

## **7. WATER SOURCE DEVELOPMENT**

### **7.3 Groundwater Sources**

#### **7.3.2 Groundwater Availability in the Province**

##### **(1) Major Information and References**

The Groundwater Availability Map was prepared using the following information and reference (detailed list of reference is presented in Table 7.3.1, Data Report):

- Administrative and Topographical Maps of the Province published by NAMRIA with scales of 1:250,000 and 1:50,000, respectively.
- Geological Map of the Philippines published by BMGS with a scale of 1:1,000,000.
- Water Resource Investigation conducted by NWRB, 1986.
- Well Inventory Database prepared by NWRB, LWUA and DPWH.
- Well Inventory Database in the province.
- General information on groundwater condition by DPWH-DEO and PPDO.
- Well Log Data by DPWH-DEO and PEO.
- Water source information by Water Districts.

##### **(2) Approach and Methodology**

The procedure in preparing the Groundwater Availability Map is explained below with workflow depicted in Figure 7.3.1.

- 1) Prepare a base map with an approximate scale of 1:600,000 (fit to the A4 map size). The topographical map of NAMRIA (1:250,000) was used as a reference map. Basic information including rivers and provincial and municipal boundaries are indicated in the prepared base map.
- 2) The groundwater potential areas, based on the geology of the province, are delineated on the base map. The Recent alluvial and/or beach deposits, Pliocene-Quaternary sedimentary formation (clay, silt, sand and gravel) and Pliocene-Quaternary volcanic rock units (pyroclastics, debris flow and tuff) are regarded as possible aquifers considering their high porosity and permeability.

Boundaries between the groundwater development potential area and the difficult area were defined and delineated as presented in Figure 7.3.1, Main Report.

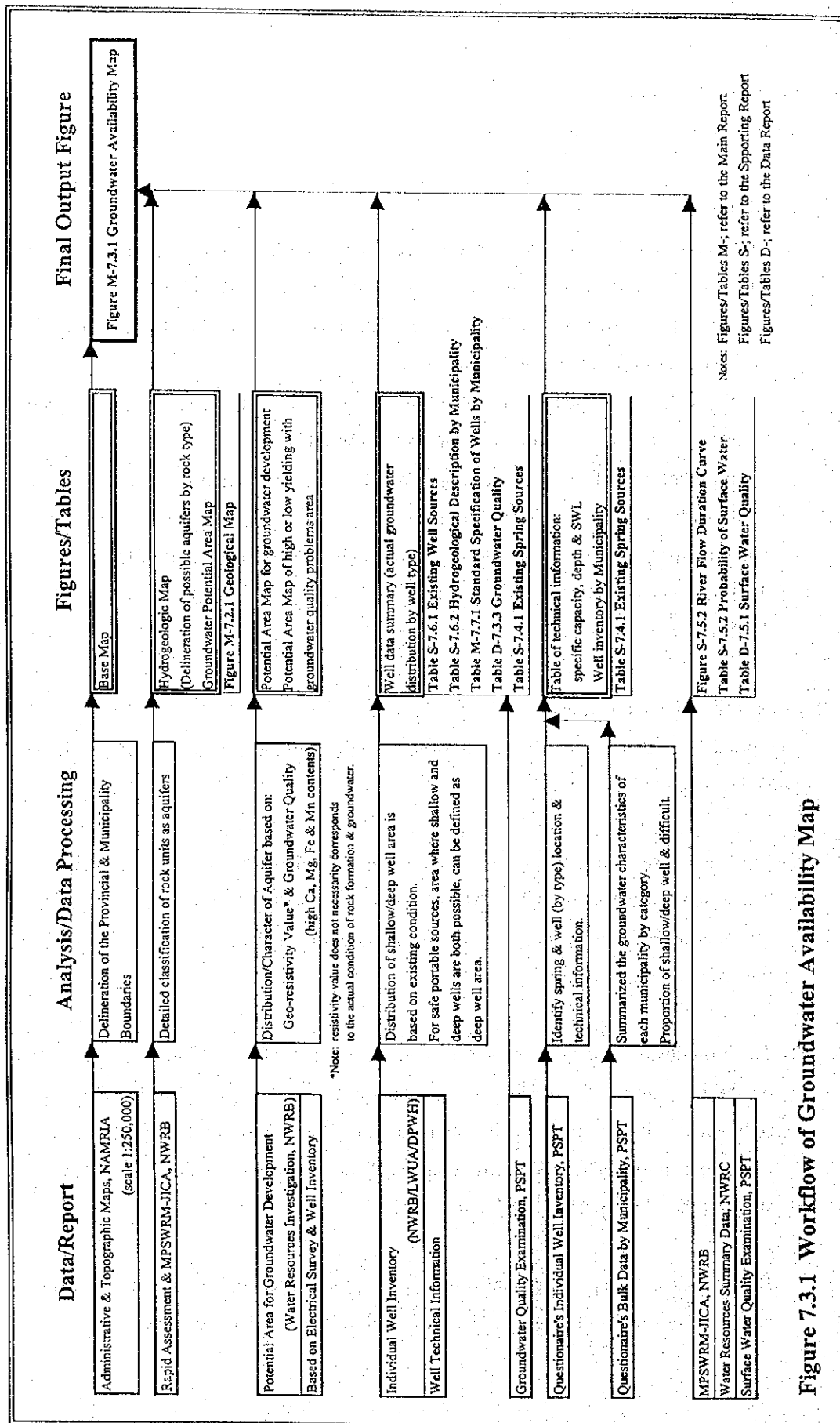


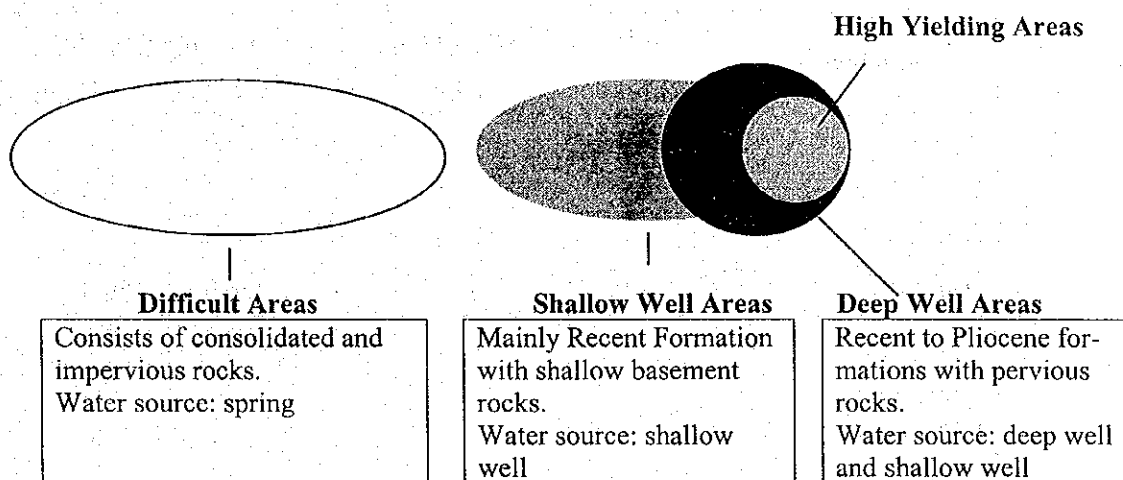
Figure 7.3.1 Workflow of Groundwater Availability Map

- 3) Areas with potential high yielding aquifer in the Water Resources Investigation of NWRB are reflected in the defined groundwater potential areas.

Based on the results of electric resistivity survey of the above investigation, resistivity values from 20 to 210 ohm-meter indicate a potential high yielding formation. Values less than 10 ohm-meter suggest clayey layer. Figure 7.3.1, Main Report, shows the boundaries of areas with high and low yielding aquifers.

- 4) Delineate shallow and deep well areas based on well database of NWRB and DPWH-central office, well inventory of DPWH-DEO (refer to Table 7.3.1, Data Report) and rock distribution. Figure 7.3.2 presents the categorization in terms of groundwater utilization.

**Figure 7.3.2 Area Category by Groundwater Utilization**



Solo shallow well areas are defined on the following basis:

- (a) Predominance of serviceable shallow wells and presence of deep wells with water quality problem and/or low yielding aquifers.
- (b) Occurrence of impervious rocks beneath the Recent formation at shallow depth.

- 5) Based on the information provided by NWRB's well inventory and the data obtained through the questionnaires, well specifications for each municipality are established as shown in the map. These specifications are used as references in evaluating the groundwater availability in each locality. Individual well locations with technical information are presented in Figure 7.6.1, Data Report.

(3) Future updating and utilization of the map

For future updating of the map, the following procedure shall be employed.

- 1) Referring to the results of any supplementary water sources investigation by various agencies, re-define the potential area for groundwater development by applying the aforementioned procedures.
- 2) Update the provincial database using the questionnaire made for the study to make necessary revision of the delineated boundaries of groundwater categories.

#### 7.4 Spring Sources

The numbers and discharges of developed and untapped springs by municipality are shown in Table 7.4.1. The data are derived from and the information obtained through the questionnaires and Table 7.1.1 Water Sources Information, Data Report.

**Table 7.4.1 Existing Spring Sources**

Municipality	No. of Developed Spring		Untapped Spring		
	Q<2.8lps	Q>2.8lps	No.	Ave. lps	Range lps
Baungon	104	0	3	2.0	2.0 ~ 2.0
Cabanglasan	5	8	3	68.2	2.0 ~ 200.0
Damulog	17	1	0	-	- ~ -
Dangcagan	10	1	1	150.0	150.0 ~ 150.0
Don Carlos	18	0	3	2.0	2.0 ~ 2.0
Impasugong	17	5	10	2.3	2.0 ~ 4.0
Kadingilan	33	1	3	3.0	2.0 ~ 4.0
Kalilangan	22	4	0	-	- ~ -
Kibawe	24	0	8	3.5	2.0 ~ 10.0
Kitaotao	74	0	5	2.2	2.0 ~ 3.0
Lantapan	10	1	0	-	- ~ -
Libona	15	0	0	-	- ~ -
Malaybalay	75	11	0	-	- ~ -
Malitbog	42	0	10	42.8	2.0 ~ 205.0
Maramag	13	1	14	4.1	2.0 ~ 5.0
Manolo Fortich	28	3	1	500.0	500.0 ~ 500.0
Pangantucan	43	5	10	4.3	2.0 ~ 18.0

Notes: "Ave.lps" & "Range lps" mean the average discharge and the range of discharges in lps (liter/second).

Table 7.4.1 Existing Spring Sources (contd)

Municipality	No. of Developed Spring		Untapped Spring		
	Q<2.8lps	Q>2.8lps	No.	Ave. lps	Range lps
Quezon	3	14	17	3.5	2.0 ~ 13.0
San Fernando	37	0	11	3.5	2.0 ~ 10.0
Sumilao	6	2	6	4.0	2.0 ~ 8.0
Talakag	14	1	3	69.5	3.5 ~ 200.0
Valencia	126	12	0	-	- ~ -
Total Spring Eyes	736	70	108	-	2.0 - 500.0

Notes; "Ave. lps" & "Range lps" mean the average discharge and the range of discharges in lps (liter/second).

## 7.5 Surface Water Sources

The major rivers in the province were selected to evaluate their potential as water supply sources to meet the future water needs of the province. The following criteria were adopted for the selection:

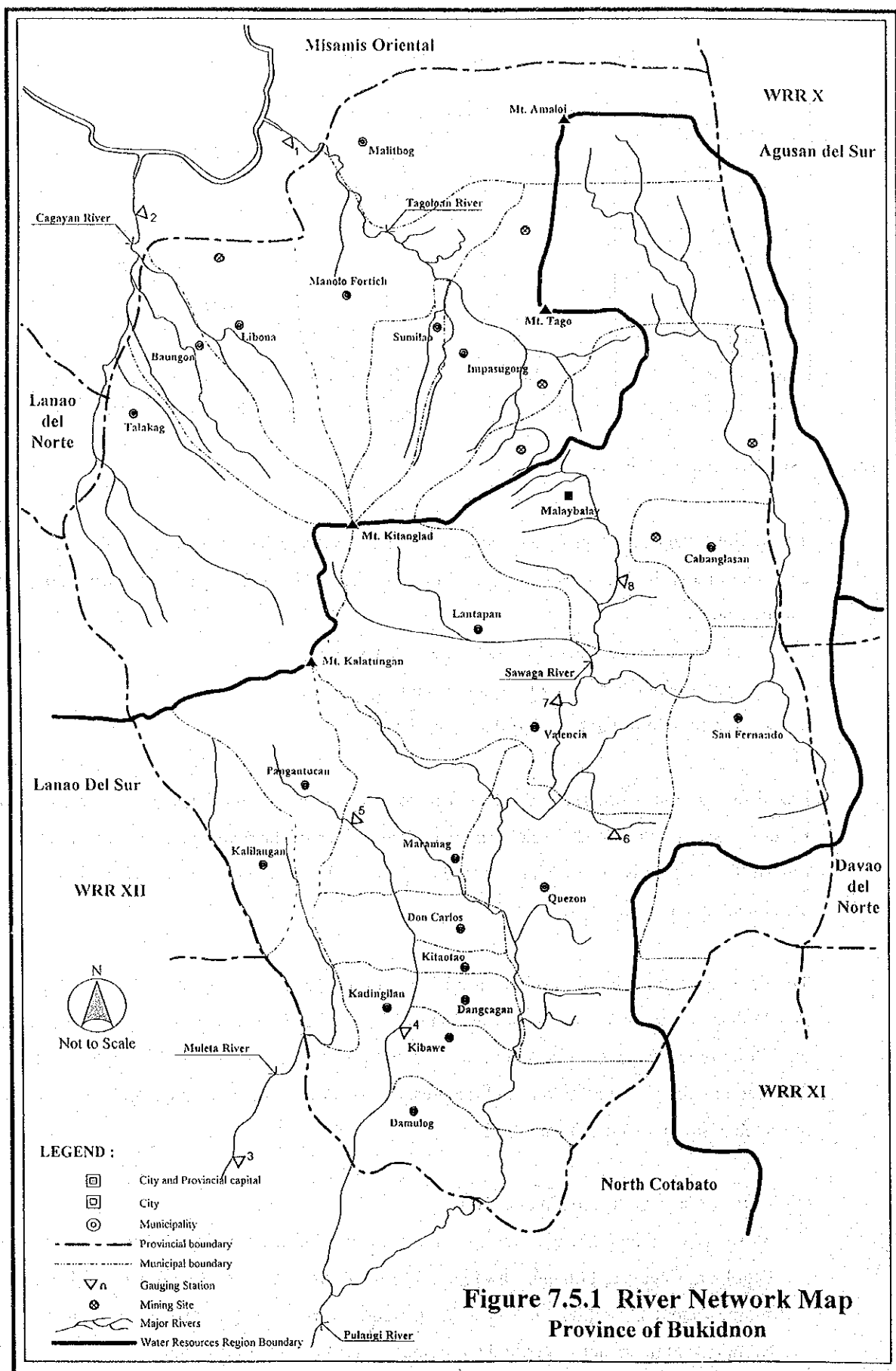
- rivers currently utilized for domestic water supply,
- rivers which have gauging stations, and
- rivers with watershed of 100 km<sup>2</sup> or more.

Based on the above criteria, the selected major rivers are Tagoloan, Cagayan & Mindanao Rivers. Sawaga, Pulangi & Muleta rivers are tributaries of the Mindanao River as shown in Figure 7.5.1 River Network Map. The boundary of the water resources region divides the provincial area into two parts.

The gauging stations in the province are located at the Tagoloan, Cagayan, Sawaga, Pulangi and Muleta rivers, which are shown in Figure 7.5.1. The run-off records are obtained from the "Philippine Water Resources Summary Data" prepared by the NWRC in 1980. The information on the gauging stations and the present uses (water rights) of the major rivers in the province is summarized in Table 7.5.1.

### (1) Surface Water Utilization/Water Rights

As seen in Table 7.5.1, the present water utilization in the provincial watersheds of the Tagoloan, Cagayan, Pulangi, Sawaga and Muleta rivers totals to 86.0 m<sup>3</sup>/sec. Of this total, the water rights of 84.2 m<sup>3</sup>/sec are registered for irrigation purpose. Hence, the rest of 1.8 m<sup>3</sup>/sec at the major rivers in the province is used for other purposes.



