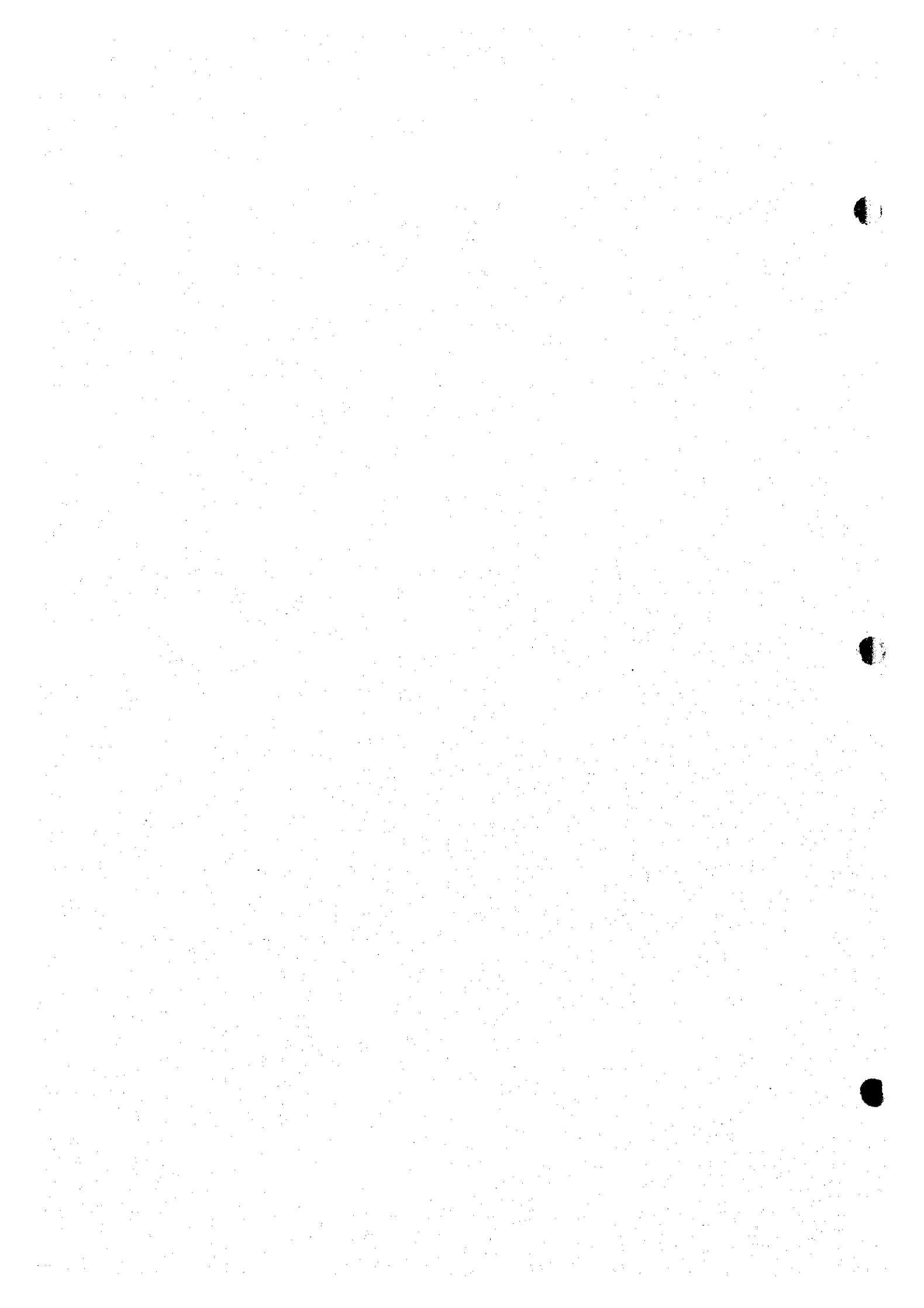


Chapter

8

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**FUTURE REQUIREMENTS IN WATER  
SUPPLY AND SANITATION IMPROVEMENT**



## 8. FUTURE REQUIREMENTS IN WATER SUPPLY AND SANITATION IMPROVEMENT

### 8.1 General

Phased investments for provincial sector development are planned in almost the same manner as adopted in the 1998 Philippine National Development Plan (PNDP) and the National Sector Master Plan (NSMP), Medium-Term Investment covering the years 2000 to 2004 and Long-Term Development covering the period 2005 to 2010.

Targets of provincial service coverage for the two phases are established as percentages of beneficiaries or utilities to be served by sub-sector. Service coverage in the base year (1998) and national sector targets indicated in the National Sector Master Plan (NSMP) and the updated Medium-Term Philippine Development Plan, 1996 - 1998 (MFPDP) are the bases of the study. Sector targets that are not prescribed in the national plan; school and public toilets as well as sewerage are assumed based on current conditions. In addition, preliminary discussions on solid waste management are included as a vital component of sanitation sector.

Projection of frame values by municipality is undertaken for respective sub-sectors: future population by urban and rural area, the number of student enrollment to public schools and the number of public utilities. Reference base figures for the study of framework are the 1995 Census of Population and Housing, the statistical data of the province and the information from relevant agencies. Provincial population by target year and the base year (1998) is estimated referring to the NSO population census results (past 10 census periods: 1903 - 1995), the 1995 Census-based National and Regional Population projection prepared by NSO, the 1995 Census-based Regional and Provincial Population projection prepared by the NEDA Regional Office VIII and the Provincial Physical Framework Plan/Comprehensive Provincial Land Use Plan. While, the population distribution to urban and rural areas prepared by NSO in 1995 is modified to meet actual conditions in the classification of the areas.

Types of required facilities and their implementation criteria according to service level standards are referred to the NSMP and the NEDA Board Resolution No. 12 (s. 1995). Some planning conditions and assumptions not prescribed in the national plan are conferred to the relevant standards of sector agencies and provincial government. For sewerage requirements, the deficit in sanitation must first be addressed. Partial upgrading of on-site disposal to a sewerage system (off-site disposal) is envisaged in the final target year.

In estimating future requirements by municipality, additional population (or number of students/public utilities) to be served by sub-sector is first calculated as a shortfall at target years in comparison between each target and its base year service coverage. In this regard, planned/on-going projects to be completed by respective base years are considered as part of existing services for each target year. Required number of facilities by sector component is then estimated corresponding to the said additional population (or number of students/public utilities) to be served. Rehabilitation work for Level I facilities limited to new deep wells to be constructed under PW4SP is taken into account. Generally, rehabilitation of deep wells and shallow wells constructed by means of conventional method is difficult.

Logistic support is considered as a minimum requirement of LGUs for community development and training, and other relevant activities along with the implementation of PW4SP. The types and number of well drilling/rehabilitation equipment and supporting vehicle for Level I facilities are also suggested as reference information. Also, minimum requirements for setting up a provincial laboratory to support drinking water quality surveillance and monitoring are described. This will include building, instrument/equipment and reagent/chemical requirements. The 1993 Philippine National Standards for Drinking Water (PNSDW) requires that initial examinations of water from newly constructed sources should first be undertaken before operation for public use and henceforth periodic examinations of these water supply sources/facilities.

Project priority for medium-term development is discussed entailing general criteria to identify specific projects. However, at the provincial level master plan, it is suggested that municipal priority ranking be used for allocation of provincial fund.

## **8.2 Targets of Provincial Sector Plan**

Provincial sector targets for the years 2004 and 2010 are determined as the provincial average of the desirable minimum level for each sub-sector. Table 8.2.1 summarizes the target percentages to be served by sub-sector. Details by sub-sector are discussed in this sub-section.

### **(1) Water supply**

The base year (1998) service coverage was calculated as a total of 1998 figures and expected by planned/on-going projects scheduled to be completed by 1999. Table 8.2.2 shows service coverage for the planning purpose (details are referred to Supporting Report).

Table 8.2.1 Provincial Sector Targets

Sub-sector	Base Year Service Coverage	Phase I (2000-2004)		Phase II (2005-2011)	
		Population Coverage (%)	Additional Population to be Served	Population Coverage (%)	Additional Population to be Served
<b>Water Supply</b>	Population Coverage (%)	Population Coverage (%)	Additional Population to be Served	Population Coverage (%)	Additional Population to be Served
<i>Urban Water Supply</i>	68	69	12,446	95	117,322
<i>Rural Water Supply</i>	52	59	22,230	93	98,333
<b>Sanitation</b>	Household Coverage (%)	Household Coverage (%)	Additional Households to be Served	Household Coverage (%)	Additional Households to be Served
<i>Household Toilet</i>					
<i>Urban Area</i>	72	85	8,268	93	15,034
Flush	3	15	2,354	50	14,730
Pour Flush	75	80	5,651	50	304
VIP/Dry	21	5	263	0	0
<i>Rural Area</i>	56	68	12,326	90	26,849
Flush	1	3	18	10	258
Pour Flush	68	75	8,933	90	26,591
VIP/Dry	31	22	3,375	0	0
<i>School Toilet</i>	Public School Student Coverage (%)	Public School Student Coverage (%)	Additional Public School Students to be Served	Public School Student Coverage (%)	Additional Public School Students to be Served
	56	85	29,624	90	13,212
<i>Public Toilet</i>	Public Utilities Coverage (%)	Public Utilities Coverage (%)	Additional Public Utilities with Sanitary Toilets	Public Utilities Coverage (%)	Additional Public Utilities with Sanitary Toilets
	100	100	7	100	0
<i>Sewerage</i>	Urban Population Coverage (%)	Not Applicable		Urban Population Coverage (%)	Urban Population to be Served
	0			50	24,129
<i>Solid Waste</i>	Urban Household Coverage (%)	Urban Household Coverage (%)	Additional Urban Households to be Served	Not Applicable	
	73	750	7,705		

Table 8.2.2 Estimation of Base Year Service Coverage of Water Supply

Name of Municipality	Area	Population (1998)	Population Served by 1998 Facilities				Percentage Coverage
			Level III	Level II	Level I	Total	
Arteche	Urban	4,682			2,680	2,680	57
	Rural	8,279			2,806	2,806	34
	Total	12,961			5,486	5,486	42
Balangiga	Urban	5,970			3,638	3,638	61
	Rural	5,632		1,355	2,050	3,405	60
	Total	11,602		1,355	5,688	7,043	61
Balangkayan	Urban	2,985	1,256	1,710	15	2,981	100
	Rural	6,270			2,550	2,550	41
	Total	9,255	1,256	1,710	2,565	5,531	60
Borongan (Capital)	Urban	20,078	6,348		9,352	15,700	78
	Rural	30,051	319	1,333	15,569	17,221	57
	Total	50,129	6,667	1,333	24,921	32,921	66
Can-avid	Urban	5,674			3,368	3,368	59
	Rural	10,905		1,696	3,033	4,729	43
	Total	16,579		1,696	6,401	8,097	49
Dolores	Urban	11,134		650	6,137	6,787	61
	Rural	24,349		2,369	7,239	9,608	39
	Total	35,483		3,019	13,376	16,395	46
General Macarthur	Urban	4,388			4,157	4,157	95
	Rural	5,788		564		564	10
	Total	10,176		564	4,157	4,721	46
Giporlos	Urban	5,168			3,143	3,143	61
	Rural	4,571		943	705	1,648	36
	Total	9,739		943	3,848	4,791	49
Guiuan	Urban	9,862			6,094	6,094	62
	Rural	26,116		2,620	14,669	17,289	66
	Total	35,978		2,620	20,763	23,383	65
Hernani	Urban	2,211			1,323	1,323	60
	Rural	6,242		304	2,501	2,805	45
	Total	8,453		304	3,824	4,128	49
Jipapad	Urban	3,402			2,500	2,500	73
	Rural	3,152					
	Total	6,554			2,500	2,500	38
Lawaan	Urban	5,212		342	3,066	3,408	65
	Rural	5,145		1,010	2,064	3,074	60
	Total	10,357		1,352	5,130	6,482	63
Llorente	Urban	6,478	506	30		536	8
	Rural	8,871		389	3,494	3,883	44
	Total	15,349	506	419	3,494	4,419	29
Maslog	Urban	1,163		337		337	29
	Rural	2,649		231		231	9
	Total	3,812		568		568	15

Table 8.2.2 Estimation of Base Year Service Coverage of Water Supply

(cont'd)

Name of Municipality	Area	Population (1998)	Population Served by 1998 Facilities				Percentage Coverage
			Level III	Level II	Level I	Total	
Maydolong	Urban	5,374	1,150	2,495	906	4,551	85
	Rural	7,333	116	1,310	1,370	2,796	38
	Total	12,707	1,266	3,805	2,276	7,347	58
Mercedes	Urban	1,335					
	Rural	4,455			3,437	3,437	77
	Total	5,790			3,437	3,437	59
Oras	Urban	8,665			7,489	7,489	86
	Rural	24,358		1,432	9,526	10,958	45
	Total	33,023		1,432	17,015	18,447	56
Quinapondan	Urban	4,547		957	2,586	3,543	78
	Rural	8,639		1,391	3,356	4,747	55
	Total	13,186		2,348	5,942	8,290	63
Salcedo	Urban	3,053	1,458	60		1,518	50
	Rural	12,786		366	10,058	10,424	82
	Total	15,839	1,458	426	10,058	11,942	75
San Julian	Urban	2,718			1,690	1,690	62
	Rural	9,267		694	5,475	6,169	67
	Total	11,985		694	7,165	7,859	66
San Policarpo	Urban	4,280			2,889	2,889	68
	Rural	7,807			4,393	4,393	56
	Total	12,087			7,282	7,282	60
Sulat	Urban	5,318	3,726	255	786	4,767	90
	Rural	9,108		703	4,240	4,943	54
	Total	14,426	3,726	958	5,026	9,710	67
Taft	Urban	4,758			3,753	3,753	79
	Rural	12,890		1,189	8,150	9,339	72
	Total	17,648		1,189	11,903	13,092	74
Provincial Total	Urban	128,455	14,444	6,836	65,572	86,852	68
	Rural	244,663	435	19,899	106,685	127,019	52
	Total	373,118	14,879	26,735	172,257	213,871	57

The base year service coverage in urban area (68%) is almost the same as the updated MTPDP sector target (69%) for the year 1998, while rural area (52%) is far behind the sector target of 79%. As identified in Chapter 4, lower service coverage in rural area is considered to arise from existence of high percentage of underserved population.

For Phase I development, targets of service coverage for water supply by urban and rural were set up considering the following conditions:

- i) at least the existing service coverage shall be secured to meet population increase;
- ii) physical targets of Level I facility for rural water supply under the on-going ADB-assisted project shall be incorporated into medium-term development plan; and

iii) viable investment using available IRA to be allocated to water supply sector shall be considered.

Thus, the service coverage of 69% for urban and 59% for rural area was set up in the medium-term period, respectively.

Phase II targets are planned to increase urban and rural water supply coverage to 95% and 93%, respectively, as envisaged in the NSMP.

## (2) Sanitation

### 1) Household toilets

As with water supply, the base year service coverage is calculated as shown in Table 8.2.3 reflecting any planned or on-going projects scheduled to be completed by 1999 (details are referred to Supporting Report).

The province has base year service coverage of 61%, which is a little above the current national average coverage of 60%. Urban area registers a level of 72% that is well above the national average coverage. Rural area however, has only 56% owing to the presence of numerous unsanitary facilities. By type of sanitary toilet facility, the existing percentage composition to total households is as follows:

<u>Type</u>	<u>Urban (%)</u>	<u>Rural (%)</u>
Flush	3	1
Pour-flush	75	68
VIP latrine	21	31

To attain sufficiency and equitable access to basic services, provincial target of Phase I for urban household toilets is planned at 85%, while, for rural household toilets, 68% is projected. This is a little below the existing urban service coverage of 72% that is pursued to lessen the gap of the coverage between the urban and rural areas and to achieve a balanced distribution of this basic facility as embodied in the PNDP. For Phase II, 93% as set by the NSMP is adopted for urban household toilets, while, 90% is arranged for rural household toilets.



