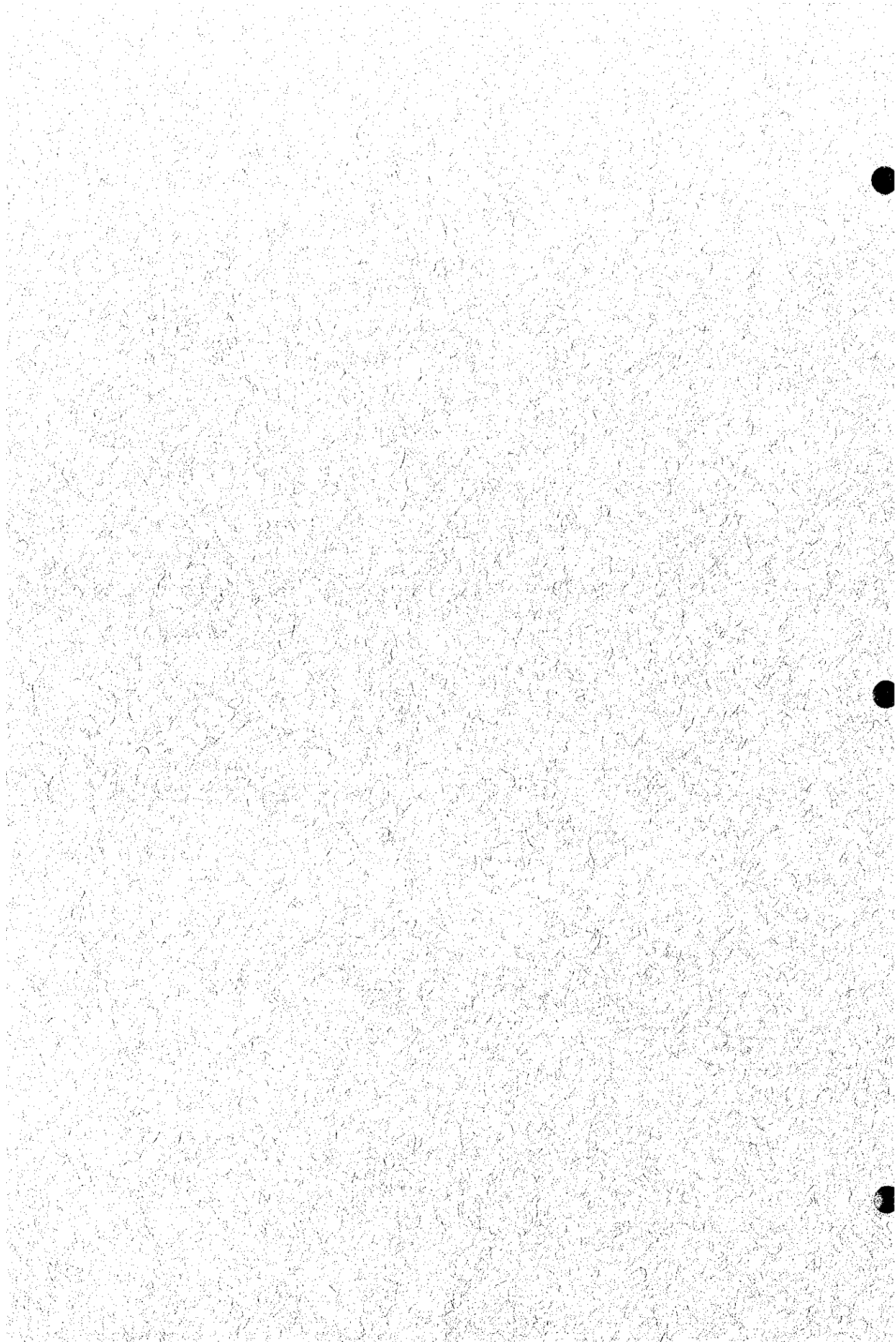


Chapter

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 4.52% of the total income of the province.
- (c) Grants, Aids and Subsidies – the province has not received any grant or subsidies from the government or any international organization.

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 Misamis Oriental during the period of 1994-1998. Local tax revenues, which were 4.52% 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 48.93% in annual average, which indicates that the province has historically been dependent on the IRA with its low tax and non-tax revenue collections.

Another source of provincial income is the operation of its economic enterprises, which are as follows:

- MISORTEL (Misamis Oriental Telephone System); and
- Stalls for rent located in the area adjacent to the Provincial Hospital.

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. Hence, the provincial government of Misamis Oriental sourced external financing mainly from government-owned banks to finance the establishment of MISORTEL.

MISORTEL was established in 1970 (using crossbar analogue technology) but in the 1990s, the IDD was introduced. Phase I of the IDD project was financed by a loan from the Land Bank of the Philippines and for Phase 2, ₱200 million was borrowed from the Development Bank of the Philippines (as of March 1998).

