

Chapter

8

**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 (MTPDP) are the bases of the study. Sector targets which are not prescribed in the national plan; school and public toilets as well as sewerage are assumed based on the 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 (2005-2010)	
		Population Coverage (%)	Population Coverage (%)	Additional Population to be Served	Population Coverage (%)
Water Supply	Population Coverage (%)	Population Coverage (%)	Additional Population to be Served	Population Coverage (%)	Additional Population to be Served
<i>Urban Water Supply</i>	82	82	62,357	95	272,406
<i>Rural Water Supply</i>	59	59	65,585	93	470,106
Sanitation	Household Coverage (%)	Household Coverage (%)	Additional Households to be Served	Household Coverage (%)	Additional Households to be Served
<i>Household Toilet</i>					
<i>Urban Area</i>	78	80	26,318	93	63,913
Flush	33	33	7,001	50	48,611
Pour Flush	65	65	17,741	50	15,302
VIP/Dry	2	2	1,576	0	0
<i>Rural Area</i>	66	75	48,967	90	102,866
Flush	10	10	5,396	10	6,196
Pour Flush	85	85	36,583	85	91,522
VIP/Dry	5	5	6,988	5	5,148
<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
	58	75	76,848	90	102,512
<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
	99	100	3	100	0
<i>Sewerage</i>	Urban Population Coverage (%)	Not Applicable		Urban Population Coverage (%)	Urban Population to be Served
	0			50	229,472
<i>Solid Waste</i>	Urban Household Coverage (%)	Urban Household Coverage (%)	Additional Urban Households to be Served	Not Applicable	
	89	90	22,637		

Table 8.2.2 Estimation of Base Year Service Coverage of Water Supply

Name of Municipality/ City	Area	Population (1998)	Population Served by 1998 Facilities				Percentage Coverage
			Level III	Level II	Level I	Total	
Abuyog	Urban	13,559	4,597		5,810	10,407	77
	Rural	36,391		4,028	13,370	17,398	48
	Total	49,950	4,597	4,028	19,180	27,805	56
Alangalang	Urban	10,561			5,337	5,337	51
	Rural	32,030			25,386	25,386	79
	Total	42,591			30,723	30,723	72
Albuera	Urban	7,078		667	3,863	4,530	64
	Rural	27,846		830	15,519	16,349	59
	Total	34,924		1,497	19,382	20,879	60
Babatngon	Urban	7,128	5,659	132	803	6,594	93
	Rural	14,029		1,852	6,813	8,665	62
	Total	21,157	5,659	1,984	7,616	15,259	72
Barugo	Urban	6,298	2,771		1,985	4,756	76
	Rural	21,415	1,752	327	8,186	10,265	48
	Total	27,713	4,523	327	10,171	15,021	54
Bato	Urban	7,072	716	219	4,098	5,033	71
	Rural	23,771		409	9,082	9,491	40
	Total	30,843	716	628	13,180	14,524	47
Baybay	Urban	22,866	15,019	596	5,080	20,695	91
	Rural	65,800	9,428	29,475	11,101	50,004	76
	Total	88,666	24,447	30,071	16,181	70,699	80
Burauen	Urban	14,992	11,777	395	803	12,975	87
	Rural	38,858	1,165	465	15,745	17,375	45
	Total	53,850	12,942	860	16,548	30,350	56
Calubian	Urban	524	297			297	57
	Rural	34,107	3,182	1,092	16,368	20,642	61
	Total	34,631	3,479	1,092	16,368	20,939	60
Capoocan	Urban	5,188	614		3,674	4,288	83
	Rural	22,979	1,610		17,225	18,835	82
	Total	28,167	2,224		20,899	23,123	82
Carigara	Urban	12,102	1,571		8,114	9,685	80
	Rural	32,438	4,501	250	19,661	24,412	75
	Total	44,540	6,072	250	27,775	34,097	77
Dagami	Urban	4,269	126		4,016	4,142	97
	Rural	23,687	3,150	250	12,801	16,201	68
	Total	27,956	3,276	250	16,817	20,343	73
Dulag	Urban	23,148	253		13,712	13,965	60
	Rural	12,694			7,402	7,402	58
	Total	35,842	253		21,114	21,367	60
Hilongos	Urban	8,819	1,472	131	4,431	6,034	68
	Rural	43,281	4,795	2,554	18,959	26,308	61
	Total	52,100	6,267	2,685	23,390	32,342	62

Table 8.2.2 Estimation of Base Year Service Coverage of Water Supply

(cont'd)

Name of Municipality/ City	Area	Population (1998)	Population Served by 1998 Facilities				Percentage Coverage
			Level III	Level II	Level I	Total	
Hindang	Urban	3,639	2,213		1,258	3,471	95
	Rural	13,119		1,025	9,342	10,367	79
	Total	16,758	2,213	1,025	10,600	13,838	83
Inopacan	Urban	2,269			956	956	42
	Rural	17,899		2,260	5,714	7,974	45
	Total	20,168		2,260	6,670	8,930	44
Isabel	Urban	13,879	2,646		9,167	11,813	85
	Rural	24,035	4,104		13,425	17,529	73
	Total	37,914	6,750		22,592	29,342	77
Isro	Urban	7,124	3,428	100	729	4,257	60
	Rural	26,239		1,327	3,126	4,453	17
	Total	33,363	3,428	1,427	3,855	8,710	26
Javier (Bugho)	Urban	2,690	826	645	461	1,932	72
	Rural	20,803	613	2,966	14,499	18,078	87
	Total	23,493	1,439	3,611	14,960	20,010	85
Julita	Urban	4,327			2,620	2,620	61
	Rural	8,530			4,871	4,871	57
	Total	12,857			7,491	7,491	58
Kananga	Urban	7,140	7,140			7,140	100
	Rural	34,949	1,913	1,123	20,742	23,778	68
	Total	42,089	9,053	1,123	20,742	30,918	73
La Paz	Urban	4,150		1,524	1,562	3,086	74
	Rural	13,600		149	7,625	7,774	57
	Total	17,750		1,673	9,187	10,860	61
Leyte	Urban	3,998	786		1,250	2,036	51
	Rural	31,118	21	2,186	14,393	16,600	53
	Total	35,116	807	2,186	15,643	18,636	53
Macarthur	Urban	3,293			2,107	2,107	64
	Rural	15,886		319	7,941	8,260	52
	Total	19,179		319	10,048	10,367	54
Mahaplag	Urban	3,784			2,183	2,183	58
	Rural	21,081		88	6,661	6,749	32
	Total	24,865		88	8,844	8,932	36
Matag-ob	Urban	3,980	386	450	2,145	2,981	75
	Rural	14,587	1,435	2,360	6,023	9,818	67
	Total	18,567	1,821	2,810	8,168	12,799	69
Matalom	Urban	3,756	3,020	476	236	3,732	99
	Rural	24,476	3,537	428	7,334	11,299	46
	Total	28,232	6,557	904	7,570	15,031	53
Mayorga	Urban	2,328		72	1,684	1,756	75
	Rural	9,092		146	6,696	6,842	75
	Total	11,420		218	8,380	8,598	75

Table 8.2.2 Estimation of Base Year Service Coverage of Water Supply

(cont'd)

Name of Municipality/ City	Area	Population (1998)	Population Served by 1998 Facilities				Percentage Coverage
			Level III	Level II	Level I	Total	
Merida	Urban	3,376	2,391		490	2,881	85
	Rural	21,396	181		16,149	16,330	76
	Total	24,772	2,572		16,639	19,211	78
Palo	Urban	22,908	17,659		4,763	22,422	98
	Rural	23,525			21,644	21,644	92
	Total	46,433	17,659		26,407	44,066	95
Palompon	Urban	11,774	3,050		4,662	7,712	66
	Rural	41,542	884	153	11,641	12,678	31
	Total	53,316	3,934	153	16,303	20,390	38
Pastrana	Urban	2,913	86		1,638	1,724	59
	Rural	12,798	2,150		3,481	5,631	44
	Total	15,711	2,236		5,119	7,355	47
San Isidro	Urban	5,210		178	1,038	1,216	23
	Rural	30,775		71	6,016	6,087	20
	Total	35,985		249	7,054	7,303	20
San Miguel	Urban	3,227			2,242	2,242	69
	Rural	11,967			6,885	6,885	58
	Total	15,194			9,127	9,127	60
Santa Fe	Urban	2,144			1,134	1,134	53
	Rural	12,603		154	7,425	7,579	60
	Total	14,747		154	8,559	8,713	59
Tabango	Urban	4,890			2,468	2,468	50
	Rural	28,296		1,375	12,593	13,968	49
	Total	33,186		1,375	15,061	16,436	50
Tabontabon	Urban	2,452	188		1,247	1,435	59
	Rural	5,327			1,983	1,983	37
	Total	7,779	188		3,230	3,418	44
Tactoban City (Capital)	Urban	168,865	160,163			160,163	95
	Rural	19,980		1,375	11,220	12,595	63
	Total	188,845	160,163	1,375	11,220	172,758	91
Tanauan	Urban	14,674	143		8,629	8,772	60
	Rural	27,771	3,575	1,889	9,008	14,472	52
	Total	42,445	3,718	1,889	17,637	23,244	55
Tolosa	Urban	1,682	1,635		16	1,651	98
	Rural	12,646	3,383	98	6,761	10,242	81
	Total	14,328	5,018	98	6,777	11,893	83
Tunga	Urban	4,219	1,638		1,327	2,965	70
	Rural	3,094	1,154		447	1,601	52
	Total	7,313	2,792		1,774	4,566	62
Villaba	Urban	3,182	1,600	275	680	2,555	80
	Rural	32,998	600	2,913	23,186	26,699	81
	Total	36,180	2,200	3,188	23,866	29,254	81
Provincial Total	Urban	461,477	253,870	5,860	118,418	378,148	82
	Rural	989,458	53,133	63,937	464,449	581,519	59
	Total	1,450,935	307,003	69,797	582,867	959,667	66

The base year service coverage in urban area (82%) is higher than the updated MTPDP sector target (69%) for the year 1998, while rural area (59%) 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; and
- ii) viable investment using available IRA to be allocated to water supply sector shall be considered.

Thus, the existing service coverage of 82% for urban and 59% for rural area shall be kept 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 69%, which is a little above the current national average coverage of 60%. Urban area registers a level of 78% that is well above the national average coverage. Rural area however, has only 66% 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	33	10
Pour-flush	65	85
VIP latrine	2	5

To attain sufficiency and equitable access to basic services, provincial target of Phase I for urban household toilets is planned at 80%, while, for rural household toilets, 75% is projected. This is almost equal to the existing urban service coverage of 78% 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/ City	Area	1998		Households and Population Using Sanitary Toilets								
		Popula- tion	HTs	Number of Households				Popula- tion	Service Coverage (%)			
				Flush	Pour Flush	VIP/Dry	Total		Flush	Pour Flush	VIP/Dry	Total
Abuyog	Urban	13,559	2,669		2,261		2,261	11,526		85		85
	Rural	36,391	7,322		4,508		4,508	22,563		62		62
	Total	49,950	9,991		6,772		6,772	34,089		68		68
Alangalang	Urban	10,561	2,019	29	1,888	5	1,922	10,033	1	94		95
	Rural	32,030	6,232	33	3,436	41	3,513	17,937	1	55	1	56
	Total	42,591	8,251	62	5,324	49	5,435	27,970	1	65	1	66
Albuera	Urban	7,078	1,433		1,016		1,016	5,026		71		71
	Rural	27,846	5,706		3,976		3,976	19,493		70		70
	Total	34,924	7,139		4,992		4,992	24,519		70		70
Babatngon	Urban	7,128	1,347		851		851	4,491		63		63
	Rural	14,029	2,729		1,653		1,653	8,558		61		61
	Total	21,157	4,076		2,504		2,504	13,049		61		61
Barugo	Urban	6,298	1,173	243	697		940	5,039	21	59		80
	Rural	21,415	3,937	165	1,701		1,866	10,066	4	43		47
	Total	27,713	5,110	408	2,398		2,806	15,105	8	47		55
Bato	Urban	7,072	1,452	105	1,304		1,409	6,860	7	90		97
	Rural	23,771	4,652	15	2,643		2,658	13,550		57		57
	Total	30,843	6,104	120	3,947		4,067	20,410	2	65		67
Baybay	Urban	22,866	4,601	235	3,152		3,387	16,921	5	69		74
	Rural	65,800	13,484		11,937		11,937	58,562		89		89
	Total	88,666	18,085	235	15,089		15,324	75,483	1	83		85
Burauen	Urban	14,992	2,823		2,444		2,444	13,044		87		87
	Rural	38,858	7,695		5,737		5,737	29,144		75		75
	Total	53,850	10,518		8,181		8,181	42,188		78		78
Calubian	Urban	524	106	25	26	12	63	310	24	25	11	59
	Rural	34,107	7,032	13	4,014	34	4,061	19,783		57		58
	Total	34,631	7,138	38	4,040	46	4,124	20,093	1	57	1	58
Capoocan	Urban	5,188	1,090		1,074		1,074	5,137		99		99
	Rural	22,979	4,596		2,122	1	2,123	10,571		46		46
	Total	28,167	5,686		3,196	1	3,197	15,708		56		56
Carigara	Urban	12,102	2,480	519	1,415		1,934	9,440	21	57		78
	Rural	32,438	6,501	24	3,237		3,261	16,219		50		50
	Total	44,540	8,981	543	4,652		5,195	25,659	6	52		58
Dagami	Urban	4,269	834	219	418		637	3,245	26	50		76
	Rural	23,687	4,854		2,530		2,530	12,318		52		52
	Total	27,956	5,688	219	2,948		3,167	15,563	4	52		56
Dulag	Urban	23,148	4,667		4,655		4,655	23,148		100		100
	Rural	12,694	2,564		2,164		2,164	10,663		84		84
	Total	35,842	7,231		6,819		6,819	33,811		94		94
Hilongos	Urban	8,819	1,683	1,010	642		1,652	8,643	60	38		98
	Rural	43,281	8,639	1,312	4,300	1,136	6,748	33,760	15	50	13	78
	Total	52,100	10,322	2,322	4,942	1,136	8,400	42,403	22	48	11	81
Hindang	Urban	3,639	723	247	329		576	2,912	34	46		80
	Rural	13,119	2,821	1,123	1,240		2,363	11,020	40	44		84
	Total	16,758	3,544	1,370	1,569		2,939	13,932	39	44		83
Inopacan	Urban	2,269	438		360		360	1,861		82		82
	Rural	17,899	3,566		2,416		2,416	12,172		68		68
	Total	20,168	4,004		2,776		2,776	14,033		69		69

