JAPAN INTERNATIONAL COOPERATION AGENCY

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

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

VOLUME II - [4]

SUPPORTING REPORT

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

DAVAO ORIENTAL

OCTOBER 1998

NIPPON JOGESUIDO SEKKEI CO., LTD.

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FOR

THE STUDY ON PROVINCIAL WATER SUPPLY, SEWERAGE AND SANITATION SECTOR PLANS

FOR

VISAYAS AND MINDANAO

IN

THE REPUBLIC OF THE PHILIPPINES

AGREED UPON BETWEEN

THE DEPARTMENT OF THE INTERIOR AND

LOCAL GOVERNMENT

AND

THE STUDY TEAM OF

JAPAN INTERNATIONAL COOPERATION AGENCY

MANILA, JANUARY 26, 1998

MR. NORMANDO J. TOLEDO
Director
Office of the Project Development Services
Dept. of the Interior and Local Government

MR. MASATOSHI MOMOSE
Team Leader, Study Team
Japan International 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 January 13, 1998 to conduct "The Study on Provincial Water Supply, Sewerage and Sanitation Sector Plans for Visayas and Mindanao" (hereinafter referred to as "the Study") in accordance with the Implementing Arrangement for the Study executed between the JICA and the Department of the Interior and Local Government (hereinafter referred to as "DILG") on August 27, 1997.

A series of discussions were made on the Inception Report for the Study between the Study Team and the officials of DILG and other agencies concerned. In the course of the discussions, both parties have agreed with the general approach and methodology, and implementation arrangements detailed in the Inception Report. Also agreed upon were the changes made as to which provinces are to be covered in 1st batch and 2nd batch (refer to 1. Study Area). The list of attendees in the series of discussions is presented in Appendix A.

1. Study Area

The subject twenty-one (21) provinces were grouped into four batches in the "Implementing Arrangement on the Study". However, a delay in the organization of the Provincial Sector Planning Team (PSPT) in the 1st batch provinces of Misamis Oriental and Surigao del Sur prompted their transfer to the 2nd batch. Instead, Davao del Sur and Davao Oriental from the 2nd batch whose PSPTs were already formed were moved up in their place. In this connection, the DILG completed to exchange MOA with the provinces on the participation and full support by the provinces.

The present study area covers the following 21 provinces grouped into four batches.

1st BATCH	2nd BATCH	3rd BATCH	4th BATCH
1. Agusan del Norte	1. Davao	1. Biliran	1. Aklan
2. Agusan del Sur	2. Misamis Oriental	2. Eastern Samar	2. Antique
3. Davao del Sur	3. Sarangani	3. Leyte	3. Capiz
4. Davao Oriental	4. South Cotabato	4. Northern Samar	4. Iloilo
5. Surigao del Norte	5. Surigao del Sur	5. Southern Leyte	5. Negros Occidental
		6. Western Samar	

With regard to Davao province, the separation into two provinces is currently under legislative process. Upon the formalization of an additional province, the total number of the provinces in the study area would be 22. The DILG has requested that the forthcoming province be included in the study area. The JICA Study Team will relay the request to JICA headquarters for consideration. The DILG is expected to complete the execution of the MOAs of the 2nd batch provinces by early July to catch up with the planned schedule. The required arrangements in terms of subject provinces and study period will be discussed between the DILG and JICA.

2. General Approach and Methodology to the Study

The PW4SPs will be prepared with the full participation of the respective PSPTs together with DILG coordinators and the Study team in accordance with the approach and methodology outlined in the Inception Report. The following topics were confirmed during the discussions:

(1) Planning framework for future sector development

a) Planning base year is 1997 for 1st and 2nd batches and 1998 for 3rd and 4th batches. Medium-term and long-term target years are 2005 (implementation program: year 2001 to year 2005) and 2010, respectively.

b) Plan will be prepared in compliance with "Implementing Rules and Regulations of NEDA Board Resolution No. 4".

(2) Standard provision of school toilets

Discussions and confirmation on the provision of school toilets will be arranged with DECS.

(3) Options on the sludge removal from septic tank and its disposal will be shown in the plan.

(4) Model province for 1st batch is Agusan del Sur.

3. Sector Information Collection

The DILG and the JICA Study Team will continuously collect information on the projects/programs assisted by various financial sources. The information will be reflected in the plans.

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.

The JICA Study Team shall:

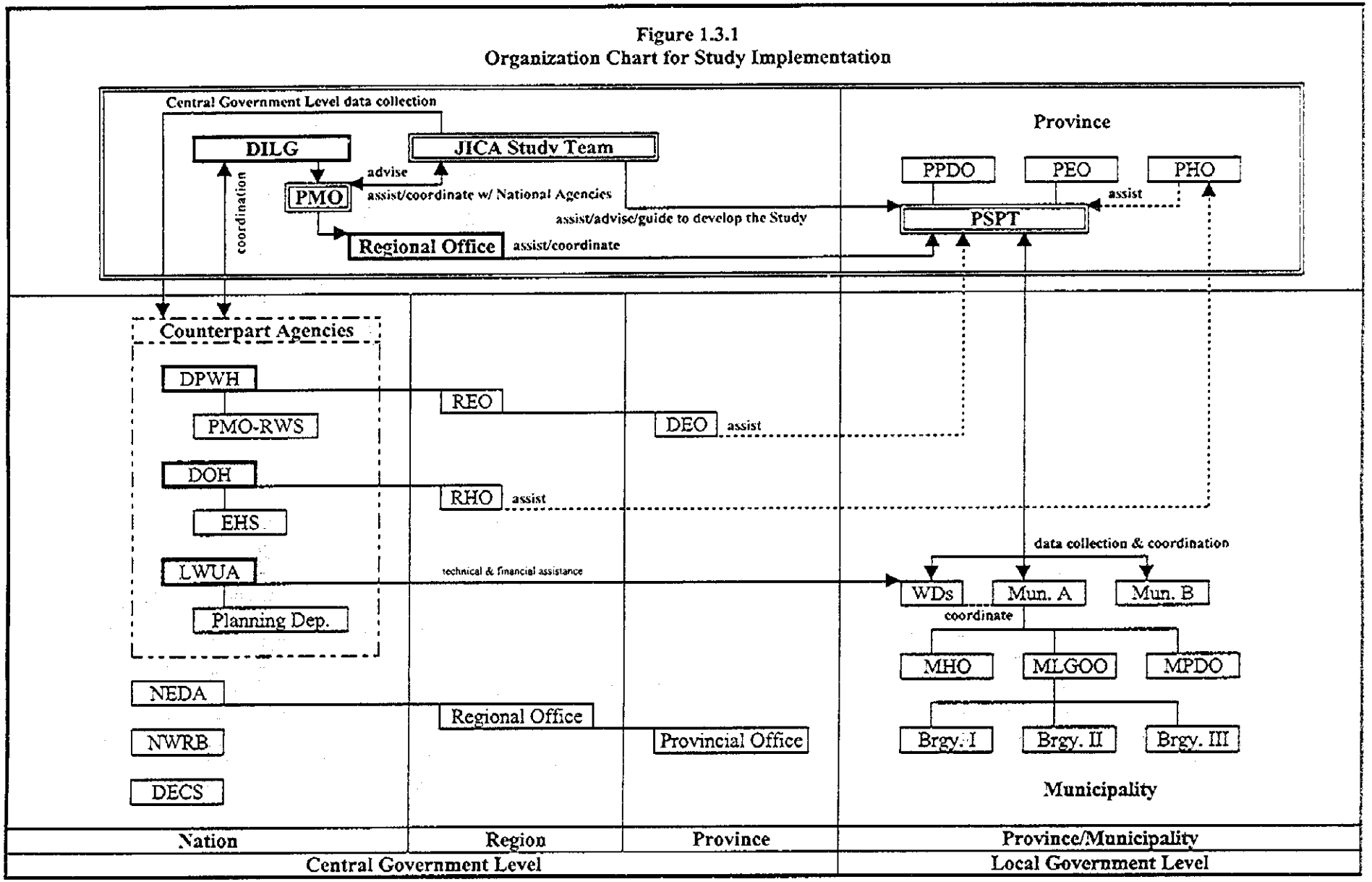
(1) Pursue technology transfer to the Philippine counterpart personnel in the course of the Study and;

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

LIST OF ATTENDEES IN THE SERIES OF DISCUSSIONS

ATTENDEES	DESIGNATION
A. DILG	
1. Mr. Normando J. Toledo	Director, Office of Project Development Services
2. Mr. Orville M. Roque	Program Manager, WSS-PMO
3. Ms. Ellen I. Pascua	Asst. Program Manager, WSS-PMO
4. Mr. Rogelio B. Ocampo	Chief, Planning Division, WSS-PMO
5. Ms. Fe Crisilla M. Banluta	PW4SP Project Officer, WSS-PMO
B. Other Agencies	
1. Mr. Sam Siao	Officer, PMO-RWS, DPWH
2. Dr. Mario Villaverde	Director, EHS, DOH
C. JICA Advisory Committee	
1. Ms. Keiko Yamamoto	Chairman, Advisory Committee
2. Mr. Keiichi Kanaya	Member, Advisory Committee
D. JICA Headquarters	
1. Mr. Shigeyuki Matsumoto	Second Development Study Division, Social Development Study Dept.
E. JICA Study Team	
1. Mr. Masatoshi Momose	Team Leader/Water Supply Planning
2. Mr. Nobuki Abe	Water Supply/Sanitation Engineer
3. Ms. Consuelo B. Estepa	Community Dev't/WID Specialist
4. Ms. Elizabeth L. Verzola	Socio-Economic/Financial Specialist
5. Mr. Kenji Takayanagi	Water Source Development Specialist
6. Mr. Emmanuel L. Patingo	Data Management Specialist

Figure 1.3.1
Organization Chart for Study Implementation



MINUTES OF DISCUSSIONS

ON

THE PROGRESS REPORT

FOR

THE STUDY ON PROVINCIAL WATER SUPPLY, SEWERAGE AND

SANITATION SECTOR PLANS

FOR

VISAYAS AND MINDANAO

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THE DEPARTMENT OF THE INTERIOR AND

LOCAL GOVERNMENT

AND

THE STUDY TEAM OF

JAPAN INTERNATIONAL COOPERATION AGENCY

MANILA, MARCH 18, 1998

MR. NORMANDO J. TOLEDO
Director
Office of the Project Development
Service
Dept. of the Interior and Local Government

MR. MASATOSHI MOMOSE
Team Leader, Study Team
Japan International Cooperation
Agency

The Stage I fieldwork for "the Study on Provincial Water Supply, Sewerage and Sanitation Sector Plan" started on January 13, 1998 and completed on March 23, 1998.

A series of discussions were held throughout the course of the Study, between JICA Study Team and officials concerned including DILG, NEDA, DOH, DPWH and other central government agencies and provinces. The general approach and methodologies, as presented in the Inception Report, have been employed for the fieldwork.

A Progress Report, which covers all outputs during the work period, was prepared entailing part of PW4SP for the respective provinces. The contents of the report were basically agreed upon on March 18,1998 between JICA Study Team and officials of the DILG. The list of attendees to the meeting is presented in Appendix A. The following issues/problems on the arrangements required for the implementation of the Study were discussed, and the Study Team will relay the modified arrangements required to JICA headquarters.

(1) Modified Arrangements Required for 1st batch Study

1) Due to the presidential election scheduled on May 11, 1998, the second workshop may be held from May 18 to May 22, 1998 after the election, and tentatively starting the 2nd field work on May 13, 1998.

2) The venue for the final workshop was requested by concerned PPDCs to be held in Mindanao rather than in Manila as originally planned. This is because of the financial constraint on the travel expenses required for 7 members of respective PSPTs under the current GOP instruction to LGUs to reduce its planned annual expenditures of up to 25%.