**Figure 7.5.1 River Network Map  
Province of Bukidnon**

**Table 7.5.1 Gauging Station & River Water Use by Major River Basins**

Major River	River Basin	Information from Gauging Station				Surface Water Use (Water Rights) in Watershed					
		Drainage*1 sq. km	Location No. in Figure 7.5.1	River Flow Rate (Q: cum/sec)			Municipality in watershed	Domestic cum/sec	Industrial cum/sec	Irrigation cum/sec	Others*3 cum/sec
Tagaioan	Main			Peak Qp	Max. Qdx	Mini. Qdn	Malaybalay	0.00	0.00	1.53	0.00
							Impasugong	0.00	0.00	1.20	0.00
							Sumitao	0.00	0.00	4.13	0.00
Cagayan	Main						Manolo Fortich	NR*4	NR*4	NR*4	NR*4
							(Misamis Oriental)*5				
							Libona	NR*4	NR*4	NR*4	NR*4
Mindanao	Bubunuan	1,656.0 (1): Sta. Ana		354.37	229.60	45.39	(Misamis Oriental)*5				
		No Gauging Station.					Baungon	0.00	0.00	0.06	0.00
	Tagite	No Gauging Station.					(Misamis Oriental)*5				
Mindanao	Main						Talaog	0.00	0.50	4.44	0.00
							(Lanao del Norte)*5				
							(Misamis Oriental)*5				
Mindanao	Sawaga	1,331.0 (2): Timb		574.75	556.45	55.80	Malaybalay	0.07	0.00	0.00	0.00
		327.0 (8): downstream		283.31	113.45	1.59	Valencia	0.00	0.00	0.00	0.00
		No Gauging Station.					Lantapan	0.00	0.00	5.76	0.00
Mindanao	Pulangi						Valencia	0.00	0.00	33.11	0.00
							Malibog	NR*4	NR*4	NR*4	NR*4
							Impasugong	NR*4	NR*4	NR*4	NR*4
Mindanao							Malaybalay	NR*4	NR*4	NR*4	NR*4
							Cabanglasan	NR*4	NR*4	NR*4	NR*4
							San Fernando	0.00	0.00	0.64	0.00
Mindanao							Valencia	0.00	0.00	22.50	0.00
							Quezon	0.00	0.00	1.03	0.00
							Don Carlos	0.00	0.00	0.00	0.00
Mindanao							Kilaosao	NR*4	NR*4	NR*4	NR*4
							Dangcagan	NR*4	NR*4	NR*4	NR*4
							Kibawe	0.00	0.00	0.25	0.00
Mindanao							Damulog	NR*4	NR*4	NR*4	NR*4
							(North Cotabato)*5				
							Pangantucan	0.00	0.00	0.15	0.00
Mindanao							Macanaga	0.00	0.91	8.76	0.00
							Don Carlos	0.00	0.00	0.12	0.00
							Kadugayan	0.00	0.00	0.03	0.00
Mindanao							(North Cotabato)*5				
							Kalilangan	0.00	0.00	0.80	0.00
							Panganman	NR*4	NR*4	NR*4	NR*4
Mindanao	Muleta	1,333.0 (3): Timulan, Pikit		576.23	486.29	46.79	(North Cotabato)*5				

Source: Philippine Water Resources Summary Data, established January 1980 by NWRC

Notes: Drainage\*1 : Watershed Area at Gauging Station  
 NA\*2 : Recorded River Gauge Height only  
 Others\*3 : Including Livestock, Recreation & Fisheries  
 NR\*4 : Surface water utilization was not registered in NWRC Database, as of March 1997.  
 (Province)\*5 : Out of Applicable Area

Qp : Peak Discharge of Daily Maximum Discharge  
 Qdx : Maximum Daily Discharge of Weighted Daily Discharge  
 Qdn : Minimum Daily Discharge of Weighted Daily Discharge

The actual surface water use for domestic water supply in the Sawaga River basin is only 0.07 % utilized by the Malaybalay WD.

## (2) River Flow Analysis

The flow duration curves, derived from the available run-off records, are shown in Figure 7.5.2. Also, for the Tagoloan, Cagayan and Muleta river duration curves, the specific discharge at the gauging stations in the provinces of Misamis Oriental and North Cotabato were added for comparison.

The stream flow, maintenance flow, diversion flow and return flow are usually used to estimate the exploitable surface water potential. In this study, the stream flow was considered as flow potential for domestic use and the diversion flow value was treated as the equivalent to the discharge of water rights registration in surface water use. No detailed study on the return flow has been performed yet due to the difficulties in investigating the irrigation, evapotranspiration and recharge value to groundwater, etc. within the entire watersheds in the province. Therefore, the return flow was not considered for the estimation of exploitable potential.

It is generally accepted that to secure the required volume for water supply, each water use sector adopts different return periods. Usually, the dependability of domestic water supply is taken to be 90% or higher (10-year or longer return-period) of the whole hydrological period.

In determining the river maintenance flow, such factors as runoff characteristics, navigation, fishing, picturesque scenery, salt water intrusion, clogging of river mouth, riparian structures, groundwater table, flora and fauna, and river water quality shall be considered to maintain the normal function of the river. In the Philippines, 10% of the dependable flow of the river is at least required as minimum maintenance flow. Therefore, the maintenance flow was calculated as the dependable flow for irrigation, which equals to 80% (5-year return-period) of the whole hydrological period.

Finally, the exploitable potentials of surface water in the province were studied in the case of inflow to and outflow from the respective municipalities. The results are summarized in Table 7.5.2.



Percent of Time (%) (No. in Figure 7.5.1)	Specific Discharge (cum/sec/100sq.km)							
	Tagaloan	Cagayan	Muleta	Pulangi	Pulangi	Pulangi	Pulangi	Sawaga
	1	2	3	4	5	6	7	8
10%	7.58	5.97	11.34	4.64	4.06	1.93	6.44	10.52
20%	6.11	5.18	9.29	4.36	3.71	1.86	6.11	7.40
30%	5.31	5.09	8.30	3.99	3.35	1.81	5.43	5.68
40%	4.49	5.09	7.14	3.76	2.92	1.05	4.95	3.78
50%	4.06	4.64	6.74	2.77	1.64	0.59	4.55	3.28
60%	3.63	4.55	5.89	2.52	0.92	0.41	4.36	2.48
70%	3.31	3.85	4.95	2.22	0.58	0.21	4.03	2.11
80%	2.83	3.68	4.37	1.95	0.40	0.07	3.73	1.09
90%	2.57	2.72	3.54	1.58	0.28	0.06	2.69	0.71
100%	1.99	1.13	0.85	1.02	0.21	0.04	1.83	0.39
Data Period	1960-'70	1954-'64	1959-'70	1967-'70	1968-'70	1967-'69	1964-'70	1956-'66

Source; Philippine Water Resources Summary Data, as of Jan. 1980 by NWRC

Interim Report, Master Plan Study on Water Resources Management, as of Oct. 1997 by NWRB

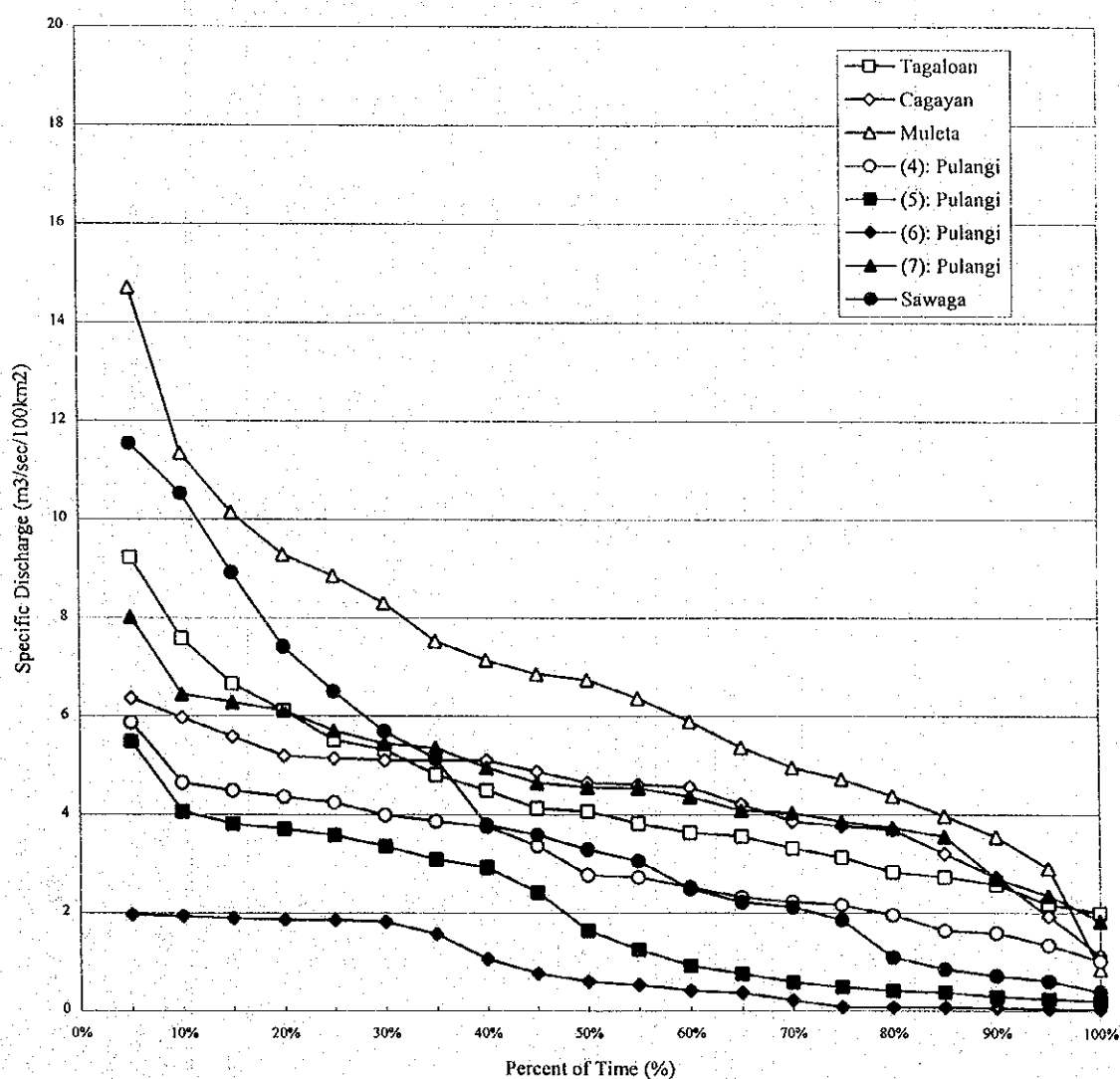


Figure 7.5.2 River Flow Duration Curve

**Table 7.5.2 Probability of Surface Water**

Surface Water Sources		Related Data				Probability of Surface Water (10-year return-period)											
Major River Water	System & Main	Location Municipality & other Province	River Connection	Watershed Area in		Sp. D (return-period)		Inlet Flow to Municipality				Outlet Flow from Municipality					
				upstream to down	outlet or inlet	Location (1)	Upstream (2)	10-year (3)	5-year (4)	S/Flow (5)	M/Flow (6)	Use (7)	Potential (8)	S/Flow (9)	M/Flow (10)	Use (11)	Potential (12)
		sq.km	sq.km	Q	Q	cu.m/sec	cu.m/sec	cu.m/sec	cu.m/sec	cu.m/sec	cu.m/sec	cu.m/sec	cu.m/sec	cu.m/sec	cu.m/sec	cu.m/sec	cu.m/sec
Tagalogan		Malaybalay		157.50	0.00	2.57	2.83	0.00	0.00	0.00	0.00	4.05	0.45	1.53	2.07	2.07	2.07
		Impasugong		578.70	157.50	2.57	2.83	4.05	0.45	1.53	2.07	18.92	2.08	2.73	14.11	14.11	14.11
		Sumilao	NIA Diversion	207.49	736.20	2.57	2.83	18.92	2.08	2.73	14.11	24.25	2.67	6.86	14.72	14.72	14.72
		Manolo Fortich		506.64	943.69	2.57	2.83	24.25	2.67	6.86	14.72	37.27	4.10	6.86	26.31	26.31	26.31
Cagayan	Bubunauan	Libona		156.77	0.00	2.72	3.68	0.00	0.00	0.00	0.00	4.26	0.58	0.00	3.69	3.69	3.69
	Sarralauan	Baungon		175.86	0.00	2.72	3.68	0.00	0.00	0.00	0.00	4.78	0.65	0.06	4.08	4.08	4.08
	Main	Talakag	NIA Diversion	808.69	0.00	2.72	3.68	0.00	0.00	0.00	0.00	22.00	2.98	4.94	14.08	14.08	14.08
Mindanao	Sawaga-1	Malaybalay		413.44	0.00	0.71	1.09	0.00	0.00	0.00	0.00	2.94	0.45	0.07	2.41	2.41	2.41
		Valencia	to Pulangi	12.15	413.44	0.71	1.09	2.94	0.45	0.07	2.41	3.02	0.46	0.07	2.49	2.49	2.49
	Sawaga-2	Lantapan	NIA Diversion	240.76	25.11	0.71	1.09	0.18	0.03	0.00	0.15	1.89	0.29	1.46	0.14	0.14	0.14
		Valencia	to Pulangi	24.29	265.87	0.71	1.09	1.89	0.29	1.46	0.14	2.06	0.32	1.57	0.17	0.17	0.17
	Pulangi	Malibog		62.53	0.00	2.69	3.73	0.00	0.00	0.00	0.00	1.68	0.23	0.00	1.45	1.45	1.45
		Impasugong		492.97	62.53	2.69	3.73	1.68	0.23	0.00	1.45	14.94	2.07	0.00	12.87	12.87	12.87
		Malaybalay		413.44	555.50	2.69	3.73	14.94	2.07	0.00	12.87	26.06	3.61	0.00	22.45	22.45	22.45
		Cabanglasan		209.00	968.94	2.69	3.73	26.06	3.61	0.00	22.45	31.69	4.39	0.00	27.29	27.29	27.29
	San Fernando		638.63	1,177.94	2.69	3.73	31.69	4.39	0.00	27.29	44.11	48.87	6.78	0.64	41.45	41.45	41.45
		Valencia	from Sawaga	582.84	1,816.57	2.69	3.73	53.95	7.56	2.28	44.11	69.63	9.73	24.78	35.12	35.12	35.12
		Quezon		409.41	2,399.41	2.69	3.73	64.54	8.95	24.78	30.81	75.56	10.48	25.81	39.27	39.27	39.27
		Don Carlos		157.02	2,808.82	2.69	3.73	75.56	10.48	25.81	39.27	79.78	11.06	25.81	42.91	42.91	42.91
		Kitaotao		150.74	2,965.84	2.69	3.73	79.78	11.06	25.81	42.91	83.84	11.62	25.81	46.40	46.40	46.40
		Dangcagan		115.15	3,116.58	2.69	3.73	83.84	11.62	25.81	46.40	86.93	12.05	25.81	49.07	49.07	49.07
		Kibawe		214.35	3,231.73	2.69	3.73	86.93	12.05	25.81	49.07	92.70	12.85	26.06	53.79	53.79	53.79
		Damulog		245.66	3,446.08	2.69	3.73	92.70	12.85	26.06	53.79	99.31	13.77	26.06	59.48	59.48	59.48
	Muleta	Kailangan		153.59	0.00	3.54	4.37	0.00	0.00	0.00	0.00	5.44	0.67	0.80	3.97	3.97	3.97
		Panganutuan		116.74	153.59	3.54	4.37	5.44	0.67	0.80	3.97	9.57	1.18	0.80	7.59	7.59	7.59

Notes: Sp. D (Specific Discharge) was analyzed by monthly mean flow records from gauging station.  
S/Flow (Stream Flow) was estimated specific discharge (10-year return-period) multiplied by upstream area.  
M/Flow (Maintenance Flow) was estimated 10% of river flow in case of 5-year return-period.  
Sp.D (10-year or 5-year return-period) without gauging station was adopted by the other analysis result from near gauging station.  
Inlet & outlet "Use" (Water Rights) are summed up by NWRB Database, as of March 1997.  
Unit Q for Specific Discharge is cu.m/sec/100 sq.km.  
S/Flow, M/Flow & Use in final outlet flow of each stream system was added to respective inlet flows of main system.

### (3) Surface Water Quality

There are mining sites located upstream of the Tagoloan and Cagayan rivers, and the Mindanao tributaries. The location of these mining sites is shown in Figure 7.5.1.

The results of water quality analysis are summarized in Table 7.5.1, Data Report. The sampling locations were basically selected at upstream of the respective municipalities. In the said table, Class AA and Class A of the DENR "Water Quality Criteria for Fresh Water" are shown as reference for raw water evaluation. The PNSDW-1994 is also used to evaluate water quality with reference to turbidity and trace elements. Except for the Pulangi River which was found to have high Fe and Mn contents, the water quality of the selected rivers is classified as class "A", although the parameters tested are limited.

## 7.6 Future Development Potential of Water Sources

### (1) Groundwater

A well inventory covering all the municipalities shows that there are 4,353 existing wells in the province, while 175 wells are recorded in the inventory prepared by PSPT (refer to Table 7.1.1 and 7.3.2, Data Report). Despite the smaller number of wells included in the PSPT data, these were used in the analysis, since these provided technical information. Of the total 175 wells, 73 have complete information: depth, static water level and specific capacity. Data are summarized in Table 7.6.1 Existing Well Sources.