Table 8.2.3 Base Year Service Coverage of Household Toilets

Name of Municipality	Area	1998		Households and Population Using Sanitary Toilets								
		Popula- tion	THHs	Number of Households				Popula- tion	Service Coverage (%)			
				Flush	Pour Flush	VIP/Dry	Total		Flush	Pour Flush	VIP/Dry	Total
Arteche	Urban	4,682	894	1	360	361	722	3,793		40	40	81
	Rural	8,279	1,556		353	353	706	3,726		23	23	45
	Total	12,961	2,450	1	713	714	1,428	7,519		29	29	58
Balangiga	Urban	5,970	1,129		682	92	774	4,120		60	8	69
	Rural	5,632	1,018		492	56	548	3,042		48	6	54
	Total	11,602	2,147		1,174	148	1,322	7,162		55	7	62
Balangkayan	Urban	2,985	575		356	34	390	2,030		62	6	68
	Rural	6,270	1,181		581	77	658	3,512		49	7	56
	Total	9,255	1,756		937	111	1,048	5,542		53	6	60
Borongan	Urban	20,078	3,846	335	1,025	1,599	2,959	15,461	9	27	42	77
	Rural	30,051	6,010	152	1,555	3,347	5,054	25,243	3	26	56	84
	Total	50,129	9,856	487	2,580	4,946	8,013	40,704	5	26	50	81
Can-avid	Urban	5,674	973		592	108	700	4,086		61	11	72
	Rural	10,905	1,961		313	702	1,015	5,671		16	36	52
	Total	16,579	2,934		905	810	1,715	9,757		31	28	58
Dolores	Urban	11,134	1,971	80	1,358	328	1,766	10,021	4	69	17	90
	Rural	24,349	4,317	2	1,193	580	1,775	9,984		28	13	41
	Total	35,483	6,288	82	2,551	908	3,541	20,005	1	41	14	56
Gen. Macarthur	Urban	4,388	804		345	79	424	2,326		43	10	53
	Rural	5,788	1,026		41	412	453	2,547		4	40	44
	Total	10,176	1,830		386	491	877	4,873		21	27	48
Giportos	Urban	5,168	983		488	86	574	2,998		50	9	58
	Rural	4,571	850		282	28	310	1,646		33	3	36
	Total	9,739	1,833		770	114	884	4,644		42	6	48
Guiuan	Urban	9,862	1,878	50	1,295	187	1,532	8,087	3	69	10	82
	Rural	26,116	5,287		1,810	394	2,204	10,969		34	7	42
	Total	35,978	7,165	50	3,105	581	3,736	19,056	1	43	8	52
Hernani	Urban	2,211	380	7	69	124	200	1,172	2	18	33	53
	Rural	6,242	1,027	1	52	645	698	4,245		5	63	68
	Total	8,453	1,407	8	121	769	898	5,417	1	9	55	64
Jipapad	Urban	3,402	539		393	72	465	2,926		73	13	86
	Rural	3,152	573		151	120	271	1,482		26	21	47
	Total	6,554	1,112		544	192	736	4,408		49	17	66
Lawaan	Urban	5,212	839		387	25	412	2,554		46	3	49
	Rural	5,145	917		484	50	534	2,985		53	5	58
	Total	10,357	1,756		871	75	946	5,539		50	4	54
Llorente	Urban	6,478	1,344	53	828	63	944	4,535	4	62	5	70
	Rural	8,871	1,829		982	39	1,021	4,968		54	2	56
	Total	15,349	3,173	53	1,810	102	1,965	9,503	2	57	3	62
Maslog	Urban	1,163	207		120	17	137	768		58	8	66
	Rural	2,649	515		243	34	277	1,431		47	7	54
	Total	3,812	722		363	51	414	2,199		50	7	57
Maydolong	Urban	5,374	1,001	28	615	70	713	3,816	3	61	7	71
	Rural	7,333	1,204	7	554	144	705	4,327	1	46	12	59
	Total	12,707	2,205	35	1,169	214	1,418	8,143	2	53	10	64
Mercedes	Urban	1,335	198		84		84	561		42		42
	Rural	4,455	740		396		396	2,406		54		54
	Total	5,790	938		480		480	2,967		51		51
Oras	Urban	8,665	1,539		795		795	4,506		52		52
	Rural	24,358	4,421		2,166		2,166	11,936		49		49
	Total	33,023	5,960		2,961		2,961	16,442		50		50
Quinapondan	Urban	4,547	641		354		354	2,501		55		55
	Rural	8,639	1,459		832		832	4,925		57		57
	Total	13,186	2,100		1,186		1,186	7,426		56		56

Table 8.2.3 Base Year Service Coverage of Household Toilets

(cont'd)

Name of Municipality	Area	1998		Households and Population Using Sanitary Toilets								
		Popula- tion	IHIs	Number of Households				Popula- tion	Service Coverage (%)			
				Flush	Pour Flush	VIP/Dry	Total		Flush	Pour Flush	VIP/Dry	Total
Salcedo	Urban	3,053	601		447		447	2,260		74		74
	Rural	12,786	2,615		1,307		1,307	6,393		50		50
	Total	15,839	3,216		1,754		1,754	8,653		55		55
San Julian	Urban	2,718	555	5	415		420	2,066	1	75		76
	Rural	9,267	1,868		1,531		1,531	7,599		82		82
	Total	11,985	2,423	5	1,946		1,951	9,665		80		81
San Policarpo	Urban	4,280	839		388	336	724	3,681		46	40	86
	Rural	7,807	1,479			886	886	4,685			60	60
	Total	12,087	2,318		388	1,222	1,610	8,366		17	53	69
Sulat	Urban	5,318	1,045		674		674	3,404		64		64
	Rural	9,108	1,748		1,310		1,310	6,831		75		75
	Total	14,426	2,793		1,984		1,984	10,235		71		71
Taft	Urban	4,758	860	9	734	13	756	4,188	1	85	2	88
	Rural	12,890	2,269		927	176	1,103	6,317		41	8	49
	Total	17,648	3,129	9	1,661	189	1,859	10,505		53	6	59
Provincial Total	Urban	128,455	23,641	568	12,804	3,594	16,966	91,860	2	54	15	72
	Rural	244,663	45,870	162	17,555	8,043	25,760	136,870		38	18	56
	Total	373,118	69,511	730	30,359	11,637	42,726	228,730	1	44	17	61

The existing composition of the 3 facility types serves as an indicator in the distribution for Phase I, while for Phase II, VIP and sanitary pit privy/latrine (dry-type) is phased-out.

## 2) School toilets

The base year service coverage of public school students is shown in Table 8.2.4 counting expected coverage of any planned or on-going projects scheduled to be completed by 1999 (details are referred to Supporting Report).

Base year service coverage is 56% applying the standard number of public school students to be served by one (1) unit of toilet facility. The low level is due to a large number of unsanitary or absence of facilities.

In the absence of national targets for school toilets, the existing level of service coverage is the base in setting up the targets. It is expected that all new construction of school-buildings will entail sanitary toilets enabling the coverage to increase on a high level. For Phase I and II, 85% and 90% are set, respectively.

## 3) Public toilets

The base year service coverage considering expected additional coverage by 1999 is shown in Table 8.2.4 (details are referred to Supporting Report).

Table 8.2.4 Base Year Service Coverage of Public School Toilets and Public Toilets

Name of Municipality	Public School Toilets			Public Toilets		
	Total Number of Public School Students (1998)	Std. No. of Public School Student that can be Served by Base Year (1998) Sanitary Toilets	Service Coverage (%)	Number of Public Utilities with Toilets in 1998	Number of Public Utility with Sanitary Toilets in Base Year (1998)	Service Coverage (%)
Arteche	3,424	400	12	1	1	100
Balangiga	2,569	2,280	89			
Balangkayan	2,061	1,680	82			
Borongon (Capital)	14,182	9,400	66	2	2	100
Can-avid	3,731			1	1	100
Dolores	9,264	880	9	5	5	100
General Macarthur	2,903	2,600	90	1	1	100
Giporlos	2,668	2,668	100			
Guiuan	9,152	3,520	38	3	3	100
Hernani	2,121	1,520	72	1	1	100
Jipapad	1,002	320	32			
Lawaan	2,523	2,200	87	1	1	100
Lorente	4,174	2,600	62	1	1	100
Maslog	698	698	100			
Maydolong	6,680	5,440	81	2	2	100
Mercedes	1,549	720	46	1	1	100
Oras	7,791	4,680	60			
Quinapondan	2,772	640	23			
Salcedo	4,703	3,800	81			
San Julian	2,998	280	9	1	1	100
San Policarpo	2,316	1,720	74	1	1	100
Sulat	3,036	3,036	100	1	1	100
Taft	4,322	2,880	67			
<b>Provincial Total</b>	<b>96,639</b>	<b>53,962</b>	<b>56</b>	<b>22</b>	<b>22</b>	<b>100</b>

All existing public utilities are served with at least one sanitary toilet giving 100% coverage. This can be attributed by the fact that almost all public utilities (mostly public markets) are provided with sanitary toilet facilities.

Without national targets as of now, the indicator in setting up provincial targets would be the existing level of coverage. Accordingly, 100% coverage for both Phase I and Phase II are assumed.

### (3) Sewerage

Given the non-existence of sewerage systems in any municipality at the present time, this plan does not consider the service during Phase I. For Phase II, a target of 50% coverage was applied to urban population of municipalities with more than 10,000 urban population provided by Level III water supply systems.

#### (4) Solid waste

The municipal level data in 1998 on the number of households served by the municipal refuse collection revealed that the current practice is concentrated to urban areas. The base year service coverage for urban area by municipality is reflected in Table 8.2.5.

About 25% of the total households in the province relied on municipal refuse collection using trucks or 73% urban household coverage. These municipalities have a total of 9 units of collection truck.

No national targets have yet been set. However, considering the present level of coverage, a 75% urban household coverage is applied for the medium-term period (2000-2004).

**Table 8.2.5 Base Year Service Coverage of Municipal Solid Waste System in 1998**

Name of Municipality	Total No. of Households	No. of Urban Households	No. of Households Served	Coverage of Households (%)	Coverage of Urban Households (%)
Arteche	2,450	894			
Balangiga	2,147	1,129	997	46	88
Balangkayan	1,756	575			
Borongan (Capital)	9,856	3,846	4,116	42	100
Can-avid	2,934	973			
Dolores	6,288	1,971	1,668	27	85
General Macarthur	1,830	804	916	50	100
Giporlos	1,833	983	950	52	97
Guiuan	7,165	1,878	1,929	27	100
Hernani	1,407	380			
Jipapad	1,112	539			
Lawaan	1,756	839			
Llorente	3,173	1,344	1,349	43	100
Maslog	722	207			
Maydolong	2,205	1,001			
Mercedes	938	198			
Oras	5,960	1,539			
Quinapondan	2,100	641	591	28	92
Salcedo	3,216	601	2,939	91	100
San Julian	2,423	555			
San Policarpo	2,318	839			
Sulat	2,793	1,045	951	34	91
Taft	3,129	860	858	27	100
<b>Provincial Total</b>	<b>69,511</b>	<b>23,641</b>	<b>17,264</b>	<b>25</b>	<b>73</b>

### 8.3 Projection of Frame Values

#### 8.3.1 Population Projection

Future population for all municipalities by urban and rural areas was projected for the target years 2004 and 2010 together with the present population in 1998 as a planning base year.

Future regional population is published by the NSO, while projections at the provincial and municipal levels were not available during the study. On the other hand, the NEDA Regional Office VIII projected the regional and provincial population for year 2006. The future population of LGUs was therefore projected (details are included in the Supporting Report). Available information for the study at present is as follows:

- NSO population census results from 1903 to 1995
- 1995 Census-based National and Regional Population Projection prepared by the NSO
- 1995 Census-based Regional and Provincial Population Projection prepared by the NEDA Regional Office-VIII
- Provincial Physical Framework Plan/Comprehensive Provincial Land Use Plan (1993-2002) prepared by the Provincial Office

(1) Comparison of regional population projected by NSO and NEDA

The NSO conducted the national population projections for the period 1995-2040 and the regional projections for the period 1995-2020. The assumptions take into account future trends in the demographic processes of fertility, mortality and migration required by the cohort-component method for projecting population.

In the regional population projection, Region VIII is classified as medium-sized region.

On the other hand, the NEDA Regional Office-VIII projected the regional population together with the provincial population for year 2006 based on the 1995 census result.

Comparing the projected population by NSO with the NEDA projection, the latter is rather conservative, which reflects the past trend.

**Table 8.3.1 Comparison of Regional Population Projection by the NSO and NEDA**

Year		1980	1990	1995	2000	2005	2010
Census	Population	2,799,534	3,054,490	3,366,917			
	Growth Rate		0.88%	1.97%			
NSO Projection	Population			3,356,854	3,743,895	4,132,242	4,523,762
	Growth Rate				2.21%	2.00%	1.82%
NEDA Projection	Population			3,366,917	3,538,664	3,719,171	
	Growth Rate				1.00%	1.00%	

Note: The 1995 population as of July 1995 was used as a basis for NSO population projection. NEDA population in 2000 and 2005 are estimated in the study.

(2) Provincial Physical Framework Plan/Comprehensive Provincial Land Use Plan (1993-2002)

The provincial and municipal population for the year 2002 was projected with 1990 as base year. The population growth rates by municipality experienced between 1980 and 1990 were basically adopted for the projection. The provincial growth rate was 0.27% between 1980 and 1990. While the experienced and projected growth rates of Region VIII were 0.88 % between 1980 and 1990 and 0.95 % between 1990 and 2002.

The population projection on the provincial total and component municipalities was made with 1990 as base year. The population for the year 2002 was projected using a uniform growth rate between 1990 and 2002 referring to the experience from 1980 to 1990 (census years).

Comparing the census and the projected population in 1995, the provincial population based on the census was about 8% higher than the projected. Regarding the municipal census population in 1995, seventeen(17) out of 23 municipalities were higher with a range of 1% to 63% comparing with projected the projected figures, while the remaining six (6) municipalities were lower with a range of -4% to -15%.

In addition to this, the province is presently updating its Land Use Plan using the NEDA projection based on the 1995 census population. Thus, the future projection shall be made using the 1995 census results as the base year.

(3) Population Projection of the Province

The following conditions are considered in the population projection.

Regional Population

For the regional population in the study, the projection conducted by the NEDA Regional Office may be adopted assuming that a rather conservative population growth will be realized comparing with that of the NSO projection.

- 1) The regional population projected by the NEDA for the year 2006 is referred to for the short and medium-term period. The annual growth rate of 1.00% between 1995 and 2006 will be adopted for the population in 1998 and 2004 using the compounded formula with 1995 as the base year.

- 2) For the long-term projection, it is assumed that the annual growth rates will decrease gradually as adopted in the NSO projection. The annual growth rates adopted in the NSO projection decline from 2.00% (2000 - 2005) to 1.82% (2005 - 2010), which indicate that the relative reduction rate is 0.09%. In this study, the same reduction rate may be used to the NEDA projected growth rate of 1.00% (2000 - 2005). Thus, the population in year 2010 is estimated at 3,891,501 applying the growth rate of 0.91% from year 2005. The growth rates adopted in the study correspond to half the figures employed by NSO.

Year	Population	Growth Rate
1995	3,366,917	Census result
1998	3,468,938	1.00% (1995 - 1998)
2004	3,682,348	1.00% (1995 - 2004)
2005	3,719,171	1.00% (1995 - 2005)
2010	3,891,501	0.91% (2005 - 2010)

#### Provincial Population

In the NEDA projection, the regional population to be increased from 1995 to 2006 was distributed to each province in proportion to the share of the provincial population increase to the regional population experienced between 1990 and 1995. In this study, it is assumed that the tendency of the population growth by province will not drastically change. Thus, the same manner as adopted by the NEDA projection was employed both for short/medium-term and long-term period in the population distribution from the regional population to those for concerned provinces. The distribution of the regional population to be increased to the provincial population was made between respective base/target years. Table 8.3.2 shows the projected population in year 1998, 2004 and 2010 together with the NEDA projection.

**Table 8.3.2 Projected Population of the Province**

Province	NEDA Projection				Projected Population		
	Population		Population Increase		1998	2004	2010
	1995	2006	Number	Share			
Biliran	132,209	149,921	17,712	4.55%	136,851	146,561	156,077
Eastern Samar	362,324	403,509	41,185	10.58%	373,118	395,697	417,825
Leyte	1,511,251	1,689,501	178,250	45.79%	1,557,966	1,655,686	1,751,458
Northern Samar	454,195	542,288	88,093	22.63%	477,282	525,577	572,908
Samar	589,373	658,859	69,486	17.85%	607,584	645,678	683,012
Southern Leyte	317,565	312,115	-5,450	-1.40%	316,137	313,149	310,221
<b>Region</b>	<b>3,366,917</b>	<b>3,756,193</b>	<b>389,276</b>	<b>100.00%</b>	<b>3,468,938</b>	<b>3,682,348</b>	<b>3,891,501</b>

## Municipal Population

- 1) The total population of the province in 1998, 2004 and 2010 was fixed.
- 2) For the population projection by municipality, the same method employed in NEDA projection for the distribution of regional population to provincial population was applied. The provincial population to be increased in respective planning years was distributed to each municipality in proportion to the share of the population increase of each municipality to the provincial total experienced between 1990 and 1995. Table 8.3.3 presents the census results (1990 and 1995) and the projected population of the municipalities.

**Table 8.3.3 Census Results and Projected Population for Municipality**

Municipality	Census Result				Projected Population					
	1990	1995	Pop. Growth	Share to Provincial Pop Growth	1998		2004		2010	
					Population	Growth Rate	Population	Growth Rate	Population	Growth Rate
Arteche	11,245	12,538	2.20%	3.9%	12,961	1.11%	13,846	1.11%	14,713	1.02%
Balangiga	9,565	11,100	3.02%	4.7%	11,602	1.49%	12,653	1.46%	13,683	1.31%
Balangkayan	7,609	8,849	3.07%	3.8%	9,255	1.51%	10,104	1.47%	10,936	1.33%
Borongon	44,085	48,638	1.99%	13.8%	50,129	1.01%	53,244	1.01%	56,298	0.93%
Can-Avid	13,254	15,759	3.52%	7.6%	16,579	1.71%	18,294	1.65%	19,974	1.48%
Dolores	30,570	34,272	2.31%	11.2%	35,483	1.16%	38,016	1.16%	40,499	1.06%
Gen. Macarthur	9,627	10,041	0.85%	1.3%	10,176	0.45%	10,459	0.46%	10,737	0.44%
Giporlos	11,001	10,050	-1.79%	-2.9%	9,739	-1.04%	9,088	-1.15%	8,450	-1.21%
Guiuan	33,825	35,447	0.94%	4.9%	35,978	0.50%	37,088	0.51%	38,176	0.48%
Hernani	6,840	8,055	3.32%	3.7%	8,453	1.62%	9,285	1.58%	10,100	1.41%
Jipapad	5,207	6,222	3.63%	3.1%	6,554	1.75%	7,249	1.69%	7,930	1.51%
Lawaan	7,792	9,725	4.53%	5.9%	10,357	2.12%	11,680	2.02%	12,977	1.77%
Llorente	18,278	16,071	-2.54%	-6.7%	15,349	-1.52%	13,838	-1.71%	12,358	-1.87%
Maslog	3,089	3,634	3.30%	1.7%	3,812	1.61%	4,185	1.57%	4,551	1.41%
Maydolong	10,656	12,201	2.74%	4.7%	12,707	1.36%	13,764	1.34%	14,800	1.22%
Mercedes	4,505	5,473	3.97%	2.9%	5,790	1.89%	6,453	1.82%	7,102	1.61%
Oras	26,978	31,533	3.17%	13.8%	33,023	1.55%	36,141	1.52%	39,196	1.36%
Quinapondan	10,986	12,644	2.85%	5.0%	13,185	1.41%	14,321	1.39%	15,433	1.25%
Salcedo	16,597	16,026	-0.70%	-1.7%	15,839	-0.39%	15,448	-0.42%	15,065	-0.42%
San Julian	11,469	11,858	0.67%	1.2%	11,985	0.36%	12,251	0.37%	12,512	0.35%
San Policarpo	9,970	11,565	3.01%	4.8%	12,087	1.48%	13,179	1.45%	14,249	1.31%
Sulat	12,738	14,010	1.92%	3.9%	14,426	0.98%	15,297	0.98%	16,150	0.91%
Taft	13,449	16,613	4.32%	9.6%	17,648	2.03%	19,814	1.95%	21,936	1.71%
<b>Province</b>	<b>329,335</b>	<b>362,324</b>	<b>1.93%</b>	<b>100.0%</b>	<b>373,118</b>	<b>0.98%</b>	<b>395,697</b>	<b>0.98%</b>	<b>417,825</b>	<b>0.91%</b>

Note: Growth rates in 1998, 2004 and 2010 were calculated using compounded formula.

