

JAPAN INTERNATIONAL COOPERATION AGENCY

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

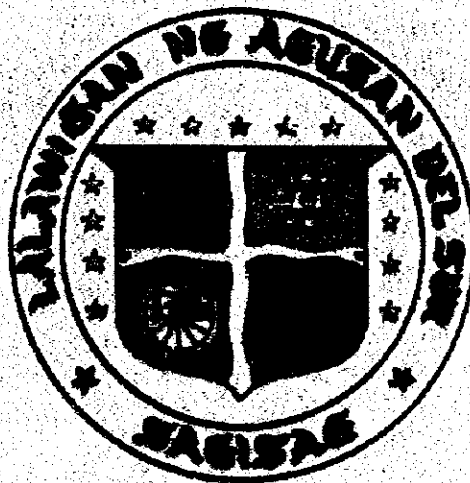
THE STUDY ON THE  
PROVINCIAL WATER SUPPLY, SEWERAGE AND  
SANITATION SECTOR PLAN  
IN  
THE REPUBLIC OF THE PHILIPPINES

VOLUME II - (2)

SUPPORTING REPORT

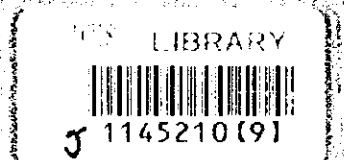
PROVINCIAL WATER SUPPLY, SEWERAGE AND  
SANITATION SECTOR PLAN  
FOR THE PROVINCE OF

AGUSAN DEL SUR



OCTOBER 1998

NIPPON JOGESUIDO SEKKEI CO., LTD.



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EXCHANGE RATE (As of 31 August 1998)

US\$ 1.00 = Peso 39.38 = Yen 137.84

100

100

100



1145210(9)

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**OCTOBER 1998**

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

**VOLUME II SUPPORTING REPORT**

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

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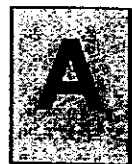
# PROVINCIAL WATER SUPPLY, SEWERAGE AND SANITATION SECTOR PLAN

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**BACKGROUND INFORMATION  
AND EXISTING CONDITIONS**






- 1. INTRODUCTION
- 1.3 The Provincial Plan for the Province of Agusan del Sur
- 1.3.1 Preparation of the Plan

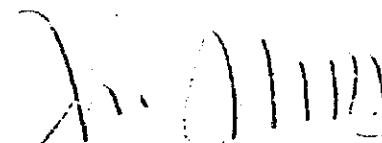
**MINUTES OF DISCUSSIONS**  
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**FOR**  
**VISAYAS AND MINDANAO**  
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**AGREED UPON BETWEEN**  
**THE DEPARTMENT OF THE INTERIOR AND**  
**LOCAL GOVERNMENT**  
**AND**  
**THE STUDY TEAM OF**  
**JAPAN 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 1<sup>st</sup> batch and 2<sup>nd</sup> batch (refer to I. 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 1<sup>st</sup> batch provinces of Misamis Oriental and Surigao del Sur prompted their transfer to the 2<sup>nd</sup> batch. Instead, Davao del Sur and Davao Oriental from the 2<sup>nd</sup> 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.

1 <sup>st</sup> BATCH	2 <sup>nd</sup> BATCH	3 <sup>rd</sup> BATCH	4 <sup>th</sup> 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
		6. Western Samar	Occidental

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 2<sup>nd</sup> 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 1<sup>st</sup> and 2<sup>nd</sup> batches and 1998 for 3<sup>rd</sup> and 4<sup>th</sup> 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 1<sup>st</sup> 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.

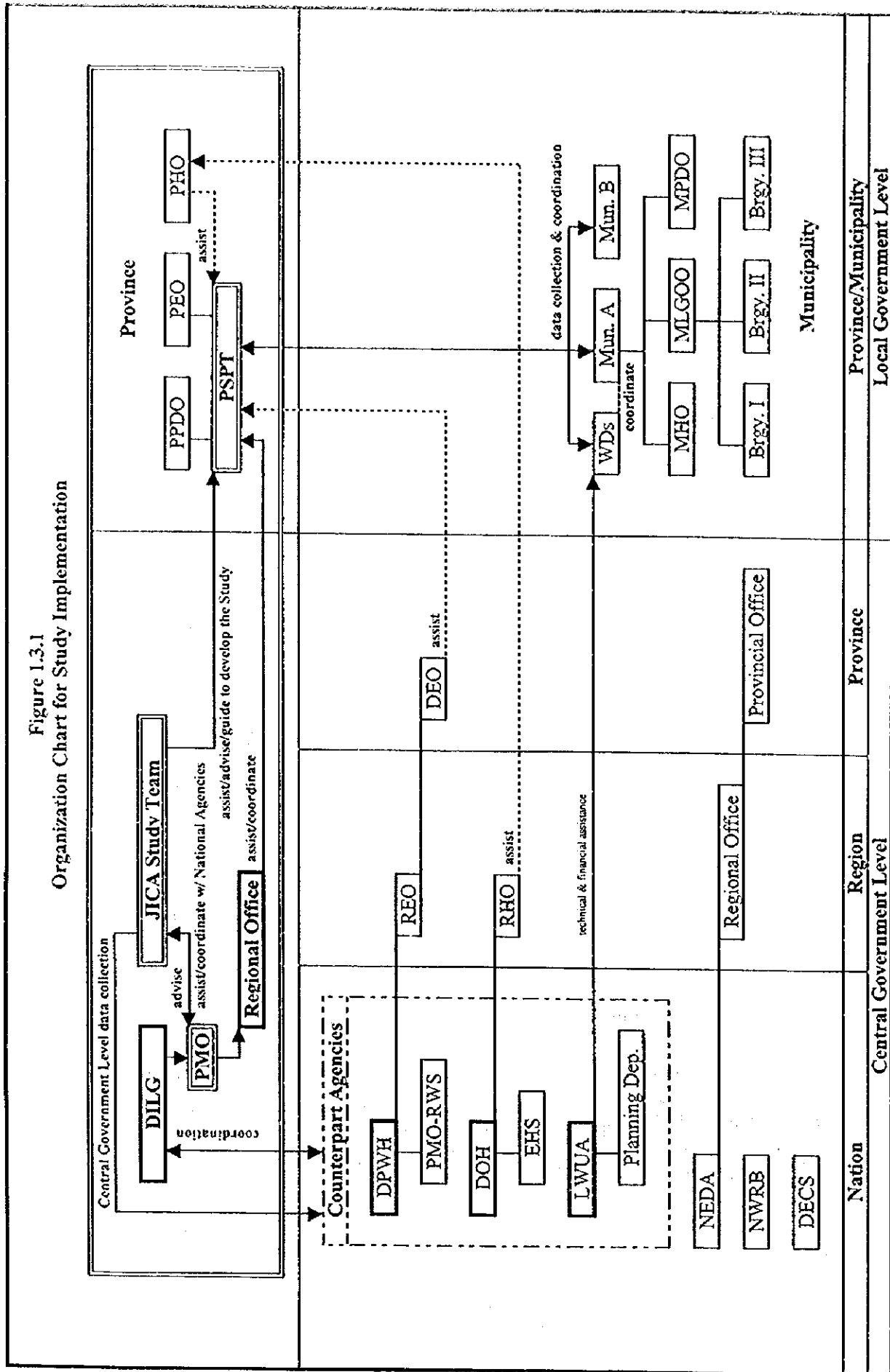
The JICA Study Team shall:

- (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**


<b><u>ATTENDEES</u></b>	<b><u>DESIGNATION</u></b>
<b>A. DJLG</b>	
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>B. Other Agencies</b>	
1. Mr. Sam Siao	Officer, PMO-RWS, DPWH
2. Dr. Mario Villaverde	Director, EHS, DOH
<b>C. JICA Advisory Committee</b>	
1. Ms. Keiko Yamamoto	Chairman, Advisory Committee
2. Mr. Keiichi Kanaya	Member, Advisory Committee
<b>D. JICA Headquarters</b>	
1. Mr. Shigeyuki Matsumoto	Second Development Study Division, Social Development Study Dept.
<b>E. JICA Study Team</b>	
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

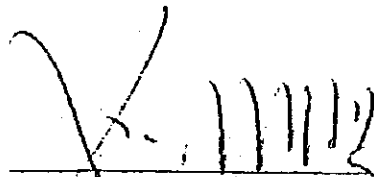


**MINUTES OF DISCUSSIONS**  
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**AND**  
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**JAPAN INTERNATIONAL COOPERATION AGENCY**

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, NEBA, 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 1<sup>st</sup> 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 2<sup>nd</sup> 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 2<sup>nd</sup> Batch

The total number of provinces for the 2<sup>nd</sup> 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 1<sup>st</sup> 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 2<sup>nd</sup> 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:

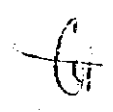
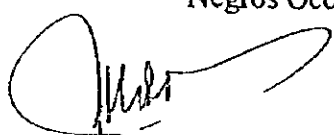
- 1) The summary reports on the sector status prepared by NEDA Regional Office through UNICEF fund were field confirmed as the materials to provide approximate sector situations in the fact of no existence of sector related information at present.
- 2) Data collection by PSPTs had sometimes to be done 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

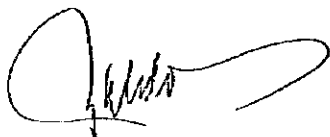
Of the three classes of cities in the Local Government Code, only component cities, which are under the jurisdiction of the provincial government will be considered. The subject cities are as follows:

<u>Province</u>	<u>Component City</u>
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



## LIST OF ATTENDEES IN THE SERIES OF DISCUSSION

<u>ATTENDEES</u>	<u>DESIGNATION</u>
<i>A. DILG</i>	
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
<i>B. JICA Study Team</i>	
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.

