

Chapter

6

**PAST FINANCIAL PERFORMANCE IN
WATER SUPPLY AND SANITATION**

6. PAST FINANCIAL PERFORMANCE IN WATER SUPPLY AND SANITATION

6.1 General

Based on the Local Government Code of 1991 and NEDA Board Resolution No. 4 (1994), the locally funded programs and projects for the water supply and sanitation sector have been devolved from the central government agencies to the LGUs since 1992. However, the central government still retains its role of providing support to LGUs in the form of technical, institution-building and limited financial assistance.

The financial arrangements conducted, since the sector's devolution to the LGUs, by the province with a special attention to the subject sector are reviewed and discussed in this chapter. The past experience is the basis to seek for appropriate financial arrangements for the medium term development. The essential study components are: (1) LGUs' past financial performance; (2) past public investment and present plans; (3) LGUs' present financing sources and management participation in the sector, (4) existing practices by the LGUs on cost recovery and (5) affordability by users.

6.2 LGU's Past Financial Performance

The provincial government's past financial performance from the year 1994 to 1998 was investigated. Actual financial data were obtained for the years 1994 to 1997, while the financial figures in 1998 are only budgetary estimates. Likewise, the municipalities' past financial performance in the same period (1994 to 1998) is included in the Supporting Report.

6.2.1 Sources and Uses of Funds

(1) Sources of Funds in the Province

The sources of income of the LGU are Internal Revenue Allotments (IRA), local tax revenues, and non-tax revenues such as grants, aids and subsidies, as shown below. At the present time, IRA is a major financial source of the LGUs.

- (a) IRA – the amount allotted by the National Government to different provinces, municipalities and barangays. A standard formula is used, which considers parameters such as population, land area, number of barangays, cost of devolved national functions, and other factors.

- (b) Tax Revenues – mainly consist of real property tax, accounting for an average of 12.11% of the total income of the province; and
- (c) Grants, Aids and Subsidies – a total amount of ₱4,707.00 and ₱2.146 million were received by the province for the year 1994 and 1995.

Based on the Local Government Code of 1991, 40% of the national internal revenue taxes of the 3rd fiscal year preceding the current year (from 1994 onwards) is allocated to the LGUs nationwide, specifically to the administrative units of (1) province (23%); (2) city (23%); (3) municipality (34%), and barangay (20%). Further, respective IRAs in different administrative levels are allotted to all administrative units concerned.

Table 6.2.1 presents the income and expenditures of Sarangani during the period of 1994-1998. Local tax revenues, which were 12.11% of the total income of the province, consist of real property tax, business taxes and licenses, and miscellaneous taxes. IRA's share to total income was 87.81% in annual average, which indicates that the province has historically been dependent on the IRA with its low tax and non-tax revenue collections.

In order to mobilize fund sourcing, the 1987 Constitution and the 1991 Local Government code granted the Provincial Government to have its initiative to create new revenue sources.

Table 6.2.1 Income and Expenditures, 1994-1998

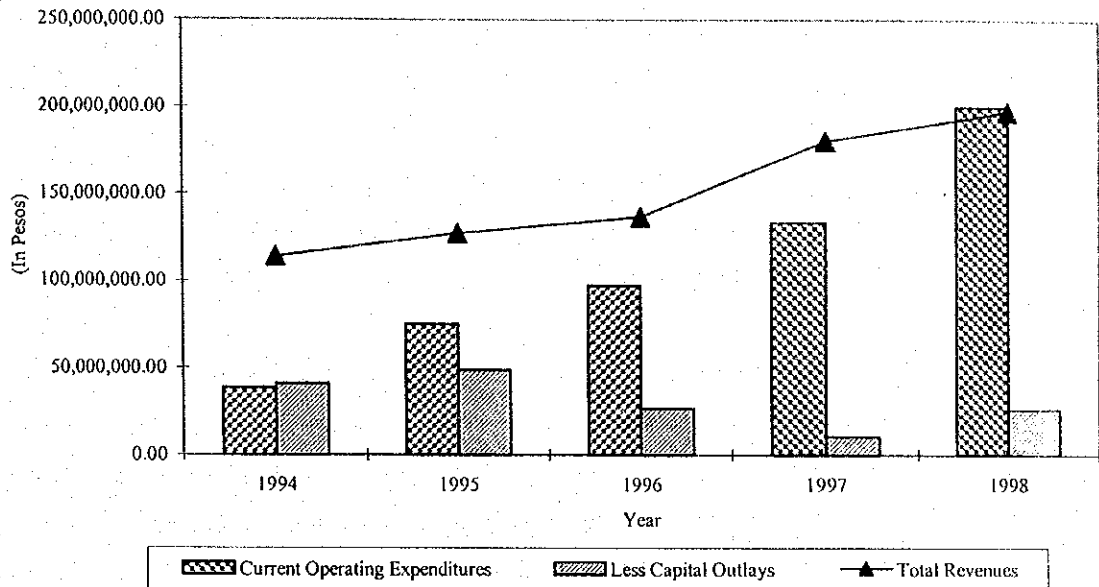
Unit: Pesos

Province	1994	1995	1996	1997	1998
RECEIPTS					
Local Revenues ^{1/}	13,461,062.31	16,399,736.69	17,997,135.00	21,013,174.00	22,592,536.00
IRA	100,646,174.00	110,889,126.00	118,792,017.00	159,031,957.00	174,576,103.00
Total Revenues	114,107,236.31	127,288,862.69	136,789,152.00	180,045,131.00	197,168,639.00
EXPENDITURES					
Current Operating Expenditures	38,617,277.63	75,066,762.01	97,129,055.00	133,725,506.00	199,887,656.92
Personal Services (P.S.)	23,319,404.80	42,612,440.30	52,640,197.00	75,309,712.00	93,243,231.02
Maint. & Other Operating Exp (MOOE)	14,297,872.83	32,454,321.71	44,488,858.00	58,415,794.00	106,644,425.90
NET OPERATING INCOME	75,489,958.68	52,222,100.68	39,660,097.00	47,603,747.58	(2,719,017.92)
Less: Capital Outlays	41,080,466.21	48,553,712.21	26,782,713.00	10,269,842.60	26,059,628.00
Add Other Receipts					
Grants	4,704.00	2,146,664.00	-	-	-
Extraordinary Receipts	416.66	7,915.94	488,001.00	552,173.00	-
Net Income:	34,414,616.33	5,822,968.41	13,325,385.00	36,515,854.00	(28,645,646.26)

Source: PSPT

Note 1/ Includes Tax Revenues (Real Property Taxes, Business Taxes and Licenses, National Wealth Share, Miscellaneous Taxes, etc.) and National Wealth in 1990s. Includes Amortization Payments.

Figure 6.2.1
Income and Expenditures, 1994-1998



(2) Uses of Funds in the Province

Actual expenditures of the provincial government during the period from 1994 to 1997 show that personnel expenses were major parts with an average of 38.01% to the total revenue. Maintenance and operating expenses of the province was 33.93%. In addition, the province has a capital outlay with an average of 20.22% to the total revenue. The funds for the water supply sector were part of the capital outlays of the province.

Previous years, (1994 to 1997) showed a positive net income. In 1998, however, the province had net operating loss of ₱2.7 million in 1998 from an income of ₱197.168 million, after deducting the projected current operating expenditures of ₱199.88 million. Taking into account the amount of ₱26.059 million for capital outlays the projected net loss is ₱28.645 million.

6.2.2 Availability of Funds

As previously noted, IRA comprises 87.89% of the total income of the province, which is tapped to finance most of its expenditures including capital outlays and even non-office expenses (incidental). According to the Provincial Treasurer's Office, the amount of IRA that will be received by the province is known in advance before the end of the preceding year. Thus, for budgeting purposes, the province just uses the actual amount of IRA it received in

the preceding year as its estimate of IRA for the budget year. In the case where the IRA received is larger than that of the preceding year, the province prepares a supplemental budget.

Table 6.2.2 presents the historical IRA of the provincial government and its municipalities between 1994 and budget year 1998. As shown, the IRA of the province was 0.87% of the provincial IRA nationwide in the period 1994-1997 and budget year 1998. While, the total amount of IRA allotted to all its municipalities in the years 1994-1998 was 0.708%. The IRA percentage of each municipality to total municipal IRA nationwide is presented in Table 6.2.2, Supporting Report.

Based on the past financial performance of the province, IRA has been a major source of funds. IRA's average share to total income of the province is 87.89% while its share to combined income of municipalities is 81.9% for the period 1994 to 1997 and 77.43% in 1998. At first, 20% Development Fund (DF) and 5% Calamity Fund are deducted from the total amount of provincial IRA. Then, the remaining portion of the IRA is combined with other income sources. Contractual and statutory items, which are covered by R.A. 324 (b) are deducted from the pooled income (75% IRA + all other income) before other appropriations are made.

Based on the income statement of the province, available funds of the province are mainly spent to cover personnel salaries, benefits, the MOOE and capital expenditures. The provincial government's combined income from IRA and its tax, and non-tax revenues are just sufficient for its operating, capital and non-office expenses. In 1998, the province projected a net loss of ₱28.645 million after deducting projected capital outlay of ₱26.059 million.

For the planned capital expenditures of the province, 20% Development Fund (DF) of the IRA are appropriated. The percentages allotted as the DF are the minimum requirement that should be arranged for capital projects as stated in the memorandum circulars of the DILG.

Table 6.2.3 presents allotted funds for capital expenditures (20% DF) between 1994 and 1998. Referring to the amount of actual expenditures from 1994 to 1997 in use of 20% DF of the province, the allotted DFs were sufficient to cover the actual expenditures. In 1998, it is projected that the DF may be adequate to cover the capital expenditures of the province, since the projected figure is equivalent to the amount of capital outlays. There were no loans incurred, while the province received grants amounting to P4,707 in 1994 and P2.14 million in 1995.

Table 6.2.2 Internal Revenue Allotment to the Province, 1994-1998

Unit: Pesos

		1994	1995	1996	1997	1998
National	I. National Total of IRA	46,753,000,000.00	55,202,000,000.00	58,022,990,000.00	71,049,000,000.00	80,990,763,000.00
	(a) IRA to all Provinces	11,498,994,198.00	12,696,644,000.00	13,755,011,803.00	17,813,000,000.00	20,054,018,925.00
	(b) IRA to all Municipalities	16,325,288,074.00	18,768,952,000.00	19,607,715,553.00	24,849,000,000.00	28,245,815,434.00
Province	II. IRA to Sarangani					
	(1) Total: (2) + (3)	216,990,774.00	239,225,712.00	255,563,800.05	339,691,355.10	377,514,514.00
	(2) Provincial Government	100,646,174.00	110,889,126.00	118,792,017.00	159,031,957.00	174,576,103.00
	Percentage against (a)	0.88	0.87	0.86	0.89	0.87
	(3) Municipalities	116,344,600.00	128,336,586.00	136,771,819.05	180,659,398.10	202,938,411.00
	Percentage against (b)	0.71	0.68	0.69	0.73	0.72
	III. Total Income of the Provincial Government	114,107,236.31	127,288,862.69	136,789,152.00	180,045,131.00	197,168,639.00
Percentage of IRA	88.20	87.12	86.84	88.32	88.54	
Province	IV. Total Income of Municipalities	138,784,224.01	162,212,791.93	165,510,804.00	220,256,472.46	262,077,089.52
	Percentage of IRA	83.83	79.12	82.64	82.02	77.43
Municipalities	V. IRA to Municipalities TOTAL	116,344,599.50	128,336,586.00	136,771,819.05	180,659,398.10	202,938,411.00
	Alabel	14,564,640.00	16,144,722.00	17,332,926.00	22,280,593.00	25,818,376.00
	Glan	20,668,897.00	23,038,648.00	24,693,046.00	32,198,232.00	37,527,848.00
	Kiamba	13,851,897.00	15,321,424.00	16,480,111.00	20,033,364.00	23,039,456.00
	Maasim	15,317,214.50	16,861,284.00	18,019,053.00	18,019,053.00	16,757,112.00
	Maitum	11,826,481.00	12,936,864.00	14,346,761.05	18,678,199.10	20,738,737.00
	Malapatan	17,734,540.00	19,329,162.00	19,329,162.00	27,460,645.00	30,033,364.00
	Malungon	22,380,930.00	24,704,482.00	26,510,724.00	41,989,312.00	49,023,518.00

Source: Provincial Treasurer's Office.

Notes: * IRA to Barangay is not included.

Table 6.2.3 Allotted Funds for Capital Expenditures (20% DF), 1994-1998

Unit: Pesos

Year	IRA of the Province (a)	20% DF (b)	Expenditures on 20% DF (c)	Surplus/(Deficit)
1994	100,646,174.00	17,000,000.00	41,080,466.21	(24,080,466.21)
1995	110,889,126.00	22,177,825.20	48,553,712.21	(26,375,887.01)
1996	118,792,017.00	38,440,964.00	26,782,713.00	11,658,251.00
1997	159,031,957.00	38,581,033.00	10,355,944	28,225,089.00
1998	174,576,103.00	31,806,391.00	26,059,628.00	5,746,763.00

Source: Provincial Treasurer's Office and Provincial Accountant's Office

Note: The figures for the 20% DF are not the same as the computed 20% of the IRA as shown: P 20.12 million (1994), P22.177 million (1995), P23.758 million (1996), P31.8 million (1997) and P34.9 million (1998). In 1996 and 1997, the allotted amounts are much higher than the computed 20% of IRA.

