009	2,770	282	3,052	15	15,284	77	1,552	8	16,836	85
045212	Roxas	Urban	2,138	889	318	1,207	165	59	224	1	1,569	41	569	15	2,138	56
		Rural	31,530	16,692	6,132	22,824	3,935	1,115	4,150	3	23,045	69	8,486	25	31,530	94
		Total	33,668	17,581	6,449	24,030	3,200	1,174	4,374	2	24,614	66	9,054	24	33,668	90
045213	San Teodoro	Urban	2,466	1,853	473	2,326	337	86	423	14	1,971	73	495	18	2,466	92
		Rural	6,430	3,588	2,635	6,223	641	471	1,112	10	3,767	37	2,663	26	6,430	63
		Total	8,896	5,441	3,108	8,549	978	557	1,535	11	5,738	41	3,158	24	8,896	69
045214	Socorro	Urban	3,918	2,203	419	2,622	408	78	486	2	3,291	76	627	14	3,918	91
		Rural	22,084	13,291	6,606	19,897	2,556	1,270	3,826	7	14,950	51	7,134	25	22,084	77
		Total	26,002	15,494	7,025	22,519	2,964	1,348	4,312	6	18,241	56	7,761	24	26,002	79
045215	Victoria	Urban	7,319	4,550	341	4,891	803	61	874	2	6,804	90	515	7	7,319	97
		Rural	27,363	22,035	2,991	25,026	4,006	541	4,550	10	24,136	76	3,227	10	27,363	86
		Total	34,682	26,585	3,332	29,917	4,809	602	5,424	6	30,940	79	3,742	10	34,682	89
Provincial Total		Urban	49,354	30,292	10,684	40,976	5,662	1,962	7,624	4	37,036	42	12,318	14	49,354	56
		Rural	492,477	232,412	106,181	338,593	43,121	19,843	62,964	5	277,969	54	124,568	24	492,477	78
		Total	541,831	262,704	116,865	379,569	48,783	21,805	70,588	5	315,005	52	136,826	23	451,831	74

4.2 Sanitation and Sewerage

4.2.2 Types of Facilities and Definition of Service Level Standard

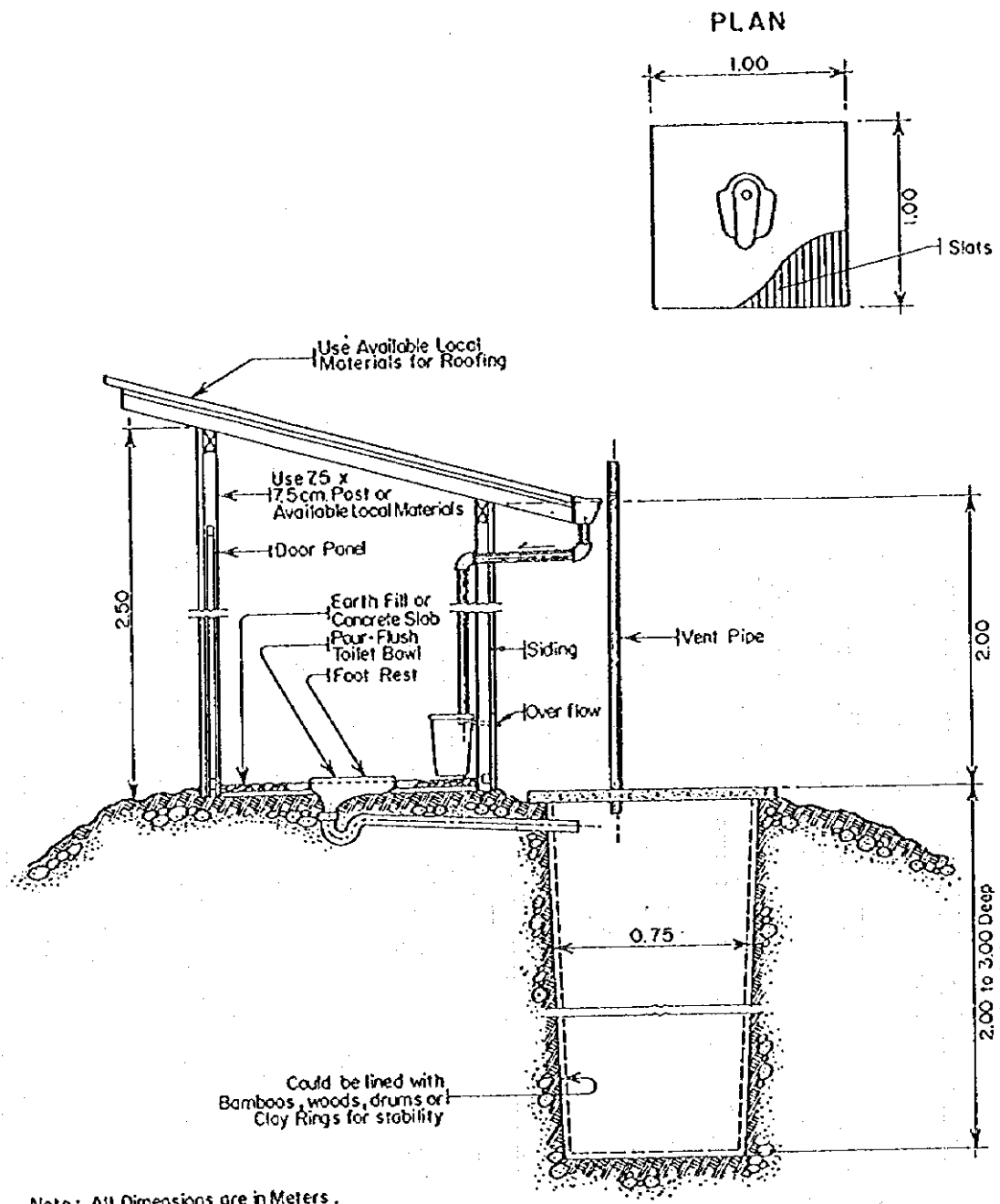
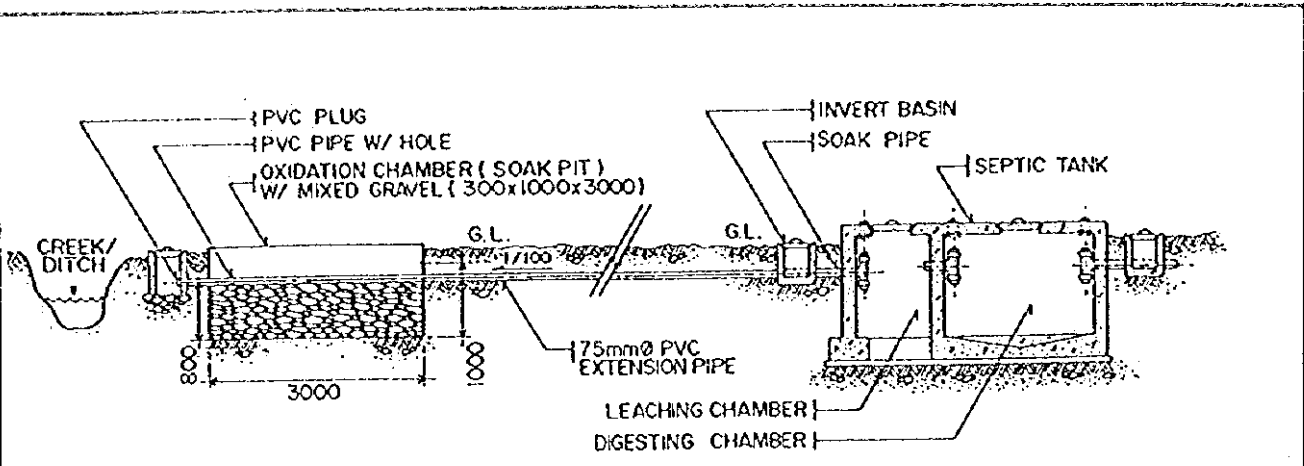


