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**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/On-going Projects				Population Served in the Base Year (1997)				Percentage Coverage
			Population Served by 1997 Facilities			Total	Population to be Served by Planned/On-going Projects			Total	Population Served in the Base Year (1997)			Total	
			Level III	Level II	Level I		Level III	Level II	Level I		Level III	Level II	Level I		
Buenavista	Urban	14,470	1,040	3,324	4,364				1,040	3,324	4,364	30	4,364	30	
	Rural	32,641	4,868	5,084	9,952				4,868	5,084	9,952	30	9,952	30	
	Total	47,111	5,908	8,408	14,316				5,908	8,408	14,316	30	14,316	30	
Cabadbaran	Urban	17,005		14,879	14,879					14,879	14,879	87	14,879	87	
	Rural	37,104	10,292	19,065	29,357				10,292	19,065	29,357	79	29,357	79	
	Total	54,109	10,292	33,944	44,236				10,292	33,944	44,236	82	44,236	82	
Carmen	Urban	4,323	3,445	158	3,603				3,445	158	3,603	83	3,603	83	
	Rural	11,860	524	6,871	7,395				524	6,871	7,395	62	7,395	62	
	Total	16,183	3,969	7,029	10,998				3,969	7,029	10,998	68	10,998	68	
Jabonga	Urban	3,028	2,718		2,718				2,718		2,718	90	2,718	90	
	Rural	17,838	11,111	1,057	12,168				11,111	1,057	12,168	68	12,168	68	
	Total	20,866	13,829	1,057	14,886				13,829	1,057	14,886	71	14,886	71	
Kitcharao	Urban	6,573	6,370		6,370				6,370		6,370	97	6,370	97	
	Rural	8,563	3,501	1,506	5,007				3,501	1,506	5,007	58	5,007	58	
	Total	15,136	9,871	1,506	11,377				9,871	1,506	11,377	75	11,377	75	
Las Nieves	Urban	1,109	528	581	1,109				528	581	1,109	100	1,109	100	
	Rural	23,325	2,984	2,752	5,736				2,984	2,752	5,736	25	5,736	25	
	Total	24,434	3,512	3,333	6,845				3,512	3,333	6,845	28	6,845	28	
Magallanes	Urban	13,265	9,260		9,260				9,260		9,260	70	9,260	70	
	Rural	4,813	2,692	27	2,719				2,692	27	2,719	56	2,719	56	
	Total	18,078	11,952	27	11,979				11,952	27	11,979	66	11,979	66	
Nasipit	Urban	16,131	9,804	3,613	13,417				9,804	3,613	13,417	83	13,417	83	
	Rural	19,332	8,076	4,235	14,239				8,076	4,235	14,239	74	14,239	74	
	Total	35,463	17,880	7,848	27,656				17,880	7,848	27,656	78	27,656	78	
Remedios T. Romualdez	Urban	3,758	2,429		2,429					2,429	2,429	65	2,429	65	
	Rural	9,572	3,977	2,377	6,354				3,977	2,377	6,354	66	6,354	66	
	Total	13,330	6,406	4,806	11,183				6,406	4,806	11,183	83	11,183	83	
Santiago	Urban	8,058	7,523	535	8,058				7,523	535	8,058	100	8,058	100	
	Rural	8,669	6,396		6,396				6,396		6,396	74	6,396	74	
	Total	16,727	13,919	535	14,454				13,919	535	14,454	86	14,454	86	
Tubay	Urban	3,226	1,108		1,108				1,108		1,108	34	1,108	34	
	Rural	14,046	168	4,106	4,274				168	4,106	4,274	30	4,274	30	
	Total	17,272	1,276	4,106	5,382				1,276	4,106	5,382	31	5,382	31	
PW4SP Study Area	Urban	90,946	9,804	25,519	67,315				9,804	25,519	67,315	74	67,315	74	
	Rural	187,763	8,076	48,441	103,597				8,076	48,441	103,597	55	103,597	55	
	Total	278,709	17,880	80,433	170,912				17,880	80,433	170,912	61	170,912	61	

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 (%)
Buenavista	Urban		1,040	3,324	4,364	14,470	30	16,569	26
	Rural		4,868	5,084	9,952	32,641	30	37,376	27
	Total		5,908	8,408	14,316	47,111	30	53,945	27
Cabadbaran	Urban			14,879	14,879	17,005	87	19,257	77
	Rural		10,292	19,065	29,357	37,104	79	42,020	70
	Total		10,292	33,944	44,236	54,109	82	61,277	72
Carmen	Urban		3,445	158	3,603	4,323	83	4,531	80
	Rural		524	6,871	7,395	11,860	62	12,431	59
	Total		3,969	7,029	10,998	16,183	68	16,962	65
Jabonga	Urban		2,718		2,718	3,028	90	3,346	81
	Rural		11,111	1,057	12,168	17,838	68	19,707	62
	Total		13,829	1,057	14,886	20,866	71	23,053	65
Kitcharao	Urban		6,370		6,370	6,573	97	7,224	88
	Rural		3,501	1,506	5,007	8,563	58	9,411	53
	Total		9,871	1,506	11,377	15,136	75	16,635	68
Las Nieves	Urban		528	581	1,109	1,109	100	1,328	84
	Rural		2,984	2,752	5,736	23,325	25	27,938	21
	Total		3,512	3,333	6,845	24,434	28	29,266	23
Magallanes	Urban		9,260		9,260	13,265	70	14,598	63
	Rural		2,692	27	2,719	4,813	56	5,296	51
	Total		11,952	27	11,979	18,078	66	19,894	60
Nasipit	Urban	9,804		3,613	13,417	16,131	83	17,923	75
	Rural	8,076	1,928	4,235	14,239	19,332	74	21,478	66
	Total	17,880	1,928	7,848	27,656	35,463	78	39,401	70
Remedios T. Romualdez	Urban			2,429	2,429	3,758	65	4,412	55
	Rural		3,977	2,377	6,354	9,572	66	11,237	57
	Total		3,977	4,806	8,783	13,330	66	15,649	56
Santiago	Urban		7,523	535	8,058	8,058	100	9,833	82
	Rural		6,396		6,396	8,669	74	10,579	60
	Total		13,919	535	14,454	16,727	86	20,412	71
Tubay	Urban		1,108		1,108	3,226	34	3,591	31
	Rural		168	4,106	4,274	14,046	30	15,636	27
	Total		1,276	4,106	5,382	17,272	31	19,227	28
PW4SP Study Area	Urban	9,804	31,992	25,519	67,315	90,946	74	102,612	66
	Rural	8,076	48,441	47,080	103,597	187,763	55	213,109	49
	Total	17,880	80,433	72,599	170,912	278,709	61	315,721	54

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				Recipient HHs of Planned/going Projects				Households Using Sanitary Toilets in the Base Year (1997)					
				Flush Toilets	Pour Flush	VIP/Dry	Total	Flush	Pour Flush	VIP/Dry	Total	Flush	Pour Flush	VIP/Dry	Total	Coverage (%)	
																Pour Flush	VIP/Dry
Buena Vista	Urban	14,470	2,788	2,103		2,103							2,103			75	75
	Rural	32,641	5,989	4,113		4,113							4,113			69	69
	Total	47,111	8,777	6,216		6,216							6,216			71	71
Cabadbaran	Urban	17,003	3,103	2,449		2,844							595	2,249	19	72	92
	Rural	37,104	6,961	5,923		5,954							31	5,923		85	86
	Total	54,109	10,064	8,372		8,798							626	8,172	6	81	87
Carmen	Urban	4,323	820	753		753								753		92	92
	Rural	11,860	2,281	1,811		1,811							60	1,811		3	79
	Total	16,183	3,101	2,564		2,564							60	2,564		2	83
Jabonga	Urban	3,028	536	520		520							520			97	97
	Rural	17,838	3,135	3,135		3,135							3,135			100	100
	Total	20,866	3,671	3,655		3,655							3,655			100	100
Kitcharao	Urban	6,573	1,199	947		947							947			79	79
	Rural	8,543	1,565	1,070		1,070							1,070			68	68
	Total	15,116	2,764	2,017		2,017							2,017			73	73
Las Nieves	Urban	1,109	183	127		127							127			68	68
	Rural	23,325	4,114	2,457		2,457							2,457			60	60
	Total	24,434	4,302	2,584		2,584							2,584			60	60
Magallanes	Urban	13,265	2,356	412		412							412			17	17
	Rural	4,813	846	452		452							452			53	53
	Total	18,078	3,202	864		864							864			27	27
Nasipit	Urban	16,131	3,108	1,935		1,935							1,935			62	62
	Rural	19,332	3,593	3,535		3,535							3,535			98	98
	Total	35,463	6,701	5,470		5,470							5,470			82	82
Remedios T. Romualdez	Urban	3,758	665	547		547							547			82	82
	Rural	9,572	1,827	1,209		1,209							1,209			66	66
	Total	13,330	2,492	1,756		1,756							1,756			70	70
Santiago	Urban	8,058	1,283	997		997							997			78	78
	Rural	8,669	1,300	1,230		1,230							1,230			95	95
	Total	16,727	2,583	2,227		2,227							2,227			86	86
Tubay	Urban	3,226	556	366		366							366			66	66
	Rural	14,046	2,886	1,826		1,826							88	1,826		4	73
	Total	17,272	3,042	2,192		2,192							88	2,192		3	72
PW4SP Study Area	Urban	90,946	16,902	9,837		11,551							595	9,837	4	59	7
	Rural	187,763	34,097	31,124		36,372							31	23,272		68	11
	Total	278,709	50,699	32,961		38,343							148	33,109	1	65	9

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 (%)
Buenvista	7,963	6,960		6,960	87
Cabadbaran	10,935	2,000		2,000	18
Carmen	3,783	240		240	6
Jabonga	3,819	1,440		1,440	38
Kitcharao	2,874	1,920		1,920	67
Las Nieves	4,100	1,040		1,040	25
Magallanes	2,780	320		320	12
Nasipit	5,444	5,444		5,444	100
Remedios T. Romualdez	789	640		640	81
Santiago	3,332	2,600		2,600	78
Tubay	3,451	880		880	25
<b>PW4SP Study Area</b>	<b>49,270</b>	<b>23,484</b>		<b>23,484</b>	<b>48</b>

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 (%)
Buenvista	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal	1	1			1	1	100
	Parks/Playground	2	2			2	2	100
	Total	4	4			4	4	100
Cabadbaran	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal	1	1			1	1	100
	Parks/Playground	2	2			2	2	100
	Total	4	4			4	4	100
Carmen	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal							
	Parks/Playground	3	3			3	3	100
	Total	4	4			4	4	100
Iabonga	Public Market							
	Bus/Jeepney Terminal							
	Parks/Playground							
	Total							
Kitcharao	Public Market							
	Bus/Jeepney Terminal							
	Parks/Playground	2	2			2	2	100
	Total	2	2			2	2	100
Las Nieves	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal							
	Parks/Playground							
	Total	1	1			1	1	100
Magallanes	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal	1	1			1	1	100
	Parks/Playground							
	Total	2	2			2	2	100
Nasipit	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal	1	1			1	1	100
	Parks/Playground							
	Total	2	2			2	2	100
Remedios T. Romualdez	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal							
	Parks/Playground							
	Total	1	1			1	1	100
Santiago	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal							
	Parks/Playground							
	Total	1	1			1	1	100
Tubay	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal							
	Parks/Playground							
	Total	1	1			1	1	100
PW4SP Study Area	Public Market	9	9			9	9	100
	Bus/Jeepney Terminal	4	4			4	4	100
	Parks/Playground	9	9			9	9	100
	Total	22	22			22	22	100

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

Name of Municipality	No. of Household Served by Existing Facilities						Coverage in 1997						Coverage in 2003						
	Area		Facilities		Total	No. of HHs	Percentage of Served Households			Served Population			No. of HHs	Percentage of Served Households			Served Population		
	Urban	Rural	Pour Flush	VIP/Dry			Total	Flush	Pour Flush	VIP/Dry	Total	Number		%	Flush	Pour Flush	VIP/Dry	Total	Number
Buena Vista	Urban		2,103		2,103	2,788	75		75	10,853	75	3,192	66		66	12,525	66		
	Rural		4,113		4,113	5,989	69		69	9,984	69	6,858	60		60	25,685	60		
	Total		6,216		6,216	8,777	71		71	20,837	71	10,050	62		62	38,210	62		
Cabadbaran	Urban	595	2,249	2,844	3,103	19	72		92	15,645	92	3,514	17		81	17,670	81		
	Rural	31	5,923	5,954	6,961	85			86	14,624	86	7,884	75		76	36,176	75		
	Total	626	8,172	8,798	10,064	6	81		87	30,269	87	11,398	5		77	53,846	77		
Carmen	Urban			753	820	92			92	3,977	92	860	88		88	4,182	88		
	Rural	60	1,811	1,871	2,281	3	79		82	3,545	82	2,391	3		78	10,169	78		
	Total	60	2,564	2,624	3,101	2	83		85	7,522	85	3,251	2		79	14,351	81		
Jabonga	Urban	520		520	536	97			97	2,937	97	592	88		88	3,254	88		
	Rural	3,135		3,135	3,135	100			100	3,028	100	3,463	91		91	19,822	91		
	Total	3,655		3,655	3,671	100			100	5,965	100	4,055	90		90	23,076	90		
Kitcharao	Urban	947		947	1,199	79			79	5,193	79	1,318	72		72	5,719	72		
	Rural	1,070		1,070	1,565	68			68	4,470	68	1,720	62		62	6,415	62		
	Total	2,017		2,017	2,764	73			73	9,663	73	3,038	66		66	12,134	66		
Las Nieves	Urban	127		127	188	68			68	754	68	225	56		56	891	56		
	Rural	2,457		2,457	4,114	60			60	665	60	4,927	50		50	16,734	50		
	Total	2,584		2,584	4,302	60			60	1,419	60	5,152	50		50	17,625	50		
Magallanes	Urban	412		412	2,356	17			17	2,255	17	2,593	16		16	2,571	16		
	Rural	452		452	846	53			53	7,030	53	931	49		49	2,857	49		
	Total	864		864	3,202	27			27	9,285	27	3,524	25		25	5,428	25		
Nasipit	Urban	1,935		1,935	3,108	62			62	10,001	62	3,453	56		56	11,155	56		
	Rural	3,535		3,535	3,593	98			98	15,808	98	3,992	89		89	21,246	89		
	Total	5,470		5,470	6,701	82			82	25,809	82	7,445	73		73	32,401	73		
Remedios T. Romualdez	Urban	547		547	665	82			82	3,082	82	781	70		70	3,626	70		
	Rural	1,209		1,209	1,827	66			66	2,480	66	2,144	56		56	7,389	56		
	Total	1,756		1,756	2,492	70			70	5,562	70	2,925	60		60	11,015	60		
Santiago	Urban	997		997	1,283	78			78	6,285	78	1,566	64		64	7,681	64		
	Rural	1,230		1,230	1,300	95			95	7,655	95	1,586	78		78	10,070	78		
	Total	2,227		2,227	2,583	86			86	13,940	86	3,152	71		71	17,751	71		
Tubay	Urban		366	366	556	66			66	2,129	66	619	59		59	2,359	59		
	Rural	88	1,826	1,914	2,486	4	73		77	2,484	77	2,767	3		69	12,014	69		
	Total	88	2,192	2,280	3,042	3	72		75	4,613	75	3,386	3		67	14,373	67		
PW4SP Study Area	Urban	595	9,837	11,119	16,602	4	59	7	70	63,131	70	18,713	3		62	71,633	62		
	Rural	31	23,272	3,637	26,940	34,097	68	11	79	71,773	79	38,663	60		70	168,577	70		
	Total	626	33,109	4,756	38,491	50,699	1	65	9	76	134,884	76	57,376	1		8	240,210	67	