(2) Provinces to be Covered by the 2nd Batch

The total number of provinces for the 2nd batch (5 provinces) will be kept as previously agreed between the two parties. However, Surigao del Sur will be omitted from the Study, since timely establishment of the PSPT by the province seems to be difficult. Instead of the said province, either the newly created Compostela Valley or Bukidnon(Region X) would be included.

The DILG will inform the Study Team of the possibility in the setting up of PSPT by the administration of Compostela Valley by the middle of June 1998. If not, DILG will make an advanced arrangement with Bukidnon.

(3) Electric Resistivity Prospecting and Test Boring

Comparatively reliable data to evaluate the development potential of water source were collected for 1st batch provinces during the fieldwork. It is assumed that the conduct of the field test for groundwater analysis, given a limited period, cannot be able to contribute significantly to the level of accuracy in the preparation of M/P and F/S. The situation will remain the same for 2nd batch provinces. Accordingly, it is not recommended to conduct field test for this study.

The required areas and the scope of work/surveys, such as field tests, will be recommended in the PW4SP and will be considered during detailed design and construction stages.

(4) Time Constraint in Data Collection/Validation/Follow-up

It was found, both by the Study Team and the DILG through the fieldwork, the following problems on data collection/validation/follow-up:

1) The summary reports on the sector status prepared by NEDA Regional Office through UNICEF fund were field confirmed as the materials to provide approximate sector situations in the fact of no existence of sector related information at present.
2) Data collection by PSPTs had sometimes to be done at the barangay level, due to limited data available in the municipal level. Thus, additional time was required for PSPTs to access to remote rural barangays.
3) Comprehensive planning work by the province in Mindanao area is still initial stage. It is necessary for the activities to ensure much more time through intensive technology transfer to DILG coordinators and PSPTs.

Based on the lessons learned, the Study Team and the DILG recognized the need of the review on the allotted period for the activities. The Study Team will relay this matter to JICA headquarters.

(5) Cities to be Covered in the Preparation of PW4SP

Of the three classes of cities in the Local Government Code, only component cities, which are under the jurisdiction of the provincial government will be considered. The subject cities are as follows:

Province	Component City
Surigao del Norte	Surigao City
Davao	Tagum City and Island Garden City
Leyte	Tacloban City
Western Samar	Calbayog City
Capiz	Roxas City
Iloilo	Passi City
Negros Occidental	Bago City, Cadiz City, La Carlota City, San Carlos City and Silay City

Appendix A

LIST OF ATTENDEES IN THE SERIES OF DISCUSSION

ATTENDEES	DESIGNATION
A. DILG	
1. Mr. Orville M. Roque	Program Manager, WSS-PMO
2. Ms. Ellen I. Pascua	Asst. Program Manager, WSS-PMO
3. Mr. Rogelio B. Ocampo	Chief, Planning Division, WSS-PMO
4. Ms. Fe Crisilla M. Banluta	PW4SP Project Officer, WSS-PMO
5. Ms. Charito Araza	Area Coordinator, WSS-PMO
6. Ms. Maria Contessa Navarro	Area Coordinator, WSS-PMO
7. Ms. Josephine Ramos	Area Coordinator, WSS-PMO
8. Ms. Susan Mangoda	Area Coordinator, WSS-PMO
9. Ms. Crisanta Rapirap	Area Coordinator, WSS-PMO
B. JICA Study Team	
1. Mr. Masatoshi Momose	Team Leader/Water Supply Planning
2. Mr. Nobuki Abe	Water Supply/Sanitation Engineer
3. Mr. Kenji Takayanagi	Water Source Development Specialist
4. Ms. Consuelo B. Estepa	Community Dev't/WID Specialist
5. Ms. Elizabeth L. Verzola	Socio-economic/Financial Specialist

2. PLANNING APPROACH FOR FUTURE SECTOR DEVELOPMENT

2.6 Planning Principles and Data Management

2.6.2 Data Management

(1) Computer-based System

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

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

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

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

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

Table 2.6.1 Key Parameter

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

Table 2.6.2 Composition of Well Sources and Specific Capacity

Name of Municipality	Type	Type Water Source	Proportion (%)	Standard Specification		
				Depth (m)	SWL (m)	Specific Capacity (liter/sec/m)
	Urban	Shallow Well				
		Deep Well				
		Spring				
	Rural	Shallow Well				
		Deep Well				
		Spring				
	Urban	Shallow Well				
		Deep Well				
		Spring				
	Rural	Shallow Well				
		Deep Well				
		Spring				
	Urban	Shallow Well				
		Deep Well				
		Spring				
	Rural	Shallow Well				
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	Urban	Shallow Well				
		Deep Well				
		Spring				
	Rural	Shallow Well				
		Deep Well				
		Spring				
	Urban	Shallow Well				
		Deep Well				
		Spring				
	Rural	Shallow Well				
		Deep Well				
		Spring				

Table 2.6.3 Annual Investment

Sub-Sector	Component	1999	2000	2001	2002	2003	Total
Urban Water Supply	**Level III System**						
	Feasibility Study and Detail Design						
	Construction & Supervision						
	Community Development & Training						
Rural Water Supply	**Level I Facility**						
	Detail Design						
	Construction & Supervision						
	Community Development & Training						
	Level II System						
	Detail Design						
	Construction & Supervision						
	Community Development & Training						
Sanitation	Urban Household Toilet						
	Rural Household Toilet						
	Public School Toilet						
	Public Toilet						
	Disinfection of Level I Wells						
	Detail Design						
	Construction & Supervision						
	Community Development & Training						

Table 2.6.4 Level I Safe & Unsafe Percentage

Name of Municipality	Safe (%)	Unsafe (%)
Provincial Total		

Table 2.6.5 Unit Construction Cost of Different Facilities

Description	Unit Construction Cost (Pesos)	Service Coverage		Unit Cost	
		Served Population	Served Household	Pesos/ Person	Pesos/ Household
Water Supply					
Level III - New System					
For 5000 Population					
For 10000 Population					
For 15000 Population					
Level III - Expansion					
For 5000 Population					
For 10000 Population					
For 15000 Population					
Level II					
Level I					
Deep Well - 40 meter depth					
Deep Well - 80 meter depth					
Deep Well - 120 meter depth					
Shallow Well - 18 meter depth					
Spring Development					
Rehabilitation Cost for Level I Deep Well					
Disinfection of Level I Wells					
Sanitation					
Flush					
Pour Flush					
VIP / Dry					
School Toilet					
Public Toilet					
Urban Sewerage					

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

Score	Underserved and Unserved Population in Base Year	Underserved and Unserved Population in Phase I	Population Unserved by Level III Systems in Base Year
1.0	< %	< %	< %
0.8	< % < 40	< % <	< % <
0.6	< % < 30	< % <	< % <
0.4	< % < 20	< % <	< % <
0.2	% < 10	% <	% <
Weight Allocation Score (%)			

Table 2.6.7 Scoring Factor for Municipal Comprehensive Investment Ranking

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 Family Income

Table 3.3.1 Distribution of Families by Income Class

Income Class	Davao Oriental				Region XI	
	Total Families		Annual Income		Total Number of Families	Annual Income Average (Pesos)
	Number	Share	Total (P '000.00)	Average (Pesos)		
Under 15,000	3,903	5	57,638	14,769	38,490	15,664
15,000 - 19,999	12,167	14	281,789	23,161	52,040	21,721
20,000 - 29,999	29,154	34	949,558	32,570	130,339	31,209
30,000 - 39,999	20,431	24	842,523	41,237	139,506	42,205
40,000 - 59,999	12,626	15	644,863	51,075	175,000	57,821
60,000 - 99,999	7,116	8	586,084	82,357	153,085	89,888
100,000 - 249,999	1,148	1	254,789	221,980	88,874	164,862
250,000 and over					12,021	496,071

Source : 1994 Family Income and Expenditure Survey, NSO

Notes:

(1) Derived from Region XI 1994 FIES

(2) Based on NEDA and other agencies , poverty threshold in Region XI in 1994 was estimated at P 41,579 (P 8,201 annual per capita poverty threshold.

(3) 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 by blood, marriage and adoption. A single person living alone is considered as a separate family. A household is composed of 1 or more families in the same housing unit and have a common arrangement of food preparation and consumption.

Table 3.3.2 Employment by Major Industry and Class of Worker, 1994

Major Industry Group	Household Population 15 years and Over Who Worked	Class of Worker							
		Worked for Private Household (Domestic Services)	Worked for Private Business/ Enterprise/ Farm	Worked for Government/ Government Corporation	Self-employed Without Any Paid Employee	Employer In Own Farm or Business	Work With Pay in Own Family Operated Farm or Business	Work Without Pay in Own Family Operated Farm or Business	Not Reported
Agriculture, Hunting and Forestry	83,490	309	15,195	259	27,627	19,191	417	19,420	1,069
Fishing	8,901	75	1,371	9	5,859	693	13	822	59
Mining and Quarrying	783	10	564	2	133	26	4	33	11
Manufacturing	2,169	65	989	23	728	234	5	86	39
Electricity, Gas and Water	261	9	191	16	30	8	0	3	4
Construction	3,602	192	2,593	196	409	135	9	20	48
Trade	8,843	75	1,807	20	4,342	1,850	13	633	103
Services	27,638	6,401	6,376	9,115	3,919	956	41	547	282
Not Stated	443	20	132	19	78	30	3	36	125
Provincial Total	136,130	7,156	29,218	9,659	43,125	23,126	505	21,600	1,740

3.3.3 Education

Table 3.3.3 Household Population by Highest Education Attainment

Highest Educational Attainment	Household Population 5 years Old and Over	Age Group				
		Below 20	20 - 24	25 - 29	30 - 34	35 and Over
No Grade Completed	32,928	22,388	668	691	649	8,532
Pre-school	11,481	10,838	68	87	71	417
Elementary						
1st - 4th Grade	110,553	63,646	6,390	5,505	5,019	29,993
5th - 7th Grade	91,134	27,915	9,587	9,733	8,776	35,123
High School						
Undergraduate	52,655	23,485	7,361	5,950	4,886	10,973
Graduate	23,894	3,843	5,357	4,363	3,431	6,900
Post Secondary						
Undergraduate	413	63	137	85	53	75
Graduate	1,542	101	530	342	187	382
College Undergraduate	14,680	2,637	3,991	2,275	1,910	3,867
Academic Degree Holder	10,888	57	1,300	2,063	2,182	5,286
Post Baccalaureate	293		12	17	37	227
Not Stated	4,196	2,993	22	206	161	814
Total	354,657	157,966	35,423	31,317	27,362	102,589