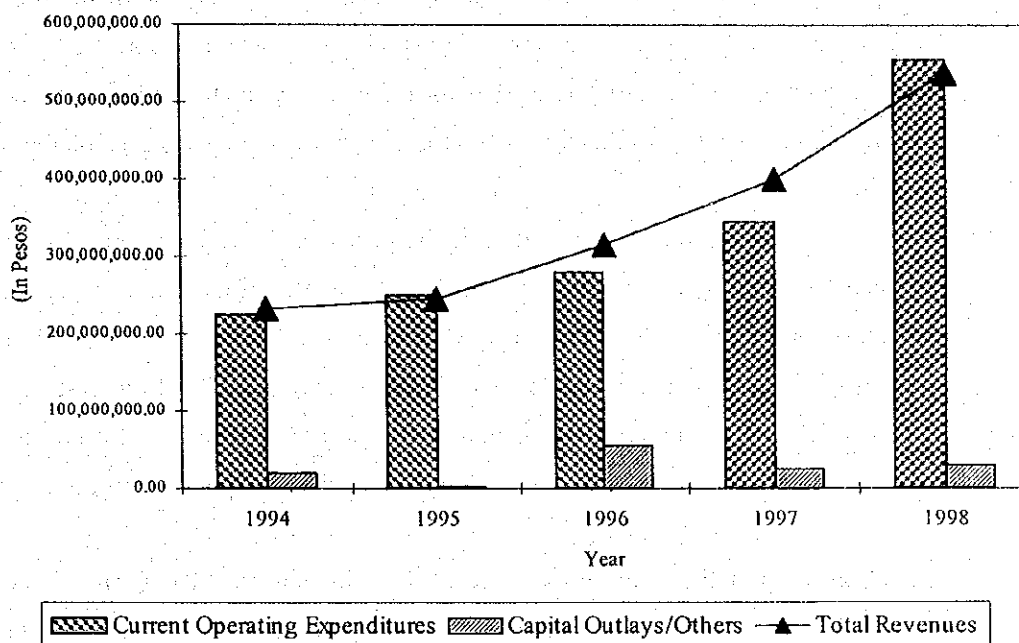
Table 6.2.1 Income and Expenditures, 1994-1998

Province	1994	1995	1996	1997	1998
Unit: Pesos					
RECEIPTS					
Tax Revenue 1/	13,745,767.84	12,526,572.18	12,895,553.63	13,813,589.75	21,840,000.00
IRA	124,361,695.00	137,858,991.32	148,691,062.40	190,211,191.64	216,251,383.00
Other Income	95,632,170.74	94,625,946.73	152,543,372.41	195,228,095.52	299,957,427.00
Total Revenues	233,748,633.58	245,011,510.23	314,129,988.44	399,252,876.91	538,048,810.00
EXPENDITURES					
Current Operating Expenditures	225,917,227.32	249,395,422.67	280,870,440.11	345,831,337.81	544,418,311.00
Personal Services (P.S.)	99,518,937.51	111,049,028.12	159,100,486.94	207,644,709.82	229,108,006.29
MOOE	71,829,913.96	98,439,777.10	113,864,673.97	123,123,569.51	254,420,265.71
Others	54,568,376.25	39,906,617.45	7,905,279.20	15,063,058.48	60,890,039.00
NET OPERATING INCOME	7,831,405.86	(4,383,912.44)	33,259,548.33	53,421,539.10	(6,369,501.00)
Less: Capital Outlays/Others	19,753,488.79	2,597,607.89	55,830,919.69	23,800,757.13	30,292,420.62
Add Borrowings/Others	36,156,083.19	25,501,951.06	67,808,162.48	46,304,428.90	-
Surplus	43,987,489.05	21,118,038.62	101,067,710.81	99,725,968.00	-
Net Income:	24,234,000.26	18,520,430.73	45,236,791.12	75,925,210.87	(36,661,921.62)

Source: Provincial Treasurer's Office

Note 1/ Includes Tax Revenues (Real Property Taxes, Business Taxes and others)
1998 Figures are estimates.

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 46.63% to the total revenue. Maintenance and operating expenses of the province was 37.06%. In addition, the province has a capital outlay with an average of 7.78% to the total revenue. The funds for the water supply sector were part of the capital outlays of the province.

From 1994 to 1997, the province had a net operating surplus from its operations except in 1995 when it incurred an operating loss of ₱4.38 million. The province has likewise projected a net loss of ₱36.66 million in 1998, which is a combined operating loss of ₱6.4 million and the projected capital outlay amounting to ₱30.29 million.

6.2.2 Availability of Funds

As previously noted, the IRA comprises 48.93% 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 1.08% 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 on the average 1.85% of IRA of all municipalities nationwide. 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. 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.