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

Name of Municipalities	Public School Toilets						Public Toilets					
	Std. No. of Students that can be Served by Base Year	Coverage in 1997		Coverage in 2003		Coverage in 1997			Coverage in 2003			
		Total No. of Public School Students	%	Total No. of Public School Students	%	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	%	
Buenvista	6,960	7,963	87	9,955	70	4	4	100	8	4	50	
Cabadbaran	2,000	10,935	18	13,485	15	4	4	100	8	4	50	
Carmen	240	3,783	6	4,122	6	4	4	100	7	4	57	
Jabonga	1,440	3,819	38	4,562	32				2			
Kitcharao	1,920	2,874	67	3,380	57	2	2	100	5	2	40	
Las Nieves	1,040	4,100	25	5,585	19	1	1	100	3	1	33	
Magallanes	320	2,780	12	3,314	10	2	2	100	5	2	40	
Nasipit	5,444	5,444	100	6,875	79	2	2	100	5	2	40	
Remedios T. Romualdez	640	789	81	1,934	33	1	1	100	4	1	25	
Santiago	2,600	3,332	78	4,295	61	1	1	100	4	1	25	
Tubay	880	3,451	25	3,969	22	1	1	100	4	1	25	
<b>Provincial Total</b>	<b>23,484</b>	<b>49,270</b>	<b>48</b>	<b>61,476</b>	<b>38</b>	<b>22</b>	<b>22</b>	<b>100</b>	<b>55</b>	<b>22</b>	<b>40</b>	



### 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 are 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	2,788,988	3,509,753	3,938,252	748,003	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 Norte	Population	365,421	465,458	514,488	136,967	219,463	216,488	228,454	245,995	297,997
	Growth Rate	2.45%		2.02%	4.83%		-0.77%	0.74%		3.91%
	Percentage 1/	13.2%	13.3%	13.1%	18.3%	14.5%	14.3%	11.4%	12.3%	12.3%

Note: 1/ Provincial population percentage to regional population

During the census year from 1980 to 1990 and from 1990 to 1995 which was the latest census year, the following population development was observed:

- The province recorded 2.45% of average annual growth rate (1980-1990) which was almost same as that of the region, but, 2.02% of average annual growth rate (1990-1995) was slight decrease compared with that of the region at 2.33%.
- Percentage of provincial population to the regional population slightly decreased from 13.2% in 1980 to 13.1% in 1995 caused by the lower growth rate of the province from 1990 to 1995 than that of the region.

##### 2) 1995 population distribution in urban and rural areas

The 1995 population census results conducted by NSO were reviewed in terms of population distribution to urban and rural areas. In application of 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**

Municipality	Total Population	1990 Census Data		Adjusted Population	
		Urban	Rural	Urban	Rural
Buenvista	45,011	13,825	31,186	13,825	31,186
Cabadbaran	51,905	16,312	35,593	16,312	35,593
Carmen	15,967	4,265	11,702	4,265	11,702
Jabonga	20,196	2,931	17,265	2,931	17,265
Kitcharao	14,679	6,375	8,304	6,375	8,304
Las Nieves	22,966	1,042	21,924	1,042	21,924
Magallanes	17,523	2,248	15,275	12,858	4,665
Nasipit	34,255	9,148	25,107	15,582	18,673
Remedios T. Romualdez	12,621	3,558	9,063	3,558	9,063
Santiago	15,616	7,523	8,093	7,523	8,093
Tubay	16,672	3,114	13,558	3,114	13,558
<b>PW4SP Study Area</b>	<b>267,411</b>	<b>70,341</b>	<b>197,070</b>	<b>87,385</b>	<b>180,026</b>
<b>Butuan City (Capital)</b>	<b>247,074</b>	<b>93,310</b>	<b>153,764</b>	<b>129,103</b>	<b>117,971</b>
<b>Provincial Total</b>	<b>514,485</b>	<b>163,651</b>	<b>350,834</b>	<b>216,488</b>	<b>297,997</b>

(2) Manner of population projection

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

As a local based projection, Regional Development Council of Caraga is currently preparing Regional Development Master Plan (1998-2008), however, the population projection has not been concluded yet. 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 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 the 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 of 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 the 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 Year<sub>2</sub>,  $P_1$ , in Year<sub>1</sub>, and n is the number of years between Year<sub>1</sub> and Year<sub>2</sub>. 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 following four types based on the 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 a type I province or municipality, the initial rate is equal to the lowest observed annual rate change in the ratio or the lower of 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 of the 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 Norte is classified as "Type I" based on the past level and trend of ratios of change, and initial rate of change was estimated at 0.0036. While, those of the municipalities were established as shown below.

<u>Municipality</u>	<u>Initial Ratio</u>	<u>Municipality</u>	<u>Initial Ratio</u>
Buonavista	0.00169	Magallanes	-0.00192
Cabadbaran	0.00070	Nasipit	-0.00104
Carmen	-0.00649	Remedios T. Romualdez	0.00390
Jabonga	-0.00155	Santiago	0.00727
Kitcharao	-0.00204	Tubay	-0.00086
Las Nieves	0.00566		

**(3) Present population (1997)**

The present population of the province including 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 have been 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 aforementioned method, as shown in Table 8.3.3, revealed that the future provincial population also reflected the discounted growth rate, same as regional population projection.

- Population in 2003 is resulted from average annual growth rate of 1.99% (1995-1998) and 1.95% (1998-2003).
- Population in 2010 with the base year of 2003 is resulted from average annual growth rate of 1.70% (2003-2010).
- Present profile of municipal population distribution both in urban and rural areas is assumed to prevail through the future.
- Household size in the year 2003 is assumed to be the same as the 1995 population census results, while that in the year 2010 is assumed to be 4 persons/household for the whole province in accordance with the target of the national family planning.

**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	1995	1997	2003	2010
						NSO Census	Base Year	Medium Term	Long Term
Region X	2.44	2.33 (4.5)	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 Norte	2.45	2.02	1.99	1.95	1.70	514,485 13.1%	534,797 12.9%	601,174 12.7%	676,502 12.4%

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

Table 8.3.4 shows provincial population by urban and rural area for the target years and the year 1995. Table 8.3.5 presents projected number of households for the target years.

**Table 8.3.4 Provincial Population for Target Years**

Area	Population/ Composition	1995	1997	2003	2010
Total	Population	514,485	534,797	601,174	676,502
Urban	Population	216,488	224,759	251,769	282,264
Area	Composition (%)	42			
Rural	Population	297,997	310,038	349,405	394,238
Area	Composition (%)	58			

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
Buenvista	5.19	5.45	5.37	2,663	5,720	8,383	2,788	5,989	8,777	3,192	6,838	10,050	4,744	10,702	15,446
Cabadbaran	5.48	5.33	5.38	2,976	6,672	9,648	3,103	6,961	10,064	3,514	7,884	11,398	5,454	11,900	17,354
Carmen	5.27	5.20	5.22	809	2,252	3,061	820	2,281	3,101	860	2,391	3,251	1,188	3,259	4,447
Jabonga	5.65	5.69	5.68	519	3,036	3,555	536	3,135	3,671	592	3,463	4,055	925	5,446	6,371
Kircharao	5.48	5.47	5.48	1,164	1,517	2,681	1,199	1,565	2,764	1,318	1,720	3,038	1,986	2,587	4,575
Las Nieves	5.89	5.67	5.68	177	3,868	4,045	188	4,114	4,302	225	4,927	5,152	398	8,367	8,765
Magallanes	5.63	5.69	5.65	2,283	820	3,103	2,556	846	3,202	2,593	931	3,524	4,018	1,458	5,476
Nasipit	5.19	5.38	5.30	3,000	3,469	6,469	3,108	3,593	6,701	3,453	3,992	7,445	4,980	5,968	10,948
Remedios T. Romualdez	5.65	5.24	5.35	630	1,729	2,359	665	1,827	2,492	781	2,144	2,925	1,295	3,299	4,594
Santiago	6.28	6.67	6.48	1,198	1,213	2,411	1,283	1,300	2,583	1,566	1,586	3,152	3,000	3,228	6,228
Tubay	5.80	5.65	5.68	537	2,398	2,935	556	2,486	3,042	619	2,767	3,386	1,000	4,355	5,355
PWASP Study Area	5.48	5.51	5.50	15,956	32,694	48,650	16,602	34,097	50,699	18,713	38,663	57,376	28,988	60,567	89,555

### 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		School Age Population	Total Enrollment		Public Sch. Enrollment Participation Rate		
		Number	Participation Rate		Number	Participation Rate		Number	Participation Rate		Number	Participation Rate			
Buena Vista	13,375	9,523	71	7,963	60	15,315	11,486	75	9,955	65	17,541	14,033	80	14,033	80
Cabacbaran	14,884	14,024	94	10,935	73	16,856	16,013	95	13,485	80	19,095	18,713	98	18,713	98
Carmen	4,626	4,094	88	3,783	82	4,849	4,607	95	4,122	85	5,085	4,983	98	4,983	98
Jabonga	5,899	3,819	65	3,819	65	6,517	4,562	70	4,562	70	7,203	5,402	75	5,402	75
Kitcharao	4,394	3,286	75	2,874	65	4,829	3,863	80	3,380	70	5,309	4,513	85	4,513	85
Las Nieves	7,174	4,100	57	4,100	57	8,593	5,585	65	5,585	65	10,294	7,206	70	7,206	70
Magallanes	5,020	3,336	66	2,780	55	5,524	3,867	70	3,314	60	6,081	4,561	75	4,561	75
Nasipit	9,520	7,854	83	5,444	57	10,577	9,519	90	6,875	65	11,756	11,168	95	11,521	98
R. T. Romualdez	5,490	789	14	789	14	6,445	1,934	30	1,934	30	7,567	2,648	35	2,648	35
Santiago	5,028	3,332	66	3,332	66	6,136	4,295	70	4,295	70	7,488	5,616	75	5,616	75
Tubay	3,753	3,451	92	3,451	92	4,178	3,969	95	3,969	95	4,652	4,419	95	4,419	95
PW4SP Study Area	79,163	57,608	73	49,270	62	89,819	69,700	78	61,476	68	102,071	83,262	82	83,919	82



### 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
Buena Vista	Public Market	1	1	2	1	3
	Bus/Jeepney Terminal	1	1	2	2	4
	Parks/Playground	2	2	4	2	6
	Total	4	4	8	5	13
Cabadbaran	Public Market	1	2	3	2	5
	Bus/Jeepney Terminal	1	1	2	2	4
	Parks/Playground	2	1	3	2	5
	Total	4	4	8	6	14
Carmen	Public Market	1	1	2	1	3
	Bus/Jeepney Terminal		1	1	1	2
	Parks/Playground	3	1	4	1	5
	Total	4	3	7	3	10
Jabonga	Public Market		1	1	1	2
	Bus/Jeepney Terminal		1	1	1	2
	Parks/Playground				1	1
	Total		2	2	3	5
Kitcharao	Public Market		1	1	1	2
	Bus/Jeepney Terminal		1	1	1	2
	Parks/Playground	2	1	3	2	5
	Total	2	3	5	4	9
Las Nieves	Public Market	1	1	2	1	3
	Bus/Jeepney Terminal					
	Parks/Playground		1	1	1	2
	Total	1	2	3	2	5
Magallanes	Public Market	1	1	2	1	3
	Bus/Jeepney Terminal	1	1	2	1	3
	Parks/Playground		1	1	1	2
	Total	2	3	5	3	8
Nasipit	Public Market	1	1	2	2	4
	Bus/Jeepney Terminal	1	1	2	2	4
	Parks/Playground		1	1	1	2
	Total	2	3	5	5	10
Remedios T. Romualdez	Public Market	1	1	2	1	3
	Bus/Jeepney Terminal		1	1	1	2
	Parks/Playground		1	1	1	2
	Total	1	3	4	3	7
Santiago	Public Market	1	1	2	1	3
	Bus/Jeepney Terminal		1	1	1	2
	Parks/Playground		1	1	1	2
	Total	1	3	4	3	7
Tubay	Public Market	1	1	2	1	3
	Bus/Jeepney Terminal		1	1	1	2
	Parks/Playground		1	1	1	2
	Total	1	3	4	3	7
PW4SP Study Area	Public Market	9	12	21	13	34
	Bus/Jeepney Terminal	4	10	14	13	27
	Parks/Playground	9	11	20	14	34
	Total	22	33	55	40	95