<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 2.6.1 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	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	
2.	Provincial Sector Target	<i>Sanitation</i>		
		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.	Medium Term Plan	<i>Water Supply</i>		
		Urban Water Supply	% of Population	
		Rural Water Supply	% of Population	
		<i>Sanitation</i>		
		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	<i>Water Supply</i>		
		Urban Water Supply	% of Population	
		Rural Water Supply	% of Population	
		<i>Sanitation</i>		
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		
6.	Level I, II and Public Toilet		% of Construction Cost	
	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/Percentages 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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		Deep Well				
		Spring				
	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	<b>Level III System</b>						
	Feasibility Study and Detail Design						
	Construction & Supervision Community Development & Training						
Rural Water Supply	<b>Level I Facility</b>						
	Detail Design						
	Construction & Supervision						
	Community Development & Training						
Sanitation	<b>Level II System</b>						
	Detail Design						
	Construction & Supervision						
	Community Development & Training						
	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 (%)
<b>Provincial Total</b>		

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					
<i>Level II</i>					
<i>Level I</i>					
Deep Well - 40 meter depth					
Deep Well - 80 meter depth					
Deep Well - 120 meter depth					
Shallow Well - 18 meter depth					
Spring Development					
<i>Rehabilitation Cost for Level I Deep Well</i>					
<i>Disinfection of Level I Wells</i>					
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 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	< % < 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	Agusan del Sur				CARAGA REGION	
	Total Families		Annual Income		Total Number of Families	Annual Income Average (Pesos)
	Number	Share	Total (P '000.00)	Average (Pesos)		
Under 20,000	10,123	14	176,367	17,422	47,687	17,398
20,000 - 29,999	22,618	32	619,065	27,371	90,476	28,430
30,000 - 39,999	15,415	22	606,160	39,324	64,408	38,042
40,000 - 59,999	14,848	21	765,370	51,547	81,931	54,243
60,000 - 99,999	4,796	7	439,786	91,693	54,889	88,626
100,000 - 249,999	3,327	5	539,335	162,089	20,684	146,067
250,000 and over	372	1	161,718	435,078	2,246	451,654

Source: 1994 Family Income and Expenditures Survey by NSO

Notes:

- (1) Derived from Region X FIES.
- (2) Based on NEDA and other agencies, poverty threshold in Region X was estimated at P=43,659 (P 7,938 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 has a common arrangement of food preparation and consumption.

Table 3.3.2 Employment by Major Industry Group 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	Worked With Pay in Own Family Operated Farm or Business	Worked Without Pay in Own Family Operated Farm or Business	Not Reported
Agriculture, Hunting and Forestry	168,923	84	9,510	118	71,708	3,632	68	83,465	338
Fishing	659	5	25	0	365	10	0	252	2
Mining and Quarrying	2,014	3	1,004	3	667	13	0	318	6
Manufacturing	2,980	32	1,521	13	794	134	10	458	18
Electricity, Gas and Water	282	2	207	18	47	3	0	5	0
Construction	2,401	27	1,945	109	290	8	0	13	9
Trade	11,618	22	1,804	8	6,784	543	27	2,415	15
Services	33,459	6,093	7,237	11,232	6,304	482	13	2,021	77
Not Stated	444	9	68	10	50	2	1	157	147
<b>Provincial Total</b>	<b>222,780</b>	<b>6,277</b>	<b>23,322</b>	<b>11,512</b>	<b>87,008</b>	<b>4,826</b>	<b>119</b>	<b>89,104</b>	<b>0</b>

Source: 1995 NSO Socioeconomic and Demographic Characteristic

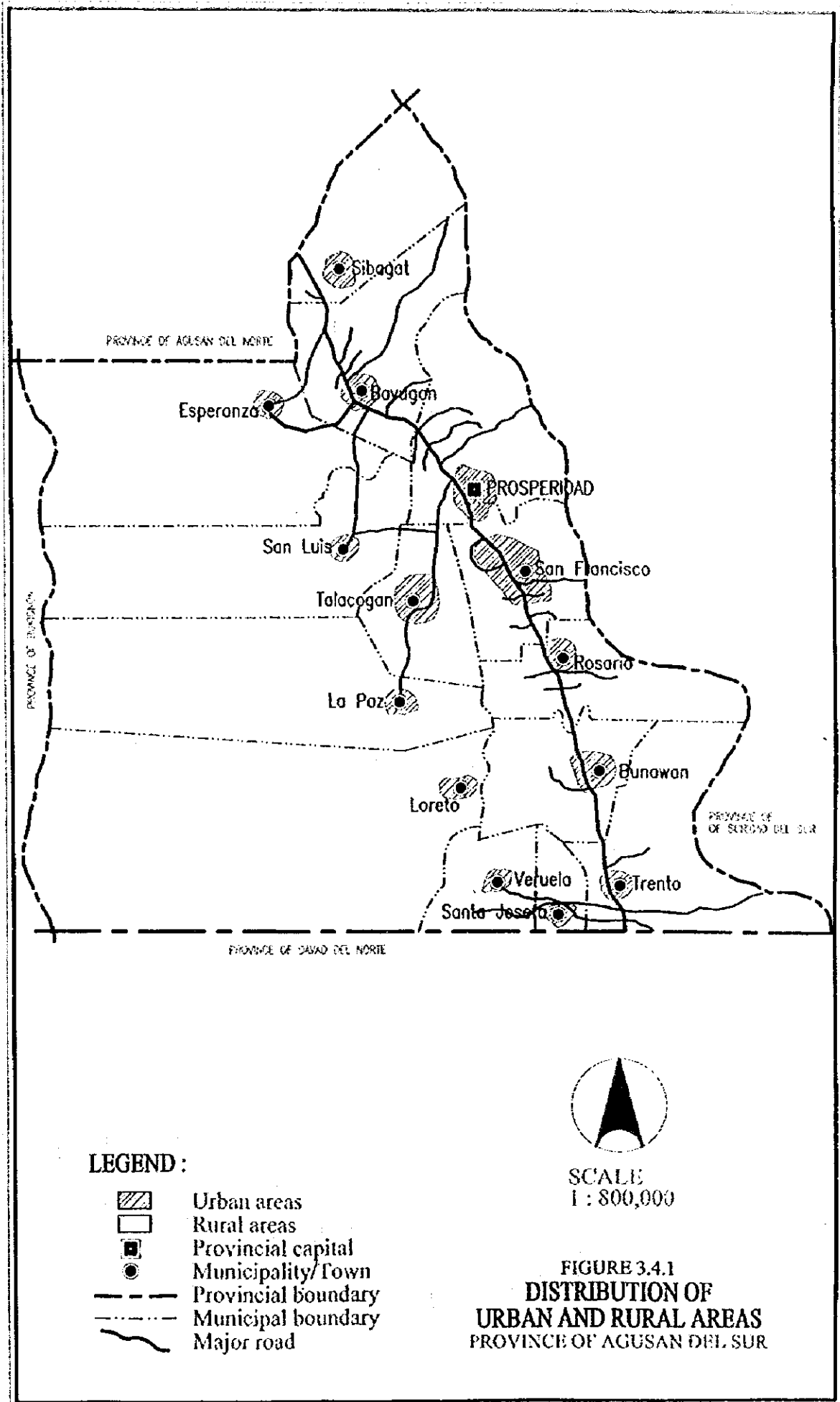
### 3.3.3 Education

Table 3.3.3 Household Population by Highest Educational 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	43,892	33,596	1,079	1,167	1,009	7,023
Pre-school	17,026	16,360	88	85	73	420
Elementary						
1st - 4th Grade	129,833	78,328	7,206	6,777	6,297	31,225
5th - 7th Grade	104,576	71,216	10,897	11,524	10,301	38,494
High School						
Undergraduate	68,171	28,632	10,096	8,235	6,333	14,875
Graduate	31,145	4,989	6,547	5,731	4,700	9,178
Post Secondary						
Undergraduate	549	73	178	106	91	101
Graduate	2,783	141	732	643	486	781
College Undergraduate	16,923	3,159	4,435	2,638	2,232	4,459
Academic Degree Holder	12,252	82	1,984	2,643	2,447	5,096
Post-Baccalaureate	794	1	76	136	124	457
Not Stated	4,079	3,002	239	166	142	530
<b>Total</b>	<b>432,023</b>	<b>239,579</b>	<b>43,557</b>	<b>39,851</b>	<b>34,235</b>	<b>112,639</b>

Source: 1995 NSO Socioeconomic and Demographic Characteristic

3.4 Population  
 3.4.2 Classification of Urban and Rural Areas



DISK NAME : AGUSAN DEL SUR(DISK1)  
 FILENAME : AGUSAN-DELSUR(DISTRIBUTION)

### 3.5 Health Status

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

Health Facilities and Practitioners	Agusan del Sur		Philippines	
	Number	Ratio	Number	Ratio
<b>Health Facilities</b>				
Hospital	15	1/35,921	1,700	1/40,206
Rural Health Units	14	1/38,487	2,335	1/29,272
Barangay Health Station	111	1/4,854	11,646	1/5,869
<b>Practitioners</b>				
Doctors	13	1/41,447	6,913	1/9887
Nurses	24	1/22,451	8,849	1/7,724
Midwives	133	1/4,051	10,831	1/6,311
Dentists	8	1/67,352	1,895	1/36,068
Others Medical Practitioner	27	1/19,956		

Source: PSPT and 1997 Philippine Statistical Yearbook.

### 3.6 Environmental Conditions

#### 3.6.2 Water Pollution

Table 3.6.1 Types of Drainage Facilities, (year)

Type	Length (km)
Drainage Main	7
Open Channel (with Concrete & rubble masonry)	10
Open Ditches & Unlined Laterals	35
Reinforced Concrete Circular Pipes	5
Street Gutters	9
Outfalls to rivers from drainage mains	12

Source: PSPT

**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 <sup>(D)</sup> (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
Dissolve Oxygen <sup>(B)</sup> (Minimum)	%satn	70	70	70	60	40
	mg/L	5.0	5.0	5.0	5.0	3.0
5-Day 20°C BOD	mg/L	1	5	5	7(10)	10(15)
Total Suspended Solids	mg/L	25	50			
Total Dissolved Solids	mg/L	500	1,000	--	--	1,000
Surfactants (MBAS)	mg/L	nil	0.2(0.5)	0.3(0.5)	0.5	--
Oil/Grease (Petroleum Ether Extract)	mg/L	nil	1	1	2	5
Nitrate as Nitrogen	mg/L	1	10	NR	10	--
Phosphate as 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 aquatic 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.

