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 - [1]

SUPPORTING REPORT

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

AGUSAN DEL NORTE

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:

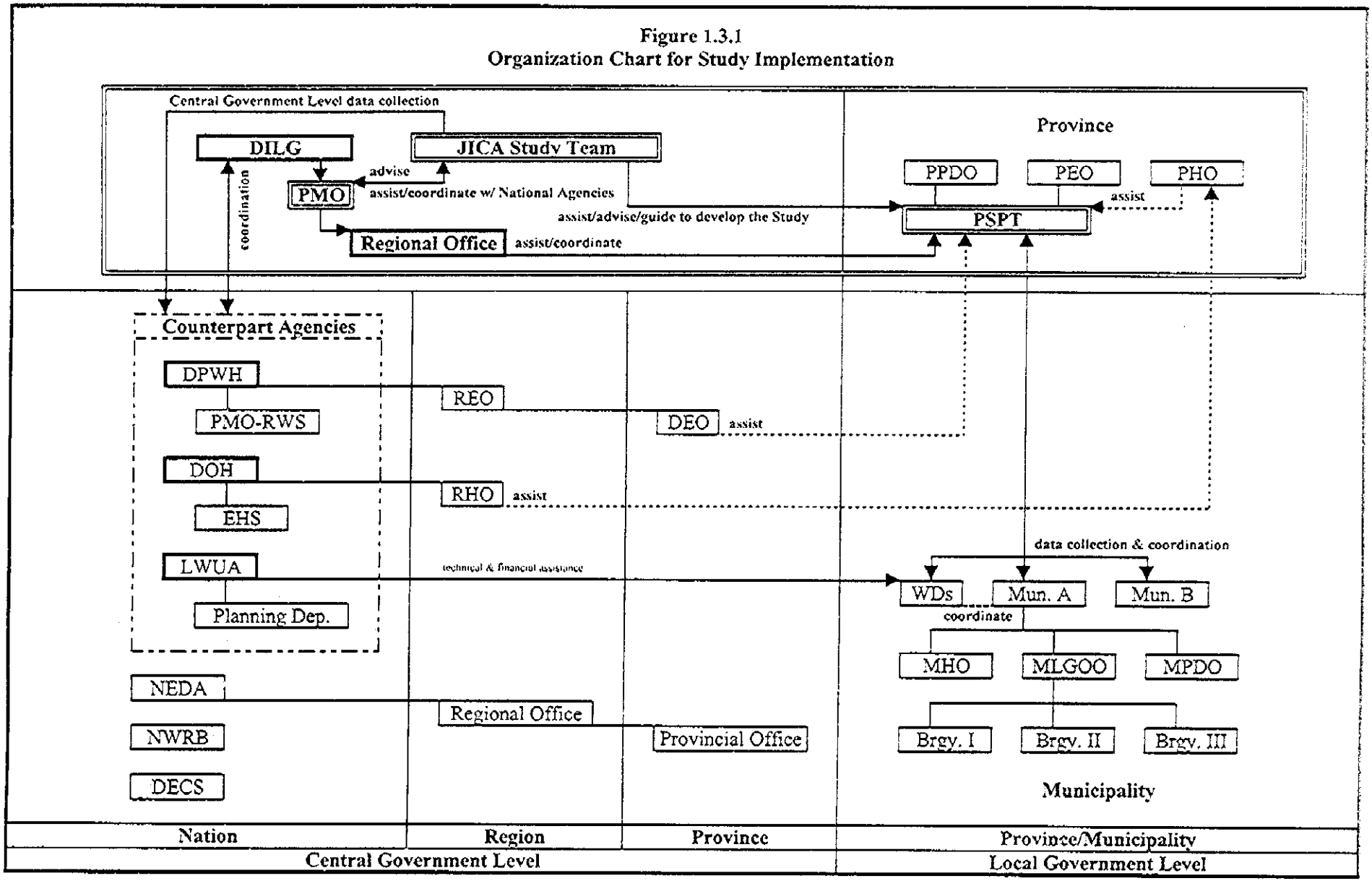
(1) Pursue technology transfer to the Philippine counterpart personnel in the course of the Study and;

(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

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				
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		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 Family by Income Class

Income Class	Agusan del Norte				CARAGA Region	
	Total Families		Annual Income			
	Number	Share	Total (P '000.00)	Average (Pesos)	Total Number of Families	Annual Income Average (Pesos)
Under 20,000	9,000	18	145,306	29,972	47,687	17,398
20,000 - 29,999	16,506	33	490,256	24,577	90,476	28,430
30,000 - 39,999	7,200	14	255,913	35,550	64,408	38,042
40,000 - 59,999	11,136	22	649,802	50,001	81,931	54,243
60,000 - 99,999	4,393	9	340,991	78,190	54,889	88,626
100,000 - 249,999	2,319	5	339,903	136,228	20,684	146,067
250,000 and over	0	0	0	0	2,246	451,654

Source : 1994 Family Income and Expenditure Survey, NSO

Notes:

(1) Derived from Region X 1994 Files

(2) Based on NEDA and other agencies , poverty threshold in Region X in 1994 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 have 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	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	39,133	157	5,999	106	18,768	2,309	67	11,478	254
Fishing	4,238	8	1,057	8	2,760	90	22	246	47
Mining and Quarrying	648	1	380	2	242	2	0	10	11
Manufacturing	4,988	39	3,898	21	792	98	11	89	40
Electricity, Gas and Water	526	3	410	62	44	1	0	4	2
Construction	3,448	61	2,681	61	570	22	7	24	22
Trade	8,736	39	1,380	18	5,904	629	24	680	62
Services	23,091	4,824	6,696	6,332	3,865	282	23	926	143
Not Stated	333	19	68	7	45	8	0	23	163
Provincial Total	**85,141**	**5,151**	**22,569**	**6,617**	**32,990**	**3,441**	**154**	**13,480**	**744**

3.3.3 Education

Table 3.3.3 Household Population by Highest Educational Attaintment

Highest Educational Attaintment	Household Population 5 Years Old and Over	Age Group				
		Below 20	20 - 24	25 - 29	30 - 34	35 and Over
No Grade Completed	18,292	11,466	501	439	408	5,478
Pre-school	9,624	9,340	28	28	25	203
Elementary						
1st - 4th Grade	56,808	35,425	2,403	2,278	2,142	14,560
5th - 7th Grade	52,327	16,860	4,322	4,783	4,505	21,857
High School						
Undergraduate	37,358	17,148	4,281	3,568	2,936	9,425
Graduate	24,961	4,368	4,545	3,827	3,367	8,854
Post Secondary						
Undergraduate	598	90	193	110	89	116
Graduate	2,600	130	682	561	404	823
College Undergraduate	12,403	2,433	3,166	1,724	1,491	3,589
Academic Degree Holder	11,815	103	1,887	2,353	1,983	5,489
Post-Baccalaureate	234	0	9	19	18	188
Not Stated	2,491	1,532	147	134	125	553
Total	229,511	98,895	22,164	19,824	17,493	71,135