Since 1996, the province had not incurred deficit in its 20% DF to finance capital expenditures, which may reflect a slow take-out of funds due to bureaucratic procedures or changes in project design and specifications.

6.2.3 Financial Indicators

In order to determine the debt servicing capability of the province, the formula used by the Bureau of Local Government Finance (BLGF) under the Department of Finance (DF) was employed. It takes into account the regular income of the LGU referring to revenues (real property and business taxes), receipts from economic enterprises, and fees and charges that are collected regularly. Receipts from borrowings, grants and inter-fund transfers are not considered as regular income.

Following is the formula adopted by BLGF in computing the debt servicing capacity, where the average annual growth rate to be used should not exceed 15%, according to the MDF Policy Governing Board Resolution 4-95.

$$DSC = [\{ RINC_1 (1 + AGR) + RINC_2 \} + IRA] \times 20\% - AMORT$$

Where:

DSC = debt servicing capacity of the LGU

RINC = regular income

AGR = average growth rate

IRA = internal revenue allotment

20% = debt servicing ceiling percentage imposed by the Local Government Code of 1991 under Section 324 (b).

AMORT = amortization of the LGU's outstanding loan

1 = current year

2 = preceding year

Based on the above formula, the amount of the debt servicing capacity of the provincial government was computed to be ₱41.5 million for the year 1998. This amount reflects the maximum loan that can be availed of from MDF. The local tax income and IRA of the province are projected at ₱22.59 million and ₱159.03 million, respectively.

Table 6.2.4 Other Sources of Funds for Capital Expenditures and 20% DF, 1994 – 1998

Year	Actual Capital Expenditures (a)	Grants (b)	Borrowings (c)	20% DF (d)	Sub-Total Financial Sources (e)	Surplus/ Shortfall (f)
1994	41,080,466.21	4,704.00	-	17,000,000.00	17,004,704.00	(24,075,762.21)
1995	48,553,712.21	2,146,664.00	-	22,177,825.20	24,324,489.20	(24,229,223.01)
1996	26,782,713.00	-	-	38,440,964.00	38,440,964.00	11,658,251.00
1997	10,355,944.00	-	-	38,581,033.00	38,581,033.00	28,225,089.00
1998	26,059,628.00	-	-	31,806,391.00	31,806,391.00	5,746,763.00

6.3 Past Public Investment and Present Plans

6.3.1 Past and Current Annual Investment Plans

The past and recent development of the water supply and sanitation sector in the province was undertaken by the provincial government and DPWH. The fund from the CDF (Countrywide Development Fund) was also availed of. Water supply sector obtained ₱ 45.1 million in total during the period 1995-1998, while sanitation sector has received only P 3.02 million. Thus, actual amount of public investments to the WATSAN sector amounted to ₱48.1 million. (refer to Table 6.3.1(a)). The largest investment registered so far is those for Level II water supply with an aggregate amount of ₱23.05 million or equivalent to about 51% of water supply sectors' planned investments. During the said period, followed by Level I and Level III water supply with ₱ 13.72 million and ₱ 8.33 million, respectively.

The allotted amount of sector investment amounting to ₱ 57.05 million is 26.5% higher than the actual amount spent (₱ 45.1) million although the percentage distribution by service level is relatively similar. Refer to Table 6.3.1 (b). Level II obtained planned allocation of ₱ 28.32 million, which is almost half of the planned investments for water supply sector.

Table 6.3.1(a) Actual Amount of Sector Investment to the Province by Concerned Agencies

Unit: Pesos

Funding Category		1995-1998				
Agency	Funds	Level I	Level II	Level III	Sub-Total	Sanitation
DILG		812,048.38	-	-	812,048.38	-
DPWH	Foreign Fund	4,862,838.12	5,225,000.00	-	10,087,838.12	827,721.16
	Local	-	-	-	-	-
LWUA		-	550,000.00	-	550,000.00	-
DOH	Foreign Fund	-	65,000.00	-	123,280.00	253,835.32
	Local	58,280.00	525,000.00	-	525,000.00	-
NGO (IPHC-DMSF)		-	300,000.00	-	6,217,992.90	-
UNICEF		5,917,992.90	-	-	2,069,604.04	-
PROVINCE		2,069,604.04	12,970,618.47	870,604.52	15,910,827.03	-
MUNICIPALITY		-	3,419,901.35	7,457,259.36	10,877,160.71	1,941,290.29
Total		13,720,763.44	23,055,519.82	8,327,863.88	45,104,147.14	3,022,846.77

Source: Various Government Agencies.

Table 6.3.1(b) Allotted Amount of Sector Investment to the Province by Concerned Agencies

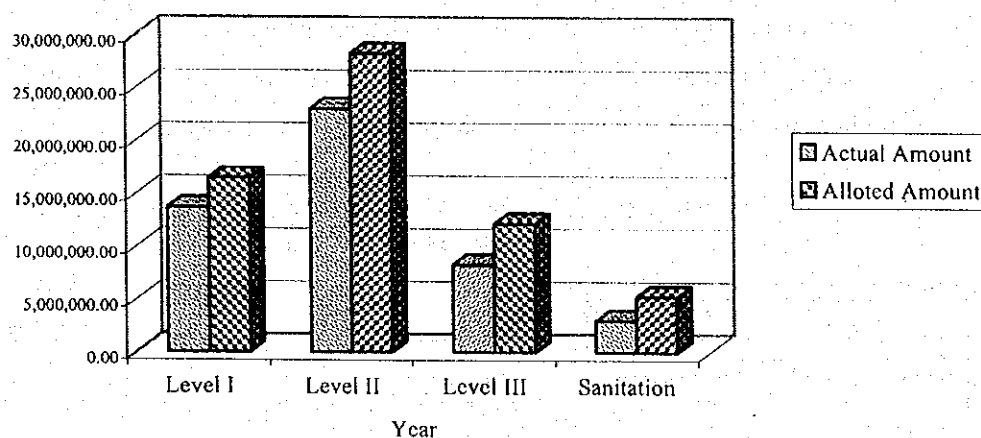
Unit: Pesos

Funding Category		1995-1998				
Agency	Funds	Level I	Level II	Level III	Sub-Total	Sanitation
DHFG						
DPWH	Foreign Fund	896,000.00	-	-	896,000.00	-
	Local	5,078,400.00	5,225,000.00	-	10,303,400.00	835,800.00
LWUA						
DOH	Foreign Fund	-	550,000.00	-	550,000.00	-
	Local	58,280.00	65,000.00	-	123,280.00	655,146.32
NGO (IPHC-DMSF)			825,000.00	-	825,000.00	-
UNDP			129,845.00	-	129,845.00	-
UNICEF			600,000.00	-	600,000.00	-
PROVINCE		8,211,483.22	16,982,607.75	899,999.52	26,094,090.49	910,605.00
MUNICIPALITY		2,274,515.94	3,944,059.50	11,310,751.00	17,529,326.44	2,920,719.00
Total		16,518,679.16	28,321,512.25	12,210,750.52	57,050,941.93	5,322,270.32

Source: Provincial Government and Agencies

Note: Figures are combined funds from DPWH (Foreign/Local), Province, Municipalities and CDF.

**Figure 6.3.1
Actual and Allotted Amount of Sector Investment to the Province by Concerned Agencies, 1995-1998**



(1) Budgetary Allocation to the Sector

The Budget Office of the province consolidates the budget proposal submitted by all offices of the Provincial Government. While, the DBM issues a Local Budget Memorandum every October of the preceding budget year to guide the provinces in their budget preparation. The sector obtains allotment from the 20% DF allocation by the Provincial Development Council (PDC).

Once, the budgetary arrangement is completed, the local chief executive (Governor) endorses it to the SP for approval and appropriation. The SP usually approves the budget, ideally before January of the budget year. In case the budget is not approved, the prov-

ince operates on a re-enacted budget, which is based on the last year's budget, until the budget for the current year is approved.

(2) Capital Expenditures in the Sector

On provincial level, the projects programmed for implementation by sector, by funding source, and by implementing agency are consolidated and presented by the PPDO in the Provincial Annual Investment Plan (AIP). The AIP is based on the planned investment of the province, as well as on the submission to the PPDO from the municipalities on their planned investments for the coming year. The AIPs of Sarangani for the Sector from 1995 to 1998 are summarized in Tables 6.3.2 and 6.3.3.

Table 6.3.2 shows the annual planned activities in the water supply sector; the corresponding funding sources and the amount of investment from 1995 to 1998, while Table 6.3.3 summarizes annual sector investments by service level. Levels I & II had the largest fund allocation with 77.1% and 14.5% share to total planned investments for the period 1995 to 1998. During the period 1995 to 1998, a cumulative amount of ₱152.384 million was planned to be mainly invested for water supply while only ₱13.475 million was planned for sanitation.

In Table 6.3.4 (a), a total amount of ₱19.205 million was planned for WATSAN during the period 1995-1998 (₱18.726 million for water supply and ₱479,390 for sanitation). But, the actual expenditures for WATSAN from the 20% DF of the province is only ₱12.03 million or 62.6% of the planned investments (while water supply sector's actual disbursed amount is 61.87% of its planned capital outlay). It was reported that there were some problems encountered in the implementation of WATSAN projects, which resulted to lower amount of actual expenditures as compared with the planned expenditures (budget). Some of these problems include delays in disbursement which are caused by revisions in project design, or change orders and some adjustments based on the field surveys conducted.

6.3.2 Past and Current Breakdown of 20% Development Fund

The allocation of the 20% DF is guided by DILG Memorandum Circular No.95-215 as amended by Memorandum Circular No. 96-263 issuing 'the Policies and Guidelines on the Utilization of the DF and other related matters'.

As presented in Table 6.3.4, (a) which shows actual disbursed amount from the 20% DF the infrastructure sector obtained 18% of the DF in 1998 (i.e. ₱1.11 million out of ₱6.37 million) which covers mainly road construction and other infrastructure. Water supply sector's share was relatively high at 15% annual average of the 20% DF for the period 1994 to 1997.

Table 6.3.2 Annual Investment Plan, 1995 – 1998

Unit: '000 Pesos

Item	1995	1996	1997	1998	Total	% Share
Construction (DW, SW, Spring Box, Reservoir, Tank)	11,440	9,995	18,221	5,144	44,800	77.11
Various Foreign Funding (OECF)	2,500	-	-	-	2,500	4.30
Various National Funding (DPWH/LWUA)	7,470	7,170	5,591	3,801	24,032	41.36
National/Local Funding (DPWH/Prov Govt.)	-	-	-	268	268	0.46
Various Local Funding (Provincial Government)	1,470	2,825	12,630	1,075	18,000	30.98
Spring Development with L2	3,800	1,950	1,400	1,250	8,400	14.46
Various National Funding (DPWH)	3,800	-	-	250	4,050	6.97
National/Local Funding (DPWH/Prov Govt.)	-	-	-	125	125	0.22
Various Local Funding	-	1,950	1,400	875	4,225	7.27
Spring Development with L3	4,200	700	-	-	4,900	8.43
Various National Funding (DPWH)	4,200	700	-	-	4,900	8.43
Total	19,440	12,645	19,621	6,394	58,100	100.00

Source: Provincial Planning and Development Office, Provincial Budget Office and Provincial Treasurer's Office.

Table 6.3.3 Sector Allocation in the Annual Investment Plan, 1995 – 1998

Unit: '000 Pesos

Item	1995	1996	1997	1998	Total
Level 1	11,440	9,995	18,221	4,876	44,532
Foreign Assisted	2,500	-	-	-	2,500
National	7,470	7,170	5,591	3,801	24,032
Local	1,470	2,825	12,630	1,075	18,000
Level 2/3	13,350	8,000	2,650	3,750	27,750
National	13,350	8,000	2,650	3,750	27,750
Local	-	-	-	-	-
Others	-	-	-	-	-
Special Water Supply Projects (Gov't. Centers, Hosp.) - Local	-	1,040	1,120	1,250	3,410
Water Quality	-	1,000	-	-	1,000
Water Supply	24,790	19,035	21,991	9,876	75,692
Sub-Total Water Supply	49,580	39,070	43,982	19,752	152,384
Health Centers	3,440	1,250	1,450	1,350	7,490
Sanitation (Health)	50	1,625	1,950	2,360	5,985
Sub-Total Sanitation	3,490	2,875	3,400	3,710	13,475
Grand Total	53,070	41,945	47,382	23,462	165,859

Source: Provincial Planning and Development Office.