Table 8.2.3 Base Year Service Coverage of Household Toilets

(cont'd)

Name of Municipality/ City	Area	1998		Households and Population Using Sanitary Toilets								
		Popula- tion	THs	Number of Households				Popula- tion	Service Coverage (%)			
				Flush	Pour Flush	VIP/Dry	Total		Flush	Pour Flush	VIP/Dry	Total
Isabel	Urban	13,879	2,827	1,359	912		2,271	11,104	48	32		80
	Rural	24,035	5,248	3,389	410		3,799	17,306	65	8		72
	Total	37,914	8,075	4,748	1,322		6,070	28,410	59	16		75
Jaro	Urban	7,124	1,428		794		794	3,990		56		56
	Rural	26,239	5,344		2,933		2,933	14,432		55		55
	Total	33,363	6,772		3,727		3,727	18,422		55		55
Javier	Urban	2,690	521		442		442	2,287		85		85
	Rural	20,803	4,071		327	321	648	3,329		8	8	16
	Total	23,493	4,592		769	321	1,090	5,616		17	7	24
Julita	Urban	4,327	921	120	742		862	4,068	13	81		94
	Rural	8,530	1,759		1,216		1,216	5,886		69		69
	Total	12,857	2,680	120	1,958		2,078	9,954	4	73		78
Kananga	Urban	7,140	1,381	214	867	90	1,171	6,069	15	63	7	85
	Rural	34,949	6,853	234	4,103	10	4,347	22,018	3	60		63
	Total	42,089	8,234	448	4,970	100	5,518	28,087	5	60	1	67
La Paz	Urban	4,150	809		711		711	3,652		88		88
	Rural	13,600	2,731		2,373		2,373	11,832		87		87
	Total	17,750	3,540		3,084		3,084	15,484		87		87
Leyte	Urban	3,998	697	72	54	518	644	3,679	10	8	74	92
	Rural	31,118	5,905	435	318	3,818	4,571	23,961	7	5	65	77
	Total	35,116	6,602	507	372	4,336	5,215	27,640	8	6	66	79
Macarthur	Urban	3,293	624	8	453	33	494	2,602	1	73	5	79
	Rural	15,886	2,992	9	2,213	50	2,272	12,074		74	2	76
	Total	19,179	3,616	17	2,666	83	2,766	14,676		74	2	76
Mahaplag	Urban	3,784	676	113	227	113	453	2,536	17	34	17	67
	Rural	21,081	4,101	31	701	313	1,045	5,271	1	17	8	25
	Total	24,865	4,777	144	928	426	1,498	7,807	3	19	9	31
Matag-ob	Urban	3,980	796	87	351	71	509	2,548	11	44	9	64
	Rural	14,587	2,965	5	2,120	239	2,364	11,670		72	8	80
	Total	18,567	3,761	92	2,471	310	2,873	14,218	2	66	8	76
Matalom	Urban	3,756	789	120	475		595	2,817	15	60		75
	Rural	24,476	4,866	64	3,477		3,541	17,868	1	71		73
	Total	28,232	5,655	184	3,952		4,136	20,685	3	70		73
Mayorga	Urban	2,328	486		158	157	315	1,514		33	32	65
	Rural	9,092	1,875		1,299	157	1,456	7,092		69	8	78
	Total	11,420	2,361		1,457	314	1,771	8,606		62	13	75
Merida	Urban	3,376	848		463		463	1,857		55		55
	Rural	21,396	4,723		3,624		3,624	16,475		77		77
	Total	24,772	5,571		4,087		4,087	18,332		73		73
Palo	Urban	22,908	4,448	3,064			3,064	15,807	69			69
	Rural	23,525	4,550	4,337			4,337	22,349	95			95
	Total	46,433	8,998	7,401			7,401	38,156	82			82
Palompon	Urban	11,774	2,463	262	2,081		2,343	11,186	11	84		95
	Rural	41,542	8,972	1,628	4,659		6,287	29,080	18	52		70
	Total	53,316	11,435	1,890	6,740		8,630	40,266	17	59		75
Pastrana	Urban	2,913	527	37	465		502	2,768	7	88		95
	Rural	12,798	2,348		2,105		2,105	11,519		90		90
	Total	15,711	2,875	37	2,570		2,607	14,287	1	89		91
San Isidro	Urban	5,210	1,173		706		706	3,126		60		60
	Rural	30,775	6,520		4,185		4,185	19,696		64		64
	Total	35,985	7,693		4,891		4,891	22,822		64		64
San Miguel	Urban	3,227	638		558		558	2,808		87		87
	Rural	11,967	2,275		1,419		1,419	7,420		62		62
	Total	15,194	2,913		1,977		1,977	10,228		68		68

Table 8.2.3 Base Year Service Coverage of Household Toilets

(cont'd)

Name of Municipality/ City	Area	1998		Households and Population Using Sanitary Toilets								
		Popula- tion	Hills	Number of Households				Popula- tion	Service Coverage (%)			
				Flush	Pour Flush	VIP/Dry	Total		Flush	Pour Flush	VIP/Dry	Total
Santa Fe	Urban	2,144	416		139		139	708		33		33
	Rural	12,603	2,452		1,980		1,980	10,209		81		81
	Total	14,747	2,868		2,119		2,119	10,917		74		74
Tabango	Urban	4,890	1,000		652		652	3,179		65		65
	Rural	28,296	5,659		2,669		2,669	13,300		47		47
	Total	33,186	6,659		3,321		3,321	16,479		50		50
Tabontabon	Urban	2,452	495	2	391		393	1,938		79		79
	Rural	5,327	1,098		739		739	3,570		67		67
	Total	7,779	1,593	2	1,130		1,132	5,508		71		71
Tacloban City	Urban	168,865	31,099	14,397	7,752		22,149	119,895	46	25		71
	Rural	19,980	3,749		273		273	1,399		7		7
	Total	188,845	34,848	14,397	8,025		22,422	121,294	41	23		64
Tanauan	Urban	14,674	2,860	63	2,450		2,513	12,914	2	86		88
	Rural	27,771	5,810	11	3,878		3,889	18,607		67		67
	Total	42,445	8,670	74	6,328		6,402	31,521	1	73		74
Tolosa	Urban	1,682	335	11	209	46	266	1,329	3	62	14	79
	Rural	12,646	2,586	2	1,489	292	1,783	8,726		58	11	69
	Total	14,328	2,921	13	1,698	338	2,049	10,055		58	12	70
Tunga	Urban	4,219	664	294	287		581	3,713	44	43		88
	Rural	3,094	517	93	357		450	2,692	18	69		87
	Total	7,313	1,181	387	644		1,031	6,405	33	55		87
Villaba	Urban	3,182	638		187	165	352	1,751		29	26	55
	Rural	32,998	6,804		4,630	21	4,651	22,439		68		68
	Total	36,180	7,442		4,817	186	5,003	24,190		65	2	67
Provincial Total	Urban	461,477	89,097	22,855	45,061	1,210	69,126	357,481	26	51	1	78
	Rural	989,458	199,103	12,923	111,111	6,436	130,470	646,599	6	56	3	66
	Total	1,450,935	288,200	35,778	156,172	7,646	199,596	1,004,080	12	54	3	69

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 58% 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.

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

Name of Municipality/ City	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 (%)
Abuyog	10,883	3,200	29	17	17	100
Alangalang	6,360	6,360	100	3	3	100
Albuera	8,307	4,080	49	2	2	100
Babatngon	5,554	2,120	38	4	4	100
Barugo	6,432	560	9	3	3	100
Bato	7,767	4,320	56	3	3	100
Baybay	18,568	5,560	30	13	13	100
Burauen	8,905	8,905	100	2	2	100
Calubian	6,064	5,560	92	2	2	100
Capoocan	5,876	4,320	74			
Carigara	3,786	3,786	100	4	4	100
Dagami	6,150	5,760	94	1	1	100
Dulag	2,503	2,503	100	2	2	100
Hilongos	7,925	6,720	85	14	14	100
Hindang	3,439	1,760	51	5	5	100
Inopacan	4,172	3,520	84	2	2	100
Isabel	7,858	2,720	35	4	3	75
Jaro	7,724	1,200	16	1	1	100
Javier (Bugho)	4,182	4,160	99	2	2	100
Julita	2,805	1,400	50			
Kananga	8,630	2,880	33	25	23	92
La Paz	4,768	3,600	76	8	8	100
Leyte	10,747	2,400	22	2	2	100
Macarthur	3,523	1,720	49	2	2	100
Mahaplag	5,809	1,120	19	2	2	100
Matag-ob	3,669	1,280	35	2	2	100
Matalom	6,312	4,320	68	2	2	100
Mayorga	2,613	640	24	1	1	100
Merida	5,224	5,224	100	5	5	100
Palo	4,996	1,680	34	1	1	100
Palompon	5,510	2,280	41	53	53	100
Pastrana	3,504	1,000	29	4	4	100
San Isidro	5,111	1,160	23	17	17	100
San Miguel	3,914	2,120	54	1	1	100
Santa Fe	3,468	1,920	55	1	1	100
Tabango	6,733	6,733	100	2	2	100
Tabontabon	1,974	1,520	77	1	1	100
Tacloban City (Capital)	6,150	5,760	94	8	8	100
Tanauan	6,367	6,367	100	5	5	100
Tolosa	3,868	3,480	90	1	1	100
Tunga	2,406	2,320	96	1	1	100
Villaba	6,855	5,560	81	7	7	100
Provincial Total	247,411	143,598	58	235	232	99

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, 75% 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).

Almost all existing public utilities are served with at least one sanitary toilet giving a 99% 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 55% of the total households in the province relied on municipal refuse collection using trucks or 89% urban household coverage. These municipalities have a total of 65 units of collection truck.

No national targets have yet been set. However, considering the present level of coverage, a 90% 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/City	Total No. of Households	No. of Urban Households	No. of Households Served	Coverage of Households (%)	Coverage of Urban Households (%)
Abuyog	9,991	2,669	2,967	30	100
Alangalang	8,251	2,019	562	7	28
Albuera	7,139	1,433	688	10	48
Babatngon	4,076	1,347	786	19	58
Barugo	5,110	1,173	1,205	24	100
Bato	6,101	1,452	2,187	36	100
Baybay	18,085	4,601	3,329	18	72
Burauen	10,518	2,823	2,277	22	81
Calubian	7,138	106	793	11	100
Capocan	5,686	1,090	491	9	45
Carigara	8,981	2,480	2,076	23	84
Dagami	5,688	834	821	14	98
Dulag	7,231	4,667	1,183	16	25
Hilongos	10,322	1,683	1,667	16	99
Hindang	3,544	723	2,423	68	100
Inopocan	4,004	438	867	22	100
Isabel	8,075	2,827	728	9	26
Jaro	6,772	1,428	1,381	20	97
Javier (Bugho)	4,592	521	718	16	100
Julita	2,680	921			
Kananga	8,234	1,381	1,243	15	90
La Paz	3,540	809	953	27	100
Leyte	6,602	697	4,714	71	100
Macarthur	3,616	624			
Mahaplag	4,777	676	653	14	97
Matag-ob	3,761	796	832	22	100
Matalom	5,655	789	400	7	51
Mayorga	2,361	486			
Merida	5,571	848	803	14	95
Palo	8,998	4,448	2,992	33	67
Palompon	11,435	2,463	1,913	17	78
Pastrana	2,875	527			
San Isidro	7,693	1,173	375	5	32
San Miguel	2,913	638	689	24	100
Santa Fe	2,868	416	1,010	35	100
Tabango	6,659	1,000	450	7	15
Tabontabon	1,593	495			
Tacloban City (Capital)	34,848	31,099	32,055	92	100
Tanauan	8,670	2,860	2,615	30	91
Tolosa	2,921	335			
Tunga	1,181	664	395	33	59
Villaba	7,412	638	472	6	74
Provincial Total	288,200	89,097	79,713	28	89

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 of 2004 and 2010 together with the present population in 1998 as a planning base year.

The future regional population is published by the NSO, while the projections at provincial and municipal levels were not available during the study. On the other hand, the NEDA Regional Office VIII projected 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 (1997-2006) 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 of Region VIII (Eastern Visayas), the subject region that is composed of the 3rd batch provinces of this study is classified as medium-sized region (projected population of at least 5 million but less than 10 million by year 2020).

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 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. The Growth Rates were estimated as an annual average using the compound formula.

(2) Provincial Physical Framework Plan/Comprehensive Provincial Land Use Plan:

Leyte: Planning period 1997-2006

The projection of the provincial population is referred to the projection prepared by the NEDA Regional Office. The provincial population for the year 2006 was projected with the base year 1995. The provincial growth rate of 1.02 % from 1995 to 2006 is about half of the regional growth rate adopted by the NSO, while almost the same as the regional average growth rate assumed by the NEDA in the subject period was applied for the provincial projection.

(3) Population projection of the Province

The following conditions are considered/assumed in the population projection for the PW4SP.

Regional Population

The growth rate projected by the NEDA Regional Office that is adopted in the Land Use Plan is considered rather conservative compared with the recent population development. In consideration of the current development (between 1990 and 1995), the NSO projection may be applicable for the PW4SP.