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	55,202,000,000	58,022,990,000	71,049,000,000	80,990,763,000
	(a) IRA to all Provinces	11,498,994,198	12,696,644,000	13,755,011,803	17,813,000,000	20,054,018,925
	(b) IRA to all Municipalities	16,325,288,074	18,768,952,000	19,607,715,553	24,849,000,000	28,245,815,434
Province	II. IRA to Misamis Or.					
	(1) Total: (2) + (3)	439,402,052	486,397,991	519,710,733	635,943,999	714,201,018
	(2) Provincial Government	124,361,695	137,858,991	148,691,062	190,211,192	216,251,383
	Percentage against (a)	1.08	1.09	1.08	1.07	1.08
	(3) Municipalities	315,040,357	348,539,000	371,019,671	445,732,807	497,949,635
	Percentage against (b)	1.93	1.86	1.89	1.79	1.76
	III. Total Income of the Provincial Government	233,748,634	245,011,510	314,129,988	399,252,877	538,048,810
	Percentage of IRA	53.2	56.3	47.3	47.6	40.2
	IV. Total Income of Municipalities	409,570,000	455,009,000	510,284,000	544,650,000	650,142,000
	Percentage of IRA	76.9	76.6	72.7	81.8	76.6
V. IRA to Municipalities**						
TOTAL	315,040,357	348,539,000	371,019,671	445,732,807	497,949,635	
Municipality	Alubijid	7,371,635	8,170,000	9,403,594	12,307,835	13,857,397
	Balingasag	12,075,000	13,417,000	14,513,254	19,275,759	21,748,184
	Balingoan	4,768,529	5,270,000	5,683,788	7,381,992	8,337,010
	Binuangan	4,118,650	4,724,000	4,922,832	6,347,416	7,157,066
	Claveria	20,052,911	22,226,000	23,337,743	30,254,981	34,491,854
	El Salvador	9,405,180	10,439,000	11,272,960	14,077,546	15,907,151
	Gitagum	5,266,403	5,845,000	6,325,645	8,121,211	9,163,400
	Initao	8,384,187	9,316,000	10,070,645	12,163,982	13,760,241
	Jasaan	9,310,309	10,352,000	11,051,182	14,669,885	16,542,235
	Kinogitan	4,662,554	5,456,000	5,899,632	7,774,587	8,783,916
	Lagonlong	5,906,284	6,542,000	7,066,052	9,937,784	11,218,496
	Laguindingan	6,115,489	6,799,000	7,363,286	9,027,239	10,170,898
	Libertad	4,830,816	5,352,000	5,786,943	7,223,283	8,140,794
	Lugait	5,181,982	5,769,000	6,257,044	8,116,498	9,172,107
	Magsaysay	9,307,838	10,278,000	11,057,712	13,567,966	15,301,029
	Manticao	7,906,216	8,876,000	9,746,902	12,205,890	13,836,446
	Medina	8,449,342	9,360,000	10,097,277	13,262,502	14,983,477
	Naawan	6,320,054	7,002,000	7,559,113	9,676,575	10,947,287
	Opol	8,679,433	9,592,000	10,324,943	12,292,038	13,853,346
	Salay	6,862,464	7,365,000	8,258,515	10,894,617	12,321,231
	Sugbongcogon	4,239,945	3,853,000	5,121,244	6,700,551	7,552,330
	Tagoloan	10,140,797	10,405,000	12,223,961	17,123,005	19,347,789
	Talisayan	7,664,953	7,791,000	9,135,311	11,974,541	13,555,344
	Villanueva	6,639,386	14,027,000	7,969,093	10,912,124	12,300,607
	Gingoog **	131,380,000	140,313,000	150,571,000	160,443,000	175,500,000

Sources: Provincial Treasurer's Office

Notes: * IRA to Barangay is not included.

** Component City

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 suf-

ficient for its operating, capital and non-office expenses. Thus, there is little surplus income that can be tapped for additional capital expenditures.

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 except in 1996 where a deficit amounting to ₱26.1 million was incurred.

In 1998, it is projected that the DF may be adequate to cover the capital expenditures of the province, since the projected 20% DF is larger than the amount for capital expenditures. It is projected that there will be a surplus amounting to ₱12.95 million.

Table 6.2.3 Available 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	124,361,695.00	26,086,634.00	19,753,488.79	6,333,145.21
1995	137,858,991.32	27,561,140.00	2,597,607.89	24,963,532.11
1996	148,691,062.40	29,738,000.00	55,830,919.69	(26,092,919.69)
1997	190,211,191.64	38,042,000.00	23,800,757.13	14,241,242.87
1998	216,250,383.00	43,250,277.00	30,292,420.62	12,957,579.38

Source: Provincial Treasurer's Office

Note: * The allotted amount under 20% DF may not be equal to the computed 20% of IRA: ₱ 20,869,312 (1995), ₱ 23,790,569.98 (1996), ₱ 30,640,432.48 (1997) and ₱ 34,600,221.28 (1998).

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.

The 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.

$$DSC = \{ [RINC_1 (1 + AGR) + RINC_1] + IRA_2 \} \times 20\% - AMORT$$

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 ₱47.42 million for the year 1998. This amount reflects the maximum loan that can be availed of from MDF. It is reported that there exists a loan amortization at present but details on terms and conditions of the loan are not available. The local tax income and IRA of the province are projected at ₱21.84 million and ₱216.25 million, respectively.

6.3 Past Public Investment and Present Plans

6.3.1 Past and Current Annual Investment Plans

The provincial government and DPWH undertook the past and recent development of the water supply and sanitation sector in the province. The fund from the CDF (Countrywide Development Fund) was also availed of by the province.

Water supply sector obtained an ₱33.0 million during the period 1995-1998, while the sanitation sector had only ₱2.9 million. Thus, actual amount of public investments to the WATSAN sector amounted to ₱35.9 million. (refer to Table 6.3.1(a)). The largest investment registered so far is those for Level I water supply with an aggregate amount of ₱16.88 million during the said period, followed by Level II and Level III water supply with ₱ 8.6 million and ₱7.54 million, respectively. Table 6.3.1 (b) shows the planned amount of ₱57 million, which is relatively higher than the actual amount spent – ₱33.0 million. Refer to Figure 6.3.1.

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

Unit: Pesos

Funding Category Agency	1995-1998			Sub-Total	Sanitation
	Level I	Level II	Level III		
DILG *	7,701,092.90	-	-	7,701,092.90	546,907.11
DPWH	6,884,500.00	-	5,700,687.00	12,585,187.00	
LWUA	-	-	1,840,000.00	1,840,000.00	
DOH	30,000.00	104,599.35	-	134,599.35	1,245,604.00
PROVINCE / MUNICIPALITY/CITY	- 2,271,084.77	870,000.00 7,640,412.68	-	870,000.00 9,911,497.45	1,110,000.00
Total	16,886,677.67	8,615,012.03	7,540,687.00	33,042,376.70	2,902,511.11

Source: Provincial Government and Agencies

Note: There is no available breakdown by agency. Figures are combined funds from DPWH (Foreign/Local), Province, Municipalities and CDF.