Table 6.3.4 Actual and Planned Disbursement from the 20% Development Fund, 1994-1998

Unit: Pesos

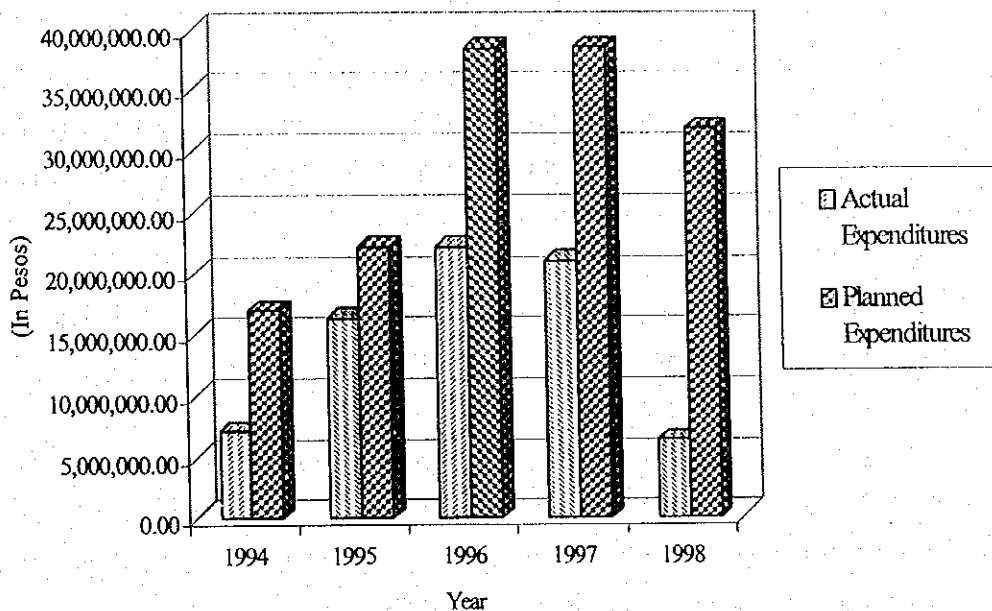
Year	20% Dev't. Fund	Social Development		Economic Development		Infrastructure		Water Supply	
		As Planned	Actual	As Planned	Actual	As Planned	Actual	Planned	Actual
1994	17,000,000	2,690,110	658,281.08	5,462,793	667,613.65	4,500,000	4,202,315.73	2,460,000	1,041,535.00
1995	22,177,825	3,886,500	2,673,014.78	5,263,918	3,107,234.15	7,803,817	6,621,517.03	3,545,090	2,662,728.15
1996	38,440,964	9,413,317	5,677,088.42	11,151,503	3,812,870.10	14,910,657	10,164,134.92	2,207,987	2,291,874.87
1997	38,581,033	15,411,033	11,075,178.42	4,576,000	1,471,067.47	13,120,000	4,952,146.94	5,050,000	3,190,542.95
1998	31,806,391	9,434,775	2,591,109.79	5,685,888	174,435.65	10,285,000	1,115,978.96	5,463,228	2,399,587.37

Year	20% Dev't. Fund	Sanitation		Others		Sub-Total		% of Water Supply to 20% DF	
		As Planned	Actual	As Planned	Actual	As Planned	Actual	Planned	Actual
1994	17,000,000	91,890	91,890	1,795,207	404,710.38	17,000,000	7,066,345.84	14.47	14.74
1995	22,177,825	100,000	100,000	1,578,500	1,174,435.04	22,177,825	16,338,929.15	15.98	16.30
1996	38,440,964	87,500	87,500	670,000	113,615.00	38,440,964	22,147,083.31	5.74	10.35
1997	38,581,033	100,000	97,322	324,000	248,665.90	38,581,033	21,034,923.72	13.09	15.17
1998	31,806,391	100,000	70,875	837,500	21,000.00	31,806,391	6,372,986.77	17.18	37.65

Source: Provincial Accountant's Office.

1/ In 1998, only first quarter actual expenditures are recorded.

Figure 6.3.4(a&b)
Allocation of the 20% Development Fund, 1994 - 1998



6.3.3 Existing Plans of the LGUs for the Sector

The Provincial Government has been undertaking various programs for the water supply and sanitation sector, but there are no specific projects to be implemented at present. The PPDO is in-charge of project identification in coordination with the different MPDOs (who then obtained proposed projects from constituent barangays). Identified projects are for deliberation by the Local Finance Committee for funding sources and allotment and for inclusion in the Annual Investment Plan (AIP) of the province. The major source of funds is the Provincial Government General Fund or mainly the 20% DF. The amount of WATSAN fund is lumped under the Social Services sector. The following are the items to be budgetary arranged.

(a) Logistic support facilities/ services with required funding

The LGUs through the course of project implementation shall ensure provision of adequate logistic supports with financial arrangements. The AIP needs to include the plan for the logistic support facilities/ services entailing manpower and vehicle allocation.

(b) Raising funds and provision of subsidies to support capital development.

The province provides the subsidies to support capital development at the municipal and barangay levels through its 20% DF. However, barangays and municipalities that request funding must be prompt in submitting the necessary documents to PPDO for processing. Barangays can propose projects to the provincial government for financing and for technical assistance. Provincial Government is utilizing their previous experience in the Kabisig Road Development Project, which provided ₱100,000 each per barangay or total amount of ₱14 million. The same structure of framework will be used for project development and monitoring of WATSAN projects.

6.4 LGUs' Present Financing Sources and Management Participation in the Sector

6.4.1 Cost Sharing Arrangements / Counterpart Funding

The implementation of water supply projects was previously undertaken by DPWH. Some requests for assistance from barangay people are received by the PEO, mostly for funding of capital expenditures. PEO is the organization that coordinates and implements WATSAN sector projects in coordination with various MEOs.

The new cost-sharing scheme was authorized in 1998 in accordance with the policy on national government grants. It is stated that "this scheme shall be applied to all new ODA-assisted projects that are currently being packaged in support of LGUs". Programs of central government agencies that involve devolved functions, particularly those that have social and/or environmental objectives are implemented through a cost-sharing arrangement between the central government agency and LGUs. For any central government grants that are provided for the development of Level I water supply systems and sanitation facilities to the limited classes of municipalities, the LGUs and beneficiaries concerned shall share the capital cost required. No subsidies from the central government will be provided for the construction of Level II and III water supply systems.

The provincial government has developed financing arrangement in terms of cost sharing for development projects including WATSAN: 70% provincial government, 20% municipal gov-

ernment and 10% for barangays. For projects of the provincial government with municipal government, a MOA is signed which indicated that the provincial government should undertake the monitoring while the municipal government will undertake construction.

6.4.2 ODA Assisted Projects and Grant Aid

Other external source of funds of the province is foreign assisted projects either directly coursed through the province as in the case of USAID and for any grant technical assistance by USAID, the provincial government puts up a counterpart fund. Water districts in the province likewise avail of funding through loans that are directly obtained from LWUA.

As of now, there was no NGO counterpart funding experienced by the Province.

(1) Arrangement through Conduits

1) Municipal Development Fund (MDF)

The MDF is a revolving fund created under Presidential Decree No. 1914 to provide LGUs access to foreign loans, assistance or grants. Operations of the MDF, as well as the evaluation and control of local government transactions of the fund, are guided by the financial policies defined in the Joint Circular No. 6-87 of the DOF, COA and DBM.

The policies include, among others, the following:

- On-lending terms for local governments or government corporations to be in accordance with the terms and conditions of the international agreements with foreign financial institutions;
- Loan repayments to conform with the terms and conditions of the corresponding Loan and Project Agreements;
- Annual debt service liabilities to all creditors to be at least 120 per cent of total net annual revenues from all sources after operating costs, unless otherwise provided in a mutual agreement among all parties concerned;
- Repayment to MDF to take precedence over all subsequent borrowings incurred;
- Payment of additional interest, charges and fees on amounts to be relented to local governments may be required by the Secretary of Finance in consultation or agreement with foreign lending institutions and LGUs/Project Cities to cover foreign exchange risks, commitment charges and front-end fees applied on foreign borrowings by lending institutions; and
- Internal revenue/specific tax allotments to be withheld by the DOF in case of default or arrearages for more than three (3) months.

The Policy on accessing loans through the MDF is currently under review by the central government to make the terms and conditions more concessional towards the LGUs.

2) Governmental Financing Institutions (GFI)

In the past, the LGUs could not access financing institutions for direct assistance. But with the devolution of the sector to the LGUs, the LGUs could now access direct financing from banks and other financing institutions.

Among the GFIs through which LGUs can access ODA loans are the Land Bank of the Philippines (LBP) and the Development Bank of the Philippines (DBP). For the LGU to enter into a loan, the respective legislative council (PA for the Province, Sangguniang Panlungsod; SP for the City and Sangguniang Bayan; SB for the Municipality) will authorize the Chief Executive Officer (Governor or Mayor, as the case may be). The collateral that the LGU may use in order to avail of loans from the bank could be any of the following: deposit hold out, public land and assignment of IRA.

In a deposit hold out loan, loanable amount is based on the amount in the time deposit account of the LGU in the bank. The LGU is allowed a maximum loanable amount of up to 90 per cent of the total amount of its time deposit account in the bank. One of the terms for this kind of loan includes deduction of amount due from the LGU's IRA deposited in that bank.

Another condition that the bank usually imposes on the loan is the signing of a MOA between the LGU and the bank, where the LGU guarantees that the loan will be honored despite a change in administration in the next election. Interest rate is not fixed.

Other collaterals accepted by the bank are public land and assignment of IRA. Interest rate is not fixed but fluctuating depending on the current interest rates prevailing during repayment. Penalty charges are imposed whenever the IRA of the province is delayed.

3) Foreign Lending Agencies

The external assistance to the Sector in the province comes from foreign assisted projects. Before the devolution of the sector, the province was a beneficiary of

USAID Water supply project. The province became the direct recipient of foreign grants. The most recent experience in foreign grants was the USAID – funded projects in environment where the province is a direct recipient from the donor.

6.4.3 LGU-Financed and Managed Waterworks/Water District.

(1) Past Financial Performance of WDs and RWSAs/BWSAs

Two (2) WDs are currently managed in the province, two (2) are LGU-managed, three (3) are managed by Water Cooperatives and seven (7) are water systems. Table 6.4.1 shows the financial indicators of WDs. The WDs adopted progressive charge method and have achieved 100% efficiency of water charge collection earning surplus income. The average monthly consumption per connection/household is 20 – 25 cu.m. Alabel WD has availed of a ₱3 million loan for start-up capital (to be paid in 3 years at interest rate of 18% p.a.) which is now fully paid. There are no outstanding loans but they are planning to avail of another ₱3.0 million for the expansion of the existing water system. A CDF grant amounting to ₱400,000 was received through DPWH.

The Municipal Engineer is the head of the Municipal Waterworks System while the Municipal Treasurers' office is in-charge of collection of water fees. Residential rate is ₱6.50 per cu.m., while commercial rate is double this amount. Minimum fee is ₱60 for a 10-cu.m. consumption. There were no problems encountered with collection since the management is very strict with unpaid account and delayed payments. They are charging a re-connection fee of ₱200.

Level II systems also exist, which are community-based and serving a minimum of 54 households to a maximum of 400 households. These Level II associations charge water fees ranging from ₱10.00 to ₱40.00 fee per household. Two associations (Alabel Spring level II and Lun Masla) charged higher water fee of ₱40.00 and ₱30.00 per household, respectively.

**Table 6.4.1 Financial Indicators of Provincial/Municipal Waterworks in the Province
(as of June 1998)**

Waterworks	Description						
	No. of Faucet	No. of Households Served	Average Monthly Rate	Average Consumption per HH	Average Monthly Expenditures	Average Revenue	Collection Efficiency
	Nos.	Nos.	Pesos/cu.m.	Cu.m./mo.	Pesos/mo.	Pesos/mo.	Percent (%)
A. Level III Systems							
Alabel							
1. LGU-Managed Level III Water System - Poblacion	249	n.a.	7.35	20	29,000.00	31,000.00	100%
2. San Miguel MPC Water System - Bagacay	72	n.a.	5.00	15	3,600.00	6,600.00	100%
3. Sto.Nino Water Cooperative - Poblacion	189	n.a.	6.00	15	11,100.00	16,000.00	100%
Glan							
1. Glan Water District	737	n.a.	11.10	25.6	104,000.00	161,000.00	100%
Maasim							
2. Maasim Water District	174	n.a.	5.50	20	9,000.00	21,000.00	100%
Malapatan							
3. LGU-Managed Level III	150	n.a.	5.00	7.5	11,836.00	6,500.00	100%
B. Level II Systems							
Alabel							
1. Spring Level II Assoc. - Spring	28	140	P40/HH	10	1,420.00	2,500.00	75%
Kiamba							
1. Kapate Water System Assoc. (KWSA)	19	120	P10.00/family	6	589.00	600.00	50%
Maasim							
1. Tinoto Water System Assoc. (TWSA)	13	400	P1.00/20L	2.5	5,500.00	6,000.00	90%
Maitum							
1. Barangay Upo Water System Assoc (BUWSA)	10	80	P10.00/Family	6	200.00	400.00	65%
Malapatan							
1. Upper Lasang Community Assoc. (ULCA)	8	116	P6.00/HH	4	260.00	436.00	90%
2. Lun Masla Water System Assoc	9	54	P30.00/HH	9	400.00	500.00	80%

Source: Various Municipalities and Water Districts.

6.5 Existing Practices by the LGU on Cost Recovery

6.5.1 Capital Cost

In the previous arrangements, the capital cost for Level I systems was free to the community, while operation and maintenance was the responsibility of the association. As for Level II systems, the capital cost was shouldered by the RWSA through loan or grants. Water charges collected by each association cover the cost of operation and maintenance and loan amortization. According to the Loan Department of LWUA, the new loan disbursement to RWSAs has been stopped for the last couple of years.