<u>Year</u>	<u>Population</u>	<u>Growth Rate</u>
1995	3,366,917	Census result
2000	3,356,854	2.21% (1995 - 2000)
2005	4,132,242	2.00% (2000 - 2005)
2010	4,523,762	1.82% (2005 - 2010)

Provincial Population

The regional population projected by the NSO may be used with conditions. The growth rate experienced between 1990 and 1995 (provincial average of 2.00% in the study area) indicates an almost the same figure for the region (1.97%). Assuming

that the tendency of the population growth by the province will follow that of the region, the growth rates of 2.00% for the short/medium-term projection and 1.82% for the long-term projection may be employed in the provincial population projection. Table 8.3.2 presents a comparison of the estimated provincial population using the growth rates adopted by the NSO and the NEDA. The additional provincial population in 2010 projected by the NSO compared with the NEDA projection (261,046) is only 7% of the regional population in 2010 by NEDA base. In this connection, the applied method to the province (NSO based) will not affect the other provinces, even if the NEDA based regional population may be used by the other provinces concerned.

Table 8.3.2 Comparison of Projected Population for Province

Year	NSO Base			NEDA Base		Comparison 1)/2) - 1
	Pop. Leyte ¹⁾	Pop. Study Area	Growth Rate	Pop. Leyte ²⁾	Growth Rate	
1995	1,511,251	1,367,248	-	1,511,251	-	-
1998	1,603,752	1,450,935	2.00%	1,557,966	1.00%	2.9%
2004	1,806,085	1,633,988	2.00%	1,655,686	1.00%	9.1%
2010	2,012,504	1,820,738	1.82%	1,751,458	0.91%	14.9%

Note: Population of Leyte includes Ormoc City.

Municipal/City Population

- 1) The provincial population for target years is fixed as shown in the above table.
- 2) The experienced growth rates (1990 - 1995) of the municipality will be employed both for short/medium-term and long-term population projections. However, for the municipality of Matalom, the population will be fixed with the figure in 1995 to avoid negative growth. Likewise for the municipality of San Isidro, the growth rate of 2.69% (1980 - 1995) will be employed, since the growth rate of 6.32% (1990 - 1995) is considered too high compared with the figures of other municipalities.
- 3) Finally, the population by municipality/city was adjusted to meet the fixed provincial population by distributing the balance between the initially calculated results and the fixed figures applying the share to the province. Table 8.3.3 presents the projected population of concerned municipalities.

Table 8.3.3 Projected Population of Municipalities

Municipality/ City	Census		Projection								
	1995		1998			2004			2010		
	Population	Growth Rate 1990-1995	Pop. (Initial)	Adjusted	Growth Rate	Pop. (Initial)	Adjusted	Growth Rate	Pop. (Initial)	Adjusted	Growth Rate
Abuyog	48,905	0.68%	49,916	49,950	0.71%	52,037	51,918	0.65%	51,687	53,117	0.38%
Alangalang	38,853	3.09%	42,562	42,591	3.11%	51,112	50,995	3.05%	61,197	60,160	2.78%
Albuera	33,939	0.91%	34,901	34,924	0.96%	36,931	36,845	0.90%	38,961	38,265	0.61%
Babatngon	19,653	2.47%	21,143	21,157	2.49%	24,485	24,429	2.43%	28,272	27,766	2.16%
Barugo	26,171	1.90%	27,691	27,713	1.93%	31,031	30,960	1.86%	31,667	31,045	1.69%
Bato	29,810	1.12%	30,822	30,813	1.14%	32,972	32,896	1.08%	35,167	34,537	0.81%
Baybay	86,179	0.93%	88,606	88,666	0.95%	93,730	93,515	0.89%	98,856	97,081	0.63%
Burauen	50,751	1.97%	53,814	53,850	2.00%	60,546	60,407	1.93%	67,917	66,700	1.67%
Calubian	31,074	3.66%	34,608	34,631	3.68%	42,955	42,857	3.62%	53,158	52,205	3.31%
Capococan	26,381	2.18%	28,147	28,167	2.20%	32,058	31,981	2.11%	36,492	35,750	1.87%
Carigara	42,302	1.71%	44,510	44,510	1.73%	49,311	49,197	1.67%	54,467	53,490	1.49%
Dagami	27,039	1.10%	27,937	27,956	1.12%	29,841	29,775	1.06%	31,786	31,216	0.79%
Dulag	31,742	1.02%	35,818	35,842	1.04%	38,097	38,009	0.98%	40,400	39,676	0.72%
Hilongos	50,741	0.86%	52,065	52,100	0.88%	54,817	54,721	0.82%	57,606	56,574	0.56%
Hindang	16,567	0.36%	16,747	16,758	0.38%	17,123	17,081	0.32%	17,456	17,143	0.06%
Inopacan	18,864	2.23%	20,155	20,168	2.25%	23,022	22,970	2.19%	26,220	25,750	1.92%
Isabel	36,131	1.59%	37,888	37,914	1.62%	41,654	41,589	1.55%	45,725	44,905	1.29%
Jaro	32,726	0.62%	33,340	33,363	0.64%	34,628	34,518	0.58%	35,858	35,215	0.32%
Javier	21,539	2.91%	23,477	23,493	2.94%	27,911	27,816	2.87%	33,083	32,490	2.60%
Julita	11,671	3.25%	12,813	12,857	3.28%	15,581	15,515	3.21%	18,838	18,501	2.91%
Kananga	39,795	1.86%	42,060	42,089	1.89%	47,016	46,968	1.82%	52,599	51,459	1.56%
Lapaz	16,366	2.72%	17,738	17,750	2.74%	20,851	20,803	2.68%	24,437	23,999	2.41%
Leyte	34,126	0.93%	35,092	35,116	0.96%	37,132	37,046	0.90%	39,173	38,470	0.65%
Macarthur	16,645	4.81%	19,166	19,179	4.81%	25,427	25,368	4.77%	33,633	33,030	4.50%
Mahaplag	24,009	1.15%	24,818	24,865	1.17%	26,633	26,572	1.11%	28,462	27,957	0.85%
Matag-Ob	17,333	2.29%	18,554	18,567	2.32%	21,274	21,225	2.26%	24,321	23,883	1.99%
Matalom	28,232	-0.04%	28,232	28,232	0.00%	28,232	28,232	0.00%	28,232	28,232	0.00%
Mayorga	11,073	1.01%	11,412	11,420	1.03%	12,130	12,102	0.97%	12,853	12,625	0.71%
Merida	23,822	1.29%	24,755	24,772	1.31%	26,749	26,688	1.25%	28,818	28,303	0.98%
Palo	43,095	2.49%	46,491	46,433	2.52%	53,830	53,706	2.46%	62,263	61,447	2.19%
Palompon	50,319	1.92%	53,280	53,316	1.95%	59,276	59,639	1.89%	66,864	65,665	1.62%
Pastrana	14,442	2.82%	15,760	15,711	2.85%	18,563	18,525	2.78%	21,894	21,501	2.51%
San Isidro	33,204	2.69%	35,961	35,985	2.72%	42,208	42,111	2.65%	49,393	48,507	2.38%
San Miguel	14,504	1.54%	15,184	15,194	1.56%	16,652	16,613	1.50%	18,207	17,881	1.23%
Santa Fe	13,695	2.48%	14,737	14,747	2.50%	17,078	17,038	2.44%	19,751	19,377	2.17%
Tabango	31,837	1.37%	33,164	33,186	1.39%	36,009	35,926	1.33%	38,933	38,281	1.06%
Tabontabon	7,547	0.99%	7,774	7,779	1.02%	8,255	8,256	0.95%	8,739	8,583	0.69%
Tacloban	167,310	4.09%	188,717	188,845	4.12%	210,260	209,708	4.05%	234,971	229,501	3.78%
Tanauan	40,716	1.37%	42,416	42,445	1.40%	46,063	45,957	1.33%	49,874	48,980	1.07%
Tolosa	13,927	0.93%	14,318	14,328	0.95%	15,143	15,109	0.89%	15,969	15,682	0.62%
Tunga	6,530	3.82%	7,308	7,313	3.85%	9,159	9,138	3.78%	11,445	11,240	3.51%
Villaba	31,674	1.40%	36,155	36,180	1.43%	39,337	39,246	1.37%	42,671	41,906	1.10%
Study Area	1,367,248	2.00%	1,419,966	1,450,935	2.00%	1,637,688	1,633,988	2.00%	1,833,460	1,820,738	1.82%

Population Projection by Urban/Rural Area

1) Past population development

With regard to the ratio of the urban population to the total population, the provincial averages in 1980 and 1990 were 26.5% and 32.1%, likewise, it slightly increased to 32.6% in 1995. Meanwhile, the provincial average growth rate of 3.27% between 1980 and 1990 slightly decreased to 2.35% in 1995.

While the rural population to provincial population in 1980 (73.5%) decreased to 67.4% in 1995 with growth rates of 0.24% (1980 - 1990) and 1.84% (1990 -1995).

The population distribution in 1995 based on NSO data was modified applying the currently revised classification of barangays in terms of urban or rural area.

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

Urban population by municipality/city was first projected and the rural population was calculated as a balance to meet the aforementioned total population.

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

- Short/Medium-term target: 1998 and 2004

Updated census results in 1995 are basically applied in terms of the share of urban population to total population by municipality/city.

- Long-term target: 2010

It is assumed that the share of urban population to total population by municipality/city will not change drastically. Thus, the same share in short/medium-term will be applied to municipal population in long-term period.

Under the above assumptions, the provincial share of the urban population for the year 2010 was arrived at 34.0%, slightly higher than the figure in 1995 (31.3%). Table 8.3.4 presents projected urban and rural population. The shares on rural population are calculated using estimated rural population.

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

Municipality/ City	1998			2004			2010		
	Total Popula-	Urban Population	Rural Population	Total Population	Urban Population	Rural Population	Total Population	Urban Population	Rural Population
Abuyog	49,950	13,559	36,391	51,918	14,093	37,825	53,117	14,418	38,699
Alangalang	42,591	10,561	32,030	50,995	12,645	38,350	60,100	14,902	45,198
Albuera	34,924	7,078	27,847	36,846	7,467	29,379	38,265	7,755	30,510
Babatngon	21,157	7,128	14,029	24,429	8,230	16,199	27,766	9,354	18,412
Barugo	27,713	6,298	21,414	30,960	7,036	23,923	34,045	7,738	26,308
Bato	30,843	7,072	23,771	32,896	7,543	25,353	34,537	7,919	26,618
Baybay	88,666	22,866	65,800	93,515	24,117	69,398	97,084	25,037	72,047
Burauen	53,850	14,992	38,858	60,407	16,817	43,589	66,700	18,569	48,131
Calubian	34,631	524	34,107	42,857	648	42,208	52,205	790	51,415
Capocan	28,167	5,188	22,978	31,984	5,892	26,092	35,750	6,585	29,164
Carigara	41,540	12,102	29,438	49,197	13,368	35,830	53,490	14,534	38,956
Dagami	27,956	4,269	23,687	29,775	4,547	25,228	31,216	4,767	26,449

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

(cont'd)

Municipality/ City	1998			2004			2010		
	Total Popula-	Urban Population	Rural Population	Total Population	Urban Population	Rural Population	Total Population	Urban Population	Rural Population
Dulag	35,842	23,148	12,695	38,009	24,547	13,462	39,676	25,623	14,053
Hilongos	52,100	8,819	43,282	54,721	9,262	45,459	56,574	9,576	46,998
Hindang	16,758	3,639	13,118	17,084	3,710	13,374	17,143	3,723	13,420
Inopacan	20,168	2,269	17,900	22,970	2,584	20,386	25,750	2,897	22,853
Isabel	37,914	13,879	24,035	41,589	15,224	26,365	44,905	16,438	28,467
Jaro	33,363	7,124	26,239	34,548	7,377	27,171	35,215	7,519	27,695
Javier	23,493	2,690	20,803	27,846	3,188	24,658	32,490	3,720	28,770
Julita	12,857	4,327	8,530	15,545	5,232	10,313	18,501	6,227	12,274
Kananga	42,089	7,140	34,948	46,908	7,958	38,950	51,459	8,730	42,730
Lapaz	17,750	4,150	13,601	20,803	4,863	15,940	23,999	5,611	18,389
Leyte	35,116	3,998	31,118	37,046	4,217	32,829	38,470	4,380	34,091
Macarthur	19,179	3,293	15,886	25,368	4,356	21,012	33,030	5,671	27,358
Mahaplag	24,865	3,784	21,081	26,572	4,044	22,528	27,952	4,254	23,698
Matag-ob	18,567	3,980	14,586	21,225	4,551	16,675	23,885	5,121	18,764
Matalom	28,232	3,756	24,476	28,232	3,756	24,476	28,232	3,756	24,476
Mayorga	11,420	2,328	9,092	12,102	2,467	9,635	12,625	2,573	10,051
Merida	24,772	3,376	21,395	26,688	3,638	23,050	28,302	3,858	24,444
Palo	46,433	22,908	23,525	53,706	26,496	27,210	61,147	30,167	30,980
Palompon	53,316	11,774	41,542	59,639	13,170	46,469	65,665	14,501	51,164
Pastrana	15,711	2,913	12,798	18,525	3,435	15,090	21,501	3,987	17,514
San Isidro	35,985	5,210	30,775	42,111	6,096	36,014	48,507	7,022	41,485
San Miguel	15,194	3,227	11,968	16,613	3,528	13,085	17,881	3,797	14,084
Santa Fe	14,747	2,144	12,603	17,038	2,477	14,561	19,377	2,817	16,560
Tabango	33,186	4,890	28,296	35,926	5,294	30,633	38,284	5,641	32,643
Tabonabon	7,779	2,452	5,327	8,236	2,596	5,640	8,583	2,705	5,877
Tacloban	188,845	168,865	19,980	239,708	214,346	25,362	299,504	267,815	31,689
Tanauan	42,445	14,674	27,771	45,957	15,888	30,069	48,980	16,933	32,047
Tolosa	14,328	1,682	12,646	15,109	1,774	13,335	15,682	1,841	13,841
Tunga	7,313	4,219	3,094	9,138	5,272	3,867	11,240	6,484	4,756
Villaba	36,180	3,182	32,997	39,246	3,452	35,794	41,906	3,686	38,220
Study Area	1,450,93	461,474 (31.8%)	989,460 (68.2%)	1,633,988	537,199 (32.9%)	1,096,789 (67.1%)	1,820,738	619,440 (34.0%)	1,201,297 (66.0%)

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 partici-

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, an increase in the 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, an increase of 3% from the 1998 rate is foreseen in 2004 and another increase of 7% from the 2004 rate in 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 8.3.2 shows the projected number of public school students by municipality, by target year. About 247,411 and 293,928 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. Refer to Table 8.3.5 for the number of public utilities by municipality by target year (details are referred to Supporting Report).