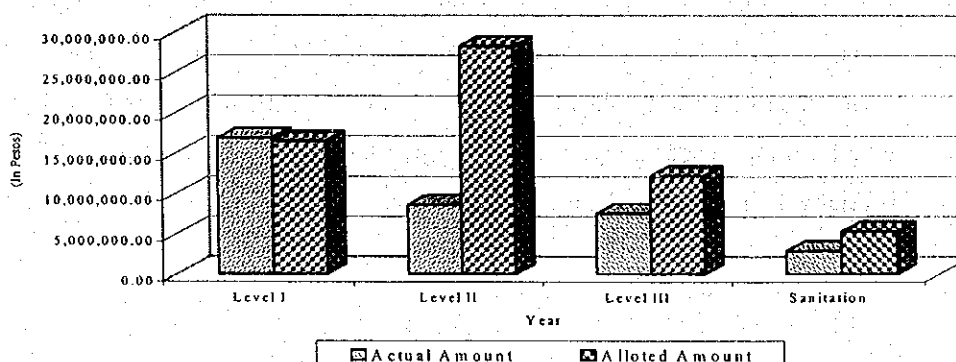
Table 6.3.1(b) Alloted Amount of Sector Investment to the Province by Concerned Agencies

Unit: Pesos

Funding Category Agency	Funds	1995 - 1998			Sub-Total	Sanitation
		Level I	Level II	Level III		
DILG						
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.

**Figure 6.3.1
Actual and Alloted 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 province 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

The projects programmed for implementation in the province 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 AIP of Misamis Oriental for the Sector from 1995 to 1997 are summarized in Tables 6.3.2 and 6.3.3. Data for the sector's detailed breakdown of activities in 1998 is not available.

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 1997. It is shown that spring development for Level III had the largest share which is 65.91% of the planned amount of ₱350.16 million for the period 1995 to 1998. Level 1 had the lowest priority with only 12.39% share. Table 6.3.3 summarizes annual sector investments by service level. Levels II & III had the largest fund allocation, particularly in 1998 with the amount of around ₱41.58 million mainly from the Countrywide Development Fund (CDF). During the period 1995 to 1998, a cumulative amount of ₱70.445 million was planned to be mainly invested for water supply (₱69.325 million), while only ₱1.12 million was planned for sanitation.

In the AIP of the province, a total investment cost of ₱70.4 million was planned both for water supply and sanitation sector during the period 1995-1998. But, the amount of actual expenditures for WATSAN out of the 20% DF of the province is only ₱11.47 million

for the same period or only 16.2% of the required investments. (refer to Tables 6.3.3 and 6.3.4).

The AIP of the province for the sector did not include the repair and maintenance items of water supply facilities, but for sustainability of operations, it is important to consider the budget for repair and maintenance of the water supply facilities.

Table 6.3.2 Annual Investment Plan, 1995 – 1998

Unit: Pesos

Item	1995	1996	1997	1998	Total	% Share
Construction (DW, SW, Spring Box, Reservoir, Tank)	14,012,000	23,585,125	3,090,000	2,700,040	43,387,165	12.39
National/Local Funding (DPWH/Prov Govt)	12,313,000	21,260,000	-	n.a.	32,573,000	9.30
Various Local Funding (Provincial Government)	1,699,000	2,325,125	3,090,000	2,700,040	9,814,165	2.80
Spring Development with L2	58,330,000	14,620,025	1,150,000	1,880,000	75,980,025	21.70
Various National Funding (DPWH)	53,430,000	2,600,000	-	-	56,030,000	16.00
Various Local Funding	4,900,000	12,020,025	1,150,000	1,880,000	19,950,025	5.70
Spring Development with L3	101,595,000	90,800,000	14,922,500	23,481,000	230,798,500	65.91
Various National Funding (DPWH)	-	90,000,000	-	n.a.	90,000,000	25.70
Various Local Funding	101,595,000	800,000	14,922,500	23,481,000	140,798,500	40.21
Total	173,937,000	129,005,150	19,162,500	28,061,040	350,165,690	100.00

Source: Provincial Planning and Development Office.

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

Unit: Pesos

Item	1995	1996	1997	1998	Total
Level I					
National (CDF)	2,277,500.00	770,000.00	-	3,837,000.00	6,884,500.00
Level 2/3					
National (CDF)	7,842,500.00	7,856,000.00	1,562,187.00	41,580,000.00	58,840,687.00
Other :					
Expansion				2,900,000.00	2,900,000.00
Water Quality	75,000.00	150,000.00	200,000.00	275,000.00	700,000.00
Sub-Total Water Supply	10,195,000.00	8,776,000.00	1,762,187.00	48,592,000.00	69,325,187.00
Health Centers		145,000.00		75,000.00	220,000.00
Other Sanitation (Health)				900,000.00	900,000.00
Sub-Total Sanitation		145,000.00		975,000.00	1,120,000.00
Grand Total	10,195,000	8,921,000	1,762,187.00	49,567,000	70,445,187.00

Source: Provincial Planning and Development Office

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, the infrastructure sector obtained 75.95% of the 20% DF in 1998 (i.e. ₱32.85 million out of ₱ 43.25 million). However, WATSAN's annual average share of 18.15% of the 20% DF for the period 1995-1998 is comparatively much smaller.