## Population by Urban and Rural Area

### 1) Past population development

With regard to the ratio of the urban population of the province to the total population, the provincial averages in 1980 and 1990 were 26.8% and 38.8%, while, it decreased to 33.7% in 1995. The provincial growth rate of 4.06% between 1980 and 1990 decreased to 1.59% in 1995. While provincial average growth rates of the rural population were -1.52% (1980 - 1990) and 3.59% (1990 - 1995).



2) Projection of urban and rural population for the years 1998, 2004 and 2010

The urban population by municipality for the target years was first projected and the rural population was calculated to meet the aforementioned total population by fixing the urban population.

In the projection of municipal urban population, the following are assumed by short/medium-term and long-term period.

- Short/Medium-term target: 1998 and 2004

Growth rates between 1990 and 1995 in terms of the profile of urban population to total population by municipality were basically adopted. However, for those municipalities having drastic changes of growth rates between the two census periods (1990 - 1995 and 1980 - 1990), the average growth rates between 1980 and 1995 were employed. These municipalities are Arteche, Gipolos, Guitan, Quinapondan, Salcedo and Taft.

In addition, some modifications were made as follows:

- Municipalities of Balangkayan, Llorente and San Julian; Population in 1995 was fixed for short/medium-term to avoid negative growth.
  - Municipalities of Borongan and Oras; Population in 1995 was fixed for short/medium-term considering higher urban population, although negative growth rates were experienced between 1990 and 1995.
  - Long-term target: 2010
- For the long-term projection, adopted share of urban/rural population in 2004 may be applied for the municipal population in 2010, assuming that the share of urban/rural population in the medium-term period will not drastically change.

Under the above assumptions, provincial average share of urban population for the year 2010 arrived at 36.3%, higher than the figure in 1995 (33.7%). Table 8.3.4 presents projected urban and rural population. The growth rates and shares on rural population are calculated using estimated rural population.

Table 8.3.4 Population Projection by Urban and Rural Area:1998, 2004 and 2010

Municipality	1998				2004				2010			
	Total	Urban/ Rural	G.R. (%)	Share (%)	Total	Urban/ Rural	G.R. (%)	Share (%)	Total	Urban/ Rural	G.R. (%)	Share (%)
Arteche	12,961	4,682	1.02%	36.1%	13,846	4,978	1.03%	36.0%	14,713	5,290	1.02%	36.0%
Balangiga	11,602	5,970	2.83%	51.5%	12,653	7,058	2.83%	55.8%	13,683	7,633	1.31%	55.8%
Balangkayan	9,255	2,985	0.00%	32.3%	10,104	2,985	0.00%	29.5%	10,936	3,231	1.33%	29.5%
Borongan	50,129	20,078	0.00%	40.1%	53,244	20,078	0.00%	37.7%	56,298	21,230	0.93%	37.7%
Can-Avid	16,579	5,674	3.78%	34.2%	18,294	7,087	3.78%	38.7%	19,974	7,738	1.48%	38.7%
Dolores	35,483	11,134	5.71%	31.4%	38,016	15,536	5.71%	40.9%	40,499	16,551	1.06%	40.9%
Gen. Macarthur	10,176	4,388	0.21%	43.1%	10,459	4,441	0.21%	42.5%	10,737	4,562	0.44%	42.5%
Giporlos	9,739	5,168	0.97%	53.1%	9,088	5,474	0.96%	60.2%	8,450	5,090	-	60.2%
Guiuan	35,978	9,862	0.52%	27.4%	37,088	10,176	0.52%	27.4%	38,176	10,475	0.48%	27.4%
Hernani	8,453	2,211	3.35%	26.2%	9,285	2,694	3.35%	29.0%	10,100	2,930	1.41%	29.0%
Jipapad	6,554	3,402	2.98%	51.9%	7,249	4,059	2.99%	56.0%	7,930	4,440	1.51%	56.0%
Lawaan	10,357	5,212	5.47%	50.3%	11,680	7,176	5.47%	61.4%	12,977	7,973	1.77%	61.4%
Llorente	15,349	6,478	0.00%	42.2%	13,838	6,478	0.00%	46.8%	12,358	5,785	-	46.8%
Maslog	3,812	1,163	2.75%	30.5%	4,185	1,369	2.76%	32.7%	4,551	1,489	1.41%	32.7%
Maydolong	12,707	5,374	2.76%	42.3%	13,764	6,325	2.75%	46.0%	14,800	6,801	1.22%	46.0%
Mercedes	5,790	1,335	4.80%	23.1%	6,453	1,768	4.79%	27.4%	7,102	1,946	1.61%	27.4%
Oras	33,023	8,665	0.00%	26.2%	36,141	8,665	0.00%	24.0%	39,196	9,397	1.36%	24.0%
Quinapondan	13,186	4,547	3.85%	34.5%	14,321	5,705	3.85%	39.8%	15,433	6,148	1.25%	39.8%
Salcedo	15,839	3,053	0.57%	19.3%	15,448	3,159	0.57%	20.4%	15,065	3,081	-	20.5%
San Julian	11,985	2,718	0.00%	22.7%	12,251	2,718	0.00%	22.2%	12,512	2,776	0.35%	22.2%
San Policarpo	12,087	4,280	1.81%	35.4%	13,179	4,766	1.81%	36.2%	14,249	5,153	1.31%	36.2%
Sulat	14,426	5,318	3.20%	36.9%	15,297	6,422	3.19%	42.0%	16,150	6,780	0.91%	42.0%
Taft	17,648	4,758	0.11%	27.0%	19,814	4,789	0.11%	24.2%	21,936	5,302	1.71%	24.2%
<b>Province</b>	<b>373,118</b>	<b>128,455</b>	<b>1.74</b>	<b>34.4%</b>	<b>395,697</b>	<b>143,909</b>	<b>1.91%</b>	<b>36.4%</b>	<b>417,825</b>	<b>151,801</b>	<b>0.89%</b>	<b>36.3%</b>
Arteche	12,961	8,279	1.16%	63.9%	13,846	8,868	1.15%	64.0%	14,713	9,423	1.02%	64.0%
Balangiga	11,602	5,632	0.14%	48.5%	12,653	5,595	-0.11%	44.2%	13,683	6,050	1.31%	44.2%
Balangkayan	9,255	6,270	2.26%	67.7%	10,104	7,119	2.14%	70.5%	10,936	7,705	1.33%	70.5%
Borongan	50,129	30,051	1.71%	59.9%	53,244	33,166	1.66%	62.3%	56,298	35,068	0.93%	62.3%
Can-Avid	16,579	10,905	0.69%	65.8%	18,294	11,207	-0.46%	61.3%	19,974	12,236	1.47%	61.3%
Dolores	35,483	24,349	-	68.6%	38,016	22,480	-1.32%	59.1%	40,499	23,948	1.06%	59.1%
Gen. Macarthur	10,176	5,788	0.62%	56.9%	10,459	6,015	0.64%	57.5%	10,737	6,175	0.44%	57.5%
Giporlos	9,739	4,571	-	46.9%	9,088	3,614	-3.84%	39.8%	8,450	3,360	-	39.8%
Guiuan	35,978	26,116	0.49%	72.6%	37,088	26,912	0.50%	72.6%	38,176	27,701	0.48%	72.6%
Hernani	8,453	6,242	1.04%	73.8%	9,285	6,591	0.91%	71.0%	10,100	7,170	1.41%	71.0%
Jipapad	6,554	3,152	0.48%	48.1%	7,249	3,190	0.20%	44.0%	7,930	3,490	1.51%	44.0%
Lawaan	10,357	5,145	-	49.7%	11,680	4,504	-2.19%	38.6%	12,977	5,004	1.77%	38.6%
Llorente	15,349	8,871	-	57.8%	13,838	7,360	-3.06%	53.2%	12,358	6,573	-	53.2%
Maslog	3,812	2,649	1.12%	69.5%	4,185	2,816	1.02%	67.3%	4,551	3,062	1.41%	67.3%
Maydolong	12,707	7,333	0.39%	57.7%	13,764	7,439	0.24%	54.0%	14,800	7,999	1.22%	54.0%
Mercedes	5,790	4,455	1.09%	76.9%	6,453	4,685	-0.84%	72.6%	7,102	5,156	1.61%	72.6%
Oras	33,023	24,358	2.13%	73.8%	36,141	27,476	2.03%	76.0%	39,196	29,799	1.36%	76.0%
Quinapondan	13,186	8,639	0.21%	65.5%	14,321	8,616	-0.04%	60.2%	15,433	9,285	1.25%	60.2%
Salcedo	15,839	12,786	-	80.7%	15,448	12,289	-0.66%	79.6%	15,065	11,984	-	79.6%
San Julian	11,985	9,267	0.46%	77.3%	12,251	9,533	0.47%	77.8%	12,512	9,736	0.35%	77.8%
San Policarpo	12,087	7,807	1.31%	64.6%	13,179	8,413	1.25%	63.8%	14,249	9,095	1.31%	63.8%
Sulat	14,426	9,108	-	63.1%	15,297	8,875	-0.43%	58.0%	16,150	9,370	0.91%	58.0%
Taft	17,648	12,890	2.79%	73.0%	19,814	15,025	2.59%	75.8%	21,936	16,634	1.71%	75.8%
<b>Province</b>	<b>373,118</b>	<b>244,663</b>	<b>0.60</b>	<b>65.6%</b>	<b>395,697</b>	<b>251,788</b>	<b>0.48%</b>	<b>63.6%</b>	<b>417,825</b>	<b>266,024</b>	<b>0.92%</b>	<b>63.6%</b>

### 8.3.2 School Enrollment Projection

From the 1995 total population of the province, the number of children who would be enrolling in elementary and high school levels for all municipalities is derived.

School age population is extrapolated from the NSO age group classification of 5-9, 10-14 and 15-19 years old bracket by municipality. The age group for the elementary level is from 6 to 13 years, while that for the high school level is from 14 to 17 years. The percentages of school age population for the target years are based on the existing composition or structure of the 1995 population.

From the school age population, the number of children who would attend either private or public school, by target year is computed using the projected participation rate. The participation rate by target year varies depending on the socio-economic condition of the province. Generally, an improved economy will result to a higher participation rate. For the province, a decreasing participation rate in both private and public schools is foreseen by year 2010.

The number of public school students by target year is then derived from the projected number of children who will attend school. A participation rate for public school enrollment is established based on the existing participation rate of public school students to the total school age population. Based on the projection, a decrease of 4% from the 1998 rate is foreseen in 2004 and the rate of 2004 is applied to 2010 (details are referred to Table 8.3.6, Supporting Report). It should be noted that some municipalities had participation rate in 1998 of over 100%, an indication that a number of school enrollees are over-aged.

Table 8.3.5 shows the projected number of public school students by municipality, by target year. About 98,335 and 103,399 public school students are estimated to enroll for years 2004 and 2010, respectively.

### **8.3.3 Projection of the Number of Public Utilities**

The number of public utilities (limited to public markets and bus/jEEPney terminals) by target year is projected in urban areas for all municipalities. The provincial physical framework plan and the provincial comprehensive development plan serve as references in the projection. Bus or jEEPney terminals are considered in major transport routes of the province.

There are no proposed construction for both target years of 2004 and 2010. However, the ADB assisted project is proposing 7 public toilets to be constructed in the province between the years 2000 and 2002, hence this is included in Phase I development. Refer to Table 8.3.2 for the number of public utilities by municipality by target year (details are referred to Supporting Report).

**Table 8.3.5 Projected Public School Enrollment and Number of Public Utilities by Municipality**

Name of Municipality	Number of Public School Student			Number of Public Utilities		
	1998	2004	2010	1998	2004	2010
Arteche	3,424	3,667	3,897	2	2	2
Balangiga	2,569	2,896	3,316		1	1
Balangkayan	2,061	2,381	2,720		1	1
Borongon (Capital)	14,182	13,634	13,658	4	4	4
Can-avid	3,731	4,355	5,034	2	2	2
Dolores	9,264	9,581	10,206	5	5	5
General Macarthur	2,903	2,830	2,752	3	3	3
Giporlos	2,668	2,357	2,076	2	3	3
Guiuan	9,152	9,548	9,311	4	4	4
Hernani	2,121	2,422	2,634	1	1	1
Jipapad	1,002	1,403	1,653	1	1	1
Lawaan	2,523	2,783	3,092	1	1	1
Llorente	4,174	3,577	3,026	3	3	3
Maslog	698	823	959			
Maydolong	6,680	3,755	4,038	2	2	2
Mercedes	1,549	1,625	1,788	1	1	1
Oras	7,791	8,909	9,662	4	5	5
Quinapondan	2,772	3,110	3,562	2	3	3
Salcedo	4,703	4,335	4,228	1	2	2
San Julian	2,998	2,966	3,030	2	2	2
San Policarpo	2,316	3,018	3,466	2	2	2
Sulat	3,036	3,293	3,681	2	2	2
Taft	4,322	5,067	5,610	1	2	2
<b>Provincial Total</b>	<b>96,639</b>	<b>98,335</b>	<b>103,399</b>	<b>45</b>	<b>52</b>	<b>52</b>

#### 8.3.4 Planning Area and its Projected Population for Sewerage

Urban areas with more than 10,000 population provided by Level III water supply systems in 2010 serve as the planning area. Population in the area is considered as the potential population to be served.

Three (3) municipalities with a total urban population of about 24,129 are considered (refer to Table 8.5.4).

#### 8.3.5 Number of Households to be Served by Municipal Solid Waste Collection System

The number of urban households in 2004 is the potential households for the planning (refer to Table 8.3.5, Supporting Report).

#### 8.4 Types of Facilities and Implementation Criteria

In principle, types of facilities and their implementation criteria as prescribed in the NSMP and the NEDA Board Resolution No. 12 (s. 1995) are adopted to this PW4SP.

## 8.4.1 Water Supply

The following are the major conditions and assumptions applied to urban and rural water supply, which are intended as a guide for the implementation of sector projects.

### (1) Urban water supply

Prevailing situation of urban water supply in each municipality was firstly reviewed mainly focusing on existing water sources and magnitude of service coverage. Planned/on-going projects for concerned municipalities were also studied and reflected in the planning, with due attention to merging of municipalities into an integrated water supply system. Potential water source for future development was then evaluated based on the study results in Chapter 7, taking into account the possibility to utilize untapped spring sources. Recommendations arising from these studies were also incorporated as overall development strategy.

Aforementioned studies were carried out by the following sequence:

- Review of existing water supply systems and water sources;
- Review of planned/on-going projects;
- Establishment of planning conditions covering service level, utilization of existing facilities, water sources, and number of systems; and
- Recommendations for overall development strategy.

Table 8.4.1 presents a summary of the study results by municipality.

#### 1) Review of existing water supply systems and water sources

The municipalities of Borongan and Llorente are served by WDs. While the municipalities of Balangkayan, Maydolong, Salcedo and Sulat are served by Level III systems operated either by the municipal government.

Population served by existing Level III systems supplying to urban areas range from about 500 persons at Llorente Water District to 6,500 persons at the Borongan Water District. The average size of served population is about 3,000 persons. Majority of the existing Level III systems in urban areas is utilizing spring sources.

The remaining 17 municipalities, out of the total 23 have no Level III system in their urban areas and are presently served by Level II systems and/or Level I facilities.