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.

Eleven (11) municipalities with a total urban population of about 229,472 are considered (refer to Table 8.5.4).

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

Name of Municipality/City	Number of Public School Student			Number of Public Utilities		
	1998	2004	2010	1998	2004	2010
Abuyog	10,883	11,622	13,376	46	46	46
Atangalang	6,360	7,941	11,060	1	1	1
Albuera	8,307	8,790	9,444	1	1	1
Babatngon	5,551	6,481	7,366	5	5	5
Barugo	6,432	7,388	8,602	2	2	2
Bato	7,767	8,568	8,996	1	1	1
Baybay	18,568	20,382	23,804	10	10	10
Burauen	8,905	11,026	13,914	1	1	1
Calubian	6,064	7,929	11,038	2	2	2
Capoocan	5,876	6,693	8,521	19	19	19
Carigara	3,786	5,619	7,637	1	1	1
Dagami	6,150	6,866	7,647	41	41	41
Dulag	2,503	3,717	4,988	2	2	2
Hilongos	7,925	9,040	10,904	10	10	10
Hindang	3,439	3,670	4,144	2	2	2
Inopacan	4,172	4,834	5,757	1	1	1
Isabel	7,858	9,477	10,831	3	3	3
Jaro	7,724	8,449	8,612	1	1	1
Javier (Bugho)	4,182	5,526	6,908	1	1	1
Julita	2,805	3,639	4,586			
Kananga	8,630	8,808	10,406	50	50	50
La Paz	4,768	5,579	6,570	8	8	8
Leyte	10,747	10,849	11,266	2	2	2
Macarthur	3,523	4,890	6,822	1	1	1
Mahaplag	5,809	6,430	7,162	2	2	2
Matag-ob	3,669	4,526	5,432	2	2	2
Matalom	6,312	6,446	7,075	3	3	3
Mayorga	2,613	2,931	3,237	1	1	1
Merida	5,224	6,117	6,868	3	3	3
Palo	4,996	6,946	9,666	1	1	1
Palompon	5,510	7,275	9,791	53	53	53
Pastrana	3,504	4,496	5,525	3	3	3
San Isidro	5,111	7,454	9,200	20	20	20
San Miguel	3,914	4,391	4,880	1	1	1
Santa Fe	3,468	4,184	5,038	1	1	1
Tabango	6,733	8,087	9,157	15	15	15
Tabontabon	1,974	2,160	2,323	1	1	1
Tacloban City (Capital)	6,150	12,659	23,726	13	13	13
Tanauan	6,367	7,525	9,356	2	2	2
Tolosa	3,868	4,082	4,325	1	1	1
Tunga	2,406	2,424	2,982	1	1	1
Villaba	6,855	8,012	9,696	3	3	3
Provincial Total	247,411	293,928	358,641	337	337	337

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 summary of the study results by municipality.

1) Review of existing water supply systems and water sources

The municipalities/city of Abuyog, Barugo, Bato, Baybay, Calubian, Capocan, Carigara, Hilongos, Hindang, Isabel, Jaro, Merida, Palo, Palompon, Pastrana, Tabontabon, Tacloban, Tanauan, Tolosa and Tunga are served by WDs.

Table 8.4.1 Summary of Urban Water Supply Development by Municipality

Municipality	Existing Condition	On-going/ Planned Project	Water Source Availability	Future Requirements
Abuyog	There is a WD to serve for 9 urban barangays (population served is 4,600, 34% of urban population). Water source is deep well, but water quality is characterized by the presence of iron and manganese.	None	Spring is better water source for future expansion of Level III water supply. Water to be developed by spring(s) will be used for dilution of groundwater containing high Fe and Mn.	System expansion with water source augmentation is required. Spring development shall be studied.
Alangalang	There is no Level III system at present. They use Level I facilities (deep/shallow wells) in urban area (10,600 population). Water source is limited to ground water. Alangalang is one of the target areas for expansion of Level III services of the Leyte Metropolitan WD in the immediate future.	Plan (expansion of service area of LMWD)	See Tacloban City	LMWD will cover the municipality as its service area.
Albuera	There is no Level III system at present. Urban population is about 7,000. They use Level I and Level II system. The municipality plans to come up with a F/S or D/D for future expansion of its Level II system and development of Level III system.	Plan (F/S & D/D)	Springs with small yields exist just behind of populated coastal areas. Deep well is also available to develop with depth of 40m. Deep well capacity is estimated about 500 cu.m/d to 1,000 cu.m/d.	New system shall be created. Ground water/spring source development together with review of existing Level II system shall be studied in F/S.
Babangon	There is Level III system managed by the municipality using spring source. About 5,700 (80% of urban population) are served by the waterworks. Current problem of the system is insufficient water supply caused by smaller diameter of transmission pipe (designed 6" dia. was changed to 3" dia in the construction stage). The municipality has a plan to augment the transmission pipeline, but financial source is not yet secured.	Plan (augmentation of transmission pipeline)	Spring is the only potential water source for future expansion of Level III water supply. Deep well development is risky in this area.	Rehabilitation/improvement of existing system is required. Financial source shall be sought.
Barugo	Barugo is a recipient municipality being supplied from Metro Caganga WD. About 2,800 population (44% of urban population) is served at present.	Plan (Improvement of MCWD)	See Caganga.	(See Caganga) Expansion of distribution pipelines in the municipality is required.
Bato	Bato is a recipient municipality being supplied from Metro Hilongos WD. About 700 population (16% of urban population) is served at present.	None	See Hilongos.	(See Hilongos) Expansion of distribution pipelines in the municipality is required.
Baybay	Baybay WD serves 23 urban barangays with served population of 15,000 (66% of urban population). Water sources are Busay and Hayas springs. The WD spring sources have a combined capacity of 8,500 m ³ /d against the average total demand of 2,300 m ³ /d.	None	There are available spring sources in this area. When the Baybay WD needs more water source for expansion, deep well is also available to develop with specifications of 40m in depth and 1,000 cu.m/d or more.	Expansion of distribution pipes is required. Maintenance of the existing facility together with improvement/replacement of the deteriorated pipelines is a requisite.

Table 8.4.1 Summary of Urban Water Supply Development by Municipality (Cont'd.)

Municipality	Existing Condition	On-going/Planned Project	Water Source Availability	Future Requirements
Burauen	One Level III managed by municipality exists. The system covers 1,800 population (79% of urban population, 15,000, is covered). Water source is a spring. At present, data on water consumption is under verification. A scheduled water supply is being practiced due to inadequate diameter of transmission and distribution pipelines. Proper chlorination is also a current issue. The municipality needs to conduct PFS for rehabilitation of the facilities, but financial source is not yet secured at present.	None	The capacity of spring sources are enough to cover this area. Deep well may have water quality problem (high Fe/Mn and slight acidic groundwater) with low yields.	System expansion together with rehabilitation of transmission/distribution pipes is required. Financial source shall be sought.
Catubian	One WD exists. Served population in urban area is 300 (57% service coverage of urban population), while population served in rural area is 3,200. Water source is Obispo springs. The WD needs rehabilitation or improvement of the present facilities.	None	Spring sources exist.	System expansion together with additional spring source development is required. Rehabilitation/improvement of existing facilities is a requisite.
Capoocan	Capoocan is one of the recipient municipalities being served from Metro Cangaia WD. Served population is about 600 (7% of urban population, 5,200).	Plan (Improvement of MCWD)	See Cangaia.	(See Cangaia) Expansion of distribution pipelines in the municipality is required.
Cangaia	Metro Cangaia WD covers 5 barangays in Cangaia together with other municipalities of Tunga, Barugo and Capoocan. The system serves for 1,600 persons (13% of urban population). Water source is a combination of surface water from Maulaog River and spring source located in Capoocan with production amount of 1,650m ³ /d and 950m ³ /d, respectively. However, dirty water appears in the settling basin. The WD is therefore planning to improve the system by putting up a rapid sand filtration plant, but WD's financial constraints hampers the realization of the plan.	Plan (Improvement of system of MCWD)	Many springs exist far from populated coastal area. Deep wells have water quality problems of high Fe/Mn contents, slight sulfidic and acidic water.	System expansion with improvement of existing facility is required. Study on water source (additional surface water) shall be conducted. Financial source shall be sought.
Dugami	Urban barangays are partly covered by Leyte Metropolitan Water District. Current service population is only 130 (3% of the urban population, 4,300).	Plan (expansion of service area of LMWD)	See Tacloban City	(See Tacloban City) Expansion of distribution pipelines in the municipality is required.
Dulang	There is a LGU-managed waterworks. Presently, one barangay is being served by the system. Population served is 250 (only 1% of urban population). Water source is a deep well.	None	Deep well can be developed for future expansion of Level III water supply. Deep well capacity is estimated at about 1,000 cum/d with depth of 40m.	System expansion together with ground water development (deep well) is required. Due consideration of saline water intrusion shall be necessary. Integrated water supply system with La Paz, MacArthur and Mavorga shall be studied.

Table 8.4.1 Summary of Urban Water Supply Development by Municipality (Cont'd.)

Municipality	Existing Condition	On-going/Planned Project	Water Source Availability	Future Requirements
Hilongos	There is Metro Hilongos WD to serve for one urban barangay in Hilongos together with the municipalities of Bato and Hindang at present. Water source is deep well. Served population in Hilongos is about 1,500 (17% of urban population).	None	Deep well can be developed for future expansion of Level III water supply. The deep well capacity is estimated at about 1,000 cu.m/d or more with depth of 40m.	System expansion of MIIWD is required. Study on deep well source with due consideration of saline water intrusion shall be necessary.
Hindang	Hindang is a recipient municipality being served from Metro Hilongos WD. Current population served is 2,200 (61% of urban population, 3,600).	None	See Hilongos.	(See Hilongos) Expansion of distribution pipelines in the municipality is required.
Inopacan	There is no Level III system at present. The urban population (about 2,300) relies on Level I facilities. There is, however, an identified adequate spring source located at Barangay Maijo and Esperanza, 10 km away from the poblacion, which could be tapped for urban Level II system.	None	Spring is the only potential source for development of Level III water supply. Deep well has poor yield of less than 500 cu.m/d in this area.	New Level III system using spring shall be created. Study on spring development is a requisite.
Isabel	There is a WD serving for 3 urban barangays with served population of 2,600 (about 20% of urban population, 13,900). Water source is deep well.	Plan (FIS & D/D on water source development)	Deep wells have insufficient capacity (less than 500 cu.m/d) in urban area. Spring is better source for Level III water supply, but springs have small yields and are located in mountainous areas.	System expansion together with water source augmentation is required. Combination of deep well and spring source shall be studied. Financial source shall be sought.
Jaro	There is a WD serving for 4 urban barangays with served population served 3,400 (48% of urban population). Water source is deep well. Water shortage is a common problem being experienced by the concessionaries of the system. The WD has a plan to tap the spring (5 km away from poblacion).	None	Deep well development is available in this area. Deep well depth is estimated about 40m. Water quality problem (high Fe contents) is locally observed.	System expansion with water source augmentation is required. Study on water source development (deep well/spring) is a requisite. Integration with MCWD shall be studied.
Javier (Bugho)	There is a LGU-managed Level III system. The waterworks supplies water to about 800 persons or 31% of urban population. Water source is a spring having sufficient production amount (2,400 m ³ /d).	None	Numerous spring sources are located within 5km to 6km away from populated area. Those springs have enough yields for future expansion of Level III water supply.	System expansion using spring source together with improvement of transmission/distribution pipelines is required.
Julita	No Level III exists in urban area. Urban population is about 4,300. They use Level I facilities.	None	Deep well development is available in this area. Deep well depth is estimated about 80m. Water quality problem with high Fe contents is observed locally.	New Level III system shall be created. Technical study on deep well development is a requisite.

Table 8.4.1 Summary of Urban Water Supply Development by Municipality (Cont'd.)

