
**FUTURE REQUIREMENTS
AND DEVELOPMENT PLAN**

B



8. FUTURE REQUIREMENTS IN WATER SUPPLY AND SANITATION IMPROVEMENT

8.2 Targets of Provincial Sector Plan

Table 8.2.1 Estimation of Base Year Service Coverage of Water Supply

Name of Municipality	Area	Population (1997)	Population Served by 1997 Facilities				Population to be Served by Planned Ongoing Projects				Population Served in the Base Year (1997)					
			Level III	Level II	Level I	Total	Level III	Level II	Level I	Total	Level III	Level II	Level I	Total	Percentage Coverage	
Bayugan	Urban	19,451			32,815	32,815							32,815	32,815	83	
	Rural	57,080	340	6,290	26,968	33,598					340	6,290	26,968	33,598	59	
	Total	96,531	340	6,290	59,783	66,413								66,413	69	
Bunawan	Urban	10,706	1,296	3,103	2,990	7,389										
	Rural	15,557		3,962	4,911	8,873					1,296	3,103	2,990	7,389	69	
	Total	26,263	1,296	7,065	7,901	16,262								16,262	62	
Esperanza	Urban	4,193	660		1,701	2,361										
	Rural	49,342	420	2,390	15,988	18,798					660				56	
	Total	44,535	1,080	2,390	17,689	21,159						420	2,390	15,988	18,798	47
La Paz	Urban	7,456			2,810	2,810										
	Rural	18,046			2,171	2,171										
	Total	25,502			4,981	4,981									20	
Loreto	Urban	5,046		340	2,621	2,961										
	Rural	20,123		1,801	7,335	9,136							340	2,621	2,961	59
	Total	25,169		2,141	9,956	12,097							1,801	7,335	9,136	45
Prosperidad (Capital)	Urban	21,840	3,276			3,276										
	Rural	44,361	2,088	3,282	26,913	32,283										
	Total	66,201	5,364	3,282	26,913	35,559										
Rosario	Urban	3,031	3,029			3,029										
	Rural	25,080	5,605	4,501	1,171	11,277										
	Total	28,111	8,634	4,501	1,171	14,306										
San Francisco	Urban	25,519	10,791	1,296	12,156	24,243										
	Rural	28,665	3,480	2,249	10,530	15,259										
	Total	54,184	14,271	3,545	22,686	40,502										
San Luis	Urban	5,038			3,103	3,103										
	Rural	18,257		1,321	7,071	8,392										
	Total	23,295		1,321	10,174	11,495										
Santa Josefa	Urban	4,261	888		1,861	2,749										
	Rural	20,506			3,615	3,615										
	Total	24,767	888		5,476	6,364										
Sibagat	Urban	7,884	623		3,762	4,385										
	Rural	22,000	290	9,294	5,686	15,270										
	Total	29,884	913	9,294	9,448	19,655										
Talacogon	Urban	17,903		5,978	10,493	16,471										
	Rural	12,123		218	2,603	2,821										
	Total	30,026		6,196	13,096	19,292										
Trento	Urban	16,725		423	10,322	10,745										
	Rural	22,778	500		8,936	9,436										
	Total	39,503	500	423	19,258	20,181										
Veruela	Urban	6,257		1,251		1,251										
	Rural	34,802		4,041	1,761	5,802										
	Total	41,059		5,292	1,761	7,053										
Provincial Total	Urban	175,320	20,563	12,391	84,634	117,588										
	Rural	379,720	12,723	39,349	125,659	177,731										
	Total	555,040	33,286	51,740	210,293	295,319										

Table 8.2.2 Population Coverage In Phase I Provided by Served Population In the Base Year (Water Supply)

Name of Municipality	Area	Population Served by 1997 Facilities				1997		2003	
		Level III	Level II	Level I	Total	Total Population	Coverage (%)	Total Population	Coverage (%)
Bayugan	Urban			32,815	32,815	39,451	83	48,136	68
	Rural	340	6,290	26,968	33,598	57,080	59	69,647	48
	Total	340	6,290	59,783	66,413	96,531	69	117,783	56
Bunawan	Urban	1,296	3,103	2,990	7,389	10,706	69	12,875	57
	Rural		3,962	4,911	8,873	15,557	57	18,710	47
	Total	1,296	7,065	7,901	16,262	26,263	62	31,585	51
Esperanza	Urban	660		1,701	2,361	4,193	56	4,919	48
	Rural	420	2,390	15,988	18,798	40,342	47	47,330	40
	Total	1,080	2,390	17,689	21,159	44,535	48	52,249	40
La Paz	Urban			2,810	2,810	7,456	38	9,915	28
	Rural			2,171	2,171	18,046	12	24,001	9
	Total			4,981	4,981	25,502	20	33,916	15
Loreto	Urban		340	2,621	2,961	5,046	59	5,772	51
	Rural		1,801	7,335	9,136	20,123	45	23,020	40
	Total		2,141	9,956	12,097	25,169	48	28,792	42
Prosperidad (Capital)	Urban	3,276			3,276	21,840	15	26,550	12
	Rural	2,088	3,282	26,913	32,283	44,361	73	53,928	60
	Total	5,364	3,282	26,913	35,559	66,201	54	80,478	44
Rosario	Urban	3,029			3,029	3,031	100	3,466	87
	Rural	5,605	4,501	1,171	11,277	25,080	45	28,675	39
	Total	8,634	4,501	1,171	14,306	28,111	51	32,141	45
San Francisco	Urban	10,791	1,296	12,156	24,243	25,519	95	30,590	79
	Rural	3,480	2,249	10,530	16,259	28,665	57	34,362	47
	Total	14,271	3,545	22,686	40,502	54,184	75	64,952	62
San Luis	Urban			3,103	3,103	5,038	62	6,000	52
	Rural		1,321	7,071	8,392	18,257	46	21,744	39
	Total		1,321	10,174	11,495	23,295	49	27,744	41
Santa Josefa	Urban	888		1,861	2,749	4,261	65	6,590	42
	Rural			3,615	3,615	20,506	18	31,708	11
	Total	888		5,476	6,364	24,767	26	38,298	17
Sibagat	Urban	623		3,762	4,385	7,884	56	9,320	47
	Rural	290	9,294	5,686	15,270	22,000	69	26,006	59
	Total	913	9,294	9,448	19,655	29,884	66	35,326	56
Talakogon	Urban		5,978	10,493	16,471	17,903	92	22,904	72
	Rural		218	2,603	2,821	12,123	23	15,510	18
	Total		6,196	13,096	19,292	30,026	64	38,414	50
Trento	Urban		423	10,322	10,745	16,725	64	20,231	53
	Rural	500		8,936	9,436	22,778	41	27,554	34
	Total	500	423	19,258	20,181	39,503	51	47,785	42
Veruela	Urban		1,251		1,251	6,267	20	9,271	13
	Rural		4,041	1,761	5,802	34,802	17	51,479	11
	Total		5,292	1,761	7,053	41,069	17	60,750	12
Provincial Total	Urban	20,563	12,391	84,634	117,588	175,320	67	216,539	54
	Rural	12,723	39,349	125,659	177,731	379,720	47	473,674	38
	Total	33,286	51,740	210,293	295,319	555,040	53	690,213	43

Table 8.2.3 Number of Households Served by Sanitary Toilets in the Base Year (1997)

Name of Municipality	Area	Population (1997)	Number of Households (1997)	Households Using Sanitary Toilets in 1997				Recipients HHs of Planned/ On-going Projects				Households Using Sanitary Toilets in the Base Year (1997)				Coverage (%)					
				Flush Toilets	Pour Flush	VIP/Dry	Total	Flush	Pour Flush	VIP/Dry	Total	Flush	Pour Flush	VIP/Dry	Total	Flush	Pour Flush	VIP/Dry	Total		
																				Number	Number
Bayugan	Urban	39,451	7,388	5,360		53,074								875	5,360		6,235	12	73	84	
	Rural	57,080	10,570	6,492		74,142								375	6,867		7,242	5	68	73	
	Total	96,531	17,958	11,852		127,216								375	12,227		13,102	7	41	48	
Bunawan	Urban	10,706	2,120	869		13,845								150	869		1,019	7	102	102	
	Rural	15,557	2,986	2,291		20,834								150	3,910		4,060	3	77	80	
	Total	26,263	5,106	3,160		34,679								17	4,561		4,731	2	61	63	
Esperanza	Urban	4,193	747	456		5,413								600	4,159		4,159		58	58	
	Rural	40,342	7,230	3,559		51,131								600	17	4,615		4,632	17	43	58
	Total	44,535	7,977	4,015		56,544								187	4,877		4,724	17	47	47	
La Paz	Urban	7,458	1,126	487		9,226								300	1,435		1,435		46	46	
	Rural	18,046	3,074	1,135		22,255								300	1,922		2,109	4	46	50	
	Total	25,502	4,200	1,622		31,511								15	3,744		3,809	2	65	66	
Lorico	Urban	5,046	888	574		6,523								150	2,893		2,893		79	79	
	Rural	20,123	3,643	2,743		26,511								150	15	3,467		3,482	17	63	80
	Total	25,169	4,533	3,317		33,034								702	2,620		3,322	17	60	60	
Prosperidad	Urban	21,840	4,160	2,620		29,322								150	5,006		5,006		61	67	
	Rural	44,361	8,276	4,850		57,493								702	7,626		8,328	6	81	83	
	Total	66,201	12,436	7,476		86,815								16	4,883		5,043	3	88	88	
Rosario	Urban	3,031	605	488		4,140								250	4,037		4,037		87	88	
	Rural	25,080	4,577	3,787		33,444								250	16	4,525		4,541	35	42	78
	Total	28,111	5,122	4,275		37,584								1,708	2,946		3,754	35	50	50	
San Francisco	Urban	25,519	4,824	2,046		34,097								650	2,706		2,706		46	63	
	Rural	28,665	3,450	2,056		36,171								650	1,708		4,752	17	37	55	
	Total	54,184	10,274	4,102		70,268								150	325		475	17	41	41	
San Luis	Urban	5,038	867	325		6,380								700	1,700		1,700		40	44	
	Rural	18,257	3,375	675		22,407								700	1,850		1,850		62	67	
	Total	23,295	4,242	1,000		28,687								35	491		1,858		57	73	
Santa Josefa	Urban	4,261	789	491		5,576								150	1,838		1,838		47	47	
	Rural	20,506	3,898	1,688		26,092								150	3,329		2,364	1	50	50	
	Total	24,767	4,687	2,179		31,668								200	820		1,050	16	57	73	
Sibagat	Urban	7,884	1,439	820		10,373								200	2,925		2,925		73	73	
	Rural	22,000	4,022	2,725		28,747								200	3,745		3,975	4	69	69	
	Total	29,884	5,461	3,545		39,120								590	1,490		2,080	18	78	78	
Talaogoo	Urban	17,903	3,279	1,490		23,262								650	1,687		1,687		38	38	
	Rural	12,123	2,161	1,037		15,321								650	3,177		3,767	11	58	69	
	Total	30,026	5,440	2,527		38,583								234	2,511		2,545	7	74	74	
Trento	Urban	16,223	3,150	2,311		22,470								200	3,328		3,328		34	34	
	Rural	22,778	4,493	3,128		30,199								200	234		5,875	3	74	77	
	Total	39,003	7,643	5,439		52,819								46	570		6,161	4	51	55	
Vernela	Urban	6,267	1,127	570		8,010								450	3,301		3,301		52	52	
	Rural	34,802	6,362	2,811		44,015								450	461		3,917	1	52	52	
	Total	41,069	7,489	3,421		52,025								4,955	18,907		23,862	15	38	73	
Provincial Total	Urban	175,320	32,509	18,907		231,691								5,575	44,598		44,598		64	64	
	Rural	379,720	70,119	39,023		488,862								4,955	63,303		68,460	5	62	67	
	Total	555,040	102,628	57,930		720,553								5,575	107,801		112,912	5	62	67	

Table 8.2.4 Number of Public School Students Served by School Toilets in Base Year (1997)

Name of Municipality	1997 Total Number of Public School Students	Standard No. of Students that can be Served by 1997	No. of Students to be Served by Planned /On-going Projects	Standard No. of Students that can be Served by Toilets in Base Year (1997)	Coverage (%)
Bayugan	33,259	14,080	0	14,080	42
Bunawan	9,582	3,440	0	3,440	36
Esperanza	16,857	5,560	0	5,560	33
La Paz	6,274	2,240	0	2,240	36
Loreto	11,483	3,440	0	3,440	30
Prosperidad	24,762	5,280	0	5,280	21
Rosario	9,769	3,520	0	3,520	36
San Francisco	21,361	2,360	0	2,360	11
San Luis	7,570	1,760	0	1,760	23
Santa Josefa	8,504	2,320	0	2,320	27
Sibagat	11,659	2,240	0	2,240	19
Talacogon	11,444	3,600	0	3,600	31
Trento	15,140	8,240	0	8,240	54
Veruela	10,811	1,920	0	1,920	18
Provincial Total	198,475	60,000	0	60,000	30