Table 8.4.1. Summary of Urban Water Supply Development by Municipality

Municipality	Existing Condition	On-going/Planned Project	Water Source Availability	Future Requirements
Areche	There is no Level III system in urban area at present. Urban population is about 4,700. They use Level I facilities (Shallow wells). The LCU has proposed Level III water supply system project with deep well at water source.	Plan (Creation of Level III system)	Shallow well has large capacity in alluvial plain where urban area is located. Deep well is also available with depth of 40m and production capacity of 1,000 cu m/d. Groundwater quality may have slight acidic value and ionic locally. Spring sources are scattered and their discharges are not large.	New system shall be treated. Water source development (deep well) shall be further studied with a due consideration of materials of intake facility.
Balingua	There is no Level III system in urban area at present. Urban population is about 6,000. They use Level I facilities (Shallow wells). The municipality has identified Bangon River for a water source for a Level III water supply system for all urban barangays. It is 15 kms. upstream and elevation will warrant a gravity system.	Plan (Water source development)	Spring is potential water source. Spring water quality shall be examined before development. Deep well development is very risky but sometime hits a fissure groundwater. Shallow or radial well is available in small alluvial plain. Saline water intrusion is observed in seashore.	New system using Bangon River as a water source shall be created with assistance from LWUA.
Batangkayan	There is a municipal waterworks serving for 5 urban barangays in provision of spring source using pumping system. The waterworks adopts combined system with communal faucets catering to urban population of 3,000. Water source is sometimes affected by high tide since it is located in lower elevation than sea level.	Plan (Construction/installation of additional reservoir and pump)	Spring is only potential water source. Spring water quality shall be examined before development. Deep well development is very risky. Shallow well is available where weathered rock formation is distributed.	Construction/installation of additional reservoir with a capacity of 6.0 m <sup>3</sup> and pump. Maintenance of the existing system is required. Purchase of tools, equipment and spareparts for O&M and repair.
Boronigan (Capital)	Boronigan WD is serving for 16 urban barangays with served population of about 6,300 (32% of urban population). Water sources of WD are springs with 3 intake facilities and total discharge is varying from 1,400 to 2,100 m <sup>3</sup> /d due to seasonal variation. Water is supplied to service area by gravity and pumping system. Insufficient water supply during dry season and salt water intrusion into deteriorated distribution pipes are current problems. The WD is seeking alternative spring source (2-3 springs 11 km away from population area) together with system expansion.	PCS is being conducted by LWUA (system expansion with additional water source development)	Deep well is potential water source for Level III water supply with depth of 40m and production capacity of 1,000 cu m/d. Groundwater quality may have slight ionic locally and saline water intrusion in seashore.	System expansion with water source augmentation (stable intake of spring water) is required. Replacement of deteriorated distribution pipes is a requisite. Water quality of spring source shall be examined through the year. C/P funding shall be secured.
Can-avid	There is no Level III system in urban area at present. Urban population is about 5,700. They use Level I facilities (Deep/Shallow wells). Available spring source is located at Sitio Pando. This spring is considered to serve Can-avid and neighboring municipalities of Dolores and Taft.	Plan (Construction of deep well at population)	Shallow well has large capacity in fluvial deposits where urban area is located. Deep well is also available with depth of 40m and production capacity of 1,000 cu m/d. Groundwater quality may have slight ionic locally. Springs are scattered but their discharges are large.	New system shall be created. Water source development (deep well) for Level III in the population shall be confirmed. Integrated system with Can-avid and Taft shall be considered.

Table 8.4.1. Summary of Urban Water Supply Development by Municipality

(cont'd)

Municipality	Existing Condition	Ongoing/Planned Project	Water Source Availability	Future Requirements
Dolores	There is no Level III system in urban area at present. Urban population is about 11,000. They use Level II system (Deep wells) and Level I facilities (Shallow wells).	None	Shallow well has large capacity in fluviatile deposits where urban area is located. Deep well is also available with depth of 40m and production capacity of 1,000 cu.m/d. Groundwater quality may have slight ironic locally. Spring is scattered water source but discharge is large.	Upgrading existing Level II system to Level III shall be considered.
General Mac Arthur	There is no Level III system in urban area as of the end of 1998. Urban population is about 4,400. They use Level I facilities (Deep wells). New WD was created in April, 1999. But actual operation is not yet started at present.	None	Spring is only potential water source. Spring water quality shall be examined before development. Deep well development is very risky. Shallow or radial well is available in alluvial plain. Saline water intrusion is observed in seashore.	Full operation of WD and expansion of its service area.
Giporlos	There is no Level III system in urban area at present. Urban population is about 5,200. They use Level I facilities (Deep/Shallow/Dug wells).	None	Deep well development is very risky but sometime has a fissure groundwater. Shallow or radial well is available in small alluvial plain. Saline water intrusion is observed in seashore.	New system shall be created. Study on water source development (expansion of deep well to Level III in all po barangays) is a requisite.
Guvant	There is no Level III system in urban area at present. Urban population is about 10,000. They use Level I facilities (Shallow wells). The municipality has a plan to create WD and has allocated P=1.3 million for 1999 and willing to put up required equity to qualify for a WD. P/S is on-going.	Plan (Creation of WD)	Both spring and deep well are potential water sources. Spring water quality may be potable but production capacity is limited. Deep well specifications are: 40m of depth and production capacity of about 500 cu.m/d. Shallow or radial well is available in small alluvial plain. Saline water intrusion is observed in seashore.	New system (WD) shall be created. Study on water source development is a requisite.
Hemman	There is no Level III system in urban area at present. Urban population is about 2,200. They use Level I facilities (deep/shallow wells). The LCU has tapped a spring source about 2.5 km from poblacion. Already constructed is a reservoir (100cu.m), intake tank and pipe laying of about 2,000 m with 6" diameter main pipe.	Ongoing (Installation of main pipe, secondary pipe and communal faucets)	Spring is only potential water source. Spring water quality shall be examined before development. Deep well development is very risky. Shallow or radial well is available in alluvial plain. Saline water intrusion is observed in seashore.	Creation of LCU-managed water system involving metered connections to 100 individual households in the poblacion.
Jipapad	There is no Level III system in urban area at present. Urban population is about 3,400. They use Level I facilities (shallow wells/developed spring). A number of shallow/deep wells are non-functional.	None	Shallow well has a large capacity in fluviatile deposits where urban area is located. Deep well is also available with depth of 40m and production capacity of 1,000 cu.m/d. Groundwater quality may be slight acidic and ironic locally. Spring source is available with large discharge.	New system shall be created. Study on water source development (combination of spring and deep well) is a requisite.

Table 8.4.1 Summary of Urban Water Supply Development by Municipality

(cont'd)

Municipality	Existing Condition	Ongoing/Planned Project	Water Source Availability	Future Requirements
Lawan	There is no Level III system in urban area at present. Urban population is about 5,200. They use Level II system (spring source) and Level I facilities (Shallow/Dug wells).	None	Spring is potential water source. Deep well development shall be examined before development. Deep well development is very risky but sometime hits a fissure groundwater. Shallow or radial well is available in small alluvial plain. Saline water intrusion is observed in seashore.	New system using spring source shall be created. Upgrading from existing Level II system shall be considered. A long-term water program to include at least 3 southern municipalities shall be studied.
Loriente	There is a WD serving for 8 urban barangays with served population of 500 (8% of urban population). The WD is using pumping system to supply spring water to its service area. There is a recurring water service failures due to defective pumping station. The main/primary water line directly connecting the pumping station to the population is too small to adequately serve the water needs of the population.	Plan (System expansion to cover all poblacion barangays, replacement of electric pump with machine, main water lines)	Spring is only potential water source. Spring water quality shall be examined before development. Deep well development is very risky. Shallow or radial well is available in alluvial plain. Saline water intrusion is observed in seashore.	System rehabilitation and expansion with getting concurrence of beneficiaries are required.
Maslog	There is no Level III system in urban area at present. Urban population is about 1,200. They use Level II system (spring source) and Level I facilities (Shallow wells).	None	Both spring and deep well are potential water sources. Priority shall be given to spring, because of cheap running cost. Deep well is available but well design may have 80m in depth. SWL of about 50 mtgs and production capacity of 500 cu.m/d or less. Groundwater has water quality problem of acidic and ionic contents.	New system using spring source shall be created. Upgrading from existing Level II system shall be considered.
Maydonog	There is a LGU-managed Level III system combined with communal faucets in provision of spring source. The waterworks covers 7 urban barangays with served population of 2,500 (40% of urban population) including population served by communal faucets. Water source is sometimes affected by unusual high tide.	Plan (Expansion of Level III to 40% & Level II to 60% of urban population with construction of treatment/sedimentation tank & distribution reservoir.	Spring is only potential water source. Spring water quality shall be examined before development. Deep well development is very risky. Shallow well is available where weathered rock formation is distributed.	System expansion with water source augmentation (spring source) is required. Upgrading from existing Level II system with augmentation of distribution pipelines shall be considered.
Mercedes	There is no Level III system in urban area at present. Urban population is about 1,300. They use Level II system (spring source) and Level I facilities (Deep/Shallow wells). Water source is salty in all urban barangays.	None	Both spring and deep well are potential water sources. Spring water quality may be potable but production capacity is limited. Deep well specifications are: depth of 40m and production capacity of about 500 cu.m/d. Saline water intrusion is observed in seashore.	New system using a combination of deep well and spring source shall be created near future. Upgrading from existing Level II system shall be considered. Merging with neighboring municipality shall be considered because of the current underserved population affected by saline water.
Oras	There is no Level III system in urban area at present. Urban population is about 8,700. They use Level I facilities (deep/shallow wells). LWCA water project in barangay San Roque has ceased its construction/implementation of water system for about 6 years now. There is major plan for the rehabilitation of two spring source at Bogy T'gub in order to provide Level II water system to its residents and to extend to nearby barangays.	None	Shallow well has large capacity in fluvial deposits where urban area is located. Deep well is also available with depth of 40m and production capacity of 1,000 cu.m/d. Groundwater quality may have slight acidic value and ionic contents locally. Spring sources are scattered and their discharges are not large.	(Medium-term) Spring source at San Roque needs to be developed to Level II system. It involves construction of reservoir, distribution pipelines, electric pump. (Long-term) Due to large water discharge of spring source of San Roque, further development of the spring source into Level III system shall be considered.



Table 8.4.1 Summary of Urban Water Supply Development by Municipality

(cont'd)

Municipality	Existing Condition	Ongoing/Planned Project	Water Source Availability	Future Requirements
Quinapondan	There is no Level III system in urban area at present. Urban population is about 4,500. They use Level II system (spring sources) and Level I facilities (Shallow wells).	None	Spring is only potential water source. Spring water quality shall be examined before development. Deep well development is very risky. Shallow or radial well is available in alluvial plain. Saline water intrusion is observed in seashore.	New system using spring source shall be created. Upgrading from existing Level II system shall be considered.
Salcedo	There is a LGU-managed Level III system with current served population of about 1,500 (48% of urban population). Water source of the system is a combination of deep well and spring water. Under spring development it has three reservoirs, but the WWS cannot serve 24 hrs. Deep wells at present are all not functional.	None	Both spring and deep well are potential water sources. Spring water quality may be possible. Deep well specifications are depth of 40m and production capacity of about 500 cu.m/d. Shallow or radial well is available in small alluvial plain. Saline water intrusion is observed in seashore.	System expansion with additional water source development is required. Since well yield is minimal, combination of two types of water source shall be sought through future. Rehabilitation of corroded pipelines and distribution lines are necessary.
San Julian	There is no Level III system in urban area at present. Urban population is about 2,700. They use Level I facilities (Deep/Shallow wells). The LGU has allowed funds for the development of water system for the urban barangays but the project is not yet started due to insufficient funds to complete the project.	Plan (Development of Level III water supply)	Deep well is potential water source for Level III water supply with depth of 40m and production capacity of 1,000 cu.m/d. Groundwater quality may have slight ionic contents locally. Spring sources are scattered but their discharges are large.	Additional funding is necessary to complete or finish the project.
San Policarpo	There is no Level III system in urban area at present. Urban population is about 4,300. They use Level I facilities (Deep/Shallow wells).	None	Shallow well has a large capacity in alluvial plain where urban area is located. Deep well is also available with depth of 40m and production capacity of 1,000 cu.m/d. Groundwater quality may have slight acidic value and ionic contents locally. Spring sources are scattered and their discharges are not large.	New system shall be created to sustain the water needs of five poblacion barangays. Study on deep well development is a requisite.
Sulit	Sulit WD is serving for 5 urban barangays. Water source is deep well and the system adopts combined system with communal faucets. Current served population is about 4,000 (75% of urban population).	None	Deep well is potential water source for Level III water supply with depth of 40m and production capacity of 1,000 cu.m/d. Groundwater quality may be slight ionic locally. Spring sources are scattered but their discharges are large.	System expansion with water source augmentation (deep well) is required.
Taft	There is no Level III system in urban area at present. Urban population is about 4,800. They use Level I facilities (Deep/Shallow/Dug wells).	Plan (Creation of Level III system)	Shallow well has a large capacity in fluvial deposits where urban area is located. Deep well is also available with depth of 40m and production capacity of 1,000 cu.m/d. Groundwater quality may have slight ionic contents locally. Spring sources are scattered but their discharges are large.	New system using deep well shall be created. Study on water source development is a requisite. F/S and engineering details from L.WUA shall be requested. Expected implementation including financial statement is year 2000 - 2004. Five long-term integrated system with Canavud and Dalaver may be considered.

2) Review of planned/on-going projects

The available information on planned/on-going projects collected during the course of PW4SP preparation is shown in Table 8.4.1.

3) Establishment of planning conditions

a. Service level

It shall be noted that a national policy for urban water supply is a Level III system, as the most suitable measure. Therefore, for the investment needs of the sector development, it is assumed in this PW4SP that underserved or unserved urban population at present and in the future will be provided with individual house connections. However, it does not intend in the future to exclude, as individual cases, Level I and II facilities from being implemented in urban area.

b. Utilization of existing facilities

The existing Level I and II facilities are considered to be utilized during the Phase I period. However, the population served by these facilities is to be absorbed by Level III service in Phase II.

c. Water sources

Possibility/availability to utilize surface water and groundwater (spring and deep well) is evaluated as potential water sources for water supply development.

From the viewpoints of cost effectiveness and easy O&M of water supply system, utilization of spring sources is given due priority in the course of urban water supply planning. Application of deep wells for water source is regarded as the second priority in principle. Surface water is, on the other hand, not adopted at this moment, because of large capital investment requirements and complexity of surface water treatment.

d. Number of systems

In principle, one (1) Level III system is considered for urban area of every municipality. In the municipalities with an existing Level III system/s, the expansion of the system was first considered. In case of no existence of Level III system/s, a new system was recommended. Existing plan/s on the development of Level III/WD are also taken into account to determine the respective systems of the municipalities.

Possibility and necessity to merge service area of some neighboring municipalities to an urban water supply system were also studied from the viewpoint of:

- water source constraints, and
- economical development/scale merit of water supply system by cost reduction of water source development and other common facilities as well as O&M cost/minimized number of technical staff.

Any rural barangay/s being served by an existing urban Level III system are considered to continue throughout the future.

c. Rehabilitation

Rehabilitation of existing and future facilities is assumed to be undertaken by the operating bodies.

4) Overall development strategy

Expansion of the existing system/s was planned for those with WD/Level III, while creation of the system is considered for those without systems at present.

Merging of municipal systems (physical arrangement) in the long-term is considered. Integrated management systems shall also be sought. Conditions to be studied include; water source availability, willingness by concerned municipalities and technical study on cost recovery/economical construction. The following municipalities may be studied for the integration both in physical and management systems.

- Can-avid, Dolores and Taft
- Balangiga, Giporlos and Lawaan
- Guiuan and Mercedes

Integration of small Level III systems for operation and management shall be sought, although these systems are currently managed individually.

Some municipalities have high potential for spring development due to the presence of a number of untapped spring sources favorable for urban water supply that were identified during the course of PW4SP preparation. However, a detailed survey to ensure appropriate development of spring sources shall be conducted in the implementation of the projects.

## (2) Rural water supply

### 1) Service level

Level I systems (deep well/shallow well/developed spring) are generally planned for rural areas where houses are scattered.

Level II systems are considered where houses are clustered and suitable untapped spring is available.

Service level standards are set forth as 15 households per source for Level I and 5 households per communal faucet for Level II, as defined in the national plan.

Application of Level III systems in rural areas may be considered in a case to case basis during actual implementation.

### 2) Utilization of existing facilities

The existing facilities/systems in all service levels are considered to be utilized throughout the future.

### 3) Water source

For Level I facilities, deep well construction is given priority wherever applicable considering safety against possible contamination and stable water supply. Standard specifications of shallow and deep wells are summarized in Table 8.4.2 based on the water source evaluation results presented in Chapter 7. Conventional construction method (driven well) may be employed under favorable substrata or hydrogeological conditions. The standard structure of wells in application of "open-hole drilling and gravel pack" is presented in Figure 8.4.1, Supporting Report. In addition to this, for deep well with high iron content, application of iron removal facility is recommended. The standard structure of iron removal facility is presented in Figures 8.4.2 (a) and 8.4.2 (b), Supporting Report.

Spring development is also included in Level I planning by adopting ADB-assisted project.

**Table 8.4.2 Standard Specifications of Level I Wells**

Specification	Shallow Well	Deep Well
Construction Method	Open-hole drilling and gravel pack	
Casing Diameter	50mm	100mm
Borehole Diameter	150mm	200mm
Ranges of Well Depth	Standard Depth	
0 - 20m	20m	Not Applicable
21 - 50m	Not Applicable	40m
51 - 100m	Not Applicable	80m
101 - 150m	Not Applicable	120m

Profile between gravel packed well and natural gravel packed well for Level I water supply:

The open-hole drilling method is employed for the well construction to ensure yield of ground water from adequate aquifer in provision of proper screen location and specifications. The conventional "cased-hole driven well" shall be used only in cases where well specifications are established in the specified area with sufficient information on the hydrogeological condition including existence of natural gravel at the expected aquifer.

It is important to study the potential areas to adopt natural gravel method, which can perform the same level of function as gravel-packed wells. Such areas are usually limited to the upper stream of larger rivers in alluvial fans and alluvial plains. The arial proportion between those in application of gravel-packed and natural gravel pack wells will be worked out referring to the condition of the province.

Modification needs of riser pipe diameter according to the water level of deep wells:

The standard specification of the riser pipe of deep well hand pump is set with a diameter of 2-1/2 inch in the plan. However, water level of the deep wells may range between 20m and around 40m, depending on the aquifer conditions. Although the Malawi type deep well pump with a cylinder that is currently used in the Philippines has operation experience up to 40 m in pumping water level, the diameter of riser pipe must be adjusted between 1" to 2-1/2" in order to lower required power at the pump handle (calculating required power under the specific pumping water level).

For Level II systems, only untapped springs suitable for water supply purpose are considered. Identified untapped springs are presented in Table 7.4.1, Supporting Report.