Municipality	Existing Condition	On-going/Planned Project	Water Source Availability	Future Requirements
Kinananga	There is one LGU-managed Level III system which utilizes Mahawan spring as its source. The urban barangay is 100% (7,100 persons) served by the system. At present, water supply is not enough due to insufficient water source/capacity of the facility.	None	Spring sources can be developed as additional water source for future expansion of Level III water supply. Deep well development is also available with depth of 40m and production of 1,000 cu.m/d or more.	System expansion together with water source augmentation is required.
La Paz	The municipality has no Level III system at present. Urban population is about 4,200. They rely on Level I and II system. There is a favorable untapped spring source located in Brgy. Mag-aso, 2.5 km away from poblacion.	None	Both spring and deep well are potential water sources for new establishment of Level II water supply. Among them, spring is better source, because groundwater has a water quality problem (high Fe contents) locally.	New Level III system using spring source shall be created. Technical study on water source development is a requisite.
Leyte	There is a LGU-managed Level III system utilizing Danus spring as its source. One urban barangay is served by the system with served population of about 800 (20% of urban population). There are no existing data on water consumption and water quality and these are still subject to verification.	None	Spring is the only potential source for Level III water supply. Deep well development has problems in terms of quality and quantity.	System expansion together with water source augmentation is required.
Mac Arthur	No Level III exists in urban area. Urban population is about 3,300. They use Level I facilities.	None	Deep well development is available in this area. Deep well depth is estimated at about 80m. Water quality problem with (high Fe contents) is locally observed.	New Level III system shall be created. Technical study on water source development is a requisite. Integrated water supply system with La Paz, Dulag and Marikina shall be studied.
Mahaplag	There is no Level III system in urban area. They use Level I facilities. Urban population is about 3,700.	None	Spring is a potential water source for Level III water supply. In case of using deep well, deep well specifications are: depth of 80m, production of less than 500 cu.m/d and water level of 40 mbsg.	New system shall be created. Study on spring source development is a requisite.
Matugob	There is a LGU-managed Level III system utilizing spring source located at Barangay Riverside (poblacion). Three urban barangays are served by the system, but current population served is about 400 (10% of urban population). People are not willing to pay water charges.	None	Spring is a better water source for future expansion of Level III water supply. When deep well development is necessary in the future, well fields located in fluvial/deltaic deposits along the river shall be considered.	System expansion (distribution pipes) with getting concurrence of beneficiaries is required. Study on additional water source (spring/deep well) is a requisite.

Table 8.4.1 Summary of Urban Water Supply Development by Municipality (Cont'd.)

Municipality	Existing Condition	On-going/Planned Project	Water Source Availability	Future Requirements
Matalom	There is a LGU-managed waterworks utilizing Agbanga spring as its water source. Three urban barangays are covered by the system with current population served of 3,000 equivalent to 88% of urban population. The system's production capacity is sufficient to fully serve the urban population and a portion of the rural population.	None	Spring is the only potential source for Level III water supply. Deep well has poor capacity in this area.	System expansion with water source augmentation is required. Integrated system with MHW shall be studied.
Mayorga	No Level III exists in urban area. Urban population is about 2,300.	None	Deep well development is available in this area. Deep well depth is estimated at about 40m. But water quality problem (saline water intrusion) is observed in coastal area.	New Level III system shall be created. Technical study on ground water development with due consideration of saline water intrusion is a requisite.
Merida	The municipality of Merida has two (2) Level III systems, namely: 1) The Merida Water District that gets its water allocation from the LIDE Management Corp. (LMC) in Isabel, and 2) the Merida Water System utilizing Canibalong Spring. As a whole, service coverage of these 2 systems to serve for two urban barangays is about 2,400 (71% of urban population). Presently, LIDE is planning to cut off water supply to the municipality. The municipality has a plan of spring development applicable for Level III.	Plan (P/S including spring development)	Spring development is available in this area. Deep well with depth of 40m is also available, but deep well yields may be 500 cum/d or less. Shallow wells are contaminated by fertilizer.	System expansion with spring development is required. Financial source shall be sought. On-going study to ensure water source shall be proceeded.
Palo	Urban barangays are served by Leyte Metropolitan Water District. Population served in Palo is about 17,700 (77% of urban population).	Plan (expansion of service area of LMWD)	(See Tacloban City)	(See Tacloban City) Expansion of distribution pipelines in the municipality is required.
Palompon	There is a WD covering ten (10) urban barangays with current population served of 3,100 (26% of urban population). Water source is a combination of deep well and spring. The production capacity is insufficient to meet the average daily requirements of the whole urban population.	None	Both spring and deep well are potential sources for future expansion of Level III water supply. Among these, development priority shall be given to spring source.	System expansion with improvement of transmission/distribution pipelines is required. Study on additional water source development (spring/deep well) shall be necessary.
Pastrana	Urban barangays are covered by Leyte Metropolitan Water District. Population served in Pastrana is about 100 (only 3% of urban population).	Plan (expansion of service area of LMWD)	(See Tacloban City)	(See Tacloban City) Expansion of distribution pipelines in the municipality is required.
San Isidro	There is no Level III system at present. The urban population (5,200) relies on Level II system with deep well as its water source. As of to date, there has not been any water source identified as potential for Level III services.	None	Potential water source of spring may be located in the southern mountainous area. Deep well production has low yields for Level III water supply.	New system shall be created considering upgrading from existing Level II system to Level III in use of deep well. Construction of transmission/distribution pipelines is necessary. Alternative water source shall be sought for future demand.

Table 8.4.1 Summary of Urban Water Supply Development by Municipality (Cont'd.)

Municipality	Existing Condition	On-going/Planned Project	Water Source Availability	Future Requirements
San Miguel	There is no Level III system at present. The urban population (about 3,200) relies on Level I facilities. The municipality, however, plans to have a Level III system either through grant or loan from a financial institution.	Plan (creation of new system)	The yield of spring source is generally small in northeastern mountainous area. Deep well development is considered as better source for Level III water supply. The specifications of deep well is depth of 40m and production capacity of 1,000 cum/d. This municipality is outside the groundwater quality problem area. The Maarl creek may be an alternative water source.	New system shall be created. F/S including water source development (deep well) is a requisite. Financial source shall be sought.
Santa Fe	There is no Level III system at present. The urban population (2,100) relies on Level I facilities. The municipality, however, is identified as a service area under the proposed expansion program of the Leyte Metropolitan Water District (LMWD).	Plan (expansion of service area of LMWD)	See Tacloban City	(See Tacloban City) LMWD will cover the municipality as its service area.
Tabango	There is no Level III system at present. The urban population (4,900) relies on Level I facilities. The municipality, however, plans to put up a Level III system to serve the poblacion. World Bank is identified as a funding source therefor.	Proposed (LGU- Urban Water Supply Project)	Spring is the only potential source for Level III water supply. Deep well development is difficult.	New system shall be created. Technical study on water source development (spring) is a requisite. Financial source shall be secured under LGU-Urban Water Supply project.
Tabontabon	Presently, urban barangays are served by Leyte Metropolitan Water District. Population served in Tabontabon is about 200 (8% of urban population).	Plan (expansion of service area of LMWD)	See Tacloban City	(See Tacloban City) Expansion of distribution pipelines in the municipality is required.
Tacloban City (Capital)	The Leyte Metropolitan Water District (LMWD) covers the urban area of the City together with the municipalities of Pastrana, Dagami, Tabontabon, Tolosa, Tanauan and Palo. Current population served in urban area of the city is estimated at about 160,000 (95% of urban population). The WD is utilizing surface water from Binahaan River and practicing water treatment adopting rapid sand filtration (in Pastrana). LMWD's existing capacity is sufficient to fully serve the total urban population of the above mentioned areas. At present the WD has a plan to expand its service area to the municipalities of Alangalang and Sta. Fe by introducing BOT.	Plan (expansion of service area of LMWD)	Additional surface water development of 0.28 cum/see is planned at Binahaan River by the LMWD. The available river water to be further developed was estimated at more than 1.00 cum/see according to F/S conducted by the LWDA in 1991. Water quality of this river is classified into class "AA" based on the DENR "Water Quality Criteria for Fresh Water".	System expansion of LMWD (Intake, Water treatment plant, Transmission pipe, Reservoir and Distribution pipes) is required. Additional water source is existing from surface water (Binahaan River) with a water rights of 1 m ³ /sec. Water treatment plant will be constructed in Pastrana with the same capacity (24,200m ³ /d) of the existing plant.
Tanauan	Presently, urban barangays are served by Leyte Metropolitan Water District. Population served in Tanauan is about 140 (only 1% of urban population).	Plan (expansion of service area of LMWD)	See Tacloban City	(See Tacloban City) Expansion of distribution pipelines in the municipality is required.

Table 8.4.1 Summary of Urban Water Supply Development by Municipality (Cont'd.)

Municipality	Existing Condition	On-going/Planned Project	Water Source Availability	Future Requirements
Tolosa	Presently, urban barangays are served by Leyte Metropolitan Water District. Population served in Tolosa is about 1,600 (97% of urban population).	Plan (expansion of service area of LMWD)	See Tacloban City	(See Tacloban City) Expansion of distribution pipelines in the municipality is required.
Tunga	Presently, urban barangays are served by Metro Carigara Water District. Population served in Tunga is about 1,600 (39% of urban population).	Plan (Improvement of Level III system)	See Carigara.	(See Tacloban City) Expansion of distribution pipelines in the municipality is required.
Villaba	There is a LGU-managed Level III system utilizing Himabuyan spring as its water source. Two (2) urban barangays are served by the system with served population of 1,600 equivalent to 50% of urban population. Insufficient water supply is a current problem.	None	The spring is the only potential water source for future expansion of Level III water supply. Deep well development is difficult.	System expansion with water source (spring) augmentation is required. Improvement of transmission/distribution pipelines is a requisite.

Among them, Tacloban City, Pastrana, Dagami, Tabontabon, Tolosa, Tanauan and Palo are covered by the Leyte Metropolitan Water District; Carigara, Capoocan, Bargo and Tunga are covered by the Metro Carigara Water District; and Hilongos, Hingang and Bato are covered by Hilongos Metro Water District. While the municipalities of Babatngon, Burauen, Dulag, Javier, Kananga, Leyte, Matag-og, Matalom, Merida, and Villaba are served by Level III systems operated either by the municipal government or the local community.

Population served by existing Level III systems range from about 250 persons at LGU-managed waterworks in Dulag to 180,000 persons at the Leyte Metropolitan Water District. The average size of served population is about 13,500 persons. Majority of the existing Level III systems in urban areas is utilizing spring sources.

The remaining 12 municipalities, out of the total 42 municipalities/city have no Level III system in their urban areas and are presently served by Level II systems and/or Level I facilities.

2) Review of planned/on-going projects

At present, there is a proposed project such as the WB-assisted LGU Urban Water Supply project being coordinated by the DILG. The recipient municipality is Tabango. In addition to this, the LMWD is planning to expand its service area to the municipalities of Alangalang and Sta. Fe. However, the details of this said project have not been clarified during the preparation of this PW4SP.

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.

e. 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 in-

clude; water source availability, willingness by concerned municipalities and technical study on cost recovery/economic construction.

The following municipalities may be studied for the integration both in physical and management systems.

- Leyte Metropolitan WD, Alangalang and Sta. Fe
- La Paz, Dulag, MacArthur and Mayorga
- Metro Carigara WD and Jaro

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. In the PW4SP, public investment for Level I facilities covers 50% of the total number of required facilities, considering the existing share between public (38%) and private facilities (62%).

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 its share of 10%. This takes into account the existing percentage of developed springs (12%) among public Level I facilities in terms of safe water sources.

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 the 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 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 having an estimated discharge of 0.5 lps. or more.

5) Rehabilitation

Rehabilitation of existing Level I wells is not considered, since most of the wells constructed by driving method is 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 provide a shallow well as a water source. Since DECS is currently promoting the "one classroom-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/jeepney terminal and parks/playground.

The standard DOH 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;
- 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.

The utilization of untapped springs for Level II systems was given priority during Phase I period for rural water supply. At the time of this plan preparation, 32 untapped springs in 8 municipalities were identified.

(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 128,000 persons in the province will be served by additional water supply services, of which 62,400 persons or 49% of the total will be urban population and 65,600 persons or 51% will be rural population.

For Phase II period, a total of 742,500 persons, of which 272,400 persons or 37% in urban area and 470,100 persons or 63% 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 124,700 persons served by Level I and II facilities in 1998.

For Phase II period, a total of 692,500 persons, of which 268,500 persons or 39% in urban area and 424,000 persons or 61% 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 124,700 persons served by Level I and II facilities in 1998.