## 8.4 Types of Facilities and Implementation Criteria

### 8.4.1 Water Supply

#### (1) Urban water supply

##### 1) Untapped spring

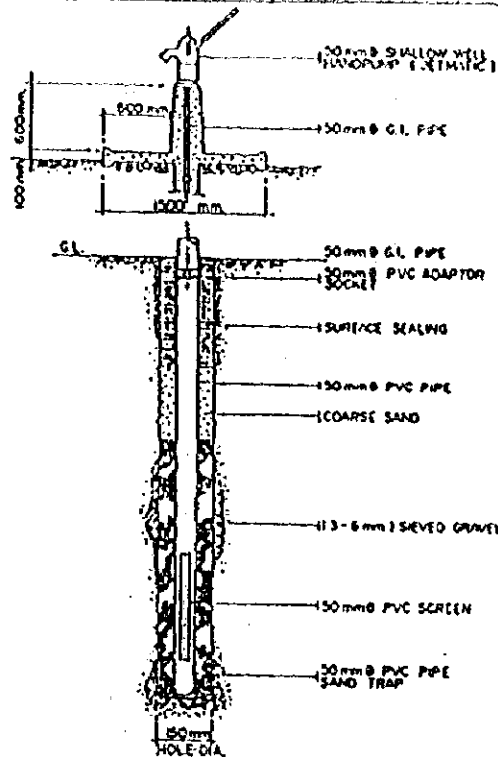
First priority is given to seek for utilization of untapped spring with large discharge capacity. During the course of PW4SP preparation, various untapped spring sources have been identified. Considerably large scale untapped spring sources having discharge capacity of more than 100 cu.m/day are then 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		Elev. Diff. (m)	Dist. from Mun. (km)	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)					Level III	Total	2003	2010
		100%	70%							
Kitcharao	Sangay	160	110	100	2.0	1,100	0	6,370	7,224	7,943

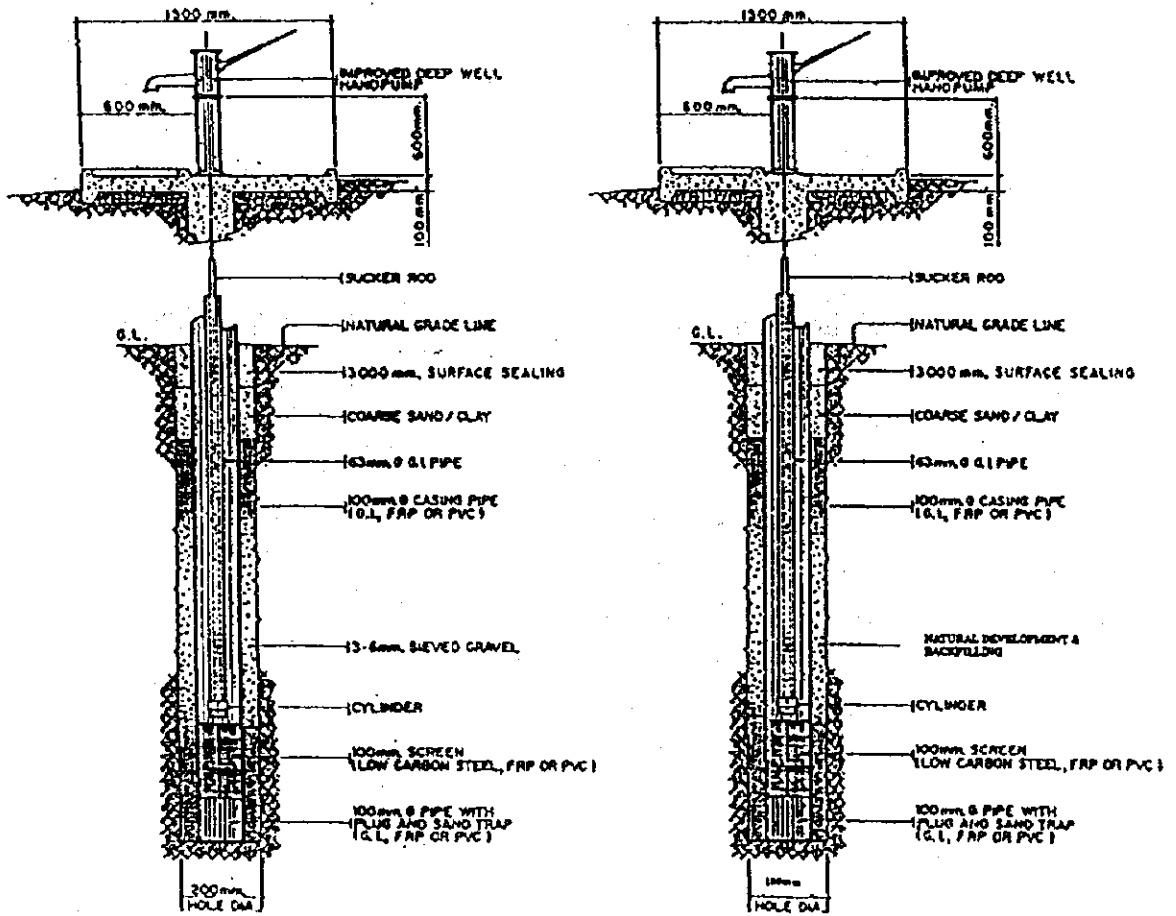
As shown in the table, the municipality of Kitcharao has one large scale untapped spring with reported discharge capacity of about 160 cu.m/day. A 70% discounted discharge capacity is taken into account in consideration of safe and dependable yield throughout the year, which is about 110 cu.m/day or about 1,100 persons maybe served by this source.

Although this municipality has no Level III system at present, about 6,300 persons are using other sources of water supply. Taking into account the magnitude of future urban population of about 7,200 by the end of Phase I development, the said untapped spring has insufficient capacity to cater for the whole urban area through the future. It is considered therefore, that this source may be utilized for Level II rural water supply in Barangay Sangay where the source is located. It shall be noted that confirmation of the difference of elevation between untapped spring and potential service area, as well as the distance and topographic conditions is prerequisite to realize this option.



OPEN HOLE DRILLING & GRAVEL PACK METHOD

SHALLOW WELLS



OPEN HOLE DRILLING & GRAVEL PACK METHOD

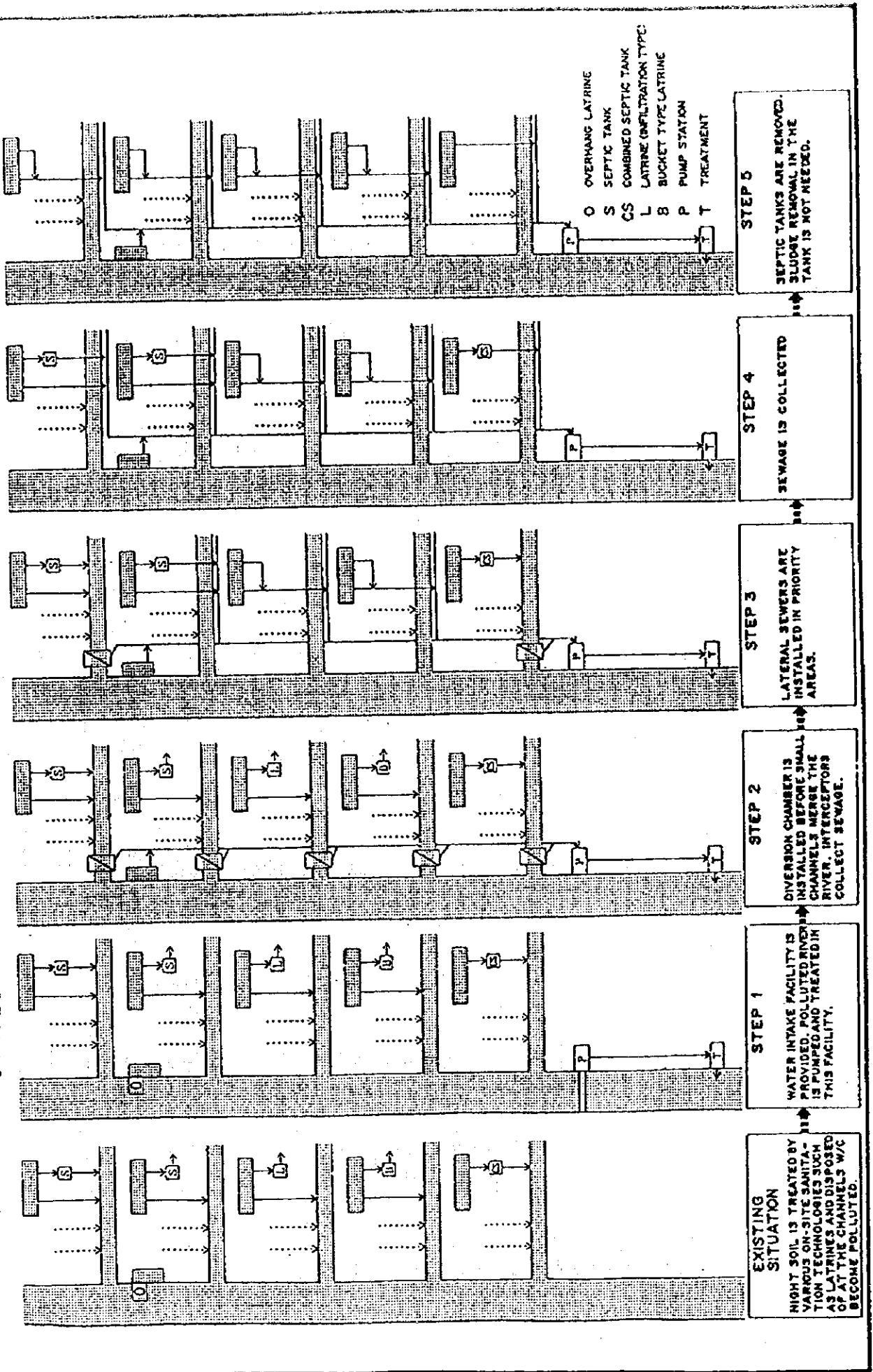
OPEN HOLE DRILLING & NATURAL GRAVEL PACK METHOD

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

Eighteen (18) 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:

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

Municipality	Number of Untapped Spring	Number of Barangays to be Served	Potential Number of Households to be Served	Population to be Served
Buenvista	4	4	400	2,180
Cabadbaran	1	1	100	533
Carmen				
Jabonga				
Kitcharao	3	3	300	1,641
Las Nieves				
Magallanes				
Nasipit	1	1	100	538
Remedios T. Romualdez	3	3	300	1,572
Santiago				
Tubay	6	6	600	3,390
<b>PW4SP Study Area</b>	<b>18</b>	<b>18</b>	<b>1,800</b>	<b>9,854</b>

#### 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:

Eighteen (18) untapped springs were considered to serve eighteen (18) Level II systems in eighteen (18) rural barangays of 6 municipalities.

#### (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)											
		Total			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		
Buena Vista	Urban		1,040	3,324	4,364	9,720	1,040	3,324	14,084	9,720						9,720
	Rural		4,868	5,084	9,952	37,376	7,048	17,246	24,294				2,180	12,162		14,342
	Total		5,908	8,408	14,316	53,945	8,088	20,570	38,378	9,720			2,180	12,162		24,062
Cabadbaran	Urban		14,879	14,879	19,257	1,489	14,879	16,368								1,489
	Rural		10,292	19,065	29,357	42,020	10,825	19,065	29,357				533			533
	Total		10,292	33,944	44,236	61,277	1,489	33,944	45,725	1,489			533			2,022
Carmen	Urban		3,445	158	3,603	4,531	248	3,445	158	3,851	248					248
	Rural		524	6,871	7,395	12,431	524	7,536	8,080				685			685
	Total		3,969	7,029	10,998	16,962	248	3,969	7,714	11,931	248			685		933
Jubonga	Urban		2,718		2,718	3,346	126	2,718	2,844							126
	Rural		11,111	1,057	12,168	19,707	11,111	1,699	12,810				642			642
	Total		13,829	1,057	14,886	23,053	126	13,829	15,654	126			642			768
Kitcharao	Urban		6,370		6,370	7,224		6,370	6,370							
	Rural		3,501	1,506	5,007	9,411	5,142	975	6,117			1,641				1,641
	Total		9,871	1,506	11,377	16,635	11,512	975	12,487			1,641				1,641
Las Nieves	Urban		528	581	1,109	1,328	20	528	581	1,129	20					20
	Rural		2,984	2,752	5,736	27,938	2,984	15,176	18,160				12,424			12,424
	Total		3,512	3,333	6,845	29,266	20	3,512	15,757	19,289	20		12,424			12,424
Magallanes	Urban		9,260		9,260	14,598	3,148	9,260	12,408	3,148						3,148
	Rural		2,692	27	2,719	5,296	2,692	750	3,442				723			723
	Total		11,952	27	11,979	19,894	3,148	11,952	15,850	3,148			723			3,871
Nasipit	Urban		9,804	3,613	13,417	17,923	11,622	3,613	15,215			1,818				1,818
	Rural		8,076	4,235	14,239	21,478	8,076	2,466	4,235	14,239			538			538
	Total		17,880	7,848	27,656	39,401	19,698	2,466	7,848	29,474			1,818			2,356
Remedios T. Romualdez	Urban		3,977	2,371	6,354	11,237	1,321	2,429	3,750	1,321						1,321
	Rural		3,977	4,806	8,783	15,649	1,321	5,549	4,184	11,054	1,321		1,572			1,572
	Total		7,954	7,177	15,137	26,886	2,642	8,003	15,238	2,642			1,572			3,143
Santiago	Urban		6,396	535	6,931	9,833	300	7,523	8,358	300						300
	Rural		13,919	535	14,454	20,412	300	13,919	1,015	15,234	300		480			480
	Total		20,315	1,070	21,385	30,245	600	21,442	9,373	30,492	600		480			880
Tubay	Urban		1,108		1,108	3,591	1,944	1,108	3,052							1,944
	Rural		168	4,106	4,274	15,636	3,538	6,605	10,163			3,390	2,499			5,889
	Total		1,276	4,106	5,382	19,227	1,944	4,666	13,215	1,944		3,390	2,499			7,833
PW4SP Study Area	Urban		9,804	31,992	67,315	102,612	29,938	31,992	87,449	20,134						20,134
	Rural		8,076	48,441	103,597	213,109	8,076	58,279	140,842	9,854			29,615			39,469
	Total		17,880	80,433	170,912	315,721	38,014	90,271	228,291	30,000			29,615			59,603