4) Number of systems/facilities

The number of Level I wells and spring development is estimated based on the service level standard, while the number of Level II systems coincides with the number of untapped springs.

5) Rehabilitation

Rehabilitation of existing Level I wells is not considered, since most of the wells constructed by driving method are not suitable for rehabilitation to recover their functions. However, minor repair work for hand-pump and concrete apron is a requisite.

#### 8.4.2 Sanitation

The conditions and assumptions are established for the different sanitation components to serve as guides in the implementation of projects.

(1) Household toilets

Three types of sanitary toilet facilities for individual houses are considered for Phase I; flush, pour-flush and VIP/sanitary pit privy (dry-type). While for Phase II, flush and pour-flush are planned considering the improvement of living standard.

The type of toilet facilities is dependent on the existing or planned service level of water supply in the community. In urban and rural areas with Level I or II water supply facilities, only pour-flush and/or VIP are considered, while in urban areas with Level III water supply systems, flush type toilets requiring a piped water connection are included. Isolated rural areas where there is dearth of water supply, sanitary pit privy (dry type) is taken into account.

(2) School toilets

Standard service level currently used by DECS (40 students per unit facility) is employed for both phases.

The standard toilet facility (1 building) with 5 units of toilet bowl to serve for 200 students is adopted for the planning purpose, which is modified from FW4SP design to pro-

vide a shallow well as a water source. Since DECS is currently promoting the "one class-room-one toilet" concept, the PW4SP also adopts this concept on a 50-50 basis, that is 50% of the school toilet requirements will be allocated using the JICA-RESP design and the other 50% will be adopting the new concept.

### (3) Public toilets

As a minimum requirement, at least 1 sanitary toilet facility is assumed to be provided for respective utilities: public market bus/jecpney terminal and parks/playground.

The DOH standard design with 6-units of toilet bowl for the market is adopted. In this design, it is assumed that water supply will be tapped from the existing system, hence an elevated water tank is provided.

## 8.4.3 Urban Sewerage

The commencement of staged implementation of the sewerage program is planned in Phase II for the limited urban area (50% of urban population served by Level III system for the municipalities with urban population of more than 10,000). It is practical to start the program fully using the existing facilities to allow for lower initial investment cost than starting at once a conventional sewerage system (refer to Figure 8.4.2 Staged Improvement in Sewage Collection Method, Supporting Report).

Low cost off-site technologies such as small-bore sewer for collection of effluent from septic tank are to be adopted. Improvement of sewage collection method may be gradually achieved from combined sewer to separate sewerage system.

Sewage treatment facilities may range from community scale septic tank or Imhoff tank to aerated lagoon systems and to a more advanced treatment process such as oxidation ditch. For this PW4SP, aerated lagoons are assumed as a representative treatment facility for planning purpose. Daily average wastewater quantity is assumed at 100 liters per capita per day.

## 8.4.4 Solid Waste

In terms of facility requirements, this PW4SP only studied the number of refuse collection trucks required for the year 2004. A rated capacity of 5 cu.m truck/vehicle is considered for calculation of required units of truck. Disposal of solid waste shall be studied in detail

through investigations, F/S and D/D. Unit solid waste generation for urban area is assumed to be 0.418 kg. per capita per day.

## 8.5 Service Coverage by Target Year

### 8.5.1 Water Supply

The service coverage in terms of population to be served by target year was estimated by urban and rural area by municipality. The service coverage in rural area was further subdivided by service level (Level I & Level II) to finally come up with physical requirements.

Base figures applied to estimate the future service coverage and the additional population to be served are:

- provincial sector targets;
- physical targets under the on-going ADB-assisted project;
- population projection by target year; and
- base year service coverage (served population) by existing facilities.

Future requirements in terms of additional population to be served were then estimated by urban (Level III) and rural (Level I & II) area by municipality as a shortfall to meet the population to be served in each target year. The population served in base year is adopted as the population served in target year, when the former population exceeds the population to be served in the target year/s. Manner of calculation is specifically presented by phase.

#### (1) Phase I requirements

Additional service coverage was estimated as a shortfall of the population to be served in Phase I comparing with the population served in base year. In this connection, existing facilities both in urban and rural areas are assumed to be utilized during the Phase I period.

With regard to the development of rural water supply, the on-going ADB-assisted Rural Water Supply and Sanitation Sector Project (RW3SP) is considered as a major role in the medium-term plan of PW4SP.

The physical targets of the province under the ADB-assisted project are construction of shallow well (71 units), deep well (118 units) and developed spring (58 units). Although a total of 247 units were allocated to the recipient municipalities, actual construction has not yet started to date. Accordingly, these physical targets may be included in the Phase I requirements of this plan (details are referred to Supporting Report).



Although the utilization of untapped springs for Level II systems is given priority for rural water supply in this plan, Level I facilities under the ADB-assisted project are solely considered for rural water supply (Level II systems are excluded from the proposed project).

**(2) Phase II requirements**

Additional service coverage was estimated as a shortfall of the population to be served in Phase II comparing with the population served in Phase I. In this regard, existing facilities in rural area were assumed to be utilized through the two Phases, while urban population served by Level I and II facilities in base year was assumed to be absorbed by Level III service during Phase II period.

Table 8.5.1 presents the service coverage by target year and by level of service as well as the additional population to be served (details are referred to Supporting Report).

Through Phase I development, approximately 34,700 persons in the province will be served by additional water supply services, of which 12,400 persons or 36% of the total will be urban population and 22,200 persons or 62% will be rural population.

For Phase II period, a total of 215,600 persons, of which 117,300 persons or 54% in urban area and 98,300 persons or 46% in rural area, will be further benefited by water supply services. This additional service coverage in urban area includes the upgrade of service level for 73,700 persons served by Level I and II facilities in 1998.

## **8.5.2 Sanitation**

**(1) Household toilets**

The service coverage (number of households to be served) by different types of sanitary facility is estimated by urban and rural area by municipality for the years 2004 and 2010.

The future service coverage and additional households to be served are estimated to meet the provincial targets using the number of household served in the base year and the number of households in target years.

Phase I service coverage will include the proposed household toilets of the on-going ADB assisted project in the province with a total of 2,580 units of pour-flush toilets. Construction/installation is expected to commence in 2000 and to end in 2002.

Table 8.5.1 Population to be Served by Target Year (Water Supply)

Name of Municipality	Area	Phase I Coverage (2004)						Phase II Coverage (2010)					
		Total Population			Service Coverage			Total Population			Service Coverage		
		Level III	Level II	Level I	Total	Level III	Level II	Level I	Total	Level III	Level II	Level I	Total
Aretteh	Urban	4,978	687	2,680	3,367	687	1,170	5,290	8,763	5,026	4,539	4,339	4,339
	Rural	8,868		3,976	3,976		1,170	9,423	8,763			4,787	4,787
	Total	13,846	687	6,656	7,343	687	2,340	14,713	17,526	5,026	4,539	9,126	9,126
Balangiga	Urban	7,058	974	3,638	4,612	974	7,058	7,251	7,251	6,277	6,277	6,277	6,277
	Rural	5,951		2,590	2,590		540	6,050	5,951			1,682	1,682
	Total	12,655	974	6,228	7,202	974	7,598	13,683	13,202	6,277	6,277	7,959	7,959
Balangayan	Urban	2,895	1,256	1,710	2,981		3,231	3,089	3,089	1,813	1,813	1,813	1,813
	Rural	7,119		3,090	3,090		540	7,705	7,166	7,166	4,076	4,076	
	Total	10,104	1,256	4,800	6,071		3,771	10,794	10,255	8,813	8,813	5,889	5,889
Borongan (Capital)	Urban	20,078	6,948	9,352	15,700		21,230	20,169	20,169	13,821	13,821	13,821	13,821
	Rural	33,166	3,119	13,331	16,450	2,143	35,068	31,9	33,068	32,613	12,782	12,782	12,782
	Total	53,244	10,067	22,683	32,150	2,143	70,336	62,119	66,128	64,782	26,603	26,603	26,603
Canavid	Urban	7,087	978	3,368	4,346	978	7,738	7,351	7,351	6,375	6,375	6,375	6,375
	Rural	11,207		5,269	5,269		540	12,236	11,379	9,683	9,683	6,110	6,110
	Total	18,294	978	8,637	9,615	978	8,278	19,974	18,730	18,730	15,863	15,863	15,863
Dabores	Urban	15,536	2,143	650	8,930	2,143	16,513	15,723	15,723	15,580	15,580	11,134	11,134
	Rural	22,480		2,369	2,369		1,530	23,948	2,369	19,903	22,272	22,272	22,272
	Total	38,016	2,143	8,900	11,300	2,143	18,043	40,690	38,095	37,995	38,095	38,095	38,095
General Macthur	Urban	4,444		4,157	4,157		4,362	4,334	4,334	4,334	4,334	4,334	4,334
	Rural	6,015		564	564		360	6,175	564	5,179	5,179	4,819	4,819
	Total	10,459		4,721	4,721		4,721	10,509	9,998	9,998	9,998	9,998	9,998
Giporlos	Urban	5,474	755	3,143	3,898	755	5,090	4,836	4,836	4,081	4,081	4,081	4,081
	Rural	3,014		943	1,515	2,458	810	3,360	943	2,182	2,182	667	667
	Total	9,088	755	4,086	5,356	755	5,900	8,196	5,838	6,068	6,263	4,748	4,748
Guitan	Urban	10,176	1,404	6,094	7,498	1,404	10,473	9,951	9,951	8,547	8,547	8,547	8,547
	Rural	26,912		2,620	2,620		2,701	28,713	2,620	23,142	23,142	23,142	23,142
	Total	37,088	1,404	8,714	10,118	1,404	13,174	32,664	12,571	25,784	25,784	25,784	25,784
Hemani	Urban	2,694	372	1,323	1,695	372	2,694	2,784	2,784	2,784	2,784	2,784	2,784
	Rural	6,591		304	3,131	3,435	7,170	7,170	304	6,866	6,866	3,233	3,233
	Total	9,285	372	1,627	5,126	717	9,864	9,864	3,088	3,088	3,088	3,088	3,088
Jipapad	Urban	4,059	560	2,500	3,060	560	4,400	4,218	4,218	3,246	3,246	2,706	2,706
	Rural	3,190		540	540		7,930	4,218	540	3,246	3,246	2,706	2,706
	Total	7,249	560	3,040	3,600	560	12,330	8,436	8,436	6,492	6,492	5,412	5,412
Lawaan	Urban	7,176	990	3,066	4,398	990	7,973	7,574	7,574	6,584	6,584	6,584	6,584
	Rural	4,504		1,010	2,514	3,524	5,004	5,004	1,010	3,694	3,694	1,130	1,130
	Total	11,680	990	4,076	7,912	1,414	12,977	12,578	8,668	8,668	7,714	7,714	7,714
Lorente	Urban	6,478	1,400	30	7,908	1,400	8,944	8,944	5,496	5,496	4,096	4,096	4,096
	Rural	7,860		389	4,694	5,033	12,358	12,358	3,89	5,724	5,724	1,060	1,060
	Total	14,338	1,400	4,083	12,601	2,833	21,302	21,302	9,390	11,520	11,520	6,156	6,156
Mislog	Urban	1,569	189	337	526	189	1,839	1,839	1,839	1,839	1,839	1,839	1,839
	Rural	2,516		231	360	591	3,062	3,062	231	2,017	2,017	2,257	2,257
	Total	4,185	189	568	886	780	4,901	4,901	2,070	3,856	3,856	4,096	4,096
Maydong	Urban	6,325	1,150	2,495	3,645	1,150	6,801	6,401	6,401	5,311	5,311	5,311	5,311
	Rural	7,439	116	1,310	1,640	1,069	7,999	7,999	1,110	6,013	6,013	4,373	4,373
	Total	13,764	1,266	3,805	5,285	2,219	14,800	14,400	7,511	11,924	11,924	9,684	9,684

Table 8.5.1 Population to be Served by Target Year (Water Supply)

(cont'd)

Name of Municipality	Area	Phase I Coverage (2004)										Phase II Coverage (2010)												
		Total Population			Service Coverage			Additional Population to be Served				Total Population			Service Coverage			Additional Population to be Served						
		Level III	Level II	Level I	Level III	Level II	Level I	Level III	Level II	Level I	Total	Level III	Level II	Level I	Total	Level III	Level II	Level I	Total	Level III	Level II	Level I	Total	
Mercedes	Urban	1,768	244	3,797	244	3,797	360	244	1,946	1,946	360	244	1,946	1,946	4,795	1,605	998	998	1,605	1,605	998	998	1,605	998
	Rural	4,653	244	7,489	244	7,489	360	244	5,156	5,156	360	244	5,156	5,156	6,644	1,605	998	998	1,605	1,605	998	998	1,605	998
	Total	6,421	488	11,286	488	11,286	720	488	7,102	7,102	720	488	7,102	7,102	8,439	3,210	1,996	1,996	3,210	3,210	1,996	1,996	3,210	1,996
Oras	Urban	8,651	787	19,797	787	19,797	1,350	787	9,397	9,397	1,350	787	9,397	9,397	14,332	5,037	2,691	2,691	5,037	5,037	2,691	2,691	5,037	2,691
	Rural	27,476	787	43,300	787	43,300	1,350	787	29,799	29,799	1,350	787	29,799	29,799	36,640	8,927	4,871	4,871	8,927	8,927	4,871	4,871	8,927	4,871
	Total	36,141	1,574	63,097	1,574	63,097	2,700	1,574	39,196	39,196	2,700	1,574	39,196	39,196	46,640	13,864	7,562	7,562	13,864	13,864	7,562	7,562	13,864	7,562
Quimaponan	Urban	3,703	787	6,997	787	6,997	1,350	787	6,148	6,148	1,350	787	6,148	6,148	7,244	2,538	1,350	1,350	2,538	2,538	1,350	1,350	2,538	1,350
	Rural	8,616	787	10,427	787	10,427	1,350	787	9,285	9,285	1,350	787	9,285	9,285	10,954	3,617	2,000	2,000	3,617	3,617	2,000	2,000	3,617	2,000
	Total	14,321	1,574	17,424	1,574	17,424	2,700	1,574	15,433	15,433	2,700	1,574	15,433	15,433	21,898	7,155	3,950	3,950	7,155	7,155	3,950	3,950	7,155	3,950
Salcedo	Urban	3,159	436	7,699	436	7,699	900	436	3,681	3,681	900	436	3,681	3,681	4,577	1,633	1,000	1,000	1,633	1,633	1,000	1,000	1,633	1,000
	Rural	12,289	436	13,725	436	13,725	900	436	11,984	11,984	900	436	11,984	11,984	13,620	4,633	3,000	3,000	4,633	4,633	3,000	3,000	4,633	3,000
	Total	15,448	872	21,424	872	21,424	1,800	872	15,665	15,665	1,800	872	15,665	15,665	25,194	9,266	4,000	4,000	9,266	9,266	4,000	4,000	9,266	4,000
San Julian	Urban	2,718	375	7,699	375	7,699	1,530	375	2,776	2,776	1,530	375	2,776	2,776	3,301	1,355	866	866	1,355	1,355	866	866	1,355	866
	Rural	9,533	375	9,764	375	9,764	1,530	375	9,736	9,736	1,530	375	9,736	9,736	10,954	3,617	2,262	2,262	3,617	3,617	2,262	2,262	3,617	2,262
	Total	12,251	750	17,463	750	17,463	3,060	750	12,512	12,512	3,060	750	12,512	12,512	20,688	7,272	4,528	4,528	7,272	7,272	4,528	4,528	7,272	4,528
Sail Policarpo	Urban	4,766	658	6,463	658	6,463	2,070	658	5,153	5,153	2,070	658	5,153	5,153	5,849	2,115	1,355	1,355	2,115	2,115	1,355	1,355	2,115	1,355
	Rural	8,413	658	10,071	658	10,071	2,070	658	9,096	9,096	2,070	658	9,096	9,096	10,454	3,437	2,196	2,196	3,437	3,437	2,196	2,196	3,437	2,196
	Total	13,179	1,316	16,534	1,316	16,534	4,140	1,316	14,249	14,249	4,140	1,316	14,249	14,249	15,898	6,552	3,551	3,551	6,552	6,552	3,551	3,551	6,552	3,551
Sulat	Urban	6,422	3,726	7,86	3,726	7,86	1,080	3,726	6,780	6,780	1,080	3,726	6,780	6,780	7,86	2,715	1,996	1,996	2,715	2,715	1,996	1,996	2,715	1,996
	Rural	8,673	3,726	10,790	3,726	10,790	1,080	3,726	9,710	9,710	1,080	3,726	9,710	9,710	11,354	4,237	2,996	2,996	4,237	4,237	2,996	2,996	4,237	2,996
	Total	15,297	7,452	18,650	7,452	18,650	2,160	7,452	16,490	16,490	2,160	7,452	16,490	16,490	18,154	6,952	4,992	4,992	6,952	6,952	4,992	4,992	6,952	4,992
Taft	Urban	4,289	3,753	10,599	3,753	10,599	1,260	3,753	5,302	5,302	1,260	3,753	5,302	5,302	6,037	2,115	1,355	1,355	2,115	2,115	1,355	1,355	2,115	1,355
	Rural	15,023	3,753	19,352	3,753	19,352	1,260	3,753	16,034	16,034	1,260	3,753	16,034	16,034	18,791	6,037	4,871	4,871	6,037	6,037	4,871	4,871	6,037	4,871
	Total	19,314	7,506	29,951	7,506	29,951	2,520	7,506	21,336	21,336	2,520	7,506	21,336	21,336	24,828	12,152	6,226	6,226	12,152	12,152	6,226	6,226	12,152	6,226
Provincial Total	Urban	143,909	26,890	6,836	26,890	6,836	22,230	26,890	266,024	266,024	22,230	26,890	266,024	266,024	317,582	117,322	98,333	98,333	117,322	117,322	98,333	98,333	117,322	98,333
	Rural	251,788	4,331	149,249	4,331	149,249	22,230	4,331	144,647	144,647	22,230	4,331	144,647	144,647	171,794	50,337	32,691	32,691	50,337	50,337	32,691	32,691	50,337	32,691
	Total	395,697	31,221	218,195	31,221	218,195	44,460	31,221	410,671	410,671	44,460	31,221	410,671	410,671	588,376	167,659	131,024	131,024	167,659	167,659	131,024	131,024	167,659	131,024

Additional number of households to be served by different type of facility by urban and rural area by municipality is the shortfall of the number of households to be served in target years comparing with either that in base year or in Phase I (details are referred to Supporting Report). However, when the number of households to be served in target year/s is less than or equal to that in base year, no additional number of households to be served is counted.