Considering the well information, the most productive wells are those having depths ranging from 15.2m to 18.3 and from 21.0m to 96.9m. The good yielding wells have static water levels varying from about 3 mbgs to 7 mbgs and specific capacities of about 0.4 lpsm to 13.2 lpsm.

Based on the hydraulic characteristics and location of wells in Bukidnon, aquifers are widely distributed in areas where these are covered by pyroclastics and alluvial deposits, which areas are formed by the central volcanoes and the Pulangi River. Solo shallow well area is not distributed in the province. The Miocene and older rock units (volcanics and sedimentary) are distributed in belt zones of the eastern mountainous area. These are classified as difficult area for groundwater development.

Table 7.6.1 Existing Well Sources

Municipality	Type	No.	Depth (m)		SWL (mbgs)		Sp. Cap. (lpsm)	
			Ave.	Range	Ave.	Range	Ave.	Range
Baungon	DW	5	61.1	52.3 - 72.3	20.2	5.0 - 36.0	0.2	0.2 - 0.4
	SW	2	18.4	18.3 - 18.6	3.0	3.0 - 3.0	-	- - -
Cabanglasan	DW	5	41.0	26.0 - 63.7	10.2	5.0 - 17.7	0.2	0.1 - 0.2
	SW	1	18.9	18.9 - 18.9	3.0	3.0 - 3.0	-	- - -
Damulog	DW	1	26.5	26.5 - 26.5	14.0	14.0 - 14.0	-	- - -
	SW	0	-	- - -	-	- - -	-	- - -
Dangcagan	DW	4	30.6	20.4 - 60.0	5.0	5.0 - 5.0	-	- - -
	SW	2	18.8	18.0 - 19.8	3.0	3.0 - 3.0	-	- - -
Don Carlos	DW	12	48.5	23.5 - 94.0	6.0	5.0 - 13.0	1.0	0.2 - 1.3
	SW	4	16.0	15.2 - 18.3	3.0	3.0 - 3.0	-	- - -
Impasugong	DW	1	30.5	30.5 - 30.5	13.1	13.1 - 13.1	0.6	0.6 - 0.6
	SW	1	18.3	18.3 - 18.3	3.0	3.0 - 3.0	-	- - -
Kadingilan	DW	3	66.3	59.5 - 82.4	10.4	5.0 - 45.7	0.1	0.1 - 0.1
	SW	1	18.3	18.3 - 18.3	3.0	3.0 - 3.0	-	- - -
Kalilangan	DW	4	36.2	22.4 - 42.7	5.0	5.0 - 5.0	-	- - -
	SW	0	-	- - -	-	- - -	-	- - -
Kibawe	DW	5	49.4	21.1 - 150.0	5.8	5.0 - 9.4	1.7	1.7 - 1.7
	SW	2	18.8	17.4 - 19.8	3.0	3.0 - 3.0	-	- - -
Kitaotao	DW	4	68.4	35.0 - 80.0	7.7	5.0 - 9.1	0.3	0.3 - 0.3
	SW	4	17.3	16.2 - 19.0	3.0	3.0 - 3.0	-	- - -
Lantapan	DW	1	49.0	49.0 - 49.0	5.0	5.0 - 5.0	-	- - -
	SW	3	16.1	15.3 - 17.0	3.0	3.0 - 3.0	-	- - -
Libona	DW	8	47.1	30.5 - 67.5	5.7	5.0 - 10.0	0.2	0.2 - 0.2
	SW	0	-	- - -	-	- - -	-	- - -
Malaybalay	DW	14	51.1	20.4 - 160.0	16.2	5.0 - 73.0	0.4	0.1 - 0.6
	SW	14	16.8	6.1 - 18.3	3.0	3.0 - 3.0	-	- - -
Malitbog	DW	1	48.8	48.8 - 48.8	5.0	5.0 - 5.0	-	- - -
	SW	0	-	- - -	-	- - -	-	- - -
Manolo Fortich	DW	9	67.4	38.7 - 90.0	7.6	5.0 - 20.0	1.6	0.5 - 2.8
	SW	0	-	- - -	-	- - -	-	- - -
Maramag	DW	9	32.1	21.3 - 48.8	5.0	5.0 - 5.0	-	- - -
	SW	0	-	- - -	-	- - -	-	- - -
Pangantucan	DW	2	21.6	21.2 - 22.3	5.0	5.0 - 5.0	-	- - -
	SW	0	-	- - -	-	- - -	-	- - -
Quezon	DW	3	29.1	25.0 - 55.0	5.0	5.0 - 5.0	-	- - -
	SW	10	18.8	18.0 - 20.0	3.0	3.0 - 3.0	-	- - -

**Table 7.6.1 Existing Well Sources (contd)**

Municipality	Type	No.	Depth (m)		SWL (mbgs)		Sp. Cap. (lpsm)	
			Ave.	Range	Ave.	Range	Ave.	Range
San Fernando	DW	5	33.6	28.0 - 36.7	5.0	5.0 - 5.0	-	- - -
	SW	5	15.7	13.5 - 18.3	3.0	3.0 - 3.0	-	- - -
Sumilao	DW	3	65.9	61.0 - 68.0	5.0	5.0 - 5.0	-	- - -
	SW	1	19.2	19.2 - 19.2	3.0	3.0 - 3.0	-	- - -
Talakag	DW	4	85.6	70.1 - 106.7	5.0	5.0 - 5.0	0.9	0.9 - 0.9
	SW	0	-	- - -	-	- - -	-	- - -
Valencia	DW	16	39.0	21.0 - 96.9	5.2	5.0 - 7.0	3.2	0.2 - 6.7
	SW	6	17.2	15.2 - 18.3	3.0	3.0 - 3.0	-	- - -

Notes; The values of "Ave. depth, SWL and Sp.Cap." by municipality are estimated using the weighted average based on 1995 census population in respective barangays at well location.

Legend; SWL=static water level, Sp.Cap.=specific capacity, Ave.=average, SW=shallow well and DW=deep well

As indicated in Figure 7.3.1 Groundwater Availability Map of the Main Report, the province is located inland. Therefore, saline water intrusion is not observed. However, the shallow and deep wells in the piedmont areas of central volcanoes contain high Fe and Mn contents due to the rich volcanic sediments in the aquifers in these areas.

As alternative water sources, the numerous untapped springs can be developed for future use. These are the most reliable and economical sources for water supply in the province because groundwater quality has problems of high Fe and Mn contents. The existing spring sources of 806 are utilized for water supply and these originate from the higher piedmont and cordillera areas of the province. The untapped springs of 108 are proposed as future water sources in the said areas.

The detailed hydrogeological characteristics of each municipality are summarized in Table 7.6.2, while the individual well locations with technical information are shown in Figure 7.6.1 Individual Well Location and Specification Map, Data Report.

Additional wells shall be designed employing "gravel packed well" with a filtration thickness at annular space of about 50mm or more depending on the grain sizes of aquifers and pumping capacity. While, natural gravel packed well may be adopted within the areas where well-sorted natural gravel formation is distributed at the expected aquifer.

Table 7.6.2 Hydrogeological Descriptions by Municipality

Municipality	Ground Information										Well Information										Groundwater Information						
	Topography			Geology			Depth		SWL			Sp.Cap.	L-III	Availability			Potential		Quality								
	Area Proportion (%)		Lithofacies (Major Aquifers)	Stratigraphy of Geological Age*		m	mbs		ipsm	Area Proportion (%)		Comparative		Area Feature													
	Plain-Plateau	Hilly-Piedmont		Mountain	Q		Tertiary			C	minL				max	minbgs	max	ave		well	SW	DW	Diff.	Wells	Springs	Problem	Pollutants
							Neo.	Paleo.																			
Baungon	0%	73%	27%	pyroclastics	X	52.3	5.0	36.0	0.24	1	0%	73%	27%	fair	rich	Fe/Mn	fertilizer										
Cabanglasan	0%	3%	97%	tuff breccia	X	26.0	5.0	17.7	0.18	0	0%	3%	97%	risky	few	mining											
Danalog	6%	82%	12%	recent deposits & limestone	X	26.5	14.0	14.0	-	0	0%	100%	0%	fair	poor												
Dangcagan	7%	93%	0%	recent deposits & limestone	X	20.4	5.0	5.0	-	0	0%	100%	0%	partly poor	few	Fe/Mn											
Don Carlos	4%	94%	2%	pyroclastics	X	23.5	5.0	13.0	0.97	1	0%	98%	2%	partly poor	few	Fe/Mn											
Impasugong	2%	44%	54%	pyroclastics	X	30.5	13.1	13.1	0.57	0	0%	46%	54%	fair	rich	Fe/Mn	mining, fertilizer										
Kadugayan	2%	98%	0%	pyroclastics & limestone	X	59.5	5.0	45.7	0.14	0	0%	100%	0%	poor	few	Fe/Mn											
Kallangan	1%	43%	56%	pyroclastics	X	22.4	5.0	5.0	-	0	0%	44%	56%	partly poor	rich	Fe/Mn											
Kibawe	4%	96%	0%	pyroclastics & limestone	X	21.1	5.0	9.4	1.67	3	0%	100%	0%	partly poor	poor	Fe/Mn											
Kitaotao	8%	36%	56%	recent deposits & pyroclastics	X	35.0	5.0	9.1	0.28	0	0%	69%	31%	partly poor	few	Fe/Mn											
Lantapan	0%	68%	32%	pyroclastics	X	49.0	5.0	5.0	-	0	0%	68%	32%	fair	rich	Fe/Mn	fertilizer										
Libona	0%	91%	9%	pyroclastics	X	30.5	5.0	10.0	0.19	5	0%	91%	9%	fair	rich	Fe/Mn	mining, fertilizer										
Malaybalay	4%	42%	54%	pyroclastics	X	20.4	5.0	73.0	0.34	5	0%	46%	54%	partly good	rich	Fe/Mn	mining, fertilizer										
Malibgo	13%	76%	11%	terrace gravel & pyroclastics	X	48.8	5.0	5.0	-	0	0%	89%	11%	fair	few												
Manolo Fortich	2%	94%	4%	pyroclastics	X	38.7	5.0	20.0	1.60	21	0%	96%	4%	fair	rich	Fe/Mn	fertilizer										
Maramag	0%	64%	36%	pyroclastics	X	21.3	5.0	5.0	-	0	0%	64%	36%	partly poor	rich	Fe/Mn											
Pangantuan	0%	52%	48%	pyroclastics	X	21.2	5.0	5.0	-	0	0%	52%	48%	partly poor	rich	Fe/Mn											
Quezon	6%	80%	14%	recent deposits & limestone	X	25.0	5.0	5.0	-	0	0%	86%	14%	partly good	few	Fe/Mn											
San Fernando	7%	12%	81%	recent deposit	X	28.0	5.0	5.0	-	0	0%	7%	93%	risky	few												
Sumilao	0%	86%	14%	pyroclastics	X	61.0	5.0	5.0	-	0	0%	86%	14%	fair	rich	Fe/Mn	fertilizer										
Talakag	0%	81%	19%	pyroclastics	X	70.1	5.0	5.0	0.93	0	0%	81%	19%	fair	rich	Fe/Mn	fertilizer										
Valencia	22%	57%	21%	recent deposits & pyroclastics	X	21.0	5.0	7.0	3.20	5	0%	20%	80%	good	rich	Fe/Mn	fertilizer										

Legend: Geological Age: Q=Quaternary, Neo=Neogene, Paleo=Paleogene, C=Cretaceous  
 Well Information: SWL=static water level, Sp.Cap.=specific capacity, L-III=wells operated for L-III service  
 Groundwater Information: SW=solo shallow well area, DW=deep well area, Diff.=difficult area

Such areas are usually the upstream areas of alluvial fans or plains in the province. The formations suitable for natural gravel packed method can be observed mostly at shallower depth. The application of such method for Level I well is also justifiable, since the inflow velocity of groundwater through the screen is very low because of minimal pumping rate by means of hand-pump operation.

Generally, shallower well has higher possibility to be constructed by the natural gravel packed method than the deeper one in areas formed by recent deposits. This is because the layers at different depths of alluvial plain or fan deposits had been formed by different conditions of transportation and sedimentation between varied grain sizes. Therefore, the availability of the natural packed well development in the province is experimentally assumed considering the limited information such as topography, geology, static water levels, etc., as shown in Table 7.6.3. However, the different proportions of two kinds of deep well structures (gravel packed and natural gravel packed wells) are not estimated by the accurate results based on the hydrogeological study.

**Table 7.6.3 Proportion of Gravel Packed and Natural Gravel Packed Wells**

Municipality (only potential area)	Proposed Well Depth	Proportion (%) of Level-I Deep Wells	
		Gravel Packed	Natural Gravel Packed
Quezon	40 m	95 %	5 %
Valencia	40 m	85 %	15 %

Examination on the effective grain sizes and the uniformity coefficient by sieve analysis at the influential aquifers (composed of coarse sand and/or fine gravel) should be conducted during the implementation period. Such analysis and actual well construction results are helpful in considering the natural gravel packed method for future planning.

## (2) Spring

Untapped spring source identification data are shown in Table 7.6.4. These data were collected and tabulated by questionnaire sheets-untapped spring information format, Data Report. Data also include barangay name, owner, discharge, transmission line length, and elevation difference.

**Table 7.6.4 Untapped Spring Source Identification**

Location		Identification of Untapped Spring			
Municipality	Barangay	Owner	Discharge (lps)	T.L.L.* (km)	Elevation Difference (m)
Baungon	Kalilangan	NA	2.0	3.5	25
	Lacolac	NA	2.0	5.0	NA
	Mabuhay	NA	2.0	4.0	-50
Cabanglasan	Iba	NA	200.0	17.0	135
	Imbatug	NA	2.0	3.0	20
	Mandaing	NA	2.5	2.0	5
Dangcagan	Bugwak	NA	150.0	3.0	-25
Don Carlos	Buyot	NA	2.0	1.7	55
	Calaocalao	NA	2.0	1.0	14
	San Antonio West	NA	2.0	3.2	18
Impasugong	Bulonay	NA	3.0	0.3	NA
	Dumalaguin	NA	2.0	3.0	NA
	Dumalaguin	NA	2.0	3.0	NA
	Dumalaguin	NA	2.0	3.0	NA
	Hagpa	NA	2.0	3.0	NA
	Kalabugao	NA	2.0	2.0	NA
	Kalabugao	NA	2.0	2.0	NA
	Kalabugao	NA	2.0	2.0	NA
	Kalabugao	NA	2.0	2.0	NA
	Kalabugao	NA	4.0	2.0	NA
Kadingilan	Baroy	NA	4.0	2.0	10
	Cabadiangan	NA	2.0	0.5	-11
	Matampay	NA	3.0	2.0	-10
Kibawe	Kisawa	NA	2.0	0.9	5
	Mascarinas	NA	2.0	1.0	15
	New Kidapawan	NA	5.0	15.0	-20
	Romagooc	NA	10.0	2.5	33
	Sampaguita	NA	2.0	2.0	42
	Sanipon	NA	2.0	0.5	10
	Spring	NA	3.0	1.0	20
	Tumaras	NA	2.0	3.5	31



**Table 7.6.4 Untapped Spring Source Identification (cont'd)**

Location		Identification of Untapped Spring			
Municipality	Barangay	Owner	Discharge (lps)	T.L.L.* (km)	Elevation Difference (m)
Kitaotao	Binoongan	NA	2.0	1.0	5
	Bobong	NA	3.0	5.0	18
	Bolocaon	NA	2.0	1.0	10
	Kitobo	NA	2.0	1.0	5
	San Lorenzo	NA	2.0	3.0	15
Malitbog	Kalingking	NA	3.0	1.0	5
	Kiabo	NA	2.0	1.5	10
	Mindagat	NA	200.0	10.0	150
	Omagling	NA	5.0	1.0	5
	Patpat	NA	2.0	1.0	9
	Sampiano	NA	3.0	1.0	10
	San Luis	NA	3.0	1.0	5
	Santa Ines	NA	2.0	2.0	10
	Silo-o	NA	3.0	3.0	10
	Sumalsag	NA	205.0	15.0	80
Maramag	Base Camp	NA	5.0	2.5	5
	Bayabason	NA	2.0	2.0	NA
	Camp I	NA	5.0	0.4	30
	Colambugon	NA	5.0	0.3	200
	Colambugon	NA	5.0	0.5	500
	Colambugon	NA	5.0	1.0	300
	Dagumba-an (Dalete)	NA	4.0	0.5	NA
	Dologon (Paragosa)	NA	5.0	6.0	5
	Kuya	NA	5.0	3.0	50
	La Roxas	NA	5.0	0.5	2
	Panadtalan	NA	3.0	5.0	20
	Panalsalan	NA	2.0	2.0	10
	Poblacion South	NA	2.0	2.5	1
	San Roque	NA	5.0	6.0	30
Manolo Fortich	Mampayag	NA	500.0	2.7	NA