Table 6.3.4 Allocation of the 20% Development Fund, 1995-1998

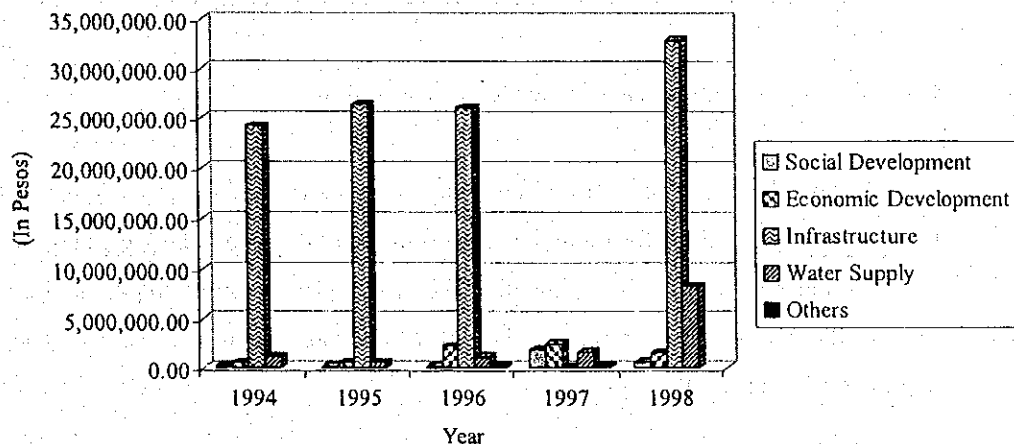
Year	20% Dev't. Fund	Actual Expenditures					Sub-Total	% of Water Supply to 20% DF
		Social Development ^{1/}	Economic Development	Infra-structure	Water Supply	Others		
1994	26,086,634.00	200,000.00	500,000.00	24,186,634.00	1,200,000.00		26,086,634.00	4.60
1995	27,561,140.00	150,000.00	500,000.00	26,411,140.00	500,000.00		27,561,140.00	1.81
1996	29,738,213.00	150,000.00	2,215,000.00	26,077,080.00	1,096,133.00	200,000.00	29,738,213.00	3.69
1997	38,300,591.00	1,841,191.00	2,504,400.00	32,150,000.00	1,625,000.00	180,000.00	38,300,591.00	4.24
1998 ^{2/}	43,250,277.00	600,000.00	1,550,000.00	32,850,277.00	8,250,000.00		43,250,277.00	19.08

Source: Provincial Accountant's Office

1/ Mostly construction and repair of schools

2/ Figures are of the second quarter of the year.

Figure 6.3.2 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 which is primarily Level I water supply and some Level II systems funded by CDF which is coursed thru the DPWH. Regular monthly meetings among MPDCs and PPDC are conducted for regular monitoring of water supply projects. The following are the items to be budgetary arranged.

(a) Logistic support with required funding

The LGUs through the course of project implementation shall ensure provision of adequate logistic support with financial arrangements. The LGUs have not given priority to the requirements considering the budgetary constraint. The AIP needs to include the plan for the logistic support entailing manpower and vehicle allocation. WATSAN is provided funds under the infrastructure sector.

(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. Further, it is also coordinates with the DPWH on technical matters in the implementation of water supply projects. However, barangays and municipalities that request funding must be prompt in submitting the necessary documents to PPDO for processing. Out of the 20% DF, the province may provide logistics for manpower requirement for devolved functions.

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

6.4.1 Cost Sharing Arrangements / Counterpart Funding

A cost sharing scheme for DILG funded projects was formulated: 10% share of barangay in terms of free labor, 20% for municipal government, LGU funded projects and provincial government and 70% central government. LGU-funded projects are implemented by administration by the Municipal Government and the Municipal Engineering Office. The supervising engineer comes from the region.

The DPWH and the DILG previously undertook the implementation of water supply projects. The DPWH, through its DEOs, still receive requests for assistance from barangay people. This is due to the lack of awareness on the part of people regarding the new institutional ar-

rangement and this proved the DEOs' technical ability. The requests, however, are granted on a case-to-case basis, usually if the manpower and budget are available.

A 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.

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 Barangay Water Program which provided training and community organizing (based on interview with CPDO). Water districts in the province likewise avail of funding through loans that are directly obtained from LWUA.

(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 lent 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 an 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

According to the PPDO, there was no external assistance to the Sector although the CPDO noted that the USAID funded the Barangay Water Program.

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, which are Claveria WD and Gingoog City WD. Table 6.4.1 shows the financial indicators of WDs and provincial/municipal waterworks in the province as of June 1998. 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 about 20 cum.

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

Waterworks	Description						
	No. of Metered Connections	No. of Households Served	Average Monthly Rate	Average Consumption per HH	Average Monthly Expenditures	Average Revenue	Collection Efficiency
	Nos.	Nos.	Pesos/cum.	Cum./mo.	Pesos/mo.	Pesos/mo.	Percent (%)
Alubijid RWSA	-	505	-	-	-	-	-
Balingoan RWSA	270	286	-	-	-	-	-
Cagayan de Oro WD	40,844	51,809	60.00	23.48	10,049,138.63	4,553,429.60	45.31
Claveria WD	4,869	4,925	66.00	-	48,118.05	63,122.93	100.00
El Salvador Mun. WWS	1,142	1,142	49.00	40.45	88,827.17	60,093.54	67.65
Molugan WWS	250	250	-	-	-	-	-
Gingoog City WD	2,534	4,814	92.40	20.30	437,470.67	405,250.00	92.63
Initao LGU WWS	1,277	1,295	4.00	-	17,000.00	20,833.33	100.00
Kinoguitan RWSA	-	236	-	30.92	80,600.00	-	-
Lagonglong LGU WS	-	72	-	-	250,000.00	-	-
Laguindingan Mun. WS	390	390	30.00	73.85	-	7,200.00	-
Sinai RWSA	-	665	-	-	-	-	-
Libertad RWSA	89	356	35.00	5.33	4,316.67	4,734.80	100.00
Lugait WWS	705	3,654	30.00	3.35	33,424.18	25,795.27	77.18

Table 6.4.1 Financial Indicators of Provincial/Municipal Waterworks in the Province (contd)