FIGURE 4.2.1
STANDARD STRUCTURE OF HOUSEHOLD TOILET FACILITY



LAYOUT PLAN OF HIGH GROUND WATER SITE

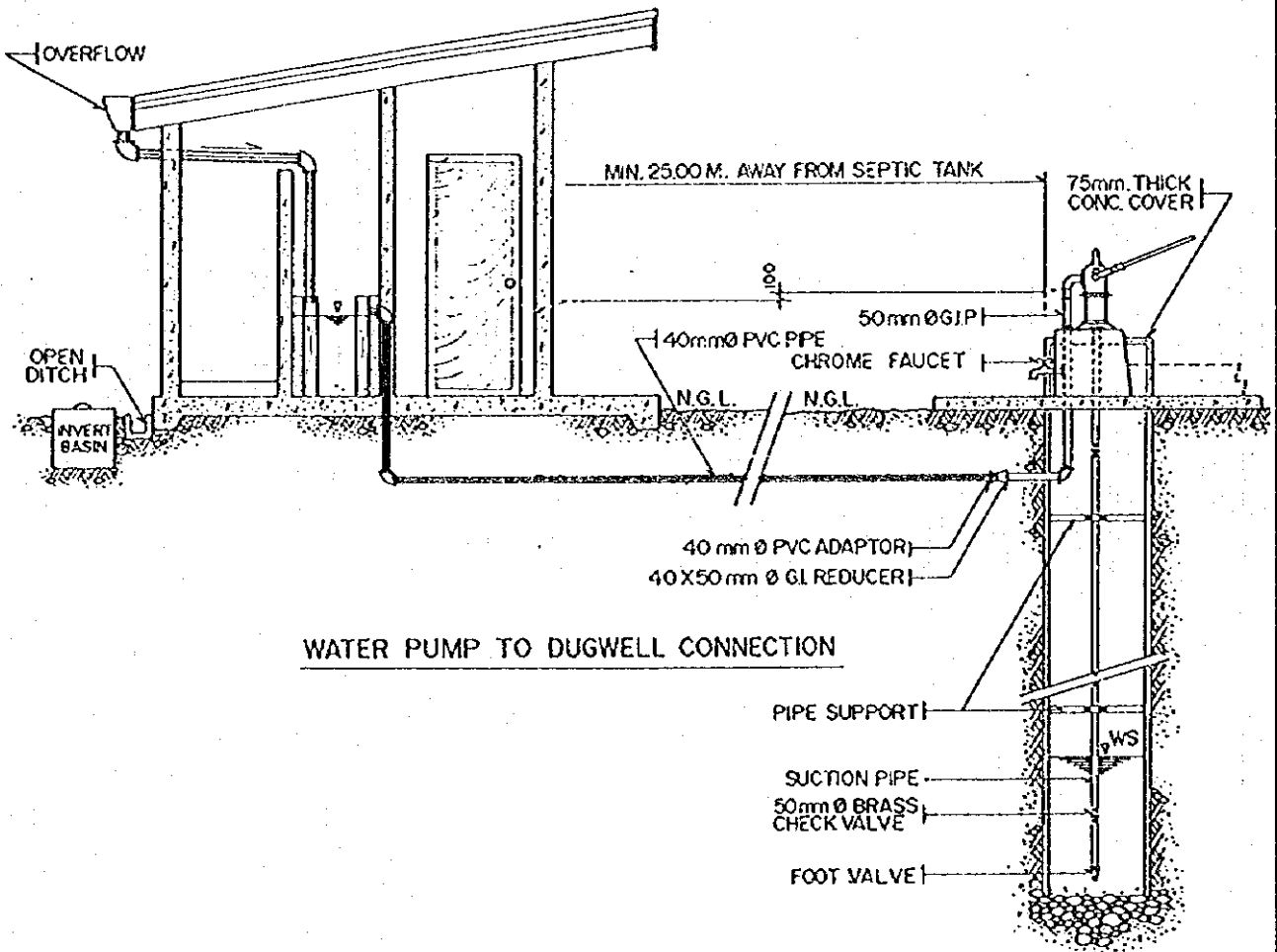


FIGURE 4.2.2
STANDARD STRUCTURE OF SCHOOL TOILET FACILITY

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, 1994

Municipality	Type	HHs No. 1994	Households Served by Sanitary Toilets								Underserved and Unserved HHs			
			Cistern Toilet		Pour Flush		VIP		Total		Unsanitary		No Facility	
			Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Baco	Urban	380	0	0	210	55	116	31	326	86	24	6	30	8
	Rural	4,483	133	3	1,803	40	1,202	27	3,133	70	660	15	685	15
	Total	4,863	133	3	2,013	41	1,318	27	3,464	71	684	14	715	15
Bansud	Urban	811	0	0	25	3	470	58	495	61	170	21	146	18
	Rural	4,571	0	0	366	8	2,066	45	2,432	53	1,031	23	1,108	24
	Total	5,382	0	0	391	7	2,536	47	2,927	54	1,201	22	1,254	23
Bongabong	Urban	807	0	0	284	35	379	47	663	82	4	0	140	17
	Rural	9,683	0	0	936	10	4,199	43	5,135	53	1,852	19	2,696	28
	Total	10,490	0	0	1,220	12	4,578	44	5,798	55	1,856	18	2,836	27
Bulalacao	Urban	479	0	0	50	10	320	67	370	77	27	6	82	17
	Rural	3,948	0	0	1,010	26	543	14	1,553	39	629	16	1,766	45
	Total	4,427	0	0	1,060	24	863	19	1,923	43	656	15	1,848	42
Calapan (Capital)	Urban	6,410	2,101	33	3,294	51	0	0	5,395	84	0	0	1,015	16
	Rural	11,191	1,179	0	4,041	36	0	0	5,220	46	3,605	32	2,366	21
	Total	17,601	3,280	19	7,335	42	0	0	10,615	60	3,605	20	3,381	19
Gloria	Urban	408	0	0	199	49	55	13	254	62	78	19	76	19
	Rural	5,765	0	0	1,364	24	1,343	23	2,707	47	1,445	25	1,613	28
	Total	6,173	0	0	1,563	25	1,398	23	2,961	48	1,523	25	1,689	27
Mansalay	Urban	466	0	0	372	80	0	0	372	80	0	0	94	20
	Rural	5,131	0	0	2,692	52	0	0	2,692	52	1,172	23	1,267	25
	Total	5,597	0	0	3,064	55	0	0	3,064	55	1,172	21	1,361	24
Naujan	Urban	1,050	205	20	450	43	160	15	815	78	190	18	45	4
	Rural	13,481	70	0	3,311	25	1,407	10	4,818	35	5,385	40	3,278	24
	Total	14,531	275	2	3,761	26	1,567	11	5,633	39	5,575	38	3,323	23
Panamayan	Urban	1,431	793	55	327	23	130	9	1,250	87	176	12	5	0
	Rural	10,411	2,249	0	1,337	13	573	6	4,159	18	3,674	35	2,578	25
	Total	11,842	3,042	26	1,664	14	703	6	5,409	46	3,850	33	2,583	22
Pala	Urban	341	119	35	187	55	0	0	306	90	0	0	35	10
	Rural	5,345	172	3	944	18	539	10	1,655	31	732	14	2,958	55
	Total	5,686	291	5	1,131	20	539	9	1,961	34	732	13	2,993	53
Puerto Galera	Urban	605	0	0	586	97	8	1	594	98	3	0	8	1
	Rural	3,187	0	0	1,821	57	209	7	2,030	64	853	27	294	9
	Total	3,792	0	0	2,407	63	217	6	2,624	69	866	23	302	8
Roxas	Urban	710	147	21	375	53	0	0	522	74	117	16	71	10
	Rural	6,086	0	0	1,283	21	550	9	1,833	30	3,380	56	873	14
	Total	6,796	147	2	1,658	24	550	8	2,355	35	3,497	51	944	14
San Teodoro	Urban	488	0	0	200	41	128	26	328	67	65	13	95	19
	Rural	1,831	0	0	553	30	368	20	921	50	301	16	609	33
	Total	2,319	0	0	753	32	496	21	1,249	54	366	16	704	30
Socorro	Urban	801	0	0	375	47	213	27	588	73	112	14	101	13
	Rural	5,482	0	0	1,028	19	649	12	1,677	31	1,839	34	1,966	36
	Total	6,283	0	0	1,403	22	862	14	2,265	36	1,951	31	2,067	33
Victoria	Urban	1,352	0	0	645	48	348	26	993	73	0	0	359	27
	Rural	5,782	0	0	2,046	35	1,152	20	3,198	55	0	0	2,584	45
	Total	7,134	0	0	2,691	38	1,500	21	4,191	59	0	0	2,943	41
Provincial Total	Urban	16,539	3,365	20	7,579	46	2,327	14	13,271	80	966	6	2,302	14
	Rural	96,377	3,803	4	24,565	26	14,800	15	43,168	45	26,588	28	26,641	27
	Total	112,916	7,168	6	32,144	28	17,127	15	56,439	50	27,554	24	28,943	26



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 ORIENTAL MINDORO

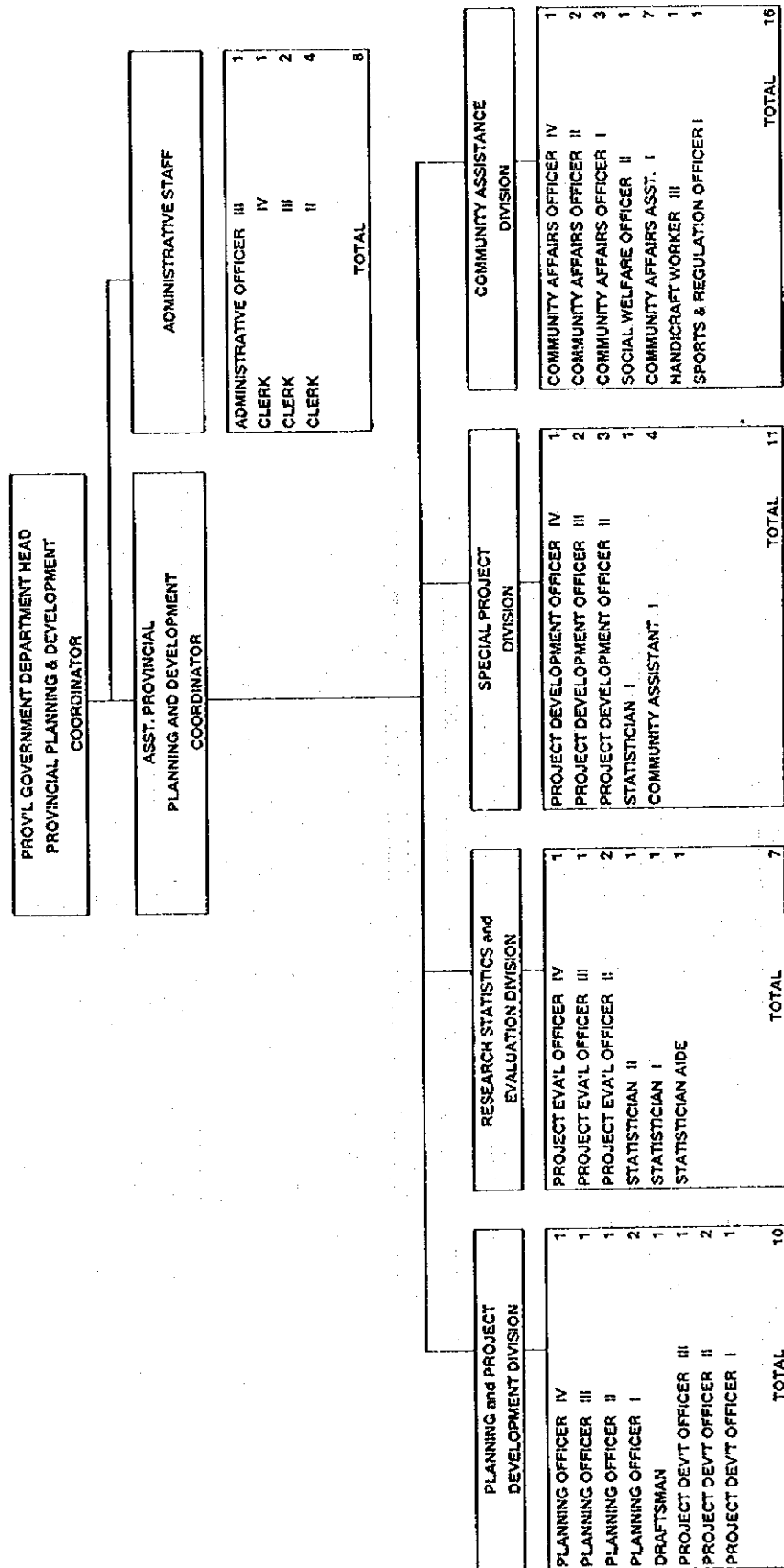


FIGURE 5.5.2
 ORGANIZATIONAL CHART
 PROVINCIAL ENGINEERS OFFICE
 Province of ORIENTAL MINDORO

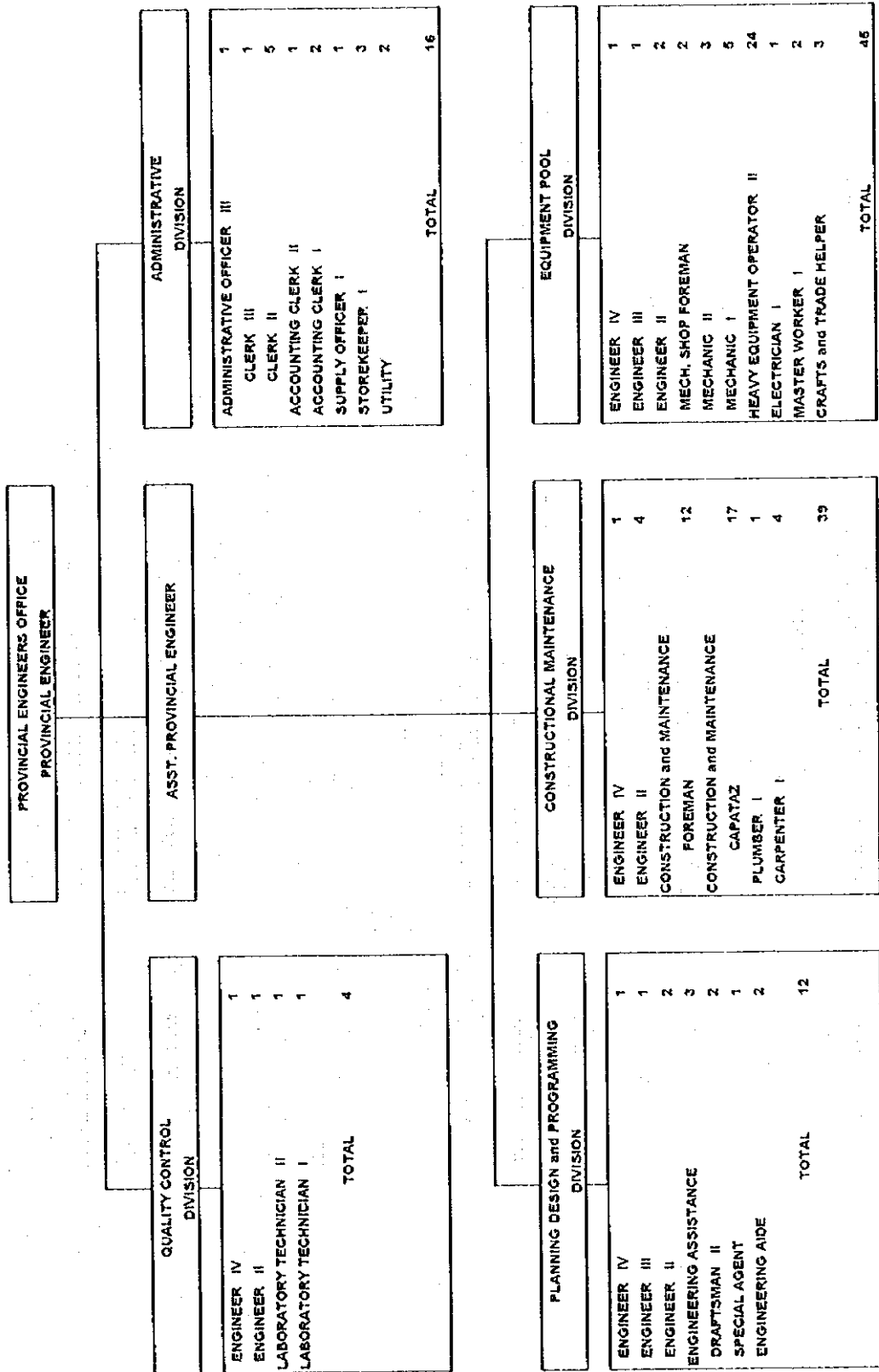
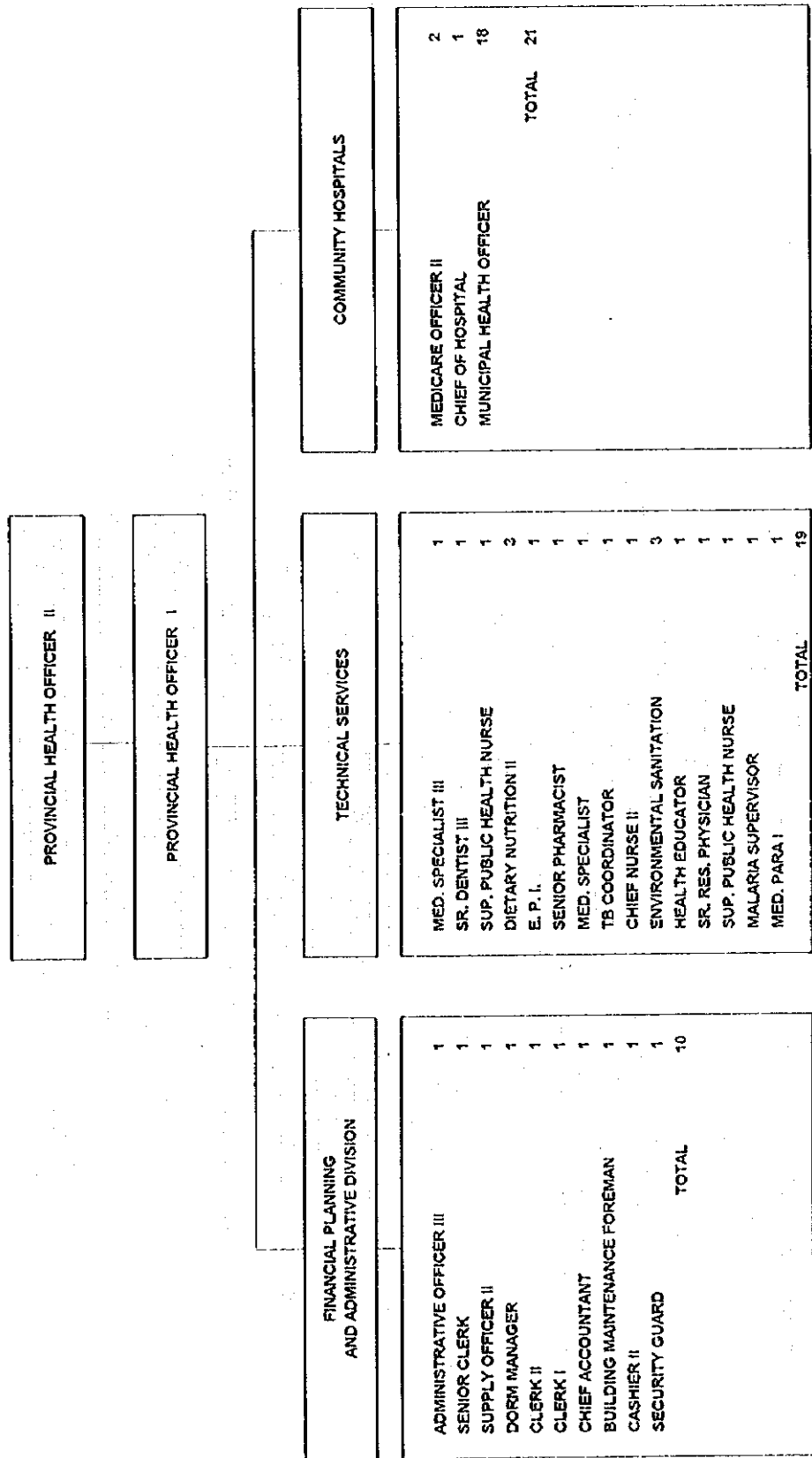