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3

4

#### 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

Name of Municipality	Name of Operating Body	Level III Service								
		Number of Barangays Served			Number of Households Served			Number of Population Served		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Dayugan	Calaitan		1	1		30	30		180	180
	San Juan		1	1		20	20		160	160
	<b>Municipal Total</b>		2	2		50	50		340	340
Bunawan	Bunawan WD	1		1	250		250	1,296		1,296
Esperanza	Poblacion	1		1	110		110	660		660
	Santa Fe		1	1		70	70		420	420
	<b>Municipal Total</b>	1	1	2	110	70	180	660	420	1,080
Prosperidad	Patin-ay		1	1		165	165		990	990
	Prosperidad WD	1	4	5	624	150	774	3,276	804	4,080
	San Jose		1	1		49	49		294	294
	<b>Municipal Total</b>	1	6	7	624	364	988	3,276	2,088	5,364
Rosario	Rosario WSS	1	6	7	373	177	550	3,029	5,605	8,634
San Francisco	Bayugan 2	1		1	202		202	1,212		1,212
	Karaus		1	1		212	212		1,166	1,166
	San Francisco WD	5	7	12	1,764	222	1,986	9,579	1,157	10,736
	San Isidro		1	1		205	205		1,157	1,157
	<b>Municipal Total</b>	6	9	15	1,966	639	2,605	10,791	3,480	14,271
Santa Josefa	Santa Josefa	1		1	148		148	888		888
Sibagat	Sibagat	1	1	2	111	52	163	623	290	913
Trento	Pulang-lupa		1	1		83	83		500	500
<b>Provincial Total</b>		12	26	38	3,582	1,435	5,017	20,563	12,723	33,286

Name of Municipality	Name of Operating Body	Level II Service								
		Number of Public Faucets			Number of Households Served			Number of Population Served		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Bayugan	Calaitan		6	6		60	60		322	322
	San Juan		15	15		150	150		804	804
	<b>Municipal Total</b>		21	21		210	210		1,126	1,126
Bunawan	Bunawan WD									
Esperanza	Poblacion									
	Santa Fe									
	<b>Municipal Total</b>									
Prosperidad	Patin-ay		113	113		307	307		1,842	1,842
	Prosperidad WD									
	San Jose		12	12		240	240		1,440	1,440
	<b>Municipal Total</b>		125	125		547	547		3,282	3,282
Rosario	Rosario WSS		21	21		176	176		954	954
San Francisco	Bayugan 2	26		26	216		216	1,296		1,296
	Karaus		23	23		138	138		759	759
	San Francisco WD		13	13		78	78		406	406
	San Isidro		32	32		192	192		1,084	1,084
	<b>Municipal Total</b>	26	68	94	216	408	624	1,296	2,249	3,545
Santa Josefa	Santa Josefa									
Sibagat	Sibagat		5	5		85	85		474	474
Trento	Pulang-lupa									
<b>Provincial Total</b>		26	240	266	216	1,426	1,642	1,296	8,085	9,381

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

Name of Municipality	Name of Operating Body	Water Sources			Consumption			
		Type <sup>1</sup>	Number	Production (cu.m/day)	Domestic	Institutional	Commercial	Industrial
					(cu.m/day)			
Bayugan	Calaitan	SP	1	72.0	37.00			
	San Juan	SP	1	518.4	64.00			
	<b>Municipal Total</b>		<b>2</b>	<b>590.4</b>	<b>101.00</b>			
Bunawan	Bunawan WD	SP	1	327.1	93.67	8.17	37.70	
Esperanza	Poblacion	DW	1	86.4	66.00			
	Santa Fe	DW	1	72.0	23.00			
	<b>Municipal Total</b>		<b>2</b>	<b>158.4</b>	<b>89.00</b>			
Prosperidad	Patin-ay	SP	1	378.0	209.00	7.00		
	Prosperidad WD	SP	2	3,456.0	365.00	1.70	64.00	
	San Jose	SP	1	864.0	202.00			
	<b>Municipal Total</b>		<b>4</b>	<b>4,698.0</b>	<b>776.00</b>	<b>8.70</b>	<b>64.00</b>	
Rosario	Rosario WSS	SP	2	3,168.0	386.00		0.50	
San Francisco	Bayugan 2	SP	2		128.80			
	Karaus	SP	2	2,016.0	173.00			
	San Francisco WD	SP	9	20,553.6	908.00		237.00	
	San Isidro	SP	4	1,944.0	188.00			
	<b>Municipal Total</b>		<b>17</b>	<b>24,513.6</b>	<b>1,397.80</b>		<b>237.00</b>	
Santa Josefa	Santa Josefa	DW	1	56.9	56.85			
Sibagat	Sibagat	SP	1	864.0	98.00			
Trento	Pulang-lupa	DW	1	80.0	80.00			
<b>Provincial Total</b>			<b>31</b>	<b>34,456.4</b>	<b>3,078.32</b>	<b>16.87</b>	<b>339.20</b>	

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

Name of Municipality	Name of Operating Body	Consumers												
		Domestic House Connections			Domestic Public Faucets			Institutional Consumers		Commercial Consumers		Industrial Consumers		
		Connection Metered	Unmetered	Consumption (m <sup>3</sup> /day)	Connection Metered	Unmetered	Consumption (m <sup>3</sup> /day)	Connection Metered	Unmetered	Consumption (m <sup>3</sup> /day)	Connection Metered	Unmetered	Consumption (m <sup>3</sup> /day)	
Bayugan	Calaitan		30	18.00		6	19.00							
	San Juan		26	16.00		15	48.00							
	<b>Municipal Total</b>		<b>56</b>			<b>21</b>								
Bunawan	Bunawan WD	179		93.67			8		8.17	63		37.70		
Esperanza	Poblacion	110		66.00										
	Santa Fe	70		23.00										
	<b>Municipal Total</b>	<b>186</b>		<b>89.00</b>										
Prosperidad	Patin-ay	138	27	99.00	99	14	110.00	15	12	7.00				
	Prosperidad WD	601	8	365.00			37		1.70	128		64.00		
	San Jose	49		116.00		12	86.00							
	<b>Municipal Total</b>	<b>739</b>	<b>84</b>	<b>580.00</b>	<b>99</b>	<b>26</b>	<b>196.00</b>	<b>52</b>	<b>12</b>	<b>8.70</b>	<b>128</b>		<b>64.00</b>	
Rosario	Rosario WSS	545	4	329.00	1	20	57.00	3	3		1	0.50		
San Francisco	Bayugan 2	202		121.00	26		7.80							
	Karaus		212	127.00		23	45.00							
	San Francisco WD	1,513		908.00	13					473		237.00		
	San Isidro		205	123.00		32	65.00							
	<b>Municipal Total</b>	<b>1,715</b>	<b>417</b>	<b>1,279.00</b>	<b>39</b>	<b>55</b>	<b>118.80</b>			<b>473</b>		<b>237.00</b>		
Santa Josefa	Santa Josefa	148		56.85										
Sibagat	Sibagat	163		98.00										
Trento	Pulang-lupa		83	80.00										
<b>Provincial Total</b>		<b>3,669</b>	<b>638</b>	<b>2,639.52</b>	<b>139</b>	<b>122</b>	<b>438.80</b>	<b>63</b>	<b>15</b>	<b>16.87</b>	<b>663</b>		<b>339.20</b>	



#### 4.1.4 Level II System

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				
		Type	Number	Discharge (m <sup>3</sup> /day)	Length of Transmission Line (meter)	Reservoir		Length of Distribution Line (meter)	Number of Public Faucets
						Number	Volume (m <sup>3</sup> )		
Bayugan	Berseba	SP	1	43.20	480	1	20.00	60	2
	Fili	SP	1	51.84	1,500	1	30.00	3,000	6
	Katipunan	SP	1	43.20	700	1	10.00	30	2
	Mabuhay	SP	1	120.96	3,800			600	13
	Osmeña	SP	1	259.20	1,000	1	30.00	2,500	5
	Tagubay	SP	1	86.40	1,500	1	30.00	1,600	6
	Wawa	SP	1	216.00	500	2	40.00	1,000	5
<b>Municipal Total</b>			<b>7</b>	<b>820.80</b>	<b>9,480</b>	<b>7</b>	<b>160.00</b>	<b>8,790</b>	<b>39</b>
Bunawan	B. Brook - Simuñao, Guitas & E	SP	1	480.00	200	1	38.00	800	5
	Bunawan Brook	SP	1	62.21	800				2
	Imelda & Libertad	SP	1	172.80	4,000	1	35.00	1,100	9
	San Andres	SP	1	276.00		1	38.00	200	3
	San Teodoro, Ascat	SP	1	288.00	600	1		200	4
	San Teodoro, Binahanan	SP	1	224.64	4,500	1	50.00	1,000	9
	San Teodoro, Clemente	SP	1	240.00	200	1	32.00		3
<b>Municipal Total</b>			<b>7</b>	<b>1,743.65</b>	<b>10,300</b>	<b>6</b>	<b>193.00</b>	<b>3,300</b>	<b>35</b>
Esperanza	Duagan	SP	1	51.84	700	1	3.93	350	3
	Maasin	SP	1	82.80	1,800	1	10.00	580	3
	Maliwanag	SP	1	86.40	1,000	1	3.00	580	2
	San Jose	SP	1	17.28	2,500	1	4.00	900	3
	Taganahaw BWSA	SP	1	51.84	804			906	4
<b>Municipal Total</b>			<b>5</b>	<b>290.16</b>	<b>6,804</b>	<b>4</b>	<b>20.93</b>	<b>3,316</b>	<b>15</b>
Loreto	Poblacion, Loreto	SP	1		70	1	74.00	5,000	4
	Kasapa	SP	1			1	18.00	150	5
	Sabud	SP	1			1	18.00	1,700	6
	Waloc	SP	1			1	12.00	1,900	12
<b>Municipal Total</b>			<b>4</b>	<b>0.00</b>	<b>70</b>	<b>4</b>	<b>122.00</b>	<b>8,750</b>	<b>27</b>
Rosario	Bayugan 3	SP	1	240.00	2,500	1	27.00	2,000	20
	Maligaya	Surf	1	10.00	2,000	1	37.69		11
	Marfil	SP	1	1,123.20	1,000	1	34.35	2,000	12
<b>Municipal Total</b>			<b>3</b>	<b>1,373.20</b>	<b>5,500</b>	<b>3</b>	<b>99.04</b>	<b>4,000</b>	<b>43</b>
San Luis	Mahagsay	SP	1	95.04	500	1	8.00	36	2
	Mahayahay	SP	1	95.04	500	1	8.00	36	2
	Muritula	SP	1	21.60	800	1	8.00	36	4
<b>Municipal Total</b>			<b>3</b>	<b>211.68</b>	<b>1,800</b>	<b>3</b>	<b>24.00</b>	<b>108</b>	<b>8</b>
Sibagat	Afga	SP	3	69.12	860	3	24.37	1,500	8
	Banag-banag	SP	1	51.84	1,000	1	8.00	2,500	4
	El Rio	SP	1	77.76	250	1	10.00	3,000	10
	Kioya	SP	1	43.20	1,000	1	1.80	3,500	2
	Kolambugan	SP	1	69.12	500	1	6.00	1,500	7
	Magsaysay, Sibagat	SP	1	34.56	1,000	1	1.80	2,500	4
	New Tubigon	SP	1	69.12	800	1	6.00	1,500	8
	Padi-ay	SP	1	69.12	1,000	1	6.00	2,500	8
	Perez	SP	1	17.28	1,000	1	1.80	2,000	2
	San Vicente	SP	1	120.96	30			1,700	6
	Santa Cruz, Sibagat	SP	1	69.12	800	1	6.00	2,500	4
	Tag-uyango	SP	1	51.84	500	1	1.80	3,000	2
	<b>Municipal Total</b>			<b>14</b>	<b>743.04</b>	<b>8,740</b>	<b>13</b>	<b>73.57</b>	<b>27,700</b>
Talacogon	Buena Gracia BWSA	SP	1	21.60	150	1	20.00	60	2
	Culi	SP	1	4.20	250	1	3.00		2
	Del Monte WW	SP	1	14.50	1,800	1	14.00		8
	San Isidro BWSA	SP	1	16.00	700			150	2
	San Nicolas BWSA	SP	1	36.00	2,500	1	15.00	600	2
	Zillovia BWSA	DW	1	43.20	100	1	60.00	1,000	8
<b>Municipal Total</b>			<b>6</b>	<b>92.30</b>	<b>5,400</b>	<b>4</b>	<b>52.00</b>	<b>810</b>	<b>16</b>
Trento	Santa Maria	SP	1	57.60	2,600	1	40.00	1,400	96
Venueta	Binongan	SP	1	88.80	1,890			400	2
	Limot	SP	1		480			480	2
	Masayan BWSA	SP	1	95.04	300			60	2
	Magsaysay	SP	1	64.80	4,500			150	6
	Poblacion	SP	1	69.12	2,000	1	21.60	1,000	6
	Sampaguita	SP	1	276.00	2,000	1	8.60	300	3
	Sampaguita, Kawayan	SP	1		2,000	1	8.60	280	3
	Santa Cruz	SP	1	158.40	4,500			600	2
	Sawagan BWSA	SP	1	345.60	3,500	1	30.00	500	8
<b>Municipal Total</b>			<b>9</b>	<b>1,097.76</b>	<b>21,170</b>	<b>4</b>	<b>68.80</b>	<b>3,770</b>	<b>34</b>
<b>Provincial Total</b>			<b>59</b>	<b>6,473.39</b>	<b>71,964</b>	<b>50</b>	<b>913</b>	<b>62,944</b>	<b>386</b>