Waterworks	Description						
	No. of Metered Connections	No. of Households Served	Average Monthly Rate	Average Consumption per HH	Average Monthly Expenditures	Average Revenue	Collection Efficiency
	Nos.	Nos.	Pesos/cum.	Cum./mo.	Pesos/mo.	Pesos/mo.	Percent (%)
Manticao WWS	610	666	25.00	34.60	15,000.00	-	-
Medina RWSA	1,222	1,968	-	18.70	16,833.33	80,000.00	70.00
Naawan WWS	343	352	20.00	28.68	6,437.08	10,665.92	80.00
Salay RWSA	-	700	-	-	23,083.37	21,959.00	95.13
Sugbongcogon LGU Ws	281	281	-	-	-	4,215.00	-
Tagoloan WS	2,881	3,288	45.00	20.82	48,283.33	234,000.00	-
Napopong LGU WS	140	140	-	-	13,479.17	-	80.00
Soligao - Lagatak WS	1,600	1,600	25.00	83.25	46,979.17	-	75.00

Source: Provincial/ Municipal Waterworks Offices.

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 system 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) years' 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.

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 Cagayan de Oro and Gingoog Water Districts are charging the amounts of ₱2.56 and ₱4.55 per cum., respectively. The water rate structure is based on LWUA's guidelines for water rate setting. Water rates are socialized, based on O and 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 group interview results, about half of the respondents did not participate in the past construction projects of WATSAN facilities. The other half participated through other minor activities. For future projects, all the respondents indicated their willingness to contribute in cash or kind for the construction of WATSAN facilities in their respective barangays and they preferred to contribute free labor during the construction while only five respondents were willing to provide materials during construction.

6.6.2 Operation and Maintenance Cost

All except three respondents from the group interview were presently paying for their water supply. Of those presently paying, 60% indicated that they were paying from ₱21.00 to ₱30.00 and 40% or 21 respondents said they were paying between ₱6.00 to ₱10.00 per month. About 81% of the respondents who were paying water fees, agreed that the fees being collected were enough to operate and maintain the facilities. The other 19% of respondents said that the fees being collected were not enough to cover O and M costs.

For those who said water fee is not enough, majority noted that not all water users pay and likewise, the current water fee is low. All the respondents could not determine which group/s in the community shouldered the operation and maintenance of the water supply facilities.

It is noted that for future WATSAN facilities, the respondents are willing to pay for ₱21.00 to ₱40.00 per month, 38% were willing to pay ₱11.00-₱20.00 and 20% were willing to pay ₱31.00 to ₱40.00.

In the water districts or Level III waterworks, O&M expenses are basically covered by the user fees depending on the water consumption amount by water user category. The water charge system was established by LWUA to compel water districts to be self-sufficient, financially viable and be able to repay any loans obtained to improve water supply services.

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 have higher income than those in rural barangays, because of the more diverse economic and commercial activities).

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 6.0 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 In- come	Affordable Range (%) 4/
Median of Monthly Income 1/	3,549.50	-	-
Average Level III: Monthly Water Bill 2/	63.00	1.01	5.0 or less
Average Level II: Monthly Water Bill	30.00	0.85	2.0 – 3.0
Mo. Level I Expenditures	20.00	0.56	1.0 or less
Private Toilet Construction Cost – Flush Type Toilet 3/	21,300	6.0	-

Notes:

1/ 1994 Family Income and Expenditures Survey, NSO. Average income (mean) is ₱ 55,536 annually for Misamis Oriental and median income is ₱ 42,594 but for Region X, the median income is ₱ 39,833 and the mean income is ₱ 57,831.

2/ Data from PSPT; It is assumed that 21 cum. 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 domestic water supply. Emphasis is placed on the groundwater availability due to its prevalent use and comparatively conservative development through 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.

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 1,164 shallow wells, 753 deep wells and 320 developed springs in the province (functional sources). Most of the wells are shallow wells. About 66% of these water sources are public facilities. Of the total existing wells, 80% remains functional at present. In addition to the above sources, 19 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	607	601	269	1,477
b. Privately owned sources	557	152	51	760
c. Number of water sources	1,164	753	320	2,237
d. Profile of different sources	52%	34%	14%	100%
2. Water sources with problems and non-functional wells				
a. Water quality problems*	582	0	0	582
b. Non-functional	290	195	31	516
3. Spring source information				
a. Undeveloped	-	-	0	0
b. Untapped	-	-	19	19

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.
 (P): Public spring source.

7.2 Geology

The fringes of the eastern peninsula are hilly areas with elevation of 500 m to 800 m and were formed by the sedimentary rocks of Tertiary period. The N-S thrust faults with limited magnitudes are distributed in mountainous area of Gingoog City, which are stretching to the western part of Davao del Norte.

The geologic setting of the central peninsula is complex undifferentiated ultramafic rocks as the basement, which is normally underlain by marine sedimentary rocks of Eo-Pliocene epoch. These rock units are in turn underlain by andesitic-basaltic flows with intercalated pyroclastics, fluvial sandstone and conglomerate ranging from Later Tertiary to Early Quaternary period of emplacement. Deltaic plain and alluvial fan deposits occur mostly in the town

of Balingasag and in some places from Medina to Gingoog City. Trust faults of the inland side of Gingoog City and normal faults in Claveria are observed with WNW-SES stretching.

In the western peninsula, the igneous and sedimentary rocks of Cretaceous to Paleogene period are underlain by the reef limestone and sporadic terrace gravel deposits of Plio-Pleistocene period. Recent formations occur in the coastal towns from Tagoloan extending westward to Alubijid including Cagayan de Oro City. The lateral faults, the trust faults and the asymmetric folds have a parallel direction toward to Lake Lanao.