Source: 1995 NSO Socioeconomic and Demographic Characteristics

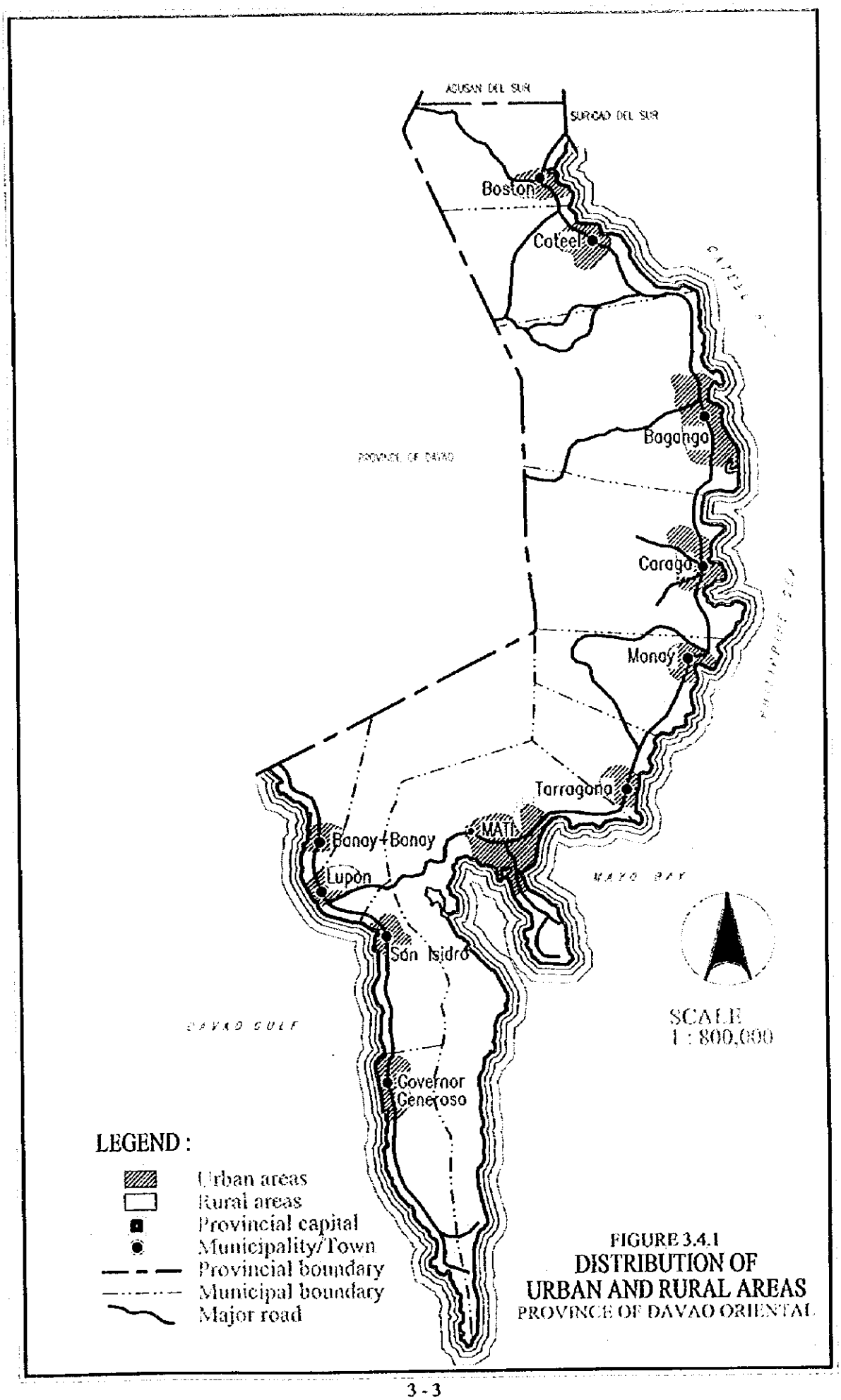


FIGURE 3.4.1
DISTRIBUTION OF
URBAN AND RURAL AREAS
PROVINCE OF DAVAO ORIENTAL

3.5 Health Status

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

Health Facilities and Practitioners	Davao Oriental		Philippines	
	Number	Ratio	Number	Ratio
Health Facilities				
Hospital	7	1/66,886	1,700	1/40,206
Rural Health Units	11	1/42,564	2,335	1/29,272
Barangay Health Station	150	1/3,121	11,646	1/5,869
Practitioners				
Doctors	66	1/7,094	2,029	1/33,686
Nurses	64	1/7,316	2,694	1/25,371
Midwives	156	1/3,001	10,898	1/6,272
Dentists	17	1/27,541	1,071	1/63,818

(1) Include only government health practitioners for the national (Philippines) total. No data is Available for private practitioners.

Source: Socio Economic Profile. 1995 and 1997 Philippine Statistical Yearbook

3.6 Environmental Conditions

3.6.2 Water Pollution

Table 3.6.1 Types of Drainage Facilities

Type	Length (km)
Drainage Main	0.44
Open Channel (with Concrete & rubble masonry)	10.33
Open Ditches & Unlined Laterals	6.87
Reinforced Concrete Circular Pipes	13.58
Street Gutters	0.34
Outfalls to rivers from drainage mains	0.12

Source: Provincial Health Office

Table 3.6.2 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	%satn	70	70	70	60	40
(Minimum)	mg/L	5.0	5.0	5.0	5.0	3.0
5-Day 20°C BOD	mg/L	1	5	5	7(10)	10(15)
Total Suspended Solids	mg/L	25	50			
Total Dissolved Solids	mg/L	500	1,000	--	--	1,000
Surfactants (MBAS)	mg/L	nil	0.2(0.5)	0.3(0.5)	0.5	--
Oil/Grease (Petroleum Ether Extract)	mg/L	nil	1	1	2	5
Nitrate as Nitrogen	mg/L	1	10	NR	10	--
Phosphate as Phosporous	mg/L	nil	0.1	0.2	0.4	--
Phenolic Substances as Phenols	mg/L	nil	0.002	0.005	0.02	--
Total Coliforms	MPN/100mL	50	1,000	1,000	5,000	--
Or Fecal Coliforms	MPN/100mL	20	100	200	--	--
Chloride as Cl	mg/L	250	250	--	350	--
Copper	mg/L	1	1	--	0.05	--

Notes:

Class AA - Public Water Supply Class I. Intended for waters having watersheds which are uninhabited and otherwise protected and which required 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
Sheet 1 of 4

Name of Municipality	Name of 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
Baganga	Baganga WD	2		2	420	-	420	2,280	-	2,280
Banaybanay	Pintatagan		1	1	-	242	242	-	1,324	1,324
Caraga	Poblacion	1		1	374	-	374	2,021	-	2,021
	San Luis		1	1	-	210	210	-	1,109	1,109
	Santiago		1	1	-	140	140	-	740	740
	Municipal Total	1	2	3	374	350	724	2,021	1,849	3,870
Lupon	Macangao		1	1	-	25	25	-	129	129
	Lupon WD	1		1	513	-	513	2,825	-	2,825
	Municipal Total	1	1	2	513	25	538	2,825	129	2,954
Manay	Central	1		1	281	-	281	1,500	-	1,500
Mati (Capital)	Macambol		1	1	-	562	562	-	2,872	2,872
	Mati WD	2		2	1,260		1,260	7,560		7,560
	Matiao	1		1	393	-	393	1,959	-	1,959
	NHA, Homeowners Ass.	1		1	284		284	1,446		1,446
	Capitol Water System	1		1	100		100	509		509
	Sainz	1		1	600		600	3,054		3,054
	Sanghay		1	1	-	10	10	-	60	60
	Taguibo		1	1	-	25	25	-	117	117
	Municipal Total	6	3	9	2,637	597	3,234	14,528	3,049	17,577
Governor Generoso	Mun. LGU	1		1	161		161	805		805
	Tiruwasai	1		1	112		112	672		672
	Municipal Total	2		2	273	-	273	1,477	-	1,477
San Isidro	Bitaogan		1	1	-	30	30	-	160	160
	San Isidro WD	1		1	413	-	413	2,160	-	2,160
	Municipal Total	1	1	2	413	30	443	2,160	160	2,320
Provincial Total		14	8	22	4,911	1,244	6,155	26,791	6,511	33,302

Table 4.1.1 Details on Existing Level III Systems
Sheet 2 of 4

Name of Municipality	Name of Operating Body	Level III Services								
		Number of Public Faucets			Number of Households Served			Number of Population Served		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Baganga	Baganga WD	2		2	32		32	96		96
Banaybanay	Pintatagan		1	1		10	10		55	55
Caraga	Poblacion	2		2	41		41	222		222
	San Luis		5	5		90	90		479	479
	Santiago		5	5		30	30		146	146
	Municipal Total	2	10	12	41	120	161	222	625	847
Lupon	Macangao									
	Lupon WD									
	Municipal Total									
Manay	Central									
Mati (Capital)	Macambol		7	7		519	519		2,652	2,652
	Mati WD									
	Matiao	3		3	30		30	150		150
	NHA, Homeowners Ass.									
	Capitol Water System									
	Sainz									
	Sanghay		10	10		60	60		358	358
	Taguibo		6	6		75	75		351	351
	Municipal Total	3	23	26	30	654	684	150	3,361	3,511
Governor Generoso	Mun. LGU									
	Tiruwasai									
	Municipal Total									
San Isidro	Bitaogan									
	San Isidro WD									
	Municipal Total									
Provincial Total		7	34	41	103	784	887	468	4,041	4,509

Table 4.1.1 Details on Existing Level III Systems
Sheet 3 of 4

Name of Municipality	Name of Operating Body	Water Sources			Consumptions			
		Type of Water Source	Number	Production Capacity (cu.m/day)	Domestic	Institutional	Commercial	Industrial
					(cu.m/day)			
Baganga	Baganga WD	SP	1	180	136	16	20	
Banaybanay	Pintatagan	SP	1	48	40	4		
Caraga	Poblacion	SP	1	216	176	18	12	
	San Luis	SP	1	240	180	5		
	Santiago	SP	1	240	188	14	6	
Municipal Total			3	696	544	37	18	
Lupon	Macangao	DW	1	24	12	1		
	Lupon WD	DW	3	536	141	37	61	
Municipal Total			4	560	153	38	61	
Manay	Central	SP	1	240	200	8		
Mati (Capital)	Macambol	SP	1	144	30	2		
	Mati WD	DW	1	1,361	1,200	14	21	
	Matiao	DW	1	235	220	15		
	NHA, Homeowners Ass.	DW	1	128	114			
	Capitol Water System	DW	2	60	40	10		
	Sainz	SP	1	288	240	21		
	Sanghay	SP	1	72	61	1		
	Taguibo	SP	1	120	100	2		
Municipal Total			9	2,408	2,005	65	21	
Governor Generoso	Mun. LGU	DW	1	72	63	5		
	Tiruwasai	SP	1	72	56	6		
Municipal Total			2	144	119	11		
San Isidro	Bitaogan	DW	1	30	10			
	San Isidro WD	DW	1	378	128	104	113	
Municipal Total			2	408	138	104	113	
Provincial Total			23	4,684	3,336	282	233	

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

Table 4.1.1 Details on Existing Level III Systems
Sheet 4 of 4

Name of Municipality	Name of Operating Body	Consumers														
		Domestic House Connections			Domestic Public Faucets			Institutional Consumers			Commercial Consumers			Industrial Consumers		
		Connection		Consumption (m³/day)	Connection		Consumption (m³/day)	Connection		Consumption (m³/day)	Connection		Consumption (m³/day)	Connection		Consumption (m³/day)
		Metered	Unmetered		Metered	Unmetered		Metered	Unmetered		Metered	Unmetered		Metered	Unmetered	
Baganga	Baganga WD	357	42	133.6	2		2.1	8	3	15.5	39		20.6			
Banaybanay	Pintatagan		242	40.0					4	4.0						
Caraga	Poblacion	357	17	176.1				5	5	18.2	8		11.7			
	San Luis		210	160.0					5	5.0						
	Santiago		140	188.0					14	14.0		4	6.0			
Municipal Total			367	544.1				5	24	37.2	8	4	17.7			
Lupon	Macangao		25	12.0					1	1.0						
	Lupon WD	418		141.4				12		36.5	70		60.9			
Municipal Total			25	153.4				12	1	37.5	70		60.9			
Manay	Central		250	200.0					10	8.0						
Mati (Capital)	Macambol		34	30.0					2	2.0						
	Mati WD	1,250		4,200.0				15		14.0	30		21.0			
	Matiao	363		220.0				6		15.0						
	NHA, Homeowners Ass		264	114.0												
	Capitol Water System		100	40.0					10	10.0						
	Sainz	606		240.0				7		21.0						
	Sanghay		10	10.0		10	51.0		1	1.0						
	Taguibo		25	94.0		6	6.0		1	2.0						
Municipal Total			453	1,948.0		16	57.0	28	14	65.0	30		21.0			
Governor Generoso	Mun. LGU	147		63.0				8		5.0						
	Tiruwasai	112		54.0	2		2.0	3		6.0						
Municipal Total				117.0	2		2.0	11		11.0						
San Isidro	Bitaogan		30	19.0												
	San Isidro WD	411		128.3				8		104.0	80		113.0			
Municipal Total			30	138.3				8		104.0	80		113.0			
Provincial Total		4,025	1,409	3,274.4	4	16	62.1	72	56	282.2	157	4	232.6			