**Table 7.6.4 Untapped Spring Source Identification (cont'd)**

Location		Identification of Untapped Spring			
Municipality	Barangay	Owner	Discharge (lps)	T.L.L.* (km)	Elevation Difference (m)
Pangantucan	Kimanait	NA	2.0	0.5	-41
	Kipadukan	NA	2.5	3.0	10
	Langcataon	NA	2.5	1.5	40
	Lantay	NA	2.0	0.4	20
	Malipayon	NA	3.0	1.5	60
	Mendis	NA	4.0	3.5	100
	New Eden	NA	2.5	0.3	100
	Payad	NA	2.5	1.5	20
	Poblacion	NA	18.0	8.0	900
	Poltulin	NA	3.5	3.5	100
Quezon	Cebole	NA	2.0	1.5	10
	Dumalama	NA	2.0	0.5	3
	Kiburiao	NA	3.0	1.5	-10
	Kiburiao	NA	4.0	1.5	5
	Linabo	NA	2.5	NA	NA
	Linabo	NA	2.5	9.5	570
	Linabo	NA	2.5	9.0	636
	Linabo	NA	2.0	0.5	10
	Lipa	NA	3.0	1.0	15
	Lipa	NA	2.0	0.5	5
	Magsaysay	NA	3.0	1.0	-15
	Mahayag	NA	5.0	14.0	750
	Minongan	NA	2.0	0.5	5
	Salawagan	NA	2.0	1.0	5
	San Isidoro	NA	2.0	1.5	3
	San Roque	NA	2.5	8.8	800
	San Roque	NA	5.0	9.5	700
San Fernando	Cabuling	NA	2.0	1.0	100
	Cayaga	NA	5.0	2.5	10
	Dao	NA	3.0	2.0	10
	Durian	NA	3.0	3.0	10
	Kawayan	NA	2.0	2.0	300
	Kibongcog	NA	5.0	1.5	18

**Table 7.6.4 Untapped Spring Source Identification (cont'd)**

Location		Identification of Untapped Spring			
Municipality	Barangay	Owner	Discharge (lps)	T.L.L.* (km)	Elevation Difference (m)
San Fernando	Little Baguio	NA	2.0	1.5	20
	Matupe	NA	10.0	2.5	15
	Nakabuklad	NA	2.0	1.5	13
	Palacpacan	NA	2.0	1.0	5
	Santo Domingo	NA	3.0	2.0	10
Sumilao	Licoan	NA	8.0	2.0	15
	Lupiagan	NA	5.0	3.0	20
	Occasion (Kulase)	NA	2.0	0.5	5
	Puntian	NA	2.0	1.5	-50
	San Roque	NA	5.0	3.0	10
	Vista Villa	NA	2.0	1.5	-50
Talakag	Cosina	NA	3.5	1.2	25
	Cosina	NA	5.0	6.0	20
	San Isidro	NA	200.0	7.5	20

Note: T.L.L.; Transmission line length  
NA; Data not available

## **7.7 Water Source Development for Medium-Term Development Plan**

### **7.7.1 Detailed Groundwater Investigation Required**

#### **(1) Test Well Investigation on Groundwater Quality and Yielding Capacity in the Central-West Volcanic Mountain Area**

As referred to in Figure 7.3.1 Groundwater Availability Map in the Main Report, this area has groundwater problems in terms of quantity and quality. The low yielding area (as quantitative problem) is located in the southern hillside of Mt. Kalatungan. While groundwater areas of high Fe and Mn contents (as qualitative problem) are experienced in both piedmonts of Mt. Kitanglad and Mt. Kalatungan.

For future sustainable groundwater development, therefore, the hydrogeological investigations with test wells construction shall be conducted in both piedmont areas. The test results of these investigations can be reflected in the detailed design of groundwater development for all service levels of water supply.

In the piedmont area of Mt. Kitanglad, the recommended tasks are the test wells with pumping tests, the water quality examinations, etc. as specified below.

- Test Well Sites; At urban areas in Manolo Fortich & Lantapan
- Number of Test Wells; One deep well in each municipality
- Tentative Deep Well Design; Depth of 150m, diameter of 250mm and screen length of 40m
- Pumping Test; Time Draw-down with maximum discharge of 1,500m<sup>3</sup>/day and Recovery Test
- Water Quality Examination; to include Fe and Mn
- Results; Possibility of yielding and potable water quality

In the piedmont area of Mt. Kalatungan, the recommended tasks are the same as that in Mt. Kitanglad as specified below.

- Test Well Sites; at urban areas in Maramag & Don Carlos
- Number of Test Wells; one deep well in each municipality
- Tentative Deep Well Design; depth of 150m, diameter of 200mm and screen length of 30m
- Pumping Test; Time Draw-down with maximum discharge of 1,000m<sup>3</sup>/day and Recovery Test
- Water Quality Examination; to include Fe and Mn
- Results; possibility of yielding and potable water quality

## (2) Test Well Investigation on Groundwater Potential of Limestone Aquifer in Southeast Area

The limestone sediments of the Plio-Pleistocene period in the southeast area of the province are developed by the deep wells in Kibawe. This formation is underlain by the pyroclastics sediments. The depth of limestone encountered is 120 mbgs. The production capacity at these deep wells is estimated at about 2.4 lpsm, which value is considered as good aquifer. However, this limestone formation is newly developed due to capacity limitation of the drilling equipment in the province. The hydrogeological characteristics of this limestone aquifer are not yet investigated.

Therefore, the study on the permissive sustained yield of potable groundwater should be performed in these limestone areas. The results of this study can soon be reflected in the detailed design of groundwater development for the L-III water supply systems. The recommended tasks are test wells construction with pumping tests, the water quality analysis, etc. as specified below.

- Test Well Sites; at urban areas in Kibawe and Kitaotao
- Number of Test Wells; one deep well in each municipality
- Tentative Deep Well Design; depth of 180m, diameter of 300mm and screen length of 50m
- Pumping Test; Time Draw-down with maximum discharge of 2,500m<sup>3</sup>/day and Recovery Test
- Water Quality Examination; to include Ca, Mg, Fe and Mn
- Results; possibility of yielding and potable water quality

### 7.7.2 Spacing Allocation for Level II and III Wells

The pumping rates required for Level I facilities are fairly lower compared with that of Level II and III systems. The well interference in Level I facilities need not be studied in terms of spacing of wells and production rate, since most formations in shallow and deep well areas generally have enough groundwater development potential. As Level II and III wells are usually expected to produce higher discharges to meet the water demand, the spacing of wells to avoid well interference has to be considered. Spacing allocation for Level II and III wells was examined considering the specific capacity, pumping rate, and the assumed drawdown of 1cm at the interference radius for a pumping duration of 16 hours.

#### (1) Specific Capacity

According to the existing well source information, specific capacity was considered with ranges from 0.5 lpsm to 6.5 lpsm. To simplify the calculation, an average value in each range is adopted in the calculation of interference radius.

#### (2) Pumping Rate

The pumping rate was estimated by assuming a drawdown of 10m with the average value of specific capacity and pump operation of 16 hours/day. The formula used to determine proper well spacing is the Jacob modified equation. Drawdown at the interference boundary is assumed 1cm after a pumping duration of 16 hours.

Table 7.7.1 presents the estimated spacing requirements and the number of wells to be constructed within a well field of 1km<sup>2</sup>. The spacing interval between adjacent wells to avoid well interference is planned to be more than twice the distances of the calculated interference radius.

**Table 7.7.1 Spacing Arrangements for Planned Wells**

<b>Range of Specific Capacity (lpsm)</b>	<b>Estimated Pumping Rate (m<sup>3</sup>/day)</b>	<b>Estimated Interference Radius (m)</b>	<b>Estimated Number of wells/km<sup>2</sup></b>
0.5 - 1.5	500	80	45
1.5 - 3.0	1,000	120	20
3.0 - 4.5	2,000	160	11
4.5 - 6.0	2,500	200	7
> 6.0	>2,500	>200	>7

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**FUTURE REQUIREMENTS  
AND DEVELOPMENT PLAN**







## 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 Served by Planned/On-going Projects				Population Served in the Base Year (1997)				
			Level III	Level II	Level I	Total	Level III	Level II	Level I	Total	Level III	Level II	Level I	Total	Percentage Coverage
Baungon	Urban	4,960	1,032	210	2,702	3,944					1,032	210	2,702	3,944	80
	Rural	18,906			1,368	14,075						1,368	14,075	15,443	82
	Total	23,866	1,032		1,578	16,777					1,032	1,578	16,777	19,387	81
Cabanglasan	Urban	4,013			390	2,881							2,881	3,271	82
	Rural	26,540			3,876	21,174						3,876	21,174	25,050	94
	Total	30,553			4,266	24,055						4,266	24,055	28,321	93
Dannulog	Urban	3,870			175	2,401							2,401	2,576	67
	Rural	11,746			1,315	9,839						1,315	9,839	11,154	95
	Total	15,616			1,490	12,240						1,490	12,240	13,730	88
Dangcagan	Urban	4,548	867		612	2,551					867	612	2,551	4,030	89
	Rural	12,909			200	2,486						200	2,486	2,686	21
	Total	17,457	867		812	5,037					867	812	5,037	6,716	38
Don Carlos	Urban	23,145	2,133		972	10,722					2,133	972	10,722	13,827	60
	Rural	30,211	1,503		912	16,462					1,503	912	16,462	18,877	62
	Total	53,356	3,636		1,884	27,184					3,636	1,884	27,184	32,704	61
Impasugong	Urban	5,475	2,329			2,162					2,329		2,162	4,491	82
	Rural	21,110			728	1,604						728	1,604	19,954	95
	Total	26,585	3,057		1,604	19,784					3,057	1,604	19,784	24,445	92
Kadangilan	Urban	4,794			1,620	1,236						1,620	1,236	2,856	60
	Rural	22,227			1,040	13,094						1,040	13,094	14,134	64
	Total	27,021			2,660	14,330						2,660	14,330	16,990	63
Kalilangan	Urban	17,250	1,156		540	11,445					1,156	540	11,445	13,141	76
	Rural	11,049	193		897	4,415					193	897	4,415	5,505	30
	Total	28,299	1,349		1,437	15,860					1,349	1,437	15,860	18,646	66
Kibawe	Urban	4,347	2,772		52	2,824					2,772		52	2,824	65
	Rural	27,352	369			23,848					369		23,848	24,217	89
	Total	31,699	3,141		52	23,848					3,141	52	23,848	27,041	85
Kitaotao	Urban	9,891			1,008	5,801						1,008	5,801	6,809	69
	Rural	30,209				22,285							22,285	22,285	74
	Total	40,100			1,008	28,086						1,008	28,086	29,094	73
Lantapan	Urban	14,761	1,015		197	11,159					1,015	197	11,159	12,371	84
	Rural	23,619	667		5,325	15,056					667	5,325	15,056	21,048	89
	Total	38,380	1,682		5,522	26,215					1,682	5,522	26,215	33,419	87
Libona	Urban	2,317	935			335					935		335	1,270	55
	Rural	30,525	4,584		5,145	9,648					4,584	5,145	9,648	19,377	63
	Total	32,842	5,519		5,145	9,983					5,519	5,145	9,983	20,647	63
Malaybalay (Capital)	Urban	28,759	25,261			25,261					25,261			25,261	88
	Rural	91,419	4,072		8,058	39,523					4,072	8,058	39,523	51,653	57
	Total	120,178	29,333		8,058	39,523					29,333	8,058	39,523	76,914	64
Malinbog	Urban	2,704			112	2,160						112	2,160	2,272	84
	Rural	14,342			1,518	11,716						1,518	11,716	13,234	92
	Total	17,046			1,630	13,876						1,630	13,876	15,506	91
Manolo Fortich	Urban	5,512	4,281			701					4,281		701	4,982	90
	Rural	64,481	19,635		4,926	36,484					19,635	4,926	36,484	61,045	95
	Total	69,993	23,916		4,926	37,185					23,916	4,926	37,185	66,027	94
Maramag	Urban	52,948	5,879		11,583	3,357					5,879	11,583	3,357	20,819	39
	Rural	12,898	558		5,130	587					558	5,130	587	6,275	49
	Total	65,846	6,437		16,713	3,944					6,437	16,713	3,944	27,094	41
Pangantuan	Urban	23,078	1,200		2,181	15,734					1,200	2,181	15,734	19,115	83
	Rural	16,450			1,532	9,903						1,532	9,903	11,435	70
	Total	39,528	1,200		3,713	25,637					1,200	3,713	25,637	30,550	77
Quezon	Urban	14,458	7,639			5,930					7,639		5,930	13,569	94
	Rural	61,163	1,889		1,909	54,592					1,889	1,909	54,592	58,390	95
	Total	75,621	9,528		1,909	60,522					9,528	1,909	60,522	71,959	95
San Fernando	Urban	13,130			360	10,162						360	10,162	10,522	80
	Rural	23,524			432	19,564						432	19,564	19,996	85
	Total	36,654			792	29,726						792	29,726	30,518	83
Sumilao	Urban	10,880	3,881		3,224	3,559					3,881	3,224	3,559	10,664	98
	Rural	5,711			1,568	3,473						1,568	3,473	5,041	88
	Total	16,591	3,881		4,792	7,032					3,881	4,792	7,032	15,705	95
Talakag	Urban	5,663	4,800		252						4,800	252		5,052	89
	Rural	35,438			450	29,653						450	29,653	30,103	85
	Total	41,101	4,800		702	29,653					4,800	702	29,653	35,155	86
Valencia	Urban	36,445	20,552			13,883					20,552		13,883	34,435	94
	Rural	97,553	11,053		5,984	78,256					11,053	5,984	78,256	95,293	98
	Total	133,998	31,605		5,984	92,139					31,605	5,984	92,139	129,728	97
Provincial Total	Urban	292,948	85,732		23,488	108,881					85,732	23,488	108,881	218,101	74
	Rural	689,382	45,251		53,189	453,755					45,251	53,189	453,755	552,195	80
	Total	982,330	130,983		76,677	562,636					130,983	76,677	562,636	770,296	78

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 (%)
Baungon	Urban	1,032	210	2,702	3,944	4,960	80	5,827	68
	Rural		1,368	14,075	15,443	18,906	82	22,213	70
	Total	1,032	1,578	16,777	19,387	23,866	81	28,040	69
Cabanglasan	Urban		390	2,881	3,271	4,013	82	4,556	72
	Rural		3,876	21,174	25,050	26,540	94	30,127	83
	Total		4,266	24,055	28,321	30,553	93	34,683	82
Damulog	Urban		175	2,401	2,576	3,870	67	4,359	59
	Rural		1,315	9,839	11,154	11,746	95	13,228	84
	Total		1,490	12,240	13,730	15,616	88	17,587	78
Dangcagan	Urban	867	612	2,551	4,030	4,548	89	5,232	77
	Rural		200	2,486	2,686	12,909	21	14,852	18
	Total	867	812	5,037	6,716	17,457	38	20,084	33
Don Carlos	Urban	2,133	972	10,722	13,827	23,145	60	26,374	52
	Rural	1,503	912	16,462	18,877	30,211	62	34,426	55
	Total	3,636	1,884	27,184	32,704	53,356	61	60,800	54
Impasugong	Urban	2,329		2,162	4,491	5,475	82	6,286	71
	Rural	728	1,604	17,622	19,954	21,110	95	24,236	82
	Total	3,057	1,604	19,784	24,445	26,585	92	30,522	80
Kadingilan	Urban		1,620	1,236	2,856	4,794	60	5,323	54
	Rural		1,040	13,094	14,134	22,227	64	24,683	57
	Total		2,660	14,330	16,990	27,021	63	30,006	57
Kalilangan	Urban	1,156	540	11,445	13,141	17,250	76	19,922	66
	Rural	193	897	4,415	5,505	11,049	50	12,760	43
	Total	1,349	1,437	15,860	18,646	28,299	66	32,682	57
Kibawe	Urban	2,772	52		2,824	4,347	65	4,746	60
	Rural	369		23,848	24,217	27,352	89	29,866	81
	Total	3,141	52	23,848	27,041	31,699	85	34,612	78
Kitaotao	Urban		1,008	5,801	6,809	9,891	69	11,260	60
	Rural			22,285	22,285	30,209	74	34,389	65
	Total		1,008	28,086	29,094	40,100	73	45,649	64
Lantapan	Urban	1,015	197	11,159	12,371	14,761	84	16,551	75
	Rural	667	5,325	15,056	21,048	23,619	89	26,485	79
	Total	1,682	5,522	26,215	33,419	38,380	87	43,036	78
Libona	Urban	935		335	1,270	2,317	55	2,529	50
	Rural	4,584	5,145	9,648	19,377	30,525	63	33,319	58
	Total	5,519	5,145	9,983	20,647	32,842	63	35,848	58
Malaybalay (Capital)	Urban	25,261			25,261	28,759	88	35,268	72
	Rural	4,072	8,058	39,523	51,653	91,419	57	112,111	46
	Total	29,333	8,058	39,523	76,914	120,178	64	147,379	52
Malitbog	Urban		112	2,160	2,272	2,704	84	3,029	75
	Rural		1,518	11,716	13,234	14,342	92	16,064	82
	Total		1,630	13,876	15,506	17,046	91	19,093	81
Manolo Fortich	Urban	4,281		701	4,982	5,512	90	6,173	81
	Rural	19,635	4,926	36,484	61,045	64,481	95	72,215	85
	Total	23,916	4,926	37,185	66,027	69,993	94	78,388	84
Maramag	Urban	5,879	11,583	3,357	20,819	52,948	39	61,404	34
	Rural	558	5,130	587	6,275	12,898	49	14,957	42
	Total	6,437	16,713	3,944	27,094	65,846	41	76,361	35
Pangantucan	Urban	1,200	2,181	15,734	19,115	23,078	83	25,137	76
	Rural		1,532	9,903	11,435	16,450	70	17,918	64
	Total	1,200	3,713	25,637	30,550	39,528	77	43,055	71
Quezon	Urban	7,639		5,930	13,569	14,458	94	15,341	88
	Rural	1,889	1,909	54,592	58,390	61,163	95	64,901	90
	Total	9,528	1,909	60,522	71,959	75,621	95	80,242	90
San Fernando	Urban		360	10,162	10,522	13,130	80	16,024	66
	Rural		432	19,564	19,996	23,524	85	28,711	70
	Total		792	29,726	30,518	36,654	83	44,735	68
Sumilao	Urban	3,881	3,224	3,559	10,664	10,880	98	12,988	82
	Rural		1,568	3,473	5,041	5,711	88	6,818	74
	Total	3,881	4,792	7,032	15,705	16,591	95	19,806	79
Talakag	Urban	4,800	252		5,052	5,663	89	6,440	78
	Rural		450	29,653	30,103	35,438	85	40,298	75
	Total	4,800	702	29,653	35,155	41,101	86	46,738	75
Valencia	Urban	20,552		13,883	34,435	36,445	94	41,208	84
	Rural	11,053	5,984	78,256	95,293	97,553	98	110,301	86
	Total	31,605	5,984	92,139	129,728	133,998	97	151,509	86
Provincial Total	Urban	85,732	23,488	108,881	218,101	292,948	74	335,977	65
	Rural	45,251	53,189	453,755	552,195	689,382	80	784,878	70
	Total	130,983	76,677	562,636	770,296	982,330	78	1,120,855	69