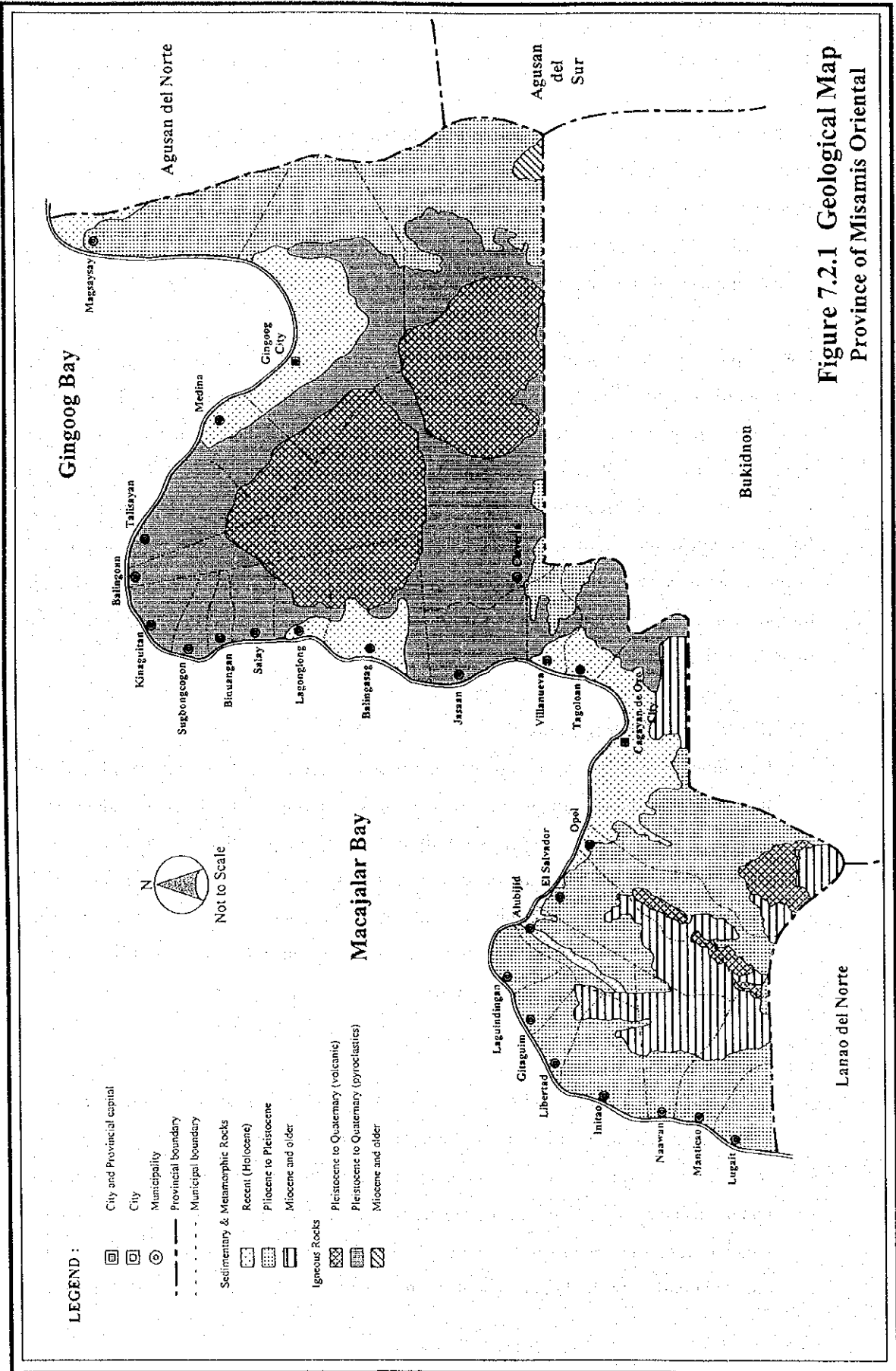
For the purpose of preparing the Groundwater Availability Map of the province, only rock units significant to groundwater storage and permeability are described briefly. The rock units in the province are classified into three (3) main groups based on the geologic ages. These are, from the oldest to 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 of the province and their geological features are described below.

(1) Miocene and Older Systems

Groundwater in the units of Pre-Jurassic basement complex to Lower-Middle Miocene limestone mostly occurs in fracture openings, solution channel ways and cavernous openings. Yield of wells depends mainly on such opening so that dry to very productive wells is possible. Upper Miocene to Pliocene sediments covers the Opol formation, which includes both the sedimentary and pyroclastic rocks. Members of this formation consist of conglomerate, pebbly sandstone, agglomerate, tuffaceous sandstone and tuff. These are well bedded and slightly folded.

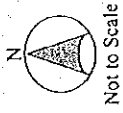
(2) Plio-Pleistocene Series

Sedimentary rocks of this series have various range of the permeability. Plio-Pleistocene sediments consist of a series of conglomerate, sandstone and shale. The conglomerate faces consist of rounded to sub-rounded pebbles and boulders of volcanic, igneous and metamorphic rocks derived from older formations in the adjoining area. The sandstone, which is grayish to greenish are frequently, interbedded with the shale members. They are well bedded, partially compacted and highly disturbed. Apparently, the sandstone



LEGEND :

- City and Provincial capital
- City
- Municipality
- Provincial boundary
- Municipal boundary
- Sedimentary & Metamorphic Rocks
 - Recent (Holocene)
 - Pliocene to Pleistocene
 - Miocene and older
- Igneous Rocks
 - Pleistocene to Quaternary (volcanic)
 - Pleistocene to Quaternary (pyroclastics)
 - Miocene and older