Source: NSO Census 1995

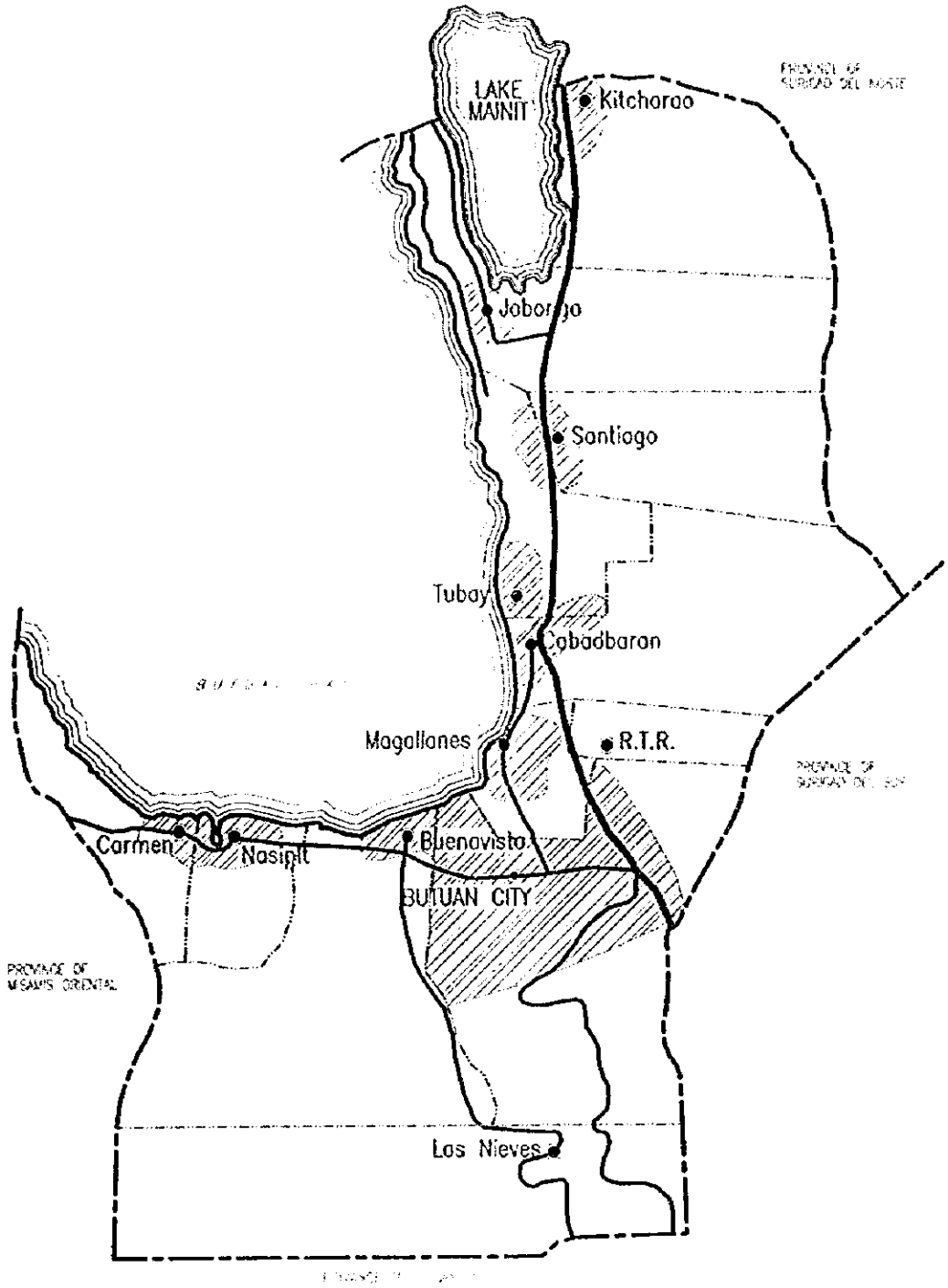


FIGURE 3.4.1
DISTRIBUTION OF URBAN AND RURAL AREAS
PROVINCE OF AGUSAN DEL NORTE

DISK NAME : AGUSAN-DELNORTE(DISK1)
FILENAME : AGUSAN-DELNORTE(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 Norte (1995)		Philippines (1995)	
	Number	Ratio	Number	Ratio
Health Facilities				
Hospital	11	1/24,310	1,700	1/40,206
Rural Health Units	11	1/24,310	2,335	1/29,272
Barangay Health Station	97	1/2,757	11,646	1/5,869
Practitioners [1]				
Doctors	34	1/7,865	2,029	1/33,686
Nurses	14	1/19,101	2,694	1/25,371
Midwives	73	N/A	10,898	1/6,272
Dentists	7	1/38,202	1,071	1/63,818

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

Note: [1] Include only government health practitioners for the national (Philippines) total. No data is available for private practitioners.

3.6 Environmental Conditions

3.6.2 Water Pollution

Table 3.6.1 Types of Drainage Facilities

Type	Length (km)
Drainage Main	0.30
Open Channel (with Concrete & rubble masonry)	7.70
Open Ditches & Unlined Laterals	15.15
Reinforced Concrete Circular Pipes	
Street Gutters	3.35
Outfalls to Rivers from Drainage Mains (number)	

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 °C)	°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	mg/L	nil	0.002	0.005	0.02	--
Phenols						
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

Municipality	Name of System (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
Nasipit	Nasipit WD	7	6	13	1,634	1,346	2,980	9,804	8,076	17,880
Butuan City (Capital)*	Butuan City WD				9,351	4,156	13,507	49,373	21,985	71,358

* Butuan City is outside PW4SP study area

Municipality	Name of System (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
Nasipit	Nasipit WD			0			0			0
Butuan City (Capital)*	Butuan City WD			0			0			0

* Butuan City is outside PW4SP study area

Municipality	Name of System (Operating Body)	Water Sources			Consumption			
		Type[1]	Number	Production (cu.m/day)	Domestic	Institutional	Commercial	Industrial
					(cu. m/day)			
Nasipit	Nasipit WD	DW/SP	1/1	2,129	1,154	0	213	0
Butuan City (Capital)*	Butuan City WD	DW/O	6	13,478.4	9,141	0	1,562	0

Note: 1. Type of Water Source: DW - Deep Well, DgW - Dug Well, Surf. - Surface Water (River), SP - Spring, IG - Infiltration Gallery.
2. Butuan City is outside PW4SP study area

Municipality	Name of System (Operating Body)	Consumers														
		Domestic House Connections			Domestic Public Faucets			Institutional			Commercial			Industrial		
		Connection		Consumption	Connection		Consumption	Connection		Consumption	Connection		Consumption	Connection		Consumption
		Metered	Unmetered	(cu.m/day)	Metered	Unmetered	(cu.m/day)	Metered	Unmetered	(cu.m/day)	Metered	Unmetered	(cu.m/day)	Metered	Unmetered	(cu.m/day)
Nasipit	Nasipit WD	2,356	0	1,154							119	0	213			
Butuan City	Butuan City WD	13,50		9,141							1,394		1,562			