FIGURE 5.5.3
 ORGANIZATIONAL CHART
 PROVINCIAL HEALTH OFFICE
 PROVINCE OF ORIENTAL MINDORO





6. PAST FINANCIAL PERFORMANCE IN WATER SUPPLY AND SANITATION
 6.2 Past Public Investment
 6.2.2 Sources of Local Fund

Table 6.2.1 Past Internal Revenue Allotment to Municipalities from Central Government

Unit: Pesos

	1990	1991	1992	1993
1. IRA to all municipalities (National total)	3,054,601,475	4,046,838,742	7,127,522,550	12,484,800,000
2. IRA to municipalities in Oriental Mindoro Province				
<i>Total</i>	37,411,754	49,181,231	84,578,869	151,344,870
Baco	1,752,954	2,353,890	4,424,000	7,806,872
Bansud	2,048,616	2,598,468	4,720,806	8,326,279
Bongabong	3,515,736	4,665,734	7,789,908	14,905,029
Bulalacao	1,806,331	2,401,492	4,646,489	8,181,083
Calapan	4,549,192	6,109,847	9,003,365	16,196,872
Gloria	2,134,278	2,739,716	4,826,358	8,511,766
Mansalay	2,641,916	3,394,132	6,295,360	11,287,471
Naujan	4,761,429	6,079,411	9,540,094	17,303,031
Pinamalayan	3,522,656	4,566,857	7,150,262	12,779,302
Pola	1,790,857	2,253,276	3,968,980	6,973,888
Puerto Galera	1,389,816	1,931,131	3,837,588	6,741,919
Roxas	1,819,142	2,477,698	4,199,786	7,329,171
San Teodoro	1,533,452	2,039,505	4,378,852	7,696,570
Socorro	1,877,455	2,455,962	4,329,894	7,574,976
Victoria	2,267,924	3,114,112	5,467,127	9,730,641
3. Shares (%) in national total by municipality				
<i>Total</i>	1.225	1.215	1.187	1.212
Baco	0.057	0.058	0.062	0.063
Bansud	0.067	0.064	0.066	0.067
Bongabong	0.115	0.115	0.109	0.119
Bulalacao	0.059	0.059	0.065	0.066
Calapan	0.149	0.151	0.126	0.130
Gloria	0.070	0.068	0.068	0.068
Mansalay	0.086	0.084	0.088	0.090
Naujan	0.156	0.150	0.134	0.139
Pinamalayan	0.115	0.113	0.100	0.102
Pola	0.059	0.056	0.056	0.056
Puerto Galera	0.045	0.048	0.054	0.054
Roxas	0.060	0.061	0.059	0.059
San Teodoro	0.050	0.050	0.061	0.062
Socorro	0.061	0.061	0.061	0.061
Victoria	0.074	0.077	0.077	0.078
Sub-total	1.225	1.215	1.187	1.212

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



7. WATER SOURCE DEVELOPMENT

7.3 Groundwater Sources

7.3.2 Groundwater Availability in the Province

(1) Major Informations and References

Groundwater Availability Map was prepared using the following major informations and references.

- Administrative and Topographical Maps of the Province published by NAMRIA with scales of 1/250,000 and 1/50,000, respectively.
- Geological Map of the Philippines published by BMGS (now defunct) with a scale of 1/1,000,000.
- Groundwater Resources Survey Report of BMGS, 1983.
- Water Resource Investigation conducted by NWRB, 1986.
- Well Inventory Database prepared by NWRB, LWUA, DPWH.
- Well Inventory Database in the province.

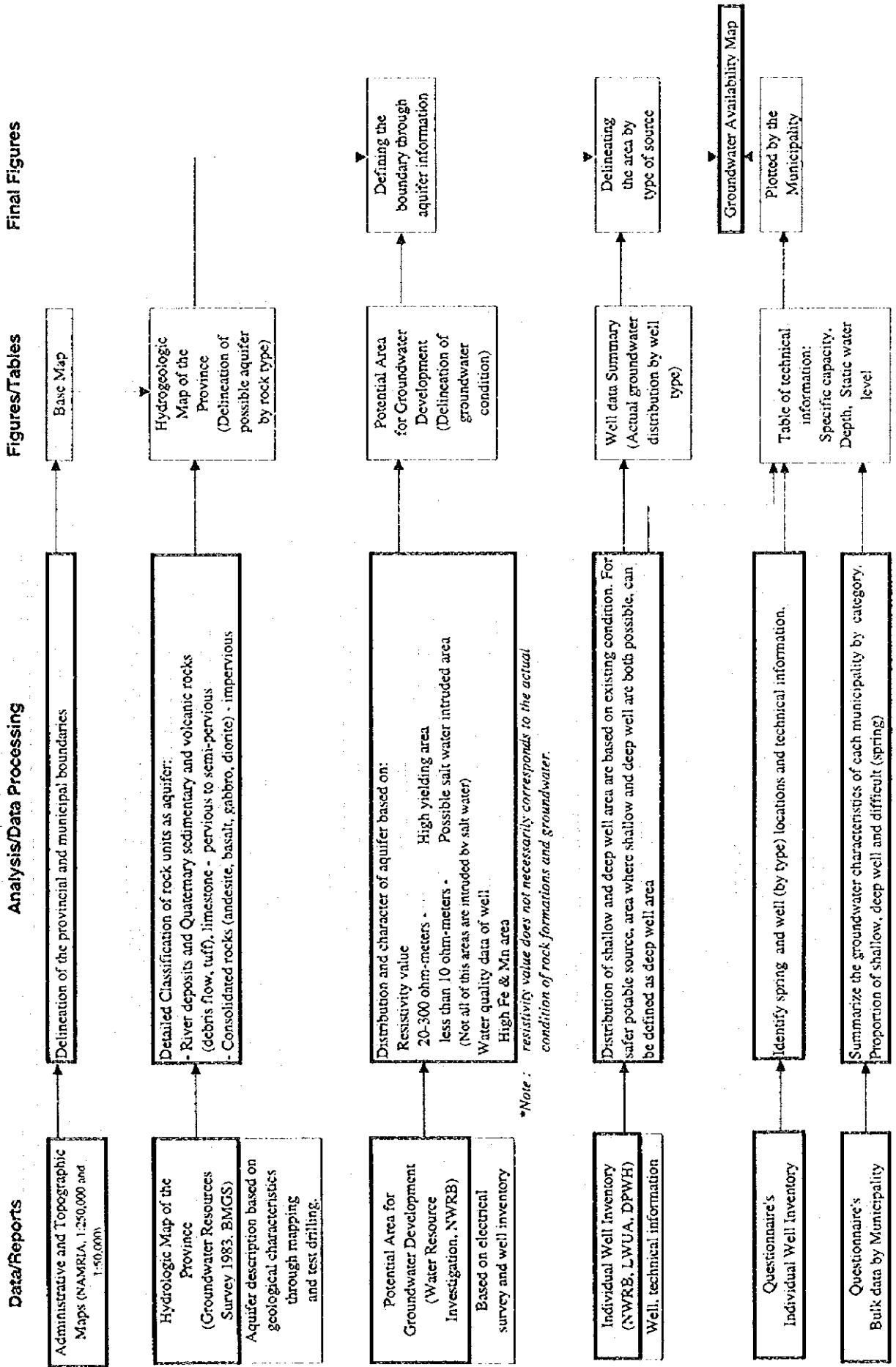
(2) Approach and Methodology

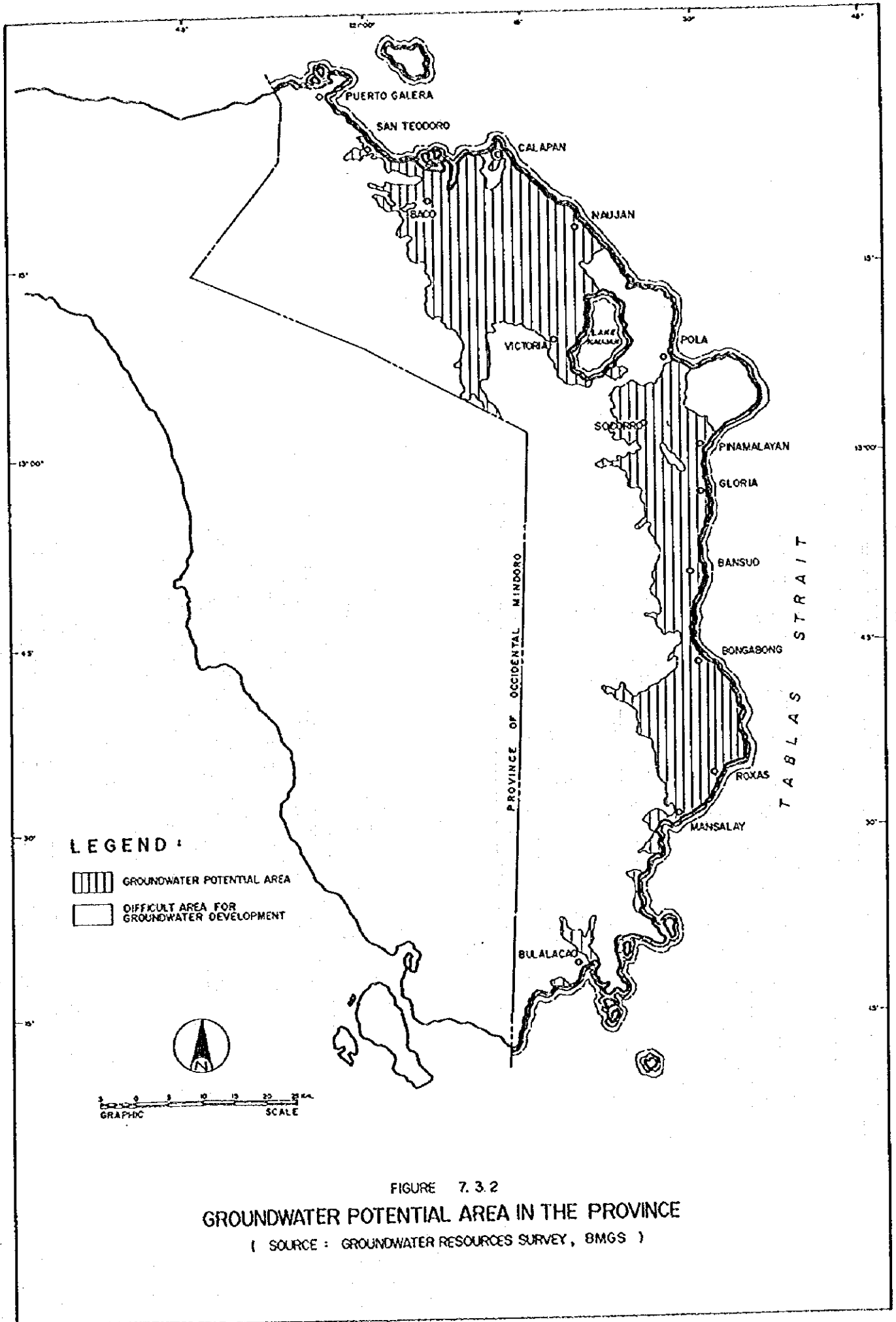
The Groundwater Availability Map was prepared according to the following work flow as presented in Figure 7.3.1:

- 1) Prepare a base map with a scale of 1:250,000 using the Administrative Map (1:250,000) and details are referred from the Topographic Map (1:250,000). Basic information including rivers and provincial/municipal boundaries are indicated on the maps.
- 2) Potential groundwater areas as identified by the Groundwater Resource Survey of BMGS is transferred to the base map. Considering the size of particles and degree of compaction of rock units, alluvial deposits, Quaternary sediments (sandstone and conglomerate) and volcanic rocks (pyroclastics, debris flow and tuff) are regarded as possible aquifers.

In addition to the defined boundaries of the areas underlain by pervious or groundwater bearing formation, difficult areas for the groundwater development are also delineated as presented in Figure 7.3.2.

Figure 7.3.1 WORK FLOW OF GROUNDWATER AVAILABILITY MAP



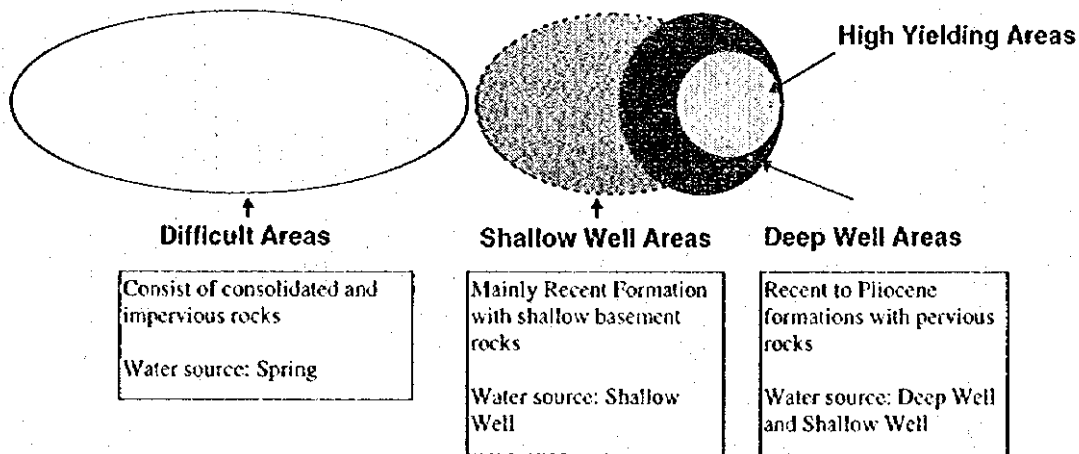


- 3) Areas with potential high yielding formations and with salt water intrusion problem, as established in the Water Resources Investigation of NWRB, are reflected within the area identified as potential groundwater development.

Based on the result of geo-electric survey of the said investigation, resistivity values of 20- 300 ohm-meter are regarded as a potential high yielding formation, while values less than 10 ohm-meters as a potential zone with salty water. Figure 7.3.3 shows the boundaries between high yielding, low yielding, and salty water areas. In addition, considering the results of water quality examination of wells, areas with high iron and manganese concentrations are also indicated on the map since these ions produce aesthetic effects when their allowable limits are exceeded.