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	
Bayugan	Berseba		1	1		112	112		608	608	
	Fili		1	1		140	140		760	760	
	Katipunan		1	1		98	98		532	532	
	Mabuhay		1	1		195	195		1,059	1,059	
	Osmeña		1	1		158	158		858	858	
	Tagubay		1	1		90	90		489	489	
	Wawa		1	1		158	158		858	858	
	<b>Municipal Total</b>		7	7		951	951		5,164	5,164	
Bunawan	B Brook - Simulao, Guita		1	1		109	109		520	520	
	Bunawan Brook		1	1		46	46		239	239	
	Imelda & Libertad		2	2		416	416		2,163	2,163	
	San Andres		1	1		200	200		1,040	1,040	
	San Teodoro, Ascat	1		1	62		62	309		309	
	San Teodoro, Binahanan	2		2	480		480	2,395		2,395	
	San Teodoro, Clemente	1		1	80		80	399		399	
	<b>Municipal Total</b>	4	5	9	622	762	1,384	3,103	3,962	7,065	
Esperanza	Duagan		1	1		48	48		267	267	
	Maasin		1	1		180	180		1,003	1,003	
	Maliwanag		1	1		58	58		323	323	
	San Jose		1	1		80	80		446	446	
	Taganahaw BWSA		1	1		63	63		351	351	
		<b>Municipal Total</b>		5	5		429	429		2,390	2,390
Loreto	Poblacion, Loreta	1		1	60		60	340		340	
	Kasapa		1	1		30		165		165	
	Sabud		1	1		79		435		435	
	Waloe		1	1		218		1,201		1,201	
		<b>Municipal Total</b>	1	3	4	60	327	387	340	1,801	2,141
Rosario	Bayugan 3		1	1		250	250		1,317	1,317	
	Maligaya		1	1		104	104		570	570	
	Marfil		1	1		303	303		1,660	1,660	
		<b>Municipal Total</b>		3	3		657	657		3,547	3,547
San Luis	Mahagsay		1	1		93	93		499	499	
	Mahayahay		1	1		97	97		521	521	
	Muritula		1	1		56	56		301	301	
		<b>Municipal Total</b>		3	3		246	246		1,321	1,321
Sibagat	Afga		1	1		125	125		750	750	
	Banag-bonag		1	1		99	99		591	591	
	El Rio		1	1		215	215		1,287	1,287	
	Kioya		1	1		121	121		726	726	
	Kolambugan		1	1		63	63		378	378	
	Magsaysay, Sibagat		1	1		36	36		216	216	
	New Tubigon		1	1		140	140		840	840	
	Padi-ay		1	1		249	249		1,493	1,493	
	Perez		1	1		138	138		828	828	
	San Vicente		1	1		124	124		744	744	
	Santa Cruz, Sibagat		1	1		60	60		360	360	
	Tag-uyango		1	1		101	101		607	607	
		<b>Municipal Total</b>		12	12		1,471	1,471		8,820	8,820
Talacogon	Buena Gracia BWSA		1	1		20	20		109	109	
	Culi		1	1		20	20		109	109	
	Del Monte WW	1		1	850		850	4,751		4,751	
	San Isidro BWSA	1		1	20		20	109		109	
	San Nicolas BWSA	1		1	120		120	671		671	
	Zillovia BWSA	1		1	80		80	447		447	
		<b>Municipal Total</b>	4	2	6	1,070	40	1,110	5,978	218	6,196
Trento	Santa Maria	1		1	80		80	423		423	
Veruela	Binongan		1	1		60	60		328	328	
	Limot		1	1		60	60		328	328	
	Masayan BWSA		1	1		20	20		109	109	
	Magsaysay		1	1		180	180		983	983	
	Poblacion	1		1	225		225	1,251		1,251	
	Sampaguita		1	1		200	200		1,092	1,092	
	Sampaguita, Kawayan		1	1		100	100		546	546	
	Santa Cruz		1	1		40	40		218	218	
	Sawagan BWSA		1	1		80	80		437	437	
		<b>Municipal Total</b>	1	8	9	225	740	965	1,251	4,041	5,292
<b>Provincial Total</b>		11	48	59	2,057	5,623	7,680	11,095	31,264	42,359	

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 Water Pressure (% of total)	
		Supply (ltrs/day)	Dirty Water <sup>1</sup>	Taste or Smell <sup>2</sup>	Supply Interruption (number/month)				Adequate	Inadequate	
				Power Failure	Pump Breakdown	Pipe Burst	Others				
Bayugan	Berseba	24		G					50	50	
	Fili	24		G					40	60	
	Kaipunan	24		G					100		
	Mabuhay	24		G					25	75	
	Osmeha	24		G			2		100		
	Tagubay	24		G					100		
	Wawa	24	O	G			3		100		
Bunawan	B. Brook - Simulao, Guitas & B.	24		G					100		
	Bunawan Brook	24		G							
	Imelda & Libertad	24		G							
	San Andres	24		G							
	San Teodoro, Ascat	24		G							
	San Teodoro, Binahanan	24		G							
	San Teodoro, Clemente	24		G							
Esperanza	Duagan	24		G				2	80	20	
	Maasin		O	G				2	70	30	
	Maliwanag	24	O	G					70	30	
	San Jose	24	O	G				3	70	30	
	Taganhaw BWSA	24		G							
Loreto	Poblacion, Loreta										
	Kasapa								100		
	Sabud										
	Waloe								100		
Rosario	Bayugan 3	24	O	G					90	10	
	Maligaya	1		G					90	10	
	Marfil	24							100		
San Luis	Mahagsay		O	G				1	100		
	Mahaythay			G					100		
	Muritiba	12		G					100		
Sibagat	Afaga	24		G							
	Banag-banag	24		G							
	El Rio	24		G							
	Kioya	24		O							
	Kolambugan	24		G							
	Magsaysay, Sibagat	24		G							
	New Tubigon	24		G							
	Padi-ay	24		G							
	Perez	24		G							
	San Vicente	24		G				4			
	Santa Cruz, Sibagat	24		G							
Tag-uyango	24		G								
Talacogon	Buena Gracia BWSA	8							2	98	
	Culi	6							100		
	Del Monte WW	5		G							
	San Isidro BWSA	3							2	98	
	San Nicolas BWSA	24							2	98	
	Zillovia BWSA	3							8	92	
Irento	Santa Maria	24	E	G						50	
Veruela	Binongan	24						1	100		
	Limot								100		
	Massayan BWSA	24							2	98	
	Magsaysay	24							2	98	
	Poblacion	24	O	G					80	20	
	Sampaguita	24						1	100		
	Sampaguita, Kawayan							1	70	30	
	Santa Cruz	24						1	100		
Sawagan BWSA	24							8	92		

Note: 1. Dirty Water: E - Everyday, OW - Once a week, OM - Once a month, O - Occasional.  
2. Taste or 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/CFO	DEO	Others	
Bayugan	Berseba								Brgy.	
	Fili	2			2				BWSA	
	Katipunan								Brgy.	
	Mabuhay				8				Caretaker	
	Osmeña								Brgy.	
	Tagubay								Brgy.	
Bunawan	Wawa								Brgy.	
	B Brook - Simulao, Guitas & Babadan								Caretaker	
	Bunawan Brook			2	2					
	Inieña & Libertad			9	9				Caretaker	
	San Andres									
	San Teodoro, Ascot								Brgy.	
Esperanza	San Teodoro, Binahanan			5	5				Caretaker	
	San Teodoro, Clemente								Brgy.	
	Duagan	Managed by Barangay Official								
	Maasin	Managed by Barangay Official								
	Maliwanag	Managed by Barangay Official								
	San Jose	Managed by Barangay Official								
Loreto	Tagannah BWSA			4	4				BWSA	
	Poblacion, Loreta								Brgy.	
	Kasapa								Brgy.	
	Sabud								Brgy.	
Rosario	Wakoe								Brgy.	
	Bayugan 3	1			1				Brgy.	
	Maligaya				1				Caretaker	
San Luis	Marfil	Managed by Barangay Official								
	Mahagsay								Caretaker	
	Mahayahay								Brgy.	
Sibagat	Murihula								Brgy.	
	Afga	Managed by Barangay Official								
	Banag-banag	Managed by Barangay Official								
	El Rio	Managed by Barangay Official								
	Kioya	Managed by Barangay Official								
	Kolambugan	Managed by Barangay Official								
	Magsaysay, Sibagat	Managed by Barangay Official								
	New Tubigon	Managed by Barangay Official								
	Padi-ay	Managed by Barangay Official								
	Perez	Managed by Barangay Official								
San Vicente	Managed by Barangay Official									
Talicegon	Santa Cruz, Sibagat	Managed by Barangay Official								
	Tag-uyango	Managed by Barangay Official								
	Buena Gracia BWSA		4	1	5				Caretaker	
	Culi		1		1				Brgy.	
	Del Monte WW								Assn.	
	San Isidro BWSA		4	1	5				Caretaker	
Trento	San Nicolas BWSA		4	1	5				Caretaker	
	Zillovia BWSA		4	1	5				Caretaker	
	Santa Maria		4		4					
	Veruela	Santa Maria		4		4				
		Binongan	Managed by Barangay Official							
Limot		Managed by Barangay Official								
Masayan BWSA			4	1	5				Caretaker	
Magsaysay			4	1	5					
Poblacion		Municipal Government								
Sampaguita		Municipal Government								
Sampaguita, Kawayan		Managed by barangay Official								
Santa Cruz	Managed by barangay Official									
Veruela	Sawagan BWSA		4	1	5				Caretaker	
	Sawagan BWSA		4	1	5				Caretaker	