4.1.4 Level II Systems

Table 4.1.2 Details on Existing Level II Systems
Sheet 1 of 6

Name of Municipality	Name of Operating Body	Water Source			Existing Facilities				
					Length of Transmission Line (meter)	Reservoir		Length of Distribution Line (meter)	Number of Public Faucets
		Type[1]	Number	Discharge (m^3/day)		Number	Volume (m^3)		
Baganga	Barangay Mikit	SP	1	36	1,000	1	5	500	5
	Binondo	SP	1	24	4,000	1	23	100	4
	Kinablangan	SP/DW	2	360	2,000	3	72	100	18
	Mahan-ub	SP	2	144	5,500	1	20	650	24
	Saoquegue	SP	1	72	2,500	1	5	700	6
	Municipal Total		7	636	15,000	7	125	2,050	57
Banaybanay	Causwagan	SP	1	96	5,000	1	360	250	12
	Maputi, Banaybanay	SP	1	240	2,500	2	19	300	15
	Punta Linao	SP	2	360	3,400	1	3,000	750	25
	Municipal Total		4	696	10,900	4	3,379	1,300	52
Boston	Cearihan	SP	1	240	600	1	6	100	6
	San Jose	SP	1	48	1,000	5	30	100	15
	Sibajay	SP	1	120	370	2	18	120	7
	Simulao	SP	1	120	250			20	6
	Municipal Total		4	528	2,220	8	54	340	34
Caraga	Caningag	SP	1	72	4,000			50	4
	Poblacion	SP	1	48	120	1	11	25	2
	San Antonio, Caraga	SP	1	120	1,500	1	19	200	4
	San Miguel, Caraga	SP	1	96	5,000	1	19	50	4
	Santa Fe	SP	1	48	500	1	23	200	14
	Municipal Total		5	384	11,120	4	72	525	28
Cateel	Abijod	SP	1	48	500	1	10	20	10
	Aliwagwag	SP	1	164	120	1	3	150	3
	Maglahus	SP	1	48	600			100	5
	Malibago	SP	1	72	1,400	3	19	150	10
	San Antonio, Cateel	SP	3	120	1,500	3	21	400	16
	Municipal Total		7	452	4,120	8	53	820	44
Governor Generoso	Anitap	SP	2	20	1,500	2	30	92	24
	Chicote	SP	1	6	1,800			10	4
	Lavigan	SP	4	216	3,200	4	46	200	17
	Magdug	SP	1	24	1,800	1	4	120	6
	Monserrat	SP	1	24	1,500	2	24	200	6
	Oregon	SP	1	24	500	1	15	50	6
	Sergio Osmeña	SP	3	156	4,100			530	12
	Tamban	SP	1	24	1,500	2	58	350	12
	Tandang Sora	SP	1	24	700	1	19	100	20
	Tiblawan	SP	2	113	4,500	5	95	400	29
	Upper Tibanban	SP	3	240	3,700	3	30	920	16
	Municipal Total		20	871	24,800	21	331	2,972	152
Lupon	Calapagan	SP	2	384	1,950	2	38	210	12
	Cocomon	SP	1	48	3,000	1	4	100	3
	Don Mariano	SP	1	48	1,500	1	2	200	7
	Maravag	SP	2	120	1,500	2	42	250	10
	New Visayas	SP	1	48	700			20	3
	Tagboa	SP	1	72	5,000	1	38	400	11
	Taguppo	SP	2	120	2,000	1	8	35	4
	Municipal Total		10	840	15,650	8	131	1,215	50
Manay	Central	SP	1	144	1,500	1	27	400	10
	Holy Cross	SP	1	48	1,000	1	19	100	2
	Zarragoza	SP	1	72	3,700	1	15	40	3
	Municipal Total		3	264	6,200	3	61	540	15
Mati (Capital)	Bobon	SP	1	96	3,000	1	23	1,000	30
	Buso	SP	1	72	5,000	1	40	400	13
	Culian	SP	4	288	2,100			70	9
	Dahican	DW	1	120	700	1	47	200	5
	Dawan	SP	3	137	6,000	3	90	1,950	20
	Don Salvador	SP	1	240	1,000	1	8	2,000	8
	Lanka	SP	3	144	1,900	1	23	170	17
	Libudon	SP	1	72	3,000	1	38	200	18
	Luban	SP	2	120	1,200	1	19		4
	Macambol	SP	3	264	3,500	1	15	590	20
	Mamali	SP	5	276	2,600	1	110	360	26
	Mayo	SP	2	144	3,300	2	170	210	28
	Sainz	SP	1	72	2,000	1	2	100	3
	Sanghay	SP	1	120	2,500	1	15	100	3
	Tamisan	SP	3	216	6,000	3	95	140	22
	Tagabakid	SP	2	528	3,000	1	38	650	43
	Municipal Total		34	2,909	46,800	20	731	8,080	269
San Isidro	Batobato	SP	1	72	1,000	2	114	50	20
	La Union	SP	1	72	700	1	23	300	6
	Maag	SP	2	96	3,050	1	8	55	4
	Manikling	DW	1	72	3,000	1	38	1,500	35
	Maputi, San Isidro	SP	1	55	1,500			500	4
	San Miguel, San Isidro	SP	1	48	500	2	8	200	2
	Sudlon	SP	1	136	100	1	19	80	2
	Talisay	SP	1	72	830	1	19	100	25
	Municipal Total		9	623	10,680	9	227	2,785	98
Tarragona	Central, Tarragona	SP	1	192	3,500	3	57	600	15
	Jovellar	SP	1	72	4,000	1	19	500	6
	Limot	SP	2	168	4,800			400	20
	Lucatan	SP	4	158	3,550	4	44	300	42
	Ompao	SP	1	192	4,000			100	8
	Municipal Total		9	782	19,850	8	119	1,900	91
Provincial Total			112	8,984	167,340	100	5,282	22,527	820

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

Table 4.1.2 Details on Existing Level II Systems
Sheet 2 of 6

Name of Municipality	Name of Operating Body	Number of Barangay Served			Number of Households Served			Number of Population Served		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Baganga	Barangay Mikit		1	1	-	80	80	-	360	360
	Binondo		1	1	-	75	75	-	450	450
	Kinablangan		1	1	-	400	400	-	2,400	2,400
	Mahan-ub		1	1	-	116	116	-	672	672
	Saoquegue	1		1	60	-	60	350	-	350
	Municipal Total	1	4	5	60	671	731	350	3,882	4,232
Banaybanay	Causwagan		1	1	-	82	82	-	489	544
	Maputi, Banaybanay		1	1	-	250	250	-	1,500	1,500
	Punta Linao		1	1	-	350	350	-	2,100	2,100
	Municipal Total		3	3	-	682	682	-	4,089	4,144
Boston	Caathan		1	1	-	85	85	-	500	500
	San Jose		1	1	-	150	150	-	600	600
	Sibajay		1	1	-	161	161	-	1,030	1,030
	Simulao		1	1	-	150	150	-	520	520
	Municipal Total		4	4	-	546	546	-	2,650	2,650
Caraga	Caningag		1	1	-	65	65	-	370	370
	Poblacion	1		1	25	-	25	130	-	130
	San Antonio, Caraga		1	1	-	60	60	-	375	375
	San Miguel, Caraga		1	1	-	85	85	-	170	170
	Santa Fe	1		1	82	-	82	300	-	300
	Municipal Total	2	3	5	107	210	317	430	915	1,345
Cateel	Abijod		1	1	-	130	130	-	800	800
	Aliwagwag		1	1	-	45	45	-	230	230
	Maglahus		1	1	-	44	44	-	264	264
	Malibago		1	1	-	54	54	-	315	315
	San Antonio, Cateel		1	1	-	150	150	-	900	900
	Municipal Total		5	5	-	423	423	-	2,509	2,509
Governor Generoso	Anitap		1	1	-	113	113	-	700	700
	Chicote		1	1	-	42	42	-	200	200
	Lavigan		1	1	-	240	240	-	1,380	1,380
	Magdug		1	1	-	160	160	-	861	861
	Monserrat		1	1	-	52	52	-	360	360
	Oregon		1	1	-	50	50	-	380	380
	Sergio Osmeña		1	1	-	213	213	-	1,098	1,098
	Tamban		1	1	-	60	60	-	288	288
	Tandang Sora		1	1	-	120	120	-	665	665
	Tiblawan		1	1	-	237	237	-	1,221	1,221
	Upper Tibanban		1	1	-	186	186	-	962	962
	Municipal Total		11	11	-	1,473	1,473	-	8,115	8,115
Lupon	Calapagan		1	1	-	80	80	-	428	428
	Cocomon		1	1	-	17	17	-	90	90
	Don Mariano		1	1	-	150	150	-	787	787
	Marayag		1	1	-	70	70	-	396	396
	New Visayas		1	1	-	25	25	-	127	127
	Tagboa	1		1	150	-	150	821	-	821
	Tagugpo		1	1	-	130	130	-	660	660
	Municipal Total	1	6	7	150	472	622	821	2,488	3,309
Manay	Central	1		1	150	-	150	800	-	800
	Holy Cross		1	1	-	30	30		221	221
	Zarragoza		1	1	-	20	20	-	130	130
	Municipal Total	1	2	3	150	50	200	800	351	1,151
Mati (Capital)	Bobon		1	1	-	150	150	-	794	794
	Buso		1	1	-	200	200	-	1,300	1,300
	Culian		1	1	-	107	107	-	592	592
	Dahican		1	1	-	100	100	-	504	504
	Dawan		1	1	-	120	120	-	615	615
	Don Salvador		1	1	-	150	150	-	872	872
	Lanka		1	1	-	105	105	-	614	614
	Libudon		1	1	-	560	560	-	3,013	3,013
	Luban		1	1	-	80	80	-	426	426
	Macambol		1	1	-	190	190	-	971	971
	Mamali		1	1	-	215	215	-	1,086	1,086
	Mayo		1	1	-	310	310	-	1,551	1,551
	Sainz	1		1	20	-	20	12	-	12
	Sanghay		1	1	-	40	40	-	238	238
	Tamisan		1	1	-	450	450	-	2,289	2,289
	Tagabakid		1	1	-	258	258	-	1,269	1,269
	Municipal Total	1	15	16	20	3,035	3,055	12	16,134	16,146
San Isidro	Batobato	1		1	160	-	160	800	-	800
	La Union		1	1	-	150	150	-	817	817
	Maag		1	1	-	85	85	-	448	448
	Manikling		1	1	-	240	240	-	1,245	1,245
	Maputi, San Isidro		1	1	-	80	80	-	415	415
	San Miguel, San Isidro		1	1	-	18	18	-	98	98
	Sudlon		1	1	-	40	40	-	240	240
	Talisay		1	1	-	130	130	-	728	728
	Municipal Total	1	7	8	160	743	903	800	3,991	4,791
Tarragona	Central, Tarragona	1		1	250	-	250	1,500	-	1,500
	Jovellar		1	1	-	70	70	-	340	340
	Limot		1	1	-	158	158	-	872	872
	Lucatan		1	1	-	273	273	-	1,529	1,529
	Ompao		1	1	-	50	50	-	264	264
	Municipal Total	1	4	5	250	551	801	1,500	3,005	4,505
Provincial Total		8	64	72	897	8,856	9,753	4,713	48,129	52,897