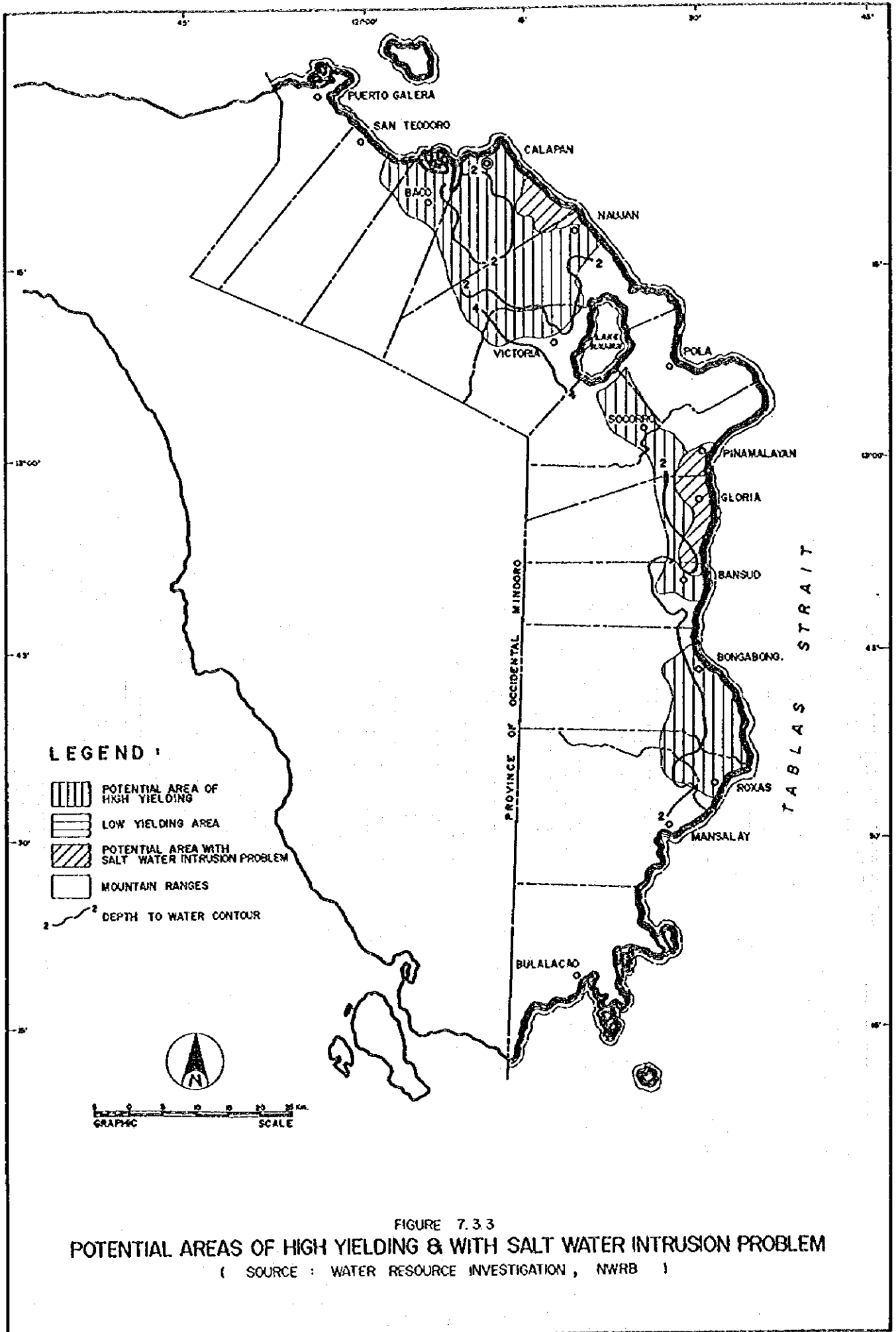
- 4) Shallow and deep well areas are delineated based on the well inventory by municipality (refer to Table 7.3.1, Data report). Figure 7.3.4 presents categorization of areas in terms of groundwater utilization.

Figure 7.3.4 Area Category in Groundwater Utilization



Shallow well areas are defined on the following basis;

- Predominance of existing shallow wells and presence of deep aquifer with water quality problem and/or low yielding capacity.
 - Occurrence of impervious rock beneath the Recent formation at shallow depth.
- 5) Standard specifications of wells by municipality presented in the map are based on informations provided by NWRB's well inventory database and provincial database.



Individual well locations with technical informations are presented in Figure 7.6.1, Data report.

(3) Manner of 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 further investigation done by BMGS, NWRB or any other agencies, delineation of potential area for groundwater development may be redefined accordingly by applying the above mentioned work process.
- 2) Updating provincial database using questionnaires to make the necessary revision of the boundaries of shallow and deep well areas.

7.4 Spring Sources

Table 7.4.1 Existing Spring Sources by Municipality

Municipality	Total Number	Untapped Spring		Average Yield cu. m/hr
		Number	Percentage (%)	
Baco	13	7	54	3.73
Bansud	9	6	67	1.15
Bongabong	6	8	0	< 4.16
Bulalakao	16	5	0	
Calapan	2	0	0	
Gloria	0	1	0	
Mansalay	16	0	0	< 4.16
Naujan	21	5	0	2.32
Pinamalayan	25	5	0	> 4.16
Pola	76	72	95	
Puerto Galera	7	3	0	
Roxas	5	2	0	
San Teodoro	49	5	0	> 4.16
Socorro	41	38	93	> 4.16
Victoria	12	4	34	> 4.16
TOTAL	298	161	43	

Source: Oriental Mindoro PPDO

7.5 Surface Water Sources

Water quality analysis of selected two selected rivers was undertaken to determine general characteristics of surface water in the province.

(1) Study Rivers

Typical rivers in the province have narrow drainage areas of 50 to 400 km² with relatively short streams. Average flow rates range from 10 to 60 cu.m/sec. Of the rivers, the Bucayao and Mag-asawang tubig rivers were selected for the study based on two criteria; existence of flow measurement records and potential use of river water (existence of populated are in the basin). Figure 7.5.1 shows study river basins and Table 7.5.1 presents relevant information on these rivers.

Table 7.5.1 River Information and Related Data

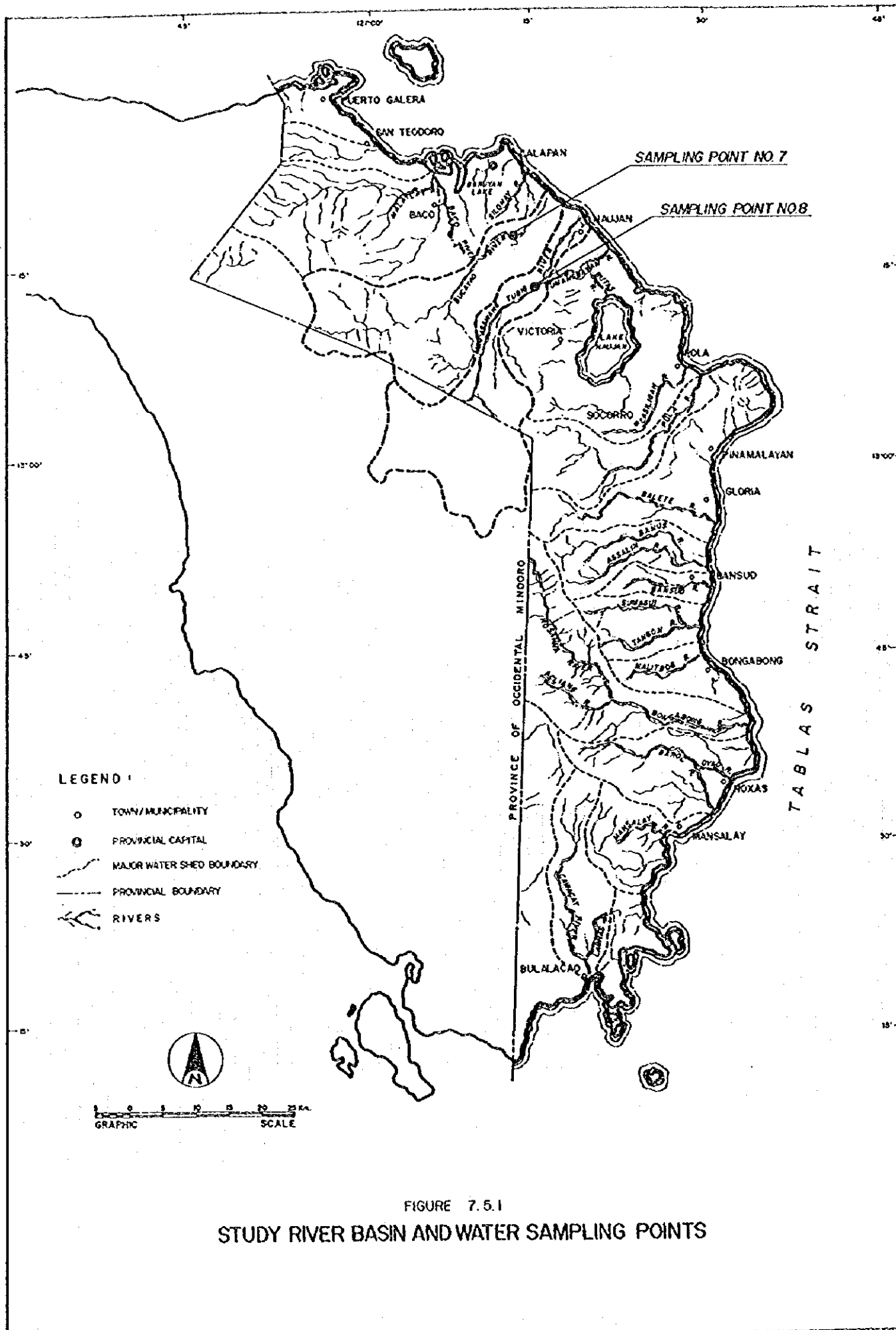
River	Drainage Area(km ²)	Flow Rate cu. m/sec.			Relevant Information in the Basin	
		Minimum	Average	Maximum	Major Mun. & Population	Water District
Bucayao River	339	13.61	59.27	517.24	Calapan 85,898	Naujan
Mag-asawang Tubig River	435	1.33	29.49	644.55	Naujan 72,203	Naujan

(2) Sampling Points and Examination Procedures

The sampling points in the rivers were located at least 5 kilometers from the river mouth to avoid tidal effect (refer to Figure 7.5.1).

Water sampling was conducted on October 5, 1994 at different points across the river channel. The samples were sent to MWSS laboratory within 24 hours after they were taken. Flow rates were also measured across the river at the same points where the samples were taken. A composite sample was prepared in proportion to flow rates at some points along the cross section of the river.

The water quality analysis, which considers twelve (12) parameters, was made in accordance with 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 data sheets prepared by MWSS Central Laboratory, 7.5 Data Report). Flow rates of Bucayao and Mag-asawang Tubig rivers at the time of sampling were 96.6 cu.m/sec and 6.97 cu.m/sec, respectively. Flow rate at Bucayao river is similar to an average rate, while Mag-asawang Tubig river is close to the minimum flow.

Table 7.5.2 Water Quality Analysis Results

INDICES	UNIT	Class A Water Quality criteria for Fresh Water	SAMPLE RIVER		REMARKS
			BUCAYAO	MAG-ASAWANG TUBIG	
ph		6.5-8.5	8.10	8.10	within standard
Turbidity, units	unit		90.00	30.00	Both rivers exceeded NSDW
Alkalinity		-	66.00	219.00	
Color	unit	50	30.00	25.00	within standard
Conductivity	ms/cm	-	172.00	440.00	
Total Hardness as Ca Co ₃	mg/l	400	78.00	226.00	
Sulfate (SO ₄)	mg/l	200	17.00	16.00	
Chloride (Cl)	mg/l	200	3.20	5.40	within standard
Manganese (Mn)	mg/l	0.5	0.20	0.10	within standard
Iron (Fe)	mg/l	1.0	15.20	3.60	within standard
Ammonia - Nitrogen	mg/l	-	0.12	0.21	Both rivers exceeded standard
BOD	mg/l	5.0	21.00	43.00	Water pollution

Generally, the river water in the province contains relatively high iron. This is due to the iron rich formation of the Mindoro Mountain Range, which forms part of the drainage. Other analyzed indices are all within Class A standard set by Water Quality Criteria for Fresh Water. However, the computed Biochemical Oxygen Demand (BOD: assumed conversion rate is BOD/COD = 1/2) of river water exceeded the standard of 5 mg/liter. Together with the existence of Ammonia-Nitrogen it suggest that organic pollution caused by wastewater discharge is underway.

7.6 Future Development Potential of Water Sources

The Groundwater Resource Survey Report (BMGS) used is based on the geological investigation covering physical and chemical characteristics of the rock units. It revealed that

more than 3/4 of the provincial area is underlain by metamorphic basement rocks, clastic rocks, ultramafic and volcanic flows. The rest is occupied by Late Pliocene to Pleistocene sediments, which are extended along the coastal areas from Baco to Roxas. The province geologically comprises numerous intense faulting and fracturings for that secondary permeability can be expected.

The Water Resources Investigation Report of NWRB, which is based on the results of geo-resistivity sounding at 90 points was correlated with field inspection, regional geology and the lithologic logs of existing wells to determine the sub-surface geology and groundwater conditions in the province. The correlation suggests that the Recent deposits, and semi-consolidated sandstone, siltstone and conglomerate rocks of Pliocene-Pleistocene formation are potential aquifer. In the municipalities of San Teodoro, Baco, Calapan, Naujan, Socorro, Pinamalayan, Gloria, Bongabong, Roxas and Mansalay resistivity values from 21 to 240 ohm-meters are observed up to the depth of 200 mbgl. Accordingly, high yielding wells may be found in these areas. Low resistivity values of 2 to 7 ohm-meters are recorded near seashore of Calapan, Pinamalayan and Gloria area, where salt intrusion is conceived.