Table 8.2.5 Number of Public Utilities with Sanitary Toilets in the Base Year (1997)

Name of Municipality	Type	No. of PU with Toilets in 1997	No. of PU with Sanitary Toilets in 1997	No. of PU with Toilets to be Served by Planned/Ongoing Project	No. of PU with Sanitary Toilets to be Served by Planned/Ongoing Projects	No. of PU with Toilets in Base Year 1997	No. of PU with Sanitary Toilets in Base Year 1997	Coverage (%)
Bayugan	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal	1	1			1	1	100
	Parks/Playground							
	Total	2	2			2	2	100
Bunawan	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal	1	1			1	1	100
	Parks/Playground							
	Total	2	2			2	2	100
Esperanza	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal	1	1			1	1	100
	Parks/Playground							
	Total	2	2			2	2	100
La Paz	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal	1	1			1	1	100
	Parks/Playground							
	Total	2	2			2	2	100
Loreto	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal	1	1			1	1	100
	Parks/Playground							
	Total	2	2			2	2	100
Prosperidad	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal	1	1			1	1	100
	Parks/Playground							
	Total	2	2			2	2	100
Rosario	Public Market	3	3			3	3	100
	Bus/Jeepney Terminal	1	1			1	1	100
	Parks/Playground	1	1			1	1	100
	Total	5	5			5	5	100
San Francisco	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal	2	2			2	2	100
	Parks/Playground							
	Total	3	3			3	3	100
San Luis	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal	1	1			1	1	100
	Parks/Playground							
	Total	2	2			2	2	100
Santa Josefa	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal	1	1			1	1	100
	Parks/Playground							
	Total	2	2			2	2	100
Sibagat	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal							
	Parks/Playground							
	Total	1	1			1	1	100
Talsocogon	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal	1	1			1	1	100
	Parks/Playground							
	Total	2	2			2	2	100
Trento	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal	1	1			1	1	100
	Parks/Playground	1	1			1	1	100
	Total	3	3			3	3	100
Venecia	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal	1	1			1	1	100
	Parks/Playground							
	Total	2	2			2	2	100
Provincial Total	Public Market	16	16			16	16	100
	Bus/Jeepney Terminal	14	14			14	14	100
	Parks/Playground	2	2			2	2	100
	Total	32	32			32	32	100

Table 8.2.6 Households Coverage in Phase I Provided by Existing Facilities in the Base Year (Household Toilets)

Name of Municipality	Area	No. of Household Served by Existing Facilities					Coverage in 1997					Coverage in 2003					
		Flush		VIP/Dry		Total	No. of HHs	Percentage of Served Households		Served Population		No. of HHs	Percentage of Served Households		Served Population		
		Flush	Pour	Flush	Dry			Flush	%	Number	%		Flush	%	Number	%	
Bayugan	Urban	875	5,360			6,235	7,308	12	73	84	9,014	10	59	69	40,275	69	
	Rural		6,867			6,867	10,570	65	65	25,043	65	53	53	44,761	53		
	Total	875	12,227			13,102	17,878	5	68	73	58,782	73	60	85,036	60		
Dunawan	Urban	150	869			1,019	2,120	7	41	48	5,139	48	54	40	6,156	40	
	Rural		3,041			3,041	2,906	102	102	10,920	102	85	85	19,009	85		
	Total	150	3,910			4,060	5,106	3	77	80	16,059	80	64	25,165	64		
Esperanza	Urban	17	456			473	747	2	61	63	2,642	63	877	2	52	3,097	54
	Rural		4,159			4,159	7,230	58	58	2,432	58	8,482	49	49	27,046	49	
	Total	17	4,615			4,632	7,977	58	58	5,074	58	9,359	49	49	30,143	49	
La Paz	Urban	187	487			674	1,126	17	43	60	4,674	60	45	45	5,896	45	
	Rural		1,435			1,435	3,074	47	47	3,504	47	4,089	35	35	11,100	35	
	Total	187	1,922			2,109	4,200	4	46	50	7,978	50	38	38	16,996	38	
Loreto	Urban	15	574			589	888	2	65	66	3,300	66	58	58	3,808	58	
	Rural		2,893			2,893	3,645	79	79	3,986	79	4,170	69	69	18,004	69	
	Total	15	3,467			3,482	4,533	76	77	7,316	77	5,186	67	67	21,872	67	
Prosperidad (Capital)	Urban	702	2,620			3,322	4,160	17	63	80	17,472	80	52	52	21,170	66	
	Rural		5,006			5,006	8,276	60	60	13,104	60	10,061	50	50	32,577	50	
	Total	702	7,626			8,328	12,436	6	61	67	30,576	61	55	55	53,747	55	
Rosario	Urban	16	488			504	605	3	81	83	2,516	83	71	71	2,876	73	
	Rural		4,037			4,037	4,577	88	88	2,667	88	5,253	77	77	25,095	77	
	Total	16	4,525			4,541	5,182	87	87	5,183	88	7,925	76	76	27,971	77	
San Francisco	Urban	1,708	2,046			3,754	4,824	35	42	78	19,905	78	65	65	23,689	65	
	Rural		2,706			2,706	5,650	50	50	12,760	50	6,553	41	41	16,785	41	
	Total	1,708	4,752			6,460	10,474	17	46	63	32,665	63	52	52	40,474	52	
San Luis	Urban	150	325			475	867	17	37	55	2,771	55	31	31	3,267	46	
	Rural		1,375			1,375	3,375	41	41	2,066	41	4,019	34	34	8,752	34	
	Total	150	1,700			1,850	4,242	4	40	44	4,837	44	37	37	12,019	37	
Santa Josefa	Urban	35	491			526	789	4	62	67	2,855	67	40	40	4,353	43	
	Rural		1,833			1,833	3,898	47	47	2,003	47	6,028	30	30	14,615	30	
	Total	35	2,329			2,364	4,687	1	50	50	4,858	50	32	32	18,968	33	
Shabtag	Urban	230	820			1,050	1,439	16	57	73	5,755	73	61	61	6,789	62	
	Rural		2,925			2,925	4,022	73	73	5,755	73	4,754	62	62	18,944	62	
	Total	230	3,745			3,975	5,461	4	69	73	11,510	73	64	64	25,733	62	
Talaogon	Urban	590	1,687			2,080	3,279	18	45	63	11,279	63	36	36	14,558	50	
	Rural		1,687			1,687	2,161	78	78	13,964	78	2,765	61	61	12,027	61	
	Total	590	3,177			3,767	5,440	11	58	69	25,243	69	46	46	26,585	54	
Trento	Urban	234	3,328			3,562	5,150	7	73	81	13,547	81	61	61	16,296	67	
	Rural		5,639			5,639	7,643	3	74	74	12,377	74	64	64	20,207	64	
	Total	234	8,967			9,201	12,793	3	74	77	25,924	77	64	64	36,503	64	
Venuela	Urban	46	370			416	1,127	4	51	55	3,447	55	34	34	5,041	37	
	Rural		3,301			3,301	6,362	52	52	3,259	52	9,411	35	35	26,479	35	
	Total	46	3,671			3,917	7,489	1	52	52	6,706	52	35	35	31,520	35	
Provincial Total	Urban	4,955	18,907			23,862	35,609	15	58	73	128,271	73	47	47	157,271	59	
	Rural		44,598			44,598	70,119	64	64	114,440	64	87,469	51	51	295,461	51	
	Total	4,955	63,505			68,460	105,728	5	62	67	242,711	67	54	54	452,732	54	

Table 8.2.7 Public School Students and Public Utilities Coverage in Phase I by Existing Facilities in the Base Year

Name of Municipality	Public School Toilets						Public Toilets					
	Std. No. of Students that can be Served by Base Year	Coverage in 1997		Coverage in 2003		No. of PU with Toilets in Base Year	No. of PU with Sanitary Toilets in Base Year	%	No. of PU with Toilets	No. of PU with Sanitary Toilets in Base Year	%	
		Total No. of Public School Students	%	Total No. of Public School Students	%							
Bayugan	14,080	33,259	42	40,674	35	2	2	100	4	2	50	
Bunawan	3,440	9,582	36	11,518	30	2	2	100	2	2	100	
Esperanza	5,560	16,857	33	19,806	28	2	2	100	3	2	67	
La Paz	2,240	6,274	36	8,291	27	2	2	100	3	2	67	
Loreto	3,440	11,483	30	13,104	26	2	2	100	4	2	50	
Prosperidad	5,280	24,762	21	30,135	18	2	2	100	4	2	50	
Rosario	3,520	9,769	36	11,158	32	5	5	100	7	5	71	
San Francisco	2,360	21,361	11	25,535	9	3	3	100	6	3	50	
San Luis	1,760	7,570	23	8,974	20	2	2	100	3	2	67	
Santa Josefa	2,320	8,504	27	13,139	18	2	2	100	2	2	100	
Sibagat	2,240	11,659	19	13,825	16	1	1	100	2	1	50	
Talacogon	3,600	11,444	31	14,573	25	2	2	100	10	2	20	
Trento	8,240	15,140	54	18,301	45	3	3	100	6	3	50	
Veruela	1,920	10,811	18	15,967	12	2	2	100	5	2	40	
Provincial Total	60,000	198,475	30	245,000	24	32	32	100	61	32	52	

8.3 Projection of Frame Values

8.3.1 Review of Past Population Development and Population Projection

(1) Review of past population development

1) Characteristics of past population development

Major statistical data of past population development are shown in Table 8.3.1, in which urban and rural population was adjusted by PPDO to reflect present conditions.

Table 8.3.1 Past Population Development

Area	Description	Total			Urban			Rural		
		1980	1990	1995	1980	1990	1995	1980	1990	1995
Region X	Population	2,758,985	3,509,753	3,938,252	748,903	1,514,157	1,517,068	2,010,082	1,995,596	2,421,184
	Growth Rate	2.44%		2.33%	7.29%		0.04%	-0.07%		3.94%
Agusan del Sur	Population	265,030	420,763	514,736	51,363	102,956	118,742	228,454	317,807	395,994
	Growth Rate	4.73%		4.11%	7.20%		2.89%	3.36%		4.50%
	Percentage ^{1/}	9.6%	12.0%	13.1%	6.9%	6.8%	7.8%	11.4%	15.9%	16.4%

Note: 1/ Provincial population percentage to regional population
Average annual growth rate: simple formula $P = P_0(1+r)^n$ is employed

During the period between census years from 1980 to 1990 and from 1990 to 1995, the following population development was observed:

- The province recorded a 4.73% average annual growth rate (1980-1990) and 4.11% (1990-1995), both of which were higher than those of the region at 2.44% and 2.33%, respectively.
- Percentage of provincial population to the regional population increased from 9.6% in 1980 to 13.1% in 1995 caused by a considerable increase of urban population, while rural population is stable with a higher growth level.

The region is classified as an out-migration area in the country. However, Agusan del Sur is the only province with a positive increase rate in Caraga Region and exhibited a higher annual growth rate of the provincial population than that of the region. This revealed that migrants originated from neighboring provinces.

2) 1995 population distribution in urban and rural areas

The 1995 population census results compiled by NSO were reviewed in terms of population distribution to urban and rural areas. Applying the revised classification of barangays in urban and rural category to reflect present conditions, the population by municipality was adjusted as shown in Table 8.3.2.

Table 8.3.2 Population Distribution in Urban and Rural Areas (1995 Census)

Municipality	Total Population	1995 Census		Adjusted Population	
		Urban	Rural	Urban	Rural
Bayugan	89,999	27,826	62,173	36,781	53,218
Bunawan	24,615	8,266	16,349	10,034	14,581
Esperanza	42,118	3,965	38,153	3,965	38,153
La Paz	23,044	4,004	19,040	6,737	16,307
Loreto	24,022	4,816	19,206	4,816	19,206
Prosperidad (Capital)	61,804	10,598	51,206	20,389	41,415
Rosario	26,836	2,894	23,942	2,894	23,942
San Francisco	50,844	15,764	35,080	23,946	26,898
San Luis	21,910	4,738	17,172	4,738	17,172
Santa Josefa	21,190	3,646	17,544	3,646	17,544
Sibagat	28,185	4,195	23,990	7,436	20,749
Talacogon	27,517	8,444	19,073	16,407	11,110
Trento	36,946	14,137	22,809	15,642	21,304
Veruela	35,706	5,449	30,257	5,449	30,257
Provincial Total	514,736	118,742	395,994	162,880	351,856

(2) Manner of population projection

The latest population study, the National and Regional Population Projections was issued by NSO based on the 1995 census results including the growth rates and demographic conditions of the respective regions. However, at this time of PW4SP preparation, the provincial/municipal population has not yet been published. It appears that there is already a long delay since the conduct of the 1995 Population Census. Meanwhile, the NSO's possible method to be applied for provincial and municipal population projection was confirmed.