* Butuan City is outside PW4SP study area

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	Number	Source Capacity (m^3/day)		Number	Volume (m^3)		
Buenavista	Alubihid WS	SP	1	86.4	1,260	1	8.0	540	21
	Guinabsan WS	SP	1	216.0	2,000	1	12.5	540	16
	Pob. 7 WS	DW	1	96.0	220	1	8.0	200	11
	Sacol WSS	SP	1	172.8	2,500	1	9.0	1,000	26
	Municipal Total		4	571.2	5,980	4	37.5	2,280	68
Cabadbaran	Cabadbaran WS	SP	1	259.2	750	1	50.0	500	25
	Calamba WSD	SP	1	205.6	3,000	2	22.0	2,000	22
	Concepcion WSD	SP	1	103.7	1,000	1	40.0	300	15
	Del Pilar SWS	SP	1	172.8	3,500	1	80.0	675	45
	La Union WS	SP	1	172.8	500	1	80.0	1,020	51
	Puting Bato SD	SP	1	43.2	1,000	1	8.0	200	4
	Municipal Total		6	957.3	9,750	7	280.0	4,695	162
Carmen	Poblacion WS	SP	1	172.8	2,500	1	22.5	500	23
	Rojales-Vinapor WSS	DW	1			1	48.6	1,120	20
	Municipal Total		2	172.8	2,500	2	71.1	1,620	43
Jabonga	A. Beltran WSS	SP	1	116.6	2,000	2	10.0	250	15
	Balegutan WS	SP	3	233.3	3,000	2	18.0	1,000	10
	Bunga WSS	SP	1	28.5	2,000	1	25.0	500	4
	Celopan WS	SP	1	125.3	1,500	1	27.0	1,000	15
	Colorado WS	SP	1	301.5	2,300	1	80.0	1,375	11
	CuyagoWSS	SP	1	43.2	2,000	1	3.5	150	9
	Libas WSS	SP	1	86.4	2,000	2	8.0	300	18
	Magdagooc SS	SP	1	43.2	1,200	1	37.0	500	5
	Maraiging WS	SP	1	86.4	1,000	1	45.0	500	3
	San Jose WSS	SP	1	43.2	1,000	1	36.0	500	11
	San Pablo SWS	SP	1	28.5	2,000	1	28.0	1,080	9
	San Vicente WSS	SP	1	86.4	1,000	1	36.0	1,200	12
	Sto. Niño WS	SP	1	86.4	1,000	1	25.0	750	9
	Municipal Total		15	1,308.9	22,100	16	378.5	9,105	131
Kitcharao	Hinimbangan WS	SP	1	2.18	1,000	1	8.0	100	5
	Kitcharao WS	DW	1	144	1,000	1	18.0	3,000	58
	Mahayahay WS	SP	1	46.9	2,000	1	15.0	200	12
	San Isidro	SP	1	10.8	1,400	1	16.0	250	16
	San Roque WS	SP	1	16.32	1,440	1	18.0	400	26
	Municipal Total		5	220.2	6,840	5	75.0	3,950	117
Las Nieves	Lingayao WSS	DW	1	25.9	1,500	1	49.0	2,500	25
	Maninggalao WSS	SP	1	190.1	800	1	64.0	800	15
	Poblacion WSS	DW	1	3.9	100	1	16.0	100	12
	Tinucuran WSS	DW	1	4.3	300	1	3.4	600	3
	Municipal Total		4	224.2	2,700	4	132.4	4,000	55
Magallanes	Magallanes WSS	DW	1	155.5	3,000	2	17.0	3,000	55
	Taod-oy WS	DW	1	40.3	50	1	6.0	3,000	6
	Municipal Total		2	195.8	3,050	3	23.0	6,000	61
Nasipit	Amontay SD	SP	2	129.6	5,500	2	16.0	5,300	24
	Aclan SD	SP	1	43.2	4,000	2	29.0	4,000	11
	Municipal Total		3	172.8	9,500	4	45.0	9,300	35
Remedios T. Romualdez	Balang-Balang WS	SP	1	216	3,000	1	27.0	500	12
	Basilisa WS	DW	1	38.8	1,170	1	12.0	200	7
	Humilog WS	DW	1	460.8	2,000	1	5.0	1,500	25
	Panaytayon WS	DW	1	17.28	300	1	5.0	350	15
	San Antonio WS	SP	1	259.2	2,000	1	30.0	50	3
	Tagbongabong WS	SP	1	129.6	2,600	1	27.0	1,000	20
	Municipal Total		6	1121.68	11,070	6	106.0	3,600	82
Santiago	E. Morgado SWS	SP	1	9.24	1,200	2	35.0	300	20
	Curva SWS	SP	1	9.12	1,200	2	35.0	300	25
	Jagupit SWS	SP	1	300.2	1,500	1	9.0	250	15
	Mabaho SWS	SP	1	300.2	1,500	1	9.0	250	16
	San Isidro SWS	SP	1	8.4	1,150	1	8.0	150	20
	Santiago SWS	SP	1	375.4	5,000	3	81.0	850	220
	Municipal Total		6	1,002.6	11,550	10	177.0	2,100	316
Tubay	Doña Rosario WWS	SP	1	21.6	800	1	9.0	100	5
	Poblacion 1 WS	SP	1	129.6	1,800	1	3.0	230	15
	Poblacion 2 WS	SP	1	432	2,500	1	9.0	200	13
	Municipal Total		3	583.2	5,100	3	21.0	530	33
Provincial Total			56	6,530.6	90,140	64	1,346.5	47,180	1,102

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
Buenavista	Alubihid WS		1	1	-	136	136	-	1,056	1,056
	Guinabsan WS		1	1	-	315	315	-	1,821	1,821
	Pob. 7 WS	1		1	176	-	176	1,040	-	1,040
	Social WSS		1	1	-	370	370	-	1,991	1,991
	Municipal Total	1	3	4	176	821	997	1,040	4,868	5,908
Cabadbaran	Cabadbaran WS		2	2	-	260	260	-	1,340	1,340
	Calamba WSD		1	1	-	415	415	-	2,175	2,175
	Concepcion WSD		1	1	-	123	123	-	711	711
	Del Pilar SWS		1	1	-	441	441	-	2,308	2,308
	La Union WS		1	1	-	531	531	-	2,883	2,883
	Poting Bato SD		1	1	-	162	162	-	875	875
	Municipal Total		7	7	-	1,932	1,932	-	10,292	10,292
Carmen	Poblacion WS	1		1	689	-	689	3,445	-	3,445
	Rojales-Vinagre WSS		2	2	-	110	110	-	524	524
	Municipal Total	1	2	3	689	110	799	3,445	524	3,969
Jabonga	A. Beltran WSS		1	1	-	108	108	-	635	635
	Baleguian WS		1	1	-	329	329	-	1,839	1,839
	Bunga WSS		1	1	-	150	150	-	850	850
	Celopan WS	1		1	462	-	462	2,718	-	2,718
	Colorado WS		1	1	-	200	200	-	1,049	1,049
	CuyagoWSS		1	1	-	83	83	-	525	525
	Libas WSS		1	1	-	243	243	-	1,245	1,245
	Magdagooc SS		1	1	-	139	139	-	758	758
	Maraiging WS		1	1	-	60	60	-	323	323
	San Jose WSS		1	1	-	117	117	-	635	635
	San Pablo SWS		1	1	-	155	155	-	840	840
	San Vicente WSS		1	1	-	252	252	-	1,488	1,488
	Sto. Niño WS		1	1	-	152	152	-	924	924
	Municipal Total	1	12	13	462	1,988	2,450	2,718	11,111	13,829
Kitcharao	Hinimbangan WS		1	1	-	38	38	-	200	200
	Kitcharao WS	1		1	1,164	-	1,164	6,370	-	6,370
	Mahayahay WS		1	1	-	237	237	-	1,306	1,306
	San Isidro		1	1	-	155	155	-	800	800
	San Roque WS		1	1	-	239	239	-	1,195	1,195
	Municipal Total	1	4	5	1,164	669	1,833	6,370	3,501	9,871
Las Nieves	Lingayao WSS		1	1		282	282		1,692	1,692
	Maninggalao WSS		1	1		145	145		792	792
	Poblacion WSS	1		1	88		88	528		528
	Tinucuran WSS		1	1		65	65		500	500
	Municipal Total	1	3	4	88	492	580	528	2,984	3,512
Magallanes	Magallanes WSS	1	5	6	1,620	284	1,904	9,260	1,574	10,834
	Tood-oy WS		1	1	-	214	214	-	1,118	1,118
	Municipal Total	1	6	7	1,620	498	2,118	9,260	2,692	11,952
Nasipit	Amontay SD		1	1	-	234	234	-	1,238	1,238
	Aclan SD		1	1	-	115	115	-	690	690
	Municipal Total		2	2	-	349	349	-	1,928	1,928
Remedios T. Romualdez	Balang-Balang WS		1	1	-	157	157	-	885	885
	Basilisa WS		1	1	-	42	42	-	236	236
	Humilog WS		1	1	-	199	199	-	1,048	1,048
	Panaytayon WS		1	1	-	101	101	-	566	566
	San Antonio WS		1	1	-	55	55	-	292	292
	Tagbongabong WS		1	1	-	190	190	-	950	950
	Municipal Total		6	6	-	744	744	-	3,977	3,977
Santiago	E. Morgado SWS		1	1	-	112	112	-	909	909
	Curva SWS		1	1	-	198	198	-	1,239	1,239
	Jagupit SWS		1	1	-	177	177	-	1,140	1,140
	Mabaho SWS		1	1	-	198	198	-	1,460	1,460
	San Isidro SWS		1	1	-	248	248	-	1,648	1,648
	Santiago SWS	2		2	1,198	-	1,198	7,523	-	7,523
	Municipal Total	2	5	7	1,198	933	2,131	7,523	6,396	13,919
Tubay	Dula Rosario WWS		1	1	-	30	30	-	168	168
	Poblacion 1 WS	1		1	96	-	96	537	-	537
	Poblacion 2 WS	1		1	102	-	102	571	-	571
	Municipal Total	2	1	3	198	30	228	1,108	168	1,276
Provincial Total		10	51	61	5,595	8,565	14,161	31,992	48,441	80,433