For Level III system, WDs or RWSAs bear the entire capital cost financed by LWUA through loans with concessional terms of 8.5%-12.5% interest rate and repayment period extending up

to thirty (30) years. Less capable WDs are granted soft loans that are interest free during the first five-(5) year's operation. In the occasion of the first assistance by LWUA, the loan for the full investment required could be provided for the WDs. For the expansion/rehabilitation works of the WDs, 90% of required investment may be granted by a loan and the remaining 10% shall be arranged by the equity of WDs. The cost of amortizing the loan and operation and maintenance of the system is recovered through monthly water bills. In case of LGU's operating Level III systems, the capital cost is managed by the LGU using part of DF and other financial sources (borrowings and aids).

Regarding the sanitation sector, the construction of the superstructure and the depository of household toilets is through self-help.

6.5.2 Operation and Maintenance Cost

The operation and maintenance cost for Level I and II water supply systems is envisioned to be the responsibility of the users. As such, the users shall form an organization (or association) to handle the collection of water charges.

When DPWH had been undertaking the construction of Level I water supply facilities, the DPWH through DEOs assisted to form many BWSAs. However, most of these BWSAs are no longer functioning, due to non-collection of water fees. As a consequence, the users had to go to the LGUs (usually barangay or municipal) to address the problem. In some cases, the users likewise requested the DEOs for assistance.

Although the DPWH had no budget for operation and maintenance, it extended assistance in the form of materials (such as gaskets or joint pipes) from their supplies, if these items are available. Because of this situation, the emphasis was placed on the need of monthly contributions from the users for the O&M. While, some of the active BWSAs for Level I water supply collected monthly fees ranging from ₱10.00 to as much as ₱40.00 per household per month. Of the four BWSAs organized, two BWSAs depended on the barangay council for O&M, while the other two BWSAs had association members who were trained to operate and maintain the facilities.

Cost recovery for Level III systems, particularly those covered by Water Districts is managed through different systems. The households covered by the Water District can be disconnected in case no payment by the users.

The Water Districts are charging the amounts of ₱5.00 and ₱11.10 per cu.m., respectively. The water rate structure is based on LWUA's guidelines for water rate setting. Water rates are socialized, based on O&M, operating expenses and capital expenditure requirements of the system for the period, and it should not exceed 5% of the low-income group's household income. Water rates are kept minimal since the Water District should be service-oriented and not profit-oriented.

6.6 Affordability of Users

This sub-section presents the affordability of users by sector service level. However, base information for the analysis is limited to that gathered from field survey at selected barangays and from the water districts in the province.

6.6.1 Capital Cost Contribution

Based on the results of the key informant survey, each of the 3 barangays has a committee on water and sanitation within the barangay council. The respondents indicated that all the barangay councils are willing to participate in sector projects by initiating the formation of a water and sanitation association. The barangay council is willing to pay for and/or facilitate the training of user beneficiary volunteers on O and M.

Among the three barangays surveyed, only Barangay Kawas received technical assistance from the provincial government, and rehabilitated the Magkove Water Supply System. All three barangays received financial grants from the province: Barangay Nagpan - for its spring development project; Barangay Atlae - for the purchase of toilet bowls; Barangay Kawas - for the construction of 12 deepwells. At the same time, Barangay Nagpan and Kawas were given financial assistance by their respective municipal governments for the construction of water systems and health/day care centers. Institutional assistance was also extended to the three barangays in the form of skills training and development planning.

Based on the results of the group interview survey, for the previous construction of WATSAN facilities, 16% of respondents (all male) contributed cash or in kind. Majority of them provided free labor (25%), cash and site (32%), and material (14%). Only one respondent donated the site but 52% of the respondents gave other services.

For future projects, all respondents indicated that they would participate and/or contribute in the following activities: formation of BWSA (92%) and in the formulation of water rates. In

the selection of sites, construction of facilities and in the operation and maintenance respondents indicated their willingness to get involved.

Majority of the respondents (54%) is presently paying for their water supply while the rest of the female respondents are not paying. Among those presently paying, amounts being paid range from P6,000 to P10,000.

Referring to the group interview results for Level I and II water supply conducted in this study, majority of respondents are willing to participate in the water supply projects in the future. Hence, for Levels I and II water supply, due to insufficient household income, there is a need for LGUs to provide some sort of subsidy.

6.6.2 Operation and Maintenance Cost

Based on the key informant survey, the common problem cited by the respondents range from defective pumps to lack of funds for the maintenance work. The problems show that the users/beneficiaries still have the thinking that O and M is a task that should be undertaken by the barangay council or the municipality. Respondents could not determine or identify which group/s in the community shoulder the cost of the operation and maintenance of the water supply facilities. About 38% of them agreed that the Barangay Council should be the organization responsible and four respondents said it should be the private owner. All the respondents expressed willingness to pay/contribute in the operation and maintenance of future facilities.

Majority of the respondents indicated that most residents do not pay for the use of the water facilities. For those who are paying water fees, they are charged from ₱ 11.00 to ₱ 20.00 a month.

Of those who are willing to pay, majority or 56% claimed that they can only pay from P 6.00 to P 10.00. per month for water service. About 27% or 13 respondents agreed to pay water fees below P 5.00 while 8 respondents are willing to pay fees ranging from P 11.00 to P 20.00 per month.

About 79% or 38 respondents indicated their willingness to contribute cash or in kind for the construction of WATSAN facilities in their respective barangays. About ten respondents were not willing to give any contribution to WATSAN project. As for the reasons for not willing to contribute, all could not provide answers.

Among those willing to contribute to WATSAN facility, majority or 79% indicated they could provide free labor; 35% or 17 respondents would contribute materials while 25% were willing to provide materials.

Majority of the respondents who pay water fees were uncertain as to the adequacy of water fees to maintain the system. Only 25% or 12 respondents said the water fee is adequate for the O and M of water supply facility. For those who claimed the water fees being collected are not adequate, the reasons could be that the water fee is low, O and M may be too high or not all users pay.

Table 6.6.1 presents the affordability of households by service level. At present, the current water bills in the province seem to be within an affordable range based on experience, although the actual income level varies from municipality to municipality and barangay to barangay (urban barangay population has higher income than those in rural barangays, because of the more diverse economic and commercial activities). Based on the median family income, it is noted that the water rates for Levels I and III are within the affordable range.

On the other hand, the construction cost of private toilet seems to be expensive as compared with the family income. The estimated cost of flush type toilet facility is about 5.70 times higher than the median monthly family income in the province and since this is the case, subsidy may be provided by the LGU concerned.

Table 6.6.1 Affordability in Water Supply and Sanitation Services

Income/ Level of Service	Amount (Pesos)	% to Monthly Income	Affordable Range (%) ^{4/}
Median of Monthly Income ^{1/}	3,738.40	-	-
Average Level III: Monthly Water Bill ^{2/}	121.00	3.237	5.0 or less
Average Level II: Monthly Water Bill	40.00	1.07	3.0 or less
Mo. Level I Expenditures	10.00	0.27	1.0 or less
Private Toilet Construction Cost - Flush Type Toilet ^{3/}	21,300.00	5.70	-

Notes:

^{1/} Average income (mean) is not available from 1994 Family Income and Expenditures Survey, NSO. Thus, the Region XI mean income of ₱59,584 and median income of ₱44,861 is used. Average salary based on barangay surveys is ₱4,000.00 -- ₱5,000.00.

^{2/} Data from PSPT; It is assumed that 21 cu.m. will be consumed per family.

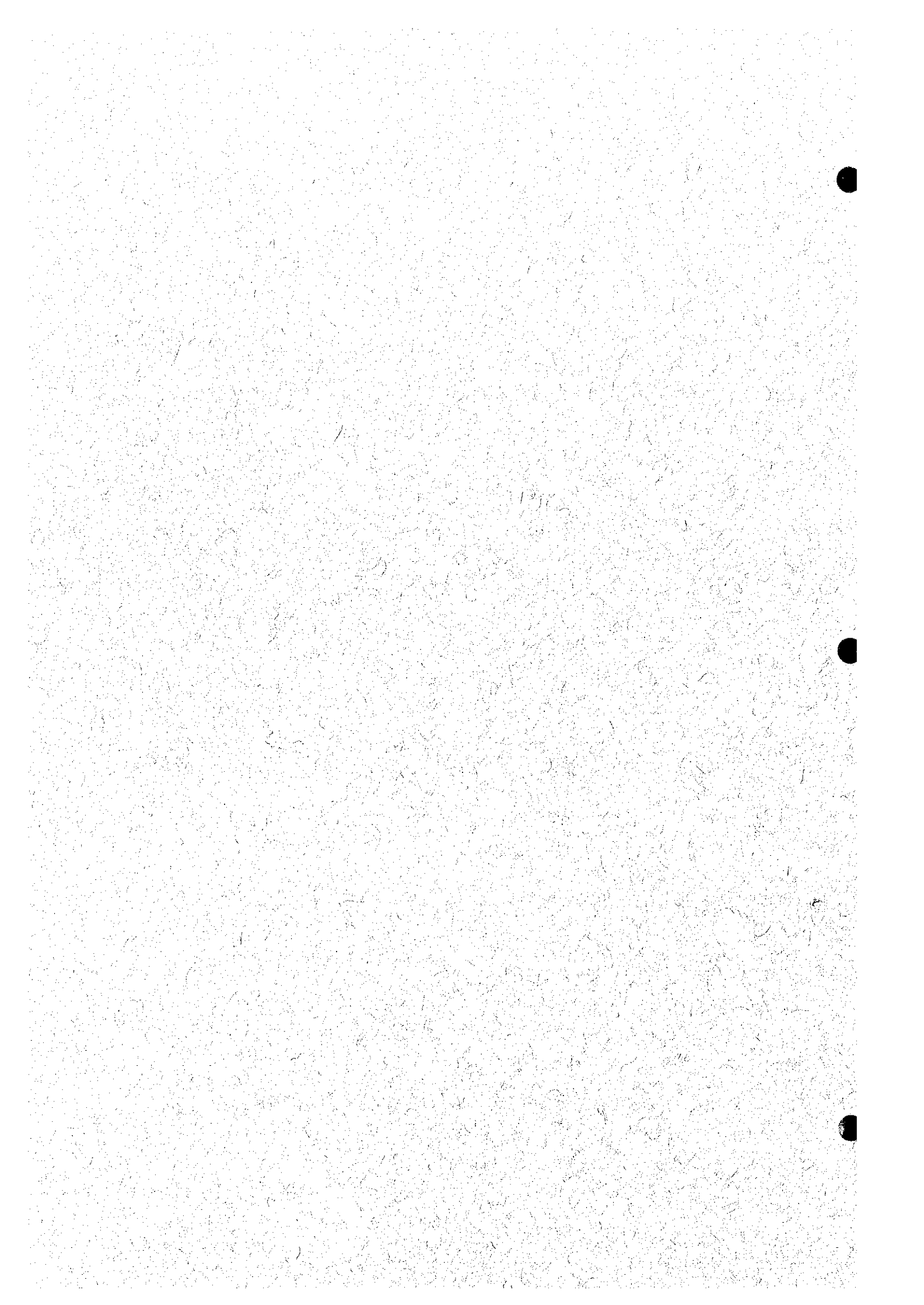
^{3/} Current prices estimated in this study

^{4/} Based on the experiences mainly from LWUA, DPWH and DILG.

Chapter

WATER SOURCE DEVELOPMENT

7



7. WATER SOURCE DEVELOPMENT

7.1 General

The study on water source development covers the entire province in order to come up with water source potential exploitable mainly as domestic water supply. Emphasis is placed on groundwater availability due to its prevalent use and comparatively conservative development throughout the future in the jurisdiction of the provincial government. It is also advantageous to utilize groundwater for domestic water supply because of better quality and economical use. Nevertheless, surface water potential of major rivers was studied in terms of quantity (return period flow rate) and quality to provide information for LGU's future use.

A "Groundwater Availability Map" was prepared, which identifies the areas with available potable water sources. The study has two major components: (1) interpretation of existing geological and groundwater conditions and (2) preparation of Groundwater Availability Map to show groundwater potential areas under three categorized areas. Furthermore, standard well specifications by municipality were also established to reflect in the medium-term sector development plan.

The major data used in the study were obtained from concerned agencies (NAMRIA, BMGS, NWRB, LWUA, DPWH and PPDO) and supplemented by the information gathered through questionnaires from relevant local offices in the field (including spring inventories with verifications). The field information directly collected by the Study Team was also used to increase the accuracy of the Map. Among the information, the Geologic Map published by BMGS, the Water Resource Investigation Report and the Well Inventory Database of NWRB are essential for the analysis of geological characteristics, projection of high yielding area and possible area with salt water intrusion, and classification of groundwater potential areas, respectively (details are referred to Table 7.1.2, Data Report).

The Groundwater Availability Map may be used for provincial level master plan and feasibility study at present. However, recommendations on the required investigations were presented for specific areas with scope of survey, as reference for LGUs, to conduct these prior to D/D and construction work. Aside from the requirements, updating the map is a requisite to gain more information on prevailing groundwater conditions using the questionnaires prepared for the study. An annual review and updating of the database will enable the LGUs to implement water source development on a project site basis.