As a local-based projection, the Regional Development Council of Caraga is currently preparing the Regional Development Master Plan (1998-2008), however, the population projection has not yet been concluded. In this respect, the possible method of NSO was adopted for this PW4SP. The regional population projected by the NSO was employed for this planning. The following are the manner of projection with conditions/assumptions employed for provincial and municipal population in the future.

- 1) Population projections for the provinces are first generated based on population projections for Region X taken from a published volume on regional population projection for the years 1995 to 2020. The regional population is projected based on the 1995 Census of Population.

- 2) The ratio method is used for the projection of both provincial and municipal population.
- For the provincial level projections, ratios (R) of the population of the concerned provinces to the population of the region are projected. These ratios are multiplied to the projected population of the region for each projection year.
 - Similarly, for the municipal population projections, ratios of the population of the municipalities in each concerned province to the population of the province are projected. These ratios are multiplied to the projected population of the province for each projection year.
 - The basic assumption adopted is that for each concerned province, and for each of the municipality in the province, the rate (r) at which the ratios change will gradually decline so that they will all become zero after 50 years from 1995. This implies that stability of the ratios will be attained after 50 years from 1995.
 - Based on this assumption, a schedule of ratios of the provinces in the same region, and of the municipalities in the same province is derived for each projection year using the formula:

$$R(k) = R(0) \prod_{i=1}^k (1 + r - kr / 50)$$

where; R(k) = ratio in kth year from 1995 of the population of the province to that of the region or of the population of the municipality to that of the province

R(0) = ratio in 1995 of the population of the province to that of the region or of the population of the municipality to that of the province

r = initial rate of change of the ratio

k = "k"th year from 1995

- The initial rate of change is derived based on the levels and trends of the ratios observed in the 1970, 1980 and 1995 censuses.
- A geometric formula for calculating the rate at which the ratio changes is adopted, that is, r is equal to $(\ln(P_2/P_1))/n$, where P_2 is the ratio in Year₂, P_1 , in Year₁, and n is the number of years between Year₁ and Year₂. Thus, for instance, for the intercensal period 1970-1980, the rate of change in the ratio is equal to $\ln(P_{1980}/P_{1970})$.

3) In the present application (r), the concerned provinces and municipalities are classified into the following four types based on trends of their ratios as observed in the censuses of 1970, 1980, 1990 and 1995:

- Type I – provinces/municipalities that showed unidirectional trend in their ratios, that is, consistently increasing or decreasing from 1970 to 1995 (r is positive or negative for intercensal periods 1970-1980, 1980-1990 and 1990-1995);
- Type II – provinces/municipalities that showed unidirectional trend in their ratios only from 1980 to 1995 (r is positive or negative for the last two intercensal periods only, that is, 1980-1990 and 1990-1995);
- Type III – provinces/municipalities that showed unidirectional trend in their ratios only from 1970 to 1990 (r is positive or negative for the first two intercensal periods only, that is 1970-1980 and 1980-1990);
- Type IV – provinces/municipalities with erratic trends.

In general, the initial rate to be used for each type of province or municipality is determined according to the following criteria.

- For Type I province or municipality, the initial rate is equal to the lowest observed annual rate of change in the ratio or lower to the average annual rates observed during the 1980-1990 and 1990-1995 periods, whichever produces a more demographically probable result;
- For a Type II province or municipality, the initial rate is equal to the lower average annual rates observed during 1980-1990 and 1990-1995 periods;
- For a Type III province or municipality, the initial rate is equal to one-half of the average annual rate during the period 1990-1995; and
- For Type IV province or municipality, the initial rate is equal to one-half of the average annual rate during the period 1990-1995, or it is equal to zero if the ratio in 1995 is equal to or higher than 0.20. An initial rate of zero means that the ratio observed in 1995 would remain the same throughout the projection period.

The province of Agusan del Sur is classified as "Type I" based on past level and trend of ratios of change. The initial rate of change was estimated at 0.0154, while those of the municipalities were established as shown below.

<u>Name of Municipality</u>	<u>Initial Ratio</u>	<u>Name of Municipality</u>	<u>Initial Ratio</u>
Bayugan	-0.00149	San Francisco	-0.00312
Bunawan	-0.00282	San Luis	-0.00373
Esperanza	-0.00514	Santa Josefa	0.01869
La Paz	0.00619	Sibagat	-0.00443
Loreto	-0.00756	Talacogon	-0.00279
Prosperidad	-0.00183	Trento	-0.00228
Rosario	-0.00761	Veruela	0.01512

(3) Present population (1997)

The present population of the province including its municipalities was estimated in application of the initial rates of change as mentioned above. This means that the trend of past population development is assumed to be prevailing up to the present. Household size in 1997 was also assumed to be the same as that in 1995.

(4) Projection of provincial population by target year

Review of provincial population projected by target year applying the aforementioned method, as shown in Table 8.3.3, revealed that the future provincial population also reflected the discounted growth rate, which is same as the regional population projection.

- Population in 2003 was derived using average annual growth rates of 3.86 % (1995-1998) and 3.66 % (1998-2003).
- Population in 2010 with 2003 as base year was derived using an average annual growth rate of 3.17% (2003-2010).
- The present profile of municipal population distribution both in urban and rural areas is assumed to prevail throughout the future.
- Household size in the year 2003 is assumed to be the same as the 1995 population census results, while in the year 2010, 4 persons/household is assumed for the whole province in accordance with the target set in the national family planning program.

Table 8.3.3 Growth Rates and Population Projection for Target Years: Region and Province

Area	Growth Rate (%)					Population and Provincial Share in the Region			
	1980-1990	1990-1995	1995-1998	1998-2003	2003-2010	Target Year			
						1995	1997	2003	2010
						NSO Census	Planning Base Year	Medium Term	Long Term
Region X	2.44	2.33 (4.50)	2.49 6.9	2.30 (7.6)	2.02 (12.2)	3,938,252	4,139,703	4,749,853	5,465,272
Agusan del Sur	4.73	4.11	3.86	3.66	3.17	514,736 13.1%	555,040 13.4%	690,214 14.5%	858,958 15.7%

Note: () shows percentage of growth rate decline from the previous period.

Table 8.3.4 shows the provincial population by urban and rural area for the target years, and the years 1995 and 1997. The profile of urban and rural population in 1995 is adopted for the projection of the same composition in the base year and target years.

Table 8.3.5 presents the projected number of households for the target years.

Table 8.3.4 Provincial Population for the Base Year and Target Years

Area	Population/ Composition	1995	1997	2003	2010
Total	Population	514,736	555,040	690,214	858,958
Urban Area	Population	162,880	175,320	216,539	266,862
	Composition (%)	32			
Rural Area	Population	351,856	379,720	473,674	592,096
	Composition (%)	68			

Table 8.3.5 Projected Number of Households by Urban and Rural Area by Municipality by Target Year

Name of Municipality	Number of Households														
	Household Size				1995			1997			2003			2010	
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Bayugan	5.34	5.40	5.38	6,885	9,847	16,732	7,388	10,570	17,958	9,014	12,898	21,912	14,593	21,114	35,707
Bunawan	5.05	5.21	5.14	1,988	2,799	4,787	2,120	2,986	5,106	2,550	3,591	6,141	3,848	5,591	9,439
Esperanza	5.61	5.58	5.59	707	6,834	7,541	747	7,230	7,977	877	8,482	9,359	1,434	13,799	15,233
La Paz	6.62	5.87	6.07	1,017	2,780	3,797	1,126	3,074	4,200	1,498	4,089	5,587	3,276	7,929	11,205
Loreto	5.68	5.52	5.55	848	3,481	4,329	888	3,645	4,533	1,016	4,170	5,186	1,641	6,545	8,186
Prosperidad	5.25	5.36	5.32	3,887	7,733	11,620	4,160	8,276	12,436	5,057	10,061	15,118	8,019	16,289	24,308
Rosario	5.01	5.48	5.42	578	4,371	4,949	605	4,577	5,182	692	5,233	5,925	985	8,148	9,133
San Francisco	5.29	5.26	5.28	4,526	5,111	9,637	4,824	5,450	10,274	5,783	6,533	12,316	9,111	10,235	19,346
San Luis	5.81	5.41	5.49	815	3,174	3,989	867	3,375	4,242	1,033	4,019	5,052	1,776	6,435	8,211
Santa Josefa	5.40	5.26	5.29	675	3,333	4,008	789	3,898	4,687	1,220	6,028	7,248	2,531	12,179	14,710
Sibagat	5.48	5.47	5.47	1,358	3,795	5,153	1,439	4,022	5,461	1,701	4,754	6,455	2,738	7,639	10,377
Talacogon	5.46	5.61	5.52	3,004	1,982	4,986	3,279	2,161	5,440	4,195	2,765	6,960	7,279	4,929	12,208
Trento	5.31	5.07	5.17	2,946	4,198	7,144	3,150	4,493	7,643	3,810	5,435	9,245	6,081	8,282	14,563
Veruela	5.56	5.47	5.48	980	5,536	6,516	1,127	6,362	7,489	1,667	9,411	11,078	3,406	18,914	22,320
Provincial Total	5.39	5.42	5.41	30,214	64,974	95,188	32,509	70,119	102,628	40,113	87,469	127,582	66,718	148,028	214,746

8.3.2 School Enrollment Projection

Table 8.3.6 Projected School Enrollment by Municipality by Target Year

Name of Municipality	1997			2003			2010								
	School Age Population	Total Enrollment		School Age Population	Total Enrollment		School Age Population	Total Enrollment							
		Participation Rate	Number		Participation Rate	Number		Participation Rate	Number						
Bavugan	30,031	37,037	123	33,259	111	36,643	39,208	107	40,674	111	44,434	44,434	100	41,768	94
Bunawan	7,850	9,582	122	9,582	122	9,441	10,007	106	11,518	122	11,285	11,172	99	11,849	105
Esperanza	14,307	16,857	118	16,857	118	16,785	17,121	102	19,806	118	19,574	18,595	95	19,770	101
La Paz	8,203	6,557	80	6,274	76	10,909	6,982	64	8,291	76	14,415	8,217	57	8,505	59
Loreto	7,900	11,483	145	11,483	145	9,037	11,658	129	13,104	145	10,277	12,538	122	13,155	128
Prosperidad (Capital)	20,319	25,771	127	24,762	122	24,701	27,418	111	30,135	122	29,843	31,037	104	31,335	105
Rosario	8,561	10,241	120	9,769	114	9,788	10,180	104	11,158	114	11,125	10,791	97	10,791	97
San Francisco	16,016	23,159	145	21,361	133	19,199	24,767	129	25,535	133	22,873	27,905	122	26,533	116
San Luis	7,245	7,570	104	7,570	104	8,629	7,594	88	8,974	104	10,215	8,274	81	8,887	87
Santa Josefa	7,325	8,504	116	8,504	116	11,327	11,327	100	13,139	116	17,402	16,184	93	17,228	99
Sibagat	9,066	11,976	132	11,659	129	10,717	12,432	116	13,825	129	12,592	13,725	109	14,103	112
Talacogon	12,118	11,908	98	11,444	94	15,503	12,712	82	14,573	94	19,707	14,780	75	15,174	77
Trento	11,728	15,858	135	15,140	129	14,187	16,883	119	18,301	129	17,056	19,103	112	19,103	112
Veruela	10,379	10,906	105	10,811	104	15,353	13,664	89	15,967	104	22,563	18,502	82	19,630	87
Provincial Total	171,048	207,409	121	198,475	116	212,219	221,953	105	245,000	110	263,361	255,257	97	257,831	98