Table 4.1.2 Details on Existing Level II Systems
Sheet 3 of 6

Name of Municipality	Name of Operating Body	Service Conditions During Dry Season								
		Supply (Hrs/day)	Dirty Water[1]	Taste or Smell[2]	Supply Interruption (number/month)				Supply Water Pressure (% of total)	
					Power Failure	Pump Break-down	Pipe Burst	Others	Adequate	Inadequate
Baganga	Barangay Mikit	24		G					100	
	Binondo	12		G						
	Kinablangan	3		O					50	50
	Mahan-ub	24		G					100	
	Saoquegue	24		G					100	
Banaybanay	Causwagan	4		G			1		100	
	Maputi, Banaybanay	12		G					100	
	Punta Linao	24		G					100	
Boston	Caatihan	24		G					100	
	San Jose								100	
	Sibajay									
	Simulao	24		G					100	
Caraga	Canlngag	24		G					100	
	Poblacion	24		G					100	
	San Antonio, Caraga	12		G					100	
	San Miguel, Caraga	12		G			1		100	
	Santa Fe	12		G			2		100	
Cateel	Abijod	24		G					100	
	Aliwagwag	24		G					100	
	Maglahus	24							100	
	Malibago	24		G					100	
	San Antonio, Cateel	24							60	40
Governor Generoso	Anitap	12		G			1		80	20
	Chicote		O	G					40	60
	Lavigan	12		G					100	
	Magdug	12		G			2		80	20
	Monserrat	3		G					100	
	Oregon	10		G					100	
	Sergio Osmeña			G					100	
	Tamban	24		G			2		100	
	Tandang Sora	8		G					100	
	Tiblawan	6		G					100	
	Upper Tibanban	24		G					100	
Lupon	Calapagan	12					1		100	
	Cocomon	24		G					100	
	Don Mariano	12		G			1		60	40
	Marayag	12					2		100	
	New Visayas	24		G					100	
	Tagboa	12		G			1		100	
	Tagugpo	24		G					100	
Manay	Central	20		G			2		100	
	Holy Cross	24	E	G	1				100	
	Zarragoza	20		G					100	
Mati (Capital)	Bobon	3		G			4	2	30	70
	Buso	12		G			2		70	30
	Cullan	24		G					100	
	Dahican	12		G					100	
	Dawan	6		G					100	
	Don Salvador	24		G					100	
	Lanka	24		G			1		100	
	Libudon	10		G					100	
	Luban	24		G					100	
	Macambol	24		G					100	
	Mamali	24		G					100	
	Mayo			G			1		100	
	Sainz	24		G					100	
	Sanghay			G					100	
	Tamisan	24		G					100	
	Tagabakid	24		G					100	
San Isidro	Batobato	12		G					100	
	La Union	15		G			2		100	
	Maag	9		G				1	30	70
	Manikling	18		G					100	
	Maputi, San Isidro	24		G			2		100	
	San Miguel, San Isidro	12		G					30	70
	Sudlon	12		G					30	70
	Tulisay	24		G					100	
Tarragona	Central, Tarragona	24		G			4			100
	Jovellar	12		G			2		60	40
	Limot	24		G					100	
	Lucatan	12		G					80	20
	Ompao	24		G			4		100	

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

Table 4.1.2 Details on Existing Level II Systems
Sheet 4 of 6

Name of Municipality	Name of Operating Body	Number of Staff							
		Technical Staff	Administrative Staff	Collector	Total Number of Staff	Repair Work			
						Local Tradesman	MEO/CEO	DEO	Others
Baganga	Barangay Mikit								
	Binondo								
	Kinablangan			1	1		✓		Brgy.
	Mahan-ub								
	Saoquegue	Managed by Barangay Officials							
Banaybanay	Causwagan								
	Maputi, Banaybanay	1	2		3				
	Punta Linao	2	3	3	8				
Boston	Caatihan								Brgy.
	San Jose					✓			
	Sibajay								
	Simulao								Brgy.
Caraga	Canigag	Managed by Barangay Officials							
	Poblacion								
	San Antonio, Caraga	Managed by Barangay Officials							
	San Miguel, Caraga	Managed by Barangay Officials							
	Santa Fe	Managed by Barangay Officials							
Cateel	Abijod					✓			Brgy.
	Aliwagwag					✓			
	Maglahus								
	Malibago								
	San Antonio, Cateel								
Governor Generoso	Anitap			1	1				Brgy.
	Chicote		7	1	8				
	Lavigan			1					Brgy.
	Magdug	Managed by Barangay Officials							
	Monserrat		4		4				
	Oregon		4	1	5				Brgy.
	Sergio Osmeña								
	Tamban	Managed by BWSA							
	Tandang Sora		8	1	9				
	Tiblawan	Managed by Barangay Officials							
	Upper Tibanban	Managed by Barangay Officials							
Lupon	Calapagan			1					Brgy.
	Cocomon	Managed by Barangay Officials							
	Don Mariano		7	1	8				
	Marayag			1	1				
	New Visayas	Managed by Barangay Officials							
	Tagboa	Managed by Barangay Officials							
	Taguigpo	Managed by Barangay Officials							
Manay	Central		1	1	2				Brgy.
	Holy Cross	12	12	1	25	✓			
	Zarragoza								
Mati (Capital)	Bobon		1		1				Brgy.
	Buso	1	7	1	9				BWSA
	Culian	Managed by Barangay Officials							
	Dahican			3	3				
	Dawan	2	12	2	16				Brgy.
	Don Salvador								
	Lanka	Managed by Barangay Officials							
	Libudon	2	3	1	6				BWSA
	Luban	Managed by Barangay Officials							
	Macambol			1	1				
	Mamali	6	25	6	37				
	Mayo								
	Sainz	Managed by Barangay Officials							Brgy.
	Sanghay	3	12	1	16				
	Tamisan		3	3	6				
	Tagabakid								
San Isidro	Batobato	1	7	1	9				BWSA
	La Union	Managed by Barangay Officials							
	Maag		1	2	3	✓			
	Manikling	1	7	2	10				BWSA
	Maputi, San Isidro	Managed by Barangay Officials				✓	✓		
	San Miguel, San Isidro		1	1	1				Brgy.
	Sudlon	Managed by Barangay Officials							Brgy.
	Talisay		7	1	8				Brgy.
Tarragona	Central, Tarragona	Managed by Barangay Officials							
	Jovellar	Managed by Barangay Officials							
	Limot	Managed by Barangay Officials							
	Lucatan	Managed by Barangay Officials							
	Ompao			1	1				Brgy.

Table 4.1.2 Details on Existing Level II Systems
Sheet 5 of 6

Name of Municipality	Name of Operating Body	Expenditures							Tariff					Average Collection Efficiency (%)
		Annual	Wages	Fuel, Chem. Mat'L	Transport	Repairs	Loan Repayment	Other	Consumer Payment	Cost per Fail	Cost per Cu. Meter	Cost per HH	Other	
		(₱ '000.00 / year)							(Year)	(Pesos)				
Bacacay	Barangay Mikit													
	Bingcoy									104				50
	Kimablangan	10		24		3								
	Mahan-ub													
	Sagosesue													
Banaybanay	Causwayan													
	Maputi, Banaybanay	2.5				1.7						11		55
	Punta Lupao	4.8				3								
Boston	Caanlhan													
	San Jose													
	Subalay													
	Simulao													
Caraus	Canipayan													
	Poblacion													
	San Antonio, Caraus													
	San Miguel, Caraus													
	Santa Fe													
Cateel	Abijod													
	Aliwanayan		4											
	Masalahus													
	Maliibago													
	San Antonio, Cateel													
Governor Generoso	Anitan	2				0.5								
	Chicoic													
	Lavigan													
	Mayhut											5		
	Monserrat											2		100
	Orevon													70
	Sergio Osmeña								12					100
	Tamban											1		
	Tandang Sora		43.2											
	Tiblawan													
	Upper Tibanban													
Lupon	Calapagan	14.5	2		1	2.3			60					75
	Cocomon											3		65
	Don Mariano					1						5		70
	Maravas		1											
	New Visayas													
	Tagboa											2		
	Tagugpo											20		
Manay	Central													
	Holy Cross	18	14.4			8			300					
	Tarragona													
Mati (Capital)	Hobon											10		80
	Ruso		6											
	Cultan											25		
	Dahican					3						4.5		75
	Dawan		4.8											
	Don Salvador													
	Lanka											10		70
	Libudon		2.98			2								
	Luban											3		
	Macambol					9						5		100
	Mamali		2.16											
	Mayo													
	Sainz												3	80
	Sanchay		4											90
	Tamisan	4.4	2.4			2						3		
	Tawabakid											10		100
San Isidro	Barobato		10.8	1.56		1								
	La Union											5		100
	Masu		1.2			1.2								
	Manikling		3.6	12		1								
	Maputi, San Isidro													
	San Miguel, San Isidro					1			60					
	Sudlon											5		100
	Talisay													
Tarragona	Central, Tarragona													
	Jovellar													
	Limot													
	Lucatan													
	Osmeña		3.6											

Table 4.1.2 Details on Existing Level II Systems
Sheet 6 of 6

Name of Municipality	Name of Operating Body	Billings: Annual Billing	Billings: Public Faucet Consumer	Billings: House Connection Consumers	Billings: Expected Subsidies	Billings: Others	Revenues: Annual Income	Revenues: Payment by Public Faucet Consumers	Revenues: Payment by House Connection Consumer	Revenues: Subsidies	Revenues: Other
		(Number)					(P '000.00 / year)				
Baganga	Barangay Mikit										
	Binondo										
	Kinablangan										
	Mahan-ub										
	Saoquegue										
Banaybanay	Causwagan										
	Maputi, Banaybanay										
	Punta Linao										
Boston	Caatihan										
	San Jose										
	Sibajay										
	Simulao										
Caraga	Caningag										
	Poblacion										
	San Antonio, Caraga										
	San Miguel, Caraga										
	Santa Fe										
Cateel	Abijod										
	Aliwagwag										
	Maglahus										
	Malibago										
	San Antonio, Cateel										
Governor Generoso	Anitap			0.06							
	Chicote										
	Lavigan										
	Magdug										
	Monserrat										
	Oregon										
	Sergio Osmeña										
	Tamban										
	Tandang Sora										
	Tiblawan										
	Upper Tibanban										
Lupon	Calapagan										
	Cocomon										
	Don Mariano										
	Maravag										
	New Visayas										
	Tagboa										
	Taguepo										
Manay	Central						14				
	Holy Cross										
	Zaragoza										
Mati (Capital)	Bobon										
	Buso										
	Culian										
	Dahican										
	Dawan										
	Don Salvador										
	Lanka						3.52				
	Libudon										
	Luban										
	Macambol										
	Mamali										
	Mayo										
	Sainz										
	Sanghay										
	Tamisan										
	Tagabakid										
San Isidro	Batobato										
	La Union										
	Maag										
	Manikling										
	Maputi, San Isidro										
	San Miguel, San Isidro										
	Sudlon										
	Talisay										
Tarragona	Central, Taragona										
	Jovellar										
	Limot										
	Lucatan										
	Ompao										

4.1.5 Level I Facilities

Safe and Unsafe Classification of Level I Facilities

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

The results of water quality analysis indicated that about 40% of existing wells as a provincial average, was classified as unsafe sources as shown in Table 4.1.3. Since the total number of shallow wells (4,502) occupies 70% of the total number of Level I facilities (6,404) and deep wells are rarely exposed to contamination by seepage of wastewater, the PHO analysis results (unsafe percentages) were applied to classify all shallow wells (drilled and driven) into safe and unsafe sources.