The overview on current groundwater use with the conditions is summarized in Table 7.1.1 (well data collected from each municipality are presented in Table 7.1.1, Water Source Information, Data Report). There are 4,152 shallow wells, 500 deep wells and 136 developed springs in the province (functional sources). Majority of the wells is shallow wells. About 17% of these water sources are public facilities. Of the total existing wells, 94% remains functional at present. In addition to the above sources, 45 untapped springs are accounted.

Table 7.1.1 Existing Groundwater Sources in the Province

Category and Classification	Shallow Well	Deep Well	Spring	Total
1. Water source being availed				
a. Public sources	481	262	85	828
b. Privately owned sources	3,671	238	51	3,960
c. Number of water sources	4,152	500	136	4,788
d. % share of different sources	87	10	3	100
2. Water sources with problems and non-functional wells				
a. Water quality problems*	1,246	0	0	1,246
b. Non-functional	163	142	40	345
3. Spring source information				
a. Undeveloped	-	-	0	0
b. Untapped	-	-	45	45

Note. 1: Number of water sources being availed at present including those with water quality problems.

2: Number of existing water sources with problems: being used, but with water quality problem/abandoned wells.

3: Number of springs availed, but not adequately protected; and those as candidate sources to be developed.

*: Assumed number of sources (unsafe category) based on the study on existing water supply facilities in Chapter 4.

7.2 Geology

Considering the topographical and geological features, the province of Sarangani could be classified into two groundwater districts. These areas are located on the eastern peninsula and the Cotabato Cordillera along the seaside of Celebes Sea.

On the eastern part of the province, the beach sediments with widths of 100m to 200m are distributed along the coastal belt of Sarangani Bay. The alluvial plains are confirmed only in Alabel and Glan areas. The volcanic sediments of Cretaceous period are underlain by the sedimentary rock units of Paleogene (early Tertiary) period or younger. The Tertiary rock units are formed by the reef limestone, the terrestrial sediments and sporadic terrace gravel deposits. The faults are observed in the mountainside of Glan and the folds are distributed in

the northeast area of Alabel. But these faults and folds have limited magnitudes with NNW-SSE stretching.

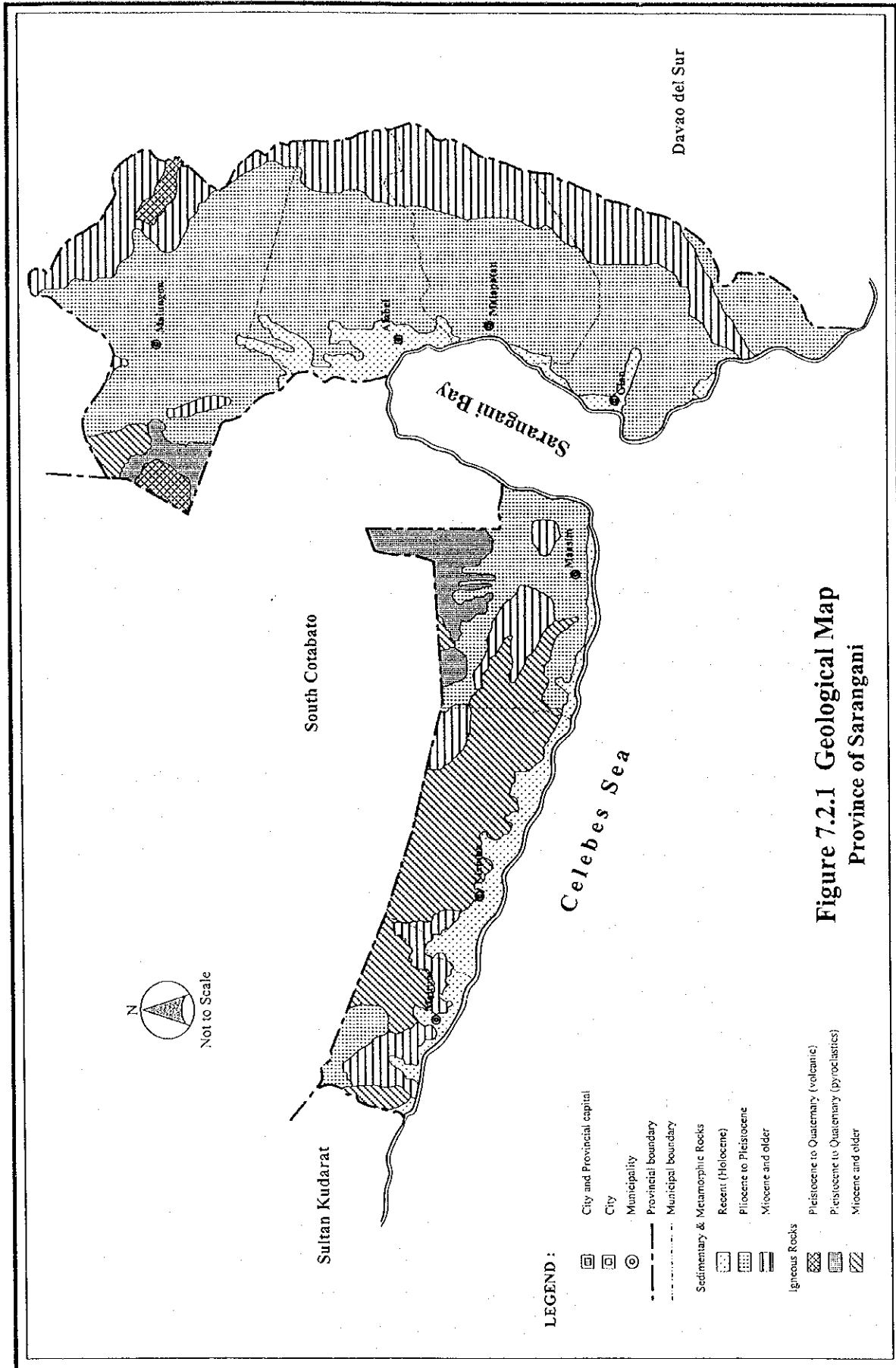
On the western part, the coastal belt has the same characteristics as on the eastern part of the province. The metamorphic rocks of Cretaceous period or older (Maitum side) and the sedimentary rock units of Paleogene period or younger (Maasim side) are distributed in the same way as South Cotabato. The thrust faults with an axis of WNW-ESE pass through Mt. Parker up to Cotabato City. The vertical slip of these faults sometimes reach 200m or more.

For the purpose of preparing the Groundwater Availability Map of the province, only rock units significant to groundwater storage and permeability are described briefly. The rock units in the province are classified into three (3) main groups based on the geologic ages. These are, from the oldest to the youngest, the Miocene and Older Systems, the Plio-Pleistocene Series and Recent Deposits. The grouping of rock units is related to their potential as groundwater sources. The younger rocks are considered the most important to groundwater because of their porosity and permeability relative to the older rocks. The distribution of these rock groups is shown in Figure 7.2.1, Geological Map. Their geological features are described below.

(1) Miocene and Older Systems

Rock units of Miocene and older have impermeability. They are classified as aquicludes. The oldest formation is the basement complex in the Cotabato Cordillera that consists of piedmontite schist, quartzo-feldspathic schist, quartz, chlorite, epidote schist and amphibolite schist. The exposure is limited and might be concealed under Miocene rock units. The Cretaceous-Paleogene rocks consist of undifferentiated metamorphosed submarine flows, largely spilites and basalt intercalated with chert, marble and sediments. A batholithic mass of diorites as Neogene intrusive underlies the western part of the province, disposed parallel following the main Cotabato Cordillera. Small satellite bodies were also noted. The rock intrudes the older formation of the area and closely follows the distribution of the older rock types. It is usually medium to coarse grained with crude foliation in some portion.

Lower Miocene sedimentary rock, which units are thick sequences of conglomerate, wackes, shales and limestone associated with basic to intermediate flows and pyroclastics, is exposed throughout the whole extent of the province. In the south-southwest portion, the lower Miocene sedimentary rocks occur in narrow, irregular and discontinuous



**Figure 7.2.1 Geological Map
Province of Sarangani**

patches overlying the older rocks. The rocks in this portion consist dominantly of conglomerate with minor wackes and limestone converted into a marbolized mass with crude schistosity. The formulation is intruded by diorite. A continuous belt also occurs in the northeast to the southeast portion of the province fringing the arcuate or elbow configuration of the eastern part.

Upper Miocene sedimentary rock formulation, which is extensive as the lower Miocene sedimentary rocks, consists of interbedded conglomerate, sandstone and shale overlain by pyroclastics. In the southeastern part, the pyroclastics are represented by tuffaceous marl. The series is associated with slightly coralline to crystalline groundmass. The clastic member is basaltic in composition.

(2) Plio-Pleistocene Series

Sedimentary rocks of this series have various range of permeability. Pliocene-Pleistocene sedimentary rock formulation overlaps the older sedimentary. Reef limestone fringes the rim of Sarangani Bay. The rocks are usually flat lying with minor inclinations. The clastic member consists of tuffaceous sandstone and shale with few lenses of conglomerate. The unconfined and confined aquifer is leaky.

(3) Recent Deposits (Holocene Series)

The recent deposits cover a wide alluvial plain, which fringes the Sarangani Bay area. The deposit consists of unconsolidated gravel, beach and swamp deposits and raised coral reefs. The unconfined and confined aquifer is leaky. The other formations are beach deposits only.

7.3 Groundwater Sources

7.3.1 Classification of Groundwater Availability

For planning purpose, the provincial area is divided into the following sub-areas in terms of groundwater availability.

(1) Shallow well area

Shallow well area is defined in this study as the area where solo shallow well is available. These areas have water bearing rock formations extending not more than 20m in depth from the ground surface. Shallow well areas are usually located in alluvial and coastal plains, where recent unconsolidated materials overlies impervious rocks at shallow depth. The extent of a completely shallow well area is limited, because most of the re-

cent formations are thick or deposited on the Late Plio-Pleistocene series that usually have multiple aquifers located at greater depths.

(2) Deep well area

In deep well areas, the lower aquifers are located more than 20m from the ground level. These areas could be found in portions underlain by the Plio-Pleistocene series and Recent formations. Most of these areas have more than one aquifer occurring at various depths. Areas where both shallow and deep wells could be developed are categorized as deep well areas.

(3) Difficult area

These are areas not suitable for well development. The areas under this category largely consist of rock formations older than Miocene epoch. Groundwater availability in the aforesaid rocks is very low and is usually released in open rock fractures. Springs are the common sources of water supply in these areas.

In addition to the above classification, potential areas to have high yielding deep aquifers are also presented based on NWRB's geo-resistivity survey.

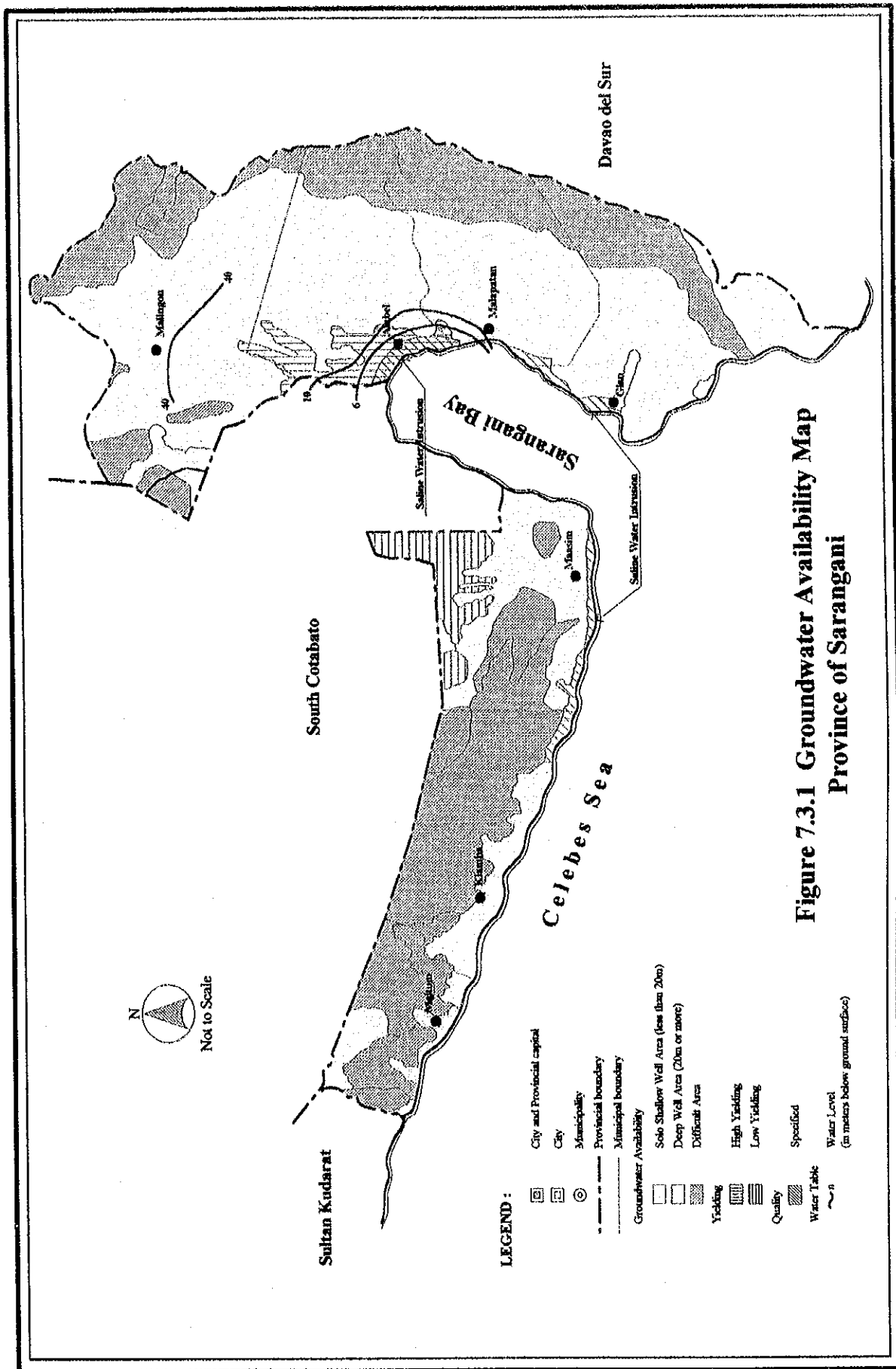
7.3.2 Groundwater Availability in the Province

The Groundwater Availability Map is presented in Figure 7.3.1. The major databases used in the preparation of the map were obtained from BMGS and NWRB. The methodology and study procedures with respective outputs are discussed in 7.3.2, Supporting Report.