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/On-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
Baungon	Urban	4,960	919	172	634		806					172	634		806	19	69
	Rural	18,906	3,560	1,032			1,032					1,032			1,032	29	
	Total	23,866	4,479	1,204	634		1,838					1,204	634		1,838	27	14
Cabanglasan	Urban	4,013	712		315		315						315		315		44
	Rural	26,540	4,861	12	45	2,441	2,498					12	45	2,441	2,498	1	50
	Total	30,553	5,573	12	360	2,441	2,813					12	360	2,441	2,813	6	44
Damulog	Urban	3,870	774		30	352	382						30	352	382	4	45
	Rural	11,746	2,290			1,025	1,025							1,025	1,025		45
	Total	15,616	3,064		30	1,377	1,407						30	1,377	1,407	1	45
Dangcagan	Urban	4,548	839	24	718		742					24	718		742	3	86
	Rural	12,909	2,360		1,625	106	1,731						1,625	106	1,731	69	4
	Total	17,457	3,199	24	2,343	106	2,473					24	2,343	106	2,473	1	73
Don Carlos	Urban	23,145	4,417	520	1,879	800	3,199					520	1,879	800	3,199	12	43
	Rural	30,211	5,689		1,000	1,045	2,045						1,000	1,045	2,045	18	18
	Total	53,356	10,106	520	2,879	1,845	5,244					520	2,879	1,845	5,244	5	28
Impasugong	Urban	5,475	952	35	415	340	790					35	415	340	790	4	44
	Rural	21,110	3,770		1,510	121	1,631						1,510	121	1,631		40
	Total	26,585	4,722	35	1,925	461	2,421					35	1,925	461	2,421	1	41
Kadangilan	Urban	4,794	951		951		951						951		951		100
	Rural	22,227	4,242		600	1,792	2,392						600	1,792	2,392	14	42
	Total	27,021	5,193		1,551	1,792	3,343						1,551	1,792	3,343	30	35
Kaliangan	Urban	17,250	3,194	522	1,800	594	2,916					522	1,800	594	2,916	16	56
	Rural	11,049	2,065		1,200	265	1,465						1,200	265	1,465	58	13
	Total	28,299	5,259	522	3,000	859	4,381					522	3,000	859	4,381	10	57
Kibawe	Urban	4,347	836	579	257		836					579	257		836	69	31
	Rural	27,352	5,342		2,000	456	2,456						2,000	456	2,456		9
	Total	31,699	6,178	579	2,257	456	3,292					579	2,257	456	3,292	9	37
Kitaotao	Urban	9,891	2,039		2,039		2,039						2,039		2,039		100
	Rural	30,209	5,843		1,728	1,971	3,699						1,728	1,971	3,699		30
	Total	40,100	7,882		3,767	1,971	5,738						3,767	1,971	5,738		48
Lantapan	Urban	14,761	2,617	150	2,467		2,617					150	2,467		2,617	6	94
	Rural	23,619	4,287		1,000		1,000						1,000		1,000		23
	Total	38,380	6,904	150	3,467		3,617					150	3,467		3,617	2	50

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

Name of Municipality	Area	Population (1997)	Number of Households (1997)	Households Using Sanitary Toilets in 1997				Recipient HHs of Planned/ On-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	Flush	VIP/Dry
Libona	Urban	2,317	434	75	359		434					75	359		434	17	83
	Rural	30,525	5,520	28	4,792	172	4,992					28	4,792	172	4,992	1	87
	Total	32,842	5,954	103	5,151	172	5,426					103	5,151	172	5,426	2	90
Malaybalay (Capital)	Urban	28,759	5,277	4,168	1,018		5,186					4,168	1,018		5,186	79	19
	Rural	91,419	16,682	1,190	3,061	755	5,006					1,190	3,061	755	5,006	7	18
	Total	120,178	21,959	5,358	4,079	755	10,192					5,358	4,079	755	10,192	24	37
Maitbog	Urban	2,704	528	10	455		465					10	455		465	2	86
	Rural	14,342	2,691		1,524	439	1,963						1,524	439	1,963	57	16
	Total	17,046	3,219	10	1,979	439	2,428					10	1,979	439	2,428	61	14
Manolo Fortich	Urban	5,512	1,058	1,005	53		1,058					1,005	53		1,058	95	5
	Rural	64,481	11,597	2,938	2,150	708	5,796					2,938	2,150	708	5,796	25	19
	Total	69,993	12,655	3,943	2,203	708	6,854					3,943	2,203	708	6,854	31	17
Maramag	Urban	52,948	9,934	1,208	4,259	3,259	8,726					1,208	4,259	3,259	8,726	12	43
	Rural	12,898	2,429	105	1,264	211	1,580					105	1,264	211	1,580	4	52
	Total	65,846	12,363	1,313	5,523	3,470	10,306					1,313	5,523	3,470	10,306	11	45
Pangasinan	Urban	23,078	4,211	219	2,000	992	3,211					219	2,000	992	3,211	5	47
	Rural	16,450	3,046		1,600		1,600						1,600		1,600		53
	Total	39,528	7,257	219	3,600	992	4,811					219	3,600	992	4,811	3	50
Quezon	Urban	14,458	2,728	1,440	881		2,321					1,440	881		2,321	53	32
	Rural	61,163	11,432	353	9,470		9,823					353	9,470		9,823	3	83
	Total	75,621	14,160	1,793	10,351		12,144					1,793	10,351		12,144	13	73
San Fernando	Urban	13,130	2,540	27	2,513		2,540					27	2,513		2,540	1	99
	Rural	23,524	4,389		1,809	1,385	3,194						1,809	1,385	3,194	41	32
	Total	36,654	6,929	27	4,322	1,385	5,734					27	4,322	1,385	5,734	62	20
Sumilao	Urban	10,880	1,953	60	422	420	902					60	422	420	902	3	22
	Rural	5,711	1,036		318		318						318		318		31
	Total	16,591	2,989	60	740	420	1,220					60	740	420	1,220	2	25
Talakag	Urban	5,663	1,075	75	1,000		1,075					75	1,000		1,075	7	93
	Rural	35,438	6,575		2,282	2,500	4,782						2,282	2,500	4,782		35
	Total	41,101	7,650	75	3,282	2,500	5,857					75	3,282	2,500	5,857	1	43
Valencia	Urban	36,445	6,889	320	5,753	287	6,360					320	5,753	287	6,360	5	84
	Rural	97,553	18,476	101	13,223	2,305	15,629					101	13,223	2,305	15,629	1	72
	Total	133,998	25,365	421	18,976	2,592	21,989					421	18,976	2,592	21,989	2	75
Provincial Total	Urban	292,948	54,877	10,609	30,218	7,044	47,871					10,609	30,218	7,044	47,871	19	55
	Rural	689,382	128,182	5,759	52,201	17,697	75,657					5,759	52,201	17,697	75,657	4	41
	Total	982,330	183,059	16,368	82,419	24,741	123,528					16,368	82,419	24,741	123,528	9	45

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

Name of Municipality	1997 Total Number of Public School Student	Standard No. of Student that can be Served by 1997	No. of Student to be Served by Planned /On- going Projects	Standard No. of Students that can be Served by Toilets in Base Year (1997)	Coverage (%)
Baungon	4,362	880		880	20
Cabanglasan	6,813	3,520		3,520	52
Damulog	4,391	1,440		1,440	33
Dangcagan	4,256	1,920		1,920	45
Don Carlos	13,095	3,800		3,800	29
Impasugong	7,236	1,680		1,680	23
Kadangilan	5,392	2,880		2,880	53
Kaliangan	7,543	840		840	11
Kibawe	6,672	5,560		5,560	83
Kitaotao	8,127	4,240		4,240	52
Lantapan	7,792	4,200		4,200	54
Libona	7,765	1,200		1,200	15
Malaybalay (Capital)	27,325	10,120		10,120	37
Malitbog	4,210	1,680		1,680	40
Manolo Fortich	16,883	9,280		9,280	55
Maramag	16,515	920		920	6
Pangantucan	8,395	960		960	11
Quezon	16,587	9,160		9,160	55
San Fernando	8,264	1,440		1,440	17
Sumilao	3,615	80		80	2
Talakag	9,565	3,600		3,600	38
Valencia	29,229	5,840		5,840	20
<b>Provincial Total</b>	<b>224,032</b>	<b>75,240</b>		<b>75,240</b>	<b>34</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 in Planned/On-going Project	No. of PU with Sanitary Toilets in Planned/On-going Projects	No. of PU with Toilets in Base Year 1997	No. of PU with Sanitary Toilets in Base year 1997	Coverage (%)
Baungon	Public Market	2	2			2	2	100
	Bus/Jeepney Terminal	2	2			2	2	100
	Parks/Playground							
	Total	4	4			4	4	100
Cabanglasan	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal	1	1			1	1	100
	Parks/Playground							
	Total	2	2			2	2	100
Damulog	Public Market	2	2			2	2	100
	Bus/Jeepney Terminal	2	2			2	2	100
	Parks/Playground							
	Total	4	4			4	4	100
Dangcagan	Public Market	2	2			2	2	100
	Bus/Jeepney Terminal	2	2			2	2	100
	Parks/Playground							
	Total	4	4			4	4	100
Don Carlos	Public Market	4	4			4	4	100
	Bus/Jeepney Terminal	4	4			4	4	100
	Parks/Playground							
	Total	8	8			8	8	100
Impasugong	Public Market							
	Bus/Jeepney Terminal							
	Parks/Playground							
	Total							
Kadugayan	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal	1	1			1	1	100
	Parks/Playground							
	Total	2	2			2	2	100
Kalilangan	Public Market	2	1			2	1	50
	Bus/Jeepney Terminal	1	1			1	1	100
	Parks/Playground							
	Total	3	2			3	2	67
Kibawe	Public Market	4	4			4	4	100
	Bus/Jeepney Terminal	4	4			4	4	100
	Parks/Playground	1	1			1	1	100
	Total	9	9			9	9	100
Kitaotao	Public Market	2	2			2	2	100
	Bus/Jeepney Terminal							
	Parks/Playground							
	Total	2	2			2	2	100
Lantapan	Public Market	6	4			6	4	67
	Bus/Jeepney Terminal	4	4			4	4	100
	Parks/Playground							
	Total	10	8			10	8	80
Libona	Public Market							
	Bus/Jeepney Terminal							
	Parks/Playground							
	Total							
Mataybalay (Capital)	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal	2	2			2	2	100
	Parks/Playground	1	1			1	1	100
	Total	4	4			4	4	100

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

Name of Municipality	Type	No. of PU with Toilets in 1997	No. of PU with Sanitary Toilets in 1997	No. of PU with Toilets in Planned/Ongoing Project	No. of PU with Sanitary Toilets in Planned/Ongoing Projects	No. of PU with Toilets in Base Year 1997	No. of PU with Sanitary Toilets in Base year 1997	Coverage (%)
Malitbog	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal	1	1			1	1	100
	Parks/Playground							
	Total	2	2			2	2	100
Manolo Fortich	Public Market	5	5			5	5	100
	Bus/Jeepney Terminal	1	1			1	1	100
	Parks/Playground	1	1			1	1	100
	Total	7	7			7	7	100
Maramag	Public Market	6	6			6	6	100
	Bus/Jeepney Terminal	2	2			2	2	100
	Parks/Playground							
	Total	8	8			8	8	100
Pangantucan	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal	2	2			2	2	100
	Parks/Playground							
	Total	3	3			3	3	100
Quezon	Public Market	2	2			2	2	100
	Bus/Jeepney Terminal	2	2			2	2	100
	Parks/Playground							
	Total	4	4			4	4	100
San Fernando	Public Market							
	Bus/Jeepney Terminal							
	Parks/Playground							
	Total							
Sumilao	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal							
	Parks/Playground							
	Total	1	1			1	1	100
Talakag	Public Market	1	1			1	1	100
	Bus/Jeepney Terminal	1	1			1	1	100
	Parks/Playground							
	Total	2	2			2	2	100
Valencia	Public Market	5	5			5	5	100
	Bus/Jeepney Terminal	5	5			5	5	100
	Parks/Playground							
	Total	10	10			10	10	100
Provincial Total	Public Market	49	46			49	46	94
	Bus/Jeepney Terminal	37	37			37	37	100
	Parks/Playground	3	3			3	3	100
	Total	89	86			89	86	97

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

Name of Municipality	Area	No. of Household Served by Existing Facilities				Coverage in 1997							Coverage in 2003						
		Flush	Pour Flush	VIP/Dry	Total	No. of HHs	Percentage of Served Households			Served Population	No. of HHs	Percentage of Served Households			Served Population				
							Flush	Pour Flush	VIP/ Dry			Total	Number	%		Flush	Pour Flush	VIP/ Dry	Total
Baungon	Urban	172	634		806	919	19	69		88	4,365	88	16	59		75	7,907	75	
	Rural	1,032			1,032	3,560	29			29	1,438	29	25			25	4,746	25	
	Total	1,204	634		1,838	4,479	27	14		41	5,803	41	23	12		35	12,653	35	
Cabanglasan	Urban		315			712		44			1,766	44		39		39	4,667	39	
	Rural	12	45	2,441	2,498	4,861		1	50	51	2,047	51		1	44	45	14,303	45	
	Total	12	360	2,441	2,813	5,573		6	44	50	3,813	50		6	39	44	18,972	44	
Daruilog	Urban		30	352	382	774		4	45	49	1,896	49		3	40	44	2,018	44	
	Rural			1,025	1,025	2,290			45	45	1,742	45			40	40	5,583	40	
	Total		30	1,377	1,407	3,064		1	45	46	3,638	46		1	40	41	7,601	41	
Dangcagan	Urban	24	718		742	839	3	86		88	4,002	88	2	74		77	4,650	77	
	Rural		1,625	106	1,731	2,360		69	4	73	3,320	73		60	4	64	9,755	64	
	Total	24	2,343	106	2,473	3,199	1	73	3	77	7,322	77		64	3	67	14,405	67	
Don Carlos	Urban	520	1,879	800	3,199	4,417	12	43	18	72	16,664	72		37	16	64	19,985	64	
	Rural		1,000	1,045	2,045	5,689		18	18	36	8,332	36		15	16	32	11,640	32	
	Total	520	2,879	1,845	5,244	10,106	5	28	18	52	24,996	52		25	16	46	31,625	46	
Impasugong	Urban	35	415	340	790	952	4	44	36	83	4,544	83		38	31	72	9,068	72	
	Rural		1,510	121	1,631	3,770		40	3	43	2,354	43		35	3	38	9,603	38	
	Total	35	1,925	461	2,421	4,722	1	41	10	51	6,898	51		36	9	45	18,671	45	
Kadagilan	Urban		951		951	951		100		100	4,794	100		90		90	4,791	90	
	Rural		600	1,792	2,392	4,242		14	42	56	2,685	56		13	38	51	12,902	51	
	Total		1,551	1,792	3,343	5,193		30	35	64	7,479	64		27	31	58	17,693	58	
Kalilangan	Urban	522	1,800	594	2,916	3,194	16	56	19	91	15,698	91		49	16	79	16,941	79	
	Rural		1,200	265	1,465	2,065		58	13	71	12,248	71		50	11	61	9,071	61	
	Total	522	3,000	859	4,381	5,259	10	57	16	83	27,946	83		9	14	72	26,012	72	
Kibawe	Urban	579	257		836	836	69	31		100	4,347	100		28		92	4,366	92	
	Rural		2,000	456	2,456	5,342		37	9	46	2,000	46		34	8	42	13,165	42	
	Total	579	2,257	456	3,292	6,178	9	37	7	53	6,347	53		33	7	49	17,531	49	