Table 4.1.3 Percentage of Unsafe Water Sources by PHO

Name of Municipality	No. of Level I Facilities Subjected to Bacteriological Examination	Percentage of Unsafe Sources (%)
Baganga	N.A.	55
Banaybanay	N.A.	*40
Boston	N.A.	31
Caraga	N.A.	*40
Cateel	N.A.	* 40
Governor Generoso	N.A.	22
Lupon	N.A.	21
Manay	N.A.	*40
Mati (Capital)	N.A.	42
San Isidro	N.A.	*40
Tarragona	N.A.	68
Provincial Total		40

*Applied provincial average

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

Public and Private Level I Facilities for Rural Water Supply

Table 4.1.4 (b) presents the number and proportion of Level I facilities by public and private water sources for rural water supply in the province. Public and private facilities cover 37%

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

Name of Municipality	Area	Safe Sources										Unsafe Source										Grand Total
		Public					Private				Total	Public					Private				Total	
		Deep Well	Shallow Well	Covered/ Improved Dug Well	Developed Spring	Sub-total	Deep Well	Shallow Well	Covered/ Improved Dug Well	Sub-total		Shallow Well	Open Dug Well	Undeveloped Spring	Rain Water Collection	Sub-total	Shallow Well	Open Dug Well	Rain Water Collector	Sub-total		
Baganga	Urban	3	13	-	2	18	-	138	-	138	155	15	-	-	-	15	168	7	-	175	191	346
	Rural	13	39	-	12	64	1	17	-	18	81	47	-	-	-	47	20	38	-	58	106	187
	Total	16	51	-	14	81	1	154	-	155	237	63	-	-	-	63	189	45	-	234	296	533
Banaybanay	Urban	44	6	-	2	52	193	11	-	204	256	4	-	-	-	4	7	12	3	22	26	282
	Rural	86	22	-	9	117	124	15	-	139	256	14	-	-	-	14	10	36	3	49	63	319
	Total	130	28	-	11	169	317	26	-	343	511	18	-	-	-	18	17	48	6	71	90	601
Boston	Urban	8	7	-	5	20	-	24	-	24	44	3	-	-	-	3	11	-	-	11	14	58
	Rural	3	9	-	16	28	-	2	-	2	30	4	-	-	-	4	1	26	-	27	31	61
	Total	11	16	-	21	48	-	26	-	26	74	7	-	-	-	7	12	26	-	38	45	119
Caraga	Urban	1	1	-	4	6	-	1	-	1	7	1	-	-	-	1	1	-	-	1	2	9
	Rural	4	17	-	23	44	-	22	-	22	67	12	-	-	-	12	15	-	-	15	26	93
	Total	5	19	-	27	51	-	23	-	23	74	12	-	-	-	12	16	-	-	16	28	102
Cateel	Urban	2	30	-	-	32	-	180	-	180	212	20	-	-	-	20	120	-	-	120	140	352
	Rural	7	65	-	5	77	-	124	-	124	201	43	-	-	-	43	83	20	-	103	146	347
	Total	9	95	-	5	109	-	304	-	304	413	63	-	-	-	63	203	20	-	223	286	699
Governor Generoso	Urban	19	35	-	1	55	-	150	-	150	205	10	-	-	-	10	42	4	-	46	56	261
	Rural	27	51	-	28	106	-	129	-	129	235	14	-	-	-	14	37	178	-	215	229	464
	Total	46	86	-	29	161	-	279	-	279	440	24	-	-	-	24	79	182	-	261	285	725
Lupon	Urban	36	6	-	-	42	10	593	-	603	646	2	-	-	-	2	158	-	-	158	159	805
	Rural	56	62	-	26	144	42	863	-	905	1,050	17	-	-	-	17	220	79	12	321	337	1,387
	Total	92	69	-	26	187	52	1,457	-	1,509	1,695	18	-	-	-	18	387	79	12	478	497	2,192
Manay	Urban	1	18	-	6	25	-	11	-	11	36	12	-	-	-	12	8	-	-	8	20	56
	Rural	5	5	-	19	29	-	-	-	-	29	3	-	-	-	3	-	5	68	73	76	105
	Total	6	23	-	25	54	-	11	-	11	65	15	-	-	-	15	8	5	68	81	96	161
Mati (Capital)	Urban	31	26	7	13	77	99	213	-	312	390	19	-	-	-	19	155	57	-	212	230	620
	Rural	16	49	-	58	123	8	27	-	35	158	36	-	-	-	36	19	74	-	93	129	287
	Total	47	75	7	71	200	107	240	-	347	548	55	-	-	-	55	174	131	-	305	359	907
San Isidro	Urban	8	11	-	1	20	-	-	-	-	20	8	-	-	-	8	-	-	-	-	8	28
	Rural	35	28	-	22	85	10	43	-	53	138	19	-	-	-	19	28	83	-	111	130	268
	Total	43	40	-	23	106	10	43	-	53	158	26	-	-	-	26	28	83	-	111	138	296
Tarragona	Urban	2	4	-	1	7	-	1	-	1	8	10	-	-	-	10	2	3	-	5	15	23
	Rural	2	1	2	26	31	-	1	-	1	32	2	-	-	-	2	2	10	-	12	14	46
	Total	4	5	2	27	38	-	2	-	2	40	12	-	-	-	12	4	13	-	17	29	69
Provincial Total	Urban	155	158	7	35	355	302	1,323	-	1,625	1,980	103	-	-	-	103	671	83	3	757	860	2,840
	Rural	254	348	2	244	848	185	1,243	-	1,428	2,276	211	-	-	-	211	445	549	83	1,077	1,288	3,564
	Total	409	506	9	279	1,203	487	2,566	-	3,053	4,256	314	-	-	-	314	1,116	632	86	1,834	2,148	6,404

and 63% of the safe water sources, respectively. Developed springs occupy 29% of public facilities.

Table 4.1.4 (b) Public and Private Level I Safe Water Sources for Rural Water Supply

	Public Souces		Private Sources		Total
	Number	(%)	Number	(%)	
Deep Well	254	58%	185	42%	439
Shallow Well	348	22%	1,243	78%	1,591
Developed Spring	244	100%	0	0%	244
Others	2	100%	0	0%	2
Total	848	37%	1,428	63%	2,276

4.1.6 Water Supply Service Coverage

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

Through review of the number of water supply systems/facilities and the number of households that were derived from the questionnaire, it was found that a great number of unserved population would be accounted as a balance between the total population and population with any levels of services (including unsafe facilities) in application of the service level standard for Level I and II. To come up with more realistic service coverage, the unserved population in 1997 was referred to the profile in 1990 population census data, "Households by Main Source of Drinking Water and City/Municipality." The rest of the population, those who are not served by Level III or II systems was considered to be covered by shared or own use of Level I facilities. The calculation procedure is as follows:

- Service percentage/population of Level III and Level II systems was estimated based on the questionnaire survey results.
- Percentage of unserved population (using undeveloped spring, lake, river, peddler, etc.) reported in the 1990 population census was assumed to be unchanged up to the present.
- Population covered by Level I facilities was calculated as the balance between the total population, and the population served by Level III & II systems and the unserved population.
- Level I population coverage was estimated with the assumption that 50% of the private facilities was shared by neighbors.
-

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

Table 4.1.5 Estimation of Unserved Population by Municipality

Name of Municipality	Area	Population and Household (1997)		Served Population			Unserved Population			Unserved Population 1997	Population Covered by Level I Facilities
							Unserved Percentage (1995)				
		Number	HH Size	Level III	Level II	Total	Total No. of HHs	No. of Unserved HHs	%		
Buganga	Urban	13,781	5	2,280	446	2,726	2,447	731	30	4,117	6,938
	Rural	27,365	5	-	3,882	3,882	5,063	2,267	45	12,253	11,230
	Total	41,146	5	2,280	4,328	6,608	7,510	2,998	40	16,426	18,168
Banaybanay	Urban	11,045	5	-	-	-	1,980	226	11	1,261	9,784
	Rural	23,388	5	1,324	4,144	5,468	4,122	700	17	3,972	13,948
	Total	34,433	5	1,324	4,144	5,468	6,102	926	15	5,225	23,733
Boston	Urban	2,450	5	-	-	-	442	278	63	1,541	909
	Rural	8,335	6	-	2,650	2,650	1,391	864	62	5,177	508
	Total	10,785	6	-	2,650	2,650	1,833	1,142	62	6,719	1,417
Caraga	Urban	5,410	5	2,021	652	2,673	1,009	908	90	2,737	-
	Rural	27,296	5	1,849	1,540	3,389	4,993	2,817	56	15,400	8,507
	Total	32,706	5	3,870	2,192	6,062	6,002	3,725	62	20,298	8,507
Cateel	Urban	5,730	5	-	-	-	1,037	483	47	2,669	3,061
	Rural	22,373	5	-	2,509	2,509	4,064	1,498	37	8,247	11,617
	Total	28,103	5	-	2,509	2,509	5,101	1,981	39	10,914	14,678
Governor Generoso	Urban	9,846	5	1,477	-	1,477	1,813	559	31	3,036	5,333
	Rural	32,876	5	-	8,115	8,115	6,056	1,736	29	9,424	15,337
	Total	42,722	5	1,477	8,115	9,592	7,869	2,295	29	12,460	20,670
Lupon	Urban	18,285	5	2,825	821	3,646	2,639	436	17	3,021	11,618
	Rural	34,158	5	129	2,488	2,617	7,001	1,352	19	6,596	24,945
	Total	52,443	5	2,954	3,309	6,263	9,640	1,788	19	9,727	36,563
Manay	Urban	8,082	5	1,500	800	2,300	2,454	2,146	87	5,782	-
	Rural	28,603	5	-	351	351	4,345	3,801	87	25,022	3,230
	Total	36,685	5	1,500	1,151	2,651	6,799	5,947	87	32,088	3,230
Mati (Capital)	Urban	43,698	5	14,528	162	14,690	10,071	1,088	11	4,721	24,287
	Rural	52,620	5	3,049	19,495	22,544	8,157	3,376	41	21,778	8,298
	Total	96,318	5	17,577	19,657	37,234	18,228	4,464	24	23,588	32,585
San Isidro	Urban	9,458	5	2,160	800	2,960	1,286	360	28	2,648	3,850
	Rural	21,838	5	160	3,991	4,151	4,392	1,116	25	5,549	12,138
	Total	31,296	5	2,320	4,791	7,111	5,678	1,476	26	8,135	15,988
Tarragona	Urban	4,608	5	-	1,500	1,500	513	336	65	3,018	90
	Rural	15,997	5	-	3,005	3,005	3,278	2,149	66	10,487	2,505
	Total	20,605	5	-	4,505	4,505	3,791	2,485	66	13,507	2,595
Provincial Total	Urban	132,393	5	26,791	5,181	31,972	25,691	7,551	29	34,550	65,871
	Rural	294,849	5	6,511	52,170	58,681	52,862	21,676	41	123,906	112,262
	Total	427,242	5	33,302	57,351	90,653	78,553	29,227	37	158,455	178,134