Technical information on the wells by municipality is also shown in the Data Report. The groundwater development potential areas in the province for the future are summarized below.

(1) Shallow well area

The province has solo shallow well areas but very limited located along the seashore side of the western part of the province. These areas are located along the Celebes Sea in the municipalities of Maitum and Kiamba. The hydrogeological basements of these areas are well-compacted sedimentary and volcanic rocks of the Cretaceous period as impermeable layers.



The shallow wells in the province are driven to an average depth of 11.5m (9.0m to 18.0m). These wells have an average static water level of 5.4 mbgs (4.0m to 8.0m) and an average specific capacity of 0.2 lpsm (0.1 lpsm to 0.4 lpsm).

(2) Deep well Area

The deep well area covers approximately 50% of the province, widely distributed in the southern and western coast of the eastern peninsula. In the southern seashore of the western part of the province, this deep well area is quite limited due to the erosive coastline and the distribution of impermeability rock units near the beach. The deep well area is composed of alluvial plain and low hills made of sedimentary rocks. The alluvial plain is composed of recent deposits of porous sediments, while the sedimentary rock units of Plio-Pleistocene epoch consist of mainly reef limestone and pyroclastics in the western part of the province.

Considering the geological formations, the alluvial plain is categorized as a high potential area for deep well development, while the pyroclastics of Plio-Pleistocene epoch are classified as a low-yielding area for deep well development. In the alluvial plain, the average depth of the existing deep wells is 42.3m with average water level of 9.2 mbgs, and the average specific capacity is 1.8 lpsm.

In the volcanic sediment area made of Plio-Pleistocene series, groundwater development is not conducted yet due to the existence of sufficient spring sources and limited population. When deep well development becomes necessary for future demands in this area, the average depth of the planned deep wells is, probably, 60m with an average water level of 20 mbgs. However, the specific capacity of the said deep well may be good for Level-I service only.

(3) Difficult area

The other 50% of the provincial area are classified as a difficult area to exploit groundwater, mostly located in the cordillera mountainous areas on the western and the northern parts of the province.

The geology is made up of: 1) metamorphic rocks of Cretaceous period to Paleocene epoch, 2) well-compacted sediments of Oligocene to Miocene epoch including sandstone, siltstone and conglomerate, and 3) volcanic and igneous rocks of Oligocene to Miocene epoch. These rocks and formations are in dense, massive and consolidated conditions and have impervious characteristics. Groundwater occurs only in fissures or fault frac-

ture zones.

7.3.3 Groundwater Quality

There are water quality problems in both shallow and deep wells in most seashore areas of the province. Major water quality problems are saline water intrusion in the coastal areas and high Ca and Mn contents in the limestone areas of the province. The results of the water resources investigation for the province conducted by NWRB and the general information from DPWH-DEO and PPDO revealed these problem areas and are shown in the Groundwater Availability Map in Figure 7.3.1. The following is a summary of the findings.

(1) Saline Water Intrusion Area

Among the water quality problems of the province, saline water intrusion is the most serious with the highest percentage of affected existing wells (most of the deep wells along the coastal area). This problem is common to the coastal areas of Alabel, Malapatan, Glan and Maasim. Presently, the magnitude of saline water intrusion is not very serious yet, although the hydrogeological cycle for the estimation of the permissive sustained has to be studied.

(2) High Ca & Mg Contents Area

It is a common feature that high Ca and Mg contents in groundwater is due to the wide distribution of aquifers made of reef limestone in the eastern part of the province. This problem is extended to most of the areas in the municipalities of Alabel, Malapatan and Glan.

Glan WD, in the southern alluvial plain of the eastern peninsula, has intake facilities to feed water from five (5) dug wells. The well field is located along the highway, which is 200m away from the beach. The latest results of water quality examination at these dug wells are; Ca 127.0 mg/l, Mg 57.5 mg/l, Cl 50.4 mg/l, Fe 0.2 mg/l, Mn 0.3 mg/l, Total Hardness 662 mg/l, etc.

7.4 Spring Sources

Spring is a natural outlet of groundwater at the ground surface. It occurs when water table intersects the ground surface, usually along the contacts of pervious and impervious rock formation and through rock features. Because of the intense fracturing, particularly older formation, and the presence of large solution openings in limestone, secondary permeability is in-

duced to the rocks that favors spring development.

For the study, springs are categorized into developed, undeveloped and untapped springs. A developed spring is utilized, with sanitary protection provided, otherwise it is classified as undeveloped spring, which is considered as unsafe water source. An untapped spring, as the name implies, is unutilized and flowing in its natural state.

Based on the inventory of water sources prepared throughout the study, the province has 136 developed springs currently serving the province, which come out from high mountain areas in the southeastern and the western parts of the province. Of these springs, 134 have discharges of less than 2.8 lps, while only 2 yield with 2.8 lps or more. Most of these springs are not dried up during a drought year with yields still varying from 0.03 lps to 3.8 lps. The technical information of springs in each municipality is presented in Table 7.4.1 Existing Spring Sources, Supporting Report.

7.5 Surface Water Sources

The major surface water sources in the province are Glan, Lun Padidu, Buayan, Siguel and Kalaong Rivers. There is only one stream gauging station in the province, at the Buayan River.

Surface water use in the province totaled to 4.8 m³/sec according to the NWRB's water rights registration database, as of March 1997. Of this usage, 95% of the water rights were registered for irrigation. The small-scale flumes are operated by NGOs. There are small-scale aqua-culture/livestock/oil industry and mining which may be possible source of water pollution in the province.

Data on river flow together with maintenance flow and water use of the major rivers/streams were obtained from available runoff records at the gauging stations (refer to Table 7.5.1, Supporting Report). The inflow to and the outflow from the respective municipalities are estimated as the exploitable potential of the major rivers in the province as shown in Table 7.5.2, Supporting Report.

Water quality analyses at selected streams were conducted during this study. The examined water quality analysis at each stream meets the Class A limitation of "DENR Fresh Water Quality Criteria".

7.6 Future Development Potential of Water Sources

(1) Groundwater

Based on the study of existing water sources, groundwater is considered as a safe and more economical source for the future water supply requirements of the province.

Shallow wells are the possible source for Level I service. Considering the existing wells in the province, the potential aquifers for shallow wells occur between 9 to 18 mbgs. One disadvantage of shallow wells is the lowering of water level during dry season that reduces the discharge of the wells. Another disadvantage is the usual high susceptibility of shallow aquifers to direct infiltration of surface pollutants.

In general, deep wells have better water quality and invariable yields when developed with appropriate technology. This depends if the wells tap to comparatively deeper aquifer. It reduces the hazards of groundwater pollution. In addition, lowering of groundwater level does not affect the discharge, since usual confinement of deep aquifer rises the water level above the aquifers. In Recent deposits and Plio-Pleistocene series, good aquifers apparently occur from 36m to 54m in depth.

Additional wells can still be developed to meet the future water supply demand of the province. For future planning purpose, the Groundwater Availability Map includes basic information for municipal groundwater development with the following information: well type, well yield, water quality and static water level. Aquifer formation as shown in Table 7.6.2, Supporting Report. The groundwater development potential in the province is shown in Table 7.6.1.

The well design with gravel placement is required for additional well development. However, the natural gravel packed well for Level I water supply is also adaptable within limited areas in the province. The percentages of the natural gravel packed wells in the expected municipality area are assumed in the Supporting Report. The construction ratio of natural gravel packed well to the total requirements in the province is probably summed at more than 5%.

(2) Spring

A total of 45 untapped spring sources for future development are listed in Table 7.6.4 Untapped Spring Source Identification, Supporting Report. The list includes detailed

Table 7.6.1 Groundwater Development Potential in the Province

Area	Groundwater Development Potential	Water Quality	Area Feature
Eastern Peninsula	<p>The majority of water sources in this area can be classified into two types, which are; (a) both deep and shallow wells in coastal area, and (b) spring sources in the hilly and mountainous areas. The deep well development is also possible in areas of above (b), where the reef limestone formations are overlaid. Therefore, two types of the target aquifers for deep well development are distributed in areas consist of alluvial plain formed by recent deposits and mountainous made of limestone formations.</p> <p>In the hilly area, which elevation is below 500 masl, the potential water source is developed by the deep well. The depths of these deep wells are ranging from 30 m to 120 m. The water depth in the deep wells is probably 20 m or so.</p> <p>The spring is solo potential source in other higher mountainous area.</p>	<p>The groundwater quality both deep wells and springs in the limestone area may have high Ca and Mg contents.</p>	<p>This area covers four (4) municipalities of Malungon, Alabel, Malapatan and Glan.</p> <p>The alluvial plain is distributed in Alabel. Other areas are hilly.</p>
Western Coast	<p>The majority of water sources can be classified into two types, which are; (a) the deep and shallow wells in coastal area, and (b) spring sources in the hilly and mountainous area. The limestone formation is widely distributed along the Sarangani Bay in Maasim that is only one wide field for deep well development. The Maasim WD has deep well facilities with depths of 50 m to 90 m. Those production capacities are estimated less than 1,000 m³/day.</p> <p>Numerous of the shallow wells presents in the other seashore area. Solo shallow well areas are seen in Maitum and Kiamba. The capacity of shallow wells is generally limited for L-I service only. The water level is generally shallow.</p> <p>The spring is potential sources in other higher mountainous area.</p>	<p>In the seashore side both shallow and deep well area, the chloride contents are reported at some deep wells.</p> <p>The spring water quality in the volcanic rocks or sediments area is reported as high Fe and Mn contents.</p>	<p>The Western Coast area covers three municipalities of Maasim, Kiamba and Maitum.</p> <p>This area is part of the Cotabato Cordillera.</p>

data on barangay name, owner, discharge rate in dry season, transmission line length and elevation difference between spring source and served area.

Such springs are mainly located in the mountainous areas of all municipalities. Discharge rates of the springs are generally small ranging from 0.5 lps to 1.5 lps. Spring development potential in the province is shown in Table 7.6.1, Supporting Report.

(3) Surface Water

The potential surface water volume exploitable at major rivers for the use of domestic water supply was estimated by municipality. It was arranged in this calculation to ensure maintenance flow of the rivers under the drought flow in the 10-year return period with due consideration of the present water rights.

The calculation results are shown in Table 7.5.2, Supporting Report. In particular, the municipalities situated in the Buayan, Siguel and Kalaong river basins are privileged to use larger amounts of river water. Surface water development at the Siguel or Kapalong rivers was previously sought under the BOT scheme to construct a hydropower station. However, based on the results of the feasibility study on the hydropower station of the said two rivers conducted by the NPC, the plan is not feasible, hence it was rejected.

7.7 Water Source Development for Medium-Term Development Plan

For preparation of the medium-term development plan in terms of water source development, standard specifications of wells by municipality were prepared. The parameters such as proportion of well type, well depth, static water level and specific capacity are shown in Table 7.7.1. These were established using the well information from NWRB and the province (detailed data base is included in Table 7.1.1, Data Report), and hydrogeological assessment presented in Table 7.6.2, Supporting Report.

The water source availability (ratio between wells to springs) by municipality is reflected in Table 7.7.1 that was assumed based on water sources study considering the limited information on geology, topography, water sources inventory, etc. These ratios indicate the general profile of the different types of groundwater source available in the municipalities. Therefore, figures of ratio have no projected meaning on future development values of each groundwater source. Considering the present water sources utilization, the percentages of spring development compared with well development for future demand of the entire province are studied in Chapter 8, of this report.