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 (lltrs/day)	Dirty Water[1]	Taste or Smell[2]	Supply Interruption (number/month)				Supply Water Pressure (% of total)	
					Power Failure	Pump Breakdown	Pipe Burst	Others	Adequate	Inadequate
Buenavista	Alubihid WS	6		G						
	Guinabsan WS	24		G						
	Pob. 7 WS	10		G						
	Sacol WSS	24		G						
Cabadbaran	Cabadbaran WS	12		G						
	Calamba WSD	24		G						
	Concepcion WSD	24		G						
	Del Pilar SWS	24		G						
	La Union WS	24		G						
	Puting Bato SD	24		G						
Carmen	Poblacion WS	6		G						
	Rojales-Vinapor WSS	3		G						
Jabonga	A. Beltran WSS	15		G						
	Baleguian WS	24		G						
	Bunga WSS	8		G						
	Celopan WS	24		G						
	Colorado WS	24		G						
	CuyagoWSS	24		G						
	Libas WSS	24		G						
	Magdagooc SS	24		G						
	Maraiging WS	24		G						
	San Jose WSS	6		G						
	San Pablo SWS	8		G						
	San Vicente WSS	12		G						
	Sto. Niño WS	12		G						
Kitcharao	Himimbangan WS	24		G						
	Kitcharao WS	12		G						
	Mahayahay WS	24		G						
	San Isidro	2		G						
	San Roque WS	6		G						
Las Nieves	Lingayao WSS	24		G						
	Maninggalao WSS	24		G						
	Poblacion WSS	6		G						
	Tinucuran WSS	8		G						
Magallanes	Magallanes WSS	3		G						
	Taod-oy WS	16		G						
Nasipit	Amontay SD	24		G						
	Aclan SD	24		G						
Remedios T. Romualdez	Balang-Balang WS	24		G						
	Basilisa WS	12		G						
	Humilog WS	14		G						
	Panaytayon WS	6		G						
	San Antonio WS	24		G						
	Tagbongabong WS	24		G						
Santiago	E. Morgado SWS	12		G						
	Curva SWS	24		G						
	Jagupit SWS	24		G						
	Mababo SWS	24		G						
	San Isidro SWS	12		G						
	Santiago SWS	24		G						
Tubay	Doña Rosario WWS	10		G						
	Poblacion 1 WS	10		G						
	Poblacion 2 WS	10		G						

Note: 1. Dirty Water: E - Everyday, OW - Once a week, OM - Once a month, O - Ocassional.
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							
		Tech. Professional	Administrative Staff	Collector	Total Number of Staff	Repair Work			
						Local Tradesman	MEO CEO	DEO	Others
Buenavista	Alubihid WS	2	2	1	5				Comm.
	Guinabsan WS								Comm.
	Pob. 7 WS	1		1	2				Comm.
	Sacol WSS	2	3	2	7				Comm.
Cabadbaran	Cabadbaran WS								Comm.
	Calamba WSD		1		1				Comm.
	Concepcion WSD		1		1				Comm.
	Del Pilar SWS								Comm.
	La Union WS		1		1				Comm.
	Puting Bato SD								Comm.
Carmen	Poblacion WS		1		1		✓		
	Rojales-Vinapor WSS		1	6	7				Brgy.
Jabonga	A. Beltran WSS		1		1		✓		Comm.
	Bafeguian WS		1		1		✓		
	Bunga WSS		1		1				Comm.
	Cetopan WS		1		1		✓		Comm.
	Colorado WS		1		1				Comm.
	CuyagoWSS								Comm.
	Libas WSS		1		1		✓		Comm.
	Magdagooc SS		1		1				Comm.
	Maraiging WS		1		1				Comm.
	San Jose WSS		1		1				Comm.
	San Pablo SWS		1		1				Comm.
	San Vicente WSS		1		1				Comm.
	Sto. Niño WS		1		1				Comm.
Kitcharao	Hinimbangan WS		1		1				Comm.
	Kitcharao WS		2		2		✓		
	Mahayahay WS		1		1		✓		
	San Isidro		1		1				Comm.
	San Roque WS		1		1		✓		
Las Nieves	Lingayao WSS								Comm.
	Maninggalao WSS								Comm.
	Poblacion WSS	1			1		✓		
	Tinucuran WSS	1			1				Comm.
Magallanes	Magallanes WSS		2		2		✓		Comm.
	Taod-oy WS	1	1		2		✓		
Nasipit	Amontay SD								
	Aclan SD	3			3				Comm.
Remedios T. Romualdez	Balang-Balang WS								Comm.
	Basilisa WS								Comm.
	Humilog WS						✓		Comm.
	Panaytayon WS								Comm.
	San Antonio WS								Comm.
	Tagbongabong WS								Comm.
Santiago	E. Morgado SWS	1			1		✓		
	Curva SWS	1			1		✓		
	Jagupit SWS		1		1		✓		
	Mabaho SWS		1		1		✓		
	San Isidro SWS		1		1		✓		
	Santiago SWS	5	2	5	12		✓		
Tubay	Doña Rosario WWS	1			1		✓		
	Poblacion 1 WS	1			1		✓		
	Poblacion 2 WS	1			1				Comm.

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

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 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 Pail	Cost per Cu. Meter	Cost per HH/Mon.	Other	
		(P '000.00 / year)							(Year)	(Pesos)				
Buenavista	Alabang WS											40.00		
	Guinobsan WS													
	Poh 7 WS											40.00		
	Sacol WSS											20.00		
Cabadbaran	Cabadbaran WS													
	Calamba WSD													
	Concepcion WSD													
	Del Pilar SWS													
	La Union WS													
	Puting Bato SD													
Carmen	Poblacion WS													
	Rojales-Vinapor WSS											20.00		
Jabonga	A. Beltran WSS													
	Bulegusan WS													
	Bunga WSS													
	Celopan WS													
	Colorado WS													
	CuyagoWSS													
	Libas WSS													
	Magtagobe SS													
	Maraigne WS													
	San Jose WSS													
	San Pablo SWS													
	San Vicente WSS													
	Sto. Niño WS													
Kitcharao	Hinimbangan WS													
	Kitcharao WS													
	Mahayahay WS													
	San Isidro													
	San Roque WS													
Las Nieves	Lingayao WSS											30.00		
	Maninggalao WSS													
	Poblacion WSS											40.00		
	Tinugcupan WSS											30.00		
Magallanes	Magallanes WSS													
	Taod-oy WS													
Nasipit	Amontay SD													
	Aglan SD													
Remedios T. Komuakdez	Balang-Balang WS													
	Basilisa WS													
	Humilog WS													
	Panaytayon WS													
	San Antonio WS													
	Tagbongabong WS													
Santiago	E. Morgado SWS													
	Curva SWS													
	Jagupit SWS													
	Mabaho SWS													
	San Isidro SWS													
	Santiago SWS													
Tubay	Doña Rosario WWS													
	Poblacion I WS													
	Poblacion 2 WS													