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

Name of Municipality	Name of Operating Body	Annual	Wages	Fuel, Chem. M&M	Expenditures (P'000,000/year)	Repairs	Loan Repayment	Other	Consumer Payments (Year)	Cost per Pail	Cost per Cu. Meter (P/pcu)	Cost per HH	Other	Average Collection Efficiency (%)	
Bayugan	Berscha											7		50	
	Fill														
	Kalipayan														
	Mabuhay														
	Osmena														
	Tagubay														
	Wawa								60						
	B. Brook - Simulao, Gutas & Babodan											10			
	Burawan Brook											10			
	Imelda & Libertad														
Bunawan	San Andres											10			
	San Teodoro, Alsat														
	San Teodoro, Brubahun														
	San Teodoro, Clemente														
	Duangan														
	Maasin														
	Majiwang											10			
	San Jose														
	Paganlaw BWSA														
	Probuccion, Lorea														
Loreto	Kasapa														
	Sabud														
	Waloe														
	Bayugan 3														
	Murifi	0.3	2.4	0.5					1.3			5		80	
	Mungay														
	Muhaybay														
	Muntulu														
	Aja														
	Sibagat	Batang-Batang											10		
El Rio															
Kiopa															
Kalambagan															
Magsaysay, Sibagat															
New Tubigon															
Padlay															
Perez															
San Vicente															
Santa Cruz, Sibagat												10			
Talaogon	Togozungo														
	Santa Cruz, BWSA														
	Buena Vista, BWSA														
	Culi														
	Del Monte WW														
	San Isidro BWSA														
	San Nicolas BWSA														
	Zilewa BWSA														
	Santa Maria														
	Bincorjon														
Trento Venuela	Limor														
	Masayan BWSA														
	Magsaysay														
	Probuccion														
	Sampalala														
	Santissima, Kawayan														
	Santa Cruz														
	Sawajan BWSA														

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

Name of Municipality	Name of Operating Body	Billing			Annual Income (P 000,000/year)	Others	Expected Subsidies	Subsidies	Other	
		Annual Billing (Numbers)	Public Faucet Consumer	House Connection Consumers						Payment by Public Faucet Consumers
Bayugan	Berscha									
	Eli									
	Katipunan									
	Mabuhay									
	Onceta									
	Tigabay									
	Wawa									
	Dunawan	B. Brook - Simulan/Gambar & Bahaden								
		Bunawan Brook								
		Invida & Libertan								
		San Andres								
		San Teodoro, Alcat								
San Teodoro, Binahanan										
Dapunawa	San Teodoro, C. Iremie									
	Dugaen									
	Masilo									
	Mallawag									
	San Jose									
	Tanabawan BWSA									
	Pudlachen, Lereca									
	Zungay									
	Sabud									
	Wagay									
Rosario	Bayugan 3									
	Maligaya									
	Merrill									
	Malagassy									
	Malayabay									
	Kumbala									
	Alfo									
	Hangkubang									
	El Rio									
	Kuya									
Sibagat	Kolumbyuan									
	Magsaysay, Sibagat									
	New Tubigon									
	Padi-ay									
	Prez									
	San Vicente									
	Santa Cruz, Sibagat									
	Talayan									
	Buena Gracia BWSA									
	Cubi									
Talonogon	Del Monte NW									
	San Pedro BWSA									
	San Nicolas BWSA									
	Zillonin BWSA									
	Santa Maria									
	Bincogan									
	Limon									
	Misayan BWSA									
	Magaway									
	Poblacion									
Trento	Sampalita									
	Sampalita, Kawayan									
	Santa Cruz									
	Sewald BWSA									
	Veneta									

#### 4.1.5 Level I Facilities

##### Safe and Unsafe Classification of Level I Facilities

According to DOH definition, protected deep well, protected shallow well, covered/improved dug well and developed spring are classified as safe sources, while unprotected shallow well, open dug well, undeveloped spring and rain water collector are classified as unsafe sources.

As for water sources in the province, the PHO conducts water quality examination upon request. However, the number of samples was very limited and majority of the samples was usually collected from doubtful sources.

On the other hand, the PPDO estimated safe/unsafe water sources in all municipalities of the province. As a provincial average, 22.5% of the households were classified to access doubtful sources as shown in Table 4.1.3. All these sources are Level I facilities.

Table 4.1.3 Percentage of Doubtful Water Sources

Municipality	Total Number of Household	Household Using Doubtful Sources	%
Bayugan	15,561	1,118	7.2
Bunawan	4,742	1,378	29.1
Esperanza	7,165	1,604	22.4
La Paz	2,064	936	45.4
Loreto	4,566	1,529	33.5
Prosperidad	10,871	2,683	24.7
Rosario	4,827	506	10.5
San Francisco	10,119	524	5.2
San Luis	3,950	1,599	40.5
Santa Josefa	2,260	828	36.6
Sibagat	4,659	1,419	30.5
Talacogon	4,979	429	8.6
Trento	7,344	2,821	38.4
Veruela	4,083	2,308	56.5
<b>Provincial Total</b>	<b>87,190</b>	<b>19,682</b>	<b>22.5</b>

Source: PPDO

These figures of unsafe percentages were applied to classify all shallow wells (a total of 1,271 representing 31% of the total number of Level I facilities) into safe and unsafe sources.

The unsafe percentage of respective municipality is applied to urban and rural areas both for public and private shallow wells. While, 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 sources for rural water supply in the province. Public and private facilities cover 65% and 35% of the safe water sources, respectively. Developed springs share is 21% of the total public facilities.

**Table 4.1.4 (b) Public and Private Level I Facilities for Rural Water Supply**

Facility	Public Source		Private Source		Total
	Number	%	Number	%	
Deep Well	218	85	37	15	255
Shallow Well	357	65	195	35	552
Spring Development	173	100	0	0	173
Others	73	26	210	74	283
<b>Total</b>	<b>821</b>	<b>65</b>	<b>442</b>	<b>35</b>	<b>1,263</b>

**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 the 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 using the profile in the 1990 population census data, "Households by Main Source of Drinking Water and City/Municipality" prepared by NSO. The rest of the population, those who are not served by Level III and/or II systems, were considered to be covered by shared or own use of Level I facilities. The calculation procedure is as follows:

- Service percentage/population of Level III and Level II systems was estimated based on the questionnaire survey results.
- Percentage of unserved population (using undeveloped spring, lake, river, peddler, etc.) reported in the 1990 population census was modified since the percentage of undeveloped spring, rainwater collector as well as unsafe well and open dug well are included in the underserved (unsafe) population in this study. As a result, percentage of



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

Name of Municipality	Area	Safe Sources										Unsafe Sources						Grand Total					
		Public					Private					Public			Private								
		Deep Well	Shallow Well	Covered/Improved Dug Well	Developed Spring	Sub-total	Deep Well	Shallow Well	Covered/Improved Dug Well	Sub-total	Total	Shallow Well	Open Dug Well	Undeveloped Spring	Rain Water Collection	Sub-total	Open Dug Well		Shallow Well	Rain Water Collector	Sub-total	Total	
Bayugan	Urban	7	49	1	57	3	347		350	407	4	8	27	27	54	62	469						
	Rural	21	124	11	36	192	76	192	10	121	6	115	6	115	121	136	328						
	Total	28	173	11	37	249	3	423	426	252	14	23	33	142	175	198	450						
Bunawan	Urban	3	1		3	12		12		12													
	Rural	7	4		8	19		19		21													
	Total	15	5		11	31		31	21	33													
Esperezua	Urban	2	17		19			19		19													
	Rural	37	61	11	109	7	24	31	116	18	2	20	7	178	185	205	321						
	Total	39	78	11	128	7	24	31	135	23	1	1	1	1	1	1	1	1	1	1	1	1	
La Paz	Urban	5	1		6			6		6													
	Rural	8	7		15	6	2	18	24	6	13	19	2	89	91	110	134						
	Total	13	8		21	6	4	31	30	12	13	20	3	89	92	112	143						
Loreto	Urban	2	1		3			3		3													
	Rural	29	21		50	8	45	4	58	11	11	12	12	55	55	67	128						
	Total	31	22		53	8	45	4	61	12	12	12	12	55	55	67	128						
Prosperidad (Capital)	Urban																						
	Rural	5	16		21	43		43		43													
	Total	5	16		21	43		43		43													
Rosario	Urban	11	4		15	24		24		24													
	Rural	11	4		15	24		24		24													
	Total	22	8		30	48		48		48													
San Francisco	Urban	12	6		18	19		19		19													
	Rural	7	24		31	42	24	66	1	24	49	66	1	15	16	52	68	154					
	Total	19	30		49	61	24	85	1	24	49	66	1	15	16	52	68	154					
San Luis	Urban	14	10		24			24		24													
	Rural	20	32		52	113		113		113													
	Total	34	42		76	126		126		126													
Santa Josefa	Urban	11	8		19	37		37		37													
	Rural	11	3		14	26		26		26													
	Total	22	11		33	63		63		63													
Sibagat	Urban	1	1		2			2		2													
	Rural	16	16		32	49		49		49													
	Total	17	17		34	49		49		49													
Talisayon	Urban	7	3		10	12		12		12													
	Rural	16	16		32	38		38		38													
	Total	23	19		42	50		50		50													
Trento	Urban	4	10		14	2		16		16													
	Rural	34	17		51	63		63		63													
	Total	38	27		65	79		79		79													
Verville	Urban	12	7		19	29		29		29													
	Rural	12	7		19	29		29		29													
	Total	24	14		38	58		58		58													
Provincial Total	Urban	63	102		165	174		174		174													
	Rural	218	357		575	821		821		821													
	Total	281	459		740	995		995		995													

present unserved population was estimated at 22%, which corresponds to 70% of the NSO's figure.