In the determination of the number of households to be served by flush type toilet, when the number of households to be served in the target year is higher than in base year, the target coverage is applied with conditions. When the target coverage is higher than Level III water supply coverage, the latter coverage is adopted, while in the other case, the target coverage is applied. In cases where the target coverage is less than that in base year, the base year coverage is adopted.

For Phase I, any type of existing sanitary facilities both in urban and rural areas is to be utilized during Phase I period. For Phase II, water-sealed toilet facilities in Phase I both in urban and rural areas are to be utilized.

The projected number of served households at the end of the Phase I period is 55,420. Additional households to be served totaled to 20,594, of which 40% is urban households and 60% is rural households. Of this requirement, a total of 2,580 units of pour-flush toilets will be absorbed by the ADB-assisted project. While at the end of Phase II period, the number of served households are 95,153 with an additional households to be served at 41,883. Table 8.5.2 provides the number of households to be served by target year for urban and rural areas by municipality.

## (2) School toilets

The service coverage or the number of public school students to be served is estimated by municipality for the years 2004 and 2010.

The future service coverage and additional number of students to be served are estimated using the number of students served in the base year, the number of students in target years and the provincial sector targets.

Table 8.5.2 Additional Number of Households to be Served by Target Year (Household Toilets)

Name of Municipality	Area	Phase I Coverage (2004)						Phase II Coverage (2010)							
		No. of Served Households			Add'l. No. of Households to be Served			No. of Served Households			Add'l. No. of Households to be Served				
		Total Households	Flush	Pour Flush	Total	Flush	Pour Flush	Total Households	Flush	Pour Flush	Total	Flush	Pour Flush	Total	
Arsoche	Urban	950	121	647	40	808	120	282	407	1,323	615	575	40	1,230	494
	Rural	1,657		385	249	1,134		532		2,356		1,871	249	3,120	986
	Total	2,607	121	1,032	289	1,942	120	819	939	3,679	615	2,446	289	3,150	1,480
Balangiga	Urban	1,354	170	907	57	1,134	170	225	395	1,908	887	830	57	1,774	717
	Rural	1,012		151	688		45	95	140	1,513		1,211	151	1,362	674
	Total	2,366	170	1,444	208	1,822	170	270	535	3,421	887	2,041	208	3,136	1,391
Balunguyan	Urban	575	73	302	24	489	73	36	109	808	376	351	24	751	303
	Rural	1,341		711	201	912		130	124	1,926		1,532	201	1,723	821
	Total	1,916	73	1,103	225	1,401	73	166	234	2,734	376	1,883	225	2,484	1,124
Bonongan (Capital)	Urban	3,846	400	2,616	163	3,269	155	1,591	1,746	5,308	2,468	2,305	163	4,936	1,978
	Rural	6,633	152	3,790	1,112	5,054		2,233	8,767	3,19	6,459	1,112	1,890	163	2,836
	Total	10,479	642	6,406	1,275	8,323	155	3,826	3,981	14,075	2,787	8,764	1,275	12,826	2,145
Canavid	Urban	1,216	155	827	52	1,034	155	235	390	1,955	900	848	52	1,800	745
	Rural	2,016		1,069	302	1,371		756	756	3,059		2,451	302	2,753	1,382
	Total	3,232	155	1,896	354	2,405	155	991	1,146	4,994	900	3,299	354	4,553	2,148
Delores	Urban	2,750	351	1,870	117	2,338	271	512	783	4,138	1,924	1,807	117	3,448	1,573
	Rural	3,986	2	2,112	596	2,710		919	16	935	5,987	2	4,790	596	2,678
	Total	6,736	353	3,982	713	5,048	271	1,431	16	10,125	1,926	6,597	713	9,236	4,251
General Macarthur	Urban	814		637	35	692		312	312	1,141		495	35	1,061	531
	Rural	1,066		565	160	725		524	524	1,544		1,230	160	1,390	665
	Total	1,880		1,202	195	1,417		836	836	2,688		1,725	195	2,481	1,196
Giporlos	Urban	1,041	133	708	44	885	133	220	355	1,273	592	548	44	1,841	459
	Rural	672		356	101	457		74	147	840		655	101	746	299
	Total	1,713	133	1,064	145	1,342	133	294	73	2,113	592	1,203	145	1,940	758
Gutuan	Urban	1,938	247	1,318	82	1,647	197	25	220	2,619	1,218	1,136	82	2,436	971
	Rural	5,448		2,890	813	3,705		1,060	421	6,925		5,418	813	6,233	2,528
	Total	7,386	247	4,208	897	5,352	197	1,103	421	9,544	1,218	6,554	897	8,669	3,499
Hernani	Urban	463	59	315	20	394	52	246	298	735	341	321	20	682	282
	Rural	1,084		574	162	737		522	522	1,793		1,451	162	1,614	877
	Total	1,547	60	889	182	1,131	52	768	820	2,526	342	1,772	182	2,296	282
Jipapad	Urban	643	92	438	27	547	82	45	127	1,110	516	489	27	1,032	434
	Rural	580		307	87	394		156	156	873		699	87	786	392
	Total	1,223	92	745	114	941	82	201	283	1,983	516	1,188	114	1,818	434
Lawaan	Urban	1,136	167	747	40	963	147	400	24	571		1,006	120	1,126	580
	Rural	803		426	120	546		70	70	1,251		1,006	120	1,126	580
	Total	1,939	167	1,173	169	1,529	147	400	94	641		1,883	169	2,079	1,160
Lorente	Urban	1,346	171	914	57	1,142	118	86	204	1,446	673	615	57	1,343	502
	Rural	1,518		805	227	1,032		188	188	1,643		1,252	227	1,479	447
	Total	2,864	171	1,719	284	2,174	118	86	392	3,089	673	1,867	284	2,823	949
Maslog	Urban	244	31	166	10	207	31	46	77	372	173	163	10	346	142
	Rural	548		291	82	373		48	48	766		607	82	689	316
	Total	792	31	457	92	580	31	94	125	1,138	173	270	92	1,035	438
Maydolong	Urban	1,178	150	801	50	1,001	122	186	308	1,700	791	240	50	1,581	641
	Rural	1,222	25	623	183	831	18	69	126	2,000	116	1,501	183	1,900	909
	Total	2,400	175	1,424	233	1,832	140	358	434	3,700	907	2,241	233	3,381	1,610

Table 8.5.2 Additional Number of Households to be Served by Target Year (Household Toilets)

(cont'd)

Name of Municipality	Area	Phase I Coverage (2004)										Phase II Coverage (2010)									
		No. of Served Households					Add'l. No. of Households to be Served					No. of Served Households					Add'l. No. of Households to be Served				
		Total Households	Flush	Pour	VIP/Dry	Total	Flush	Pour	VIP/Dry	Total	Total Households	Flush	Pour	VIP/Dry	Total	Flush	Pour	VIP/Dry	Total		
Mercedes	Urban	262	33	179	11	223	33	95	11	139	487	227	215	11	453	194	36	250			
	Rural	778	413	116	529	17	17	116	133	1,289	1,289	1,044	116	1,160	631	631	631				
	Total	1,040	33	292	127	752	33	112	127	272	1,776	227	1,259	127	1,613	194	667	881			
Oras	Urban	1,539	1,265	65	1,308	448	448	65	513	2,349	1,093	1,027	65	2,185	1,093	3,314	3,314				
	Rural	4,937	2,645	746	3,391	479	479	746	1,225	7,450	5,959	246	6,705	3,314	4,407	4,407					
	Total	6,526	3,888	811	4,699	927	927	811	1,738	9,799	1,093	6,985	311	8,890	1,093	7,745	7,745				
Quinapondan	Urban	805	103	547	34	684	103	193	350	1,537	215	680	34	1,429	612	133	1,100				
	Rural	1,455	771	218	989	218	218	989	2,321	2,321	1,871	215	2,089	1,100	1,100	1,100					
	Total	2,260	103	1,318	252	1,673	103	193	252	548	3,858	715	2,551	352	3,518	612	1,233	1,845			
Safedco	Urban	622	79	424	26	529	79	26	105	770	358	332	26	716	279	279	279				
	Rural	2,513	1,353	376	1,709	26	26	376	402	2,996	2,996	2,320	376	2,696	987	987					
	Total	3,135	79	1,257	402	2,238	79	26	402	507	3,766	358	2,652	402	3,412	279	987	1,266			
San Julian	Urban	555	71	377	24	472	66	24	90	694	323	298	24	645	252	252	252				
	Rural	1,922	1,194	337	1,551	337	337	1,551	2,424	2,424	1,854	337	2,191	660	660	660					
	Total	2,477	71	1,571	361	2,003	66	361	427	3,128	3,233	2,152	361	2,836	252	660	912				
San Policarpo	Urban	953	119	636	40	795	119	248	367	1,288	599	559	40	1,198	480	480	480				
	Rural	1,593	845	238	1,083	845	845	1,083	1,845	2,274	1,809	278	2,027	964	964						
	Total	2,528	119	1,481	278	1,878	119	1,093	1,212	3,562	599	2,368	278	3,245	480	964	1,444				
Sulat	Urban	1,262	161	858	54	1,073	161	184	54	399	1,695	788	74	1,576	627	627	627				
	Rural	1,703	101	1,022	288	1,310	101	184	288	2,343	1,821	288	288	2,109	799	799					
	Total	2,965	161	1,880	342	2,343	161	372	342	4,687	4,038	788	342	3,696	627	1,426					
Tali	Urban	866	9	709	38	756	38	25	25	1,326	617	578	38	1,233	608	608	608				
	Rural	2,645	9	1,405	396	1,799	396	476	696	4,159	3,347	347	396	3,743	1,944	1,944					
	Total	3,511	9	2,112	434	2,555	434	245	721	5,485	617	3,925	434	4,976	1,944	2,552					
Provincial Total	Urban	26,338	2,955	18,336	1,119	22,410	2,387	5,618	283	8,268	37,953	17,652	16,523	1,119	35,294	14,697	337	15,034			
	Rural	47,192	180	25,367	7,263	33,010	18	8,933	12,376	66,509	438	52,158	7,263	59,859	2,581	26,591	26,591				
	Total	73,530	3,135	43,903	8,382	55,420	2,405	14,551	3,659	20,594	104,462	18,090	68,681	8,382	95,153	14,955	26,928	41,983			

Phase I development will include the proposed school toilets under the ADB-assisted project in the province with a total of about 90 units of school toilets to be situated in each classroom.

Additional number of students to be served by municipality is the shortfall of the number of students to be served in targets comparing with either that in base year or in Phase I (details are referred to Supporting Report). However, when the number of students to be served in target/s is less than or equal to the base year, no additional number of households to be served is considered.

The existing facilities are to be utilized during Phase I period, while the facilities in Phase I are to be utilized during Phase II period.

The projected number of served students at the end of Phase I period is 83,586. The additional students to be served are 29,624 inclusive of about 3,600 students to be covered by the proposed ADB-assisted project. While at the end of Phase II period, the projected number of served students are 94,267 with an additional students to be served at 13,212. Table 8.5.3 summarizes the number of public school students to be served by target year.

### (3) Public toilets

The service coverage of public utilities with sanitary toilet facility by municipality is estimated for the years 2004 and 2010.

The future service coverage and additional coverage are estimated using the existing number of public utilities with sanitary toilets in the base year, the number of public utilities in target years, and provincial sector targets.

The additional number of public utilities with sanitary toilets needed by municipality is the shortfall of the number of public utilities in target year comparing with either the existing coverage or Phase I coverage (details are referred to Supporting Report).

The existing sanitary facilities are to be utilized during Phase I period. The facilities in Phase I are to be utilized during Phase II period.

As mentioned earlier, there are no proposed public utilities for both target years. However, the ADB-assisted project proposes 7 units of public toilets in the province to be constructed within the Phase I period. Table 8.5.4 reflects the distribution of these public toilets by municipality.

Table 8.5.3 Add'l. Number of Public School Student to be Served by Target Year (School Toilets)

Name of Municipality	Phase I Coverage (2004)			Phase II Coverage (2010)		
	Total No. of Public School Student	Std. No. of Public School Students to be Served	Add'l. No. of Public School Student to be Served	Total No. of Public School Student	Std. No. of Public School Students to be Served	Add'l. No. of Public School Student to be Served
Arteche	3,667	1,947	1,547	3,897	3,507	1,560
Balangiga	2,896	2,896	616	3,316	2,984	88
Balangkayan	2,381	2,381	701	2,720	2,448	67
Borongon (Capital)	13,634	13,634	4,234	13,658	12,292	
Can-avid	4,355	1,837	1,837	5,034	4,531	2,694
Dolores	9,581	4,921	4,041	10,206	9,185	4,264
General Macarthur	2,830	2,830	230	2,752	2,752	
Giporlos	2,357	2,357	(311)	2,076	2,076	
Guiuan	9,548	7,547	4,027	9,311	8,380	833
Hernani	2,422	2,422	902	2,634	2,371	
Jipapad	1,403	912	592	1,653	1,488	576
Lawaan	2,783	2,783	583	3,092	2,783	
Llorente	3,577	3,577	977	3,026	3,026	
Maslog	823	823	125	959	863	40
Maydolong	3,755	3,755	(1,685)	4,038	3,634	
Mercedes	1,625	1,405	685	1,788	1,609	204
Oras	8,909	8,438	3,758	9,662	8,696	258
Quinapondan	3,110	1,952	1,312	3,562	3,206	1,254
Salcedo	4,335	4,335	535	4,228	4,228	
San Julian	2,966	1,531	1,251	3,030	2,727	1,196
San Policarpo	3,018	2,993	1,273	3,466	3,119	126
Sulat	3,293	3,293	257	3,681	3,313	20
Taft	5,067	5,017	2,137	5,610	5,049	32
<b>Provincial Total</b>	<b>98,335</b>	<b>83,586</b>	<b>29,624</b>	<b>103,399</b>	<b>94,267</b>	<b>13,212</b>

Table 8.5.4 Additional Number of Public Utilities with Sanitary Toilets by Target Year

Name of Municipality	Type	Phase I Coverage (2004)		Phase II Coverage (2010)	
		Add'l. No. of Public Utility with Sanitary Toilets	No. of Public Utility with Sanitary Toilets	Add'l. No. of Public Utility with Sanitary Toilets	No. of Public Utilities with Sanitary Toilets
Arteche	Public Market		1		1
	Bus/Jeepney Terminal				
	Parks/Playground				
	<b>Total</b>		1		1
Balangiga	Public Market	1	1		1
	Bus/Jeepney Terminal				
	Parks/Playground				
	<b>Total</b>	1	1		1
Balangkayan	Public Market	1	1		1
	Bus/Jeepney Terminal				
	Parks/Playground				
	<b>Total</b>	1	1		1



Table 8.5.4 Additional Number of Public Utilities with Sanitary Toilets by Target Year (cont'd)

Name of Municipality	Type	Phase I Coverage (2004)		Phase II Coverage (2010)	
		Add'l. No. of Public Utility with Sanitary Toilets	No. of Public Utility with Sanitary Toilets	Add'l. No. of Public Utility with Sanitary Toilets	No. of Public Utilities with Sanitary Toilets
Borongan (Capital)	Public Market		1		1
	Bus/Jeepney Terminal		1		1
	Parks/Playground				
	Total		2		2
Can-avid	Public Market		1		1
	Bus/Jeepney Terminal				
	Parks/Playground				
	Total		1		1
Dolores	Public Market		2		2
	Bus/Jeepney Terminal		2		2
	Parks/Playground		1		1
	Total		5		5
General Macarthur	Public Market		1		1
	Bus/Jeepney Terminal				
	Parks/Playground				
	Total		1		1
Giporlos	Public Market	1	1		1
	Bus/Jeepney Terminal				
	Parks/Playground				
	Total	1	1		1
Guiuan	Public Market		3		3
	Bus/Jeepney Terminal				
	Parks/Playground				
	Total		3		3
Hernani	Public Market		1		1
	Bus/Jeepney Terminal				
	Parks/Playground				
	Total		1		1
Jipapad	Public Market				
	Bus/Jeepney Terminal				
	Parks/Playground				
	Total				
Lawaan	Public Market		1		1
	Bus/Jeepney Terminal				
	Parks/Playground				
	Total		1		1
Llorente	Public Market		1		1
	Bus/Jeepney Terminal				
	Parks/Playground				
	Total		1		1
Maslog	Public Market				
	Bus/Jeepney Terminal				
	Parks/Playground				
	Total				
Maydong	Public Market		1		1
	Bus/Jeepney Terminal				
	Parks/Playground		1		1
	Total		2		2
Mercedes	Public Market		1		1
	Bus/Jeepney Terminal				
	Parks/Playground				
	Total		1		1
Oras	Public Market	1	1		1
	Bus/Jeepney Terminal				
	Parks/Playground				
	Total	1	1		1

Table 8.5.4 Additional Number of Public Utilities with Sanitary Toilets by Target Year

(cont'd)

Name of Municipality	Type	Phase I Coverage (2004)		Phase II Coverage (2010)	
		Add'l. No. of Public Utility with Sanitary Toilets	No. of Public Utility with Sanitary Toilets	Add'l. No. of Public Utility with Sanitary Toilets	No. of Public Utilities with Sanitary Toilets
Quinapondan	Public Market	1	1		1
	Bus/Jeepney Terminal				
	Parks/Playground				
	Total	1	1		1
Salcedo	Public Market	1	1		1
	Bus/Jeepney Terminal				
	Parks/Playground				
	Total	1	1		1
San Julian	Public Market		1		1
	Bus/Jeepney Terminal				
	Parks/Playground				
	Total		1		1
San Policarpo	Public Market				
	Bus/Jeepney Terminal		1		1
	Parks/Playground				
	Total		1		1
Sulat	Public Market		1		1
	Bus/Jeepney Terminal				
	Parks/Playground				
	Total		1		1
Taft	Public Market	1	1		1
	Bus/Jeepney Terminal				
	Parks/Playground				
	Total	1	1		1
Provincial Total	Public Market	7	23		23
	Bus/Jeepney Terminal		4		4
	Parks/Playground		2		2
	Total	7	29		29

### 8.5.3 Urban Sewerage

The service coverage in 2010 (Phase II) is estimated for the municipalities with population of more than 10,000 in urban area provided by Level III water supply. It is assumed that half of the population in the area/s is to be served by the sewerage systems. Table 8.5.5 shows the population to be served in Phase II.