8.3.3 Projection of the Number of Public Utilities

Table 8.3.7 Projected Number of Public Utilities by Municipality by Target Year

Name of Municipality	Type	1997	2003		2010	
		No. of Public Utilities	Proposed Construction	Total	Proposed Construction	Total
Bayugan	Public Market	1		1		1
	Bus/Jeepney Terminal	1		1		1
	Parks/Playground		2	2		2
	Total	2	2	4		4
Bunawan	Public Market	1		1		1
	Bus/Jeepney Terminal	1		1		1
	Parks/Playground					
	Total	2		2		2
Esperanza	Public Market	1		1		1
	Bus/Jeepney Terminal	1	1	2		2
	Parks/Playground					
	Total	2	1	3		3
La Paz	Public Market	1		1		1
	Bus/Jeepney Terminal	1	1	2		2
	Parks/Playground					
	Total	2	1	3		3
Loreto	Public Market	1		1		1
	Bus/Jeepney Terminal	1	1	2		2
	Parks/Playground		1	1		1
	Total	2	2	4		4
Prosperidad	Public Market	1	1	2	1	3
	Bus/Jeepney Terminal	1	1	2		2
	Parks/Playground				2	2
	Total	2	2	4	3	7
Rosario	Public Market	3		3		3
	Bus/Jeepney Terminal	1	1	2		2
	Parks/Playground	1	1	2		2
	Total	5	2	7		7
San Francisco	Public Market	1	2	3		3
	Bus/Jeepney Terminal	2		2		2
	Parks/Playground		1	1	1	2
	Total	3	3	6	1	7
San Luis	Public Market	1	1	2		2
	Bus/Jeepney Terminal	1		1	1	2
	Parks/Playground					
	Total	2	1	3	1	4
Santa Josefa	Public Market	1		1		1
	Bus/Jeepney Terminal	1		1		1
	Parks/Playground					
	Total	2		2		2
Sibagat	Public Market	1		1		1
	Bus/Jeepney Terminal					
	Parks/Playground		1	1		1
	Total	1	1	2		2
Talacogon	Public Market	1	3	4	1	5
	Bus/Jeepney Terminal	1	1	2	1	3
	Parks/Playground		4	4	1	5
	Total	2	8	10	3	13
Trento	Public Market	1	2	3	1	4
	Bus/Jeepney Terminal	1		1	1	2
	Parks/Playground	1	1	2		2
	Total	3	3	6	2	8
Veruela	Public Market	1	1	2		2
	Bus/Jeepney Terminal	1	1	2		2
	Parks/Playground		1	1		1
	Total	2	3	5		5
Provincial Total	Public Market	16	10	26	3	29
	Bus/Jeepney Terminal	14	7	21	3	24
	Parks/Playground	2	12	14	4	18
	Total	32	29	61	10	71

8.4 Types of Facilities and Implementation Criteria

8.4.1 Water Supply

(1) Urban water supply

1) Untapped spring

First priority is given to seek for utilization of untapped spring with large discharge capacity. During the course of PW4SP preparation, various untapped spring sources have been identified. Considerably large scale untapped spring sources having discharge capacity of more than 100 cu.m/day are then selected as potential water sources and rapidly evaluated as shown in Table 8.4.1.

Table 8.4.1 Rapid Evaluation of Untapped Spring for Use in Urban Water Supply

Name of Municipality	Location (Name of Barangay)	Untapped Spring				Population can be Served by Untapped Spring	Population Served by Existing Water Supply System/Facility in Base Year		Future Urban Population	
		Discharge Capacity (cu.m/day)		Elev. Diffr. (m)	Dist. from Mun. (km)		Level III	Total	2003	2010
		100%	70%							
Esperanza	Hawi Liau	280	200	3	1.5	2,000	660	2,361	4,919	5,736
Rosario	Bayugan	2,730	1,910	Unknown	3.2	19,100	3,029	3,029	3,466	3,940
San Francisco	Lucac	260	180	3.5	0.6	1,800	10,791	24,243	30,590	36,445
Veruela	Sta. Emilia	660	460	150	1.8	4,600	0	1,251	9,271	13,624

Esperanza

The untapped spring source has a potential discharge capacity to serve for about 2,000 persons and can contribute to augment its present service coverage. About half of the potential water demand in Phase I may be secured by this source. Technical constraint may occur from its marginal difference of elevation from the poblacion at only about 3 meters.

Rosario

As shown in the table, the municipality of Rosario has one large scale untapped spring with a reported discharge capacity of about 2,730 cu.m/day. A 70% discounted discharge capacity is taken into account in consideration of safe and dependable yield throughout the year which is about 1,910 cu.m/day or about 19,100 persons may be served by this source.

Although the elevation of this spring source from the urban area of Rosario is not known at present, the potential discharge of this spring source can cater for not only the urban area, but also the surrounding rural barangays. The municipality has less possibility to share this spring source with other municipalities owing to its geographical conditions.

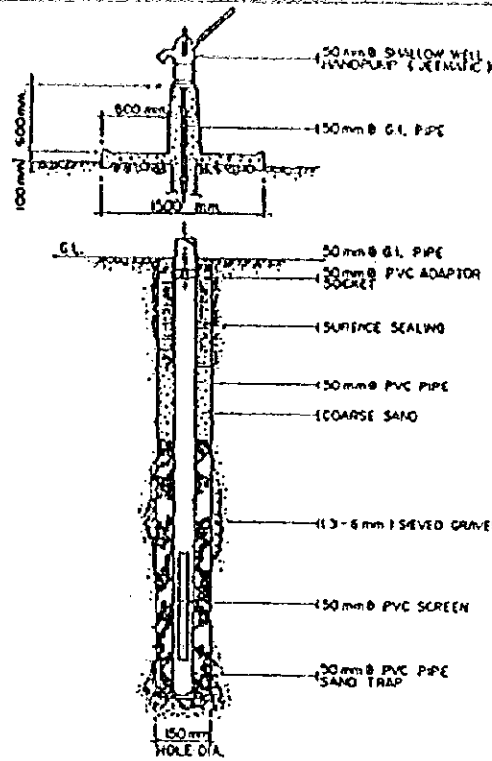
San Francisco

The untapped spring identified at barangay Lucac has supply capacity of only 180 cu.m/day or about 1,800 persons of additional service population, while the existing urban water supply system has a present service coverage of about 10,800 persons. It will further increase to about 30,600 persons in Phase I. Considering the magnitude of demand in water supply, this spring source is too small for urban water supply and therefore may be utilized for barangay level water supply, i.e. for Level II rural water supply system.

Veruela

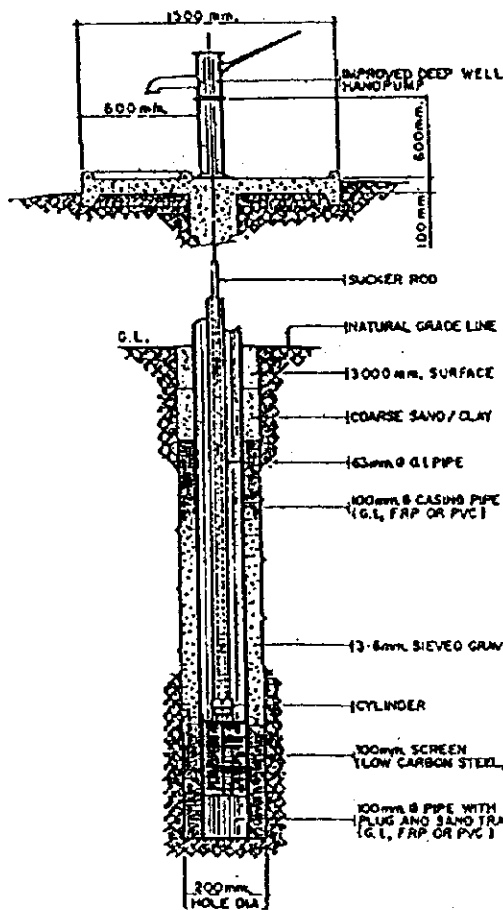
Barangay Sta. Emilia has an untapped spring with a discounted discharge capacity of about 460 cu.m/day or serviceable for about 4,600 persons. It seems to have favorable elevation and distance from the urban area of the municipality. Since the municipality has no urban water supply system, this particular spring can initiate the commencement of Level III service for about half of the planned population to be served in Phase I (about 9,300 persons).

As evaluated, the municipalities of Rosario and Veruela have considerably favorable untapped spring sources for Level III system. It shall be noted, however, that confirmation of difference of elevation between untapped spring and potential service area, as well as distance and topographic conditions is prerequisite to realize this option. Discharge measurement of each spring throughout the year is also indispensable to obtain dependable/reliable discharge of the springs.

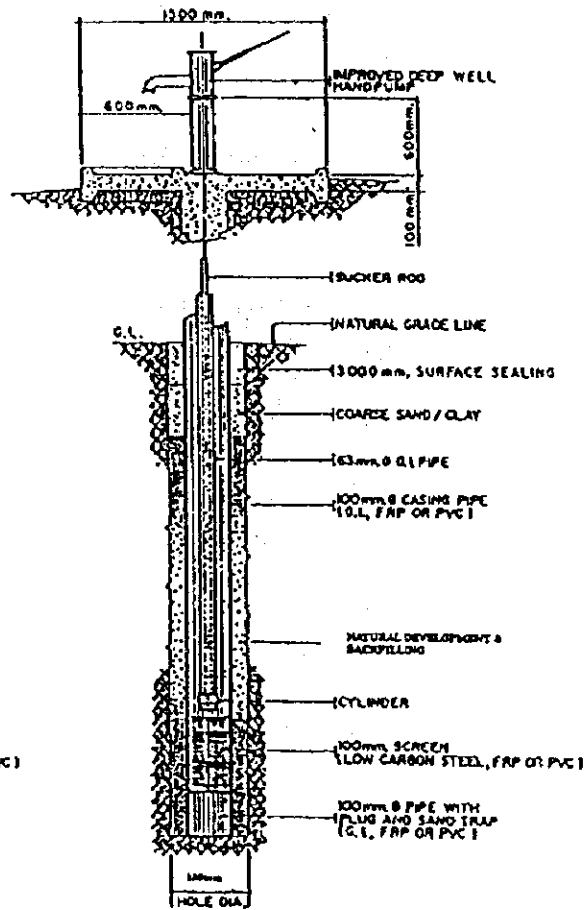


OPEN HOLE DRILLING & GRAVEL PACK METHOD

SHALLOW WELLS



OPEN HOLE DRILLING & GRAVEL PACK METHOD



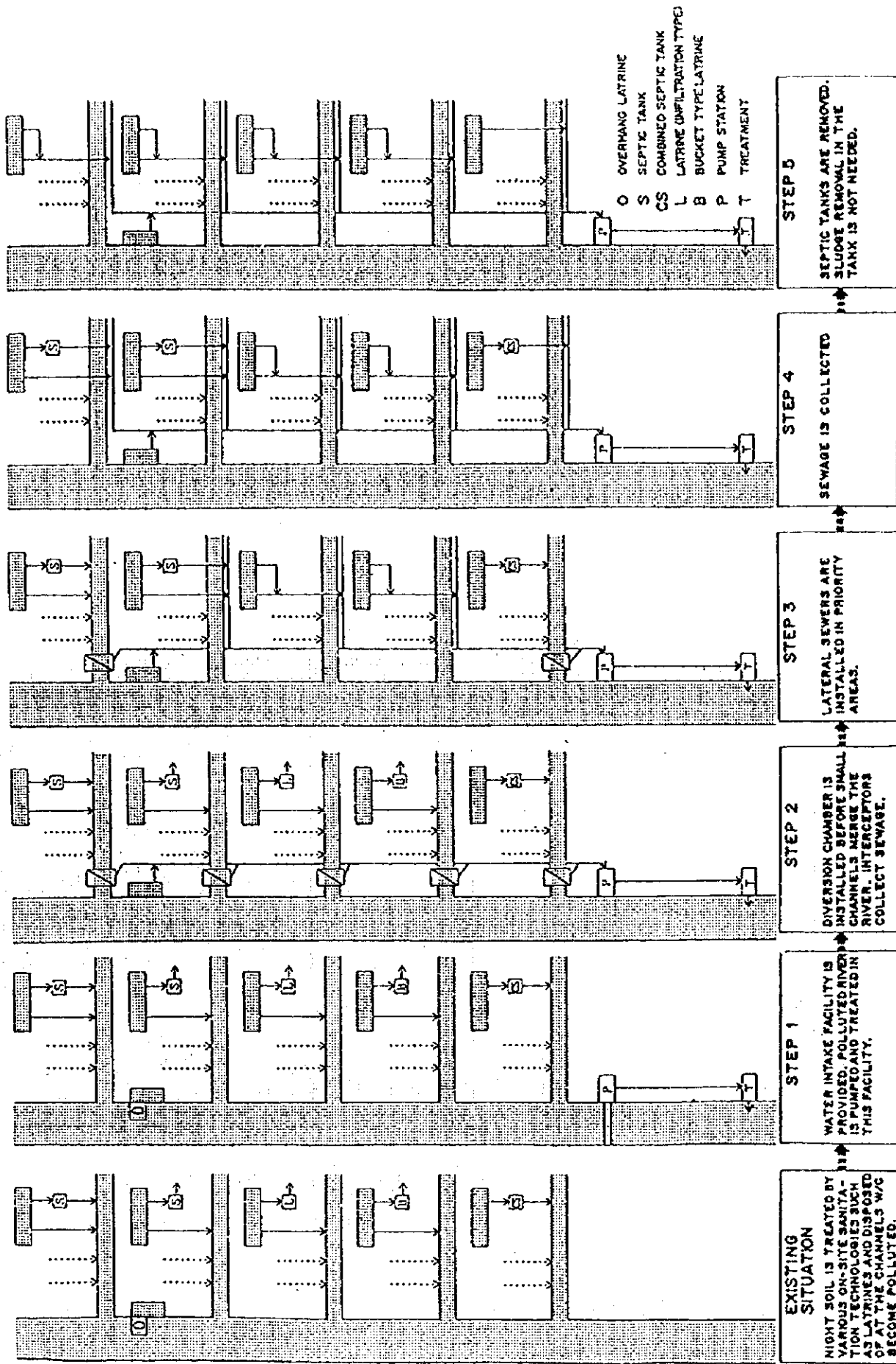
OPEN HOLE DRILLING & NATURAL GRAVEL PACK METHOD

DEEP WELLS

FIGURE 8.4.1

TYPICAL STRUCTURE OF LEVEL I WELL FACILITY

FIGURE 8.4.2 STAGED IMPROVEMENT IN SEWAGE COLLECTION METHOD



8.5 Service Coverage by Target Year

8.5.1 Water Supply

(1) Population to be served by Level II system in Phase I

Sixty-five (65) untapped spring sources were confirmed to be suitable for Level II systems in rural water supply by the time of PW4SP preparation as shown in Table 8.5.1.