Questionnaires collected from municipalities confirmed the existence of 27,392 wells in the province, while the NWRB Database includes 284 wells. Table 7.6.1 presents well information by municipality. Municipalities of Baco, Calapan, Naujan, Victoria, Socorro, Pinamalayan, Gloria, Bansud, Bongabong and Roxas are high potential areas for deep well development. In these areas, the specifications of deep wells are : 28.89 to 65.16 mbgl. in depth and 0.61 to 18.35 mbgl. in water level. Specific capacity ranges from 0.21 to 3.51 l/sec/m. Municipalities of San Teodoro, Mansalay and Bulalacao are also considered as potential deep well area, but the extent of the aquifer may be limited. Detailed investigation entailing test drilling, well logging, geo-resistivity testing and pumping tests are necessary to find adequate aquifers in the area.

Individual well locations and specifications are included in Figure 7.6.1, Data Report. The NWRB database is also attached in the Table 7.3.1, Data report. Annual review and updating of these database are essential.

The standard specification of wells are projected based on NWRBs database and the geological continuity of the province. Table 7.6.2 presents potential sources for water supply by municipality for water supply planning purpose. Spring development may be considered in the difficult area for groundwater development.

Table 7.6.1 Existing Well Sources (Province of Oriental Mindoro)

Municipality	Type	Number	Average		
			Depth (m)	SWI.(m)	Specific Capacity (l/sec/m)
BACO	Shallow Well	10	11.10	2.06	0.92
	Deep Well	7	53.08	2.92	1.04
	Total	17	28.38	2.41	0.97
BANSUD	Shallow Well	1	19.81	7.62	1.05
	Deep Well	3	39.33	0.61	0.21
	Total	4	34.45	2.36	0.42
BONGABONG	Shallow Well	11	13.67	2.74	1.16
	Deep Well	20	65.16	18.35	0.47
	Total	31	46.89	12.81	0.71
BULALAKAO	Shallow Well	2	5.79	1.52	0.41
	Deep Well	1	40.85	1.52	0.24
	Total	3	17.48	1.52	0.35
CALAPAN	Shallow Well	21	9.87	2.16	1.66
	Deep Well	31	49.39	3.44	0.71
	Total	52	33.43	2.93	1.09
GLORIA	Shallow Well	4	16.08	2.06	0.18
	Deep Well	3	33.74	9.15	0.26
	Total	7	23.65	5.10	0.22
MANSALAY	Shallow Well	3	13.61	3.50	
	Deep Well	5	37.38	3.29	0.55
	Total	8	28.47	3.37	0.34
NAUJAN	Shallow Well	17	11.97	1.89	1.59
	Deep Well	20	60.74	2.24	1.83
	Total	37	38.33	2.08	1.72
PINAMALAYAN	Shallow Well	23	11.97	3.77	1.13
	Deep Well	18	40.51	7.58	0.69
	Total	41	24.50	5.44	0.94
POLA	Shallow Well	3	11.28	2.95	0.69
	Deep Well	11	52.09	1.86	0.98
	Total	14	43.34	2.09	0.92
PUERTO GALERA	Shallow Well	22	11.72	3.70	1.38
	Deep Well	1	21.34	12.20	2.59
	Total	23	12.14	4.07	1.43
ROXAS	Shallow Well	6	12.70	1.61	5.27
	Deep Well	8	50.27	2.02	3.51
	Total	14	34.17	1.84	4.26
SAN TEODORO	Shallow Well	3	8.34	1.42	2.69
	Deep Well	10	42.84	3.12	0.72
	Total	13	34.87	2.72	1.17
SOCORRO	Shallow Well				
	Deep Well	3	40.57	6.81	1.29
	Total	3	40.57	6.81	1.29
VICTORIA	Shallow Well	9	12.13	2.71	1.11
	Deep Well	8	28.89	8.27	2.39
	Total	17	20.02	5.33	1.71
TOTAL	Shallow Well	135	11.75	2.78	1.38
	Deep Well	149	49.49	5.88	1.09
	Total	284	31.55	4.40	1.23

Table 7.6.2 Standard Specifications of Wells by Municipality

Municipality	Type	Proportion (%)	Standard Specification			Remarks	
			Depth (m)	SWI (m)	Specific Capacity (l/sec/m)		
Rasu	Rural	Shallow Well	10	10<D<20	2	1	
		Deep Well	80	20<D<50	5	0.5	
		Spring	10				
	Urban	Shallow Well	30	10<D<20	1	1	
		Deep Well	70	20<D<50	2	3	Fe, Mn
		Spring	0				
Ransad	Rural	Shallow Well	40	10<D<20	2	1	Fe, Mn
		Deep Well	60	20<D<50	3	0.5	Fe, Mn
		Spring	0				
	Urban	Shallow Well	0				
		Deep Well	100	20<D<50	1	2	Fe, Mn
		Spring	0				
Bongabing	Rural	Shallow Well	10	10<D<20	3	0.5	
		Deep Well	80	20<D<50	5	0.2	Fe, Mn
		Spring	10				
	Urban	Shallow Well	60	10<D<20	3	1	
		Deep Well	40	50<D<100	5	0.5	
		Spring	0				
Rutafacan	Rural	Shallow Well	80	10<D<20	3	0.5	
		Deep Well	20	20<D<50	5	0.2	Fe, Mn
		Spring	0				
	Urban	Shallow Well	80	10<D<20	3	0.5	
		Deep Well	20	20<D<50	5	0.2	
		Spring	0				
Calapan	Rural	Shallow Well	0				
		Deep Well	100	20<D<50	2	1	Cl
		Spring	0				
	Urban	Shallow Well	0				
		Deep Well	100	20<D<50	1	1	Cl
		Spring	0				
Oluta	Rural	Shallow Well	40	10<D<20	2	0.5	
		Deep Well	60	20<D<50	5	0.5	Fe, Mn
		Spring	0				
	Urban	Shallow Well	0				
		Deep Well	100	20<D<50	3	0.5	Cl
		Spring	0				
Mansalay	Rural	Shallow Well	0				
		Deep Well	100	50<D<100	5	1	
		Spring	0				
	Urban	Shallow Well	0				
		Deep Well	100	20<D<50	3	0.5	
		Spring	0				
Naujan	Rural	Shallow Well	0				
		Deep Well	100	20<D<50	3	1.5	Cl
		Spring	0				
	Urban	Shallow Well	0				
		Deep Well	100	20<D<50	3	2	Cl
		Spring	0				
Pinamuyan	Rural	Shallow Well	10	10<D<20	3	1	
		Deep Well	70	20<D<50	5	1	Fe, Mn
		Spring	20				
	Urban	Shallow Well	0				
		Deep Well	100	20<D<50	5	1	Cl
		Spring	0				
Pala	Rural	Shallow Well	0				
		Deep Well	60	20<D<50	2	1	Fe, Mn
		Spring	40				
	Urban	Shallow Well	0				
		Deep Well	100	20<D<50	3	1	
		Spring	0				
Puerto Galera	Rural	Shallow Well	0				
		Deep Well	60	20<D<50	10	1	
		Spring	40				
	Urban	Shallow Well	0				
		Deep Well	70	20<D<50	10	1	
		Spring	30				
Rosas	Rural	Shallow Well	0				
		Deep Well	100	20<D<50	3	1	Fe, Mn
		Spring	0				
	Urban	Shallow Well	0				
		Deep Well	100	20<D<50	2	3	Cl, Fe, Mn
		Spring	0				
San Tendido	Rural	Shallow Well	0				
		Deep Well	60	20<D<50	3	0.5	Fe, Mn
		Spring	40				
	Urban	Shallow Well	0				
		Deep Well	100	50<D<100	2	0.5	Cl, Fe, Mn
		Spring	0				
Socorro	Rural	Shallow Well	0				
		Deep Well	100	20<D<50	3	1	Fe, Mn
		Spring	0				
	Urban	Shallow Well	0				
		Deep Well	100	50<D<100	3	2	
		Spring	0				
Victoria	Rural	Shallow Well	20	10<D<20	2	1	
		Deep Well	80	20<D<50	5	2	Fe, Mn
		Spring	0				
	Urban	Shallow Well	0				
		Deep Well	100	20<D<50	5	1	
		Spring	0				

* Specifications are estimated from NWRB Well Inventory Database and geological continuity of the aquifer
 ** Urban area in Oriental Mindoro is limited to Palawan.

Legend
 Depth (m):
 10<D<20 Depth between 10m and 20m
 20<D<50 Depth between 20m and 50m
 50<D<100 Depth between 50m and 100m
 100<D<150 Depth between 100m and 150m
 Oriental Mindoro
 Remarks:
 Cl Possible salt water intrusion near the sea shore
 Fe High iron content water
 Mn High manganese content water

**B. FUTURE REQUIREMENTS AND
DEVELOPMENT PLAN**

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DEVELOPMENT PLAN**



8. FUTURE REQUIREMENTS IN WATER SUPPLY AND SANITATION IMPROVEMENT

8.2 Targets of Provincial Sector Plan

Table 8.2.1 Estimation of Base Year Service Coverage of Water Supply

Municipality	Type	Population (1994)	Population Served by 1994 Facilities				Pop. Served by Planned/ On-going Projects				Pop. Served in the Base Year (1994)				% Coverage
			Level III	Level II	Level I	Total	Level III	Level II	Level I	Total	Level III	Level II	Level I	Total	
Baco	Urban	1,898	0	0	1,716	1,716	0	0	0	0	0	0	1,716	1,716	90
	Rural	24,654	1,431	275	19,354	21,060	0	2,363	0	2,363	1,431	2,638	19,354	23,423	95
	Total	26,552	1,431	275	21,070	22,776	0	2,363	0	2,363	1,431	2,638	21,070	25,139	95
Bansud	Urban	4,299	0	318	2,946	3,264	0	0	0	0	0	318	2,946	3,264	76
	Rural	23,771	0	0	15,504	15,504	0	0	0	0	0	0	15,504	15,504	65
	Total	28,070	0	318	18,450	18,768	0	0	0	0	0	318	18,450	18,768	67
Bongabong	Urban	4,278	0	0	2,516	2,516	0	0	0	0	0	0	2,516	2,516	59
	Rural	51,321	0	0	25,719	25,719	0	0	0	0	0	0	25,719	25,719	50
	Total	55,599	0	0	28,234	28,234	0	0	0	0	0	0	28,234	28,234	51
Bulacao	Urban	2,829	0	0	658	658	0	0	0	0	0	0	658	658	23
	Rural	21,312	0	0	2,181	2,181	0	0	0	0	0	0	2,181	2,181	10
	Total	24,146	0	0	2,839	2,839	0	0	0	0	0	0	2,839	2,839	12
Catapan (Capital)	Urban	34,616	22,685	0	8,472	31,157	0	0	0	0	22,685	0	8,472	31,157	90
	Rural	61,548	12,964	0	34,305	47,269	0	0	0	0	12,964	0	34,305	47,269	77
	Total	96,164	35,649	0	42,776	78,425	0	0	0	0	35,649	0	42,776	78,425	82
Gloria	Urban	2,204	0	0	1,243	1,243	0	0	0	0	0	0	1,243	1,243	50
	Rural	30,555	0	0	17,050	17,050	0	0	0	0	0	0	17,050	17,050	56
	Total	32,759	0	0	18,293	18,293	0	0	0	0	0	0	18,293	18,293	56
Mansalay	Urban	2,561	0	0	1,163	1,163	0	0	0	0	0	0	1,163	1,163	45
	Rural	27,707	0	0	13,590	13,590	0	0	0	0	0	0	13,590	13,590	49
	Total	30,268	0	0	14,753	14,753	0	0	0	0	0	0	14,753	14,753	49
Naujan	Urban	5,143	2,009	221	1,909	4,139	0	0	0	0	2,009	221	1,909	4,139	80
	Rural	72,797	756	0	48,281	49,037	0	250	0	250	756	250	48,281	49,287	68
	Total	77,940	2,765	221	50,190	53,176	0	250	0	250	2,765	471	50,190	53,426	69
Pinamalayan	Urban	7,582	7,420	0	0	7,420	0	0	0	0	7,420	0	0	7,420	98
	Rural	56,217	24,284	540	18,326	43,150	0	1,655	0	1,655	24,284	2,195	18,326	41,805	80
	Total	63,799	31,704	540	18,326	50,570	0	1,655	0	1,655	31,704	2,195	18,326	52,225	82
Pola	Urban	1,637	1,142	0	0	1,142	0	0	0	0	1,142	0	0	1,142	70
	Rural	27,262	1,754	0	5,257	7,011	0	250	0	250	1,754	250	5,257	7,261	27
	Total	28,899	2,896	0	5,257	8,153	0	250	0	250	2,896	250	5,257	8,403	29
Puerto Galera	Urban	3,024	0	0	2,779	2,779	0	0	0	0	0	0	2,779	2,779	92
	Rural	16,889	0	0	12,506	12,506	0	3,086	0	3,086	0	3,086	12,506	15,592	92
	Total	19,913	0	0	15,284	15,284	0	3,086	0	3,086	0	3,086	15,284	18,370	92
Roxas	Urban	3,836	1,582	0	1,569	3,151	0	0	0	0	1,582	0	1,569	3,151	82
	Rural	33,475	0	0	23,045	23,045	0	0	0	0	0	0	23,045	23,045	69
	Total	37,311	1,582	0	24,614	26,196	0	0	0	0	1,582	0	24,614	26,196	70
San Teodoro	Urban	2,685	0	0	1,971	1,971	0	0	0	0	0	0	1,971	1,971	73
	Rural	10,253	0	0	3,767	3,767	0	0	0	0	0	0	3,767	3,767	37
	Total	12,938	0	0	5,738	5,738	0	0	0	0	0	0	5,738	5,738	44
Socorro	Urban	4,328	0	0	3,291	3,291	0	0	0	0	0	0	3,291	3,291	76
	Rural	28,506	0	0	14,950	14,950	0	0	0	0	0	0	14,950	14,950	52
	Total	32,834	0	0	18,241	18,241	0	0	0	0	0	0	18,241	18,241	56
Victoria	Urban	7,569	0	0	6,804	6,804	0	0	0	0	0	0	6,804	6,804	90
	Rural	31,800	0	165	24,136	24,301	0	425	0	425	0	590	24,136	24,726	78
	Total	39,369	0	165	30,940	31,105	0	425	0	425	0	590	30,940	31,530	80
Provincial Total	Urban	88,489	34,838	539	37,036	72,413	0	0	0	0	34,838	539	37,036	72,413	82
	Rural	518,072	41,189	980	277,969	320,138	0	8,029	0	8,029	41,189	9,009	277,969	328,167	63
	Total	606,561	76,027	1,519	315,005	392,551	0	8,029	0	8,029	76,027	9,548	315,005	400,580	66