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	Service Coverage			Additional Population to be Served					
		Level III	Level II	Level I		Total	Level III	Level II	Level I	Total	Level III	Level II	Level I	Total
Buena Vista	Urban	9,720	1,040	3,324	14,084	18,977	18,028	18,028	8,308					8,308
	Rural		7,048	17,246	24,294	42,809			7,048	32,764				15,518
	Total	9,720	8,088	20,570	38,378	61,786	18,028	18,028	8,308	32,764				23,826
Cabadbaran	Urban	1,489		14,879	16,368	21,815	20,724	20,724	19,235					19,235
	Rural		10,825	19,065	29,890	47,600			10,825	33,443				14,378
	Total	1,489	10,825	33,944	46,258	69,415	20,724	20,724	19,235	33,443				33,613
Carmen	Urban	248	3,445	158	3,851	4,752	4,514	4,514	4,266					4,266
	Rural		524	7,556	8,080	13,037			524	11,600				4,044
	Total	248	3,969	7,714	11,931	17,789	4,514	4,514	4,266	11,600				4,044
Jabonga	Urban	126	2,718		2,844	3,698	3,513	3,513	3,387					3,387
	Rural		1,111	1,699	2,810	21,782			1,111	9,146				7,447
	Total	126	3,829	1,699	5,529	25,480	3,513	3,513	3,387	9,146				10,834
Kitcharao	Urban		6,370		6,370	7,943	7,546	7,546	7,546					7,546
	Rural		5,142	975	6,117	10,346			5,142	4,480				3,505
	Total		11,512	975	12,487	18,289	7,546	7,546	7,546	4,480				3,505
Las Nieves	Urban	20	528	581	1,129	1,591	1,511	1,511	1,491					1,491
	Rural		2,984	15,176	18,160	33,468			2,984	28,141				12,965
	Total	20	3,512	15,757	19,289	35,059	1,511	1,511	1,491	28,141				14,456
Magallanes	Urban	3,148	9,260		12,408	16,070	15,267	15,267	12,119					12,119
	Rural		2,692	750	3,442	5,831			2,692	2,731				1,981
	Total	3,148	11,952	750	15,850	21,901	15,267	15,267	12,119	20,990				14,100
Nasipit	Urban	11,622	2,466	4,235	14,777	23,872	8,076	8,076	7,302					7,302
	Rural		2,466	7,848	10,314	43,792	27,000	27,000	2,466	11,659				7,424
	Total	11,622	4,932	12,073	25,091	67,664	35,076	35,076	9,778	22,201				14,726
Remedios T. Romualdez	Urban	1,321	5,549	1,755	7,304	13,194	4,921	4,921	3,600					3,600
	Rural		5,549	4,184	11,054	18,374			5,549	6,721				4,966
	Total	1,321	11,098	5,939	18,374	31,568	4,921	4,921	3,600	6,721				8,566
Santiago	Urban	300	6,396	480	6,876	12,910	11,401	11,401	11,101					11,101
	Rural		1,108	1,015	2,123	17,411			1,108	5,610				5,130
	Total	300	7,504	1,495	8,999	30,321	11,401	11,401	11,101	11,101				16,231
Tubay	Urban	1,944	4,666	6,605	13,215	21,410	3,799	3,799	1,855					1,855
	Rural		3,538	6,605	10,143	17,411			3,538	12,634				6,029
	Total	1,944	8,204	13,215	31,558	38,821	3,799	3,799	1,855	12,634				7,884
PW4SP Study Area	Urban	29,938	31,992	25,519	87,449	115,946	110,148	110,148	80,210					80,210
	Rural	8,076	58,295	75,542	141,913	242,260	8,076	8,076	58,295	158,929				83,387
	Total	38,014	90,287	101,061	229,362	358,206	118,224	118,224	58,295	158,929				163,597



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 Based 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	
Buenavista	Urban	2,103			2,103	3,192	575	2,154	144	2,873	575		51	144	770
	Rural	4,113			4,113	6,858	5,246	583	5,829	1,133		1,133	583	1,716	
	Total	6,216			6,216	10,050	575	7,400	727	8,702	575		1,184	727	2,486
Cabadbaran	Urban	595	2,249		2,844	3,514	633	2,372	158	3,163	38		123	158	319
	Rural	31	5,923		5,954	7,884	31	6,000	670	6,701	38		77	670	747
	Total	626	8,172		8,798	11,398	664	8,372	828	9,864	77		200	828	1,066
Carmen	Urban		60		60	860	155	580	39	774	155		580		735
	Rural		1,871		1,871	2,391	1,829	2,409	203	2,032	155		1,769		1,769
	Total		1,931		1,931	3,251	155	2,409	242	2,806	155		2,349		2,349
Jabonga	Urban		520		520	592	107	399	27	533	107		27	134	314
	Rural		3,135		3,135	3,463	2,821	3,220	341	3,668	107			341	448
	Total		3,655		3,655	4,055	107	1,127	59	1,186	107		180	59	239
Kitcharao	Urban		947		947	1,318		1,316	146	1,462			246	146	392
	Rural		1,070		1,070	1,720	2,443	2,443	205	2,648			426	205	631
	Total		2,017		2,017	3,038	20	173	10	203	20		46	10	76
Las Nieves	Urban		127		127	225	20	173	10	203	20		46	10	76
	Rural		2,457		2,457	4,927	3,769	4,193	419	4,188	20		1,312	419	1,731
	Total		2,584		2,584	5,152	20	3,942	429	4,391	20		1,358	429	1,807
Magallanes	Urban		412		412	2,593	467	1,750	117	2,334	467		1,338	117	1,922
	Rural		452		452	931	712	79	79	791			260	79	339
	Total		864		864	3,524	467	2,462	196	3,125	467		1,598	196	2,261
Nasipit	Urban		1,935		1,935	3,453	622	2,331	155	3,108	622		396	155	1,173
	Rural		3,535		3,535	3,992	3,181	3,54	354	3,535			354	354	354
	Total		5,470		5,470	7,445	622	5,512	509	6,643	622		396	509	1,527
Remedios T. Romualdez	Urban		547		547	781	141	527	35	703	141		35	176	613
	Rural		1,209		1,209	2,144	1,640	1,822	182	1,822	141		431	182	789
	Total		1,756		1,756	2,925	141	2,167	217	2,525	141		431	217	789
Santiago	Urban		997		997	1,566	282	1,057	70	1,409	282		60	70	412
	Rural		1,230		1,230	1,586	1,213	1,35	1,348			60	135	135	
	Total		2,227		2,227	3,152	282	2,270	205	2,757	282		60	205	547
Tubay	Urban		366		366	619	111	418	28	557	111		418		529
	Rural		1,826		1,826	2,767	2,535	2,63	2,63	2,909	111		2,447		2,029
	Total		2,192		2,192	3,386	111	2,117	235	2,352	111		2,447		2,538
PWASP Study Area	Urban	595	9,837		11,551	18,713	3,113	12,888	842	16,843	2,518		3,192	775	6,485
	Rural	31	23,272		26,940	38,663	31	29,844	3,320	33,195	7,257		2,882	10,139	
	Total	626	33,109		38,491	57,376	3,144	42,732	4,162	50,038	2,518		10,449	3,657	16,624

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)							
		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
Buenavista	Urban	575	2,154	144	2,873	4,744	2,254	2,109	144	4,507	1,679			1,679
	Rural		5,246	583	5,829	10,702	9,584		583	10,167	4,338			4,338
	Total	575	7,400	727	8,702	15,446	2,254	11,693	727	14,674	1,679			6,017
Cabadbaran	Urban	633	2,372	158	3,163	5,454	2,591	2,432	158	5,181	1,958			2,018
	Rural	31	6,000	670	6,701	11,900	31	10,604	670	11,305	4,604			4,604
	Total	664	8,372	828	9,864	17,354	2,622	13,036	828	16,486	1,958			6,622
Carmen	Urban	155	580	39	774	1,188	565	525	39	1,129	410			410
	Rural		1,829	203	2,032	3,259	2,893	203	3,096	1,064				1,064
	Total	155	2,409	242	2,806	4,447	565	3,418	242	4,225	410			1,474
Jabonga	Urban	107	399	27	533	925	440	412	27	879	333			346
	Rural		2,821	314	3,135	5,446	4,860	314	5,174	2,039				2,039
	Total	107	3,220	341	3,668	6,371	440	5,272	341	6,053	333			2,385
Kitcharao	Urban		1,127	59	1,186	1,986	944	884	59	1,887	944			944
	Rural		1,316	146	1,462	2,587	2,312	146	2,458	996				996
	Total		2,443	205	2,648	4,573	944	3,196	205	4,345	944			1,940
Las Nieves	Urban	20	173	10	203	398	189	179	10	378	169			175
	Rural		3,769	419	4,188	8,367	7,530	419	7,949	3,761				3,761
	Total	20	3,942	429	4,391	8,765	189	7,709	429	8,327	169			3,936
Magallanes	Urban	467	1,750	117	2,334	4,018	1,909	1,791	117	3,817	1,442			1,483
	Rural		712	79	791	1,458	1,306	79	1,385	594				594
	Total	467	2,462	196	3,125	5,476	1,909	3,097	196	5,202	1,442			2,077
Nasipit	Urban	622	2,331	155	3,108	4,980	2,366	2,210	155	4,731	1,744			1,744
	Rural		3,181	354	3,535	5,968	5,316	354	5,670	2,135				2,135
	Total	622	5,512	509	6,043	10,948	2,366	7,526	509	10,401	1,744			3,879
Remedios T. Romualdez	Urban	141	527	35	703	1,295	615	580	35	1,230	474			527
	Rural		1,640	182	1,822	3,299	2,952	182	3,134	1,312				1,312
	Total	141	2,167	217	2,525	4,594	615	3,532	217	4,364	474			1,839
Santiago	Urban	282	1,057	70	1,409	3,000	1,425	1,355	70	2,850	1,143			1,143
	Rural		1,213	135	1,348	3,228	2,932	135	3,067	1,719				1,719
	Total	282	2,270	205	2,757	6,228	1,425	4,287	205	5,917	1,143			3,160
Tubay	Urban	111	418	28	557	1,000	475	447	28	950	364			393
	Rural		2,117	235	2,352	4,353	3,900	235	4,135	1,783				1,783
	Total	111	2,535	263	2,909	5,353	475	4,347	263	5,085	364			2,176
PWASP Study Area	Urban	3,113	12,888	842	16,843	28,988	13,773	12,924	842	27,539	10,660			11,160
	Rural	31	29,844	3,320	33,195	60,567	31	54,189	3,320	57,540	24,345			24,345
	Total	3,144	42,732	4,162	50,038	89,555	13,804	67,113	4,162	85,079	10,660			35,505

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
Buenvista	6,960	9,955	7,964	1,004	14,033	12,630	4,666
Cabadbaran	2,000	13,485	10,788	8,788	18,713	16,842	6,054
Carmen	240	4,122	3,298	3,058	4,983	4,485	1,187
Jabonga	1,440	4,562	3,650	2,210	5,402	4,862	1,212
Kitcharao	1,920	3,380	2,704	784	4,513	4,062	1,358
Las Nieves	1,040	5,585	4,468	3,428	7,206	6,485	2,017
Magallanes	320	3,314	2,651	2,331	4,865	4,379	1,728
Nasipit	5,444	6,875	5,500	56	11,521	10,369	4,869
Remedios T. Romualdez	640	1,934	1,547	907	2,648	2,383	836
Santiago	2,600	4,295	3,436	836	5,616	5,054	1,618
Tubay	880	3,969	3,175	2,295	4,419	3,977	802
<b>PW4SP Study Area</b>	<b>23,484</b>	<b>61,476</b>	<b>49,181</b>	<b>25,697</b>	<b>83,919</b>	<b>75,528</b>	<b>26,347</b>

Table A.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 I 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 Toilets Facilities	Add'l. No. of Public Utilities with Sanitary Toilets	No. of PU with Toilets Facilities	Add'l. No. of Public Utilities with Sanitary Toilets	No. of PU with Sanitary Toilets
Buena Vista	Public Market	1	1	2	1	2	3	1	3	
	Bus/Jersey Terminal	1	1	2	1	2	4	2	4	
	Parks/Playground	2	2	4	2	4	6	2	6	
	Total	4	4	8	4	8	13	5	13	
Cibadbaran	Public Market	1	1	3	2	3	5	2	5	
	Bus/Jersey Terminal	1	1	2	1	2	4	2	4	
	Parks/Playground	2	2	3	1	3	5	2	5	
	Total	4	4	8	4	8	14	6	14	
Carmen	Public Market	1	1	2	1	2	3	1	3	
	Bus/Jersey Terminal	1	1	1	1	2	2	1	2	
	Parks/Playground	3	3	4	1	4	5	1	5	
	Total	4	4	7	3	7	10	3	10	
Jabonga	Public Market	1	1	1	1	1	2	1	2	
	Bus/Jersey Terminal	1	1	1	1	2	1	1	2	
	Parks/Playground	1	1	2	2	2	5	3	5	
	Total	2	2	4	4	4	8	5	8	
Kitcharao	Public Market	1	1	1	1	1	2	1	2	
	Bus/Jersey Terminal	1	1	1	1	2	1	1	2	
	Parks/Playground	2	2	3	1	3	5	2	5	
	Total	3	3	5	3	6	8	4	8	
Las Nieves	Public Market	1	1	2	1	2	3	1	3	
	Bus/Jersey Terminal	1	1	1	1	2	1	1	2	
	Parks/Playground	1	1	2	2	2	5	3	5	
	Total	2	2	5	4	5	9	5	9	
Magallanes	Public Market	1	1	1	1	1	2	1	2	
	Bus/Jersey Terminal	1	1	1	1	2	1	1	2	
	Parks/Playground	1	1	2	1	2	3	1	3	
	Total	2	2	4	3	5	6	3	6	
Nasipit	Public Market	1	1	2	1	2	4	2	4	
	Bus/Jersey Terminal	1	1	2	1	2	4	2	4	
	Parks/Playground	1	1	1	1	2	2	1	2	
	Total	2	2	5	3	6	10	5	10	
Nemecades T. Romualdez	Public Market	2	2	3	1	3	5	1	5	
	Bus/Jersey Terminal	1	1	2	1	2	3	1	3	
	Parks/Playground	1	1	1	1	2	2	1	2	
	Total	4	4	6	3	7	10	3	10	
Santiago	Public Market	1	1	2	1	2	3	1	3	
	Bus/Jersey Terminal	1	1	1	1	2	1	1	2	
	Parks/Playground	1	1	1	1	2	2	1	2	
	Total	3	3	4	3	6	6	3	6	
Tubbay	Public Market	1	1	2	1	2	3	1	3	
	Bus/Jersey Terminal	1	1	1	1	2	2	1	2	
	Parks/Playground	1	1	4	3	4	7	3	7	
	Total	3	3	7	5	8	12	5	12	
PWASP Study Area	Public Market	9	9	21	12	21	34	13	34	
	Bus/Jersey Terminal	4	4	14	10	14	27	13	27	
	Parks/Playground	9	9	20	11	20	34	14	34	
	Total	22	22	55	33	55	95	40	95	

## 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 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. Eighteen (18) untapped springs suitable for Level II system were confirmed during this PW4SP preparation.