Table 7.7.1 Standard Specification of Wells by Municipality

Municipalities with Classification	Type	Proportion (%)	Standard Specification			Ratio (%) Well:Spring
			Depth Range (m)	SWL (m)	Sp. Cap. (lpsm)	
Alabel	Rural	80	<D<	20	0.5	90:10
	Urban	100	<D<	10	2.5	
Glan	Rural	70	<D<	30	0.5	60:40
	Urban	100	<D<	5	1.0	
Kiamba	Rural	5	<D<	5	0.2	50:50
	Urban	100	<D<	5	0.5	
Maasin	Rural	70	<D<	20	0.3	60:40
	Urban	100	<D<	10	1.0	
Matitun	Rural	20	<D<	20	0.2	40:60
	Urban	80	<D<	5	0.3	
Malapatan	Rural	80	<D<	30	0.5	70:30
	Urban	100	<D<	5	1.0	
Malungon	Rural	80	<D<	40	0.2	70:30
	Urban	100	<D<	40	0.5	

Shallow wells are currently used in some municipalities. The municipal areas are categorized into deep well and shallow well areas considering the on-going practices. The proportions (%) of shallow and deep wells are determined with reference to groundwater development potential in the Groundwater Availability Map. Furthermore, the well locations are assumed in terms of rural and urban areas by municipality using the classification of rural and urban barangays.

For municipalities without any well data, well parameters are estimated using the data of adjoining towns, provided they have similar hydrogeologic features.

For the furtherance in collecting accurate information to design the concrete specifications of the planned wells, the following recommendations are made (details are referred to Chapter 7.7.1, Supporting Report). Prior to the detailed design or pre-construction stages, additional

detailed groundwater investigations involving electric resistivity survey and the construction of test wells shall be conducted. The municipalities that fall on this group are Alabel and Maasim. Table 7.7.2 summarizes the requirements.

Table 7.7.2 Detailed Groundwater Investigation Required

Municipality	Area	Investigation Activities and Specification
Alabel	Urban Area	Test Wells; One deep well depth of 150 m, diameter of 250 mm and well screen of 40 m target aquifers: confined un-consolidated deposits Installation of Test; Pumping Test & Water Quality Examination Time Draw-down with maximum discharge of 2,500 m ³ /day Recovery Test Water Quality Examination to include of Cl
Maasim	Urban Area	Test Deep Wells; several existing deep wells owned by the WD Installation of Test; Pumping Test & Water Quality Examination Time Draw-down with maximum discharge of 2,000 m ³ /day Recovery Test Water Quality Examination to include of Ca, Mg, Fe, Mn and Cl Installation of Study on Groundwater Balancing River Flow; run-off measurement, Maintenance flow, etc. Meteorological Analysis; precipitation, etc.

Groundwater development for water supply in urban areas (Level II and III systems) may require the construction of deep wells with larger casing diameter of 6 inches or more to ensure larger production rates. In these cases, short spacing intervals between the adjacent wells often cause the well interference due to the large lowering of pumping water level when the adjacent wells are operated simultaneously in a longer period. As a remedy to the problem on pump operation with excess electric consumption and deterioration of deep well life, appropriate spacing interval and number of wells to be constructed per km² shall be considered. Table 7.7.1, Supporting Report presents reference information on spacing arrangements for planned wells.

Spring sources, proposed by barangay level, for future developments are shown in Table 7.6.4, Supporting Report. Further investigation shall be conducted for these springs, prior to the implementation, on the following items: (1) location and type of spring sources, (2) fluctuation of discharge rates throughout the year, (3) distance from spring sources and proposed served areas, and (4) elevation differences between the two points.

Chapter

8

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

8. FUTURE REQUIREMENTS IN WATER SUPPLY AND SANITATION IMPROVEMENT

8.1 General

Phased investments for provincial sector development are planned in almost the same manner as adopted in the 1998 Philippine National Development Plan (PNDP) and the National Sector Master Plan (NSMP), Medium-Term Investment covering the years 1999 to 2003 and Long-Term Development covering the period 2004 to 2010.

Targets of provincial service coverage for the two phases are established as percentages of beneficiaries or utilities to be served by sub-sector. Service coverage in the base year (1997) and national sector targets indicated in the National Sector Master Plan (NSMP) and the updated Medium-Term Philippine Development Plan, 1996 - 1998 (MTPDP) are the bases of the study. Sector targets that are not prescribed in the national plan; school and public toilets as well as sewerage are assumed based on the current conditions. In addition, preliminary discussions on solid waste management are included as a vital component of sanitation sector.

Projection of frame values by municipality is undertaken for respective sub-sectors; future population by urban and rural area, the number of student enrollment to public schools and the number of public utilities. Reference base figures for the study of framework are the 1995 Census of Population and Housing, the statistical data of the province and the information from relevant agencies. Provincial population by target year and the base year (1997) is estimated with referring to NSO population census results (1980, 1990 and 1995), 1995 Census-based National and Regional Population projection prepared by NSO and Provincial Physical Framework Plan/Comprehensive Provincial Land Use Plan. While, the population distribution to urban and rural areas prepared by NSO in 1995 is modified to meet actual conditions in the classification of the areas.

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

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

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

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

8.2 Targets of Provincial Sector Plan

Provincial sector targets for the years 2003 and 2010 are determined as the provincial average of the desirable minimum level for each sub-sector. Table 8.2.1 summarizes the target percentages to be served by sub-sector. Details by sub-sector are discussed in this sub-section.

(1) Water supply

The base year (1997) service coverage was calculated as a total of 1997 figures and expected by planned/on-going projects scheduled to be completed by 1998. Table 8.2.2 shows service coverage for the planning purpose (details are referred to Supporting Report).

Table 8.2.1 Provincial Sector Targets

Sub-sectors	Existing Service Coverage	Phase I (1999-2003)		Phase II (2004-2010)	
		Population Coverage (%)	Population Coverage (%)	Additional Population to be Served	Population Coverage (%)
Water Supply	Population Coverage (%)	Population Coverage (%)	Additional Population to be Served	Population Coverage (%)	Additional Population to be Served
<i>Urban Area</i>	70	72	16,194	95	135,077
<i>Rural Area</i>	52	55	48,905	93	140,942
Sanitation	Household Coverage (%)	Household Coverage (%)	Additional Households to be Served	Household Coverage (%)	Additional Households to be Served
<i>Household Toilet</i>					
<i>Urban Area</i>	61	80	7,422	93	19,011
	Flush	0*	20	3,507	16,081
	Pour Flush	100	70	1,888	2,930
	VIP/Dry	0*	10	2,027	0
<i>Rural Area</i>	44	60	16,640	80	32,018
	Flush	0*	0	0	679
	Pour Flush	100	80	9,073	31,339
	VIP	0*	20	7,567	0
<i>School Toilet</i>					
	Public School Student Coverage (%)	Public School Student Coverage (%)	Additional Public School Students to be Served	Public School Student Coverage (%)	Additional Public School Students to be Served
	46	60	26,191	90	52,301
<i>Public Toilet</i>					
	Public Utilities Coverage (%)	Public Utilities Coverage (%)	Additional Public Utilities with Sanitary Toilets	Public Utilities Coverage (%)	Additional Public Utilities with Sanitary Toilets
	100	100	43	100	53
<i>Sewerage</i>					
	Urban Population Coverage (%)	Not Applicable		Urban Coverage (%)	Urban Population to be Served
	0			50	84,458
<i>Solid Waste</i>					
	Urban Household Coverage (%)	Urban Household Coverage (%)	Additional Urban Households to be Served	Not Applicable	
	38	60	4,931		

Note: * - less than 1%.

Table 8.2.2 Estimation of Base Year Service Coverage of Water Supply

Name of Municipality	Area	Population (1997)	Population Served by 1997 facilities				Percentage Coverage
			Level III	Level II	Level I	Total	
Atabel (Capital)	Urban	13,341	2,638		8,067	10,705	80
	Rural	35,887	350	840	24,499	25,689	72
	Total	49,228	2,988	840	32,566	36,394	74
Glan	Urban	17,851	4,100	108	8,794	13,002	73
	Rural	59,093	336	732	34,463	35,531	60
	Total	76,944	4,436	840	43,257	48,533	63
Kiamba	Urban	12,098		612	8,341	8,953	74
	Rural	29,191		3,438	16,510	19,948	68
	Total	41,289		4,050	24,851	28,901	70
Maasim	Urban	8,973	870		5,544	6,414	71
	Rural	23,656		1,938	14,821	16,759	71
	Total	32,629	870	1,938	20,365	23,173	71
Maitum	Urban	10,398			8,857	8,857	85
	Rural	25,705		2,640	15,775	18,415	72
	Total	36,103		2,640	24,632	27,272	76
Malapatan	Urban	25,730	1,590	90	17,309	18,989	74
	Rural	24,038		1,950	12,764	14,714	61
	Total	49,768	1,590	2,040	30,073	33,703	68
Malungon	Urban	26,359		390	12,955	13,345	51
	Rural	73,867		2,142	6,997	9,139	12
	Total	100,226		2,532	19,952	22,484	22
Provincial Total	Urban	114,750	9,198	1,200	69,867	80,265	70
	Rural	271,437	686	13,680	125,829	140,195	52
	Total	386,187	9,884	14,880	195,696	220,460	57

The base year service coverage in urban area (70%) is slightly higher than the updated MTPDP sector target (68.8%) for the year 1998, while rural area (52%) is far behind the sector target of 79%. As identified in Chapter 4, the lower service coverage in rural area is caused by the presence of a large number of unsafe sources/facilities or no provision of water supply facilities.

For Phase I development, targets of service coverage for water supply by urban and rural area are established to maintain the current service coverage. Seventy two percent (72%) and 55% are adopted for urban and rural area, respectively. Phase II targets are planned

to increase urban and rural water supply coverage to 95% and 93%, respectively, as envisaged in the NSMP.

(2) Sanitation

1) Household toilets

As with water supply, the base year service coverage is calculated as shown in Table 8.2.3 reflecting any planned or on-going projects scheduled to be completed by 1998 (details are referred to Supporting Report).

The province has base year service coverage of 49%, which is well below the current national average coverage of 60%. Urban area registers a level of 61% that is almost the same level as the national average coverage. Rural area however, has only 44% owing to the presence of numerous unsanitary facilities. By type of sanitary toilet facility, the existing percentage composition to total households is as follows:

Type	Urban (%)	Rural (%)
Flush	0	0
Pour-flush	100	100
VIP latrine	0	0

(It should be noted that the 0% represents a less than 1% coverage, or is negligible.)

To attain sufficiency and equitable access to basic services, provincial target of Phase I for urban household toilets is planned at 80%, while, for rural household toilets, 60% is projected. This is almost equal to the existing urban service coverage of 61% that is pursued to lessen the gap of the coverage between the urban and rural areas and to achieve a balanced distribution of this basic facility as embodied in the PNDP. For Phase II, 93% as set by the NSMP is adopted for urban household toilets, while, 80% is arranged for rural household toilets.

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

2) School toilets

The base year service coverage of public school students is shown in Table 8.2.4 counting expected coverage of any planned or on-going projects scheduled to be completed by 1998 (details are referred to Supporting Report).

Table 8.2.3 Base Year Service Coverage of Household Toilets

Name of Municipality	Area	1997		Households and Population Using Sanitary Toilets												
		Population n	HHs	Number of Households			Population			Service Coverage (%)						
				Flush	Pour	VIP/Dry	Total	Flush	n	Flush	Pour	VIP/Dry	Total			
Alabel (Capital)	Urban	13,341	2,647		2,547			2,547	12,808				96			96
	Rural	35,887	7,309		6,234			6,234	30,504				85			85
	Total	49,228	9,956		8,781			8,781	43,312				88			88
Glan	Urban	17,851	3,257		1,809			1,832	9,997		1		56			56
	Rural	59,093	11,277		3,681			3,688	19,501				33			33
	Total	76,944	14,534		5,490			5,520	29,498		1		38			38
Kiamba	Urban	12,098	2,515		1,335			1,353	6,533				53			53
	Rural	29,191	5,827		3,720			3,724	18,683				64			64
	Total	41,289	8,342		5,055			5,077	25,216		1		61			61
Maasim	Urban	8,973	1,756		1,341			1,351	6,910				76			76
	Rural	23,656	4,515		1,889	3		1,892	9,936				42			42
	Total	32,629	6,271		3,230	3		3,243	16,846				52			52
Maitum	Urban	10,398	1,944		1,132			1,132	6,031				58			58
	Rural	25,705	4,982		2,507	1		2,508	12,853				50			50
	Total	36,103	6,926		3,639	1		3,640	18,884				53			53
Malapatan	Urban	25,730	4,836		2,788			2,788	14,924				58			58
	Rural	24,038	4,695		1,323	2		1,325	6,731				28			28
	Total	49,768	9,531		4,111	2		4,113	21,655				43			43
Malungon	Urban	26,359	4,890		2,421	8		2,429	13,180				50			50
	Rural	73,867	13,964		3,733	14		3,747	19,945				27			27
	Total	100,226	18,854		6,154	22		6,176	33,125				33			33
Provincial Total	Urban	114,750	21,845	51	13,373	8		13,432	70,383				61			61
	Rural	271,437	52,569	11	23,087	20		23,118	118,153				44			44
	Total	386,187	74,414	62	36,460	28		36,550	188,536				49			49

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

Name of Municipality	Public School Toilets			Public Toilets		
	Total Number of Public School Students (1997)	Std. No. of Public School Student that can be Served by Sanitary Toilets in Base Year (1997)	Service Coverage (%)	Number of Public Utilities with Toilets in 1997	Number of Public Utility with Sanitary Toilets in Base Year (1997)	Service Coverage (%)
Alabel (Capital)	10,410	2,920	28	4	4	100
Glan	16,671	7,040	42	14	14	100
Kiamba	8,112	6,000	74	6	6	100
Maasim	7,190	2,040	28	4	4	100
Maitum	6,007	6,007	100	3	3	100
Malapatan	9,202	3,320	36	2	2	100
Malungon	16,914	6,760	40	18	18	100
Provincial Total	74,506	34,087	46	51	51	100

Base year service coverage is 46% applying the standard number of public school students to be served by one (1) unit of toilet facility. The low level is due to a large number of unsanitary or absence of facilities.