Conditions and assumptions applied for this estimate are as follows:

Source capacity:

The average source capacity of untapped spring was assumed to meet the need of 100 households based on the review of existing Level II systems with spring sources.

Number of system:

Sixty-five (65) untapped springs were considered to serve sixty-five (65) Level II systems in sixty-four (64) rural barangays of 11 municipalities.

Table 8.5.1 Population to be Served by Level II System in Phase I

Name of Municipality	Number of Untapped Spring	Number of Barangay to be Served	Number of Households to be Served	Population to be Served
Bayugan	9	9	313	1,685
Bunawan				
Esperanza	12	12	1,193	6,653
La Paz				
Loreto				
Prosperidad	1	1	56	296
Rosario	1	1	4,152	22,752
San Francisco	2	2	441	2,319
San Luis	8	8	299	1,613
Santa Josefa				
Sibagat	24	23	788	4,306
Talacogon	3	3	139	778
Trento	2	2	89	447
Veruela	3	3	3,479	19,030
Provincial Total	65	64	10,949	59,879

(2) Population to be served by target year

Phase I

For urban area, the additional service coverage was estimated to be served by Level III service. For rural area, the population to be served by Level II systems with untapped springs was first calculated and the rest of additional service coverage was estimated to be served by Level I facilities.

Phase II

For urban area, the population served by Level I and II facilities in base year was considered to be absorbed by Level III service aside from the additional service coverage to be estimated by the sector target. For rural area, all existing facilities in Phase I was assumed to be utilized through the future.

The population to be served by target year is exhibited in Table 8.5.2 and Table 8.5.3.

Table 8.5.2 Population to be Served in Phase I (Water Supply)

Name of Municipality	Area	Population Served in the Base Year					Phase I Coverage (2003)											
		Level III			Level I		Total		Service Coverage			Additional Population to be Served			Total			
		Level III	Level II	Level I	Level I	Total	Level III	Level II	Level I	Level II	Level III	Level II	Level I	Level II	Level III	Level II	Level I	Total
Bayugan	Urban			32,815		32,815	5,694	32,815	38,509	5,694								
	Rural	340	6,290	26,968		33,598	340	6,290	35,158	41,788	1,685							
	Total	340	6,290	59,783		66,413	6,034	6,290	67,973	80,297	5,694	1,685						8,190
Bunawan	Urban	1,296	3,103	2,990		7,389	4,207	3,103	2,990	10,300	2,911							
	Rural		3,962	4,911		8,873	18,710	3,962	7,264	11,226								
	Total	1,296	7,065	7,901		16,262	31,585	4,207	7,065	10,254	2,911							2,353
Esperanza	Urban	660	1,701	2,361		4,722	2,234	1,701	2,361	5,935	1,574							
	Rural	420	2,390	15,988		18,798	47,330	420	2,390	25,588	28,398	6,653						
	Total	1,080	2,390	17,689		21,159	52,249	2,654	2,390	27,289	32,333	1,574						9,600
La Paz	Urban			2,810		2,810	9,915	5,122	2,810	7,932	5,122							
	Rural			2,171		2,171	24,001	5,122	14,401	14,401								
	Total			4,981		4,981	33,916	10,244	17,211	22,333	5,122							12,230
Loreto	Urban		340	2,621		2,961	5,772	1,657	340	2,621	4,618	1,657						
	Rural		1,801	7,335		9,136	23,020	1,801	12,011	13,812								
	Total		2,141	9,956		12,097	28,792	3,458	14,632	18,430	1,657							4,676
Prosperidad	Urban	3,276				3,276	26,550	21,240										
	Rural	2,088		26,913		28,991	53,928	2,088	3,282	26,987	29,6							
	Total	5,364		26,913		35,559	80,478	23,328	3,282	26,987	53,997	17,964						18,260
Rosario	Urban	3,029				3,029	3,466	3,029										
	Rural	5,605		1,171		6,776	28,675	5,605	4,501	7,099	17,205	22,752						
	Total	8,634		1,171		9,805	34,141	8,634	4,501	7,099	20,234	22,752						22,752
San Francisco	Urban	10,791		12,156		22,947	30,590	11,020	1,296	12,156	24,472	229						
	Rural	3,480		10,530		14,010	34,362	3,480	2,249	14,888	20,617	2,319						
	Total	14,271		22,686		36,957	64,952	14,500	3,545	27,044	45,089	2,229						4,587
San Luis	Urban			3,103		3,103	6,000	1,697										
	Rural		1,321	7,071		8,392	21,744	1,321	11,725	13,046	1,613							
	Total		1,321	10,174		11,495	27,744	1,697	14,828	17,946	1,697							6,351
Santa Josefa	Urban	888		1,861		2,749	6,590	3,411										
	Rural			3,615		3,615	31,708	3,411	19,025	19,025								
	Total	888		5,476		6,364	38,298	3,411	20,886	24,297	2,523							15,410
Sibagat	Urban	923		3,762		4,685	9,320	3,694										
	Rural	290		5,686		6,376	26,006	290	9,294	15,604	4,306							
	Total	1,213		9,448		11,061	35,326	3,984	9,294	21,060	3,071							7,377
Talaogon	Urban			10,493		10,493	22,904	1,852										
	Rural			2,18		2,18	15,510	1,852	218	9,088	9,306	778						
	Total			12,673		12,673	38,414	3,704	6,196	19,581	27,629	1,852						8,377
Trento	Urban			10,322		10,322	20,231	5,440										
	Rural			8,936		8,936	27,554	5,000	423	16,332	16,332	447						
	Total			19,258		19,258	47,785	5,940	423	26,354	32,717	5,440						7,096
Veneria	Urban			1,251		1,251	6,166	1,251										
	Rural			4,041		4,041	26,846	4,041	26,846	30,887	19,030	6,055						
	Total			5,292		5,292	33,012	5,292	33,012	37,134	25,065	12,105						12,105
Provincial Total	Urban	20,563		12,391		32,954	216,539	76,463	12,391	34,634	173,488	55,900						
	Rural	12,723		39,349		52,072	478,674	12,723	39,349	232,132	284,204	99,879						
	Total	33,286		210,293		295,319	690,213	89,186	51,740	316,766	457,692	155,900						187,391

Table 8.5.3 Population to be Served in Phase II (Water Supply)

Name of Municipality	Area	Population Served in 2003				Phase II Coverage (2010)									
		Population Served in 2003			Total Population	Services Coverage			Additional Population to be Served			Total			
		Level III	Level II	Level I		Total	Level III	Level II	Level I	Level III	Level II		Level I		
Bayugan	Urban	5,694	6,290	32,815	38,509	58,370	55,452	49,758	55,452	49,758	55,452	49,758	55,452	49,758	55,452
	Rural	340	6,290	35,158	41,788	84,455	340	6,290	71,913	78,543	78,543	36,755	36,755	36,755	36,755
	Total	6,034	6,290	67,973	80,297	142,825	55,792	6,290	71,913	133,995	49,758	36,755	36,755	36,755	36,755
Bunawan	Urban	4,207	3,103	2,990	10,300	15,390	14,021	10,414	14,021	10,414	14,021	10,414	14,021	10,414	14,021
	Rural	4,207	3,103	2,990	10,300	22,363	3,962	3,962	16,836	20,798	16,836	9,572	9,572	9,572	9,572
	Total	8,414	6,206	5,980	20,600	37,753	14,021	3,962	16,836	35,419	10,414	19,986	19,986	19,986	19,986
Esperanza	Urban	2,234	2,390	1,701	3,935	5,736	5,449	3,215	5,449	3,215	5,449	3,215	5,449	3,215	5,449
	Rural	420	2,390	25,588	28,398	55,195	470	2,390	48,321	51,331	48,321	22,933	22,933	22,933	22,933
	Total	2,654	2,390	27,289	32,333	60,931	5,869	2,390	48,521	56,780	3,215	22,933	22,933	22,933	22,933
La Paz	Urban	5,122	2,810	2,810	7,932	13,102	12,447	7,325	12,447	7,325	12,447	7,325	12,447	7,325	12,447
	Rural	5,122	2,810	14,401	31,715	44,817	12,447	29,495	41,942	29,495	15,094	15,094	15,094	15,094	
	Total	10,244	5,620	17,211	44,817	66,534	24,894	58,990	83,934	81,437	30,189	30,189	30,189	30,189	
Loreto	Urban	1,657	340	2,621	4,618	6,565	6,237	4,580	6,237	4,580	6,237	4,580	6,237	4,580	
	Rural	1,657	340	12,011	13,812	26,179	1,801	22,545	24,346	24,346	10,534	10,534	10,534	10,534	
	Total	3,314	680	14,632	18,430	32,744	6,237	1,801	27,545	30,583	4,580	10,534	10,534	10,534	
Prosperidad	Urban	21,240	3,282	26,987	32,357	65,154	2,088	3,282	55,223	60,593	28,236	28,236	28,236	28,236	
	Rural	21,240	3,282	26,987	32,357	97,230	32,560	3,282	55,223	91,065	9,232	9,232	9,232	9,232	
	Total	42,480	6,564	53,974	64,714	162,384	35,120	6,564	110,446	151,658	37,468	37,468	37,468	37,468	
Rosario	Urban	3,029	4,501	7,099	17,205	32,591	5,605	4,501	20,204	30,310	714	13,105	13,105	13,105	
	Rural	3,029	4,501	7,099	17,205	36,531	9,348	4,501	20,204	34,053	714	13,105	13,105	13,105	
	Total	6,058	9,002	14,198	34,410	69,062	14,653	9,002	40,408	68,063	1,428	26,210	26,210	26,210	
San Francisco	Urban	11,020	1,296	12,156	24,472	36,445	34,623	23,603	34,623	23,603	34,623	23,603	34,623	23,603	
	Rural	3,480	2,249	14,888	20,617	40,938	3,480	2,249	32,343	38,072	17,455	17,455	17,455	17,455	
	Total	14,500	3,545	27,044	45,089	77,383	38,103	2,249	32,343	72,695	23,603	17,455	17,455	17,455	
San Luis	Urban	1,697	3,103	3,103	4,800	7,102	6,747	5,050	6,747	5,050	6,747	5,050	6,747	5,050	
	Rural	1,697	3,103	11,725	13,045	25,740	1,321	22,617	23,938	10,892	10,892	10,892	10,892	10,892	
	Total	3,394	6,206	14,828	17,846	32,842	6,747	1,321	22,617	30,685	5,050	10,892	10,892	10,892	
Santa Josefa	Urban	3,411	1,861	1,861	5,272	10,124	9,618	6,207	9,618	6,207	9,618	6,207	9,618	6,207	
	Rural	3,411	1,861	19,025	24,297	58,359	9,618	45,305	54,923	6,207	26,280	26,280	26,280	26,280	
	Total	6,822	3,722	38,046	48,594	116,713	19,236	54,923	61,143	12,825	52,487	52,487	52,487	52,487	
Sibagat	Urban	3,694	3,762	7,455	10,950	10,403	6,709	6,709	10,403	6,709	9,030	9,030	9,030	9,030	
	Rural	290	9,294	6,020	15,604	30,555	290	9,294	18,832	28,416	28,416	12,812	12,812	12,812	
	Total	3,984	9,294	9,182	23,040	41,505	10,693	9,294	18,832	38,819	6,709	12,812	12,812	12,812	
Talauegon	Urban	1,852	5,978	10,493	18,323	29,116	27,660	25,808	27,660	25,808	25,808	25,808	25,808	25,808	
	Rural	1,852	5,978	9,088	15,916	19,716	218	18,118	18,336	18,118	6,777	6,777	6,777	6,777	
	Total	3,704	11,956	19,581	34,239	49,632	27,660	18,118	36,672	36,954	13,585	13,585	13,585	13,585	
Trenio	Urban	5,440	423	10,322	16,185	24,322	23,106	17,666	23,106	17,666	14,275	14,275	14,275	14,275	
	Rural	5,440	423	16,032	21,895	33,126	500	30,307	30,807	14,275	14,275	14,275	14,275		
	Total	10,880	846	36,354	38,080	57,448	23,606	30,307	61,613	61,613	28,550	28,550	28,550		
Venuela	Urban	6,166	1,251	7,417	13,624	12,943	6,777	6,777	12,943	6,777	9,030	9,030	9,030		
	Rural	6,166	1,251	26,846	30,887	75,654	4,041	66,317	70,358	39,471	39,471	39,471	39,471		
	Total	12,332	2,502	34,263	44,771	156,308	10,818	136,674	140,716	110,716	78,941	78,941	78,941		
Provincial Total	Urban	76,463	12,391	84,634	173,488	266,862	253,521	177,058	253,521	177,058	266,444	266,444	266,444		
	Rural	12,723	39,349	232,132	284,204	592,096	12,723	39,349	499,576	550,648	266,444	266,444	266,444		
	Total	89,186	51,740	316,766	457,692	858,958	266,244	39,349	499,576	804,169	532,898	532,898	532,898		