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			Additional Population to be Served			Total Population		Service Coverage			Additional Population to be Served			Total			
		Level III	Level II	Level I	Level III	Level II	Level I	Level III	Level II	Level I	Level III	Level II	Level I	Level III	Level II	Level I	Level III	Level II	Level I		
Abuyog	Urban	14,893	6,488	5,810	12,298	1,891	1,891	1,891	14,418	13,697	4,028	13,697	7,209	7,209	14,905	14,905	14,905	14,905	14,905		
	Rural	37,825	17,037	17,037	21,035	3,687	3,687	3,687	33,117	33,117	4,028	33,117	37,145	37,145	41,173	41,173	41,173	41,173	41,173		
	Total	51,918	23,525	23,525	33,333	5,578	5,578	5,578	48,535	48,535	8,116	48,535	54,354	54,354	56,078	56,078	56,078	56,078	56,078		
Alanglang	Urban	12,045	1,696	5,337	7,033	1,696	1,696	1,696	14,902	14,157	42,034	42,034	16,648	16,648	16,648	16,648	16,648	16,648	16,648		
	Rural	38,350	1,696	25,336	25,336	1,696	1,696	1,696	45,198	45,198	42,034	42,034	42,034	42,034	42,034	42,034	42,034	42,034	42,034		
	Total	50,995	3,392	30,773	32,419	3,392	3,392	3,392	60,196	60,196	84,068	84,068	58,682	58,682	58,682	58,682	58,682	58,682	58,682		
Albuera	Urban	7,697	1,002	3,803	5,532	1,002	1,002	1,002	7,755	7,367	8,301	8,301	9,161	9,161	9,161	9,161	9,161	9,161	9,161		
	Rural	29,379	1,002	18,383	19,213	2,864	2,864	2,864	30,510	30,510	8,301	30,510	33,741	33,741	33,741	33,741	33,741	33,741	33,741		
	Total	36,846	2,004	22,246	24,745	4,866	4,866	4,866	38,265	38,265	16,602	38,265	43,482	43,482	43,482	43,482	43,482	43,482	43,482		
Babatngon	Urban	8,290	6,763	803	7,698	1,104	1,104	1,104	9,354	8,886	1,852	1,852	2,123	2,123	2,123	2,123	2,123	2,123	2,123		
	Rural	16,199	6,763	8,392	10,244	1,104	1,104	1,104	18,412	18,412	1,852	18,412	17,123	17,123	17,123	17,123	17,123	17,123	17,123		
	Total	24,489	13,526	16,794	17,942	2,208	2,208	2,208	27,766	27,766	3,704	27,766	26,009	26,009	26,009	26,009	26,009	26,009	26,009		
Barugo	Urban	7,036	3,715	327	10,518	12,597	944	944	7,738	7,351	3,271	3,271	24,466	24,466	11,869	11,869	11,869	11,869	11,869		
	Rural	23,924	3,467	12,503	18,297	944	944	944	26,307	26,307	3,271	26,307	31,817	31,817	31,817	31,817	31,817	31,817	31,817		
	Total	30,960	7,182	15,270	28,815	22,541	22,541	22,541	34,045	34,045	6,542	34,045	56,283	56,283	43,686	43,686	43,686	43,686	43,686		
Bato	Urban	7,343	1,728	219	4,098	6,045	1,012	1,012	2,919	2,523	2,880	2,880	5,795	5,795	5,795	5,795	5,795	5,795	5,795		
	Rural	25,353	1,728	2,880	11,902	2,471	2,471	2,471	26,618	26,618	2,880	26,618	24,755	24,755	24,755	24,755	24,755	24,755	24,755		
	Total	32,696	3,456	5,099	15,140	18,007	4,942	4,942	34,537	34,537	5,760	34,537	32,278	32,278	32,278	32,278	32,278	32,278	32,278		
Baybay	Urban	24,117	15,019	596	5,088	20,695			25,037	23,785	29,475	29,475	17,000	17,000	17,000	17,000	17,000	17,000	17,000		
	Rural	69,398	9,428	11,101	50,004				72,047	72,047	29,475	29,475	8,766	8,766	8,766	8,766	8,766	8,766	8,766		
	Total	93,515	24,447	16,197	70,699				97,084	97,084	58,950	58,950	25,766	25,766	25,766	25,766	25,766	25,766	25,766		
Bunuen	Urban	16,817	14,033	395	15,231	2,256	2,256	2,256	18,569	17,647	4,714	4,714	38,883	38,883	23,138	23,138	23,138	23,138	23,138		
	Rural	43,590	1,165	4,714	15,745	21,624	4,249	4,249	48,131	48,131	4,714	48,131	44,762	44,762	44,762	44,762	44,762	44,762	44,762		
	Total	60,407	15,198	9,669	30,976	26,880	26,880	26,880	66,700	66,700	9,428	66,700	83,645	83,645	67,900	67,900	67,900	67,900	67,900		
Caliuban	Urban	648	384	384	384	87	87	87	790	751	751	751	367	367	367	367	367	367	367		
	Rural	42,209	3,182	20,482	24,756	4,114	4,114	4,114	51,415	51,415	1,092	51,415	47,816	47,816	47,816	47,816	47,816	47,816	47,816		
	Total	42,857	3,566	20,866	25,140	4,201	4,201	4,201	52,230	52,230	1,474	52,230	48,581	48,581	48,581	48,581	48,581	48,581	48,581		
Capeoan	Urban	5,892	1,404	1,674	5,078	790	790	790	29,165	27,123	25,513	25,513	4,852	4,852	4,852	4,852	4,852	4,852	4,852		
	Rural	26,092	1,610	17,225	18,835	2,866	2,866	2,866	35,750	35,750	25,513	25,513	8,288	8,288	8,288	8,288	8,288	8,288	8,288		
	Total	31,984	3,014	18,899	23,913	5,756	5,756	5,756	64,915	64,915	51,026	51,026	13,140	13,140	13,140	13,140	13,140	13,140	13,140		
Cangara	Urban	13,368	3,644	8,114	11,478	1,793	1,793	1,793	14,534	13,807	31,478	31,478	10,443	10,443	10,443	10,443	10,443	10,443	10,443		
	Rural	35,829	4,501	19,661	24,412	4,501	4,501	4,501	38,956	38,956	250	38,956	36,229	36,229	36,229	36,229	36,229	36,229	36,229		
	Total	49,197	8,145	27,775	35,890	6,294	6,294	6,294	53,490	53,490	320	53,490	50,036	50,036	50,036	50,036	50,036	50,036	50,036		
Dagami	Urban	4,547	126	4,016	4,142				4,767	4,529	4,529	4,529	4,403	4,403	4,403	4,403	4,403	4,403	4,403		
	Rural	25,228	3,150	2,801	16,201				26,449	26,449	250	26,449	24,598	24,598	24,598	24,598	24,598	24,598	24,598		
	Total	29,775	3,276	6,817	20,343				31,216	31,216	750	31,216	29,127	29,127	29,127	29,127	29,127	29,127	29,127		
Dilag	Urban	24,547	3,546	13,712	17,258	3,293	3,293	3,293	28,242	28,242	13,069	13,069	20,796	20,796	20,796	20,796	20,796	20,796	20,796		
	Rural	13,462	3,546	8,714	8,714	3,293	3,293	3,293	14,053	14,053	13,069	13,069	4,355	4,355	4,355	4,355	4,355	4,355	4,355		
	Total	38,009	7,092	22,426	25,972	6,586	6,586	6,586	42,295	42,295	26,138	26,138	25,151	25,151	25,151	25,151	25,151	25,151	25,151		
Hibngos	Urban	9,262	2,714	1,311	7,276	1,242	1,242	1,242	9,997	9,997	3,055	3,055	6,383	6,383	6,383	6,383	6,383	6,383	6,383		
	Rural	45,459	4,795	22,889	30,739	4,431	4,431	4,431	46,998	46,998	3,055	46,998	43,708	43,708	43,708	43,708	43,708	43,708	43,708		
	Total	54,721	7,509	24,708	38,015	5,673	5,673	5,673	56,996	56,996	6,110	56,996	52,808	52,808	52,808	52,808	52,808	52,808	52,808		

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	Level III	Level II	Level I	Total	Level III	Level II	Level I	Total	Level III	Level II	Level I	Total			
Hindang	Urban	3,710	2,213	1,258	3,471	1,258	9,342	10,367																	
	Rural	13,374	2,213	10,660	13,838	1,025	17,084	13,838																	
	Total	17,084	4,426	11,918	27,205	2,283	30,951	27,205																	
Munipacan	Urban	2,584	347	956	1,303	347	1,987	1,987																	
	Rural	20,386	347	5,714	9,961	1,987	19,877	22,853																	
	Total	22,970	694	6,670	11,264	3,477	21,864	24,706																	
Masel	Urban	15,224	4,688	9,167	13,855	2,042	16,438	15,616																	
	Rural	26,365	4,104	13,425	17,529	2,042	28,467	4,104																	
	Total	41,589	8,792	22,592	31,384	4,084	44,934	19,720																	
Jaro	Urban	7,377	4,418	100	729	5,247	990	7,143	2,725																
	Rural	27,171	4,418	1,818	5,243	7,301	491	2,157	2,648																
	Total	34,548	8,836	1,918	6,012	12,348	990	491	2,157	3,638															
Javier (Bugho)	Urban	3,188	1,254	645	461	2,360	428	2,677	2,677																
	Rural	24,658	613	2,966	14,499	18,078	428	25,496	4,147																
	Total	27,846	1,867	3,611	14,960	20,438	428	25,992	8,824																
Jaitta	Urban	5,332	702	5,876	5,876	702	1,003	12,274	1,003																
	Rural	10,313	702	8,496	9,198	702	1,003	17,077	18,501																
	Total	15,645	1,404	14,372	15,074	1,404	2,006	28,771	35,502																
Kamanga	Urban	7,658	1,913	1,123	20,742	30,918	652	43,729	39,738																
	Rural	38,950	9,053	3,123	20,742	30,918	652	51,459	10,207																
	Total	46,608	10,966	4,246	41,484	61,836	1,304	95,188	50,945																
La Paz	Urban	4,863	652	1,524	3,738	1,554	1,554	18,388	5,611																
	Rural	13,940	652	3,227	9,187	13,066	652	23,999	5,330																
	Total	20,803	1,304	4,751	12,925	16,804	1,206	42,387	10,941																
Leyte	Urban	32,829	21	2,186	18,843	22,402	566	34,090	21																
	Rural	37,046	1,373	2,186	18,843	13,066	652	3,766	38,470																
	Total	69,875	1,394	4,372	37,686	35,468	1,218	37,856	38,491																
Macarthur	Urban	4,356	584	2,107	2,691	584	1,062	2,048	2,735																
	Rural	21,012	584	1,381	8,927	10,308	584	10,652	986																
	Total	25,368	1,168	3,488	11,618	20,616	1,168	11,694	11,634																
Mahaplag	Urban	4,044	542	2,183	2,725	542	1,028	1,168	2,196																
	Rural	22,528	542	1,116	7,829	8,945	1,028	2,738	27,952																
	Total	26,572	1,084	3,299	10,554	17,890	1,556	29,696	29,897																
Munay-ob	Urban	4,551	997	430	2,145	3,592	611	18,764	4,435																
	Rural	16,674	1,435	2,360	6,023	9,818	611	23,885	6,300																
	Total	21,225	2,432	2,810	8,168	13,410	611	42,649	10,735																
Matalom	Urban	3,756	3,020	476	236	3,522	2,386	24,476	3,527																
	Rural	24,476	3,527	2,814	7,334	13,685	2,386	28,232	7,269																
	Total	28,232	6,557	3,290	7,570	17,417	2,386	33,708	10,794																
Mayorga	Urban	2,467	331	72	1,684	2,087	331	2,573	2,444																
	Rural	9,635	331	146	6,696	6,842	146	10,052	9,348																
	Total	12,102	662	218	8,380	8,929	331	12,625	11,692																