#### (2) Required well drilling and rehabilitation equipment

Presently, one unit of truck-mounted percussion drilling rig and one unit of trailer-mounted rotary drilling rig are available PEO in the province.

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 and the easiness of technical operation. Both types of percussion and rotary are suitable for soft and hard formations. The percussion type can be easily operated and maintained without special training to drillers. Compared with the latter, it is very useful to bore in boulder and cobble formations. Thus, the drilling equipment of percussion type is recommended 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	No. of Barangay Served	Served Population	Type of Water Source	Plan for Expansion	Additional Population to be Served	Number of House Connections	Average Water Demand (m <sup>3</sup> /day)	Number of Spring Dev't/ Deep Well	Additional Population to be Served	Number of House Connections	Average Water Demand (m <sup>3</sup> /day)	Number of Spring Dev't/ Deep Well	
Buena Vista	Not Applicable	Urban	N.A.	N.A.	N.A.	N.A.	9,720	1,873	972	2	8,308	2,077	831	2	
		Rural	N.A.	N.A.											
		Total													
Cabadbaran	Not Applicable	Urban	N.A.	N.A.	N.A.	N.A.	1,489	272	149	1	19,235	4,809	1,924	3	
		Rural	N.A.	N.A.											
		Total													
Carmen	Not Applicable	Urban	N.A.	N.A.	N.A.	N.A.	248	47	25	1	4,266	1,067	427	1	
		Rural	N.A.	N.A.											
		Total													
Jabonga	Not Applicable	Urban	N.A.	N.A.	N.A.	N.A.	126	22	13	1	3,387	847	339	1	
		Rural	N.A.	N.A.											
		Total													
Kitcharao	Not Applicable	Urban	N.A.	N.A.	N.A.	N.A.					7,546	1,887	755	1	
		Rural	N.A.	N.A.											
		Total													
Las Nieves	Not Applicable	Urban	N.A.	N.A.	N.A.	N.A.	20	3	2	1	1,491	373	149	1	
		Rural	N.A.	N.A.											
		Total													
Magallanes	Not Applicable	Urban	N.A.	N.A.	N.A.	N.A.	3,148	559	315	1	12,119	3,030	1,212	2	
		Rural	N.A.	N.A.											
		Total													
Nasipit	Nasipit WD	Urban	7	9,804	DW/SP	No	1,818	350	182	1	7,302	1,826	730	1	
		Rural	6	8,076											
		Total	13	17,880											
Remedios T. Romualdez	Not Applicable	Urban	N.A.	N.A.	N.A.	N.A.	1,321	234	132	1	3,600	900	360	1	
		Rural	N.A.	N.A.											
		Total													
Santago	Not Applicable	Urban	N.A.	N.A.	N.A.	N.A.	300	48	30	1	11,101	2,775	1,110	2	
		Rural	N.A.	N.A.											
		Total													
Tubay	Not Applicable	Urban	N.A.	N.A.	N.A.	N.A.	1,944	335	194	1	1,855	464	186	1	
		Rural	N.A.	N.A.											
		Total													
PW4SP Study Area		Urban	7	9,804			20,134	3,743	2,014	11	80,210	20,055	8,023	16	
		Rural	6	8,076											
		Total	13	17,880											

Table 8.6.2 Plan for Expansion of Existing Level III Systems

Name of Municipality	Name of Operating Body	Additional Areas Barangay to be Covered	Additional Population to be Served	Additional Water Sources	
				Type	Capacity (m <sup>3</sup> /day)
Nasipit	Nasipit WD				

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	Number of Deep Wells			No. of Shallow Wells	Total				
			40 m	80 m	120 m			40 m	80 m	120 m			Sub-total	Sub-total		
Buenavista	4	80	23		23	126	149		39		39	220	259			
Cabadbaran	1	20		1	1	8	9		72	7	72	168	240			
Carmen					2	6	8					19	106			
Jabonga	3	60				131	146		11		11	48	59			
Kitcharao					15	7	8		22		22	195	217			
Las Nieves					7	1	8		28		28	6	34			
Magallanes	1	20							38		38	86	124			
Nasipit	3	60							25		25	58	83			
Remedios T. Romualdez			1			4	5		9		9	77	86			
Santiago	6	120	9		9	20	29		31		31	70	101			
Tubay					54	296	354		39	255	7	301	1,396			
PW4SP Study Area	18	360	3		1	58	354									

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 (85%)					Share of Public Facility (85%)					Share of Public Facility (85%)					Share of Public Facility (85%)							
	Percentage Allocated to Public Wells (90%) and					Percentage Allocated to Public Wells (90%) and					Percentage Allocated to Public Wells (90%) and					Percentage Allocated to Public Wells (90%) and							
	Number of Deep Wells		No. of Shallow		Total	Number of Deep Wells		No. of Shallow		Total	Number of Deep Wells		No. of Shallow		Total	Number of Deep Wells		No. of Shallow		Total			
40 m	80 m	120 m	Sub-total	18		96	114	13	127		40 m	80 m	120 m	Sub-total		30	168	198	40 m		80 m	120 m	Sub-total
Buenavista																							
Cabadbaran																							
Carmen																							
Jabonga																							
Kitcharao																							
Las Nieves																							
Magallanes																							
Nasipit																							
Remedios T. Romualdez																							
Santiago																							
Tubay																							
PW4SP Study Area	2	42	1		45	226	271	302	31	197	6	234	833	1,067	1,180								



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

- 1 set for the total 45 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

- 1 set for 10% of 45 Level I deep wells

Support vehicle:

Type - pick-up truck with winch, double cab

Required number

- 1 unit 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:

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

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		Flush	Pour Flush	VIP/Dry	Total	
Buenavista	575	51	144	770	575	51	144	770	1,679	1,679	1,679	1,679	1,679	60	1,958	1,958	60	2,018	2,018	
Cabadbaran	38	123	158	319	38	123	158	319	1,958	1,958	410	410	410	13	346	346	13	346	346	
Carmen	155	580	735	1,555	155	580	735	1,555	1,744	1,744	333	333	333	6	1,750	1,750	6	1,756	1,756	
Jabonga	107	27	134	241	107	27	134	241	944	944	944	944	944	298	1,442	1,442	298	1,740	1,740	
Kitcharao	180	59	239	478	180	59	239	478	1,744	1,744	1,744	1,744	1,744	53	2,039	2,039	53	2,092	2,092	
Las Nieves	20	46	10	76	20	46	10	76	169	169	169	169	169	41	2,135	2,135	41	2,176	2,176	
Magallanes	467	1,338	1,173	3,022	467	1,338	1,173	3,022	1,744	1,744	1,744	1,744	1,744	298	2,042	2,042	298	2,340	2,340	
Nasipit	622	396	135	1,173	622	396	135	1,173	1,744	1,744	1,744	1,744	1,744	29	1,773	1,773	29	1,802	1,802	
Remedios T. Romualdez	141	35	176	352	141	35	176	352	474	474	474	474	474	298	1,441	1,441	298	1,739	1,739	
Santiago	282	60	70	412	282	60	70	412	1,143	1,143	364	364	364	500	10,660	10,660	500	11,160	11,160	
Tubay	111	418	529	1,057	111	418	529	1,057	6485	6485	775	775	775	2,882	10,139	10,139	2,882	13,021	13,021	
PW4SP Study Area	2,518	3,192	775	6,485	2,518	3,192	775	6,485	6,485	6,485	500	500	500	24,345	24,345	24,345	24,345	48,690	48,690	

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		Flush	Pour Flush	VIP/Dry	Total	
Buenavista	1,133	583	1,716	3,432	1,133	583	1,716	3,432	4,338	4,338	4,338	4,338	4,338	4,604	8,942	8,942	4,604	13,546	13,546	
Cabadbaran	77	670	747	1,487	77	670	747	1,487	1,064	1,064	1,064	1,064	1,064	2,039	3,103	3,103	2,039	5,142	5,142	
Carmen	1,769	1,769	1,769	5,307	1,769	1,769	1,769	5,307	996	996	996	996	996	3,761	9,067	9,067	3,761	12,828	12,828	
Jabonga	314	314	314	942	314	314	314	942	314	314	314	314	314	996	1,308	1,308	996	2,304	2,304	
Kitcharao	246	146	392	784	246	146	392	784	392	392	392	392	392	594	986	986	594	1,580	1,580	
Las Nieves	1,312	419	1,731	3,462	1,312	419	1,731	3,462	339	339	339	339	339	2,135	5,597	5,597	2,135	7,732	7,732	
Magallanes	260	79	339	678	260	79	339	678	354	354	354	354	354	1,312	1,666	1,666	1,312	2,978	2,978	
Nasipit	431	182	613	1,226	431	182	613	1,226	135	135	135	135	135	1,719	2,854	2,854	1,719	4,573	4,573	
Remedios T. Romualdez	431	182	613	1,226	431	182	613	1,226	2,029	2,029	2,029	2,029	2,029	1,783	3,812	3,812	1,783	5,595	5,595	
Santiago	2,029	2,029	2,029	6,087	2,029	2,029	2,029	6,087	2,882	2,882	2,882	2,882	2,882	10,139	13,021	13,021	2,882	15,903	15,903	
Tubay	7,257	2,882	10,139	20,278	7,257	2,882	10,139	20,278	24,345	24,345	24,345	24,345	24,345	24,345	48,690	48,690	24,345	73,035	73,035	
PW4SP Study Area	7,257	2,882	10,139	20,278	7,257	2,882	10,139	20,278	24,345	24,345	24,345	24,345	24,345	24,345	48,690	48,690	24,345	73,035	73,035	

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
Buenvista	1,004	26	6	4,666	117	24
Cabadbaran	8,788	220	44	6,054	152	31
Carmen	3,058	77	16	1,187	30	6
Jabonga	2,210	56	12	1,212	31	7
Kitcharao	784	20	4	1,358	34	7
Las Nieves	3,428	86	18	2,017	51	11
Magallanes	2,331	59	12	1,728	44	9
Nasipit	56	2	1	4,869	122	25
Remedios T. Romualdez	907	23	5	836	21	5
Santiago	836	21	5	1,618	41	9
Tubay	2,295	58	12	802	21	5
PW4SP Study Area	25,697	648	135	26,347	664	139

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			Total			Number of Public Toilets			Total		
	Public Market	Bus/Jeepney Terminal	Parks/Playground	Public Market	Bus/Jeepney Terminal	Parks/Playground	Public Market	Bus/Jeepney Terminal	Parks/Playground	Public Market	Bus/Jeepney Terminal	Parks/Playground
Buenvista	1	1	2	4	1	2	1	2	2	1	2	5
Cabadbaran	2	1	1	4	2	1	2	2	2	2	2	6
Carmen	1	1	1	3	1	1	1	1	1	1	1	3
Jabonga	1	1	1	2	1	1	1	1	1	1	1	3
Kitcharao	1	1	1	3	1	1	1	1	2	1	2	4
Las Nieves	1	1	1	2	1	1	1	1	1	1	1	2
Magallanes	1	1	1	3	1	1	1	1	1	1	1	3
Nasipit	1	1	1	3	2	1	2	2	1	1	1	5
Remedios T. Romualdez	1	1	1	3	1	1	1	1	1	1	1	3
Santiago	1	1	1	3	1	1	1	1	1	1	1	3
Tubay	1	1	1	3	1	1	1	1	1	1	1	3
PW4SP Study Area	12	10	11	33	13	13	13	13	14	13	14	40

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**SECTOR IMPLEMENTATION  
ARRANGEMENTS**





- 9            **SECTOR MANAGEMENT FOR MEDIUM-TERM DEVELOPMENT**
- 9.4        **Project Management Arrangements**
- 9.4.1      **Project Approach/Strategy**

**PROJECT IMPLEMENTATION ARRANGEMENT AND PROCEDURE**

Together with the following Figures (Figure 9.4.1 and 9.4.2), will show the project implementation arrangement and procedure for Level I and sanitation from national level to barangay levels, which are designed to encourage active participation of implementers and beneficiaries in undertaking the project.

**(1) National Government Level**

Project Planning/Launching Workshop as start-up activity will be conducted to introduce and orient the implementers on the Project, define their roles, responsibilities and relationships among them and formulate provincial action plans. The Consultant, upon completion of the training needs assessment and development of appropriate training programs shall conduct capacity enhancement for the WSS-PMO Staff, NGOs, DPWH and DOH representatives. This activity aims to strengthen their competence in technical, managerial, training and community organizing and gender responsiveness. The trained members are responsible to facilitate the organization/reactivation of the PWSO and information dissemination for the provincial officials to secure their support and commitment to the Project. With the assistance from the Consultant, they will enhance the capacity of the PWSO, the MSLT and COs/NGOs in planning, implementing, monitoring and evaluating the project.