**Table 8.2.2 Population Coverage in Phase I Provided by Served Population in the Base Year
(Water Supply)**

Municipality	Type	Population Served by Existing Facilities				1994		2000	
		Level III	Level II	Level I	Total	Total Population	% Coverage	Total Population	% Coverage
Baco	Urban	0	0	1,716	1,716	1,898	90	2,200	78
	Rural	1,431	2,638	19,354	23,423	24,654	95	27,772	84
	Total	1,431	2,638	21,070	25,139	26,552	95	29,972	84
Bansud	Urban	0	318	2,946	3,264	4,299	76	4,785	68
	Rural	0	0	15,504	15,504	23,771	65	26,140	59
	Total	0	318	18,450	18,768	28,070	67	30,925	61
Bongabong	Urban	0	0	2,516	2,516	4,278	59	4,781	53
	Rural	0	0	25,719	25,719	51,321	50	55,224	47
	Total	0	0	28,235	28,235	55,599	51	60,005	47
Bulalacao	Urban	0	0	658	658	2,829	23	3,113	21
	Rural	0	0	2,181	2,181	21,317	10	23,801	9
	Total	0	0	2,839	2,839	24,146	12	26,914	11
Calapan (Capital)	Urban	22,685	0	8,472	31,157	34,616	90	40,680	77
	Rural	12,964	0	34,305	47,269	61,548	77	67,866	70
	Total	35,649	0	42,777	78,426	96,164	82	108,546	72
Gloria	Urban	0	0	1,243	1,243	2,204	56	2,382	52
	Rural	0	0	17,050	17,050	30,555	56	32,977	52
	Total	0	0	18,293	18,293	32,759	56	35,359	52
Mansalay	Urban	0	0	1,163	1,163	2,561	45	2,812	41
	Rural	0	0	13,590	13,590	27,707	49	31,055	44
	Total	0	0	14,753	14,753	30,268	49	33,867	44
Naujan	Urban	2,009	221	1,909	4,139	5,143	80	5,788	72
	Rural	756	250	48,281	49,287	72,797	68	81,730	60
	Total	2,765	471	50,190	53,426	77,940	69	87,518	61
Pinamalayan	Urban	7,420	0	0	7,420	7,582	98	8,630	86
	Rural	24,284	2,195	18,326	44,805	56,217	80	63,040	71
	Total	31,704	2,195	18,326	52,225	63,799	82	71,670	73
Pola	Urban	1,142	0	0	1,142	1,637	70	1,786	64
	Rural	1,754	250	5,257	7,261	27,262	27	30,565	24
	Total	2,896	250	5,257	8,403	28,899	29	32,351	26
Puerto Galera	Urban	0	0	2,779	2,779	3,024	92	4,155	67
	Rural	0	3,086	12,506	15,592	16,889	92	18,370	85
	Total	0	3,086	15,285	18,371	19,913	92	22,525	82
Roxas	Urban	1,582	0	1,569	3,151	3,836	82	4,641	68
	Rural	0	0	23,045	23,045	33,475	69	36,874	62
	Total	1,582	0	24,614	26,196	37,311	70	41,515	63
San Teodoro	Urban	0	0	1,971	1,971	2,685	73	2,897	68
	Rural	0	0	3,767	3,767	10,253	37	12,148	31
	Total	0	0	5,738	5,738	12,938	44	15,045	38
Socorro	Urban	0	0	3,291	3,291	4,328	76	5,325	62
	Rural	0	0	14,950	14,950	28,506	52	31,362	48
	Total	0	0	18,241	18,241	32,834	56	36,687	50
Victoria	Urban	0	0	6,804	6,804	7,569	90	8,879	77
	Rural	0	590	24,136	24,726	31,800	78	35,260	70
	Total	0	590	30,940	31,530	39,369	80	44,139	71
Provincial Total	Urban	34,838	539	37,036	72,413	88,489	82	102,854	70
	Rural	41,189	9,009	277,969	328,167	518,072	63	574,184	57
	Total	76,027	9,548	315,005	400,580	606,561	66	677,038	59

Table 8.2.3 Number of Households Served by Sanitary Toilets in the Base Year (1994)

Municipality	Area	1994		Households Using Sanitary Toilets in 1994				Recipient Hhs of Planned/ On-going Projects				Households Using Sanitary Toilets in Base Year (1994)							
		Popu-lation	HHS	Flush	Pour Flush	VIP	Total	Flush	Pour Flush	VIP	Total	Number				Coverage (%)			
												Flush	Pour Flush	VIP	Total	Flush	Pour Flush	VIP	Total
Baco	Urban	1,898	380	0	210	116	326	0	46	8	54	0	256	124	380	0	67	33	100
	Rural	24,654	4,483	133	1,803	1202	3,138	0	454	86	540	133	2,257	1288	3,678	3	50	29	83
	Total	26,552	4,863	133	2,013	1318	3,464	0	500	94	594	133	2,513	1412	4,058	3	52	29	83
Bansud	Urban	4,299	811	0	25	470	495	0	152	14	166	0	177	484	661	0	22	60	82
	Rural	23,721	4,571	0	366	2066	2,432	0	243	47	290	0	609	2113	2,722	0	13	46	60
	Total	28,070	5,382	0	391	2536	2,927	0	395	61	456	0	786	2597	3,383	0	15	48	63
Bongabong	Urban	4,278	807	0	284	379	663	0	0	0	0	0	284	379	663	0	35	47	82
	Rural	51,321	9,683	0	936	4199	5,135	0	0	0	0	0	936	4199	5,135	0	10	43	53
	Total	55,599	10,490	0	1,220	4578	5,798	0	0	0	0	0	1,220	4578	5,798	0	12	44	55
Bulabacan	Urban	2,829	479	0	50	320	370	0	0	0	0	0	50	320	370	0	10	67	77
	Rural	21,317	3,943	0	1,010	543	1,553	0	0	0	0	0	1,010	543	1,553	0	26	14	39
	Total	24,146	4,422	0	1,060	863	1,923	0	0	0	0	0	1,060	863	1,923	0	24	19	43
Calapan (Capital)	Urban	34,616	6,410	2,101	3,294	0	5,395	0	338	18	356	2,101	3,632	18	5,751	33	57	0	90
	Rural	61,543	11,191	1,179	4,041	0	5,220	0	1,375	269	1,644	1,179	5,416	269	6,864	11	48	2	61
	Total	96,164	17,601	3,280	7,335	0	10,615	0	1,713	287	2,000	3,280	9,048	287	12,615	19	51	2	72
Gloria	Urban	2,204	408	0	199	55	254	0	0	0	0	0	199	55	254	0	49	13	62
	Rural	30,555	5,765	0	1,364	1343	2,707	0	0	0	0	0	1,364	1343	2,707	0	24	23	47
	Total	32,759	6,173	0	1,563	1398	2,961	0	0	0	0	0	1,563	1398	2,961	0	25	23	45
Mansalay	Urban	2,561	466	0	372	0	372	0	0	0	0	0	372	0	372	0	80	0	80
	Rural	27,707	5,131	0	2,692	0	2,692	0	0	0	0	0	2,692	0	2,692	0	52	0	52
	Total	30,268	5,597	0	3,064	0	3,064	0	0	0	0	0	3,064	0	3,064	0	55	0	55
Naujan	Urban	5,143	1,050	205	450	160	815	0	159	11	170	205	609	171	985	20	58	16	94
	Rural	72,797	13,431	70	3,341	1407	4,818	0	245	62	308	70	3,587	1469	5,126	1	27	11	38
	Total	77,940	14,531	275	3,791	1567	5,633	0	405	73	478	275	4,196	1640	6,111	2	29	11	42
Binamlayan	Urban	2,582	1,431	793	327	130	1,250	0	0	0	0	793	327	130	1,250	55	23	9	87
	Rural	56,217	10,411	2,249	1,337	571	4,159	0	1,479	371	1,850	2,249	2,816	944	6,009	22	27	9	58
	Total	63,799	11,842	3,042	1,664	701	5,409	0	1,479	371	1,850	3,042	3,143	1,074	7,239	26	27	9	61
Pala	Urban	1,637	341	119	187	0	306	0	0	0	0	119	187	0	306	35	55	0	90
	Rural	27,262	5,345	172	944	539	1,655	0	185	36	221	172	1,129	575	1,876	3	21	11	35
	Total	28,899	5,686	291	1,131	539	1,961	0	185	36	221	291	1,316	575	2,182	5	23	10	38
Puerto Galera	Urban	3,024	605	0	586	8	594	0	11	0	11	0	597	8	605	0	99	1	100
	Rural	16,889	3,187	0	1,821	209	2,030	0	180	14	194	0	2,001	223	2,224	0	63	7	70
	Total	19,913	3,792	0	2,407	217	2,624	0	191	14	205	0	2,598	231	2,829	0	69	6	75
Roxas	Urban	3,836	710	147	375	0	522	0	72	6	78	147	447	6	600	21	63	1	85
	Rural	33,475	6,086	0	1,283	550	1,833	0	177	66	243	0	1,460	616	2,076	0	24	10	34
	Total	37,311	6,796	147	1,658	550	2,355	0	249	72	321	147	1,907	622	2,676	2	28	9	39
San Teodoro	Urban	2,685	488	0	200	128	328	0	0	0	0	200	128	328	0	41	25	67	
	Rural	10,251	1,831	0	553	368	921	0	209	97	306	0	962	593	1,555	0	41	26	67
	Total	12,938	2,319	0	753	496	1,249	0	209	97	306	0	962	593	1,555	0	41	26	67
Socorro	Urban	4,328	801	0	375	213	588	0	0	0	0	375	213	588	0	47	27	73	
	Rural	28,506	5,482	0	1,028	649	1,677	0	342	124	466	0	1,370	773	2,143	0	25	14	39
	Total	32,834	6,283	0	1,403	862	2,265	0	342	124	466	0	1,745	986	2,731	0	28	16	43
Victoria	Urban	7,569	1,352	0	645	348	993	0	0	0	0	645	348	993	0	48	26	73	
	Rural	31,800	5,782	0	2,046	1152	3,198	0	1,130	273	1,403	0	3,176	1425	4,601	0	55	25	80
	Total	39,369	7,134	0	2,691	1500	4,191	0	1,130	273	1,403	0	3,821	1773	5,594	0	54	25	78
Provincial Total	Urban	88,459	16,539	3,365	7,379	2,327	13,271	0	778	57	835	3,365	8,357	2,384	14,106	20	51	14	85
	Rural	518,072	96,377	3,803	24,565	14,800	43,168	0	6,020	1,445	7,465	3,803	30,585	16,245	50,633	4	32	17	53
	Total	606,561	112,916	7,168	32,144	17,127	56,439	0	6,798	1,502	8,300	7,168	38,942	18,629	64,739	6	34	16	57

Table 8.2.4 Number of Public School Students Served by School Toilets in Base Year (1994)

Municipality	1994 Total No. of Public School Students	Std. No. of Students that can be Served by 1994 Toilets	No. of Students to be Served by Planned/On-going Projects	Std. No. of Students that can be Served by Toilets in Base Year (1994)	Coverage (%)
Baco	4,541	1,500	300	1,800	40
Bansud	6,365	2,100	0	2,100	33
Bongabong	11,820	3,900	0	3,900	33
Bulalacao	4,644	1,500	0	1,500	32
Calapan (Capital)	16,994	5,650	0	5,650	33
Gloria	7,547	2,500	0	2,500	33
Mansalay	6,570	2,150	0	2,150	33
Naujan	16,958	5,650	0	5,650	33
Pinamalayan	15,182	5,050	0	5,050	33
Pola	5,194	1,700	0	1,700	33
Puerto Galera	3,844	1,300	0	1,300	34
Roxas	7,529	2,500	0	2,500	33
San Teodoro	842	300	0	300	36
Socorro	8,580	2,850	0	2,850	33
Victoria	5,394	1,800	0	1,800	33
Provincial Total	122,004	40,450	300	40,750	33

Table 8.2.5 Number of Public Utilities with Sanitary Toilets in the Base Year (1994)

Municipality	Type	No. of PU with Toilets In 1994	No. of PU with Sanitary Toilets in 1994	No. of PU with Toilets in Planned/ On-going Project	No. of PU with Sanitary Toilets in Planned/On-going Projects	No. of PU with Toilets in Base Year 1994	No. of PU with Sanitary Toilets in Base year 1994	Coverage (%)
Baco	Public Market	1	1	1	1	2	2	100
	Bus/Jeep Terminal	0	0	0	0	0	0	0
	Total	1	1	1	1	2	2	100
Bansud	Public Market	1	0	0	0	1	0	0
	Bus/Jeep Terminal	0	0	0	0	0	0	0
	Total	1	0	0	0	1	0	0
Bongabong	Public Market	1	1	0	0	1	1	100
	Bus/Jeep Terminal	1	1	0	0	1	1	100
	Total	2	2	0	0	2	2	100
Bulalacao	Public Market	1	0	0	0	1	0	0
	Bus/Jeep Terminal	0	0	0	0	0	0	0
	Total	1	0	0	0	1	0	0
Calapan (Capital)	Public Market	1	0	0	0	1	0	0
	Bus/Jeep Terminal	1	0	0	0	1	0	0
	Total	2	0	0	0	2	0	0
Gloria	Public Market	1	0	0	0	1	0	0
	Bus/Jeep Terminal	0	0	0	0	0	0	0
	Total	1	0	0	0	1	0	0
Mansalay	Public Market	1	1	0	0	1	1	100
	Bus/Jeep Terminal	0	0	0	0	0	0	0
	Total	1	1	0	0	1	1	100
Naujan	Public Market	1	1	0	0	1	1	100
	Bus/Jeep Terminal	0	0	0	0	0	0	0
	Total	1	1	0	0	1	1	100
Pinamalayan	Public Market	2	0	0	0	2	0	0
	Bus/Jeep Terminal	0	0	0	0	0	0	0
	Total	2	0	0	0	2	0	0
Pola	Public Market	1	0	0	0	1	0	0
	Bus/Jeep Terminal	0	0	0	0	0	0	0
	Total	1	0	0	0	1	0	0
Puerto Galera	Public Market	1	1	0	0	1	1	100
	Bus/Jeep Terminal	0	0	0	0	0	0	0
	Total	1	1	0	0	1	1	100
Roxas	Public Market	1	1	0	0	1	1	100
	Bus/Jeep Terminal	1	0	0	0	1	0	0
	Total	2	1	0	0	2	1	50
San Teodoro	Public Market	1	1	0	0	1	1	100
	Bus/Jeep Terminal	0	0	0	0	0	0	0
	Total	1	1	0	0	1	1	100
Socorro	Public Market	1	1	0	0	1	1	100
	Bus/Jeep Terminal	0	0	0	0	0	0	0
	Total	1	1	0	0	1	1	100
Victoria	Public Market	2	2	0	0	2	2	100
	Bus/Jeep Terminal	1	1	0	0	1	1	100
	Total	3	3	0	0	3	3	100
Provincial Total	Public Market	17	10	1	1	18	11	61
	Bus/Jeep Terminal	4	2	0	0	4	2	50
	Total	21	12	1	1	22	13	59