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

Name of Municipality	Area	Population Covered by Level I Facilities	Number of Facilities						Coverage of Own Use					
			Public Facilities			Private Facilities			Number of Private Facilities			(1) Population Covered		
			Safe	Unsafe	Total	Safe	Unsafe	Total	Safe	Unsafe	Total	Safe	Unsafe	Total
Baganga	Urban	6,938	18	15	33	138	175	313	69	88	157	375	477	851
	Rural	11,230	64	47	111	18	58	76	9	29	38	48	159	207
	Total	18,168	81	63	144	155	234	389	78	117	195	423	636	1,058
Banaybanay	Urban	9,784	52	4	56	204	22	226	102	11	113	546	59	606
	Rural	13,948	117	14	131	139	49	188	70	25	94	373	131	504
	Total	23,733	169	18	187	343	71	414	171	36	207	919	191	1,110
Boston	Urban	909	20	3	23	24	11	35	12	5	18	65	29	94
	Rural	508	28	4	32	2	27	29	1	13	15	6	72	78
	Total	1,417	48	7	55	26	38	64	13	19	32	70	101	172
Caraga	Urban		6	1	7	1	1	2	1	0	1			
	Rural	8,507	44	12	56	22	15	37	11	7	19	57	38	96
	Total	8,507	51	12	63	23	16	39	12	8	20	57	38	96
Cateel	Urban	3,061	32	20	52	180	120	300	90	60	150	482	321	803
	Rural	11,617	77	43	120	124	103	227	62	51	114	332	275	607
	Total	14,678	109	63	172	304	223	527	152	111	264	814	596	1,410
Governor Generoso	Urban	5,333	55	10	65	150	46	196	75	23	98	395	122	516
	Rural	15,337	106	14	120	129	215	344	65	107	172	341	565	906
	Total	20,670	161	24	185	279	261	540	140	130	270	736	687	1,423
Lupon	Urban	11,618	42	2	44	603	158	761	302	79	381	1,611	421	2,032
	Rural	24,945	144	17	161	905	321	1,226	453	160	613	2,418	856	3,273
	Total	36,563	187	18	205	1,509	478	1,987	754	239	994	4,028	1,277	5,305
Manay	Urban		25	12	37	11	8	19	6	4	10			
	Rural	3,230	29	3	32		73	73		37	37		195	195
	Total	3,230	54	15	69	11	81	92	6	40	46		195	195
Mati (Capital)	Urban	24,287	77	19	96	312	212	524	156	106	262	798	541	1,339
	Rural	8,298	123	36	159	35	93	128	17	47	64	89	238	327
	Total	32,585	200	55	255	347	305	652	174	152	326	887	779	1,666
San Isidro	Urban	3,850	20	8	28									
	Rural	12,138	85	19	104	53	111	164	26	56	82	138	292	430
	Total	15,988	106	26	132	53	111	164	26	56	82	138	292	430
Tarragona	Urban	90	7	10	17	1	5	6	0	3	3	2	13	15
	Rural	2,505	31	2	33	1	12	13	0	6	7	2	31	34
	Total	2,595	38	12	50	2	17	19	1	9	10	5	44	49
Provincial Total	Urban	65,871	355	103	458	1,625	757	2,382	812	379	1,191	4,273	1,983	6,256
	Rural	112,262	848	211	1,059	1,428	1,077	2,505	714	538	1,253	3,803	2,853	6,656
	Total	178,134	1,203	314	1,517	3,053	1,834	4,887	1,527	917	2,444	8,077	4,836	12,912

The number of households per shared public/private facility ranges from 2 to 24 households, which are considered within a reasonable level, which are more or less equivalent to the service level standard of Level I public facility (15 households/facility).

Percentage of Population Covered by Level I Public Facility for Rural Water Supply

Grasping the current percentage of population covered by public facilities would be useful information in considering to what extent the additional population to be covered by public facilities in the future plan. This takes into account that the major facilities would be Level I especially for rural water supply in the future.

Population covered by public facilities is calculated as a balance between total population served by Level I facilities and population covered by private facilities. Thus, it is estimated at 42,000 persons or 52% of the total population is covered by public Level I facilities from the figures shown in Table 4.1.6 (b).

Tabie 4.1.6 (b) Estimation of Population Covered by Safe and Unsafe Source by Municipality

Name of Municipality	Area	Coverage of Shared Well						Level I Coverage (1) + (2)						
		(2) Population Covered by Private and Public			Number of Households			No. of HHs per Shared Facility	Safe		Unsafe		Total	
		Safe	Unsafe	Total	Safe	Unsafe	Total		Pop.	%	Pop.	%	Pop.	%
Baganga	Urban	3,165	2,922	6,087	582	537	1,119	6	3,540	26	3,398	25	6,938	50
	Rural	5,466	5,557	11,023	1,047	1,065	2,112	14	5,514	20	5,716	21	11,230	41
	Total	8,631	8,479	17,110	1,629	1,602	3,231	10	9,054	22	9,114	22	18,168	44
Banaybanay	Urban	8,910	269	9,179	1,662	50	1,712	10	9,456	86	328	3	9,784	89
	Rural	11,537	1,908	13,444	2,117	350	2,467	11	11,909	51	2,039	9	13,948	60
	Total	20,447	2,176	22,623	3,779	400	4,179	11	21,366	62	2,367	7	23,733	69
Boston	Urban	718	98	815	134	18	152	4	782	32	127	5	909	37
	Rural	317	113	430	55	20	74	2	322	4	186	2	508	6
	Total	1,034	211	1,245	189	38	226	3	1,105	10	312	3	1,417	13
Caraga	Urban													
	Rural	6,337	2,074	8,411	1,200	393	1,593	21	6,395	23	2,112	8	8,507	31
	Total	6,337	2,074	8,411	1,200	393	1,593	19	6,395	20	2,112	6	8,507	26
Cateel	Urban	1,849	410	2,259	346	77	422	2	2,330	41	731	13	3,061	53
	Rural	6,911	4,099	11,010	1,297	769	2,066	9	7,243	32	4,374	20	11,617	52
	Total	8,759	4,509	13,269	1,642	846	2,488	6	9,573	34	5,105	18	14,678	52
Governor Generoso	Urban	4,253	564	4,817	807	107	914	6	4,647	47	686	7	5,333	54
	Rural	8,952	5,478	14,430	1,702	1,042	2,743	9	9,293	28	6,044	18	15,337	47
	Total	13,205	6,042	19,247	2,509	1,149	3,657	8	13,941	33	6,729	16	20,670	48
Lupon	Urban	9,414	172	9,586	1,763	32	1,795	4	11,025	60	593	3	11,618	64
	Rural	19,245	2,426	21,671	3,694	466	4,160	5	21,662	63	3,282	10	24,945	73
	Total	28,659	2,599	31,257	5,457	498	5,955	5	32,687	62	3,875	7	36,563	70
Manay	Urban													
	Rural	1,358	1,677	3,035	263	324	587	9	1,358	5	1,872	7	3,230	11
	Total	1,358	1,677	3,035	263	324	587	5	1,358	4	1,872	5	3,230	9
Mati (Capital)	Urban	15,829	7,120	22,948	3,098	1,393	4,491	13	16,627	38	7,660	18	24,287	56
	Rural	5,233	2,738	7,971	1,010	528	1,539	7	5,322	10	2,976	6	8,298	16
	Total	21,062	9,857	30,919	4,108	1,922	6,030	10	21,949	23	10,636	11	32,585	34
San Isidro	Urban	2,805	1,045	3,850	535	199	735	26	2,805	30	1,045	11	3,850	41
	Rural	7,276	4,432	11,708	1,355	825	2,180	12	7,414	34	4,724	22	12,138	56
	Total	10,082	5,477	15,559	1,890	1,025	2,915	14	10,219	33	5,769	18	15,988	51
Tarragona	Urban	36	39	74	7	7	14	1	38	1	52	1	90	2
	Rural	1,994	478	2,471	381	91	472	12	1,996	12	509	3	2,505	16
	Total	2,029	516	2,546	388	99	487	8	2,034	10	560	3	2,595	13
Provincial Total	Urban	46,978	12,637	59,615	8,933	2,421	11,355	7	51,251	39	14,620	11	65,871	50
	Rural	74,626	30,980	105,606	14,120	5,873	19,993	9	78,429	27	33,833	11	112,262	38
	Total	121,604	43,617	165,221	23,054	8,294	31,348	8	129,681	30	48,453	11	178,134	42

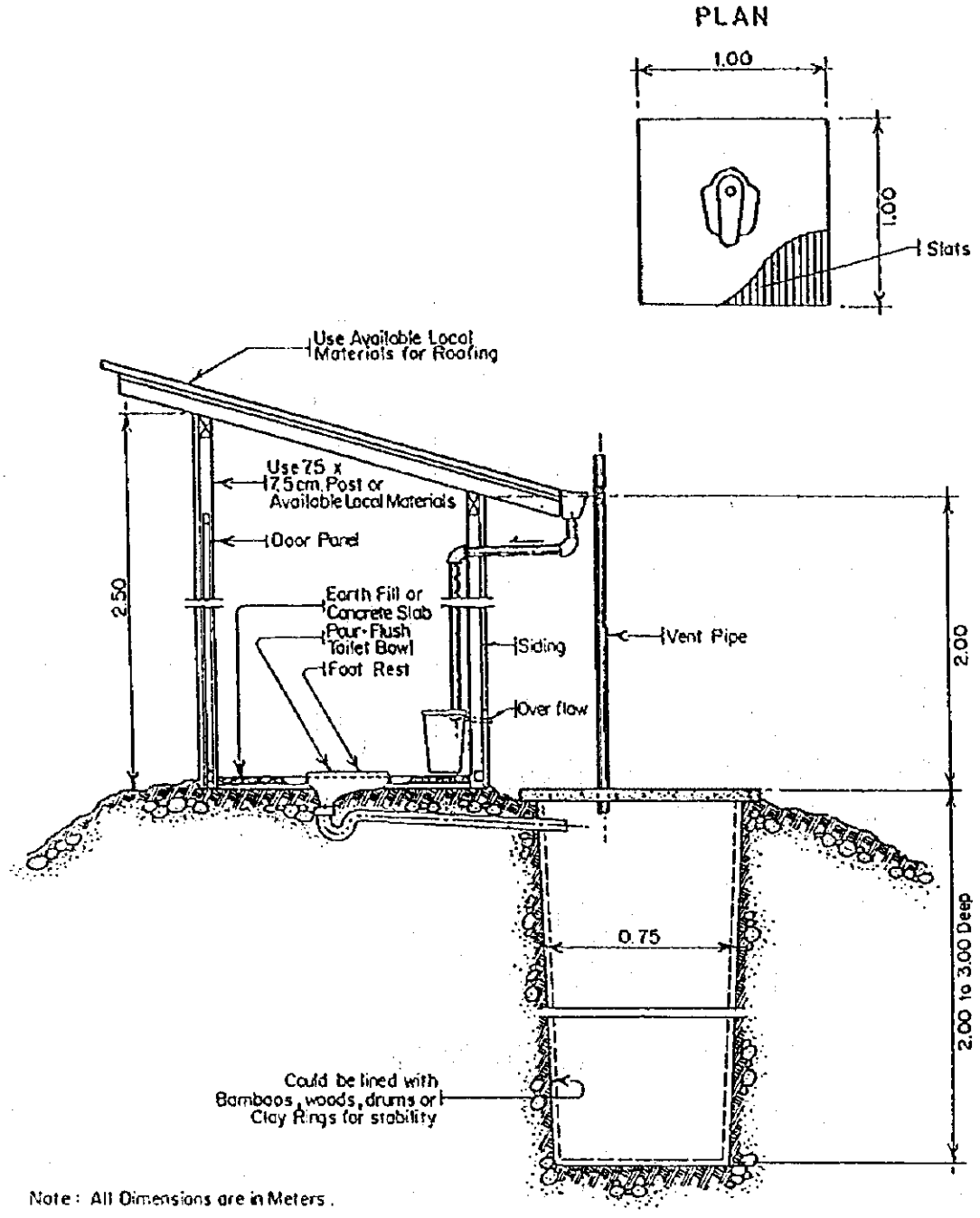
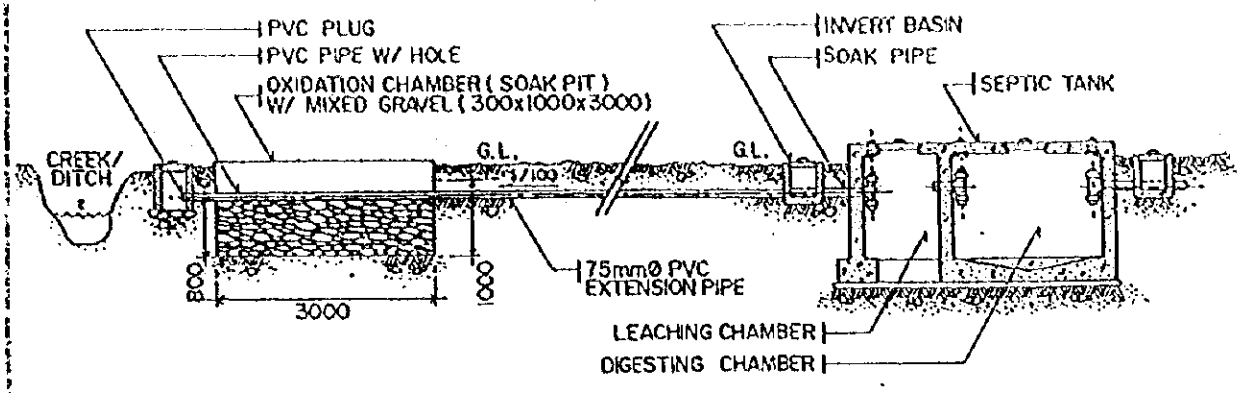