Table 8.2.6 Households Coverage in Phase I Provided by Existing Facilities in the Base Year (Household Toilets)  
Part 2 of 3

Name of Municipality	Area	No. of Household Served by Existing				Coverage in 1997						Coverage in 2003					
		Flush	Pour Flush	VIP/Dry	Total	No. of HHs	Percentage of Served Households			Served Population		No. of HHs	Percentage of Served Households			Served Population	
							Flush	Pour Flush	VIP/Dry	Total	Number	%	Flush	Pour Flush	VIP/Dry	Total	%
Kitaotao	Urban		2,039		2,039	2,039			100	100	9,991	100		88		88	88
	Rural		1,728	1,971	3,699	5,843		30	34	63	6,231	63		26	30	56	56
	Total		3,767	1,971	5,738	7,882		48	25	73	16,122	73		42	22	64	64
Lantapan	Urban	150	2,467		2,617	2,617	6			100	14,761	100	5	84		89	89
	Rural		1,000		1,000	4,287		23		23	3,395	23		21		21	21
	Total	150	3,467		3,617	6,904	2	50		52	18,156	52	2	45		47	47
Libona	Urban	75	359		434	434	17			100	2,317	100		76		92	92
	Rural	28	4,792	172	4,992	5,520	1	87	3	90	2,085	90		80	3	83	83
	Total	103	5,151	172	5,426	5,954	2	87	3	91	4,402	91		79	3	83	83
Malaybalay (Capital)	Urban	4,168	1,018		5,186	5,277	79			98	28,184	98	64	16		80	80
	Rural	1,190	3,061	755	5,006	16,682	7	18	5	30	8,628	30	6	15	4	24	24
	Total	5,358	4,079	755	10,192	21,959	24	19	3	46	36,812	46	20	15	3	38	38
Maitbog	Urban	10	455		465	528	2			88	2,380	88		77		79	79
	Rural		1,524	439	1,963	2,691		57	16	73	1,974	73		51	15	65	65
	Total	10	1,979	439	2,428	3,219		61	14	75	4,354	75		55	12	67	67
Manolo Fortich	Urban	1,005	53		1,058	1,058	95			100	5,512	100	85	4		89	89
	Rural	2,938	2,150	708	5,796	11,597	25	19	6	50	2,756	50	23	17	5	45	45
	Total	3,943	2,203	708	6,854	12,655	31	17	6	54	8,268	54	28	16	5	48	48
Maramag	Urban	1,208	4,259	3,259	8,726	9,934	12	43	33	88	46,594	88	10	37	28	76	76
	Rural	105	1,264	211	1,580	2,429	4	52	9	65	34,416	65	4	45	7	56	56
	Total	1,313	5,523	3,470	10,306	12,363	11	45	28	83	81,010	83	14	39	24	72	72
Pangantucan	Urban	219	2,000	992	3,211	4,211	5	47	24	76	17,539	76	5	44	22	70	70
	Rural		1,600		1,600	3,046		53		53	12,231	53		48		48	48
	Total	219	3,600	992	4,811	7,257	3	50	14	66	29,770	66	3	46	13	61	61
Quezon	Urban	1,440	881		2,321	2,728	53			85	12,289	85	50	30		80	80
	Rural	353	9,470		9,823	11,432	3	83		86	12,434	86	3	78		81	81
	Total	1,793	10,351		12,144	14,160	13	73		86	24,723	86	12	69		81	81

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

Part 3 of 3

Name of Municipality	Area	No. of Household Served by Existing				Coverage in 1997						Coverage in 2003					
		No. of HHs		Total		No. of HHs		Percentage of Served Households		Served Population		No. of HHs		Percentage of Served Households		Served Population	
		Flush	Pour Flush	VIP/Dry	Total	Flush	Pour Flush	Flush	Pour Flush	Number	%	Flush	VIP/Dry	Flush	VIP/Dry	Number	%
San Fernando	Urban	27	2,513		2,540	2,540	1	99		13,130	100	3,099		81		13,828	82
	Rural		1,809	1,385	3,194	4,389		41	32	9,585	73	5,357	34	51	26	18,961	60
	Total	27	4,322	1,385	5,734	6,929		62	20	22,715	83	8,456		132	16	32,789	68
Sumilao	Urban	60	422	420	902	1,953	3	22	22	5,005	46	2,332	3	18	18	7,175	39
	Rural		318		318	1,036		31		3,373	31	1,237		26		1,784	26
	Total	60	740	420	1,220	2,989	2	25	14	8,378	41	3,569	2	44	12	8,879	34
Talakag	Urban	75	1,000		1,075	1,075	7	93		5,663	100	1,222	6	82		5,667	88
	Rural		2,282	2,500	4,782	6,575		35	38	4,134	73	7,476		31	33	30,946	64
	Total	75	3,282	2,500	5,857	7,650	1	43	33	9,797	77	8,698	1	113	29	36,613	67
Valencia	Urban	320	5,753	287	6,360	6,889	5	84	4	33,529	92	7,790	4	74	4	75,918	82
	Rural	101	13,223	2,305	15,629	18,476	1	72	12	30,978	85	20,890		63	11	64,140	75
	Total	421	18,976	2,592	21,989	25,365	2	75	10	64,507	87	28,680	1	137	9	140,058	77
Provincial Total	Urban	10,609	30,218	7,044	47,871	54,871	19	55	13	254,870	87	62,932	17	48	11	352,011	76
	Rural	5,759	52,201	17,697	75,657	128,182	4	41	14	168,386	59	145,904	4	36	12	412,670	52
	Total	16,368	82,419	24,741	123,528	183,059	9	45	14	423,256	67	208,836	8	84	12	764,681	59

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 Student that can be Served by Base Year	Coverage in 1997		Coverage in 2003	Coverage in 1997			Coverage in 2003		No. of PU with Sanitary Toilets in Base Year	No. of PU with Sanitary Toilets in 2003	No. of PU with Sanitary Toilets in Base Year	No. of PU with Sanitary Toilets in 2003	%
		Total No. of Public School Students	%		Total No. of Public School Student	%	No. of PU with Toilets in Base Year	No. of PU with Sanitary Toilets in Base Year						
Baunon	880	4,362	20		5,478	16	4	4	100	4	4	100	4	100
Cabanglasan	3,520	6,813	52		8,160	43	2	2	100	2	2	100	2	100
Damulog	1,440	4,391	33		4,186	34	4	4	100	4	4	100	4	100
Dangcagan	1,920	4,256	45		4,199	46	4	4	100	4	4	100	4	100
Don Carlos	3,800	13,095	29		13,041	29	8	8	100	8	8	100	8	100
Impasugong	1,680	7,236	23		7,394	23								
Kadingilan	2,880	5,392	53		6,542	44	2	2	100	2	2	100	2	100
Kalilangan	840	7,543	11		7,857	11	3	2	67	3	2	67	2	67
Kibawe	5,560	6,672	83		7,072	79	9	9	100	9	9	100	9	100
Kitaotao	4,240	8,127	52		9,817	43	2	2	100	2	2	100	2	100
Lantapan	4,200	7,792	54		9,383	45	10	8	80	10	8	80	8	80
Libona	1,200	7,765	15		8,698	14								
Malaybalay (Capital)	10,120	27,325	37		31,873	32	4	4	100	4	4	100	4	100
Malibog	1,680	4,210	40		4,615	36	2	2	100	2	2	100	2	100
Manolo Fortich	9,280	16,883	55		18,132	51	7	7	100	7	7	100	7	100
Maramag	920	16,515	6		17,004	5	8	8	100	8	8	100	8	100
Pangantucan	960	8,395	11		9,636	10	3	3	100	3	3	100	3	100
Quezon	9,160	16,587	55		17,939	51	4	4	100	4	4	100	4	100
San Fernando	1,440	8,264	17		10,621	14								
Sumilao	80	3,615	2		4,723	2	1	1	100	1	1	100	1	100
Talakag	3,600	9,565	38		10,246	35	2	2	100	2	2	100	2	100
Valencia	5,840	29,229	20		31,012	19	10	10	100	10	10	100	10	100
Provincial Total	75,240	224,032	34		247,628	30	89	86	97	89	86	97	86	97

### 8.3 Projection of Frame Values

#### 8.3.1 Review of Past Population Development and Population Projection

Since the NSO has not yet prepared/issued future population of the provinces, the provincial population for the years 1997 (planning base year), 2003 (medium-term target year) and 2010 (long-term target year) were projected. Available information for the study at present is as follows:

- NSO population census results in 1980, 1990 and 1995
- 1995 Census-based National and Regional Population Projection prepared by the NSO
- Provincial Physical Framework Plan/Comprehensive Provincial Land Use Plan (1993-2002)

##### (1) 1995 Census-Based National and Regional Population Projections: NSO

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

In the regional population projection, Region X and XI, the subject regions for the 2<sup>nd</sup> batch areas of this study are classified as medium-sized regions (at least 5 million but less than 10 million by year 2000). The following are the result of projection for the two regions in 2000, 2005 and 2010.

**Table 8.3.1 Regional Population Projection**

Year		1980	1990	1995	2000	2005	2010
Region X	Population	2,758,985	3,509,753	3,938,252	4,441,739	4,955,545	5,465,272
	Growth Rate	-	2.44 %	2.33 %	2.44 %	2.21 %	1.98 %
Region X (Revised)	Population	1,765,120	2,197,554	2,472,947	2,737,148	NA	NA
	Growth Rate	-	2.22 %	2.39 %	2.05 %	NA	NA
Region XI	Population	3,346,803	4,458,829	5,052,730	5,749,821	6,456,464	7,146,889
	Growth Rate	-	2.91 %	2.53 %	2.62 %	2.35 %	2.05 %

Note: Region X (Revised) excludes CARAGA Region NA: Not Available

Growth rates of Region X and Region X (Revised) from 1990 to 2000 are projected at 2.38% and 2.22%, respectively.

The growth rates from 1980-1995 between Region X (previous composition of the provinces used by the NSO) and the recently arranged Region X (excluding the provinces in the CARAGA Region) are almost the same. The growth rate (2.22%) of the revised Region X adopted from 1990 to 2000 is the same as that experienced from 1980 to 1990

(10 years). However, the growth rates between 1990 and 1995, and 1995 and 2000 become 2.39% and 2.05% respectively, as a result of the 1995 census.

(2) Provincial Physical Framework Plan/Comprehensive Provincial Land Use Plan:  
Bukidnon: Planning period 1993-2002

The provincial population for the year 2002 was projected with 1990 as the base year. The provincial growth rate experienced between 1980 and 1990 was adopted for the projection. However, the growth rate used in the Land Use Plan was revised in this study from 3.09% to 2.94% based on updated census results. Meanwhile, the recorded/projected growth rate of Region X (excluding CARAGA Region) from 1980 to 1990 and from 1990 to 2000 is 2.22 %

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

Table 8.3.2 shows the past population developments in census years (1980-1995) and projections for the years 1995 and 2002 with 1990 as base year using the assumed growth rates for the period 1990 to 2002 as established in the Comprehensive Provincial Land Use Plan (hereafter referred to as "Land Use Plan").

Comparing the census and the projected population in 1995, the provincial population based on the census was about 4% lower than the projected. On the other hand, the growth rate from 1990 to 1995 was reduced from the previous 2.94% to 2.19%. Thus, it is recommended to use the recently experienced growth rate for the medium-term projection. Regarding the municipal population in 1995, about 60% of the municipalities (of a total of 22 municipalities/city) decreased their population from 1990. Although the differences between actual and projected population are within  $\pm 10\%$ , the municipal growth rates experienced between 1990 and 1995 may be applied for the medium-term plan to reflect the current trend.

(3) Population Projection of the Province

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

Provincial Population

- 1) The regional population (Region X including CARAGA Region at present) projected by the NSO for the year 2010 is referred to, as the fixed frame value of the Region. The following are the population ratios of the province to the Region from 1980 to

1995 and for the year 2003 (projected as a base year 1995 with the growth rate from 1990 to 1995).

**Table 8.3.2 Census Population and Projected Population**

Municipality/City	Census Population /Growth Rate (%)			Projected Population/Adopted Growth Rate (%) : Base Year 1990 in Land Use Plan	
	1980	1990	1995	1995	2002
Baungon	18,320	19,774	22,617	20,517	21,603
		0.77	2.72	0.74	0.74
Cabanglasan	16,843	26,351	29,288	32,885	44,842
		4.58	2.14	4.53	4.53
Damulog	12,596	13,595	15,010	14,120	14,888
		0.77	2.00	0.76	0.76
Dangcagan	13,652	14,823	16,660	15,448	16,369
		0.83	2.36	0.83	0.83
Don Carlos	35,038	45,815	51,083	52,369	63,148
		2.72	2.20	2.71	2.71
Impasugong	14,803	22,629	25,389	27,971	37,634
		4.34	2.33	4.33	4.33
Kadingilan	20,634	23,911	26,093	25,708	28,454
		1.48	1.76	1.46	1.46
Kalilangan	18,316	23,923	26,973	27,332	32,935
		2.71	2.43	2.70	2.70
Kibawe	26,949	28,608	30,783	29,477	30,737
		0.60	1.48	0.60	0.60
Kitaotao	29,497	34,472	38,404	37,228	41,460
		1.57	2.18	1.55	1.55
Lantapan	22,678	33,581	36,943	40,856	53,764
		4.00	1.93	4.00	4.00
Libona	21,229	29,652	31,897	35,031	44,238
		3.40	1.47	3.39	3.39
Malaybalay	60,779	94,722	112,277	118,041	160,637
		4.54	3.46	4.50	4.50
Malitbog	13,581	14,934	16,414	15,657	16,728
		0.95	1.91	0.95	0.95
Manolo Fortich	42,493	61,329	67,400	73,582	94,954
		3.74	1.91	3.71	3.71
Maramag	36,734	55,394	62,673	67,948	90,443
		4.19	2.50	4.17	4.17
Pangantucan	29,065	35,777	38,418	39,695	45,911
		2.10	1.43	2.10	2.10
Quezon	59,819	70,566	74,141	76,470	85,575
		1.67	0.99	1.62	1.62
San Fernando	23,083	29,052	34,299	32,598	38,301
		2.33	3.38	2.33	2.33
Sumilao	8,635	13,494	15,640	16,864	23,042
		4.57	3.00	4.56	4.56
Talakag	25,055	35,379	39,378	41,999	53,398
		3.51	2.16	3.49	3.49
Valencia	81,835	116,110	128,623	138,102	176,061
		3.56	2.07	3.53	3.53
Province	631,634	843,891	940,403	979,896	1,215,123
		2.94	2.19	3.03	3.08

Note: Provincial growth rates for the year 1995 and 2002 are estimated using the total of municipal population.

The growth rates by municipality for the years 1995 and 2002 are revised using updated population records.

Year	1980	1990	1995	2003
Province	631,634	843,891	940,403	1,118,358
Region	2,758,985	3,509,753	3,938,252	4,742,782
P/R	22.9%	24.0%	23.9%	23.6%

The provincial ratio to the Region is stable with a range of 23% to 24%. The population share of the province to the regional total in the long-term period is assumed to be represented by that of 2003.

The growth rate (2.19 % is adjusted to 2.20% and 2.22 % for the years 1997 and 2003, respectively as a sum of municipal population) experienced during the period 1990 to 1995 is basically applied for the medium-term (1995-2003) projection with 1995 as base year. For the long-term projection from 2004 to 2010, the provincial average growth rate of 2.03 % was estimated applying the aforementioned manner of projection. The projected population for the years 1997, 2003 and 2010 are as follows:

<u>Year</u>	<u>Population</u>	<u>Growth rate</u>
1995	940,403	Census result
1997	982,331	2.20 % (initial assumption 2.19 %)
2003	1,120,854	2.22 % (initial assumption 2.19 %)
2010	1,289,804	2.03 % (estimated from projected population in 2010)

#### Municipal population

The municipal population for the medium-term target years is estimated using the recorded growth rates between 1990 and 1995. Table 8.3.3 shows the projected population with growth rates by municipality.