Note: PU - Public Utilities

Table 8.2.6 Household Coverage in Phase I Provided by Existing Facilities in the Base Year (Household Toilets)

Municipality	Area	No. of Household Served by Existing Facilities				Coverage in 1994								Coverage in 2000			
		Flush	Pour Flush	VIP Latrine	Total	No. of HHs	Served Households				Served Population		No. of HHs	Served Households			
							Flush	Pour Flush	VIP Latrine	Total	Number	%		Flush	Pour Flush	VIP Latrine	Total
Baco	Urban	0	256	124	380	380	0	67	33	100	1,898	100	440	0	58	28	86
	Rural	133	2,257	1,288	3,678	4,483	3	50	29	82	20,216	82	5,049	3	45	26	73
	Total	133	2,513	1,412	4,058	4,863	3	52	29	83	22,038	83	5,489	2	46	26	74
Bansud	Urban	0	177	484	661	811	0	22	60	82	3,525	82	903	0	20	54	73
	Rural	0	609	2,113	2,722	4,571	0	13	46	60	14,263	60	5,027	0	12	42	54
	Total	0	786	2,597	3,383	5,382	0	15	48	63	17,684	63	5,930	0	13	44	57
Bongabong	Urban	0	284	379	663	807	0	35	47	82	3,508	82	902	0	31	42	74
	Rural	0	936	4,199	5,135	9,683	0	10	43	53	27,200	53	10,420	0	9	40	49
	Total	0	1,220	4,578	5,798	10,490	0	12	44	55	30,579	55	11,322	0	11	40	51
Bulalacao	Urban	0	50	320	370	479	0	10	67	77	2,178	77	528	0	9	61	70
	Rural	0	1,010	543	1,553	3,948	0	26	14	39	8,314	39	4,408	0	23	12	35
	Total	0	1,060	863	1,923	4,427	0	24	19	43	10,383	43	4,936	0	21	17	39
Catapan (Capital)	Urban	2,101	3,632	18	5,751	6,410	33	57	0	90	31,154	90	7,823	27	46	0	74
	Rural	1,179	5,416	269	6,864	11,191	11	48	2	61	37,544	61	12,119	10	45	2	57
	Total	3,280	9,048	287	12,615	17,601	19	51	2	72	69,238	72	19,942	16	45	1	63
Gloria	Urban	0	199	55	254	408	0	49	13	62	1,366	62	441	0	45	12	58
	Rural	0	1,364	1,343	2,707	5,765	0	24	23	47	14,351	47	6,222	0	22	22	44
	Total	0	1,563	1,398	2,961	6,173	0	25	23	48	15,724	48	6,663	0	23	21	44
Mansalay	Urban	0	372	0	372	466	0	80	0	80	2,049	80	511	0	73	0	73
	Rural	0	2,692	0	2,692	5,131	0	52	0	52	14,408	52	5,751	0	47	0	47
	Total	0	3,064	0	3,064	5,597	0	55	0	55	16,647	55	6,262	0	49	0	49
Naujan	Urban	205	609	171	985	1,050	20	58	16	94	4,834	94	1,181	17	52	14	83
	Rural	70	3,587	1,469	5,126	13,481	1	27	11	38	27,663	38	15,135	0	24	10	34
	Total	275	4,196	1,640	6,111	14,531	2	29	11	42	32,735	42	16,316	2	26	10	37
Pinalmayan	Urban	793	327	130	1,250	1,431	55	23	9	87	6,596	87	1,628	49	20	8	77
	Rural	2,249	2,816	944	6,009	10,411	22	27	9	58	32,606	58	11,674	19	24	8	51
	Total	3,042	3,143	1,074	7,259	11,842	26	27	9	61	38,917	61	13,302	23	24	8	55
Tola	Urban	119	187	0	306	341	35	55	0	90	1,473	90	372	32	50	0	82
	Rural	122	1,129	575	1,876	5,345	3	21	11	35	9,542	35	5,993	3	19	10	31
	Total	291	1,316	575	2,182	5,686	5	23	10	38	10,982	38	6,365	5	21	9	34
Puerto Galera	Urban	0	597	8	605	605	0	99	1	100	3,024	100	831	0	72	1	73
	Rural	0	2,001	223	2,224	3,187	0	63	7	70	11,822	70	3,466	0	58	6	64
	Total	0	2,598	231	2,829	3,792	0	69	6	75	14,935	75	4,297	0	60	5	66
Roxas	Urban	147	447	6	600	710	21	63	1	85	3,261	85	859	17	52	1	70
	Rural	0	1,460	616	2,076	6,086	0	24	10	34	11,382	34	6,704	0	22	9	31
	Total	147	1,907	622	2,676	6,796	2	28	9	39	14,551	39	7,563	2	25	8	35
San Teodoro	Urban	0	200	128	328	488	0	41	26	67	1,799	67	527	0	38	24	62
	Rural	0	762	465	1,227	1,831	0	42	25	67	6,870	67	2,169	0	35	21	57
	Total	0	962	593	1,555	2,319	0	41	26	67	8,668	67	2,696	0	36	22	58
Secorro	Urban	0	375	213	588	801	0	47	27	73	3,159	73	986	0	38	22	60
	Rural	0	1,370	773	2,143	5,482	0	25	14	39	11,117	39	6,031	0	23	13	36
	Total	0	1,745	986	2,731	6,283	0	28	16	43	14,119	43	7,017	0	25	14	39
Victoria	Urban	0	645	348	993	1,352	0	48	26	73	5,525	73	1,586	0	41	22	63
	Rural	0	3,176	1,425	4,601	5,782	0	55	25	80	25,440	80	6,411	0	50	22	72
	Total	0	3,821	1,773	5,594	7,134	0	54	25	78	30,708	78	7,997	0	48	22	70
Provincial Total	Urban	3,365	8,357	2,384	14,106	16,539	20	51	14	85	75,352	85	19,518	17	43	12	72
	Rural	3,803	30,585	16,245	50,633	96,377	4	32	17	53	272,746	53	106,579	4	29	15	48
	Total	7,168	38,942	18,629	64,739	112,916	6	34	16	57	348,098	57	126,097	6	31	15	51

Table 8.2.7 Public School Students and Public Utilities Coverage in Phase I Provided by Existing Facilities in the Base Year

Municipality	Std. No. of Students that can be Served by Base Year (1994)	Public Schools Toilets				Public Toilets					
		Coverage in 1994		Coverage in 2000		Coverage in 1994			Coverage in 2000		
		Total No. of Public School Students	%	Total No. of Public School Students	%	No. of PU with Toilets in Base Year	No. of PU with Sanitary Toilets in Base Year (1994)	%	No. of PU with Toilets	No. of PU with Sanitary Toilets	%
Baco	1,800	4,541	40	5,691	32	2	2	100	4	2	50
Bansud	2,100	6,365	33	7,467	28	1	0	0	3	0	0
Bongabong	3,900	11,820	33	14,060	28	2	2	100	3	2	67
Bulalacao	1,500	4,644	32	5,860	26	1	0	0	1	0	0
Calapan (Capital)	5,650	16,994	33	21,582	26	2	0	0	4	0	0
Gloria	2,500	7,547	33	8,863	28	1	0	0	2	0	0
Mansalay	2,150	6,570	33	8,054	27	1	1	100	2	1	50
Naujan	5,650	16,958	33	20,449	28	1	1	100	2	1	50
Pinamalayan	5,050	15,182	33	18,415	27	2	0	0	3	0	0
Pala	1,700	5,194	33	6,267	27	1	0	0	2	0	0
Puerto Galera	1,300	3,844	34	5,055	26	1	1	100	3	1	33
Roxas	2,500	7,529	33	9,445	26	2	1	50	2	1	50
San Teodoro	300	842	36	1,016	30	1	1	100	2	1	50
Socorro	2,850	8,580	33	10,563	27	1	1	100	2	1	50
Victoria	1,800	5,394	33	6,869	26	3	3	100	3	3	100
Provincial Total	40,750	122,004	33	149,656	27	22	13	59	38	13	34

Note: PU - Public Utilities

8.3 Projection of Frame Values

8.3.1 Population Projection

(1) Review of past population development

1) 1990 population distribution in urban and rural areas

The 1990 population census results conducted by NSO were reviewed in terms of population distribution in urban and rural areas. In application of revised classification of barangays in urban or rural category, population by municipality was adjusted as shown in Table 8.3.1.

Table 8.3.1 Population Distribution in Urban and Rural Areas

Municipality	Total Population	Census Data		Adjusted Population	
		Urban	Rural	Urban	Rural
Oriental Mindoro	550,049	140,582	409,467	80,529	469,520
Baco	23,800	1,713	22,087	1,713	22,087
Bansud	26,225	4,003	22,222	4,003	22,222
Bongabong	50,213	15,769	34,444	3,961	46,252
Bulalacao	21,316	6,336	14,980	2,642	18,674
Calapan (Cap.)	85,898	32,440	53,458	31,230	54,668
Gloria	30,102	4,241	25,861	2,040	28,062
Mansalay	27,515	8,282	19,233	2,400	25,115
Naujan	72,203	4,768	67,435	4,768	67,435
Pinamalayan	58,777	23,177	35,600	7,248	51,529
Pala	26,833	1,540	25,293	1,540	25,293
Puerto Galera	17,200	2,447	14,753	2,447	14,753
Roxas	33,178	21,416	11,762	3,379	29,799
San Teodoro	12,223	1,555	10,668	2,555	9,668
Socorro	29,806	3,780	26,026	3,780	26,026
Victoria	34,760	9,115	25,645	6,823	27,937

Note: Classification of barangays in urban and rural was arranged by PPDO.

2) Characteristics of past population development

Major statistical data of past population development are shown in Table 8.3.2.

Table 8.3.2 Past Population Development

Area	Description	Total		Urban		Rural	
		1980	1990	1980	1990	1980	1990
Region IV	Population	6,118,620	8,263,099	2,268,828	4,160,133	3,849,792	4,102,966
	Growth Rate	3.1%		6.3%		0.6%	
Oriental Mindoro	Population	446,938	550,049	66,964	80,529	379,974	469,520
	Growth Rate	2.1%		1.9%		2.1%	
	Provincial Profile I/	7.3%	6.6%	3.0%	1.9%	9.9%	11.4%

Note: I/ Provincial population percentage to regional population

During the census period from 1980 to 1990, the following population development was observed:

- The province recorded 2.1% of annual growth rate lower than that of the region at 3.1%. Regional average rate might have affected by the economic development in Metro Manila and its adjacent provinces.
- Percentage of provincial population to the regional population decreased from 7.3% in 1980 to 6.6% in 1990 although rural population percentage increased.

The experiences in the past population trend revealed that the province was not affected drastically by the economic and population development as observed in the region. The future population may therefore remain under similar conditions as experienced in the last census decade, unless specific development takes place in the province.

(2) Population Projection

NSO projected population for the years 2000 and 2010 broken down up to urban and rural population by municipality, base year of which is 1990. Modification of the projected population was made through the following study.

- 1) Review of NSO projection in total population and annual growth rate at regional and provincial levels.
- 2) Review of the same at municipal level.
- 3) Review of population distribution to urban and rural areas at municipal level in comparison with 1990 population distribution under re-classification of barangays.

Population and its growth rates by target year both for the province and the region were confirmed to be reasonable reflecting the trend of past population development, as shown in Table 8.3.3.

Table 8.3.3 Population Projection for Target Years: Region and Province

	Population and Provincial Share in the Region			Growth Rate (%)		
	1990	2000	2010	1980 - 1990	1990 - 2000	2000 - 2010
Region IV	8,263,099	11,273,000	14,087,000	3.1	3.2	2.3
Oriental Mindoro	550,049 6.7%	677,038 6.0%	789,842 5.6%	2.1	2.1	1.6

Municipal population projected by NSO for the target years is also within the range of the past population development.

Municipal population distribution to urban and rural areas for the target years was adjusted corresponding to reclassification of some barangays arranged for the year 1990. It is assumed that the profile of municipal population distribution in 1990 by urban and rural area will prevail through the future. Population for all municipalities in 1994 by urban and rural area was then projected using respective annual growth rates employed between 1990 and 2000 in the above mentioned study (base year 1990). Table 8.3.4 shows provincial population by urban and rural area for the target years.

Table 8.3.4 Provincial Population for Target Years

Area	Population/Composition	1990	1994	2000	2010
Total	Population	550,049	606,561	677,038	789,842
Urban Area	Population	80,529	88,489	102,584	134,534
	Composition (%)	15	15	15	17
Rural Area	Population	469,520	518,072	574,184	655,308
	Composition (%)	85	85	85	83

Number of Households in the year 2000 was estimated by urban and rural area of each municipality based on the assumption that the household size (persons/household) given by the 1990 population census will prevail up to the year, while that for the year 2010 was assumed to be 4 persons/household for the whole province in accordance with the target of the national family planning. Table 8.3.5 presents projected number of households for the target years.