8.5.2 Sanitation

Table 8.5.4 Additional Number of Households to be Served in Phase I (Household Toilets)

Name of Municipality	Area	No. of Household Served in the Base Year					Phase I Coverage (2003)							
		Flush	Pour Flush	VIP/Dry	Total	Total No. of HHs	Household Coverage			Additional No. of HHs to be Served				
							Flush	Pour Flush	VIP/Dry	Total	Flush	Pour Flush	VIP/Dry	Total
Bayugan	Urban	875	5,360		6,235	9,014	2,163	4,327	721	7,211	1,288		721	2,009
	Rural		6,867		6,867	12,898	340	6,342	2,902	9,674	340		2,902	3,242
	Total	875	12,227		13,102	21,912	2,503	10,759	3,623	16,885	1,628		3,623	5,251
Bunawan	Urban	130	869		1,019	2,550	612	1,224	204	2,040	462		204	1,021
	Rural		3,041		3,041	3,591		2,129	912	3,041			912	912
	Total	130	3,910		3,041	6,141	612	3,353	1,116	5,081	462		1,116	1,933
Esperanza	Urban	17	456		473	877	211	421	700	702	194		700	264
	Rural		4,159		4,159	8,482	450	4,033	1,909	6,362	420		1,909	2,329
	Total	17	4,615		4,159	9,359	631	4,454	1,979	7,064	614		1,979	2,593
La Paz	Urban	187	487		674	1,498	359	719	120	1,198	172		120	524
	Rural		1,435		1,435	4,089		2,147	920	3,067			920	1,632
	Total	187	1,922		1,435	5,587	359	2,866	1,040	4,265	172		1,040	2,156
Loreto	Urban	15	574		589	1,016	244	488	81	813	229		81	310
	Rural		2,893		2,893	4,170	219	2,190	938	3,128			938	938
	Total	15	3,467		2,893	5,186	244	2,678	1,019	3,941	229		1,019	1,248
Prosperidad	Urban	702	2,620		3,322	5,057	1,214	2,427	405	4,046	512		405	917
	Rural		5,006		5,006	10,061	755	4,527	2,264	7,546	755		2,264	3,019
	Total	702	7,626		5,006	15,118	1,969	6,954	2,669	11,592	1,267		2,669	3,936
Rosario	Urban	16	488		504	692	166	333	55	554	150		55	205
	Rural		4,037		4,037	5,233		2,826	1,211	4,037			1,211	1,211
	Total	16	4,525		4,037	5,925	166	3,159	1,266	4,591	150		1,266	1,416
San Francisco	Urban	1,708	2,046		3,754	5,783	1,388	2,775	463	4,626	729		463	1,192
	Rural		2,706		2,706	6,233	490	2,940	1,470	4,900	490		1,470	2,194
	Total	1,708	4,752		2,706	12,016	1,878	5,715	1,933	9,526	490		1,933	3,386
San Luis	Urban	150	325		475	1,033	248	495	83	826	98		83	351
	Rural		1,375		1,375	4,019		2,110	904	3,014			904	1,639
	Total	150	1,700		1,375	5,052	248	2,605	987	3,840	98		987	1,990
Santa Josefa	Urban	35	491		526	1,220	293	585	98	976	258		98	450
	Rural		1,838		1,838	6,028		3,165	1,356	4,521			1,356	2,683
	Total	35	2,329		1,838	7,248	293	3,750	1,454	5,497	258		1,454	3,133
Sibagat	Urban	230	820		1,050	1,701	408	817	136	1,361	178		136	314
	Rural		2,925		2,925	4,754	290	2,206	1,070	3,566	290		1,070	1,360
	Total	230	3,745		2,925	6,455	698	3,023	1,206	4,927	468		1,206	1,674
Talaogon	Urban	590	1,490		2,080	4,195	1,007	2,013	336	3,356	417		336	1,276
	Rural		1,687		1,687	2,765		1,452	622	2,074			622	622
	Total	590	3,177		1,687	6,960	1,007	3,465	958	5,430	417		958	1,898
Trento	Urban	234	3,328		3,328	5,435	408	2,445	1,223	4,076	408		1,223	1,631
	Rural		5,639		5,639	9,245	1,322	4,274	1,528	7,124	1,088		1,528	2,616
	Total	234	8,967		8,967	14,680	1,730	6,719	2,751	11,200	1,496		2,751	4,247
Veruela	Urban	46	570		616	1,667	400	801	133	1,334	354		133	718
	Rural		3,301		3,301	9,411		4,941	2,117	7,058			2,117	3,257
	Total	46	3,871		3,301	11,078	400	5,742	2,250	8,392	354		2,250	4,475
Provincial Total	Urban	4,955	18,907		23,862	40,113	9,627	19,254	3,210	32,091	4,992		3,210	10,550
	Rural		44,598		44,598	87,469	2,703	43,543	19,818	66,064	2,703		19,818	27,169
	Total	4,955	63,505		68,460	127,582	12,330	62,797	23,028	98,155	7,695		23,028	37,719

Table 8.5.5 Additional Number of Households to be Served in Phase II (Household Toilets)

Name of Municipality	Area	No. Households Served in 2003					Phase II Coverage (2010)							
		Household Coverage					Additional No. of HHs to be Served							
		Flush	Pour Flush	VIP/ Dry	Total	Total No. of HHs	Flush	Pour Flush	VIP/ Dry	Total	Flush	Pour Flush	VIP/ Dry	Total
Bayugan	Urban	2,163	4,327	721	7,211	14,593	6,786	6,064	721	13,571	4,623	1,737		6,360
	Rural	340	6,432	2,902	9,674	21,114	340	14,705	2,902	17,947	8,273	8,273		8,273
	Total	2,503	10,759	3,623	16,885	35,707	7,126	20,769	3,623	31,518	4,623	10,010		14,633
Bunawan	Urban	612	1,224	204	2,040	3,848	1,790	1,585	204	3,579	1,178	361		1,539
	Rural	2,129	912	3,041	5,991	11,716	3,840	912	3,041	7,793	1,178	2,072		1,711
	Total	612	3,553	1,116	5,081	9,439	1,790	5,425	1,116	8,331	1,178	2,072		3,250
Esperanza	Urban	211	421	70	702	1,434	667	597	70	1,334	456	176		632
	Rural	420	4,033	1,909	6,362	13,799	420	9,400	1,909	11,729	456	5,367		5,367
	Total	631	4,454	1,979	7,064	15,233	1,087	9,997	1,979	13,063	456	5,543		5,999
La Paz	Urban	359	2,147	920	3,067	7,929	1,524	5,820	920	6,740	3,673	674		3,673
	Rural	244	488	81	813	1,641	763	682	81	1,526	519	194		713
	Total	244	2,190	938	3,128	6,545	4,625	5,307	1,019	7,089	519	2,629		2,435
Loreto	Urban	1,214	2,427	405	4,046	8,019	3,729	3,324	405	7,458	2,515	897		3,412
	Rural	755	4,527	2,264	7,546	16,289	2,088	9,494	2,264	13,846	1,353	4,967		6,300
	Total	1,969	6,954	2,669	11,592	24,308	5,817	12,818	2,669	21,304	3,868	5,864		9,712
Rosario	Urban	166	333	55	554	985	458	403	55	916	292	70		362
	Rural	248	2,826	1,211	4,037	8,148	1,385	4,330	1,211	6,926	1,385	1,504		2,889
	Total	166	3,159	1,266	4,591	9,133	1,843	4,733	1,266	7,842	1,677	1,574		3,251
San Francisco	Urban	1,388	2,775	463	4,626	9,111	4,237	3,773	463	8,473	2,849	998		3,847
	Rural	490	2,940	1,470	4,900	10,235	1,740	5,490	1,470	8,700	1,250	2,550		3,800
	Total	1,878	5,715	1,933	9,526	19,346	5,977	9,263	1,933	17,173	4,099	3,548		7,647
San Luis	Urban	248	495	83	826	1,776	826	743	83	1,652	578	248		826
	Rural	248	2,110	904	3,014	6,435	4,366	904	904	5,470	2,456		2,456	
	Total	248	2,605	987	3,840	8,211	826	5,309	987	7,122	578	2,704		3,282
Santa Josefa	Urban	293	585	98	976	2,531	1,177	1,079	98	2,354	884	494		1,378
	Rural	293	3,165	1,356	4,821	12,179	1,177	8,996	1,356	10,352	5,831		5,831	
	Total	293	3,750	1,454	5,497	14,710	1,177	10,075	1,454	12,706	884	6,325		7,209
Sibagat	Urban	408	817	136	1,361	2,738	1,273	1,137	136	2,546	865	320		1,185
	Rural	290	2,206	1,070	3,566	7,639	290	5,133	1,070	6,493	865	2,927		4,112
	Total	698	3,023	1,206	4,927	10,377	1,563	6,270	1,206	9,039	865	3,247		3,413
Talacogon	Urban	1,007	2,013	336	3,356	7,279	3,385	3,048	336	6,769	2,378	1,116		2,116
	Rural	1,007	1,452	622	2,074	4,929	3,368	622	4,190	2,378	1,116		2,116	
	Total	1,007	3,465	958	5,430	12,208	3,385	6,616	958	10,959	2,378	3,151		5,529
Trento	Urban	914	1,829	305	3,048	6,081	2,828	2,522	305	5,655	1,914	693		2,607
	Rural	408	2,445	1,223	4,076	8,282	500	5,317	1,223	7,040	92	2,872		2,964
	Total	1,322	4,274	1,528	7,124	14,363	3,328	7,839	1,528	12,695	2,006	3,565		5,571
Venuela	Urban	400	801	133	1,334	3,406	1,584	1,451	133	3,168	1,184	650		1,834
	Rural	400	4,941	2,117	7,058	18,914	1,584	15,411	2,117	16,077	9,019		9,019	
	Total	400	5,742	2,250	8,392	22,320	3,168	26,822	2,250	19,245	11,844	9,669		10,853
Provincial Total	Urban	9,627	19,254	3,210	32,091	66,718	31,027	27,811	3,210	62,048	21,400	8,557		29,957
	Rural	2,703	43,543	19,818	66,064	148,028	6,763	99,244	19,818	125,825	4,960	55,701		59,761
	Total	12,330	62,797	23,028	98,155	214,746	37,790	127,055	23,028	187,873	25,460	64,258		89,718

Table 8.5.6 Additional Number of Public School Students to be Served in Phases I and II (School Toilets)