For the year 2010 in the long-term, it is assumed that the trend of population growth of the respective municipalities between 1990 and 2002, which is considered in the Land Use Plan, will be realized in line with the land use plan of the province. Thus, the projected growth rate for the year 2002 by municipality in the Land Use Plan is first applied to project the 2010 population from the year 2003. Then, the municipal population estimated initially is adjusted in proportion to the population size of each municipality to the total provincial population, to meet the above-mentioned provincial population fixed for the year 2010 (1,289,804 persons). In this adjustment, the growth rates of Baungon, Damulog, Dangcagan, Kibawe and Malitbog are fixed (rates used in

the Land Use Plan) to avoid negative growth rates (less than -0.5%). Table 8.3.4 shows the results of the study process and the projected population by municipality for the year 2010 and the adjusted growth rates

**Table 8.3.3 Municipal Population Projection and Growth Rates**

Municipality	Annual Growth Rate (%)				Population (person)		
	'80-'90	Land Use	'90-'95	Adopted	1995	1997	2003
Baungon	0.77	0.74	2.72	2.72	22,617	23,866	28,040
Cabanglasan	4.58	4.58	2.14	2.14	29,288	30,553	34,683
Damulog	0.77	0.76	2.00	2.00	15,010	15,616	17,587
Dangcagan	0.83	0.83	2.36	2.36	16,660	17,457	20,084
Don Carlos	2.72	2.71	2.20	2.20	51,083	53,356	60,800
Impasugong	4.34	4.33	2.33	2.33	25,389	26,585	30,522
Kadingilan	1.48	1.46	1.76	1.76	26,093	27,021	30,006
Kalilangan	2.71	2.70	2.43	2.43	26,973	28,299	32,682
Kibawe	0.60	0.60	1.48	1.48	30,783	31,699	34,612
Kitaotao	1.57	1.55	2.18	2.18	38,404	40,100	45,649
Lantapan	4.00	4.00	1.93	1.93	36,943	38,380	43,036
Libona	3.40	3.39	1.47	1.47	31,897	32,842	35,848
Malaybalay	4.54	4.50	3.46	3.46	112,277	120,178	147,379
Malitbog	0.95	0.95	1.91	1.91	16,414	17,046	19,093
Manolo Fortich	3.74	3.71	1.91	1.91	67,400	69,993	78,388
Maramag	4.19	4.17	2.50	2.50	62,673	65,846	76,361
Pangantucan	2.10	2.10	1.43	1.43	38,418	39,528	43,055
Quezon	1.67	1.62	0.99	0.99	74,141	75,621	80,242
San Fernando	2.33	2.33	3.38	3.38	34,299	36,654	44,735
Sumilao	4.57	4.56	3.00	3.00	15,640	16,591	19,806
Talakag	3.51	3.49	2.16	2.16	39,378	41,101	46,738
Valencia	3.56	3.53	2.07	2.07	128,623	133,998	151,509
<b>Province</b>	<b>2.94</b>	<b>3.09</b>	<b>2.19</b>	<b>2.19</b>	<b>940,403</b>	<b>982,331</b>	<b>1,120,854</b>

Note: 1995 population is census results.

#### Population by urban and rural area

In the Land Use Plan, urban/rural population by municipality for the year 2002 is projected with 1990 as base year. The annual growth rate of the rural population for the year 2002 by municipality is estimated by the PPDO referring to the experience from 1980 to 1990 and the future land use plan. The provincial average growth rate is set at 1.15%, which is modified from the experienced 0.77 % between 1980 and 1990. Furthermore, the growth rates for 4 municipalities, of the total 22 municipalities/city are modified with a uniform rate of 0.77 %. The urban population by municipality is estimated as the balance between the total population and the rural population. The average growth rate of urban area of the province is estimated at 6.3 %.

Urban and rural population by municipality was studied considering the 1995 census results and the estimated figures in the Land Use Plan.



Table 8.3.4 Municipal Population Projection and Growth Rates

Municipality	Population Projection Using G.R. in Land Use Plan			2010 Population Projection					
	2003 Pop.	G.R. (%)	2010 Pop.	<sup>1)</sup> Adjusted	<sup>2)</sup> G.R. (%)	<sup>3)</sup> Modified	<sup>4)</sup> Share (%)	<sup>5)</sup> Adjusted	<sup>6)</sup> G.R. (%)
Baungon	28,040	0.74	29,525	27,433	-0.31	29,525	N.A.	29,525	0.74
Cabanglasan	34,683	4.58	47,452	44,090	3.49	44,090	3.8	43,755	3.38
Damulog	17,587	0.76	18,544	17,230	-0.29	18,544	N.A.	18,544	0.76
Dangcagan	20,084	0.83	21,281	19,773	-0.22	21,281	N.A.	21,281	0.83
Don Carlos	60,800	2.71	73,315	68,121	1.64	68,121	5.8	67,603	1.53
Impasugong	30,522	4.33	41,066	38,156	3.24	38,156	3.3	37,866	3.13
Kadingilan	30,006	1.46	33,210	30,857	0.40	30,857	2.6	30,622	0.29
Kalilangan	32,682	2.70	39,383	36,592	1.63	36,592	3.1	36,314	1.52
Kibawe	34,612	0.60	36,092	33,535	-0.45	36,092	N.A.	36,092	0.60
Kitaotao	45,649	1.55	50,838	47,236	0.49	47,236	4.0	46,877	0.38
Lantapan	43,036	4.00	56,633	52,620	2.91	52,620	4.5	52,220	2.80
Libona	35,848	3.39	45,270	42,063	2.31	42,063	3.6	41,743	2.20
Malaybalay	147,379	4.50	200,562	186,352	3.41	186,352	15.9	184,935	3.30
Malitbog	19,093	0.95	20,400	18,954	-0.10	20,400	N.A.	20,400	0.95
Manolo Fortich	78,388	3.71	101,157	93,989	2.63	93,989	8.0	93,275	2.52
Maramag	76,361	4.17	101,641	94,439	3.08	94,439	8.1	93,721	2.97
Pangantucan	43,055	2.10	49,797	46,269	1.03	46,269	3.9	45,917	0.92
Quezon	80,242	1.62	89,795	83,433	0.56	83,433	7.1	82,799	0.45
San Fernando	44,735	2.33	52,562	48,838	1.26	48,838	4.2	48,466	1.15
Sumilao	19,806	4.56	27,061	25,144	3.47	25,144	2.1	24,953	3.36
Talakag	46,738	3.49	59,423	55,213	2.41	55,213	4.7	54,793	2.30
Valencia	151,509	3.53	193,153	179,467	2.45	179,467	15.3	178,103	2.34
Province	1,120,854	3.09	1,388,160	1,289,804	2.03	1,298,720	100	1,289,80	2.03

Notes:

G.R.: Annual Growth Rate N.A.: Not Applicable

1) Adjusted in proportion to municipal population (provincial total of 1,388,160) to meet the fixed figure (1,289,804)

2) Estimated growth rates of municipalities between 2003 and 2010 using adjusted population <sup>1)</sup>3) Modified population from adjusted population <sup>1)</sup> for Baungon, Damulog, Dangcagan, Kibawe and Malitbog (figures in Land Use Plan are used) to avoid negative growth rates. The population of the remaining municipalities is that of adjusted <sup>1)</sup>.

4) Proportion of the municipal population (excluding above five municipalities) to total population of 1,172,879.

5) Municipal population : modified for the five municipalities <sup>3)</sup> and rearranged for the other municipalities to meet the population of 1,172,879 using the shares {above item 4)}.6) Estimated growth rates of municipalities between 2003 and 2010 applying finally adjusted population <sup>5)</sup>

## 1) Past population development

Table 8.3.5 shows the urban and rural population with growth rates in census years (1980-1995) by municipality. With regard to the rural population of the province to the total population, the provincial averages in 1980, 1990 and 1995 were 84.7 %, 68.5 % and 70.2 %, respectively. The provincial averages of the rural population in the past 15 years were within the range of 70-85%. While, the growth rates of Don Carlos, Kalilangan, Kitaotao, Lantapan, Maramag, Pangantucan and Sumilao from 1990 to 1995 showed negative trends. Likewise, the share of the urban population of the province has been about 20 %-30 % during census period, although the growth rate from 1990 to 1995 was as high as 6.30 %.

Table 8.3.5 Past Population Development by Urban and Rural Area

Municipality		1980			1990				1995			
		Total	Urban/ Rural	Share (%)	Total	Urban/ Rural	G.R. (%)	Share (%)	Total	Urban/ Rural	G.R. (%)	Share (%)
Rural Area	Baungon	18,320	15,456	84.4	19,774	12,352	-2.22	62.5	22,617	17,917	7.72	79.2
	Cabanglasan	16,843	16,843	100.0	26,351	24,064	3.63	91.3	29,288	25,441	1.12	86.9
	Damulog	12,596	12,596	100.0	13,595	10,593	-1.72	77.9	15,010	11,290	1.28	75.2
	Dangcagan	13,652	10,414	76.3	14,823	10,807	0.37	72.9	16,660	12,320	2.66	73.9
	Don Carlos	35,038	27,482	78.4	45,815	29,727	0.79	64.9	51,083	28,924	-0.55	56.6
	Impasugong	14,803	11,687	79.0	22,629	12,410	0.60	54.8	25,389	20,160	10.19	79.4
	Kadingilan	20,634	16,223	78.6	23,911	19,573	1.89	81.9	26,093	21,464	1.86	82.3
	Kalilangan	18,316	12,235	66.8	23,923	15,230	2.21	63.7	26,973	10,531	-7.11	39.0
	Kibawe	26,949	22,549	83.7	28,608	24,780	0.95	86.6	30,783	26,562	1.40	86.3
	Kitaotao	29,497	29,090	98.6	34,472	31,017	0.64	90.0	38,404	28,931	-1.38	75.3
	Lantapan	22,678	19,847	87.5	33,581	29,655	4.10	88.3	36,943	22,735	-5.18	61.5
	Libona	21,229	19,899	93.7	29,652	27,778	3.39	93.7	31,897	29,647	1.31	92.9
	Malaybalay	60,779	46,761	76.9	94,722	65,532	3.43	69.2	112,277	85,409	-5.44	76.1
	Malitbog	13,581	11,917	87.7	14,934	12,670	0.61	84.8	16,414	13,810	1.74	84.1
	Manolo Fortich	42,493	39,171	92.2	61,329	44,489	1.28	72.5	67,400	62,092	6.89	92.1
	Maramag	36,734	29,204	79.5	55,394	29,373	0.06	53.0	62,673	12,276	-16.01	19.6
	Pangantucan	29,065	25,981	89.4	35,777	25,352	-0.24	70.9	38,418	15,988	-8.81	41.6
	Quezon	59,819	53,073	88.7	70,566	47,901	-1.02	67.9	74,141	59,966	4.60	80.9
	San Fernando	23,083	16,064	69.6	29,052	18,417	1.38	63.4	34,299	22,013	3.63	64.2
	Sumilao	8,635	6,553	75.9	13,494	6,197	-0.56	45.9	15,640	5,384	-2.77	34.4
	Talakag	25,055	22,301	89.0	35,379	31,397	3.48	88.7	39,378	33,952	1.58	86.2
	Valencia	81,835	69,845	85.3	116,110	48,536	-3.57	41.8	128,623	93,640	14.05	72.8
	Province	631,634	535,191	84.7	843,891	577,850	0.77	68.5	940,403	660,452	2.71	70.2
Urban Area	Baungon	18,320	2,864	15.6	19,774	7,422	9.99	37.5	22,617	4,700	-8.73	20.8
	Cabanglasan	16,843	0	0.0	26,351	2,287	N.A.	8.7	29,288	3,847	10.96	13.1
	Damulog	12,596	0	0.0	13,595	3,002	N.A.	22.1	15,010	3,720	4.38	24.8
	Dangcagan	13,652	3,238	23.7	14,823	4,016	2.18	27.1	16,660	4,340	1.56	26.1
	Don Carlos	35,038	7,556	21.6	45,815	16,088	7.85	35.1	51,083	22,159	6.61	43.4
	Impasugong	14,803	3,116	21.0	22,629	10,219	12.61	45.2	25,389	5,229	-12.54	20.6
	Kadingilan	20,634	4,411	21.4	23,911	4,338	-0.17	18.1	26,093	4,629	1.31	17.7
	Kalilangan	18,316	6,081	33.2	23,923	8,693	3.64	36.3	26,973	16,442	13.59	61.0
	Kibawe	26,949	4,400	16.3	28,608	3,828	-1.38	13.4	30,783	4,221	1.97	13.7
	Kitaotao	29,497	407	1.4	34,472	3,455	23.85	10.0	38,404	9,473	22.35	24.7
	Lantapan	22,678	2,831	12.5	33,581	3,926	3.32	11.7	36,943	14,208	29.34	38.5
	Libona	21,229	1,330	6.3	29,652	1,874	3.49	6.3	31,897	2,250	3.72	7.1
	Malaybalay	60,779	14,018	23.1	94,722	29,190	7.61	30.8	112,277	26,868	-1.64	23.9
	Malitbog	13,581	1,664	12.3	14,934	2,264	3.13	15.2	16,414	2,604	2.84	15.9
	Manolo Fortich	42,493	3,322	7.8	61,329	16,840	17.62	27.5	67,400	5,308	-20.62	7.9
	Maramag	36,734	7,530	20.5	55,394	26,021	13.20	47.0	62,673	50,397	14.13	80.4
	Pangantucan	29,065	3,084	10.6	35,777	10,425	12.95	29.1	38,418	22,430	16.56	58.4
	Quezon	59,819	6,746	11.3	70,566	22,665	12.88	32.1	74,141	14,175	-8.96	19.1
	San Fernando	23,083	7,019	30.4	29,052	10,635	4.24	36.6	34,299	12,286	2.93	35.8
	Sumilao	8,635	2,082	24.1	13,494	7,297	13.36	54.1	15,640	10,256	7.05	65.6
	Talakag	25,055	2,754	11.0	35,379	3,982	3.76	11.3	39,378	5,426	6.38	13.8
	Valencia	81,835	11,990	14.7	116,110	67,574	18.88	58.2	128,623	34,983	-12.34	27.2
	Province	631,634	96,443	15.3	843,891	266,041	10.68	31.5	940,403	279,951	1.02	29.8

N.A.: Not Applicable

## 2) Projection of urban and rural population for the years 1997, 2003 and 2010

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

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

- Short/Medium-term target: 1997 and 2003
- Updated census results in 1995 are applied in terms of the share of rural population to total population by municipality.
- Long-term target: 2010
- The growth rate of the rural population by municipality, which is used for the projection in the year 2002 in the Land Use Plan, is basically employed with 2003 as base year. It is anticipated that the share between urban and rural population will be regulated to meet the land use plan in the long-term period.

The urban population of 5 municipalities: Kadingilan, Kibawe, Kitaotao, Libona and Talakag for the year 2010 by applying the above-mentioned method revealed lesser population than that of 2003. Therefore, the rural and urban population of these municipalities was revised to keep urban population in 2003 for that of year 2010.

Under the above assumptions and modifications, the provincial average share of rural population for the year 2010 was arrived at 64%, about 6% lower than the figure in 1995 (70.2%) and even much lower than those in 1980 and 1990 (about 84.7% and 68.5%, respectively).

Table 8.3.6 presents the projected urban and rural population by municipality with assumed/estimated growth rates.