Table 8.3.5 Projected Number of Households by Urban and Rural Area by Municipality by Target Year

Municipality	Household Size			Number of Households											
	1990			1994			1994			2000			2010		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Baco	5.0	5.5	5.5	345	3,990	4,335	380	4,483	4,863	440	5,049	5,489	703	8,038	8,741
Bansud	5.3	5.2	5.3	758	4,234	4,992	811	4,571	5,382	903	5,027	5,930	1,430	7,589	9,019
Bongabong	5.3	5.3	5.3	750	8,715	9,465	807	9,683	10,490	902	10,420	11,322	1,439	16,062	17,501
Bulalacao	5.9	5.4	5.5	451	3,433	3,884	479	3,948	4,427	528	4,408	4,936	917	6,933	7,850
Calapan (Capital)	5.2	5.6	5.5	5,994	9,693	15,687	6,410	11,191	17,601	7,823	12,119	19,942	13,642	18,016	31,658
Gloria	5.4	5.3	5.3	381	5,306	5,687	408	5,765	6,173	441	6,222	6,663	696	9,617	10,313
Mansalay	5.5	5.4	5.4	437	4,686	5,123	466	5,131	5,597	511	5,751	6,262	822	9,056	9,878
Naujan	4.9	5.4	5.3	965	12,591	13,556	1,050	13,481	14,531	1,181	15,135	16,316	1,770	23,755	25,525
Pinamalayan	5.3	5.4	5.4	1,361	9,620	10,981	1,431	10,411	11,842	1,628	11,674	13,302	2,678	18,225	20,903
Pola	4.8	5.1	5.1	322	4,913	5,235	341	5,345	5,686	372	5,993	6,365	517	8,919	9,436
Puerto Galera	5.0	5.3	5.2	487	2,792	3,279	605	3,187	3,792	831	3,466	4,297	1,764	4,866	6,570
Roxas	5.4	5.5	5.5	629	5,456	6,085	710	6,086	6,796	859	6,704	7,563	1,593	10,514	12,107
San Teodoro	5.5	5.6	5.6	466	1,722	2,188	488	1,831	2,319	527	2,169	2,696	825	3,563	4,388
Secorro	5.4	5.2	5.3	696	4,976	5,672	801	5,482	6,283	986	6,031	7,017	1,901	8,799	10,700
Victoria	5.6	5.5	5.5	1,214	5,114	6,325	1,352	5,782	7,134	1,586	6,411	7,997	2,937	9,936	12,873
Provincial Total	5.3	5.4	5.4	15,253	87,241	102,494	16,539	96,377	112,916	19,518	106,579	126,097	33,634	163,828	197,462

8.3.2 School Enrollment Projection

Table 8.3.6 Projected School Enrollment by Municipality by Target Year

Municipality	1994					2000					2010				
	School Age Population	Total Enrollment		Public School Enrollment		School Age Population	Total Enrollment		Public School Enrollment		School Age Population	Total Enrollment		Public School Enrollment	
		Number	Participation Rate	Number	Participation Rate		Number	Participation Rate	Number	Participation Rate		Number	Participation Rate	Number	Participation Rate
Baco	7,928	5,388	68	4,541	57	9,984	6,789	68	5,691	57	11,647	8,735	75	7,338	63
Bansud	8,556	6,365	74	6,365	74	10,090	7,467	74	7,467	74	11,771	9,652	82	9,652	82
Bongabong	16,117	13,656	85	11,820	73	19,260	16,371	85	14,060	73	22,469	20,896	93	17,975	80
Bulalacao	7,366	4,644	63	4,644	63	9,301	5,860	63	5,860	63	10,851	7,596	70	7,596	70
Calapan (Capital)	27,547	20,505	74	16,994	62	34,810	25,759	74	21,582	62	40,610	33,300	82	27,615	68
Gloria	9,799	8,553	87	7,547	77	11,510	10,014	87	8,863	77	13,428	12,757	95	11,280	84
Mansalay	9,216	7,122	77	6,570	71	11,344	8,735	77	8,054	71	13,234	11,249	85	10,323	78
Naujan	23,110	18,743	81	16,958	73	28,012	22,690	81	20,449	73	32,679	29,411	90	26,143	80
Pinamalayan	18,645	17,506	94	15,182	81	22,734	21,370	94	18,415	81	26,522	25,726	97	23,870	90
Pola	8,663	5,849	68	5,194	60	10,445	7,103	68	6,267	60	12,185	9,139	75	8,042	66
Puerto Galera	5,594	4,544	81	3,844	69	7,326	5,934	81	5,055	69	8,547	7,607	89	6,496	76
Roxas	10,940	9,938	91	7,529	69	13,689	12,452	91	9,445	69	15,970	15,491	97	12,137	76
San Teodoro	3,754	1,332	36	842	22	4,617	1,662	36	1,016	22	5,386	2,693	50	2,154	40
Secorro	9,978	9,715	97	8,580	86	12,282	11,914	97	10,563	86	14,328	14,041	98	13,458	94
Victoria	11,509	7,891	69	5,394	47	14,615	10,084	69	6,869	47	17,050	13,981	82	10,230	60
Provincial Total	178,721	141,751	79	122,004	68	220,019	174,208	79	149,656	68	256,677	222,274	87	194,319	76

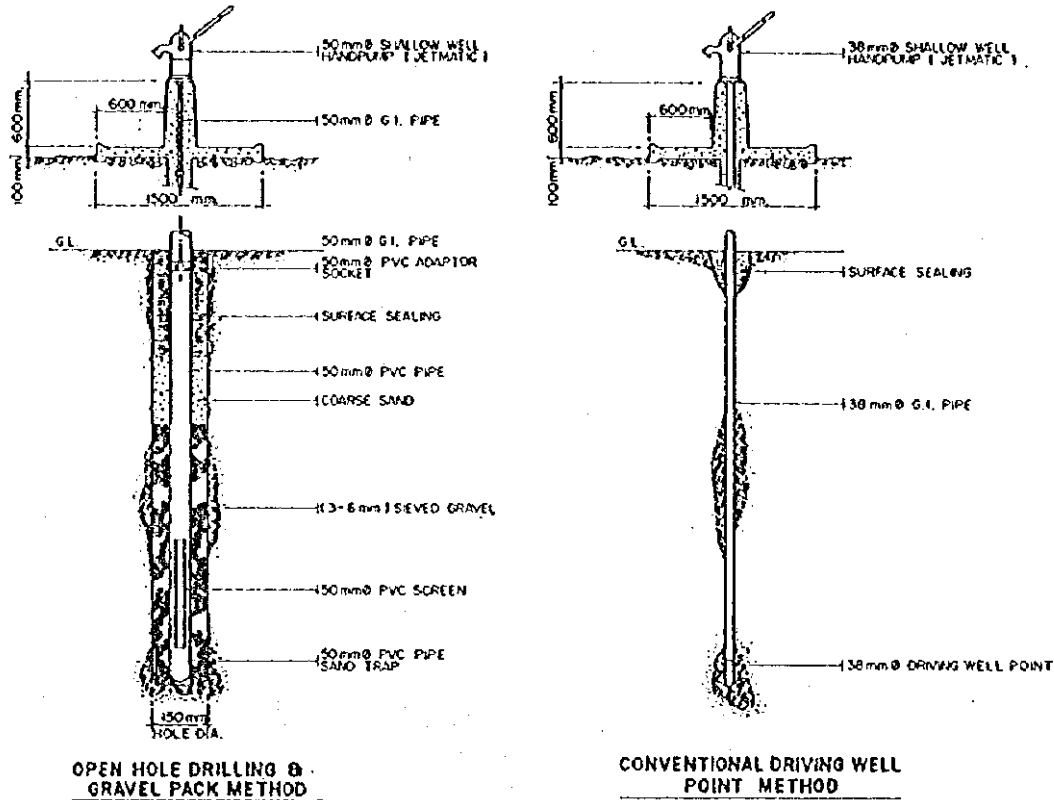
8.3.3 Projection of the Number of Public Utilities

Table 8.3.7 Projected Number of Public Utilities by Municipality by Target Year

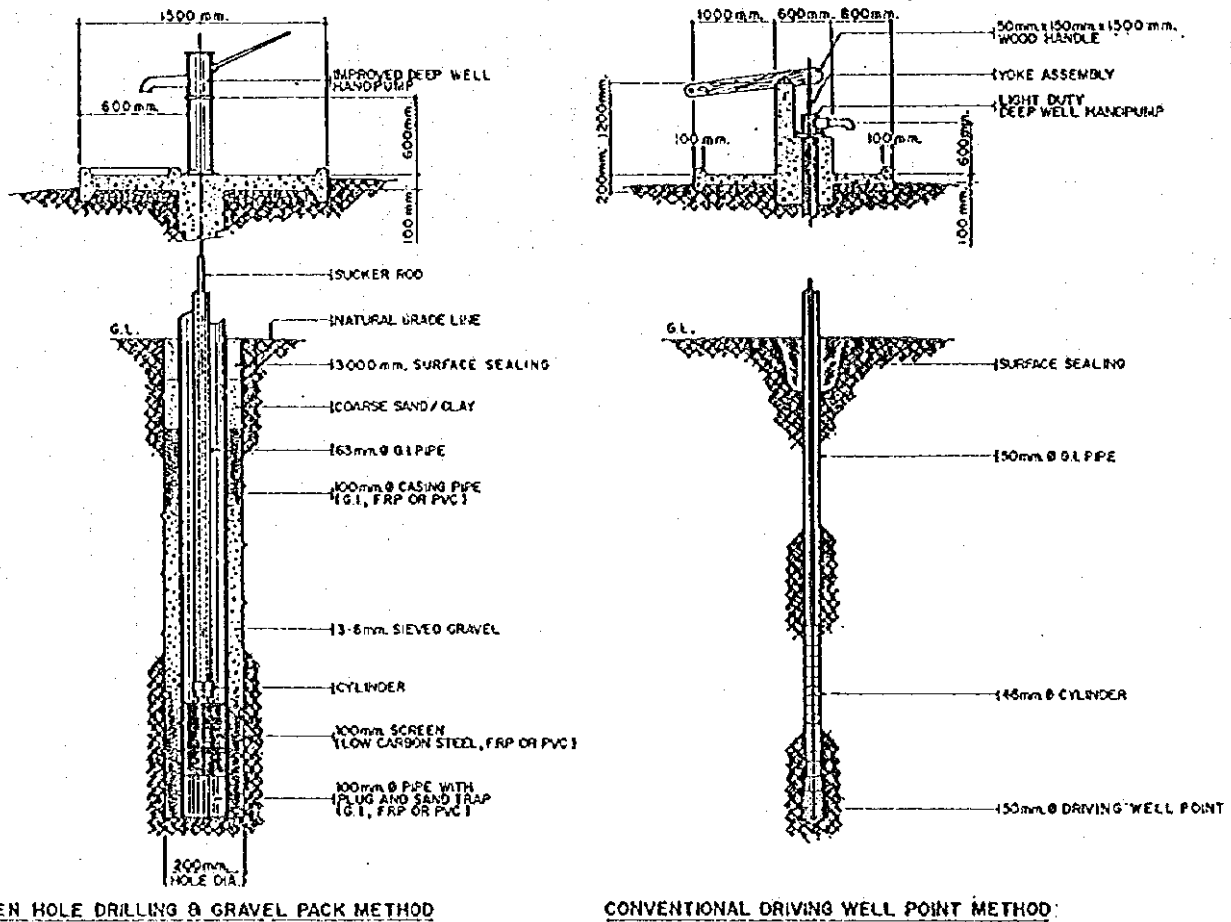
Municipality	Type	1994	2000		2010	
		No. of Public Utilities	Proposed Construction	Total	Proposed Construction	Total
Baco	Public Markets	2	1	3	0	3
	Bus/Jeep Term.	0	1	1	0	1
	Total	2	2	4	0	4
Bansud	Public Markets	1	1	2	0	2
	Bus/Jeep Term.	0	1	1	0	1
	Total	1	2	3	0	3
Bongabong	Public Markets	1	0	1	1	2
	Bus/Jeep Term.	1	1	2	0	2
	Total	2	1	3	1	4
Bulalacao	Public Markets	1	0	1	0	1
	Bus/Jeep Term.	0	0	0	0	0
	Total	1	0	1	0	1
Calapan (Capital)	Public Markets	1	1	2	0	2
	Bus/Jeep Term.	1	1	2	0	2
	Total	2	2	4	0	4
Gloria	Public Markets	1	0	1	0	1
	Bus/Jeep Term.	0	1	1	0	1
	Total	1	1	2	0	2
Mansalay	Public Markets	1	0	1	0	1
	Bus/Jeep Term.	0	1	1	0	1
	Total	1	1	2	0	2
Naujan	Public Markets	1	0	1	0	1
	Bus/Jeep Term.	0	1	1	0	1
	Total	1	1	2	0	2
Pinamalayan	Public Markets	2	0	2	1	3
	Bus/Jeep Term.	0	1	1	0	1
	Total	2	1	3	1	4
Pola	Public Markets	1	0	1	0	1
	Bus/Jeep Term.	0	1	1	0	1
	Total	1	1	2	0	2
Puerto Galera	Public Markets	1	1	2	0	2
	Bus/Jeep Term.	0	1	1	0	1
	Total	1	2	3	0	3
Roxas	Public Markets	1	0	1	0	1
	Bus/Jeep Term.	1	0	1	0	1
	Total	2	0	2	0	2
San Teodoro	Public Markets	1	0	1	0	1
	Bus/Jeep Term.	0	1	1	0	1
	Total	1	1	2	0	2
Socorro	Public Markets	1	0	1	0	1
	Bus/Jeep Term.	0	1	1	0	1
	Total	1	1	2	0	2
Victoria	Public Markets	2	0	2	0	2
	Bus/Jeep Term.	1	0	1	0	1
	Total	3	0	3	0	3
Provincial Total	Public Markets	18	4	22	2	24
	Bus/Jeep Term.	4	12	16	0	16
	Total	22	16	38	2	40

8.4 Types of Facilities and Implementation Criteria

8.4.1 Water Supply



SHALLOW WELLS



DEEP WELLS

FIGURE 8.4.1
STANDARD STRUCTURE OF LEVEL I WELLS

FIGURE 8.4.2

STAGED IMPROVEMENT IN SEWAGE COLLECTION METHOD