Table 4.1.2 Details on Existing Level II Systems

Sheet 6 of 6

Name of Municipality	Name of Operating Body	Billings					Revenues				
		Annual Billing	Public Faucet Consumer	House Connection Consumers	Expected Subsidies	Others	Annual Income	Payment by Public Faucet Consumers	Payment by House Connection Consumer	Subsidies	Other
		(Number)					(P '000.00 / year)				
Buenavista	Alubihid WS										
	Guinabsan WS										
	Pob. 7 WS										
	Sucol WSS										
Cabadbaran	Cabadbaran WS										
	Calamba WSD										
	Concepcion WSD										
	Del Pilar SWS										
	La Union WS										
	Puting Bato SD										
Carmen	Poblacion WS										
	Roxales-Vinajor WSS										
Jabonga	A. Beltran WSS										
	Balegunan WS										
	Bunga WSS										
	Celopan WS										
	Colorado WS										
	CuvagoWSS										
	Libas WSS										
	Maydarooc SS										
	Maraiging WS										
	San Jose WSS										
	San Pablo SWS										
	San Vicente WSS										
	Sto. Nino WS										
Kitcharao	Himimbangan WS										
	Kitcharao WS										
	Mahayahay WS										
	San Isidro										
	San Roque WS										
Las Nieves	Lingayao WSS										
	Maninggalao WSS										
	Poblacion WSS										
	Tinucuran WSS										
Magallanes	Magallanes WSS										
	Tiaod-ov WS										
Nasipit	Amontay SD										
	Aclan SD										
Remedios T. Romualdez	Balang-Balang WS										
	Basilisa WS										
	Humilog WS										
	Panaytayon WS										
	San Antonio WS										
	Taybongabong WS										
Santiago	E. Morgado SWS										
	Curva SWS										
	Javuplit SWS										
	Mabaho SWS										
	San Isidro SWS										
	Santiago SWS										
Tubay	Dona Rosario WWS										
	Poblacion 1 WS										
	Poblacion 2 WS										

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 50% of the 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 (1,172) occupies 91% of the total number of Level I facilities (2,609) 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 of Level I Facilities

Name of Municipality	No. of Level I Facilities Subjected for Bacteriological Examination	Unsafe (%)
Buenavista	26	73
Cabadbran	49	27
Carmen	25	76
Jabonga	8	88
Kitcharo		
Las Nievas	3	33
Magallanes	30	57
Naspit	15	40
Remedios T. Romualdes	19	21
Santiago	9	67
Tubay	11	55
Provincial Total	195	50

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.

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 Collector	Sub-total	Shallow Well	Open Dug Well	Rain Water Collector	Sub-total		
Buenavista	Urban	7	26		1	34		38		38	72	69				69	103			103	172	244
	Rural	10	38			48		24		24	73	104				104	66	9		75	178	251
	Total	17	64		1	82		62		62	144	173				173	169	9		178	351	495
Cabadbaran	Urban	33	4			37	197	7		204	242	2				2	3			3	6	248
	Rural	181	1			182	114			114	296	1				1					1	297
	Total	214	6			220	311	7		318	538	2				2	3			3	5	543
Carmen	Urban		4		1	5		20		20	25	13				13	62			62	75	100
	Rural	17	16		2	35	1	23		24	59	49				49	74			74	123	182
	Total	17	20		3	40	1	43		44	84	62				62	136			136	198	282
Jabonga	Urban	3				3					3											3
	Rural	22			3	25	30			30	55											55
	Total	25			3	28	30			30	58											58
Kitcharao	Urban	1	3			4		5		5	9											9
	Rural	9	5			14	9	4		13	27											27
	Total	10	8			18	9	9		18	36											36
Las Nieves	Urban	2				2					2											2
	Rural	7	14			21		11		11	32	7				7	6	226		232	239	271
	Total	9	14			23		11		11	34	7				7	6	226		232	239	273
Magallanes	Urban																	54		54	54	54
	Rural	10	2			12	7	2		9	21	3				3	2	361		363	366	387
	Total	10	2			12	7	2		9	21	3				3	2	415		417	420	441
Nasipit	Urban	16	23			39		5		5	44	16				16	3			3	19	63
	Rural	12	98		4	114	3	49		52	166	66				66	32			32	98	264
	Total	28	122		4	154	3	53		56	210	81				81	36			36	117	327
Remedios T. Romualdez	Urban	8	6			14	5	2		7	21	1				1	1			1	2	23
	Rural	13	6		5	24		2		2	26	2				2	6			8	2	28
	Total	21	12		5	38	5	4		9	47	3				3	1			1	4	51
Santiago	Urban	4			2	6					6											6
	Rural	9			7	16					16											16
	Total	13			9	22					22											22
Tubay	Urban	1	6		3	10		3		3	13	8				8	3			3	11	24
	Rural	15	10		13	38		3		3	41	13				13	3			3	16	57
	Total	16	17		16	49		5		5	54	20				20	7			7	27	81
PW4SP Study Area	Urban	751	72		7	154	202	80		282	436	109				109	175	54		229	338	774
	Rural	305	192		34	531	164	118		282	812	243				243	183	596		779	1,023	1,835
	Total	380	264		41	685	366	197		563	1,249	352				352	359	650		1,009	1,360	2,609
Butuan City (Capital)	Urban																					
	Rural																					
	Total																					
Provincial Total	Urban	751	72		7	154	202	80		282	436	109				109	175	54		229	338	774
	Rural	305	192		34	531	164	118		282	812	243				243	183	596		779	1,023	1,835
	Total	380	264		41	685	366	197		563	1,249	352				352	359	650		1,009	1,360	2,609

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 occupy 6% of public facilities.

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

Type of Facility	Public Sources		Private Sources		Total
	Number	%	Number	%	
Deep Well	305	65	164	35	469
Shallow Well	192	62	118	38	310
Spring Development	34	100	0	0	34
Others	0		0		0
Total	531	65	282	35	813

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 Levels I and II. To come up with more realistic service coverage, the unserved population in 1997 was referred to 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 Levels 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 the overall population covered by Level I facilities and the number of households.

The number of households per shared public/private facility ranges mostly from 4 to 20 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 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 35,000 persons or 78 % of the total population is covered by public Level I facilities from the figures shown in Table 4.1.6 (b).

Table 4.1.5 Estimation of Unserved Population by Municipality

Name of Municipality	Area	Population and Household Size (1997)		Served Population			Unserved Population				Population Covered by Level I Facilities
							Unserved Percentage (1995)			Unserved Population 1997	
		Number	HH Size	Level III	Level II	Total	Total No. of HHs	No. of Unserved HHs	%		
Buenavista	Urban	14,470	5.19		1,040	1,040	2,663	517	19	2,809	10,621
	Rural	32,641	5.45		4,868	4,868	5,720	1,936	34	11,048	16,725
	Total	47,111	5.37		5,908	5,908	8,383	2,453	29	13,857	27,346
Cabadbaran	Urban	17,005	5.48				2,976	372	13	2,126	14,879
	Rural	37,104	5.33		10,292	10,292	6,672	1,393	21	7,747	19,065
	Total	54,109	5.38		10,292	10,292	9,648	1,765	18	9,872	33,945
Carmen	Urban	4,323	5.27		3,445	3,445	809	134	17	716	162
	Rural	11,860	5.20		524	524	2,252	504	22	2,654	8,682
	Total	16,183	5.22		3,969	3,969	3,061	638	21	3,370	8,844
Jabonga	Urban	3,028	5.65		2,718	2,718	519	257	50	310	
	Rural	17,838	5.69		11,111	11,111	3,036	965	32	5,670	1,057
	Total	20,866	5.68		13,829	13,829	3,555	1,222	34	5,980	1,057
Kitcharao	Urban	6,573	5.48		6,370	6,370	1,164	139	12	203	
	Rural	8,563	5.47		3,501	3,501	1,517	522	34	2,947	2,115
	Total	15,136	5.48		9,871	9,871	2,681	661	25	3,150	2,115
Las Nieves	Urban	1,109	5.89		528	528	177				581
	Rural	23,325	5.67		2,984	2,984	3,868	1,538	40	9,275	11,066
	Total	24,434	5.68		3,512	3,512	4,045	1,538	38	9,275	11,647
Magallanes	Urban	13,265	5.63		9,260	9,260	2,283	71	3	413	3,592
	Rural	4,813	5.69		2,692	2,692	820	267	33	1,567	554
	Total	18,078	5.65		11,952	11,952	3,103	338	11	1,980	4,146
Nasipit	Urban	16,131	5.19	9,804		9,804	3,000	30	1	161	6,166
	Rural	19,332	5.38	8,076	1,928	10,004	3,469	111	3	619	8,709
	Total	35,463	5.30	17,880	1,928	19,808	6,469	141	2	780	14,875
Remedios T. Romualdez	Urban	3,758	5.65				630	138	22	823	2,935
	Rural	9,572	5.24		3,977	3,977	1,729	516	30	2,857	2,738
	Total	13,330	5.35		3,977	3,977	2,359	654	28	3,680	5,673
Santiago	Urban	8,058	6.28		7,523	7,523	1,198	972	81		535
	Rural	8,669	6.67		6,396	6,396	1,213	988	81	2,273	
	Total	16,727	6.48		13,919	13,919	2,411	1,960	81	2,273	535
Tubay	Urban	3,226	5.80		1,108	1,108	537	356	66	2,118	
	Rural	14,046	5.65		168	168	2,398	1,336	56	7,825	6,053
	Total	17,272	5.68		1,276	1,276	2,935	1,692	58	9,943	6,053
PW4SP Study Area	Urban	90,946	5.48	9,804	31,992	41,796	15,956	2,986	19	9,679	39,471
	Rural	187,763	5.51	8,076	48,441	56,517	32,694	10,076	31	54,480	76,766
	Total	278,709	5.50	17,880	80,433	98,313	48,650	13,062	27	64,159	116,237
Butuan City (Capital)	Urban	96,714	5.29	49,373		49,373	17,651	1,828	10	10,016	37,325
	Rural	159,374	5.31	21,985		21,985	28,945	6,853	24	37,733	99,656
	Total	256,088	5.30	71,358		71,358	46,596	8,681	19	47,749	136,981
Provincial Total	Urban	187,660	5.38	59,177	31,992	91,169	33,607	4,814	14	19,695	76,796
	Rural	347,137	5.42	30,061	48,441	78,502	61,639	16,929	27	92,214	176,421
	Total	534,797	5.40	89,238	80,433	169,671	95,246	21,743	23	111,909	253,217