Table 8.3.6 Population Projection by Urban and Rural Area

Municipality		1997			2003			2010						
								Population Projection Using Growth Rate Used in Land Use Plan				Adjusted <sup>1)</sup>		
		Total	Urban/ Rural	Share (%)	Total	Urban/ Rural	Share (%)	Total	Urban/ Rural	G.R. (%)	Share (%)	Urban/ Rural	G.R. (%)	Share (%)
Rural Area	Baungon	23,866	18,906	79.2	28,040	22,213	79.2	29,525	18,983	-2.22	64.3	18,983	-2.22	64.3
	Cabanglasan	30,553	26,539	86.9	34,683	30,127	86.9	43,755	31,789	0.77	72.7	31,789	0.77	72.7
	Damulog	15,616	11,746	75.2	17,587	13,228	75.2	18,544	13,958	0.77	75.3	13,958	0.77	75.3
	Dangcagan	17,457	12,909	73.9	20,084	14,852	73.9	21,281	15,241	0.37	71.6	15,241	0.37	71.6
	Don Carlos	53,356	30,211	56.6	60,800	34,426	56.6	67,603	36,376	0.79	53.8	36,376	0.79	53.8
	Impasugong	26,585	21,110	79.4	30,522	24,236	79.4	37,866	25,272	0.60	66.7	25,272	0.60	66.7
	Kadingilan	27,021	22,227	82.3	30,006	24,683	82.3	30,622	26,044	0.77	85.0	25,299	0.35	82.6
	Kalilangan	28,299	11,049	39.0	32,682	12,760	39.0	36,314	14,870	2.21	40.9	14,870	2.21	40.9
	Kibawe	31,699	27,352	86.3	34,612	29,866	86.3	36,092	31,514	0.77	87.3	31,346	0.69	86.9
	Kitaotao	40,100	30,208	75.3	45,649	34,389	75.3	46,877	35,960	0.64	76.7	35,617	0.50	76.0
	Lantapan	38,380	23,619	61.5	43,036	26,485	61.5	52,220	35,087	4.10	67.2	35,087	4.10	67.2
	Libona	32,842	30,525	92.9	35,848	33,319	92.9	41,743	42,077	3.39	100.8	39,214	2.35	93.9
	Malaybalay	120,178	91,420	76.1	147,379	112,111	76.1	184,935	141,962	3.43	76.8	141,962	3.43	76.8
	Malitbog	17,046	14,342	84.1	19,093	16,064	84.1	20,400	16,763	0.61	82.2	16,763	0.61	82.2
	Manolo Fortich	69,993	64,481	92.1	78,388	72,215	92.1	93,275	78,939	1.28	84.6	78,939	1.28	84.6
	Maramag	65,846	12,897	19.6	76,361	14,957	19.6	93,721	15,020	0.06	16.0	15,020	0.06	16.0
	Pangantucan	39,528	16,450	41.6	43,055	17,918	41.6	45,917	17,619	-0.24	38.4	17,619	-0.24	38.4
	Quezon	75,621	61,163	80.9	80,242	64,900	80.9	82,799	60,406	-1.02	73.0	60,406	-1.02	73.0
	San Fernando	36,654	23,525	64.2	44,735	28,711	64.2	48,466	31,602	1.38	65.2	31,602	1.38	65.2
	Sumilao	16,591	5,711	34.4	19,806	6,818	34.4	24,953	6,555	-0.56	26.3	6,555	-0.56	26.3
Talakag	41,101	35,438	86.2	46,738	40,298	86.2	54,793	51,200	3.48	93.4	48,353	2.64	88.2	
Valencia	133,998	97,553	72.8	151,509	110,301	72.8	178,103	85,519	-3.57	48.0	85,519	-3.57	48.0	
Province	982,331	689,383	70.2	1,120,854	784,877	70.0	1,289,804	832,756	0.85	64.6	825,791	0.73	64.0	
Urban Area	Baungon	23,866	4,959	20.8	28,040	5,827	20.8	29,525	10,542	8.84	35.7	10,542	8.84	35.7
	Cabanglasan	30,553	4,013	13.1	34,683	4,556	13.1	43,755	11,966	14.79	27.3	11,966	14.79	27.3
	Damulog	15,616	3,870	24.8	17,587	4,359	24.8	18,544	4,586	0.73	24.7	4,586	0.73	24.7
	Dangcagan	17,457	4,548	26.1	20,084	5,232	26.1	21,281	6,039	2.07	28.4	6,039	2.07	28.4
	Don Carlos	53,356	23,145	43.4	60,800	26,374	43.4	67,603	31,227	2.44	46.2	31,227	2.44	46.2
	Impasugong	26,585	5,475	20.6	30,522	6,286	20.6	37,866	12,594	10.44	33.3	12,594	10.44	33.3
	Kadingilan	27,021	4,794	17.7	30,006	5,323	17.7	30,622	4,578	-2.13	15.0	5,323	0.00	17.4
	Kalilangan	28,299	17,250	61.0	32,682	19,922	61.0	36,314	21,444	1.06	59.1	21,444	1.06	59.1
	Kibawe	31,699	4,347	13.7	34,612	4,746	13.7	36,092	4,579	-0.51	12.7	4,746	0.00	13.1
	Kitaotao	40,100	9,891	24.7	45,649	11,260	24.7	46,877	10,918	-0.44	23.3	11,260	0.00	24.0
	Lantapan	38,380	14,761	38.5	43,036	16,551	38.5	52,220	17,133	0.49	32.8	17,133	0.49	32.8
	Libona	32,842	2,317	7.1	35,848	2,529	7.1	41,743	-334	-1.74	-0.8	2,529	0.00	6.1
	Malaybalay	120,178	28,759	23.9	147,379	35,268	23.9	184,935	42,973	2.86	23.2	42,973	2.86	23.2
	Malitbog	17,046	2,704	15.9	19,093	3,029	15.9	20,400	3,637	2.65	17.8	3,637	2.65	17.8
	Manolo Fortich	69,993	5,512	7.9	78,388	6,173	7.9	93,275	14,336	12.79	15.4	14,336	12.79	15.4
	Maramag	65,846	52,948	80.4	76,361	61,403	80.4	93,721	78,701	3.61	84.0	78,701	3.61	84.0
	Pangantucan	39,528	23,078	58.4	43,055	25,137	58.4	45,917	28,298	1.71	61.6	28,298	1.71	61.6
	Quezon	75,621	14,458	19.1	80,242	15,341	19.1	82,799	22,393	5.55	27.0	22,393	5.55	27.0
	San Fernando	36,654	13,130	35.8	44,735	16,024	35.8	48,466	16,864	0.73	34.8	16,864	0.73	34.8
	Sumilao	16,591	10,880	65.6	19,806	12,988	65.6	24,953	18,398	5.10	73.7	18,398	5.10	73.7
Talakag	41,101	5,663	13.8	46,738	6,440	13.8	54,793	3,593	-8.00	6.6	6,440	0.00	11.8	
Valencia	133,998	36,445	27.2	151,509	41,207	27.2	178,103	92,583	12.26	52.0	92,583	12.26	52.0	
Province	982,331	292,948	29.8	1,120,854	335,977	30.0	1,289,804	457,048	4.49	35.4	464,013	4.72	36.0	

Notes:

Adjusted population by municipality is estimated according the following procedure.

- Urban population of the 5 municipalities in 2003 was employed for the year 2010 (since estimated urban population in 2010 is less than that of 2003).
- Accordingly, rural population for the 5 municipalities estimated using the growth rates in the Land Use Plan was revised to meet respective municipal population fixing urban population in 2010.
- Rural population of the other municipalities is estimated in application of respective growth rates in the Land Use Plan, and that for urban population is calculated as the balance with municipal total population.

Table 8.3.7 Projected Number of Households by Urban and Rural Area by Municipality by Target Year

Name of Municipality	Household Size						Number of Households								
	1995			1997			2003			2010					
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total			
Baungon	5.40	5.31	5.33	870	3,377	4,247	919	3,560	4,479	1,079	4,183	5,262	2,636	4,746	7,382
Cabanglasan	5.64	5.46	5.49	682	4,656	5,338	712	4,861	5,573	808	5,518	6,326	2,992	7,947	10,939
Damulog	5.00	5.13	5.10	744	2,202	2,946	774	2,290	3,064	872	2,579	3,451	1,147	3,490	4,637
Dangcagan	5.42	5.47	5.45	801	2,254	3,055	839	2,360	3,199	965	2,715	3,680	1,510	3,811	5,321
Don Carlos	5.24	5.31	5.28	4,232	5,447	9,679	4,417	5,689	10,106	5,033	6,483	11,516	7,807	9,094	16,901
Impasugong	5.75	5.60	5.63	909	3,599	4,508	952	3,770	4,722	1,093	4,328	5,421	3,149	6,318	9,467
Kadilingan	5.04	5.24	5.20	918	4,096	5,014	951	4,242	5,193	1,056	4,710	5,766	1,331	6,325	7,656
Kaliangan	5.40	5.35	5.38	3,043	1,969	5,012	3,194	2,065	5,259	3,689	2,385	6,074	5,361	3,718	9,079
Kibawe	5.20	5.12	5.13	812	5,184	5,996	836	5,342	6,178	913	5,833	6,746	1,187	7,837	9,024
Kitaotao	4.85	5.17	5.09	1,952	5,594	7,546	2,039	5,843	7,882	2,322	6,652	8,974	2,815	8,904	11,719
Lantapan	5.64	5.51	5.56	2,521	4,128	6,649	2,617	4,287	6,904	2,935	4,807	7,742	4,283	8,772	13,055
Libona	5.34	5.53	5.51	421	5,365	5,786	434	5,520	5,954	474	6,025	6,499	632	9,804	10,436
Malaybalay (Capital)	5.45	5.48	5.47	4,932	15,597	20,529	5,277	16,682	21,959	6,471	20,458	26,929	10,743	35,491	46,234
Malibog	5.12	5.33	5.29	509	2,592	3,101	528	2,691	3,219	592	3,014	3,606	909	4,191	5,100
Manolo Fortich	5.21	5.56	5.53	1,019	11,162	12,181	1,058	11,597	12,655	1,185	12,988	14,173	3,584	19,735	23,319
Maramag	5.33	5.31	5.33	9,451	2,311	11,762	9,934	2,429	12,363	11,520	2,817	14,337	19,675	3,755	23,430
Pangantucan	5.48	5.40	5.44	4,096	2,961	7,057	4,211	3,046	7,257	4,587	3,318	7,905	7,075	4,405	11,480
Quezon	5.30	5.35	5.34	2,674	11,218	13,892	2,728	11,432	14,160	2,895	12,131	15,026	5,598	15,102	20,700
San Fernando	5.17	5.36	5.29	2,376	4,104	6,480	2,540	4,389	6,929	3,099	5,357	8,456	4,216	7,901	12,117
Sumilao	5.57	5.51	5.55	1,840	978	2,818	1,953	1,036	2,989	2,332	1,237	3,569	4,600	1,639	6,239
Talakag	5.27	5.39	5.37	1,030	6,303	7,333	1,075	6,575	7,650	1,222	7,476	8,698	1,610	12,088	13,698
Valencia	5.29	5.28	5.28	6,609	17,750	24,359	6,889	18,476	25,365	7,790	20,890	28,680	23,146	21,380	44,526
Provincial Total	5.34	5.38	5.36	52,441	122,847	175,288	54,877	128,182	183,059	62,932	145,904	208,836	116,006	206,453	322,459

Table 8.3.8 Projected School Enrollment by Municipality by Target Year

Name of Municipality	1997				2003				2010			
	School Age Population	Total Enrollment		Public Sch. Enrollment	School Age Population	Total Enrollment		Public Sch. Enrollment	School Age Population	Total Enrollment		Public Sch. Enrollment
		Number	Participation Rate			Number	Participation Rate			Number	Participation Rate	
Baungon	6,217	4,689	75	4,362	7,304	5,843	80	5,478	7,691	6,537	85	6,153
Cabanglasan	7,987	7,358	92	6,813	9,067	8,614	95	8,160	11,439	10,867	95	10,295
Damulog	3,912	4,691	120	4,391	4,406	4,626	105	4,186	4,646	4,414	95	4,181
Dangcagan	4,294	4,652	108	4,256	4,940	4,693	95	4,199	5,234	4,972	95	4,711
Don Carlos	13,464	14,405	107	13,095	15,342	14,575	95	13,041	17,059	16,206	95	15,353
Impasugong	6,779	7,236	107	7,236	7,783	7,394	95	7,394	9,656	9,173	95	9,173
Kadangilan	6,930	6,185	89	5,392	7,696	7,311	95	6,542	7,854	7,461	95	7,069
Kaliangan	7,162	8,235	115	7,543	8,271	8,685	105	7,857	9,190	8,731	95	8,271
Kibawe	8,096	8,745	108	6,672	8,840	8,398	95	7,072	9,218	8,757	95	8,296
Kitaotao	10,145	8,673	85	8,127	11,549	10,394	90	9,817	11,860	11,267	95	10,674
Lantapan	9,845	8,095	82	7,792	11,039	9,935	90	9,383	13,395	12,725	95	12,056
Libona	8,854	7,765	88	7,765	9,664	8,698	90	8,698	11,253	10,690	95	10,690
Malaybalay (Capital)	30,577	30,175	99	27,325	37,498	35,623	95	31,873	47,053	44,700	95	42,348
Malitbog	4,578	4,416	96	4,210	5,128	4,872	95	4,615	5,479	5,205	95	4,931
Manolo Fortich	19,047	19,368	102	16,883	21,332	20,265	95	18,132	25,383	24,114	95	22,845
Maramag	17,250	17,993	104	16,515	20,005	19,005	95	17,004	24,553	23,325	95	22,098
Pangantucan	10,408	9,731	93	8,395	11,337	10,770	95	9,636	12,091	11,486	95	10,882
Quezon	19,890	18,671	94	16,587	21,105	20,050	95	17,939	21,778	20,689	95	19,600
San Fernando	9,669	8,813	91	8,264	11,801	11,211	95	10,621	12,785	12,146	95	11,507
Sumilao	4,396	4,215	96	3,615	5,248	4,723	90	4,723	6,612	6,281	95	6,281
Talakag	10,600	10,605	100	9,565	12,054	11,451	95	10,246	14,131	13,424	95	12,718
Valencia	34,285	37,433	109	29,229	38,765	36,827	95	31,012	45,569	43,291	95	38,734
<b>Provincial Total</b>	<b>254,385</b>	<b>252,149</b>	<b>99</b>	<b>224,032</b>	<b>290,174</b>	<b>273,963</b>	<b>94</b>	<b>247,628</b>	<b>333,929</b>	<b>316,461</b>	<b>95</b>	<b>298,866</b>

### 8.3.3 Projection of the Number of Public Facilities

Table 8.3.9 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
Baungon	Public Market	2		2		2
	Bus/Jeepney Terminal	2		2		2
	Parks/Playground					
	Total	4		4		4
Cabanglasan	Public Market	1		1		1
	Bus/Jeepney Terminal	1		1		1
	Parks/Playground					
	Total	2		2		2
Damulog	Public Market	2		2		2
	Bus/Jeepney Terminal	2		2		2
	Parks/Playground					
	Total	4		4		4
Dangcagan	Public Market	2		2		2
	Bus/Jeepney Terminal	2		2		2
	Parks/Playground					
	Total	4		4		4
Don Carlos	Public Market	4		4		4
	Bus/Jeepney Terminal	4		4		4
	Parks/Playground					
	Total	8		8		8
Impasugong	Public Market					
	Bus/Jeepney Terminal					
	Parks/Playground					
	Total					
Kadingilan	Public Market	1		1		1
	Bus/Jeepney Terminal	1		1		1
	Parks/Playground					
	Total	2		2		2
Kalilangan	Public Market	2		2		2
	Bus/Jeepney Terminal	1		1		1
	Parks/Playground					
	Total	3		3		3
Kibawe	Public Market	4		4		4
	Bus/Jeepney Terminal	4		4		4
	Parks/Playground	1		1		1
	Total	9		9		9
Kitaotao	Public Market	2		2		2
	Bus/Jeepney Terminal					
	Parks/Playground					
	Total	2		2		2
Lantapan	Public Market	6		6		6
	Bus/Jeepney Terminal	4		4		4
	Parks/Playground					
	Total	10		10		10
Libona	Public Market					
	Bus/Jeepney Terminal					
	Parks/Playground					
	Total					

Table 8.3.9 Projected Number of Public Utilities by Municipality by Target Year (cont'd.)

Name of Municipality	Type	1997	2003		2010	
		No. of Public Utilities	Proposed Construction	Total	Proposed Construction	Total
Malaybalay (Capital)	Public Market	1		1		1
	Bus/Jeepney Terminal	2		2		2
	Parks/Playground	1		1		1
	Total	4		4		4
Malitbog	Public Market	1		1		1
	Bus/Jeepney Terminal	1		1		1
	Parks/Playground					
	Total	2		2		2
Manolo Fortich	Public Market	5		5		5
	Bus/Jeepney Terminal	1		1		1
	Parks/Playground	1		1		1
	Total	7		7		7
Maramag	Public Market	6		6		6
	Bus/Jeepney Terminal	2		2		2
	Parks/Playground					
	Total	8		8		8
Pangantucan	Public Market	1		1		1
	Bus/Jeepney Terminal	2		2		2
	Parks/Playground					
	Total	3		3		3
Quezon	Public Market	2		2		2
	Bus/Jeepney Terminal	2		2		2
	Parks/Playground					
	Total	4		4		4
San Fernando	Public Market					
	Bus/Jeepney Terminal					
	Parks/Playground					
	Total					
Sumilao	Public Market	1		1		1
	Bus/Jeepney Terminal					
	Parks/Playground					
	Total	1		1		1
Talakag	Public Market	1		1		1
	Bus/Jeepney Terminal	1		1		1
	Parks/Playground					
	Total	2		2		2
Valencia	Public Market	5		5		5
	Bus/Jeepney Terminal	5		5		5
	Parks/Playground					
	Total	10		10		10
Provincial Total	Public Market	49		49		49
	Bus/Jeepney Terminal	37		37		37
	Parks/Playground	3		3		3
	Total	89		89		89