Table 8.5.5 Population to be Served by Urban Sewerage in Phase II

Name of Municipality	Urban Population in 2010	Level III Water Supply Coverage	Population to be Served
Borongan (Capital)	21,230	20,169	10,615
Dolores	16,551	15,723	8,276
Guiuan	10,475	9,951	5,238
<b>Provincial Total</b>	<b>151,801</b>	<b>144,212</b>	<b>24,129</b>

## 8.5.4 Solid Waste

Future requirements in the sub-sector are studied giving priority to urban area for the Phase I. Staged improvement for the rural area shall be studied in the future.

Service coverage in Phase I was assumed at 75% with reference to the present service coverage of 72% in urban area. Additional service coverage in Phase I is calculated as a shortfall of target coverage in Phase I comparing with current service coverage. Table 8.5.6 presents additional service coverage for Phase I in the urban area.

**Table 8.5.6 Additional Number of Urban Households to be Served by Municipal Solid Waste System in Phase I**

Name of Municipality	No. of Urban Households Served in the Base Year	Phase I Coverage (2004)		
		No. of Urban Households	Urban Households Coverage	Add'l. No. of Urban Households to be Served
Ateche		950	713	713
Balangiga	997	1,334	1,001	4
Balangkayan		575	432	432
Borongan (Capital)	4,116	3,846	4,116	
Can-avid		1,216	912	912
Dolores	1,668	2,750	2,063	395
General Macarthur	916	814	916	
Giporlos	950	1,041	950	
Guiuan	1,929	1,938	1,929	
Hernani		463	348	348
Jipapad		643	483	483
Lawaan		1,156	867	867
Llorente	1,349	1,344	1,349	
Maslog		244	183	183
Maydolong		1,178	884	884
Mercedes		262	197	197
Oras		1,539	1,155	1,155
Quinapondan	591	805	604	13
Salcedo	2,939	622	2,939	
San Julian		555	417	417
San Policarpo		935	702	702
Sulat	951	1,262	951	
Taft	858	866	858	
<b>Provincial Total</b>	<b>17,264</b>	<b>26,338</b>	<b>24,969</b>	<b>7,705</b>

## 8.6 Facilities, Equipment and Rehabilitation to Meet the Target Services

### 8.6.1 Water Supply

#### (1) Required facilities

Water supply facilities required by service level were estimated by urban and rural area by municipality based on the additional service coverage by target year and summarized in Table 8.6.1 (details are referred to Supporting Report).

Table 8.6.1 Water Supply Facilities Required by Target Year

Name of Municipality	Phase I (2004) Requirements										Phase I (2010) Requirements									
	Urban Water Supply (Level III)					Rural Water Supply					Urban WS (Level III)					Rural Water Supply				
	Mode of Project	No. of Add'l. Water Source	No. of HHS Connection	No. of System	No. of Communal Faucets	Level I			Total No. of Wells	No. of Add'l. Water Source	No. of HHS Connection	Level I			Total No. of Wells	No. of Shallow Wells	Total No. of Wells			
						40 m	80 m	120 m				40 m	80 m	120 m				40 m	80 m	120 m
Anteche	New	1	131			15		1	16	1	1,085			72		72	8	80		
Balangiga	New	1	184					1	1	1	1,569						29	29		
Balangkayan	N/A							11	11	1	453						68	68		
Borongan (Capital)	N/A					6		22	28	2	3,455			43		43	171	214		
Canavid	New	1	168			9		9	14	1	1,593			62		62	40	102		
Dolores	New	1	379			24		6	30	2	3,395			149		149	37	186		
General MacArthur	N/A					2		2	18	1	1,084			9		9	72	81		
Giporlos	New	1	144					12	12	1	1,020						12	12		
Guiuan	New	1	267			5		2	7	2	2,137			90		90	38	128		
Hermani	New	1	64					10	10	1	603						54	54		
Jippapad	New	1	89			14		1	15	1	915			42		42	4	46		
Lawaan	New	1	159					3	3	1	1,646						19	19		
Liloente	Expansion	1	185					7	7	1	1,024						18	18		
Maslog	New	1	34			1		8	9	1	307					4	4	38		
Maydolong	N/A							12	12	1	1,328						73	73		
Mercedes	New	1	36			1		1	1	1	401			7		7	10	17		
Oras	N/A					38		38	38	2	2,232			257		257	25	257		
Quinapondan	New	1	111			4		6	10	1	1,264			18		18	25	43		
Salcedo	Expansion	1	86			2		3	5	1	258						20	23		
San Julian	New	1	77			1		8	9	1	566			3		3	20	23		
San Policarpo	New	1	129			22		22	22	1	1,059			81		81	81	81		
Sulat	N/A					3		3	6	1	679			18		18	27	45		
Taft	N/A					3		3	6	1	1,259			41		41	41	82		
Provincial Total	Exp-2	16	2,243			49	100	1	150	140	200	27	29,332	310	592	4	890	800	1,696	
New-14																				

Urban water supply:

Physical requirements of Level III systems were estimated as the number of required house connections. Mode of project indicates whether future urban water supply will be implemented as expansion of existing system or construction of a new system. The number of water sources was also estimated based on the water source evaluation results in Chapter 7.

Rural water supply:

Physical requirements of Level II systems were estimated as the number of systems and number of communal faucets, while that of Level I facilities were first estimated as the number of wells with classification of deep and shallow wells. Deep wells were further subdivided in terms of three different standard depths based on the water source evaluation results.

Furthermore, as for Level I facilities, 50% of the total required facilities will be implemented by public (LGUs) and 20% of these public Level I facilities will be allocated to spring development.

However, in the medium-term development plan of this PW4SP, the physical requirements for rural water supply shall coincide with the physical targets of Level I facilities to be implemented under the ADB-assisted project, since Level II systems are excluded from the proposed project.

(2) Rehabilitation

Rehabilitation requirements were estimated as 10% of the total number of deep wells to be constructed under PW4SP. Rehabilitation work will be mainly redevelopment of wells by means of air surging, while minor repair of concrete apron and hand-pump will be undertaken by respective beneficiary organizations.

(3) Equipment

Logistic support:

For rural water supply development, 1 unit each or set of the following equipment was considered necessary for the provincial government to conduct various activities of PW4SP implementation;

- |                   |   |
|-------------------|---|
| Transportation-   | service vehicle   |
| Office equipment- | computer with printer, typewriter, mimeo machine, scanning machine and copier |
| Field equipment-  | sound system, tape recorder and tools for maintenance                         |

For urban water supply, no hardware was considered.

Well drilling and rehabilitation equipment:

As a reference information, necessary types and number of well drilling and rehabilitation equipment were studied considering the existing equipment of sector agencies in the province.

During Phase I, a total of 118 Level I deep wells shall be newly constructed under ADB-assisted project and 10% of these deep wells shall be rehabilitated annually. Presently, the DPWH-DEO (Borongan) has one unit of rotary type drilling rig (applicable for 8" of bit diameter and 70 ft of well depth).

Therefore, at least 3 sets of drilling rig (medium size percussion type) together with 3 units of service truck for deep well construction shall be mobilized by private sector to implement ADB-assisted project. Aside from this, one set of well rehabilitation equipment and one unit of support vehicle for well rehabilitation shall be procured by LGUs (details are referred to Supporting Report).

Selection of well drilling machine

An appropriate type of well drilling machine with its specifications shall be selected after comprehensive study on the technical requirements, local capability in O&M of the machine and cost effectiveness.

From the technical viewpoint, geological conditions in the province allow for the use of either rotary or percussion type drilling machine (no rock drilling is expected). While, in view of economical and O&M experience on the machine in the local area, a percussion type is recommendable. Although, the rotary type machine is quite effective to reduce construction period under soft soil condition, special training on mud-circulation, handling manner, etc. are required together with additional equipment and materials as compared with percussion type. The drilling speed of the percussion type is rather slow, but has advantages in drilling boulder and cobble formations.

One unit of truck mounted percussion drilling machine was considered to be procured in the long-term development period.

#### (4) Laboratory

##### Instrument/Equipment and Other Laboratory Accessory:

The provincial government is a recipient of the ADB-assisted project. This project will provide 3 water quality laboratories and 4 portable water test kits that are considered sufficient for the medium term requirement of the province.

### 8.6.2 Sanitation

This sub-section refers to physical requirements by target year covering household, school and public toilet facilities. Table 8.6.2 presents the required sanitation facilities by target year. Rehabilitation for the sanitation facilities is considered as part of recurrent cost.

#### (1) Household toilets

Future requirements in the number of household toilets by different type for urban and rural areas were estimated based on the additional households to be served by type of facility both for urban and rural areas by target year (details are referred to Supporting Report).

#### (2) School toilets

The future requirements in the number of toilet facilities were estimated based on the standard number of students to be served by a 5-unit standard facility or a toilet in every classroom (50-50 sharing) and the additional students to be served by target (details are referred to Supporting Report).

Total required facilities were further broken down into urban and rural areas by applying the percentage share of urban and rural population.

### 8.6.3 Urban Sewerage and Solid Waste

Physical requirements for the sewerage facilities are not discussed in this sub-section. Further study shall be conducted in the future.

As reference information, the number of refuse collection trucks is estimated for the urban area in Phase I. Fifteen (15) additional units of truck are required to meet assumed service coverage as reflected in Table 8.6.3.

Table B.6.2. Sanitation Facilities Required by Target Year

Name of Municipality	Phase I (2004) Requirements												Phase II (2010) Requirements												
	Urban Sanitation						Rural Sanitation						Urban Sanitation						Rural Sanitation						
	No. of Households			No. of Public Sch. Toilets	No. of Public Toilets			No. of Households			No. of Public Sch. Toilets	No. of Public Toilets			No. of Households			No. of Public Sch. Toilets	No. of Public Toilets			No. of Households			
	Pour Flush	VIP/ Dry	Total		Public Market	Bus/ Jeepney Terminal	Park/ Playground	Flush	Pour Flush	VIP/ Dry		Total	Public Market	Bus/ Jeepney Terminal	Park/ Playground	Flush	Pour Flush		VIP/ Dry	Total	Public Market	Bus/ Jeepney Terminal	Park/ Playground	Flush	Pour Flush
Ateneo	120	287	407	3			532	65	140	1	717				494	3	494				984	674		1658	
Balabac	170	223	393	2			45	65	140	1	717				717		717				674			674	
Batangas	35	36	71	1			130	124	254	2	303				303		303				351			351	
Batangas (Capital)	155	1,921	2,076	4			2,235	13	1,978	13	1,978				1,978		1,978				167	2,660		2,827	
Caridad	155	235	390	4			576	74	745	6	745				745		745				1,382			1,382	
Dolores	271	512	783	8			919	16	935	12	1,573				1,573		1,573				2,678			2,678	
General MacArthur	133	220	353	3			524	74	75	147	971				971		971				2,990			2,990	
Guilford	197	23	220	6			1,080	421	1,501	15	971				971		971				2,528			2,528	
San Juan	32	246	278	1			74	75	147						147		147				371			371	
Imelda	35	43	78	2			156	70	226	3	282				282		282				592			592	
Laguna	147	400	547	2			760	70	830	1	830				830		830				447			447	
Lorone	118	86	204	2			183	183	366	3	366				366		366				316			316	
Maido	31	46	77				48	48	96						96		96				91			91	
Mayablong	122	185	307				18	69	87	2	94				94		94				828			828	
Meneses	33	95	128				17	116	133	2	194				194		194				631			631	
Onda	443	65	508	5			479	746	1,225	14	1,093				1,093		1,093				3,314			3,314	
San Mateo	193	34	227	3			218	218	436	4	440				440		440				1,109			1,109	
San Mateo (Capital)	79	26	105				26	376	402	2	279				279		279				987			987	
San Julian	66	24	90				337	337	674	5	252				252		252				660			660	
San Policarpo	119	248	367	2			345	288	633	4	480				480		480				790			790	
Sila	161	184	345				476	220	696	8	698				698		698				1,944			1,944	
Tali	2,367	5,618	8,285	53			18,893	3,375	12,326	101	14,897				14,897		14,897				288	26,390		26,678	
Provincial Total																									



**Table 8.6.3 Number of Refuse Collection Trucks Required in Phase I**

Name of Municipality	Additional Urban Households to be Served	Estimated Daily Amount of Refuse to be Generated, (Kg)	Number of Collection Truck Required
Arteche	713	299	1
Balangiga	4	2	1
Batangayan	432	181	1
Borongan (Capital)			
Can-avid	912	382	1
Dolores	395	166	1
General Macarthur			
Giporlos			
Guiuan			
Hernani	348	146	1
Jipapad	483	202	1
Lawaan	867	363	1
Llorente			
Maslog	183	77	1
Maydolong	884	370	1
Mercedes	197	83	1
Oras	1,155	483	1
Quinapondan	13	6	1
Salcedo			
San Julian	417	175	1
San Policarpo	702	294	1
Sulat			
Taft			
<b>Provincial Total</b>	<b>7,705</b>	<b>3,229</b>	<b>15</b>

### 8.7 Identification of Priority Projects for Medium-Term Development Plan

In general, the present service coverage by municipality with reference to the target coverage indicates the direction of development effort for implementing PW4SP with municipal priorities.

Specific projects shall be selected subject to detailed studies and will not be discussed in the provincial master plan. In addition, pertinent information to identify priority projects is not available both at provincial and municipal level during this PW4SP preparation, except some future expansion work for WDs.

The general criteria for identifying priority projects as guide for implementing the PW4SP are summarized below.

The first level of priority should be given to projects with positive feasibility studies and identified funding. Next level of priority should be given to projects with positive feasibility studies, although no funding source has been identified. The third level should be for which feasi-

feasibility study has been conducted. Within each level, if funds were insufficient, a ranking could be carried out applying some factors, such as willingness to pay, water-related diseases status and per capita cost. Under the above-mentioned conditions, the implementors should prepare a list of projects.

Due attention shall be paid on the importance of integrated development of relevant sub-sectors to maximize the effects and benefits through simultaneous implementation of water supply and sanitation projects. On a municipal level priority, synthetic evaluation of sector components for concerned municipalities (which is studied in the financial arrangements, Chapter 11) may be used for implementation arrangements.

Chapter

9

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**SECTOR MANAGEMENT FOR  
MEDIUM-TERM DEVELOPMENT**



## **9. Sector Management for Medium-Term Development**

### **9.1 General**

In order to manage the water and sanitation sector effectively, the provincial and municipal governments of Eastern Samar will have to make some adjustments in their current policies and structures.

#### **9.1.1 Purpose of Policy and Structural Adjustment**

The adjustments should be aimed at coordinating these local policies and structures more closely with the overall policies, institutional and regulatory frameworks, and resource-sharing systems of the water sector, so that the Province and its municipalities would be in the best position to realize available opportunities to improve water services, specifically:

- (1) to effect immediate improvements in the physical infrastructure for water, sanitation, and related environmental services; and
- (2) to acquire permanent capabilities to (a) plan, manage and institutionalize gains in sector services, (b) to nurture constructive partnerships with the private sector, and (c) to set in place and maintain the mechanisms for sustainability.

To the extent that additional resources are provided by programs like the World Bank-assisted LGU Urban Water and Sanitation Sector Project; and to the extent that the national government has instituted facilitative mechanisms to improve the sector, the provincial and municipal governments must seize the opportunities that, for the present, are available in order to achieve and expand current sectoral targets, and to ensure the long-term sustainability of sectoral gains.

#### **9.1.2 Perspectives**

In making the needed adjustments, the LGUs will do well to keep the following realities in clear perspective:

- (1) That the nature of public accountability dictates certain rigidities and procedural constraints in all governmental systems. Thus, while government must fulfill its mandate as the necessary and enabling institution for the provision of basic services, it is not the most responsive, efficient, and cost-effective agent for directly implementing these services. For this reason, local governments must clearly define their role in the investment, operation, and maintenance of water service utilities;

- (2) That the public -- and even many local officials -- still lack a deep realization of the importance of institutionalizing water services. This lack of realization reflects the transitional stage of most of Philippine society, to which the pervasive effects of urbanization (effects that extend even to the rural areas) and their demands on social participation in sustaining basic services are very recent and unfamiliar experiences. For this reason, the sector's social marketing endeavor must include a primary thrust of helping the community and all LGU officials understand the fundamental role of safe water and sanitation in the actualization of their most cherished of aspirations -- that is, to secure a better future for their children.
- (3) That large sectors in many communities, as well as some entire communities, do not have the capacity to shoulder the full cost of institutionalized water and sanitation services. LGUs are especially challenged to devise ways and means to ensure their disadvantaged constituents basic access to safe water and related services -- even as they seek fair participation from those who can afford to pay, and as they continue to exert efforts to establish these services on a permanent, self-sustaining basis.