Name of Municipality	Std. No. of Public School Student that can be Served in the Base Year (1997)	Projected No. of Public School Student in 2000	Phase I Coverage (2003)		Projected Number of Public School Students in 2010	Phase II Coverage (2010)	
			Public School Students Coverage	Additional No. of Public School Student to be Served		Public School Students Coverage	Additional No. of Public School Students to be Served
Bayugan	14,080	40,674	24,404	10,324	41,768	37,591	13,187
Bunawan	3,440	11,518	6,911	3,471	11,849	10,664	3,753
Esperanza	5,560	19,806	11,884	6,324	19,770	17,793	5,909
La Paz	2,240	8,291	4,975	2,735	8,505	7,655	2,680
Loreto	3,440	13,104	7,862	4,422	13,155	11,840	3,978
Prosperidad (Capital)	5,280	30,135	18,081	12,801	31,335	28,202	10,121
Rosario	3,520	11,158	6,695	3,175	10,791	9,712	3,017
San Francisco	2,360	25,535	15,321	12,961	26,533	23,880	8,559
San Luis	1,760	8,974	5,384	3,624	8,887	7,998	2,614
Santa Josefa	2,320	13,139	7,883	5,563	17,228	15,505	7,622
Sibagat	2,240	13,825	8,295	6,055	14,103	12,693	4,398
Talacogon	3,600	14,573	8,744	5,144	15,174	13,657	4,915
Trento	8,240	18,301	10,981	2,741	19,103	17,193	6,212
Vernela	1,920	15,967	9,580	7,660	19,630	17,667	8,087
Provincial Total	60,000	245,000	147,000	87,000	257,831	232,050	85,050

Table 8.5.7 Additional Number of Public Utilities with Sanitary Toilets In Phase I and II

Name of Municipality	Type	Coverage in Base Year (1997)		Phase I Coverage (2003)			Phase II Coverage (2010)		
		No. of PU with Toilets Facilities	No. of PU with Sanitary Toilets	No. of PU with Toilets Facilities	Add'l No. of Public Utilities with Sanitary Toilets	No. of PU with Sanitary Toilets	No. of PU with Toilets Facilities	Add'l No. of Public Utilities with Sanitary Toilets	No. of PU with Sanitary Toilets
Bayugan	Public Market	1	1	1		1	1		1
	Bus/Jeepney Terminal	1	1	1		1	1		1
	Parks/Playground			2	2	2	2		2
	Total	2	2	4	2	4	4		4
Bunawan	Public Market	1	1	1		1	1		1
	Bus/Jeepney Terminal	1	1	1		1	1		1
	Total	2	2	2		2	2		2
Esperanza	Public Market	1	1	1		1	1		1
	Bus/Jeepney Terminal	1	1	2	1	2	2		2
	Parks/Playground								
	Total	2	2	3	1	3	3		3
La Paz	Public Market	1	1	1		1	1		1
	Bus/Jeepney Terminal	1	1	2	1	2	2		2
	Parks/Playground								
	Total	2	2	3	1	3	3		3
Loreto	Public Market	1	1	1		1	1		1
	Bus/Jeepney Terminal	1	1	2	1	2	2		2
	Parks/Playground			1	1	1	1		1
	Total	2	2	4	2	4	4		4
Prosperidad	Public Market	1	1	2	1	2	3	1	3
	Bus/Jeepney Terminal	1	1	2	1	2	2		2
	Parks/Playground						2	2	2
	Total	2	2	4	2	4	7	3	7
Rosario	Public Market	3	3	3		3	3		3
	Bus/Jeepney Terminal	1	1	2	1	2	2		2
	Parks/Playground	1	1	2	1	2	2		2
	Total	5	5	7	2	7	7		7
San Francisco	Public Market	1	1	3	2	3	3		3
	Bus/Jeepney Terminal	2	2	2		2	2		2
	Parks/Playground			1	1	1	2	1	2
	Total	3	3	6	3	6	7	1	7
San Luis	Public Market	1	1	2	1	2	2		2
	Bus/Jeepney Terminal	1	1	1		1	2	1	2
	Parks/Playground								
	Total	2	2	3	1	3	4	1	4
Santa Josefa	Public Market	1	1	1		1	1		1
	Bus/Jeepney Terminal	1	1	1		1	1		1
	Parks/Playground								
	Total	2	2	2		2	2		2
Sibagat	Public Market	1	1	1		1	1		1
	Bus/Jeepney Terminal								
	Parks/Playground			1	1	1	1		1
	Total	1	1	2	1	2	2		2
Talacogon	Public Market	1	1	4	3	4	5	1	5
	Bus/Jeepney Terminal	1	1	2	1	2	3	1	3
	Parks/Playground			4	4	4	5	1	5
	Total	2	2	10	8	10	13	3	13
Trento	Public Market	1	1	3	2	3	4	1	4
	Bus/Jeepney Terminal	1	1	1		1	2	1	2
	Parks/Playground	1	1	2	1	2	2		2
	Total	3	3	6	3	6	8	2	8
Veruela	Public Market	1	1	2	1	2	2		2
	Bus/Jeepney Terminal	1	1	2	1	2	2		2
	Parks/Playground			1	1	1	1		1
	Total	2	2	5	3	5	5		5
Provincial Total	Public Market	16	16	26	10	26	29	3	29
	Bus/Jeepney Terminal	14	14	21	7	21	24	3	24
	Parks/Playground	2	2	14	12	14	18	4	18
	Total	32	32	61	29	61	71	10	71

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

8.6.1 Water Supply

(1) Required water supply facilities

Urban water supply:

Urban water supply facilities required by target year shown in Table 8.6.1 were estimated as the required number of house connections based on the additional service coverage.

As reference, the following requirements were also estimated:

- daily average water demand at 100 lpcd consumption rate, and
- number of deep wells to meet the daily maximum water demand based on the groundwater productivity.

(daily maximum water demand = 1.3 x daily average water demand)

Information pertaining to the expansion plan of Level III systems was arranged to be indicated in Table 8.6.1 and details presented in Table 8.6.2, however, required data were not available during this PW4SP preparation.

Rural water supply:

Rural water supply facilities required by target year shown in Table 8.6.3(a) were estimated as the number of Level II systems with number of communal faucets and the number of Level I wells broken-down to deep and shallow wells. Sixty-five (65) untapped springs suitable for Level II system were confirmed during this PW4SP preparation.

(2) Required well drilling and rehabilitation equipment

Presently, only one unit of spindle type drilling rig is available at DPWH-DEO in the province and 1 unit of truck-mounted percussion drilling rig at DPWH regional office.

Taking into account the maximum utilization of existing equipment, additional number of required equipment is estimated as described below.

Applicable type of well drilling equipment is determined considering the geological formation of the province, the easiness to technically operate. Both types of percussion and rotary are suitable for the soft and hard formations, and the percussion type can be easily operated and maintained without special training to drillers compared with the latter, it is very useful to bores in the boulders or cobbles formations. Thus, the drilling equipment of percussion type is recommendable to be selected in the PW4SP preparation.

Table 8.6.1 Urban Water Supply Facilities Required by Target Year

Name of Municipality	Reference on Expansion of Existing Level III System				Phase I (2003) Requirements					Phase II (2010) Requirements				
	Name of Operating Body	Area	Coverage in 1997		Type of Water Source	Plan for Expansion	Additional Population to be Served	Number of House Connection	Daily Average Water Demand (m ³ /day)	Number of Spring/Deep Well	Additional Population to be Served	Number of House Connection	Daily Average Water Demand (m ³ /day)	Number of Spring/Deep Well
			Nb. of Barangay Served	Served Population										
Bayugan	Calaitan	Urban	0	0	SP	No	5,694	1,066	569	1	49,758	12,440	4,976	7
		Rural	1	180										
		Total	1	180										
San Juan	San Juan	Urban	0	0	SP	No								
		Rural	1	160										
		Total	1	160										
Municipal Total	Municipal Total	Urban	0	0										
		Rural	2	340										
		Total	2	340										
Bunawan	Bunawan WD	Urban	1	1,296	SP	No	2,911	576	291	1	10,414	2,604	1,041	2
		Rural	0	0										
		Total	1	1,296										
Esperanza	Poblacion	Urban	1	660	DW	No	1,574	281	157	1	3,215	804	322	1
		Rural	0	0										
		Total	1	660										
Santa Fe	Santa Fe	Urban	0	0	DW	No								
		Rural	1	420										
		Total	1	420										
Municipal Total	Municipal Total	Urban	1	660										
		Rural	1	420										
		Total	2	1,080										
La Paz	Not Applicable	Urban	N.A.	N.A.	N.A.	N.A.	5,122	774	512	1	7,325	1,831	733	1
		Rural	N.A.	N.A.										
		Total	0	0										
Loreto	Not Applicable	Urban	N.A.	N.A.	N.A.	N.A.	1,657	292	166	1	4,580	1,145	458	1
		Rural	N.A.	N.A.										
		Total	0	0										
Prosperidad	Patinay	Urban	0	0	SP	No	17,964	3,422	1,796	3	9,232	2,308	923	2
		Rural	1	990										
		Total	1	990										
Prosperidad WD	Prosperidad WD	Urban	1	3,276	SP	No								
		Rural	4	804										
		Total	5	4,080										
San Jose	San Jose	Urban	0	0	SP	No								
		Rural	1	294										
		Total	1	294										
Municipal Total	Municipal Total	Urban	1	3,276										
		Rural	6	2,088										
		Total	7	5,364										

Table 8.6.1 Urban Water Supply Facilities Required by Target Year

Name of Municipality	Name of Operating Body	Reference on Expansion of Existing Level III System				Phase I (2003) Requirements					Phase II (2010) Requirements				
		Area	No. of Barangay Served	Coverage in 1997		Type of Water Source	Plan for Expansion	Additional Population to be Served	Number of House Connection	Daily Average Water Demand (m ³ /day)	Number of Spring/Deep Well	Additional Population to be Served	Number of House Connection	Daily Average Water Demand (m ³ /day)	Number of Spring/Deep Well
				Served Population											
Rosario	Rosario WSS	Urban	1	3,029											
		Rural	6	5,605		SP	No	0	0	0	0	714	179	71	1
		Total	7	8,634											
San Francisco	Bayugan 2	Urban	1	1,212											
		Rural	0	0		SP	No	229	43	23	1	23,603	5,901	2,360	4
		Total	1	1,212											
Karaus		Urban	0	0											
		Rural	1	1,166		SP	No								
		Total	1	1,166											
San Francisco WD		Urban	5	9,579											
		Rural	7	1,157		SP	No								
		Total	12	10,736											
San Isidro		Urban	0	0											
		Rural	1	1,157		SP	No								
		Total	1	1,157											
Municipal Total		Urban	6	10,791											
		Rural	9	3,480											
		Total	15	14,271											
San Luis	Not Applicable	Urban	N.A.	N.A.											
		Rural	N.A.	N.A.		N.A.	N.A.	1,697	292	170	1	5,050	1,263	505	1
		Total	0	0											
Santa Josefa		Urban	1	148											
		Rural	1	888		DW	No	2,523	467	252	1	6,207	1,552	621	1
		Total	2	1,036											
Sibagat		Urban	1	163											
		Rural	1	623		SP	No	3,071	560	307	1	6,709	1,677	671	1
		Total	2	786											
Talaogon	Not Applicable	Urban	N.A.	N.A.											
		Rural	N.A.	N.A.		N.A.	N.A.	1,852	339	185	1	25,808	6,452	2,581	4
		Total	0	0											
Trento	Pulang-lupa	Urban	1	83											
		Rural	0	0		DW	No	5,440	1,024	544	1	17,666	4,417	1,767	3
		Total	1	83											
Venecia	Not Applicable	Urban	N.A.	N.A.											
		Rural	N.A.	N.A.		N.A.	N.A.	6,166	1,109	617	1	6,777	1,694	678	1
		Total	0	0											
Provincial Total		Urban	13	19,446											
		Rural	26	13,444											
		Total	39	32,890											

Table 8.6.2 Plan for Expansion of Existing Level III Systems

Name of Municipality	Name of Operating Body	Additional Areas/ Barangays to be Covered	Additional Population to be Served	Additional Water Sources	
				Type	Capacity (m ³ /day)
Bayugan	Calaitan				
	San Juan				
	Municipal Total				
Bunawan	Bunawan WD				
	Poblacion				
	Municipal Total				
Esperanza	Santa Fe				
	Municipal Total				
	Municipal Total				
Prosperidad	Pain-ay				
	Prosperidad WD				
	Municipal Total				
Rosario	San Jose				
	Municipal Total				
	Rosario WSS				
San Francisco	Bayugan 2				
	Karaus				
	Municipal Total				
Santa Josefa	San Francisco WD				
	San Isidro				
	Municipal Total				
Sibagat	Santa Josefa				
	Sibagat				
	Municipal Total				
Trento	Pulang-lupa				