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	Total	Level III	Level II	Total	Level III	Level II	Total	Level III	Level II	Total	Level III	Level II	Total	Level III	Level II	Total		
Merida	Urban	3,638	2,879	3,269	488	488	488	3,658	3,658	3,658	3,658	3,658	3,658	3,658	3,658	3,658	3,658	3,658	3,658	3,658	
	Rural	21,040	1,181	16,130	181	181	181	21,221	21,221	21,221	21,221	21,221	21,221	21,221	21,221	21,221	21,221	21,221	21,221	21,221	
	Total	24,678	4,060	19,399	488	488	488	24,869	24,869	24,869	24,869	24,869	24,869	24,869	24,869	24,869	24,869	24,869	24,869	24,869	
Tulio	Urban	26,496	17,659	22,452	4,763	4,763	4,763	30,167	30,167	30,167	30,167	30,167	30,167	30,167	30,167	30,167	30,167	30,167	30,167	30,167	
	Rural	27,210	21,644	21,644	21,644	21,644	21,644	30,980	30,980	30,980	30,980	30,980	30,980	30,980	30,980	30,980	30,980	30,980	30,980	30,980	
	Total	53,706	39,303	44,096	43,276	43,276	43,276	61,147	61,147	61,147	61,147	61,147	61,147	61,147	61,147	61,147	61,147	61,147	61,147	61,147	
Palampunan	Urban	13,170	4,817	9,479	1,767	1,767	1,767	14,937	14,937	14,937	14,937	14,937	14,937	14,937	14,937	14,937	14,937	14,937	14,937	14,937	
	Rural	46,469	384	16,171	17,208	17,208	4,530	51,044	51,044	51,044	51,044	51,044	51,044	51,044	51,044	51,044	51,044	51,044	51,044	51,044	
	Total	59,639	5,701	25,650	18,976	18,976	4,530	62,588	62,588	62,588	62,588	62,588	62,588	62,588	62,588	62,588	62,588	62,588	62,588	62,588	
Pastrana	Urban	3,435	547	1,638	2,185	461	461	3,987	3,987	3,987	3,987	3,987	3,987	3,987	3,987	3,987	3,987	3,987	3,987	3,987	
	Rural	15,090	2,150	4,952	7,102	7,102	1,471	17,514	17,514	17,514	17,514	17,514	17,514	17,514	17,514	17,514	17,514	17,514	17,514	17,514	
	Total	18,525	2,697	6,590	9,287	7,563	1,471	21,501	21,501	21,501	21,501	21,501	21,501	21,501	21,501	21,501	21,501	21,501	21,501	21,501	
San Isidro	Urban	6,096	818	1,038	2,034	818	818	6,912	6,912	6,912	6,912	6,912	6,912	6,912	6,912	6,912	6,912	6,912	6,912	6,912	
	Rural	36,015	818	249	10,565	11,632	818	43,299	43,299	43,299	43,299	43,299	43,299	43,299	43,299	43,299	43,299	43,299	43,299	43,299	
	Total	42,111	1,636	11,603	12,666	12,666	1,636	48,998	48,998	48,998	48,998	48,998	48,998	48,998	48,998	48,998	48,998	48,998	48,998	48,998	
San Miguel	Urban	3,528	473	7,108	8,160	473	473	3,992	3,992	3,992	3,992	3,992	3,992	3,992	3,992	3,992	3,992	3,992	3,992	3,992	
	Rural	13,083	473	9,350	10,875	473	1,052	14,084	14,084	14,084	14,084	14,084	14,084	14,084	14,084	14,084	14,084	14,084	14,084	14,084	
	Total	16,613	946	16,458	21,735	946	1,524	17,881	17,881	17,881	17,881	17,881	17,881	17,881	17,881	17,881	17,881	17,881	17,881	17,881	
Santa Fe	Urban	14,561	844	8,998	332	332	332	2,817	2,817	2,817	2,817	2,817	2,817	2,817	2,817	2,817	2,817	2,817	2,817	2,817	
	Rural	17,038	332	9,978	10,464	332	1,419	16,560	16,560	16,560	16,560	16,560	16,560	16,560	16,560	16,560	16,560	16,560	16,560	16,560	
	Total	31,600	1,176	18,976	20,928	664	1,751	19,377	19,377	19,377	19,377	19,377	19,377	19,377	19,377	19,377	19,377	19,377	19,377	19,377	
Tabalogo	Urban	30,632	710	14,079	16,954	710	710	2,886	2,886	2,886	2,886	2,886	2,886	2,886	2,886	2,886	2,886	2,886	2,886	2,886	
	Rural	35,926	710	16,547	20,132	710	1,500	38,284	38,284	38,284	38,284	38,284	38,284	38,284	38,284	38,284	38,284	38,284	38,284	38,284	
	Total	66,558	1,420	30,626	37,086	1,420	4,386	76,568	76,568	76,568	76,568	76,568	76,568	76,568	76,568	76,568	76,568	76,568	76,568	76,568	
Tabonabon	Urban	2,606	536	1,247	1,783	346	346	2,705	2,705	2,705	2,705	2,705	2,705	2,705	2,705	2,705	2,705	2,705	2,705	2,705	
	Rural	5,640	536	2,533	2,533	536	536	5,878	5,878	5,878	5,878	5,878	5,878	5,878	5,878	5,878	5,878	5,878	5,878	5,878	
	Total	8,246	1,072	3,780	4,316	882	882	8,656	8,656	8,656	8,656	8,656	8,656	8,656	8,656	8,656	8,656	8,656	8,656	8,656	
Tactoban City (Capital)	Urban	214,346	188,917	188,917	28,754	28,754	28,754	267,815	267,815	267,815	267,815	267,815	267,815	267,815	267,815	267,815	267,815	267,815	267,815	267,815	
	Rural	25,362	1,375	13,692	15,067	15,067	2,472	31,689	31,689	31,689	31,689	31,689	31,689	31,689	31,689	31,689	31,689	31,689	31,689	31,689	
	Total	239,708	190,292	202,609	43,821	43,821	43,821	299,504	299,504	299,504	299,504	299,504	299,504	299,504	299,504	299,504	299,504	299,504	299,504	299,504	
Tandagan	Urban	15,888	2,274	8,629	10,903	2,131	2,131	16,933	16,933	16,933	16,933	16,933	16,933	16,933	16,933	16,933	16,933	16,933	16,933	16,933	
	Rural	30,069	3,575	11,939	17,403	2,931	2,931	32,047	32,047	32,047	32,047	32,047	32,047	32,047	32,047	32,047	32,047	32,047	32,047	32,047	
	Total	45,957	5,849	20,568	28,306	5,062	5,062	48,980	48,980	48,980	48,980	48,980	48,980	48,980	48,980	48,980	48,980	48,980	48,980	48,980	
Tolosa	Urban	1,774	1,635	16	1,651	1,651	1,651	1,749	1,749	1,749	1,749	1,749	1,749	1,749	1,749	1,749	1,749	1,749	1,749	1,749	
	Rural	13,335	3,383	8,761	10,242	10,242	13,841	13,841	13,841	13,841	13,841	13,841	13,841	13,841	13,841	13,841	13,841	13,841	13,841	13,841	
	Total	15,109	5,018	8,777	11,893	11,893	15,682	15,682	15,682	15,682	15,682	15,682	15,682	15,682	15,682	15,682	15,682	15,682	15,682	15,682	
Tunga	Urban	5,272	2,345	1,327	3,072	707	707	6,484	6,484	6,484	6,484	6,484	6,484	6,484	6,484	6,484	6,484	6,484	6,484	6,484	
	Rural	3,866	1,154	824	1,978	1,978	377	4,756	4,756	4,756	4,756	4,756	4,756	4,756	4,756	4,756	4,756	4,756	4,756	4,756	
	Total	9,138	3,499	2,151	5,050	707	707	11,240	11,240	11,240	11,240	11,240	11,240	11,240	11,240	11,240	11,240	11,240	11,240	11,240	
Villaba	Urban	3,452	2,063	680	3,018	463	463	3,886	3,886	3,886	3,886	3,886	3,886	3,886	3,886	3,886	3,886	3,886	3,886	3,886	
	Rural	35,794	600	2,913	30,699	707	707	38,220	38,220	38,220	38,220	38,220	38,220	38,220	38,220	38,220	38,220	38,220	38,220	38,220	
	Total	39,246	2,663	3,593	33,817	1,174	1,174	42,106	42,106	42,106	42,106	42,106	42,106	42,106	42,106	42,106	42,106	42,106	42,106	42,106	
Provincial Total	Urban	537,201	316,227	380,018	440,505	62,157	62,157	619,441	619,441	619,441	619,441	619,441	619,441	619,441	619,441	619,441	619,441	619,441	619,441	619,441	
	Rural	1,096,736	53,133	82,218	647,104	18,281	47,364	65,385	1,201,299	1,201,299	1,201,299	1,201,299	1,201,299	1,201,299	1,201,299	1,201,299	1,201,299	1,201,299	1,201,299	1,201,299	
	Total	1,633,937	369,360	462,236	1,087,609	80,438	109,521	127,542	1,820,740	1,820,740	1,820,740	1,820,740	1,820,740	1,820,740	1,820,740	1,820,740	1,820,740	1,820,740	1,820,740	1,820,740	

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.

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 251,638. Additional households to be served totaled to 75,285, of which 35% is urban households and 65% is rural households. While at the end of Phase II period, the number of served households are 414,328 with an additional households to be served at 166,779. 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.

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

Name of Municipality/City	Area	Phase I Coverage (2004)										Phase II Coverage (2010)									
		No. of Served Households					Addtl. No. of Households to be Served					No. of Served Households					Addtl. No. of Households to be Served				
		Total Households	Flush	Pour Flush	VIP/Dry	Total	Flush	Pour Flush	VIP/Dry	Total	Total Households	Flush	Pour Flush	VIP/Dry	Total	Flush	Pour Flush	VIP/Dry	Total		
Abuyog	Urban	2,274			45	2,319			285	2,034	45	3,605			45	3,353			1,677	1,677	
	Rural	7,611			915	8,526			330	8,196	915	9,675			915	8,760			2,850	1,500	
	Total	10,385			1,200	11,585			615	10,970	1,200	12,800			1,200	10,010			4,450	3,000	
Alangalang	Urban	2,418			39	2,457			689	1,768	39	1,807			39	1,768			4,445	2,291	
	Rural	7,461			230	7,691			609	7,082	230	7,312			230	7,082			2,291	4,821	
	Total	9,879			270	10,149			1,298	8,854	270	9,122			270	8,854			6,736	7,112	
Albuera	Urban	1,512			34	1,546			399	1,147	34	1,181			34	1,147			902	593	
	Rural	6,020			226	6,246			313	5,933	226	6,159			226	5,933			2,533	1,171	
	Total	7,532			260	7,792			612	7,180	260	7,441			260	7,180			3,435	2,364	
Babangon	Urban	1,550			411	1,961			411	1,550	411	1,961			411	1,550			1,690	89	
	Rural	4,708			118	4,826			593	4,233	118	4,351			118	4,233			1,943	752	
	Total	6,258			159	6,417			1,004	5,413	159	5,572			159	5,413			3,633	841	
Banga	Urban	4,961			15	5,076			877	4,199	15	4,214			15	4,214			2,155	114	
	Rural	6,510			120	6,630			877	5,753	120	5,873			120	5,753			3,099	1,739	
	Total	11,471			135	11,606			1,754	9,852	135	10,087			135	9,968			5,254	2,883	
Baybay	Urban	1,238			1,240	2,478			1,046	1,432	1,240	2,672			1,240	1,432			1,631	841	
	Rural	3,167			816	3,983			836	3,147	816	3,963			816	3,147			2,448	1,515	
	Total	4,405			2,056	6,461			1,882	4,579	2,056	6,635			2,056	4,579			4,079	3,356	
Boracay	Urban	8,632			647	9,279			647	8,632	647	9,279			647	8,632			4,530	2,188	
	Rural	1,299			1,483	2,782			1,483	1,299	1,483	2,782			1,483	1,299			1,164	799	
	Total	9,931			1,930	11,861			1,930	9,931	1,930	11,861			1,930	9,931			5,694	3,087	
Calubian	Urban	8,703			65	8,768			292	8,476	65	8,541			65	8,476			4,286	252	
	Rural	8,834			682	9,516			650	8,864	682	9,546			682	8,864			4,508	252	
	Total	17,537			1,337	18,874			942	17,932	1,337	18,090			1,337	17,340			8,794	504	
Caposon	Urban	5,218			391	5,609			391	5,218	391	5,609			391	5,218			2,251	132	
	Rural	6,436			391	7,027			391	6,635	391	7,027			391	6,635			3,031	132	
	Total	11,654			782	12,436			782	11,853	782	12,636			782	11,853			5,282	264	
Carigara	Urban	7,140			539	7,679			515	7,164	539	7,703			539	7,164			3,338	169	
	Rural	9,919			1,262	11,181			1,262	9,919	1,262	11,181			1,262	9,919			3,095	669	
	Total	17,059			1,801	18,860			1,801	17,083	1,801	18,884			1,801	17,083			6,433	838	
Dagupan	Urban	5,170			388	5,558			388	5,170	388	5,558			388	5,170			2,071	104	
	Rural	6,058			514	6,572			514	6,058	514	6,572			514	6,058			1,762	104	
	Total	11,228			902	12,130			902	11,228	902	12,130			902	11,228			3,833	208	
Dula	Urban	4,949			4,562	9,511			4,562	4,949	4,562	9,511			4,562	4,949			948	30	
	Rural	2,720			108	2,828			108	2,720	108	2,828			108	2,720			948	50	
	Total	7,669			4,670	12,339			4,670	7,669	4,670	12,339			4,670	7,669			1,896	80	
Hilongos	Urban	1,768			669	2,437			33	2,404	669	3,073			669	2,404			1,031	471	
	Rural	9,074			651	9,725			1,485	8,240	651	8,891			651	8,240			3,773	189	
	Total	10,842			1,320	12,162			1,518	9,680	1,320	11,002			1,320	9,680			4,804	260	
Iloilo	Urban	2,876			1,122	3,998			54	3,944	1,122	5,066			1,122	3,944			624	33	
	Rural	3,014			1,305	4,319			132	4,187	1,305	5,492			1,305	4,187			662	33	
	Total	5,890			2,427	8,317			186	8,131	2,427	10,558			2,427	8,131			1,286	66	
Inopacan	Urban	4,061			152	4,213			478	3,735	152	3,887			152	3,735			1,911	105	
	Rural	4,560			132	4,692			132	4,560	132	4,692			132	4,560			2,060	105	
	Total	8,621			284	8,905			610	8,395	284	8,677			284	8,395			3,971	210	

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

Name of Municipality/City	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	VIP/Dry	Total	Flush	Pour Flush	VIP/Dry	Total	Total Households	Flush	Pour Flush	VIP/Dry	Total	Flush	Pour Flush	VIP/Dry	Total		
Isabel	Urban	3,101	819	1,612	50	2,481				50	790	4,110	1,911	1,861	50	3,872	1,092	749	1,341		
	Rural	5,257	432	3,670	216	4,318				3,260	216	3,476	7,117	641	5,444	320	6,405	209	1,774		
	Total	8,358	1,251	5,282	266	6,799				3,460	266	4,226	11,227	2,552	7,305	370	10,227	1,301	2,023		
Jaro	Urban	1,478	390	768	24	1,182				390	24	414	1,880	874	850	24	1,268	484	82		
	Rural	5,534	390	3,943	208	4,151				1,010	208	6,924	8,804	574	6,770	322	7,980	484	2,059		
	Total	7,012	780	4,711	232	5,335				1,400	232	1,632	13,608	1,448	7,820	346	9,268	968	2,081		
Javier (Bugho)	Urban	618	163	321	10	494				10	173	930	433	422	10	865	270	101	371		
	Rural	4,835	362	3,076	181	3,619				2,749	362	3,111	7,193	613	5,537	324	6,474	251	2,461		
	Total	5,443	525	3,397	191	4,113				2,749	362	3,284	8,123	1,046	5,929	324	7,329	521	2,562		
Julika	Urban	1,113	294	578	18	890				174	192	1,557	724	706	18	1,448	430	128	538		
	Rural	2,126	294	1,515	80	1,595				290	80	379	3,069	724	2,624	138	2,762	1,109	88		
	Total	3,239	588	2,093	98	2,485				464	172	4,626	724	3,330	156	4,210	430	1,237	56		
Kunanga	Urban	1,539	406	800	25	1,231				192	192	2,183	1,015	990	25	2,030	609	190	799		
	Rural	7,637	573	4,869	286	5,728				766	276	1,381	10,682	961	8,172	481	9,614	3,481	195		
	Total	9,176	979	5,669	311	6,959				766	276	1,573	12,865	1,976	9,162	506	11,644	3,977	3,493		
La Paz	Urban	948	250	493	15	758				250	15	265	1,403	653	637	15	1,305	403	144		
	Rural	3,201	220	2,281	120	2,401				120	120	4,597	3,930	207	4,137	222	5,442	403	1,649		
	Total	4,149	470	2,774	135	3,159				370	135	365	6,000	653	4,967	222	5,442	403	1,793		
Leyte	Urban	735	72	559	13	644				505	505	1,095	509	496	13	1,018	432	432	432		
	Rural	6,229	21	4,417	234	4,672				4,099	234	8,523	21	7,266	384	7,671	2,849	150			
	Total	6,964	93	4,976	247	5,316				4,604	247	4,099	9,618	530	7,762	397	8,089	437	2,849		
MacArthur	Urban	825	218	429	13	660				210	210	1,418	660	646	13	1,319	442	212	639		
	Rural	3,957	9	2,811	148	2,968				598	98	6,940	9	5,439	308	6,156	3,028	160			
	Total	4,782	227	3,240	161	3,628				598	208	8,258	669	6,485	321	7,475	442	3,245			
Mahaplag	Urban	722	191	375	12	578				148	148	1,064	495	483	12	900	304	108	412		
	Rural	4,385	31	3,092	164	3,287				2,901	164	5,923	31	5,015	262	5,333	1,943	103			
	Total	5,107	222	3,467	176	3,865				2,901	176	6,989	526	5,518	279	6,323	3,044	2,031			
Malagob	Urban	910	340	473	15	728				122	153	1,280	395	380	15	1,190	355	107	462		
	Rural	3,389	254	2,161	127	2,542				41	41	4,691	422	3,589	211	4,222	1,681	1,226			
	Total	4,299	494	2,634	142	3,270				163	163	5,971	1,017	4,169	226	5,212	523	1,531			
Malalom	Urban	749	208	410	13	631				88	88	919	437	423	13	873	229	13	242		
	Rural	4,866	365	3,102	183	3,650				183	484	6,119	551	4,681	275	5,407	186	1,579			
	Total	5,615	573	3,512	196	4,281				196	389	7,058	988	5,104	268	6,390	415	1,902			
Mayorga	Urban	515	136	268	8	412				110	156	645	299	291	8	598	163	23			
	Rural	1,987	116	1,490	75	1,490				116	116	2,513	116	2,149	113	2,262	734	38			
	Total	2,502	252	1,658	83	1,902				226	272	3,166	399	2,440	121	2,660	163	743			

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.