This Chapter proposes the mechanisms, processes and structures needed in the medium-term to achieve the coverage targets with sustainability. Not all recommendations can be laid out with the same level of detail at this time as some are dependent on further policy guidelines being formulated at the national level. These include the on-going study on access of LGUs to external financing assistance and the sector devolution process.

## **9.2 Sector Management**

### **9.2.1 Development of the Vision**

One glaring institutional need at the local level is a common vision that could focus and mobilize the water sector's resources and the efforts of the different shareholders within a practical structure that delivers the desired services effectively in a sustainable manner. Such a common, shared vision can only be achieved if all the share shareholders realize the importance of managing water as a basic economic commodity and place value on their family's access to safe water within the framework of their own needs and aspiration.

Both the policy makers and the officials at all levels of governance and public service and a critical mass of the consumers themselves must internalize and share in the vision so that their efforts and resources could be mobilized for project implementation. Local planners need to focus on the long-term requirements i.e., beyond the technical requirements of forming users' associations, drilling wells, distributing bowls, etc. They need to work as "change agents" to

prepare themselves and their constituents to participate in ensuring that basic services like water and sanitation become available and are placed on a sustainable basis in their respective communities. With these considerations, and based on a realistic assessment of constraints, opportunities and demand, the province has set its vision and mission for the sector.

Initial vision statement: The province will adopt a two-phased plan, which seeks to dramatically improve the provision of water supply and sanitation. In the medium-term (2000-2004) plan, the province expects to maintain present service level: water supply coverage in urban areas at 69% and in rural areas at 59%. On the other hand, household toilets will be made available to 85% of the urban population and 68% of the rural population; 85% of the students in public schools will have adequate sanitary toilet facilities; 100% of public utilities will have sanitary toilets; and 75% of the urban population will be covered by solid waste collection services. For its long-term (2005-2010) plan, the province will pursue a more vigorous program to increase water supply coverage in urban areas to 95% and in rural areas to 93%. For the sanitation sub-sector, individual household toilets will increase up to 93% in urban areas and 90% in rural areas; public school toilets will rise up to 90%; public utilities will have 100% sanitary toilet coverage; while sewerage service will cover 50% of the urban population.

### **9.2.2 Sector Management**

A Sector Management Model is presented in Figure 9.2.1 for sector management and project development. It is envisaged that this PW4SP will be used as a basis for the Annual Sector Plan and/or as input into Loan or Grant Negotiations in the future. The Annual Sector Plan, together with the budgets, will be reviewed by the Governor and passed upon by the legislature as part of the provincial budget approval process.

The sector level implementation activities consist principally of three broad areas: social marketing; technical assistance; and monitoring. Project selection follows on from a self-selection process that includes the identification of a responsible community-based association and the preparation of technical studies, as needed. Construction or rehabilitation will take place only after the institutional, financial and technical studies have been done. Operation and maintenance, including arrangements for finances of the system, will be the responsibility of the community organization. The Monitoring Function, on the other hand, will be implemented as a sectoral program, augmented with water quality surveillance by the Provincial Health Office (PHO) and operational audits done by the LGU.

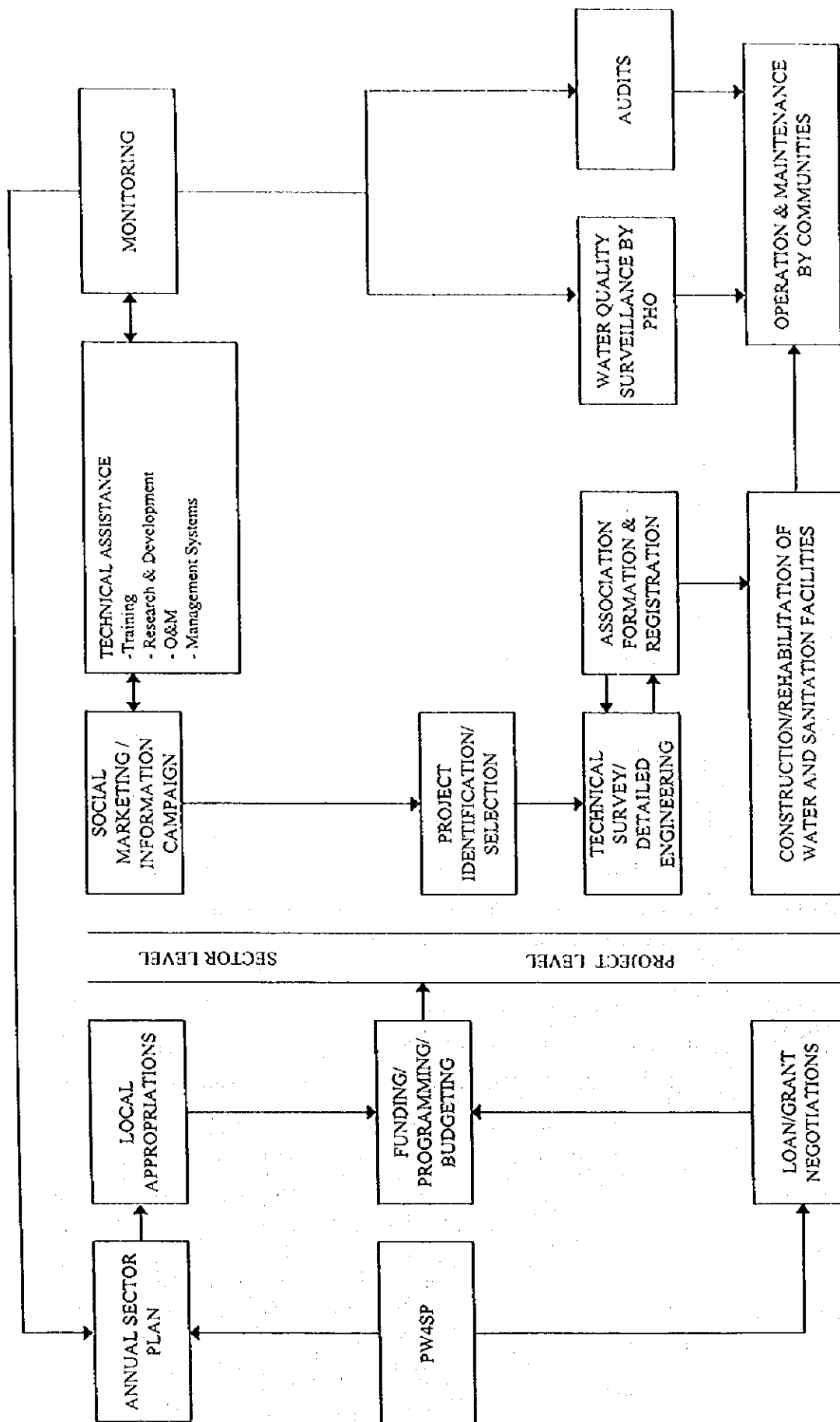


Figure 9.2.1 Sector Management Model



### 9.2.3 Service Provision Policies and Objectives

The LGU seeks to provide an adequate level of water and sanitation facilities defined as follows:

- Level I facilities serve at most 15 (fifteen) households per source; Level II public taps serve 5 (five) households per faucet; and Level III systems provide individual household connections.
- Water supply provision will be at least 20 lpcd for Level I; 60 lpcd for Level II; and 100 lpcd for Level III.
- A critical mass of 90% of the individual households in every barangay has sanitary toilet facilities.
- All schools shall have adequate water supply and at least one sanitary toilet facility for every 40 students.

### 9.2.4 Operating Policies

The following policy and strategy statements are adopted by the Provincial Government. These may be reviewed and revised from time to time by the Provincial Government. The key policy statements include the following:

- (1) Sustainability shall be promoted through increased community responsibility for management of facilities. Unless potential users demonstrate initiative and commitment (beyond making the request for assistance) to maintain the systems, no support shall be provided by the LGUs. To the extent possible, the LGUs should utilize existing local resources (self-reliance).
- (2) Selection and prioritization of projects shall be based on demonstrated commitment of the beneficiaries to participate in the project and their willingness to pay; the current water, sanitation and overall health conditions; potentials for growth; and cost implications.
- (3) Technology to be used for the projects shall be appropriate to local conditions and resources. While economical facilities should be the objective of design and selection, construction costs should not compromise quality, reliability, and provisions for future upgrading and expansion. Phased upward integration and future upgrading of systems and facilities shall also be promoted utilizing to the extent possible previously constructed facilities. In urban centers, a range of technologies may be adopted for wastewater collection and treatment, as well as for drainage.

- (4) An integrated approach to the provision of potable water supply, sanitation and hygiene education shall be promoted. All projects to be developed by the LGU must involve these three elements.
- (5) As part of the overall social marketing efforts for the sector, the Province shall implement an "Information, Education and Communication Program" with the primary thrust of promoting safe water and sanitation values. A nationwide IEC Program to Create "Safe Water" Value among communities is described in the Supporting Report. At the provincial level, the IEC Program shall start with the orientation of all local government officials down to the barangay level, and be coordinated with and draw the participation of other agencies, NGOs, and civic groups throughout the province, particularly those involved in community development, social projects, and health and education services. The program shall include, among others, a component to train individuals selected from the LGUs, participating agencies and organizations, and volunteers from the communities themselves as communicators/change agents for safe water values. Figure 9.2.2 shows the schematic design of the IEC Program.

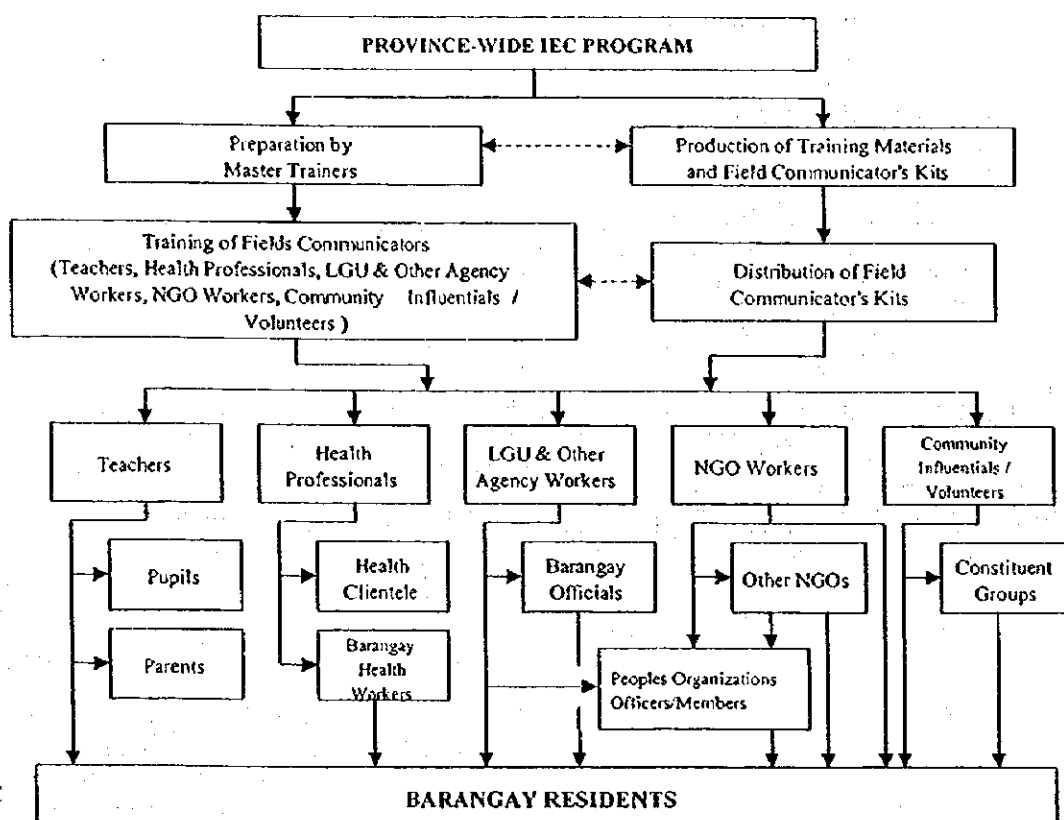


Figure 9.2.2 IEC Program Implementation Flow (Provincial Level)

- (6) The LGU shall seek, to the extent possible, to provide water and sanitation services equally to all their constituents, whether they reside in rural or urban areas, or in wealthy or depressed areas.
- (7) **Cost Recovery and Cost Sharing (Subsidy Policies):** The LGU shall enforce a rational and consistent policy on the application of subsidies and loans for water supply and sanitation. In May 1996, the Investment Coordination Committee (ICC) of the NEDA adopted a policy "to support the financing of devolved activities with social and/or environmental objectives" based on three considerations namely: Equity, Externalities and Economies of Scale. Accordingly, NEDA advised DILG of the revised cost-sharing arrangement which clearly limited the national government subsidy to Level I water supply systems for 5<sup>th</sup> and 6<sup>th</sup> class municipalities up to a maximum 50% of the total project cost. No subsidy from GOP is provided for Level II and III. For sanitation facilities, the national government subsidy for the 3<sup>rd</sup> to 6<sup>th</sup> class municipalities shall be from 50% to 70% of the total project cost.
- (8) **Private Sector Participation:** The government shall give the private sector a substantial and preferential role in the attainment of the PW4SP objectives. In harnessing their participation, less government intervention shall be exercised in areas where the private sector is or can be a key player. An environment designed to empower them to absorb new social responsibilities and proactively convey to the government their aspirations and interests shall be established. The formation of private sector groups, NGOs, community organizations, cooperatives and people's organizations shall be encouraged. The implementation of programs to develop their capabilities in the sector development programs shall be promoted.
- (9) The province's fiscal management, in terms of capital funds generation capability, budget and disbursement, shall be improved. The assistance of the legislative branch in the enactment of the proposed revenue-generating measures shall be sought. Financing through the private sector will also be encouraged.
- (10) Sector development shall be consistent with broader concerns for environmental protection and management. Pollution control, conservation and proper utilization of water and land resources are critical issues to be considered in development plans at all levels, including municipal land use plans. Among the specific concerns in relation to water resources that the LGUs shall address through a proactive, environmentally responsive management approach to resource use, are the preservation and enhancement

of watersheds, the prevention of pollution of streams and groundwater resources, and the protection of riverbanks and natural hydro-geological formations.

(11) Disaster Response and Emergency Coordination: The LGU shall formulate, as part of its contingency plans, a program to address emergency conditions. The program shall include maintenance of stocks of chlorine, organization and training of local communities on restoration of water supplies, and provision of emergency sanitary facilities. The LGU should coordinate closely and regularly with the local officials of the Regional Disaster Coordinating Council (RDCC).

### 9.2.5 Regulatory Policies

In coordination with appropriate national and local agencies, the LGU shall endeavor to set up an effective regulatory framework considering the following:

- (1) Water allocation and water rights policies (conflict resolution) which are within the mandate of the National Water Resources Board. The LGUs or the concerned water utility shall apply for water rights from the Board, prior to implementing a project that would require extraction of water.
- (2) Water Rate Review: While the rate setting and approval functions remain largely a concern of the associations or the Water Districts (and LWUA), a vehicle for resolving grievances against unrealistic tariffs (or other practices) can be instituted by the LGUs. The court system, of course, remains as the final arbiter in conflicts.
- (3) Association Registration: The LGUs shall likewise adopt a registration and franchising system for associations responsible for water supply facilities outside the WD franchise areas. Annual reporting requirements will have to be established for monitoring and possibly, auditing purposes.
- (4) Water Quality: The National Drinking Water Standards have been established. The LGUs will have to establish a viable mechanism, including water testing and standards enforcement, to ensure that water delivered meets the potability standards. The DOIH currently has the responsibility and the regulatory power to stop the operations of water systems not delivering potable water.

## 9.2.6 Financing System

### (1) Water supply investment financing

In financing water supply investments, the LGUs may tap their Internal Revenue Allotment (or IRA) and/or locally generated revenues, or leverage these resources to borrow from government and private financial institutions. Overall, it is the LGU's responsibility to raise funds to support capital development sector projects and to ensure that adequate O&M reserves are raised by the beneficiary communities.

In the medium-term, the primary sources of funds are envisaged to be provincial and local taxes, allocation from the IRA 20% Development Funds, and the Municipal Development Fund. Also, in the medium-term, it is envisaged that national and external funds will continue to be channeled through local offices of central agencies.

Studies are underway to look into the feasibility of direct access of LGUs to external funds. The LGU will continue to monitor the developments and policy decisions to be established, as these will invariably affect local financing mechanisms. (For reference, "Accessing the ODA Funds" is presented in the Supporting Report.)

### (2) Financing for sanitation activities

To support sanitation activities, housing improvement loans for installing in-house sanitary facilities should be studied and instituted by the LGU. Such a mechanism can be organized with the rural banks or the existing credit cooperatives. Seed funding for this revolving fund also needs to be raised. Upon agreement by the parties, the enabling local legislation establishing the sanitation revolving fund will have to be enacted.

The total resources for the above purpose could be augmented by establishing formal linkages with the home improvement loan facilities available through the Social Security Service (SSS), the Government Service Insurance System (GSIS), and the Pag Ibig Fund.

### (3) Project owners should be fully responsible for providing sufficient funds for the sewerage, waste treatment and disposal, and sanitation requirements of their projects. Through their Municipal Engineering Office (MEO) and Health Office (MHO), and in coordination with the DENR, municipalities should strictly enforce the sanitation and sewerage requirements of the Building Code and environmental laws in issuing building permits, approving subdivision plans, and inspecting buildings and constructions.