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
Buenavista	Urban	10,621	34	69	103	38	103	141	19	51	71	99	267	366
	Rural	16,725	48	104	152	24	75	99	12	37	50	63	194	257
	Total	27,346	82	173	255	62	178	240	31	89	120	162	461	623
Cabadbaran	Urban	14,879	37	2	39	204	3	207	102	1	104	560	7	567
	Rural	19,065	182	1	183	114	-	114	57	-	57	312	-	312
	Total	33,945	220	2	222	318	3	321	159	1	161	872	7	880
Carmen	Urban	162	5	13	18	20	62	82	10	31	41	52	164	216
	Rural	8,682	35	49	84	24	74	98	12	37	49	64	194	258
	Total	8,844	40	62	102	44	136	180	22	68	90	116	358	474
Jabonga	Urban	-	3	-	3	-	-	-	-	-	-	-	-	-
	Rural	1,057	25	-	25	30	-	30	15	-	15	85	-	85
	Total	1,057	28	-	28	30	-	30	15	-	15	85	-	85
Kitcharao	Urban	-	4	-	4	5	-	5	3	-	3	-	-	-
	Rural	2,115	14	-	14	13	-	13	7	-	7	36	-	36
	Total	2,115	18	-	18	18	-	18	9	-	9	36	-	36
Las Nieves	Urban	581	2	-	2	-	-	-	-	-	-	-	-	-
	Rural	11,066	21	7	28	11	232	243	6	116	122	34	682	716
	Total	11,647	23	7	30	11	232	243	6	116	122	34	682	716
Magallanes	Urban	3,592	-	-	-	-	54	54	-	27	27	-	152	152
	Rural	554	12	3	15	9	363	372	4	182	186	25	1,023	1,047
	Total	4,146	12	3	15	9	417	426	4	209	213	25	1,175	1,199
Nasipit	Urban	6,166	39	16	55	5	3	8	2	2	4	12	8	21
	Rural	8,709	114	66	180	52	32	84	26	16	42	134	84	218
	Total	14,875	154	81	235	56	36	92	28	18	46	146	92	239
Remedios T. Romualdez	Urban	2,935	14	1	15	7	1	8	4	0	4	21	2	23
	Rural	2,738	24	2	26	2	0	2	1	0	1	4	1	6
	Total	5,673	38	3	41	9	1	10	4	1	5	25	3	28
Santiago	Urban	535	6	-	6	-	-	-	-	-	-	-	-	-
	Rural	-	16	-	16	-	-	-	-	-	-	-	-	-
	Total	535	22	-	22	-	-	-	-	-	-	-	-	-
Tubay	Urban	-	10	8	18	3	3	6	1	2	3	-	-	-
	Rural	6,053	38	13	51	3	3	6	1	2	3	8	10	17
	Total	6,053	49	20	69	5	7	12	3	3	6	8	10	17
PW4SP Study Area	Urban	39,471	154	109	263	282	229	511	141	115	256	744	601	1,345
	Rural	76,766	531	243	774	282	779	1,061	141	390	531	764	2,188	2,952
	Total	116,237	685	352	1,037	563	1,009	1,572	282	504	786	1,508	2,788	4,296
Butuan City (Capital)	Urban	37,325	-	-	-	-	-	-	-	-	-	-	-	-
	Rural	99,656	-	-	-	-	-	-	-	-	-	-	-	-
	Total	136,981	-	-	-	-	-	-	-	-	-	-	-	-
Provincial Total	Urban	76,796	154	109	263	282	229	511	141	115	256	744	601	1,345
	Rural	176,421	531	243	774	282	779	1,061	141	390	531	764	2,188	2,952
	Total	253,217	685	352	1,037	563	1,009	1,572	282	504	786	1,508	2,788	4,296

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			No. of Hhs per Shared Facility	Safe		Unsafe		Total		
		Safe	Unsafe	Total	Safe	Unsafe	Total		Pop.	%	Pop.	%	Pop.	%	
Buenavista	Urban	3,225	7,030	10,255	621	1,354	1,976	11	3,324	23	7,297	50	10,621	73	
	Rural	5,021	11,447	16,468	921	2,100	3,022	15	5,084	16	11,641	36	16,725	51	
	Total	8,246	18,477	26,723	1,543	3,455	4,998	13	8,408	18	18,938	40	27,346	58	
Cabadbaran	Urban	14,312	-	14,312	2,612	-	2,612	18	14,872	87	7	0	14,879	88	
	Rural	18,753	-	18,753	3,518	-	3,518	15	19,065	51	-		19,065	51	
	Total	33,065	-	33,065	6,130	-	6,130	16	33,937	63	7	0	33,945	63	
Carmen	Urban	-	-	-	-	-	-		52	1	164	4	216	5	
	Rural	3,051	5,372	8,423	587	1,033	1,620	12	3,115	26	5,567	47	8,682	73	
	Total	3,051	5,372	8,423	587	1,033	1,620	8	3,167	20	5,731	35	8,898	55	
Jabonga	Urban	-	-	-	-	-	-		-		-		-		
	Rural	972	-	972	171	-	171	4	1,057	6	-		1,057	6	
	Total	972	-	972	171	-	171	4	1,057	5	-		1,057	5	
Kitcharao	Urban	-	-	-	-	-	-		-		-		-		
	Rural	2,080	-	2,080	380	-	380	19	2,115	25	-		2,115	25	
	Total	2,080	-	2,080	380	-	380	14	2,115	14	-		2,115	14	
Las Nieves	Urban	581	-	581	99	-	99	49	581	52	-		581	52	
	Rural	1,981	8,370	10,351	349	1,476	1,826	12	2,015	9	9,052	39	11,066	47	
	Total	2,562	8,370	10,932	448	1,476	1,924	13	2,596	11	9,052	37	11,647	48	
Magallanes	Urban	-	3,440	3,440		611	611	23	-		3,592	27	3,592	27	
	Rural	-	-	-		-	-		25	1	1,023	21	1,047	22	
	Total	-	3,440	3,440		611	611	3	25	0	4,615	26	4,640	26	
Nasipit	Urban	4,368	1,777	6,145	842	342	1,184	20	4,381	27	1,785	11	6,166	38	
	Rural	5,500	2,991	8,491	1,022	556	1,578	7	5,634	29	3,075	16	8,709	45	
	Total	9,869	4,768	14,636	1,864	898	2,762	10	10,015	28	4,860	14	14,875	42	
Remedios T. Romualdez	Urban	2,659	253	2,912	471	45	515	27	2,680	71	255	7	2,935	78	
	Rural	2,547	186	2,733	486	36	522	19	2,551	27	187	2	2,738	29	
	Total	5,206	439	5,645	957	80	1,037	23	5,231	39	442	3	5,673	43	
Santiago	Urban	535	-	535	85	-	85	14	535	7	-		535	7	
	Rural	-	-	-		-	-		-		-		-		
	Total	535	-	535	85	-	85	4	535	3	-		535	3	
Tubay	Urban	-	-	-	-	-	-		-		-		-		
	Rural	4,450	1,585	6,035	788	281	1,068	20	4,458	32	1,595	11	6,053	43	
	Total	4,450	1,585	6,035	788	281	1,068	14	4,458	26	1,595	9	6,053	35	
PW4SP Study Area	Urban	25,681	12,500	38,181	4,729	2,353	7,082	14	26,424	29	13,101	14	39,525	43	
	Rural	44,355	29,952	74,307	8,223	5,482	13,705	11	45,119	24	32,140	17	77,259	41	
	Total	70,036	42,452	112,488	12,952	7,835	20,787	11	71,543	26	45,241	16	116,784	42	
Butuan City (Capital)	Urban	-	37,325	37,325		7,056	7,056		-		37,325	39	37,325	39	
	Rural	-	99,656	99,656		18,768	18,768		-		99,656	63	99,656	63	
	Total	-	136,981	136,981		25,823	25,823		-		136,981	53	136,981	53	
Provincial Total	Urban	25,681	49,825	75,506	4,729	9,408	14,138	27	26,424	14	50,426	27	76,850	41	
	Rural	44,355	129,608	173,963	8,223	24,249	32,472	25	45,119	13	131,796	38	176,915	51	
	Total	70,036	179,433	249,469	12,952	33,658	46,610	26	71,543	13	182,221	34	253,765	47	