In the absence of national targets for school toilets, the existing level of service coverage is the base in setting up the targets. It is expected that all new construction of school buildings will entail sanitary toilets enabling the coverage to increase on a high level. For Phase I and II, 60% and 90% are set, respectively.

3) Public toilets

The base year service coverage considering expected additional coverage by 1998 is shown in Table 8.2.4 (details are referred to Supporting Report).

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

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

(3) Sewerage

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

(4) Solid waste

The municipal level data in 1997 on the number of households served by the municipal refuse collection revealed that the current practice is concentrated to urban areas. The base year service coverage for urban area by municipality is reflected in Table 8.2.5.

Table 8.2.5 Base Year Service Coverage of Municipal Solid Waste System in 1997

Name of Municipality	Total No. of Households	No. of Urban Households	No. of Households Served	Coverage of Total No. of Households (%)	Coverage of Urban Households (%)
Alabel (Capital)	9,956	2,647	1,713	17	65
Glan	14,534	3,257	1,021	7	31
Kiamba	8,342	2,515	1,200	14	48
Maasim	6,271	1,756	738	12	42
Maitum	6,926	1,944	900	13	46
Malapatan	9,531	4,836	2,731	29	56
Malungon	18,854	4,890			
Provincial Total	74,414	21,845	8,303	11	38

About 11% of the total households in the province relied on municipal refuse collection using trucks or a 38% urban household coverage. These municipalities have a total of 7 units of collection truck.

No national targets have yet been set. However, considering the present level of coverage, a 60% urban household coverage is applied for the medium-term period (1999-2003).

8.3 Projection of Frame Values

8.3.1 Population Projection

Future population for all municipalities by urban and rural area was projected for the target years of 2003 and 2010 together with the present population in 1997 as a planning base year.

Regional population in the future is published by the NSO, while projection at provincial and municipal levels was not available during the study. The future population of LGUs was

therefore projected (details are included in the Supporting Report). Available information for the study at present is as follows:

- NSO population census results 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 projected the regional population 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 are classified as medium-sized regions. 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 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 %

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

Planning period 1993-2002

The provincial population for the year 2002 was projected with 1990 as base year. The provincial growth rate of 2.58 % experienced between 1980 and 1990 was adopted for the projection. While the recorded/ projected growth rates of Region XI are 2.91 % between 1980 and 1990 and 2.58 % between 1990 and 2000 (which is the same growth rate employed for the projection of the provincial population for the year 2002).

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

In comparison between the census and the projected population in 1995, the provincial population of the census exceeded about 15 % of the projected figure. Regarding the

municipal population in 1995, only the projection for Alabel was lower than the census result, while the census population results of other municipalities were beyond the projected population (between 10% and 30%). Among the municipalities, Maitum, Malapatan and Malungon have remarkable differences with about 30% between census and projected population. In this connection, it is necessary to reflect the 1995 census results in the projection as a base year population.

(3) Population Projection of the Province

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

Provincial Population

- 1) The regional population projected by the NSO with regional average growth rates is referred to, since the Land Use plan employed the regional average growth rate for projection of the provincial population. In this regard, the growth rate (2.58 %) used for the period 1990 to 2002 in the Land Use Plan (the same growth rate used in the projection of regional population from 1990 to 2000) is applied for the medium-term (1995-2003) projection with 1995 as base year. For the long-term projection from 2004 to 2010, the growth rate of 2.05 % that was adopted for regional population projection between 2005 and 2010 is employed. The projected population for the years 1997, 2003 and 2010 are as follows:

<u>Year</u>	<u>Population</u>	<u>Growth rate</u>
1995	367,006	Census result
1997	386,187	2.58 %
2003	449,961	2.58 %
2010	518,640	2.05 %

- 2) The range of population ratios of the provincial population to the regional population (from 1980 to 1995 and projected year 2002 in the Land Use Plan) considered the correlation with other component provinces in the region and projected regional population. The following are occupancy ratios of the province to the region both in the past and the projected.

<u>Year</u>	<u>1980</u>	<u>1990</u>	<u>1995</u>	<u>2002</u>	<u>2003</u>	<u>2010</u>
Province	219,372	283,030	367,006	384,224	449,961	518,641
Region	3,346,803	4,458,829	5,052,730	6,032,322	6,173,575	7,146,889
P/R (%)	6.55	6.35	7.26	6.37	7.29	7.26

The population ratios of the province from 1980 to 1990 ranged between 6-7 %, while the 1995 census results showed a higher figure with 7.26 %. The ratio for the year 2002 as projected in the Land Use Plan (6.37 %) was rather conservative with reference to the past experience (1980-1990). This condition may be taken into account for the long-term projection. However, for the medium-term target, 2003, the recent development in 1995 would be signified. In this regard, the projected ratio for the year 2003 (growth rate of 2.58 % is used from base year 1995) is almost the same as that in 1995. The ratio for the year 2010 is within the range of existing plan (7.26 %). Therefore, the provincial population by planning target year mentioned above is recommended to be used for the PW4SP.

Municipal population

- 1) The total population of the province by target year is fixed.
- 2) The growth rates of respective municipalities for the years 1997 and 2003 are determined referring to the development experienced between 1990 and 1995. The following rules are established:
 - The growth rates of the municipalities with a considerable increase of growth rates from 1990 to 1995 are modified, in principle, using those of 1980 to 1990. This is because the provincial average growth rate adopted for the medium-term target year is the same as that from 1980 to 1990: Glan, Maasim, Malapatan and Malungon.
 - The growth rate of the municipality with a considerable growth from 1990 to 1995, though a minimal growth rate between 1980 and 1990 was recorded; is assumed to be the same, by itself, a municipality with a similar population size and rapid growth experience at present: Maitum.
 - The growth rates of the municipalities with a similar growth rates between 1980-1990 and 1990-1995 are assumed to be the same as the one used in the Land Use Plan: Kiamba.
 - The population of Alabel is calculated as the balance between the provincial population and the total population of other municipalities.

Table 8.3.2 presents the calculation results under the above conditions/assumptions.

Regarding the municipal population for the year 2010 in the long-term, it is assumed that the tendency of the population growth of respective municipalities between 1990 and 2002, which is considered in the Land Use Plan, will be realized in line with the land use

Table 8.3.2 Municipal Population Projection

Municipality	Annual Growth Rate (%)				Population (person)		
	'80-'90	Land Use	'90-'95	Adopted	1995	1997	2003
Alabel	4.74	4.59	2.70	2.86/2.64	46,527	49,231	57,324
Glan	2.13	1.99	4.09	2.13	73,768	76,943	87,316
Kiamba	2.20	1.96	2.34	1.96	39,717	41,289	46,389
Maassim	1.55	1.21	3.43	1.55	31,641	32,629	35,784
Maitum	0.31	0.31	6.44	1.55	35,009	36,102	39,593
Malapatan	1.92	1.43	5.75	1.92	47,911	49,768	55,784
Malungon	4.13	4.01	9.78	4.13	92,433	100,225	127,771
Province	2.58	2.58	5.33	2.58	367,006	386,187	449,961

Note: Population of Alabel is estimated as a balance between provincial total and other municipalities' total population. 1995 population is census results.

plan of the province. Thus, the projected growth rates for the year 2002 by municipality in the Land Use Plan are first applied to project the 2010 population from the year 2003. Then, the municipal population initially estimated is adjusted in proportion to the population size of each municipality to the total provincial population, to meet above mentioned provincial population fixed for the year 2010 (518,640 persons). In this adjustment, the growth rate of Maitum (0.31 %) is fixed to avoid negative growth rate (-0.30 %). Table 8.3.3 shows the study process results and the projected population by municipality for the year 2010 and the adjusted growth rates.

Table 8.3.3 Municipal Population for the year 2010 and Estimated Growth Rates

Municipality	Population Projection using G.R in Land Use Plan				2010 Population Projection	
	2003 Pop.	Growth Rate(%)	2010 Pop.	Percent	Population	Growth Rate(%)
Alabel	57,324	4.59	78,482	15.68	74,960	3.91
Glan	87,316	1.99	100,230	20.02	95,733	1.32
Kiamba	46,389	1.96	53,140	10.61	50,756	1.29
Maassim	35,784	1.21	38,927	7.78	37,181	0.55
Maitum	39,593	0.31	40,460	N.A	40,460	0.31
Malapatan	55,784	1.43	61,613	12.31	58,849	0.77
Malungon	127,771	4.01	168,251	33.60	160,702	3.33
Province	449,961	2.67	541,103	100.00	518,640	2.05

Note: 2010 Population by municipality is calculated proportionally distributing 478,180 persons to 6 municipalities except for Maitum (the figure before adjustment, 40,460).

N.A: Not Applicable □ Growth rate: 2003-2010

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 the base year. The annual growth rate of urban population for the year 2002 by municipality is estimated referring to the experience from 1980 to 1990 and

the future land use plan. The provincial average growth rate is set at 3.64%. The rural population by municipality is estimated as the balance between the total population and the urban population. The average growth rate of the province is estimated to be double than that of the urban area.

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

1) Past population development

With regard to urban population of the province to the total population, provincial average in 1980 and 1990 was 20% and 37%, respectively. While it reduced to about 30% in 1995. The percentage seems to have been affected by the decrease of urban population of Kiamba, Maasim and Malungon, since there were considerable number of out-migration from 1990 to 1995. Likewise, provincial average growth rate of 9.09% between 1980 and 1990 reduced to 0.86% in 1995.

Rural population by municipality has been adversely increased with a growth rate of 7.63% from 1990 to 1995 as a provincial average.

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

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

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

- Short/Medium-term target: 1997 and 2003

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

- Long-term target: 2010

The growth rate of the urban population by municipality, which is used for the projection in the year 2002 in the Land Use Plan, is 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.

Under the above assumptions, provincial average share of urban population for the year 2010 was arrived at 32.6%, slightly higher than the figure in 1995 (29.8%), but still lower than that in 1990 (37%). Table 8.3.4 presents the projected urban and rural population.

The growth rates and shares of rural population are calculated using the estimated rural population.

Table 8.3.4 Municipal Population for the year 2010 and Estimated Growth Rates

Municipality	Pop. Projection using G.R in Land Use Plan			2010 Pop. Projection		
	2003 Pop.	Growth Rate(%)	2010 Pop.	Percent	Population	Growth Rate(%)
Alabel	57,324	4.59	78,482	15.68	74,960	3.91
Glan	87,316	1.99	100,230	20.02	95,733	1.32
Kiamba	46,389	1.96	53,140	10.61	50,756	1.29
Maassim	35,784	1.21	38,927	7.78	37181	0.55
Maitum	39,593	0.31	40,460	N.A	40,460	0.31
Malapatan	55,784	1.43	61,613	12.31	58,849	0.77
Malunbon	127,771	4.01	168,251	33.60	160,702	3.33
Province	449,961	2.67	541,103	100.00	518,640	2.05

Note: 2010 Population by municipality is calculated proportionally distributing 478,180 persons to 6 municipalities except for Maitum (the figure before adjustment, 40,460).

N.A: Not Applicable

Growth rate: 2003-2010

8.3.2 School Enrollment Projection

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

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

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

The number of public school students by target year is then derived from the projected number of children who will attend school. A participation rate for public school enrollment is established based on the existing participation rate of public school students to the total school age population. Based on the projection, an average increase of 8% from the 1997 rate is foreseen in 2003 and another decrease of 7% from the 2003 rate in 2010 (details are re-

ferred to Table 8.3.6, Supporting Report). It should be noted that the public school rate in 1997 was quite low, at 68.

Table 8.3.5 shows the projected number of public school students by municipality, by target year. About 97,955 and 123,415 public school students are estimated to enroll for years 2003 and 2010, respectively.

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

Name of Municipality	Number of Public School Student			Number of Public Utilities		
	1997	2003	2010	1997	2003	2010
Alabel (Capital)	10,410	13,122	19,304	4	8	15
Glan	16,671	19,970	24,631	14	21	31
Kiamba	8,112	9,516	11,800	6	14	23
Maasim	7,190	8,199	9,052	4	9	15
Maitum	6,007	7,987	8,706	3	8	13
Malapatan	9,202	12,571	14,090	2	6	11
Malungon	16,914	26,590	35,832	18	28	39
Provincial Total	74,506	97,955	123,415	51	94	147

8.3.3 Projection of the Number of Public Utilities

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

A total of 43 public markets, bus/jeepney terminals and parks/playgrounds are planned for construction by year 2003 and another 53 by the year 2010. Refer to Table 8.3.2 for the number of public utilities by municipality by target year (details are referred to Supporting Report).

8.3.4 Planning Area and its Projected Population for Sewerage

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

All 7 municipalities with a total urban population of about 168,914 are considered (refer to Table 8.5.5).