**(2) Local Government Level**

The PWSO shall assist the MSLT in each municipality and conduct information dissemination for the municipal officials to orient them on the project and obtain their support and commitment. With the PWSO assistance, the trained MSLT members shall select priority barangays, in coordination with the municipal development council. The Team will be responsible for facilitating barangay activities such as consultation meetings with barangay officials and community members, barangay survey and spot mapping, formation of BWSA/RWSA, pre-construction conference, and supervision of construction. Skills training will be conducted for the operating body in maintaining

and managing the project. They shall also provide continuing assistance and monitor the activities of the beneficiaries and status of the project.

(3) Barangay Level

The barangay officials/development councils shall provide support to the PWSO and MSLT members in conducting activities and mobilizing resources in the barangay. Men and women volunteer shall conduct barangay survey and spot mapping to confirm their demand for the level of service, HH latrines and willingness to operate and maintain the facilities and counterpart. The community members decide on the operating body, tap existing community-based organization or organize a BWSA/RWSA. They have also to agree on the monthly water fees and provide labor and local materials during the construction of facilities. The BOD/Officers, Bookkeeper and Caretaker of the operating body shall attend skills training to develop their competence in performing their jobs. The beneficiaries shall provide information and request assistance from the PWSO/MSLT members, if necessary.

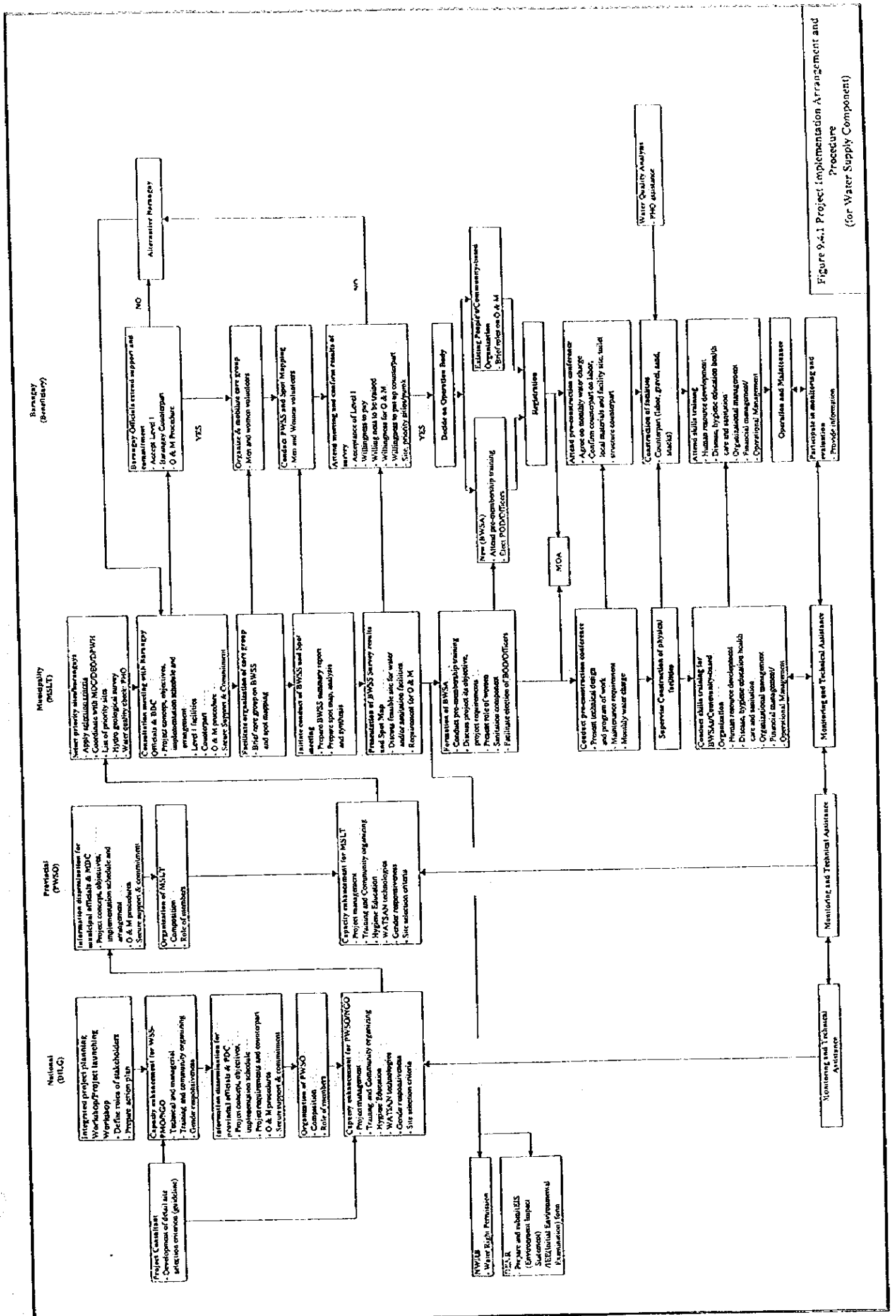


Figure 9.4.1 Project Implementation Arrangement and Procedure (for Water Supply Component)



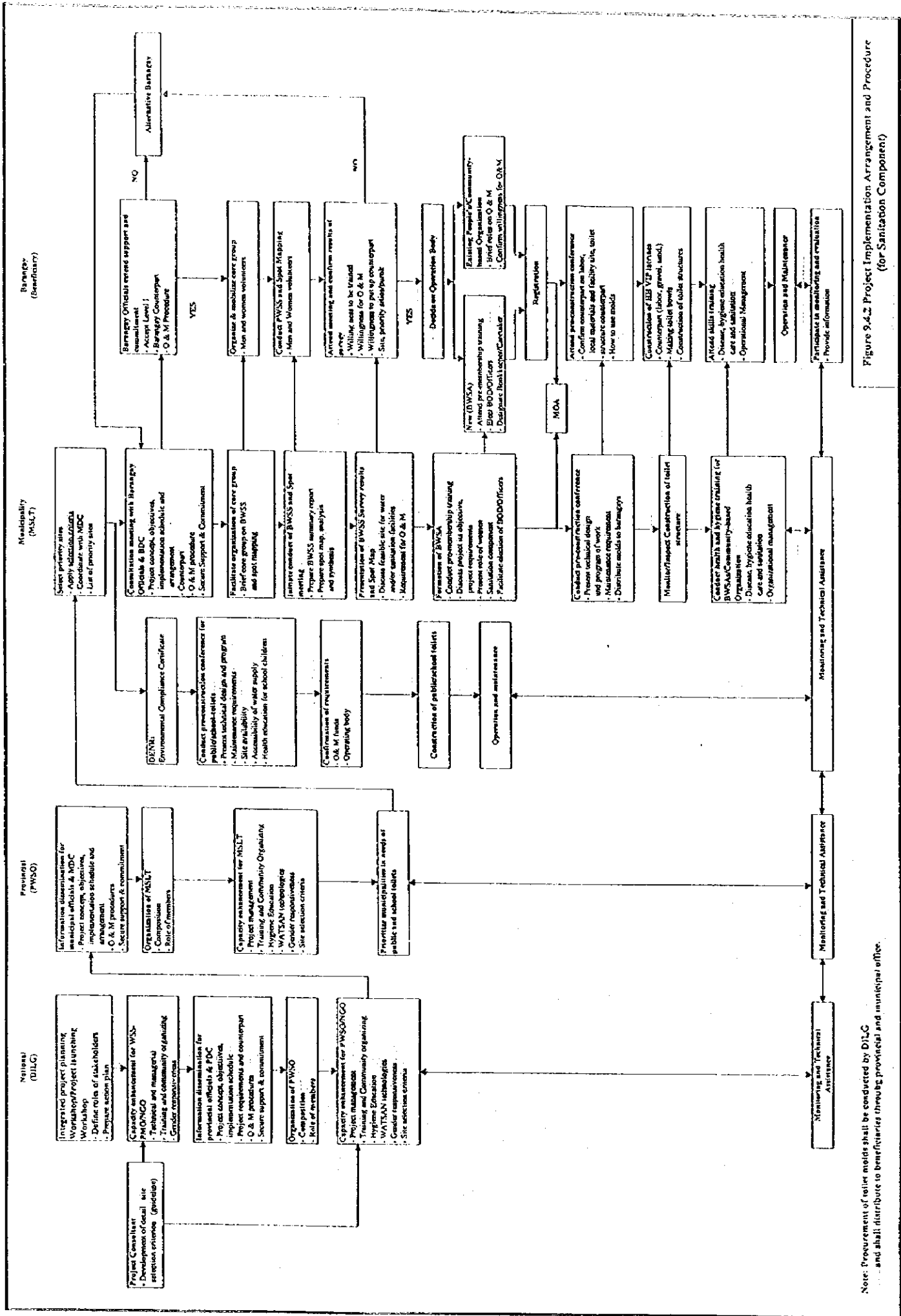


Figure 9.4.2 Project Implementation Arrangement and Procedure (for Sanitation Component)

Note: Procurement of toilet models shall be conducted by DILC and shall distribute to beneficiaries through provincial and municipal office.

## 9.4.2 Project Implementation Arrangement

### **PROJECT IMPLEMENTATION FOR LEVEL I WATER SUPPLY AND SANITATION**

The project implementation for Level I water supply system and sanitation facility is largely divided into three phases, namely; pre-implementation, implementation, and post implementation.

#### **1. Pre-implementation phase**

The pre-implementation phase includes the preparatory activities. In line with the revised cost sharing arrangement between the national government and local government units, the government through DILG, shall secure the re-confirmation of the concerned LGUs to participate in the proposed project by disseminating the project concept, objectives, implementation schedule and arrangement as follows:

- Scope of the Project
- Financial arrangement
- Project implementation arrangement (construction period, contract methods, procurement package)
- Roles and responsibilities of the LGUs (Provinces, Municipalities and Barangays)

#### **2. Project Implementation Phase**

The Project implementation phase includes the detailed design, community development and construction works. The detailed design stage covers both technical and institutional/community development activities. It shall include the preparatory work, socio-economic, gender and water source survey, development of site selection criteria and preparation of bidding documents. The institutional/community and gender in development aspect includes an assessment of training needs, review of existing training strategies and materials and development of training modules and materials, and conduct of training for WSS-PMO, NGOs, and LGUs. It shall also include the implementation of model study for site selection, gender analysis, formation of pilot BWSAs and skill training.

##### **(1) Site Selection**

- 1) Water supply component: Selection criteria for the priority sites shall be developed during the detailed design stage. In applying the selection criteria, all barangays can

be ranked and the PPDC, as a head of PWSO, shall approve the priority sites. The criteria shall be composed of the following aspects:

- a) Physical requirements for Level I water system shall be assessed to rank all barangays on the basis of the following items.
  - No alternative water source
  - Acceptance of Level I facility
  - Water source availability (quality and quantity)
  - Present coverage
  - Incidence of water-borne diseases
  - Accessibility to water source
  - Coverage of community
  - Family income
  
- b) Community participation and interest shall be assessed to evaluate the willingness to participate in the project of barangays on the basis of the following items.
  - Willingness to assume responsibility for O&M
  - Willingness to be trained on O&M
  - Willingness to pay water fees
  - Willingness to put up counterpart

No alternative source and acceptance of Level I should be highly prioritized as required item for the order of involvement in the project. PROPOSED SITE SELECTION CRITERIA is referred to this 9.4.2, Supporting Report.

Water source investigation through actual hydrogeological survey shall be conducted in the target barangays during the detailed design so that water source availability may be properly confirmed. The LGUs, through their technical representatives from the PWSO/MSLT (PEO or MEO) shall ensure that the construction undertaken by the private contractors shall be in accordance with the designed program of work and standard specifications for Level I water systems. In the course of detailed design or construction supervision, the Consultants should utilize the technical capability of DPWH and DOH personnel on the basis of MOA.

## 2) Sanitation Component

- a) Latrine: The provision of household latrines by distributing toilet bowls shall be primarily based on the demand of households. The proposed criteria shall include the following:

- No existing household latrines
- Willingness to put up counterpart
- High incidence of water borne and water related diseases
- Accessibility to water supply
- Number of household members

b) **Public/School Toilet:** The provision of public/school toilet shall be based on the following:

- No existing public/school toilet
- Suitable site
- Willingness to assume responsibility for O&M
- Willingness to integrate health education to school children
- Willingness to raise funds for operation and maintenance
- Accessibility to water supply for washing

**(2) Civil Works and Equipment Procurement**

Water supply and sanitation components are composed of well drilling and general construction works for toilet buildings. Each province shall engage the services of private contractors to under take the construction of water supply and sanitation facilities separately. The contracts shall be reviewed, evaluated, and endorsed by the committee of PBAC (Procurement, Bidding, Award, and Contract) of each agency.

**(3) Capacity Enhancement Program**

The capacity-enhancement program shall be composed of courses in strengthening the capacities of the LGUs in planning, implementing, managing, monitoring and evaluating gender responsiveness WATSAN projects. Training needs assessment (TNA) shall be conducted at various levels to determine the appropriate kind of training program intervention suited and relevant to their level of attainment. The TNA shall be administered for the WSS-PMO staff, PWSO, MSLT and NGO/COs to assess their present knowledge and skills in technical and social aspects of WATSAN projects (refer to 9.4.2, Supporting Report, for PROPOSED CAPACITY ENHANCEMENT PROGRAM).