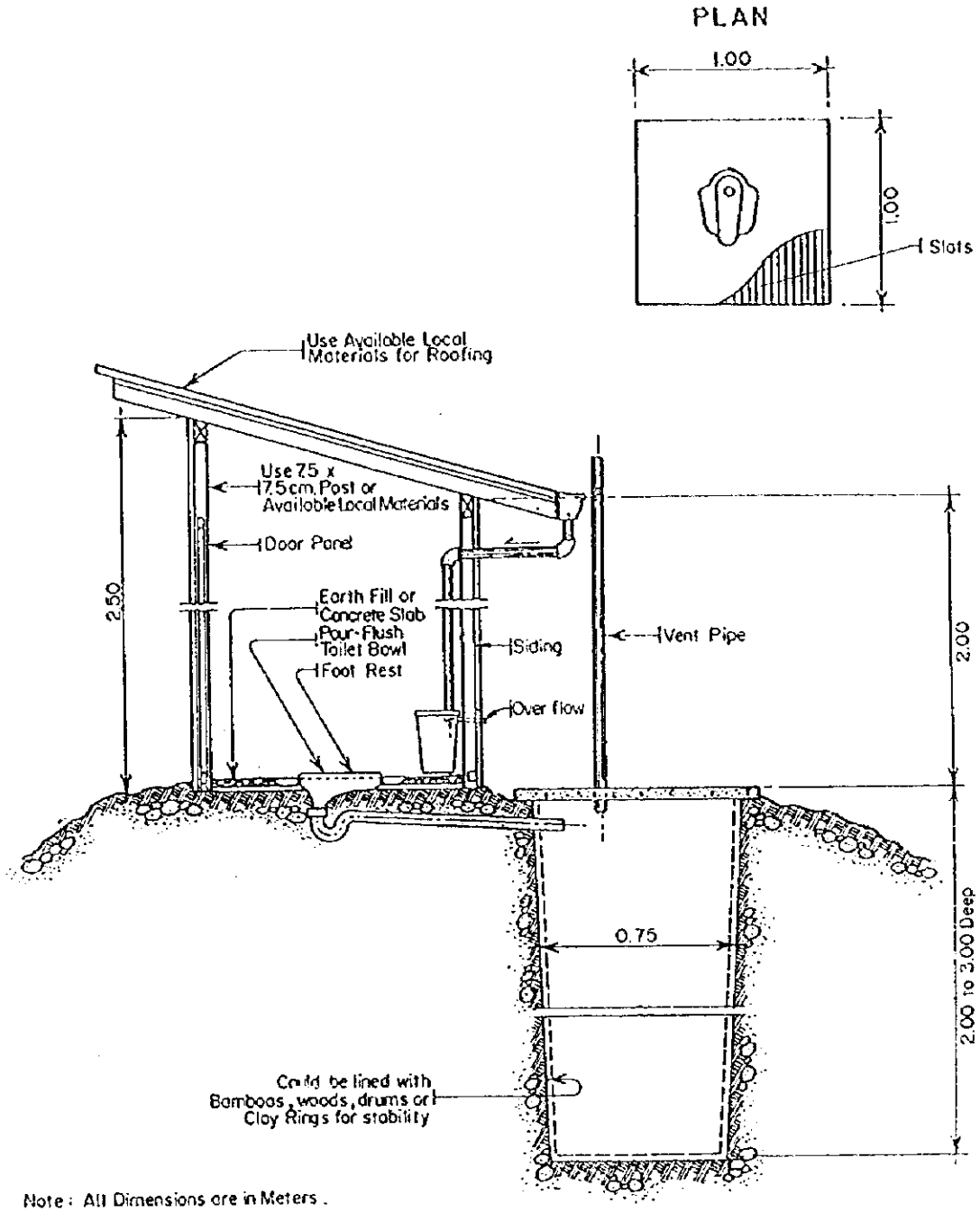
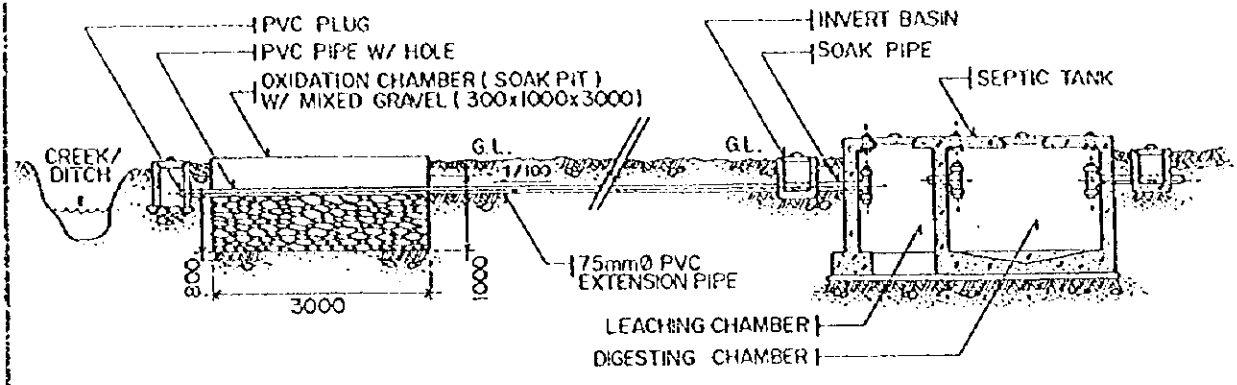