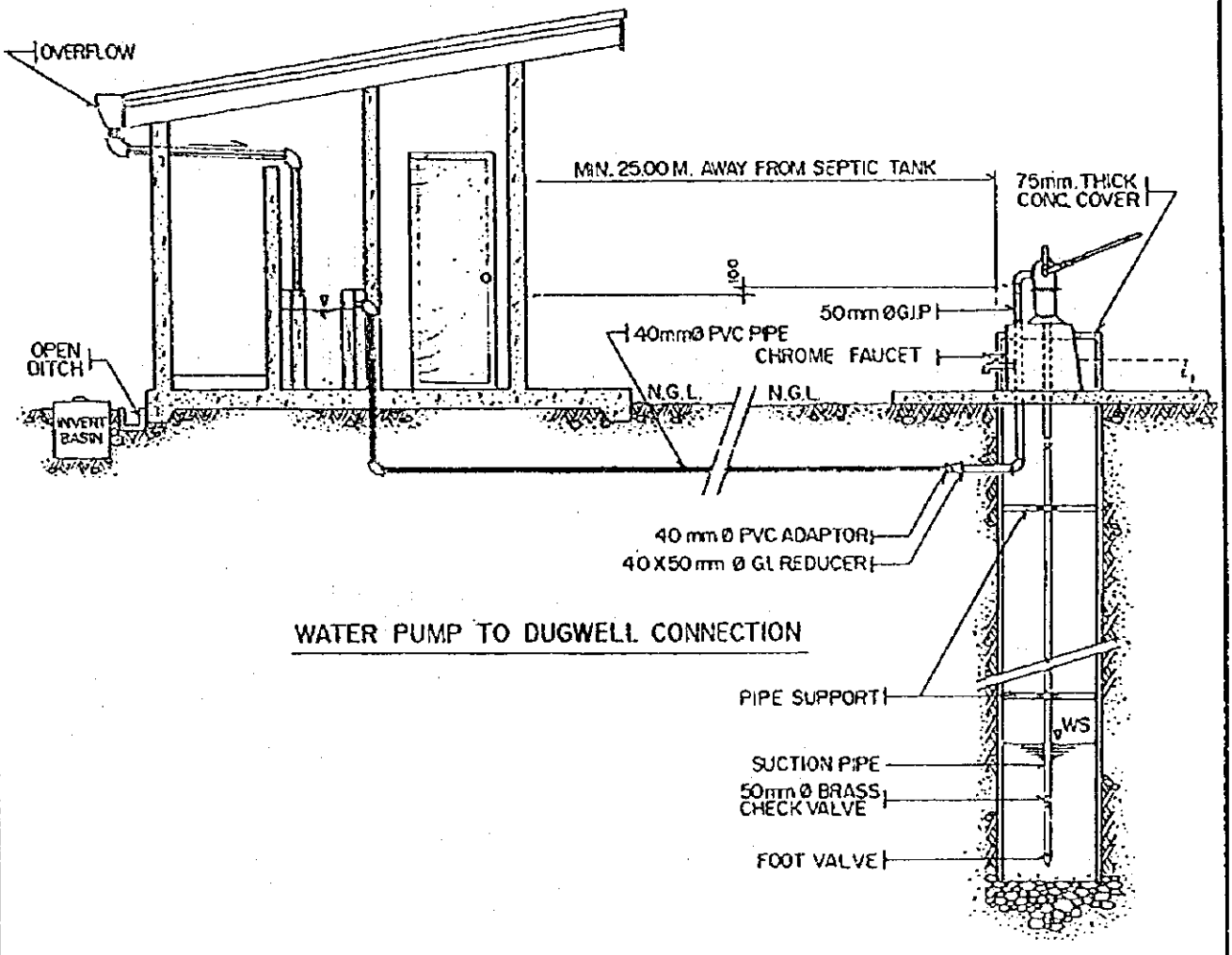
FIGURE 4.2.1

STANDARD STRUCTURE OF PRIVATE TOILET FACILITY

SOURCE : DEPARTMENT OF HEALTH



LAYOUT PLAN OF HIGH GROUND WATER SITE



WATER PUMP TO DUGWELL CONNECTION

FIGURE 4.2.2

STANDARD STRUCTURE OF SCHOOL TOILET FACILITY

SOURCE : JICA - DPWH RURAL ENVIRONMENTAL SANITATION PROJECT .

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

Name of Municipalities	Area	No. of Households (1997)	Households Served by Sanitary Toilets								Underserved/Unserved HHs			
			Flush Toilet		Pour Flush		VIP		Total		Unsanitary		No Facility	
			Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Baganga	Urban	2,533	158	6	1,310	52			1,468	58	663	26	402	16
	Rural	5,242			4,296	82			4,296	82	147	3	799	15
	Total	7,775	158	2	5,606	72			5,764	74	810	10	1,201	15
Banaybanay	Urban	2,061	350	17	990	48			1,340	65	269	13	452	22
	Rural	4,291			3,107	72			3,107	72	530	12	654	15
	Total	6,352	350	6	4,097	64			4,447	70	799	13	1,106	17
Boston	Urban	457	34	7	187	41			221	48	158	35	78	17
	Rural	1,440			871	60			871	60	192	13	377	26
	Total	1,897	34	2	1,058	56			1,092	58	350	18	455	24
Caraga	Urban	1,044	127	12	335	32			462	44	174	17	408	39
	Rural	5,170			4,679	91			4,679	91	155	3	336	6
	Total	6,214	127	2	5,014	81			5,141	83	329	5	744	12
Cateel	Urban	1,071	95	9	556	52			651	61	262	24	158	15
	Rural	4,198			3,016	72			3,016	72	647	15	535	13
	Total	5,269	95	2	3,572	68			3,667	70	909	17	693	13
Governor Generoso	Urban	1,868	107	6	1,012	54			1,119	60	313	17	436	23
	Rural	6,250			4,567	73			4,567	73	991	16	692	11
	Total	8,118	107	1	5,579	69			5,686	70	1,304	16	1,128	14
Lupon	Urban	3,424	371	11	910	27			1,281	37	729	21	1,414	41
	Rural	6,556			6,194	94			6,194	94	150	2	212	3
	Total	9,980	371	4	7,104	71			7,475	75	879	9	1,626	16
Manay	Urban	1,513	238	16	503	33			741	49	127	8	645	43
	Rural	5,532			3,925	71			3,925	71	288	5	1,319	24
	Total	7,045	238	3	4,428	63			4,666	66	415	6	1,964	28
Mati (Capital)	Urban	8,551	2,606	30	1,802	21			4,408	52	1,516	18	2,627	31
	Rural	10,158			5,317	52	2	0	5,319	52	2,378	23	2,461	24
	Total	18,709	2,606	14	7,119	38	2	0	9,727	52	3,894	21	5,088	27
San Isidro	Urban	1,805	227	13	771	43			998	55	230	13	577	32
	Rural	4,067			3,751	92			3,751	92	143	4	173	4
	Total	5,872	227	4	4,522	77			4,749	81	373	6	750	13
Tarragona	Urban	893	65	7	172	19			237	27	240	27	416	47
	Rural	3,059			2,382	78			2,382	78	381	12	296	10
	Total	3,952	65	2	2,554	65			2,619	66	621	16	712	18
Provincial Total	Urban	25,220	4,378	17	8,548	34			12,926	51	4,681	19	7,613	30
	Rural	55,963			42,105	75	2	0	42,107	75	6,002	11	7,854	14
	Total	81,183	4,378	5	50,653	62	2	0	55,033	68	10,683	13	15,467	19

Table 4.2.2 Number of Student and School Toilet Facilities by Municipality

Name of Municipality		Number of School	Number of Student	Number of Toilets		
				Sanitary	Unsanitary	Total
Baganga	Public	29.0	10,256.0	82.0	12.0	94.0
	Private	2.0	665.0	10.0	-	10.0
	Total	31.0	10,921.0	92.0	12.0	104.0
Banaybanay	Public	18.0	7,766.0	368.0	26.0	394.0
	Private	1.0	54.0	4.0	-	4.0
	Total	19.0	7,820.0	372.0	26.0	398.0
Boston	Public	13.0	3,407.0	12.0	8.0	20.0
	Private	-	-	-	-	-
	Total	13.0	3,407.0	12.0	8.0	20.0
Caraga	Public	39.0	8,990.0	76.0	29.0	105.0
	Private	2.0	399.0	10.0	-	10.0
	Total	41.0	9,389.0	86.0	29.0	115.0
Cateel	Public	30.0	7,517.0	89.0	46.0	135.0
	Private	2.0	341.0	6.0	-	6.0
	Total	32.0	7,858.0	95.0	46.0	141.0
Governor Generoso	Public	27.0	11,213.0	91.0	53.0	144.0
	Private	2.0	147.0	6.0	-	6.0
	Total	29.0	11,360.0	97.0	53.0	150.0
Lupon	Public	34.0	12,856.0	178.0	21.0	199.0
	Private	2.0	532.0	8.0	-	8.0
	Total	36.0	13,388.0	186.0	21.0	207.0
Manay	Public	37.0	8,416.0	101.0	34.0	135.0
	Private	2.0	354.0	3.0	-	3.0
	Total	39.0	8,770.0	104.0	34.0	138.0
Mati (Capital)	Public	56.0	25,123.0	408.0	51.0	459.0
	Private	6.0	4,230.0	76.0	-	76.0
	Total	62.0	29,353.0	484.0	51.0	535.0
San Isidro	Public	23.0	7,696.0	146.0	35.0	181.0
	Private	1.0	153.0	4.0	-	4.0
	Total	24.0	7,849.0	150.0	35.0	185.0
Tarragona	Public	21.0	4,293.0	53.0	12.0	65.0
	Private	-	-	-	-	-
	Total	21.0	4,293.0	53.0	12.0	65.0
Provincial Total	Public	327.0	107,533.0	1,604.0	327.0	1,931.0
	Private	20.0	6,875.0	127.0	-	127.0
	Total	347.0	114,408.0	1,731.0	327.0	2,058.0

Table 4.2.3 Number of Public Toilets Facilities

Name of Municipality	Public Markets			Bus/Jeepney Terminals			Parks/Playground			Total Number of Toilets
	No.of Sanitary Toilets	No. of Unsanitary Toilets	Sub-total	No.of Sanitary Toilets	No. of Unsanitary Toilets	Sub-total	No.of Sanitary Toilets	No. of Unsanitary Toilets	Sub-total	
Baganga	1	1	2	1	1	2	1	1	2	6
Banaybanay	1		1	1	1	2	1		1	4
Boston	1	1	2		1	1		1	1	4
Caraga	1	1	2		1	1		1	1	4
Cateel		1	1		1	1	1	1	2	4
Gov. Generoso		1	1		1	1	1		1	3
Lupon	1		1		1	1	1		1	3
Manay	1		1		1	1	1		1	3
Mati (Capital)	1	1	2	1		1	3		3	6
San Isidro	1		1	1	1	2	1		1	4
Tarragona	1		1							1
Provincial Total	9	6	15	4	9	13	10	4	14	42