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 220,446. The additional students to be served are 76,848. While at the end of Phase II period, the projected number of served students are 322,776 with an additional students to be served at 102,512. 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.

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

Name of Municipality/City	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
Abuyog	11,622	7,096	3,896	13,376	12,038	4,942
Alangalang	7,941	6,360		11,060	9,954	3,594
Albuera	8,790	7,027	2,947	9,444	8,500	1,473
Babatngon	6,481	4,292	2,172	7,366	6,629	2,337
Barugo	7,388	3,037	2,477	8,602	7,742	4,705
Bato	8,568	7,192	2,872	8,996	8,096	904
Baybay	20,382	12,392	6,832	23,804	21,424	9,032
Burauen	11,026	8,905		13,914	12,523	3,618
Calubian	7,929	7,929	2,369	11,038	9,934	2,005
Capoocan	6,693	6,564	2,244	8,521	7,669	1,105
Carigara	5,619	5,619	1,833	7,637	6,873	1,254
Dagami	6,866	5,760		7,647	6,882	1,122
Dulag	3,717	3,717	1,214	4,988	4,489	772
Hilongos	9,040	9,040	2,320	10,904	9,814	774
Hindang	3,670	2,991	1,231	4,144	3,730	739
Inopacan	4,834	4,834	1,314	5,757	5,181	347
Isabel	9,477	5,897	3,177	10,834	9,751	3,854
Jaro	8,449	4,032	2,832	8,612	7,751	3,719
Javier (Bugho)	5,526	4,160		6,908	6,217	2,057
Julita	3,639	2,619	1,219	4,586	4,127	1,508
Kananga	8,808	5,833	2,953	10,406	9,365	3,532
La Paz	5,579	5,471	1,871	6,570	5,913	442
Leyte	10,849	6,037	3,637	11,266	10,139	4,102
Macarthur	4,890	3,360	1,640	6,822	6,140	2,780
Mahaplag	6,430	3,276	2,156	7,162	6,446	3,170
Matag-ob	4,526	2,797	1,517	5,432	4,889	2,092
Matalom	6,446	6,481	2,161	7,075	6,368	
Mayorga	2,931	1,622	982	3,237	2,913	1,291
Merida	6,117	5,224		6,868	6,181	957
Palo	6,946	4,009	2,329	9,666	8,699	4,690
Palompon	7,275	4,719	2,439	9,791	8,812	4,093
Pastrana	4,496	2,507	1,507	5,525	4,973	2,466
San Isidro	7,454	3,658	2,498	9,200	8,280	4,622
San Miguel	4,391	3,592	1,472	4,880	4,392	800
Santa Fe	4,184	3,322	1,402	5,038	4,534	1,212
Tabango	8,087	6,733		9,157	8,241	1,508
Tabontabon	2,160	2,160	640	2,323	2,091	
Tacloban City (Capital)	12,659	10,003	4,243	23,726	21,353	11,350
Tanauan	7,525	6,367		9,356	8,420	2,053
Tolosa	4,082	3,480		4,325	3,893	413
Tunga	2,424	2,320		2,982	2,684	364
Villaba	8,012	8,012	2,452	9,696	8,726	714
Provincial Total	293,928	220,446	76,848	358,641	322,776	102,512

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 8.5.4 shows the population to be served in Phase II.

Table 8.5.4 Population to be Served by Urban Sewerage in Phase II

Name of Municipality/City	Urban Population in 2010	Level III Water Supply Coverage	Population to be Served
Abuyog	14,418	13,697	7,209
Alangalang	14,902	14,157	7,451
Baybay	25,037	23,785	12,519
Burauen	18,569	17,641	9,285
Carigara	14,534	13,807	7,267
Dulag	25,623	24,342	12,812
Isabel	16,438	15,616	8,219
Palo	30,167	28,659	15,084
Palompon	14,501	13,776	7,251
Tacloban City	267,815	254,424	133,908
Tanauan	16,933	16,086	8,467
Provincial Total	619,441	588,633	229,472

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 90% with reference to the present service coverage of 89% 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 8.5.5 presents additional service coverage for Phase I in the urban area.

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

Name of Municipality/City	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
Abuyog	2,967	2,774	2,967	
Alangalang	562	2,118	2,177	1,615
Albuera	688	1,512	1,361	673
Babatngon	786	1,556	1,401	615
Barugo	1,205	1,310	1,205	
Bato	2,187	1,549	2,187	
Baybay	3,329	4,853	4,368	1,039
Burauen	2,277	3,167	2,851	574
Calubian	793	131	793	
Capoocan	491	1,238	1,115	624
Carigara	2,076	2,739	2,466	390
Dagami	821	888	821	
Dulag	1,183	4,949	4,455	3,272
Hilongos	1,667	1,768	1,667	
Hindang	2,423	738	2,423	
Inopacan	867	499	867	
Isabel	728	3,101	2,791	2,063
Jaro	1,381	1,478	1,381	
Javier (Bugho)	718	618	718	
Julita		1,113	1,002	1,002
Kananga	1,243	1,539	1,386	143
La Paz	953	948	953	
Leyte	4,714	735	4,714	
Macarthur		825	743	743
Mahaplag	653	722	653	
Matag-ob	832	910	832	
Matalom	400	789	711	311
Mayorga		515	464	464
Merida	803	914	823	20
Palo	2,992	5,145	4,631	1,639
Palompon	1,913	2,755	2,480	567
Pastrana		621	559	559
San Isidro	375	1,373	1,236	861
San Miguel	689	697	689	
Santa Fe	1,010	481	1,010	
Tabango	450	1,083	975	525
Tabontabon		524	472	472
Tactoban City (Capital)	32,055	39,474	31,527	3,472
Tanauan	2,615	3,097	2,788	173
Tolosa		353	318	318
Tunga	395	830	747	352
Villaba	472	692	623	151
Provincial Total	79,713	103,421	102,350	22,637

Table 8.6.1 Water Supply Facilities Required by Target Year

Name of Municipality/City	Phase 1 (2004) Requirements										Phase 1 (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 Communal Faucets	No. of System	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	Level I		Total No. of Wells	
						No. of Deep Wells	No. of Shallow Wells	No. of Communal Faucets				No. of System	40 m	80 m			120 m	40 m		80 m
Albay	Expansion	1	372			15	15	14	49	1	1,892			78	78	174	249			
Albay	New		324							2	3,115			251	251	278		278		
Albay	New		203			12	12	27	39	1	1,591			46	46	107		107		
Albay	Expansion		209			8	8	12	20	1	331			36	36	69		69		
Albay	Expansion		178			29	29	29	29	1	909			198	198	198		198		
Albay	Expansion		208		5	97				2	1,449			214	214	214		214		
Albay	N/A									2	2,192			256	256	284		284		
Albay	Expansion		425		14	166				1	902			193	193	396		396		
Albay	Expansion		18			46				1	92			308	308	385		385		
Albay	Expansion		166							2	2,631			178	178	191		191		
Albay	Expansion		367							1	1,101			126	126	141		141		
Albay	N/A					17	17	17	18	3	5,999			66	66	71		71		
Albay	Expansion		664		1	20	47	5	52	1	1,596			196	196	211		211		
Albay	Expansion		237							1	331			22	22	36		36		
Albay	N/A				6	89				1	601			95	95	189		189		
Albay	New		67							2	2,732			60	60	90		90		
Albay	Expansion		416							1	681			249	249	262		262		
Albay	Expansion		198		1	20	24	5	29	1	570			87	87	88		88		
Albay	Expansion		83							1	1,304			93	93	93		93		
Albay	Expansion		149			14	14	14	14	1	289			228	228	264		264		
Albay	N/A									1	1,170			91	91	91		91		
Albay	New		127		19	63				1	702			180	180	191		191		
Albay	Expansion		99			36	4	4	40	1	1,201			203	203	219		219		
Albay	New		111		2	40	10	10	12	1	875			198	198	219		219		
Albay	New		97		2	40	14	14	15	1	967			131	131	115		115		
Albay	Expansion		122							1	178			137	137	151		151		
Albay	N/A				11	95				1	528			38	38	4		4		
Albay	New		69							1	197			33	33	74		74		
Albay	Expansion		123							2	2,750			72	72	48		48		
Albay	N/A									2	2,240			406	406	307		307		
Albay	Expansion		370			39	39	26	65	2	810			154	154	184		184		
Albay	Expansion		83			18	18	18	18	1	1,463			291	291	484		484		
Albay	Expansion		184			30	30	20	50	1	784			25	25	58		58		
Albay	New		93		2	40	1	1	3	1	386			33	33	5		5		
Albay	New		64			6	6	12	18	1	1,162			45	45	170		170		
Albay	New		145		3	60	4	16	20	1	509			49	49	49		49		
Albay	Expansion		70			8	8	8	8	1	16,377			25	25	216		216		
Albay	Expansion		5,295		4	4	4	27	31	9	3,453			187	187	207		207		
Albay	Expansion		415			37	37	4	41	2	29			22	22	22		22		
Albay	N/A					4	4	4	4	1	954			41	41	41		41		
Albay	Expansion		111			4	4	4	4	1	60			60	60	148		148		
Albay	Expansion		93							1	60			60	60	148		148		
Albay	Expansion		38		66	724	273	136	14	423	209	632	59	68,106	3,200	1,759	198	5,157	2,718	
Albay	Expansion		11,955		66	724	273	136	14	423	209	632	59	68,106	3,200	1,759	198	5,157	2,718	
Albay	New		12							1	60			60	60	148		148		

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, in this PW4SP, 50% of the total required facilities will be implemented by public (LGUs) and 10% of these public Level I facilities will be allocated to spring development.

(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 197 Level I deep wells shall be newly constructed by public (LGUs) and 10% of these deep wells shall be rehabilitated annually (details are referred to Supporting Report). Presently, the DPWH-1st DEO (in Palo) has one each unit of truck-mounted percussion type and rotary type drilling rig applicable for more than 8" of bore hole diameter. While 5th DEO (in Baybay) has one unit of truck-mounted percussion drilling rig.

Therefore, a total of 2 sets of drilling rigs (medium size percussion type) together with 1 set of well rehabilitation equipment, 1 unit of support vehicle for well rehabilitation and 2 units of service truck for deep well construction shall be mobilized/procured either by the private sector or 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 will need at least 3 sets of instruments/equipment in order to ensure regular water quality monitoring and surveillance activities for the entire province. The distribution would be in 3 strategic municipalities where provincial/municipal hospitals are located. These are in the hospitals of Palo (existing), Baybay and Kananga. Water samples have to be examined on time to avoid unpredictable changes of the quality due to long storage.

The laboratory equipment requirement for Palo hospital is designed to upgrade the existing facility so as to efficiently cover central part of the province. The 2 new laboratories in Baybay and Kananga will cover the southern and western municipalities, respectively.

The following are the requirements:

Item	Unit	New Laboratories		
		Upgrading of Palo Laboratory	Baybay	Kananga
1. Instrument/Equipment				
Turbidity meter	set	1	1	1
Color meter	set	1	1	1
pH/Residual chlorine checker	set	1	1	1
Incubator	set	1	1	1
Refrigerator	set	1	1	1
Sterilizer	set	1	1	1
Portable water quality testing kit	set	1	1	1
Electric stove	set	1	1	1
Range hood	set	1	1	1
2. Glassware/Chemical	set	1	1	1
3. Accessory				
Sink	set	1	1	1
Working table	set	1	1	1
Shelf	set	1	1	1
Office desk	set	1	1	1
Chair	set	1	1	1

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. Twenty six (26) additional units of truck are required to meet assumed service coverage as reflected in Table 8.6.3.

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.

Table 8.6.3 Number of Refuse Collection Trucks Required in Phase I

Name of Municipality/ City	Additional Urban Households to be Served	Estimated Daily Amount of Refuse to be Generated, (Kg)	Number of Collection Truck Required
Abuyog			
Alangalang	1,615	676	1
Albuera	673	282	1
Babatngon	615	258	1
Barugo			
Bato			
Baybay	1,039	435	1
Burauen	574	240	1
Calubian			
Capoocan	624	261	1
Carigara	390	161	1
Dagami			
Dulag	3,272	1,368	1
Hilongos			
Hindang			
Inopacan			
Isabel	2,063	863	1
Jaro			
Javier (Bugho)			
Julita	1,002	419	1
Kananga	143	60	1
La Paz			
Leyte			
Macarthur	743	311	1
Mahaplag			
Matag-ob			
Matalom	311	130	1
Mayorga	464	194	1
Merida	20	9	1
Palo	1,639	686	1
Palompon	567	238	1
Pastrana	559	234	1
San Isidro	861	360	1
San Miguel			
Santa Fe			
Tabango	525	220	1
Tabontabon	472	198	1
Tacloban City (Capital)	3,472	1,452	1
Tanauan	173	73	1
Tolosa	318	133	1
Tunga	352	148	1
Villaba	151	61	1
Provincial Total	22,637	9,476	26

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 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.