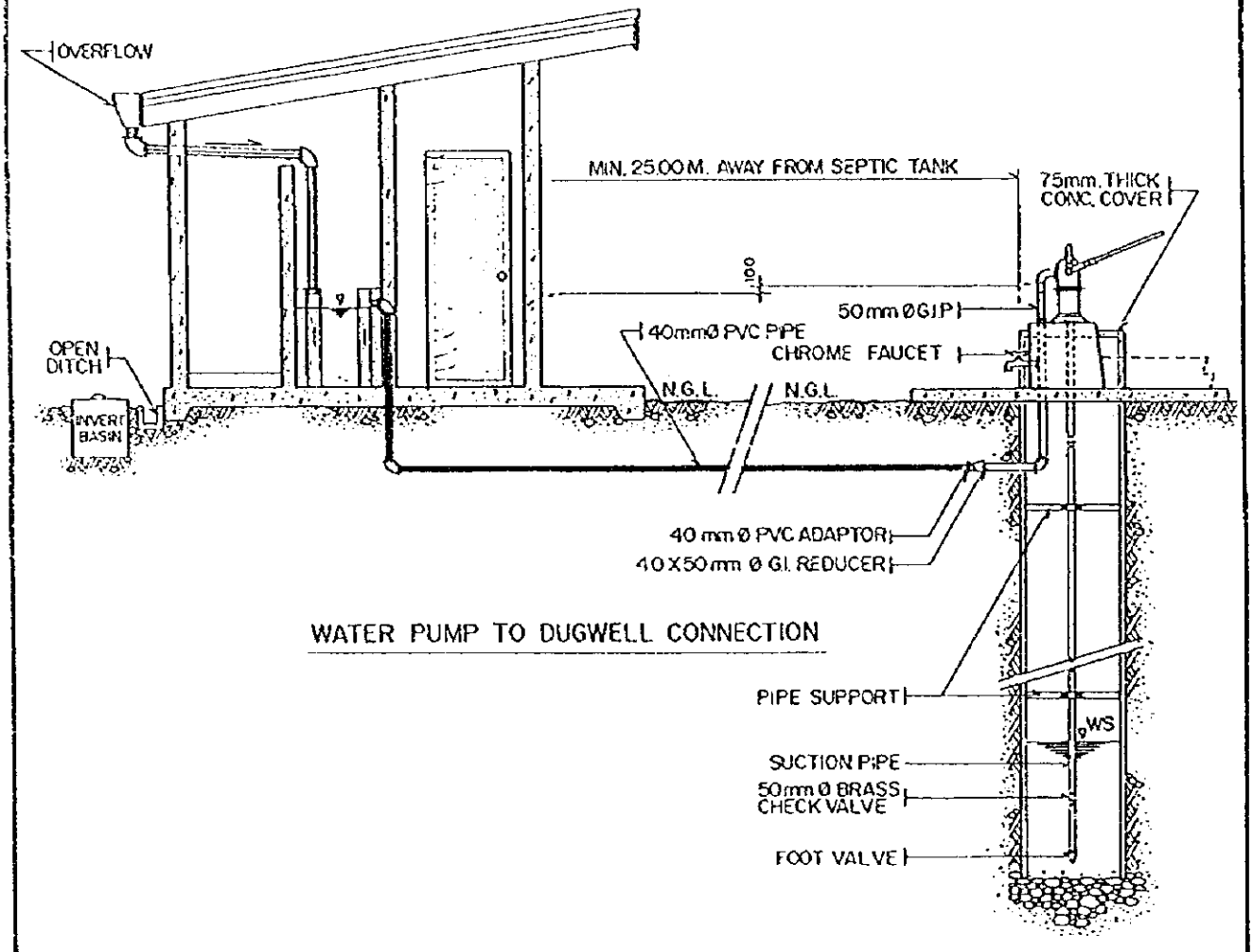
FIGURE 4.2.1

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	%
Buenavista	Urban	2,788			2,103	75			2,103	75	321	12	364	13
	Rural	5,989			4,113	69			4,113	69	1,051	18	825	14
	Total	8,777			6,216	71			6,216	71	1,372	16	1,189	14
Cabadbaran	Urban	3,103	595	19	2,249	72			2,844	92	74	2	185	6
	Rural	6,961	31		5,923	85			5,954	86	377	5	630	9
	Total	10,064	626	6	8,172	81			8,798	87	451	4	815	8
Carmen	Urban	820					753	92	753	92			67	8
	Rural	2,281					1,811	79	1,811	79			470	21
	Total	3,101					2,564	83	2,564	83			537	17
Jabonga	Urban	536			520	97			520	97	8	1	8	1
	Rural	3,135			3,135	100			3,135	100				
	Total	3,671			3,655	100			3,655	100	8		8	
Kitcharao	Urban	1,199			947	79			947	79	174	15	78	7
	Rural	1,565			1,070	68			1,070	68	406	26	89	6
	Total	2,764			2,017	73			2,017	73	580	21	167	6
Las Nieves	Urban	188			127	68			127	68	39	21	22	12
	Rural	4,114			2,457	60			2,457	60	1,291	31	366	9
	Total	4,302			2,584	60			2,584	60	1,330	31	388	9
Magallanes	Urban	2,356			412	17			412	17	970	41	974	41
	Rural	846			452	53			452	53	255	30	139	16
	Total	3,202			864	27			864	27	1,225	38	1,113	35
Nasipit	Urban	3,108			1,935	62			1,935	62	632	20	541	17
	Rural	3,593			3,535	98			3,535	98	43	1	15	
	Total	6,701			5,470	82			5,470	82	675	10	556	8
Remedios T. Romualdez	Urban	665			547	82			547	82	33	5	85	13
	Rural	1,827			1,209	66			1,209	66			618	34
	Total	2,492			1,756	70			1,756	70	33	1	703	28
Santiago	Urban	1,283			997	78			997	78	193	15	93	7
	Rural	1,300			1,230	95			1,230	95	46	4	24	2
	Total	2,583			2,227	86			2,227	86	239	9	117	5
Tubay	Urban	556					366	66	366	66			190	34
	Rural	2,486					1,826	73	1,826	73			660	27
	Total	3,042					2,192	72	2,192	72			850	28
PW4SP Study Area	Urban	16,602	595	4	9,837	59	1,119	7	11,551	70	2,444	15	2,607	16
	Rural	34,097	31		23,124	68	3,637	11	26,792	79	3,469	10	3,836	11
	Total	50,699	626	1	32,961	65	4,756	9	38,343	76	5,913	12	6,443	13

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
Buenavista	Public	20	7,963	174	-	174
	Private	2	1,560	17	-	17
	Total	22	9,523	191	-	191
Cabadbaran	Public	25	10,935	50	12	62
	Private	4	3,089	20	6	26
	Total	29	14,024	70	18	88
Carmen	Public	10	3,783	6	-	6
	Private	1	311	12	2	14
	Total	11	4,094	18	2	20
Jabonga	Public	13	3,819	36	-	36
	Private	-	-	-	-	-
	Total	13	3,819	36	-	36
Kitcharao	Public	7	2,874	48	-	48
	Private	1	412	8	-	8
	Total	8	3,286	56	-	56
Las Nieves	Public	14	4,100	26	2	28
	Private	-	-	-	-	-
	Total	14	4,100	26	2	28
Magallanes	Public	4	2,780	8	12	20
	Private	1	556	14	4	18
	Total	5	3,336	22	16	38
Nasipit	Public	17	5,444	158	-	158
	Private	5	2,410	-	-	-
	Total	22	7,854	158	-	158
Remedios T. Romualdez	Public	1	789	16	-	16
	Private	-	-	-	-	-
	Total	1	789	16	-	16
Santiago	Public	7	3,332	65	-	65
	Private	-	-	-	-	-
	Total	7	3,332	65	-	65
Tubay	Public	12	3,451	22	2	24
	Private	-	-	-	-	-
	Total	12	3,451	22	2	24
PW4SP Study Area	Public	130	49,270	609	28	637
	Private	14	8,338	71	12	83
	Total	144	57,608	680	40	720

Table 4.2.3 Number of Public Toilets Facilities in 1997

Name of Municipality	Public Markets			Bus/Jeepney Terminals			Parks/Playground			Total Number of Toilets
	No.of Sanitary Toilets	No. of Unsani-tary Toilets	Sub-total	No.of Sanitary Toilets	No. of Unsani-tary Toilets	Sub-total	No.of Sanitary Toilets	No. of Unsani-tary Toilets	Sub-total	
Buenavista	1		1	1		1	2		2	4
Cabadbaran	1		1	1		1	2		2	4
Carmen	1		1				3		3	4
Jabonga										
Kitcharao							2		2	2
Las Nieves	1		1							1
Magallanes	1		1	1		1				2
Nasipit	1		1	1		1				2
R. T. Romualdez	1		1							1
Santiago	1		1							1
Tubay	1		1							1
PW4SP Study Area	9		9	4		4	9		9	22