#### (4) Community Management Program

- 1) Demand Assessment: : Considering the time constraint during the detailed design stage, demand assessment shall be initially undertaken at the barangay officials/development councils level, but subject to further validation in the results of the barangay survey and spot map during the construction stage. Community demand shall be assessed through the following activities to be undertaken in the target barangays:
  - a) Consultation with barangay officials/development council: As entry-point of all development activities, barangay officials/development council is primarily responsible for the identification and prioritization of community projects/needs and preparation of barangay development plans. The decision regarding the acceptance of Level I water facility and barangay counterpart shall emanate from them. This activity serves as an initial step in assessing community demand as well as securing their support and commitment to the project.
  - b) Barangay Survey: Through the Barangay Water and Sanitation Survey (BWSS), the beneficiaries' demand for the level of service shall be validated. The barangay survey will provide an information on the prospective users' willingness to undertake the responsibility for the O&M of the facilities, willingness to pay and to be trained on O&M as well as the provision local counterpart. The survey results will also identify the potential households to be served and to be provided with latrines/toilet facilities. Likewise, the survey will indicate the cultural habits of the community members in terms of water usage and sanitation practices that are important factor in determining the appropriate intervention in the community.
  - c) Spot Map: The survey results and spot map shall be presented to the community members for confirmation of their demand. The spot map will identify the most feasible site for Level I facilities, household latrines (VIP), school and public toilets. The prospective users shall decide on the actual site of the facilities in the barangay, upon confirmation of the technical representative from the PWSO/MSLT (PEO/MEO) as to the technical feasibility of the selected sites. They will also decide on the priority sitios/puroks that will be provided with water facilities based on their readiness to give local counterpart. Households that are ready to give counterpart for toilet structure shall be given priority in the provision of latrines (refer to 9.4.2, SAMPLE SPOT MAP, Supporting Report).

To avoid duplication of activities in the barangay, LGUs shall possibly utilize available barangay profile/spot map prepared by other national government agencies.

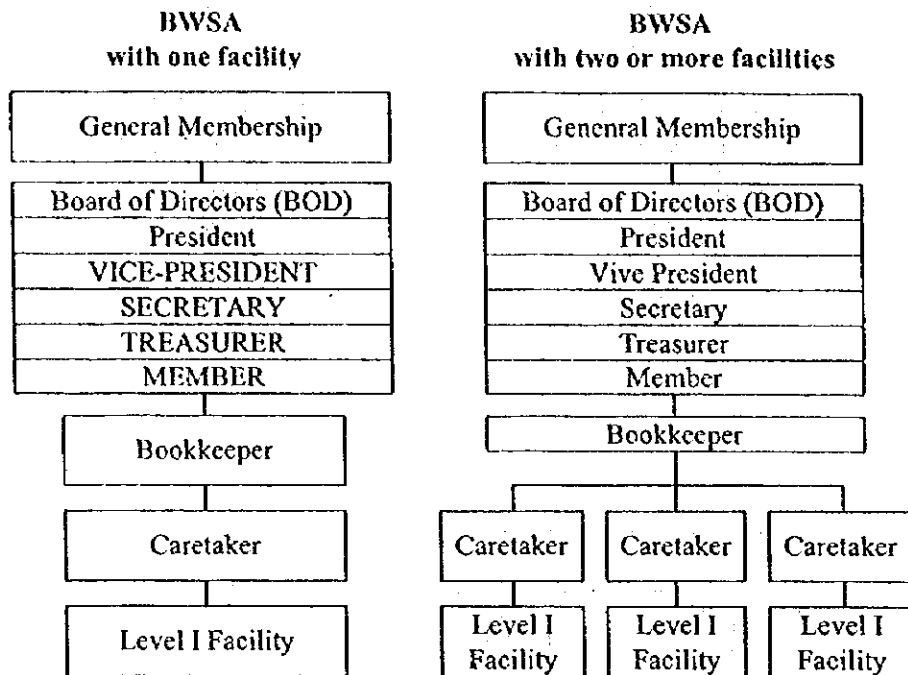
- 2) **Formation of BWSA:** A BWSA (Barangay Waterworks and Sanitation Association) is an organization of water supply and sanitation beneficiaries in a barangay whose objective is to own, operate and maintain the water systems. RA 6716 requires its formation to ensure the provision of adequate, potable and accessible water supply to its members through proper operation and maintenance of the water facilities. The organizational structure of BWSA is quite simple and depends on the number of facilities, need, culture and situation in a particular barangay.

The decision to tap existing community-based organization, merge/consolidate with the existing water association or to form a new association is lodged with the community members. Should the decision is to form a new association as operating body of the facilities, it shall be known as BWSA.

The formation activities of the BWSA are divided into three phases: pre-formation/social preparation, formation and post formation (refer to PROPOSED COMMUNITY MANAGEMENT PROGRAM attached here for the detailed activities in each phase). During the formation phase, pre-membership training and election of BDO and Officers are held. In this phase, individual member interest and community commitment are manifested through application for membership in the association and signing of Manifesto Resolution (refer to the sample formats attached hereafter).

Adequate social preparation through pre-formation activities in the barangay shall be made prior to the formation of BWSA. A more participatory approach in the formation process will promote exercise of leadership, communication, problem solving/decision making, which are important requirements of sustainable association. The organizers' intervention must ensure a clear understanding of the project and the beneficiaries' individual and collective responsibility in the operation and maintenance of the facilities. Post formation activities such as provision of skills training, monitoring and continuing technical assistance are vital to nurture the growth of BWSA to become self-sustaining water association.

- a) **BWSA Organization Set-Up:** The BWSA organizational set-up shall be flexible. It shall depend on the number of facilities, need, culture and arrangement in a particular barangay. Inter-barangay, inter-sitios/puroks or cluster of community organizations shall be allowed, if acceptable in the locality. The following chart represents the BWSA organizational structure.



- b) **Registration:** An operating body shall be registered to acquire legal personality to enter into a contractual obligation such as in the execution of MOA, imposition of water charge, sanction for non and delayed payment of user-members. BWSA (and RWSA) is mandated to register with DILG.
- c) **BWSA Skills Training:** Skills training for the beneficiaries shall be designed to provide them with appropriate knowledge, skills, positive attitude and confidence to assume their roles and responsibilities in operating and maintaining the facilities that will eventually facilitate the sustainability of the project (refer to PROPOSED CAPACITY ENHANCEMENT PROGRAM, 9.4.2 Supporting Report, for the proposed course content for the operating body).

### 3. Post Implementation Phase

#### (1) Operation, Maintenance, and Cost Recovery

The post-implementation phase consists of actual system utilization, fee collection, O&M by beneficiaries and monitoring/evaluation by implementing agency.

##### 1) Operation, Maintenance, and Cost Recovery

Minor repair such as replacement of spare parts (sealing packing), handle of handpump, etc. shall be undertaken by the beneficiaries themselves. Hence, it is imperative for the operating body to collect water fees from the end-users and properly administered the funds for the repair and maintenance of the facilities. The water fee contribution shall be the main source of income for the association. Payments must be properly documented so that all members know the status of their monthly payments. The information is also necessary so that the BWSA Officers can plan for future expenditures (refer to PROCEDURES FOR BWSA FINANCIAL OPERATIONS, 9.4.2, Supporting Report, for the procedures to record financial transactions and prepare financial reports).

Depending upon the users' income level, water charge shall be determined and agreed among the water users. The estimated water charge for the O&M cost which varies between six to eight pesos per household per month, is quite affordable which is within one percent of household income. Furthermore, if the users will pay for water charge up to 2% of their income or sixty pesos per household per month, the beneficiaries can afford the minor repair of handpump, rehabilitation, and reconstruction of well, provided that well life is assumed to be 20 years.

LGUs shall include in their supply management plan a procurement of bulk spare parts for future need of the beneficiaries at reasonable cost. Upon request from the end-users, major repair like rehabilitation of well or water quality surveillance, shall be undertaken in technical cooperation with LGUs (PEO/MEO/PHO trained members), utilizing procured rehabilitation equipment or water quality analysis kit.

Major rehabilitation work, beyond the capacity of the associations, shall be referred to the municipality for action. Clear definition of "major rehabilitation work" is needed. All costs incident to the rehabilitation shall be to the account of the association O&M



reserve fund. The municipality supported by PWSO will assist, if needed, the association in securing soft loans, if the reserve funds are inadequate.

#### 12) Monitoring and Evaluation

Participatory monitoring and evaluation shall be conducted in partnership between the PWSO/MSLT and operating body (existing community-based organization or BWSA). The Team members from MHO through the RIU and its network of barangay health workers shall be tapped to monitor the project. DILG's Barangay Government Operations Officer (BGOO) shall also be tapped to monitor. MHO shall assist the beneficiaries to monitor water quality and quantity once in three months as stipulated in the Philippine national Standards for Drinking Water.

Monitoring and evaluation shall start during project implementation. The system must have the right and clear objectives and right indicators - sustainability, effective use and replicability.

## PROPOSED SITE SELECTION CRITERIA

Barangay: \_\_\_\_\_ Municipality: \_\_\_\_\_ Province: \_\_\_\_\_

**(1). Required Items**

Item No.	Description	Score
1.	No alternative water source except ground water	OK or Not
2.	Acceptance of Level I facility	OK or Not

**(2) Technical & Socio Economical Requirements 60%**

Item No.	Description	Score
1.	Water source availability (quality and quantity)	20%
2.	Incidence of water-borne disease	25%
3.	Accessibility of well drilling machine to water source	15%

**(3) Community Interest and Involvement 40%**

Item No.	Description	Score
1.	Willingness to assume responsibility for operating and maintenance of the facility/ies	10%
2.	Willingness to be trained on O&M	5%
3.	Willingness to pay for water fees	15%
4.	Willingness to put up counterpart	10%

**(4) Total Score**

Item No.	Description	Score
(1)	Required items	OK or Not
(2)	Physical requirements	
(3)	Community interest and involvement	

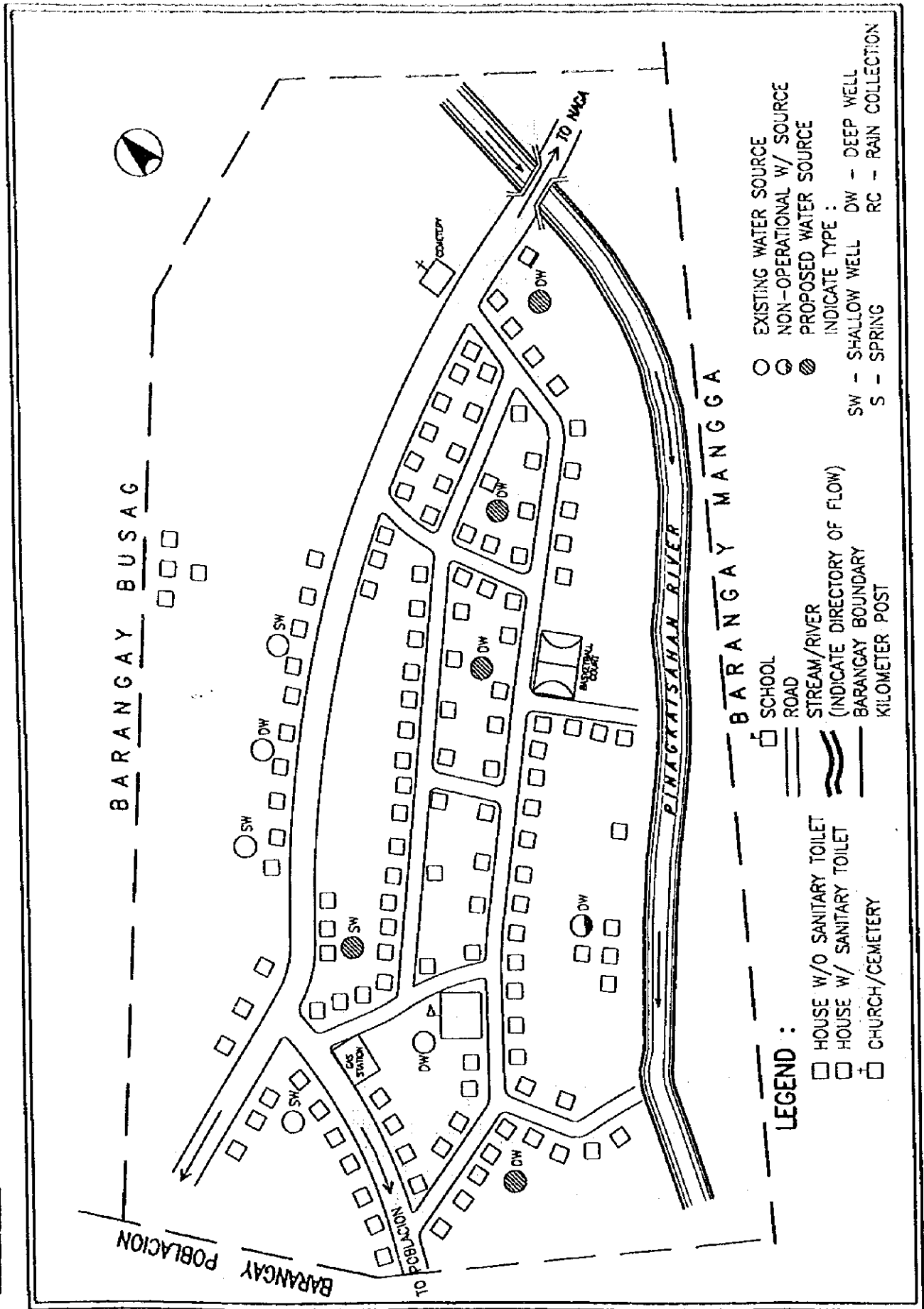
Total Score

## PROPOSED CAPACITY ENHANCEMENT PROGRAM

Activity/Participants	Course Content
<p>1. Project Planning/Launching Workshop DILG (WSS-PMO) DPWH, DOH, NWRB NEDA, DOF, OECF</p>	<ol style="list-style-type: none"> <li>1. Project Concept, Objective, Project requirements, Implementation schedule and arrangement</li> <li>2. Role and responsibility of national government agencies, LGUs (province and municipalities and project beneficiaries)</li> <li>3. Action Plan by province</li> </ol>
<p>2. Capacity Enhancement for WSS-PMO, NGOs DOH and DPWH</p>	<ol style="list-style-type: none"> <li>1. Project Concept (objectives, components, requirements, implementation arrangement, O&amp;M systems and procedures, etc.)</li> <li>2. Sector Development and existing Policies</li> <li>3. Project Planning, Management and Control</li> <li>4. Team Building Exercises</li> <li>5. Presentation and Facilitating Skills</li> <li>6. Methods of Instruction</li> <li>7. Community Organization/Community Development</li> <li>8. Barangay Surveys and Spot Mapping</li> <li>9. Formation of BWSA</li> <li>10. Health and Hygiene Education</li> <li>11. Technical Training               <ul style="list-style-type: none"> <li>- Designing and Construction</li> <li>- Water Source Investigation</li> </ul> </li> <li>12. Skills Training for Operating Body               <ul style="list-style-type: none"> <li>- Organizational Management</li> <li>- Financial Management</li> <li>- Operational Management</li> </ul> </li> <li>13. Gender Responsiveness</li> <li>14. Monitoring and Evaluation</li> </ol>
<p>3. Capacity Enhancement for LGUs (PWSU, MSLT, CO/NGOs)</p>	<ol style="list-style-type: none"> <li>1. Project Concept (objectives, components, requirements, implementation arrangement, O&amp;M systems and procedures, etc)</li> <li>2. Sector Development and Existing Policies</li> <li>3. Project Planning, Management and Control</li> <li>4. Team Building and Experiences</li> <li>5. Methods of Institution</li> <li>6. Presentation and Facilitating Skills</li> <li>7. Community Organization/Community Development</li> <li>8. Barangay Surveys and Spot Mapping</li> <li>9. Formation of BWSA</li> <li>10. Health and Hygiene Education</li> <li>11. Technical Training               <ul style="list-style-type: none"> <li>- Designing and Construction of WATSAN facilities</li> <li>- Water source investigation</li> </ul> </li> <li>12. Skills training for Operating Body               <ul style="list-style-type: none"> <li>- Organizational Management</li> <li>- Financial Management</li> <li>- Operational Management</li> </ul> </li> <li>13. Gender Responsiveness</li> <li>14. Monitoring and Evaluation</li> </ol>