- 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 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 the overall population covered by Level I facilities and the number of households.

The number of households per shared public/private facility ranges from 7 to 35 households in rural areas and from 16 to 160 in urban areas. Compared with the service level standard of Level I public facility (15 households/facility), these figures are considered quite large especially in urban areas of Loreto, San Francisco, Talacogon and Trento. This reason seems to arise from a considerable number of non-reported/unidentified private wells.

#### **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 a 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 96,200 persons or 78% of the total population is covered by public Level I facilities as shown in Tables 4.1.6 (a) and 4.1.6 (b).

Table 4.1.5 Estimation of Unserved Population by Municipality

Name of Municipality	Area	Population and Household (1997)		Served Population			Unserved Population			Population Covered by Level I Facilities	
				Level III	Level II	Total	Unserved Percentage (1995)				Unserved Population (1997)
		Number	HH Size				Total No. of HHs	No. of Unserved HHs	%		
Bayugan	Urban	39,451	5.34				6,885	483	7	2,762	36,659
	Rural	57,080	5.40	340	6,290	6,630	9,847	2,587	26	14,841	35,609
	Total	96,531	5.38	340	6,290	6,630	16,732	3,070	18	17,603	72,298
Bunawan	Urban	10,706	5.05	1,296	3,103	4,399	1,988	487	24	2,569	3,738
	Rural	15,557	5.21		3,962	3,962	2,799	980	35	5,445	6,150
	Total	26,263	5.14	1,296	7,065	8,361	4,787	1,467	31	8,014	9,888
Esperanza	Urban	4,193	5.61	660		660	707	231	33	1,384	2,149
	Rural	40,342	5.58	420	2,390	2,810	6,834	1,238	18	7,262	30,270
	Total	44,535	5.59	1,080	2,390	3,470	7,541	1,469	19	8,646	32,419
La Paz	Urban	7,456	6.62				1,017	534	53	3,952	3,504
	Rural	18,046	5.87				2,780	1,460	53	9,564	8,482
	Total	25,502	6.07				3,797	1,994	53	13,516	11,986
Loreto	Urban	5,046	5.68		340	340	848	203	24	1,211	3,495
	Rural	20,123	5.52		1,801	1,801	3,481	1,089	31	6,238	12,034
	Total	25,169	5.55		2,141	2,141	4,329	1,292	30	7,449	15,579
Prosperidad (Capital)	Urban	21,840	5.25	3,276		3,276	3,887	292	8	1,747	16,817
	Rural	44,361	5.36	2,088	3,282	5,370	7,733	1,565	20	8,872	30,119
	Total	66,201	5.32	5,364	3,282	8,646	11,620	1,857	16	10,619	46,936
Rosario	Urban	3,031	5.01	3,029		3,029	578	244	42	-	2
	Rural	25,080	5.48	5,605	4,501	10,106	4,371	1,307	30	7,524	7,450
	Total	28,111	5.42	8,634	4,501	13,135	4,949	1,551	31	7,524	7,452
San Francisco	Urban	25,519	5.29	10,791	1,296	12,087	4,526	205	5	1,276	12,156
	Rural	28,665	5.26	3,480	2,249	5,729	5,111	1,098	21	6,020	16,916
	Total	54,184	5.28	14,271	3,545	17,816	9,637	1,303	14	7,296	29,072
San Luis	Urban	5,038	5.81				815	190	23	1,159	3,879
	Rural	18,257	5.41		1,321	1,321	3,174	1,016	32	5,842	11,094
	Total	23,295	5.49		1,321	1,321	3,989	1,206	30	7,001	14,973
Santa Josefa	Urban	4,261	5.40	888		888	675	122	18	767	2,606
	Rural	20,506	5.26				3,333	653	20	4,101	16,405
	Total	24,767	5.29	888		888	4,008	775	19	4,868	19,011
Sibatog	Urban	7,884	5.48	623		623	1,358	296	22	1,734	5,527
	Rural	22,000	5.47	290	9,294	9,584	3,795	797	21	4,620	7,796
	Total	29,884	5.47	913	9,294	10,207	5,153	1,093	21	6,354	13,323
Talacogon	Urban	17,903	5.46		5,978	5,978	3,004	244	8	1,432	10,493
	Rural	12,123	5.61		218	218	1,982	1,041	53	6,425	5,480
	Total	30,026	5.52		6,196	6,196	4,986	1,285	26	7,857	15,973
Trento	Urban	16,725	5.31		423	423	2,946	218	7	1,171	15,131
	Rural	22,778	5.07	500		500	4,198	1,168	28	6,378	15,900
	Total	39,503	5.17	500	423	923	7,144	1,386	19	7,549	31,031
Veruela	Urban	6,267	5.56		1,251	1,251	980	250	26	1,629	3,387
	Rural	34,802	5.47		4,041	4,041	5,536	1,338	24	8,352	22,409
	Total	41,069	5.48		5,292	5,292	6,516	1,588	24	9,981	25,796
Provincial Total	Urban	175,320	5.39	20,563	12,391	32,954	30,214	3,999	13	22,793	119,573
	Rural	379,720	5.42	12,723	39,349	52,072	64,974	17,337	27	101,484	226,164
	Total	555,040	5.41	33,286	51,740	85,026	95,188	21,336	22	124,277	345,737

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

Name of Municipality	Area	Pop. Covered by Level I Facilities	Number of Facilities						Coverage of Own Use					
			Public Facilities			Private Facilities			Number of Private Facilities			(1) Population Covered		
			Safe	Unsafe	Total	Safe	Unsafe	Total	Safe	Unsafe	Total	Safe	Unsafe	Total
Dayugan	Urban	36,689	57	8	65	350	54	404	27	175	202	935	144	1,079
	Rural	35,609	192	15	207	76	121	197	61	38	99	38	203	529
	Total	72,298	249	23	272	426	175	601	88	213	301	1,138	470	1,608
Dunawan	Urban	3,738	12	3	15	-	-	-	-	-	-	-	-	-
	Rural	6,150	19	8	27	21	-	21	11	-	11	56	-	56
	Total	9,888	31	11	42	21	-	21	11	-	11	56	-	56
Esperanza	Urban	2,149	19	5	24	-	-	-	-	-	-	-	-	-
	Rural	30,270	109	20	129	31	185	216	16	93	109	90	522	612
	Total	32,419	128	25	153	31	185	216	16	93	109	90	522	612
La Paz	Urban	3,504	7	1	8	2	-	2	1	-	1	7	-	7
	Rural	8,482	18	19	37	8	91	99	4	46	50	26	305	331
	Total	11,986	25	20	45	10	92	102	5	47	52	33	312	345
Loctoc	Urban	3,495	3	1	4	-	-	-	-	-	-	-	-	-
	Rural	12,084	58	11	69	4	55	59	2	28	30	11	159	170
	Total	15,579	61	12	73	4	55	59	2	28	30	11	159	170
Prosperidad (Capital)	Urban	16,817	-	-	-	-	-	-	-	-	-	-	-	-
	Rural	30,119	43	17	60	161	-	161	81	-	81	425	-	425
	Total	46,936	43	17	60	161	-	161	81	-	81	425	-	425
Rosario	Urban	2	-	-	-	-	-	-	-	-	-	-	-	-
	Rural	7,450	24	5	29	5	294	299	3	142	145	15	711	726
	Total	7,452	24	5	29	5	294	299	3	142	145	15	711	726
San Francisco	Urban	12,156	19	-	19	-	-	-	-	-	-	-	-	-
	Rural	16,916	42	16	58	49	52	101	25	26	51	132	138	270
	Total	29,072	61	16	77	49	52	101	25	26	51	132	138	270
San Luis	Urban	3,879	24	6	30	-	-	-	-	-	-	-	-	-
	Rural	13,094	113	26	139	1	77	78	1	39	40	6	227	233
	Total	14,973	137	32	169	1	77	78	1	39	40	6	227	233
Santa Josefa	Urban	2,605	5	2	7	-	-	-	-	-	-	-	-	-
	Rural	16,405	26	18	44	-	148	148	74	-	74	-	400	400
	Total	19,011	31	20	51	-	148	148	74	-	74	-	400	400
Sibagat	Urban	5,527	2	2	4	28	12	40	6	6	20	77	33	140
	Rural	7,796	47	8	55	40	25	65	8	13	23	44	71	115
	Total	13,323	49	10	59	43	37	80	14	19	43	121	104	225
Tainogon	Urban	10,493	12	-	12	-	-	-	-	-	-	-	-	-
	Rural	5,489	38	4	42	-	75	75	38	38	38	207	207	207
	Total	15,973	50	4	54	-	75	75	38	38	38	207	207	207
Trento	Urban	13,131	14	7	21	-	-	2	1	-	1	5	-	5
	Rural	15,900	63	10	73	71	141	212	36	71	107	191	377	568
	Total	31,031	77	17	94	73	141	214	37	71	108	196	377	573
Venuela	Urban	3,382	-	-	-	-	-	-	-	-	-	-	-	-
	Rural	22,409	29	10	39	-	660	660	330	330	330	1,835	1,835	
	Total	25,796	29	10	39	-	660	660	330	330	330	1,835	1,835	
Provincial Total	Urban	119,573	174	35	209	382	67	449	191	34	225	1,024	184	1,208
	Rural	226,164	821	187	1,008	442	1,914	2,356	225	961	1,186	1,799	5,278	6,477
	Total	345,737	995	222	1,217	824	1,981	2,805	416	995	1,411	2,223	5,462	7,685