Table 8.6.3(a) Rural Water Supply Facilities Required by Target Year

Name of Municipality	Phase I (2003) Requirements										Phase II (2010) Requirements													
	Level II					Level I					Level I					Level I								
	Number of System	No. of Communal Faucets	Number of Deep Wells			No. of Shallow Wells	Total	40 m	80 m	120 m	Sub-total	40 m	80 m	120 m	Sub-total	No. of Shallow Wells	Total	40 m	80 m	120 m	Sub-total	No. of Shallow Wells	Total	
			40 m	80 m	120 m																			
Bayugan	9	63	40	18	40	80	307	307	307	307	307	307	307	307	306	613	306	306	306	306	306	306	306	306
Bunawan	12	239	18	18	30	30	96	96	96	96	96	96	96	96	192	383	192	192	192	192	192	192	192	192
Esperanza	12	239	18	18	35	35	119	119	119	119	119	119	119	119	215	252	215	215	215	215	215	215	215	215
La Paz	12	239	18	18	20	20	48	48	48	48	48	48	48	48	150	176	150	150	150	150	150	150	150	150
Loreto	1	11	11	11	11	11	377	377	377	377	377	377	377	377	94	471	94	94	94	94	94	94	94	94
Prosperidad (Capital)	1	830	23	23	23	23	66	66	66	66	66	66	66	66	153	219	153	153	153	153	153	153	153	153
Rosario	2	88	23	23	3	3	248	248	248	248	248	248	248	248	43	291	43	43	43	43	43	43	43	43
San Francisco	8	60	32	32	5	5	37	37	37	37	37	37	37	37	155	182	155	155	155	155	155	155	155	155
San Luis	8	60	176	176	19	19	395	395	395	395	395	395	395	395	43	438	43	43	43	43	43	43	43	43
Santa Josefa	24	158	58	58	10	10	68	68	68	68	68	68	68	68	214	214	214	214	214	214	214	214	214	214
Sibagat	3	28	27	27	60	60	72	72	72	72	72	72	72	72	129	151	129	129	129	129	129	129	129	129
Talacogon	2	18	67	67	7	7	593	593	593	593	593	593	593	593	65	658	65	65	65	65	65	65	65	65
Trento	3	696	333	333	293	293	827	827	827	827	827	827	827	827	1,451	4,446	1,451	1,451	1,451	1,451	1,451	1,451	1,451	1,451
Veneria	65	2,191	293	293	201	201	1,681	1,681	1,681	1,681	1,681	1,681	1,681	1,681	2,995	4,446	2,995	2,995	2,995	2,995	2,995	2,995	2,995	2,995
Provincial Total	65	2,191	333	333	293	293	827	827	827	827	827	827	827	827	1,451	4,446	1,451	1,451	1,451	1,451	1,451	1,451	1,451	1,451

Table 8.6.3(b) Public Facilities Required for Rural Water Supply by Target Year

Name of Municipality	Phase I (2003) Requirements										Phase II (2010) Requirements														
	Share of Public Facility (80%)					Share of Public Facility (80%)					Share of Public Facility (80%)					Share of Public Facility (80%)									
	Percentage Allocated to Public Wells (80%) and Percentage Allocated to Public Spring Dev. (20%)					Percentage Allocated to Public Wells (80%) and Percentage Allocated to Public Spring Dev. (20%)					Percentage Allocated to Public Wells (80%) and Percentage Allocated to Public Spring Dev. (20%)					Percentage Allocated to Public Wells (80%) and Percentage Allocated to Public Spring Dev. (20%)									
	Number of Deep Wells		No. of Shallow Wells		Total	Number of Deep Wells		No. of Shallow Wells		Total	Number of Deep Wells		No. of Shallow Wells		Total	Number of Deep Wells		No. of Shallow Wells		Total	Number of Deep Wells		No. of Shallow Wells		Total
40 m	80 m	120 m	Sub-total	40 m		80 m	120 m	Sub-total	40 m		80 m	120 m	Sub-total	40 m		80 m	120 m	Sub-total	40 m		80 m	120 m	Sub-total	40 m	
Bayugan	26	12	12	26	25	51	13	64	196	196	196	196	196	196	392	490	196	196	196	196	196	196	196	196	196
Bunawan	12	11	11	12	7	19	5	24	62	62	62	62	62	62	128	128	62	62	62	62	62	62	62	62	62
Esperanza	11	11	11	11	22	6	28	6	28	28	28	28	28	28	245	306	28	28	28	28	28	28	28	28	28
La Paz	76	76	76	76	13	89	22	111	138	138	138	138	138	138	242	306	138	138	138	138	138	138	138	138	138
Loreto	31	31	31	31	5	36	9	45	97	97	97	97	97	97	113	141	97	97	97	97	97	97	97	97	97
Prosperidad (Capital)									42	42	42	42	42	42	140	175	42	42	42	42	42	42	42	42	42
Rosario	15	21	21	15	2	17	4	21	159	159	159	159	159	159	186	233	159	159	159	159	159	159	159	159	159
San Francisco	21	21	21	21	3	24	6	30	100	100	100	100	100	100	117	146	100	100	100	100	100	100	100	100	100
San Luis	113	113	113	113	12	125	31	156	252	252	252	252	252	252	280	350	252	252	252	252	252	252	252	252	252
Santa Josefa															137	171									
Sibagat	37	37	37	37	6	43	11	54	83	83	83	83	83	83	97	121	83	83	83	83	83	83	83	83	83
Talacogon	17	17	17	17	39	56	14	70	46	46	46	46	46	46	152	190	46	46	46	46	46	46	46	46	46
Trento	43	43	43	43	4	47	12	59	379	379	379	379	379	379	421	526	379	379	379	379	379	379	379	379	379
Veneria	214	188	188	214	127	529	133	662	1,074	1,074	1,074	1,074	1,074	1,074	2,846	3,556	1,074	1,074	1,074	1,074	1,074	1,074	1,074	1,074	1,074
Provincial Total	214	188	188	214	127	529	133	662	1,074	1,074	1,074	1,074	1,074	1,074	2,846	3,556	1,074	1,074	1,074	1,074	1,074	1,074	1,074	1,074	1,074

Medium size percussion drilling rig (truck-mounted type for deep well):

Average performance

- 1 well/30 days (5 m/day of drilling rate with finishing work)

Annual accomplishment

- 9 wells/year (365 days/year ÷ 30 days/well x 0.75)

Required number

- 11 sets for the total 507 deep wells

Well rehabilitation equipment:

Average performance

- 1 well/7 days (well redevelopment and finishing work)

Annual accomplishment

- 39 wells/year (365 days/year ÷ 7 days/well x 0.75)

Required number

- 2 sets for 10% of 507 Level I deep wells

Support vehicle:

Type - pick-up truck with winch, double cab

Required number

- 2 units for well rehabilitation

Considering the utilization of existing percussion drilling rig, the following equipment shall be mobilized/procured either by private sector or LGUs to accomplish the physical targets:

- 10 sets of medium size percussion rig for the total number of deep wells;
- 2 sets of well rehabilitation equipment for 10% of deep wells (at least 1 set shall be held by the provincial government); and
- 2 units of support vehicle for well rehabilitation.

In addition to the above, service trucks equipped with crane are required for each unit of medium size rotary and percussion rigs for hauling drilling tools and water.

8.6.2 Sanitation

Table 8.6.4 Urban Household Toilets Required by Target Year

Name of Municipality	Phase I (2003) Requirements						Phase II (2010) Requirements					
	Additional HHs to be Served			No. of HHs to be Served			Additional HHs to be Served			No. of HHs to be Served		
	Flush	Pour Flush	VIP/ Dry	Total	Flush	Pour Flush	VIP/ Dry	Total	Flush	Pour Flush	VIP/ Dry	Total
Bayugan	1,288	721	2,009	1,288	721	2,009	4,623	1,737	4,623	1,737	6,360	6,360
Bunawan	462	355	204	1,021	462	355	204	1,021	1,178	361	1,539	1,539
Esperanza	194	232	70	264	194	232	70	264	456	176	632	632
La Paz	172	229	120	524	172	229	120	524	1,165	684	1,849	1,849
Loreto	229	81	310	229	81	310	310	519	194	194	713	713
Prosperidad	512	405	917	512	405	917	2,515	897	2,515	897	3,412	3,412
Rosario	150	729	463	1,192	150	729	463	1,192	2,849	998	3,847	3,847
San Francisco	98	170	83	351	98	170	83	351	578	248	826	826
San Luis	258	94	98	450	258	94	98	450	884	494	1,378	1,378
Santa Josefa	178	136	314	178	136	314	865	320	865	320	1,185	1,185
Sibagat	417	523	336	1,276	417	523	336	1,276	2,378	1,035	3,413	3,413
Talacogon	680	354	305	985	680	354	305	985	1,914	693	2,607	2,607
Trento	354	231	133	718	354	231	133	718	1,184	650	1,834	1,834
Veruela	4,992	2,334	3,210	10,536	4,992	2,334	3,210	10,536	21,400	8,557	29,957	29,957
Provincial Total												

Table 8.6.5 Rural Household Toilets Required by Target Year

Name of Municipality	Phase I (2003) Requirements						Phase II (2010) Requirements					
	Additional HHs to be Served			No. of HHs to be Served			Additional HHs to be Served			No. of HHs to be Served		
	Flush	Pour Flush	VIP/ Dry	Total	Flush	Pour Flush	VIP/ Dry	Total	Flush	Pour Flush	VIP/ Dry	Total
Bayugan	340	2,902	340	3,242	340	2,902	340	3,242	8,273	8,273	8,273	8,273
Bunawan	420	1,909	420	2,329	420	1,909	420	2,329	5,367	5,367	5,367	5,367
Esperanza	712	920	1,632	712	920	1,632	3,673	3,673	3,673	3,673	3,673	3,673
La Paz	938	938	938	938	938	938	2,435	2,435	2,435	2,435	2,435	2,435
Loreto	755	2,264	3,019	755	2,264	3,019	1,333	4,967	1,333	4,967	6,300	6,300
Prosperidad	490	1,211	1,211	1,211	1,211	1,211	1,385	1,504	1,385	1,504	2,889	2,889
Rosario	234	1,470	2,194	234	1,470	2,194	2,550	2,550	2,550	2,550	3,800	3,800
San Francisco	735	904	1,639	735	904	1,639	2,456	2,456	2,456	2,456	2,456	2,456
San Luis	1,327	1,356	2,683	1,327	1,356	2,683	5,831	5,831	5,831	5,831	5,831	5,831
Santa Josefa	290	1,070	1,360	290	1,070	1,360	2,927	2,927	2,927	2,927	2,927	2,927
Sibagat	408	622	622	622	622	622	2,116	2,116	2,116	2,116	2,116	2,116
Talacogon	1,640	1,223	1,631	1,640	1,223	1,631	92	2,872	92	2,872	2,964	2,964
Trento	2,703	2,117	3,757	2,703	2,117	3,757	9,019	9,019	9,019	9,019	9,019	9,019
Veruela	4,648	19,818	2,703	27,169	4,648	19,818	4,060	55,701	4,060	55,701	59,761	59,761
Provincial Total												

Table 8.6.6 Public School Toilets Required by Target Year

Name of Municipality	Phase I (2003) Requirements			Phase II (2010) Requirements		
	Additional Public School Students to be Served	No. of Toilet Unit	No. of Toilet Facilities	Additional Public School Students to be Served	No. of Toilet Unit	No. of Toilet Facilities
Bayugan	10,324	259	52	13,187	330	66
Bunawan	3,471	87	18	3,753	94	19
Esperanza	6,324	159	32	5,909	148	30
La Paz	2,735	69	14	2,680	67	14
Loreto	4,422	111	23	3,978	100	20
Prosperidad	12,801	321	65	10,121	254	51
Rosario	3,175	80	16	3,017	76	16
San Francisco	12,961	325	65	8,559	214	43
San Luis	3,624	91	19	2,614	66	14
Santa Josefa	5,563	140	28	7,622	191	39
Sibagat	6,055	152	31	4,398	110	22
Talacogon	5,144	129	26	4,913	123	25
Trento	2,741	69	14	6,212	156	32
Veruela	7,660	192	39	8,087	203	41
Provincial Total	87,000	2,184	442	85,050	2,132	432

Table 8.6.7 Public Toilets Required by Target Year

Name of Municipality	Phase I (2003) Requirements				Phase II (2010) Requirements			
	Number of Public Toilets				Number of Public Toilets			
	Public Market	Bus/Jeepney Terminal	Park/Playground	Total	Public Market	Bus/Jeepney Terminal	Park/Playground	Total
Bayugan			2	2				
Bunawan								
Esperanza		1		1				
La Paz		1		1				
Loreto		1	1	2				
Prosperidad	1	1		2	1		2	3
Rosario		1	1	2				
San Francisco	2		1	3			1	1
San Luis	1			1		1		1
Santa Josefa								
Sibagat			1	1				
Talacogon	3	1	4	8	1	1	1	3
Trento	2		1	3	1	1		2
Veruela	1	1	1	3				
Provincial Total	10	7	12	29	3	3	4	10