<p>4. Capacity Enhancement for Operating body (BOD/Officers, Bookkeeper, Caretakers)</p>	<ol style="list-style-type: none"> <li>1. Project concept (objectives, components, requirements, implementation arrangement, O&amp;M systems and procedures, etc.)</li> <li>2. Human Resources Development (Team Building, Leadership and Value Formation)</li> <li>3. Disease, Hygiene, Education, Health Care and Sanitation (Excreta, Liquid and Solid Waste Disposal)</li> <li>4. Organizational Management (BWSA Management Skills)</li> <li>5. Operational Management (Operation, repair and maintenance skills)</li> <li>6. Financial Management (Simplified Bookkeeping Procedures)</li> <li>7. Greater Participation of Women</li> <li>8. Monitoring and Evaluation</li> </ol>
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SPOT MAP



## **INSTRUCTIONS FOR COPLETING BARANGAY MAP**

This sample barangay map is a rough sketch of an entire barangay showing the households, with and without sanitation facilities. The map also shows location, type and condition of existing water facilities and plot location of proposed water sources.

- 1) The map will be used for BWSA planning.
- 2) The map can be used as a planning tool to determine best locations for future water sources.
- 3) The map can also be used to support funding requests for other water and/or sanitation facilities.
- 4) The map may also be entered into a national data base.

To make a map of your barangay, use the legend at the bottom of the sample to indicate information and landmarks. Follow these procedures when completing the map:

- 1) Indicate location of highways and roads, including name and number of road if any.
- 2) Draw approximate boundaries of your barangay and indicate names of adjacent barangays.
- 3) Indicate direction of north line.
- 4) Locate public buildings, cemeteries, schools, or other prominent landmarks.
- 5) Locate natural land features (like rivers, rice field, hills, etc.) and animal pens.
- 6) Show households by drawing a clear square.
- 7) Show all sanitation facilities in households by darkening bottom of square.
- 8) Show water sources location and condition by drawing a clear circle for existing water sources, a half dark circle if source is not in operation and a darkened circle for proposed facility. (Proposed facilities should be at least thirty (30) meters away from the nearest latrine and animal pen).
- 9) Show water source type like deepwell, shallow well, spring, etc. Following legend on the map.
- 10) Next to exiting facilities, write the distance in meters to the nearest latrine or animal pen. Proposed facilities should be at least 30 meters away from the nearest latrine and animal pen.
- 11) Show kilometer posts along the road by drawing a darkened small square.

PROPOSED COMMUNITY MANAGEMENT PROGRAM

Barangay Activities		Responsible	Duration (Day)	Cost
<b>A. Pre-Formation/Social Preparation Phase</b>				
<b>1. Consultation with barangay officials/development councils (First Meeting)</b> The activity aims to obtain the support, commitment and active participation in planning, implementation and managing the project. They are primarily responsible for the identification and prioritization of community needs. The decision on the acceptance of Level I water facility and barangay counterpart shall emanate from them.	CO/NGO; PWSU/MSLT; Barangay Officials Development Council	0.5		
<b>2. Barangay Water Supply and Sanitation Survey/Spot Map</b> A core group composed of men and women volunteers will conduct BWSS and spot mapping. The BWSS results provide information on the prospective users willingness to undertake the responsibility for the O&M as well as provision of counterpart. Spot map will identify the most feasible site for Level I facilities, HH latrines, school and public toilets.	CO/NGO; PWSU/MSLT; Men and Women Volunteers	5		P600
<b>3. Presentation of survey results and spot map (Second Meeting)</b> The survey results and spot map will be presented to the barangay officials, core group and prospective water users of the facilities. The decisions of the community members will be confirmed in terms of acceptance of Level I water facilities, site of the water facility/ies, willingness to contribute for water fee, operate and maintain the facilities, to be trained and to put up counterpart such as labor, site, and local materials. The results of the survey and spot map are discussed relative to the most feasible site of the water facilities in the barangay as well as the most feasible site of sanitation facilities and houses in need of latrine. The community members will decide among themselves which sitios/puroks will be given priority in the provision of water and sanitation facilities. The community members will also decide on the operating body, whether to tap existing community-based organization, form a new one (BWSA) or merge/consolidate with existing water association.	CO/NGO; PWSU/MSLT; Prospective Users	0.5		P500

<p><b>B. Formation Phase</b></p>	<p><b>4. Pre-membership Training and election of BOD and Officers (Third Meeting)</b>  A core group will be mobilized to conduct house to house campaign to ensure membership attendance in the Pre-membership Training. The training is conducted for prospective water users of the facilities. The project concept is discussed including its objectives, importance and role of BWSA and members. Other modules such as women's role, sanitation, technical aspects, success factors, etc. are discussed during the pre-membership training.</p> <p>The board of Directors is elected by the general membership and the Board elects among themselves the officers of the BWSA. Bookkeeper and Caretaker are designated by the President. With the initiative of the newly elected officers, the organizational documents are accomplished.</p>	<p>CONGO;  PWSU/MSLT;  Prospective Water Users</p>	<p>1</p>	<p>P1,000</p>
<p><b>5. Meeting of the Board of Directors (Fourth Meeting)</b></p>	<p>The first meeting of the BOD is conducted to discuss in details the duties and responsibilities of the Board /Officers, how to conduct a meeting, formulate administrative and operational policies (collection of water fees, dates and place of regular meetings, etc.) and prepare an action plan. The registration procedures and requirements are also discussed.</p>	<p>CONGO;  PWSU/MSLT;  BOD/Officers</p>	<p>1</p>	<p>P1,000</p>
<p><b>6. Registration</b></p>	<p>The operating body (existing community organization or BWSA is registered to give it legal personality to enter into a contractual obligation)</p>	<p>BOD/Officers  CONGO;  PWSU/MSLT;</p>		
<p><b>7. Pre-construction Conference (Fifth Meeting)</b></p>	<p>The technical design and program of work for the construction of water and sanitation facilities are presented to the officers and members of the operating body. Based on the technical design, the financial computation to determine the operation and maintenance requirements of the facilities is discussed. The proposed estimates on monthly water fees are presented and the beneficiaries must agree among themselves the monthly water charge to be collected. The commitment of the beneficiaries to actively participate in the construction and counterpart shall be confirmed.</p>	<p>CONGO;  PWSU/MSLT;  BOD/Officers  members</p>	<p>5</p>	<p>P500</p>



<p>8. <b>Construction of Water and Sanitation Facilities</b> The operating body shall ensure that the materials delivered are all accounted for and in accordance with the approved specifications in the technical design. Labor, local materials such as gravel and sand, and snacks are provided as counterpart. The prospective users actively participate during construction and test run of water facilities. Upon completion, the facility is turned-over to the operating body. The President, in behalf of the association, shall receive the water systems from the LGUs. Simple turn-over ceremony is held witnessed by barangay officials/leaders. BOD/officers and members the association and P/MSLT members.</p>	<p>CONGO; PWSU/MSLT; BOD/Officers members</p>	<p>10</p>	
<p>9. <b>Skills Training (Sixth Meeting)</b> Skills training aims to build the capacity of project beneficiaries in planning, proper operation, repair and maintenance of water and sanitation facilities. This will also create and awareness among the project beneficiaries on the importance of proper hygiene and the need to main a health environment. BOD/officers will be trained on organizational management, bookkeeper on financial management/bookkeeping and caretaker on operational management (operation, maintenance and repair of wells hand-pumps, etc).</p>	<p>CONGO; PWSU/MSLT; BOD/Officers Bookkeeper/Caretaker</p>	<p>5</p>	<p>P4,400</p>
<p>10. <b>Health and Hygiene Education</b> Health and hygiene education services shall be continuously provided to the community members focusing on the interdependence of safe water supply and sanitary toilet facilities to achieve overall health and environmental benefits.</p>	<p>MSLT/RHW/BHW</p>	<p>Continuous</p>	<p>P1,800</p>
<p><b>C. Post Formation Phase</b></p>			
<p>11. <b>Monitoring, Evaluation and Technical Assistance</b> Periodic monitoring and evaluation will be conducted in partnership between MSLT and beneficiaries. M&amp;E will start from project implementation. Technical assistance will be provided, if necessary.</p>	<p>PWSU/MSLT; BOD/Officers</p>	<p>Continuous</p>	
<p><b>TOTAL</b></p>			<p>23.5</p>

SAMPLE MANIFEST

**MANIFESTO RESOLUTION**

We, household heads (men or women) of Barangay \_\_\_\_\_, Municipality of \_\_\_\_\_, Province of \_\_\_\_\_, seek the assistance of the Provincial Government in putting up a Level I water system in our area.

Conscious of the attendant responsibilities in operating and maintaining the facilities, we constitute ourselves into an association in accordance with R.A. 6716 and hereby declare:

1. That the name of the association shall be \_\_\_\_\_ Barangay Waterworks and Sanitation Association;
2. That the association is formed primarily to own, operate and maintain the water facilities and provide members with adequate supply of water for domestic use;
3. That the association shall maintain office of Barangay \_\_\_\_\_;
4. That the following shall maintain office at Barangay \_\_\_\_\_;  
President \_\_\_\_\_  
Vice-President \_\_\_\_\_  
Secretary \_\_\_\_\_  
Treasurer \_\_\_\_\_  
Board Member \_\_\_\_\_
5. That membership shall be open to household heads (men or women) who shall use the water facilities; and
6. That this Resolution may be amended or repealed by majority vote of all members of the association.

To ensure the construction, smooth operation and proper maintenance of the water supply system, we bind ourselves to the following:

1. That we will provide a suitable site for the project;
2. That we will collect monthly contributions for water fees to raise funds for the repair, maintenance and cost recovery of the system;
3. That we will attend meetings and seminars conducted by PWSU/MSLT for the association;
4. That we will provide counterpart needed for the water facilities;

5. That we will exercise the following rights:

- a. Right to vote
- b. Right to hold elective office
- c. Right to be informed of the association's affairs
- d. Right to use the association's facilities

6. That we will hold an annual meeting every \_\_\_\_\_, to discuss the association's business and to elect officers for one year.

NOW, THEREFORE, we hereunto set our hands this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_.

	PRINTED NAME	SIGNATURE	CTN
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____
4.	_____	_____	_____
5.	_____	_____	_____
6.	_____	_____	_____
7.	_____	_____	_____
8.	_____	_____	_____
9.	_____	_____	_____
10.	_____	_____	_____
11.	_____	_____	_____
12.	_____	_____	_____
13.	_____	_____	_____
14.	_____	_____	_____
15.	_____	_____	_____
16.	_____	_____	_____
17.	_____	_____	_____
18.	_____	_____	_____

-----  
(Name of BWSA)

-----  
(Barangay, Municipality)

-----  
(Province)

The Board of Directors  
-----  
Barangay Waterworks  
and Sanitation Association  
-----

Date -----

Gentlemen:

I hereby apply for membership in ----- Barangay Waterworks and Sanitation Association of avail of its services of providing potable water for domestic use. I pledge to faithfully obey and comply with the rules and regulations which may be promulgated by the Board of Directors.

I hereby further pledge to:

1. Attend all meetings which will be called by the BWSA Board of Directors/Officers;
2. Attend training/seminars which will be conducted by PWSU/MSLT for BWSA members;
3. Pay monthly water fee contributions for operation, repair, maintenance and cost recovery of the facilities as may be prescribed by the Board;
4. Observe proper utilization of water and preventive maintenance of facilities as required by the Association;
5. Assist in the installation of the water facility by providing labor, local materials and snacks, and
6. Help attain the objectives of the Association.

For information about myself and my household, please refer to my information sheet at the back page.

-----  
Signature of Applicant  
Over Name in Print

Right Thumbmark

**BWSA MEMBER INFORMATION SHEET**

Name of Prospective Member: \_\_\_\_\_

Age: \_\_\_\_\_ Civil Status: \_\_\_\_\_ Sex: \_\_\_\_\_

Place of Birth: \_\_\_\_\_ Date of Birth: \_\_\_\_\_

Household Members (include household help):

Name	Age	Relation to Member
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Present Water Source used by Household (Please Check):

Handpump \_\_\_\_\_ Artesian Well \_\_\_\_\_  
Dug Well \_\_\_\_\_ Spring \_\_\_\_\_  
Others \_\_\_\_\_

Present Expenses for Water per Month \_\_\_\_\_

Distance of Water Source to the House \_\_\_\_\_ meters

I hereby certify that the information above are true and correct to the best of my knowledge.

\_\_\_\_\_  
Signature Date