Table 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					Safe		Unsafe		Total	
		Safe		Unsafe		Total	Safe		Unsafe		Total	Pop.	%	Pop.	%	Pop.	%
		Safe	Unsafe	Total	Safe	Unsafe	Total	Safe	Unsafe	Total	No. of HHs per Shared Facility						
Bayugan	Urban	31,880	3,730	35,610	5,970	699	6,669	25		32,815	83	3,874	10	36,689	93		
	Rural	26,765	8,315	35,080	4,956	1,540	6,496	21		26,968	47	8,661	15	35,629	62		
	Total	58,645	12,045	70,690	10,926	2,239	13,165	23		59,783	62	12,515	13	72,298	75		
Bunawan	Urban	2,990	748	3,738	592	148	740	49		2,990	28	748	7	3,738	35		
	Rural	4,855	1,239	6,094	932	238	1,170	31		4,911	32	1,239	8	6,150	40		
	Total	7,845	1,987	9,832	1,524	386	1,910	36		7,901	30	3,000	8	9,888	38		
Esperanza	Urban	1,701	448	2,149	303	80	383	16		1,701	41	448	11	2,149	51		
	Rural	15,898	13,760	29,658	2,849	2,466	5,315	22		15,988	40	14,282	35	30,270	75		
	Total	17,599	14,208	31,807	3,152	2,546	5,698	22		17,689	40	14,730	33	32,419	73		
La Paz	Urban	2,803	687	3,490	423	104	527	55		2,810	38	694	9	3,504	47		
	Rural	2,145	6,006	8,151	365	1,023	1,388	16		2,171	12	6,311	35	8,482	47		
	Total	4,948	6,693	11,641	788	1,127	1,915	20		4,981	20	7,005	27	11,986	47		
Loreto	Urban	2,621	874	3,495	661	154	815	156		2,621	52	874	17	3,495	69		
	Rural	7,324	4,590	11,914	1,327	832	2,159	22		7,335	36	4,749	24	12,084	60		
	Total	9,945	5,464	15,409	1,783	986	2,774	27		9,956	40	5,623	22	15,579	62		
Prosperidad (Capital)	Urban	26,488	16,817	43,305	4,942	3,203	8,145	39		26,913	61	3,206	7	30,119	68		
	Rural	26,488	20,023	46,511	4,942	3,801	8,743	62		26,913	41	20,023	30	46,936	71		
	Total	52,976	36,840	89,816	9,884	7,004	16,888	101		53,826	61	23,229	26	77,055	70		
Rosario	Urban	1,156	5,570	6,726	211	1,016	1,227	7		1,171	5	6,279	25	7,450	30		
	Rural	12,156	2,298	14,454	2,298	2,298	4,596	121		12,156	48	6,281	22	18,437	77		
	Total	13,312	7,868	21,180	4,409	3,314	7,723	128		13,312	48	12,560	28	25,873	62		
San Francisco	Urban	10,398	6,248	16,646	1,977	1,184	3,161	29		10,530	37	6,386	22	16,916	59		
	Rural	22,554	6,248	28,802	4,275	1,188	5,463	43		22,686	42	6,386	12	29,072	54		
	Total	32,952	12,496	45,448	6,252	2,372	8,624	72		33,216	42	12,772	28	45,988	62		
San Luis	Urban	3,103	776	3,879	534	134	668	22		3,103	62	76	15	3,879	77		
	Rural	7,065	3,796	10,861	1,306	702	2,008	11		7,071	39	4,023	22	11,094	61		
	Total	10,168	4,572	14,740	1,840	836	2,676	13		10,174	44	4,799	21	14,973	64		
Santa Josefa	Urban	1,861	745	2,606	345	138	483	69		1,861	44	745	17	2,606	61		
	Rural	12,390	13,135	25,525	687	2,356	3,043	26		12,790	18	12,790	62	25,582	80		
	Total	14,251	13,880	28,131	1,434	2,712	4,146	52		14,251	22	13,535	55	27,786	77		
Sibagat	Urban	3,685	1,732	5,417	672	316	988	41		3,762	48	1,765	22	5,527	70		
	Rural	5,642	2,039	7,681	1,031	373	1,404	19		5,686	26	2,110	10	7,796	35		
	Total	9,327	3,771	13,098	1,703	689	2,392	24		9,448	32	3,875	13	13,323	45		
Talauegon	Urban	10,493	3,771	14,264	1,922	1,043	2,965	160		10,493	59	10,493	59	20,986	100		
	Rural	2,603	2,670	5,273	464	476	940	12		2,603	21	2,877	24	5,480	45		
	Total	13,096	6,441	19,537	2,386	1,522	3,908	172		13,096	44	3,100	10	16,196	83		
Trento	Urban	10,317	4,809	15,126	1,943	876	2,819	130		10,322	62	4,809	29	15,131	90		
	Rural	8,745	6,587	15,332	1,725	1,299	3,024	17		8,936	39	6,944	31	15,900	70		
	Total	19,062	11,396	30,458	3,668	2,203	5,871	29		19,258	49	11,773	30	31,031	79		
Veruela	Urban	3,387	3,387	6,774	609	609	1,218	18		3,387	54	3,387	54	6,774	100		
	Rural	1,761	18,813	20,574	322	3,439	3,761	10		1,761	5	20,648	59	22,409	64		
	Total	5,148	22,200	27,348	931	4,048	5,019	28		5,148	4	24,035	59	29,183	63		
Provincial Total	Urban	81,610	34,755	116,365	15,463	6,491	21,954	51		84,634	48	34,939	20	119,573	68		
	Rural	124,460	95,227	219,687	23,094	17,546	40,640	19		125,659	33	100,505	26	226,164	60		
	Total	206,070	129,982	336,052	38,557	24,037	62,594	24		210,293	33	135,444	24	345,737	62		

4.2 Sanitation and Sewerage  
 4.2.2 Types of Facilities and Definition of Service Level Standard

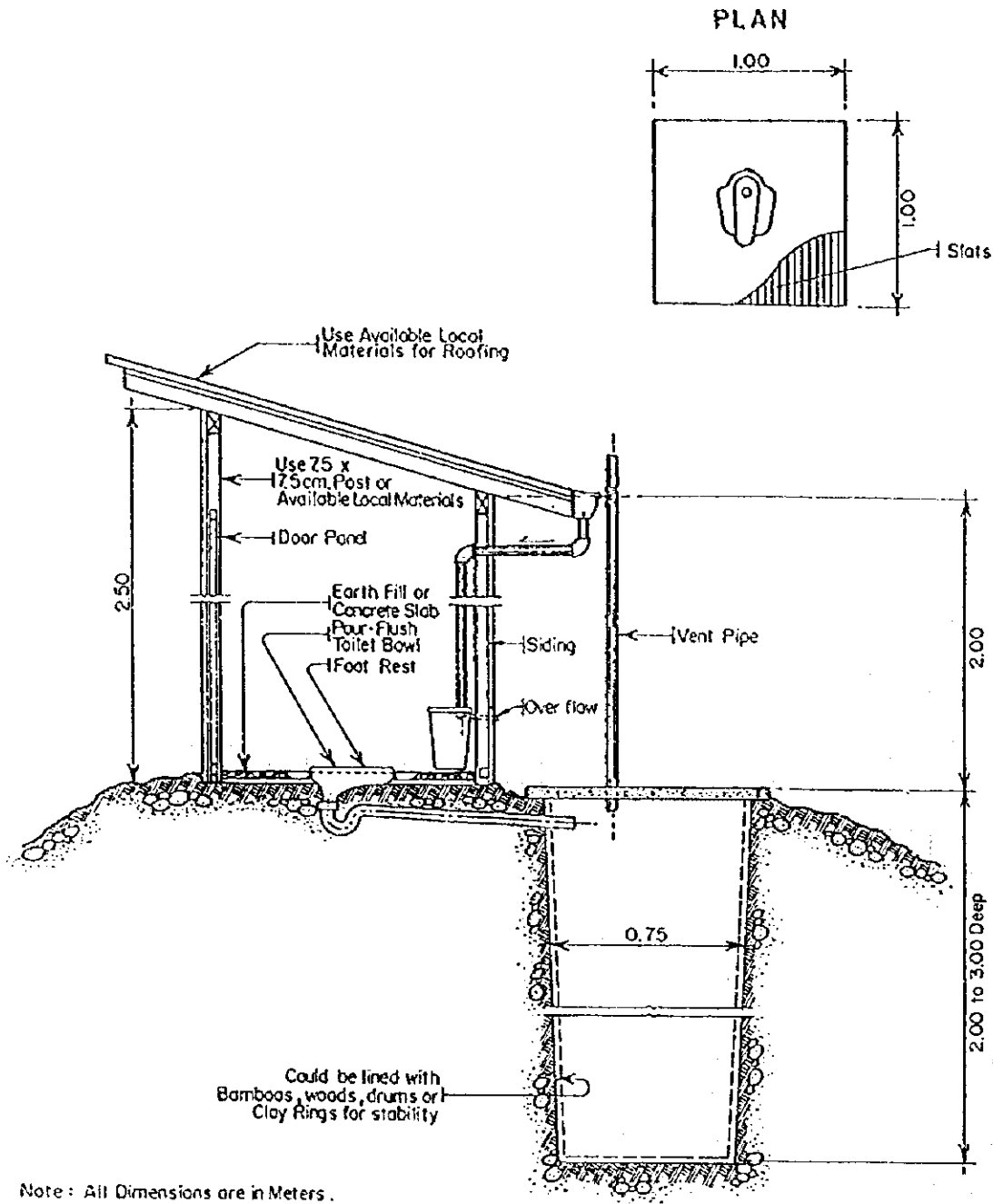
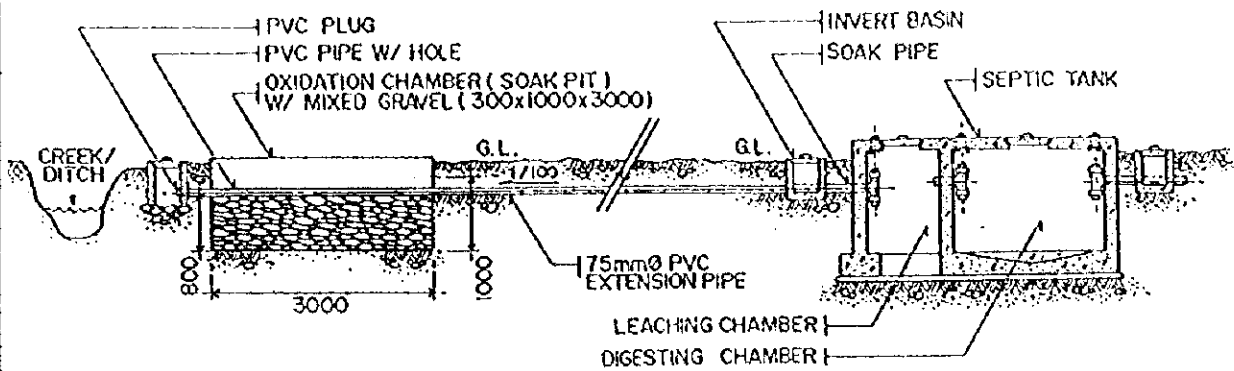


FIGURE 4.2.1  
 STANDARD STRUCTURE OF PRIVATE TOILET FACILITY

SOURCE : DEPARTMENT OF HEALTH



LAYOUT PLAN OF HIGH GROUND WATER SITE

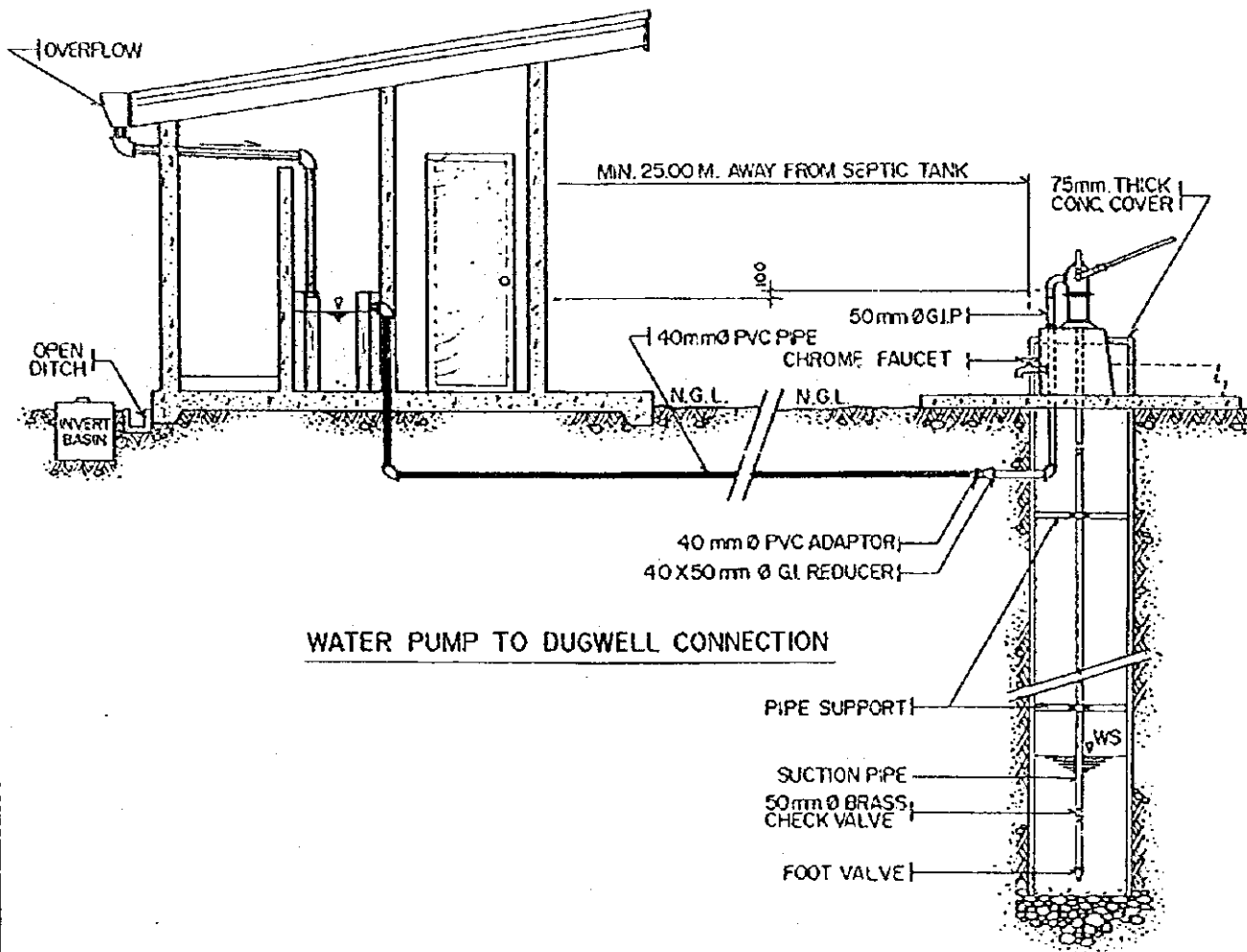


FIGURE 4.2.2  
STANDARD STRUCTURE OF SCHOOL TOILET FACILITY

SOURCE : JICA - DPWH RURAL ENVIRONMENTAL SANITATION PROJECT .

### 4.2.3 Sanitation Facilities and Service Coverage

Table 4.2.1 Sanitation Facilities and Service Coverage of Household Toilets by Type, by Municipality, Urban and Rural, 1997

Name of Municipality	Area	No. of Households (1997)	Households Served by Sanitary Toilets								Underserved/Unserv'd Hh's			
			Flush Toilet		Pour Flush		VIP/Dry		Total		Unsanitary		No Facility	
			Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Bayugan	Urban	7,388	875	12	5,360	73			6,235	84	849	11	304	4
	Rural	10,570			6,492	61			6,492	61	1,011	10	3,067	29
	Total	17,958	875	5	11,852	66			12,727	71	1,860	10	3,371	19
Bunawan	Urban	2,120	150	7	869	41			1,019	48	583	28	518	24
	Rural	2,986			2,291	77			2,291	77	636	21	59	2
	Total	5,106	150	3	3,160	62			3,310	65	1,219	24	577	11
Esperanza	Urban	747	17	2	456	61			473	63	87	12	187	25
	Rural	7,230			3,559	49			3,559	49	891	12	2,780	38
	Total	7,977	17		4,015	50			4,032	51	978	12	2,967	37
La Paz	Urban	1,126	187	17	487	43			674	60	284	25	168	15
	Rural	3,074			1,135	37			1,135	37	593	19	1,346	44
	Total	4,200	187	4	1,622	39			1,809	43	877	21	1,514	36
Loreto	Urban	888	15	2	574	65			589	66	206	23	93	10
	Rural	3,645			2,743	75			2,743	75	651	18	251	7
	Total	4,533	15		3,317	73			3,332	74	857	19	344	8
Prosperidad	Urban	4,160	702	17	2,620	63			3,322	80	714	17	124	3
	Rural	8,276			4,856	59			4,856	59	359	4	3,061	37
	Total	12,436	702	6	7,476	60			8,178	66	1,073	9	3,185	26
Rosario	Urban	605	16	3	488	81			504	83	74	12	27	4
	Rural	4,577			3,787	83			3,787	83	494	11	296	6
	Total	5,182	16		4,275	82			4,291	83	568	11	323	6
San Francisco	Urban	4,824	1,708	35	2,046	42			3,754	78	676	14	354	8
	Rural	5,450			2,056	38			2,056	38	1,160	21	2,234	41
	Total	10,274	1,708	17	4,102	40			5,810	57	1,836	18	2,628	26
San Luis	Urban	867	150	17	325	37			475	55	175	20	217	25
	Rural	3,375			675	20			675	20	150	4	2,550	76
	Total	4,242	150	4	1,000	24			1,150	27	325	8	2,767	65
Santa Josefa	Urban	789	35	4	491	62			526	67	140	18	123	16
	Rural	3,898			1,688	43			1,688	43	1,304	33	906	23
	Total	4,687	35	1	2,179	46			2,214	47	1,444	31	1,029	22
Sibagat	Urban	1,439	230	16	820	57			1,050	73	368	26	21	1
	Rural	4,022			2,725	68			2,725	68	672	17	625	16
	Total	5,461	230	4	3,545	65			3,775	69	1,040	19	646	12
Talacogon	Urban	3,279	590	18	1,490	45			2,080	63	894	27	305	9
	Rural	2,161			1,037	48			1,037	48	76	4	1,048	48
	Total	5,440	590	11	2,527	46			3,117	57	970	18	1,353	25
Trento	Urban	3,150	234	7	2,311	73			2,545	81	500	16	105	3
	Rural	4,493			3,128	70			3,128	70	846	19	519	12
	Total	7,643	234	3	5,439	71			5,673	74	1,346	18	624	8
Veruela	Urban	1,127	46	4	570	51			616	55	221	20	290	26
	Rural	6,362			2,851	45			2,851	45	1,461	23	2,050	32
	Total	7,489	46	1	3,421	46			3,467	46	1,682	22	2,340	31
Provincial Total	Urban	32,509	4,955	15	18,907	58			23,862	73	5,771	18	2,876	9
	Rural	70,119			39,023	56			39,023	56	10,304	15	20,792	30
	Total	102,628	4,955	5	57,930	56			62,885	61	16,075	16	23,668	23

Notes: \* Less than 1%

\*\* Dry type with sanitary pit privy was classified as unsanitary by the PHIO (odor problems), hence the zero inventory.



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
Bayugan	Public	54	33,259	352		352
	Private	15	3,778	18		18
	Total	69	37,037	370		370
Bunawan	Public	19	9,582	86		86
	Private					
	Total	19	9,582	86		86
Esperanza	Public	39	16,857	139	9	148
	Private					
	Total	39	16,857	139	9	148
La Paz	Public	22	6,274	56	8	64
	Private	1	283	2		2
	Total	23	6,557	58	8	66
Loreto	Public	32	11,483	86		86
	Private					
	Total	32	11,483	86		86
Prosperidad (Capital)	Public	45	24,762	132		132
	Private	3	1,009	6		6
	Total	48	25,771	138		138
Rosario	Public	15	9,769	88		88
	Private	2	472	4		4
	Total	17	10,241	92		92
San Francisco	Public	29	21,361	59		59
	Private	7	1,798	16		16
	Total	36	23,159	75		75
San Luis	Public	27	7,570	44		44
	Private			2		2
	Total	27	7,570	46		46
Santa Josefa	Public	15	8,504	58		58
	Private					
	Total	15	8,504	58		58
Sibagat	Public	29	11,659	56		56
	Private	1	317	2	20	22
	Total	30	11,976	58	20	78
Talacogon	Public	26	11,444	90		90
	Private	1	464			
	Total	27	11,908	90		90
Trento	Public	27	15,140	206		206
	Private	2	718	2		2
	Total	29	15,858	208		208
Veruela	Public	32	10,811	48		48
	Private	1	95	2		2
	Total	33	10,906	50		50
Provincial Total	Public	411	198,475	1,500	17	1,517
	Private	33	8,934	54	20	74
	Total	444	207,409	1,554	37	1,591

Table 4.2.3 Number of Public Toilets Facilities

Name of Municipality	Public Market			Bus/Jeepney Terminal			Park/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	
Bayugan	1		1	1		1				2
Bunawan	1		1	1		1				2
Esperanza	1		1	1		1				2
La Paz	1		1	1		1				2
Loreto	1		1	1		1				2
Prosperidad (Capital)	1		1	1		1				2
Rosario	3		3	1		1	1		1	5
San Francisco	1		1	2		2				3
San Luis	1		1	1		1				2
Santa Josefa	1		1	1		1				2
Sibagat	1		1							1
Talacogon	1		1	1		1				2
Trento	1		1	1		1	1		1	3
Vemela	1		1	1		1				2
<b>Provincial Total</b>	<b>16</b>		<b>16</b>	<b>14</b>		<b>14</b>	<b>2</b>		<b>2</b>	<b>32</b>