**Figure 7.2.1 Geological Map
Province of Misamis Oriental**

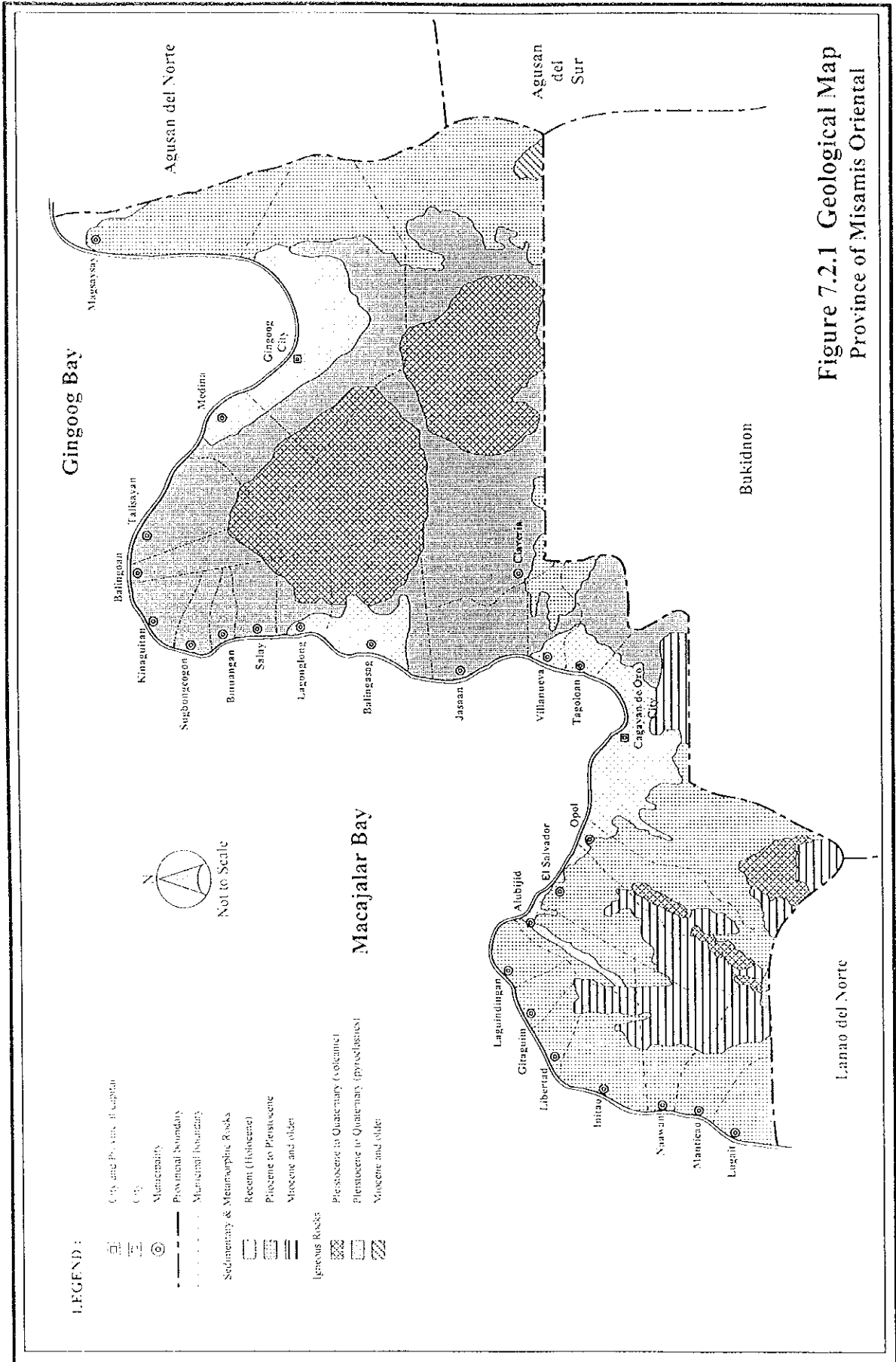


Figure 7.2.1 Geological Map Province of Misamis Oriental

and shales are folded by volcanic intrusion and by the movement in the Philippine Rift Zone. Plio-Pleistocene limestone is coralline. It is distributed in widely separated areas and forms thin veneer in the hills.

Pliocene to Quaternary volcanics are composed of basalt and andesite that are commonly extruded through the Miocene formations. On the other hand, Pliocene to Quaternary pyroclastics consist of reworked volcanic debris, mud and ash flows, tuff and some river deposits at lower elevations, agglomerate, breccia and massive andesite at higher elevations. Pleistocene deposits include the Cagayan terrace gravel, which is composed of intercalated beds of semi-compacted gravel, sand, shale and tuffaceous sandstone. The layer that contains mostly gravel is composed of rounded to sub-rounded pebbles to boulders of volcanic, igneous and metamorphic rocks. This occurs along the Cagayan Airport road, national road from Cagayan de Oro City to Indahag, Bugo to Alae and the west bank of Cagayan River just before the Airport.

(3) Recent Deposits (Holocene Series)

Recent deposits includes river, lake and beach deposits. These are mostly flood-drains, areas along the mouths of major drainage, shallow sea and near-shore deposits of loose gravel, sand, silt, clay and mud which are being re-transported by rivers and reworked by the sea.

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 term of groundwater availability.

(1) Shallow well area

Shallow well area is defined in this study as an area where solo shallow well is available. These areas have water bearing rock formations extending not more than 20 m 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 completely shallow well area is limited, because most of the recent 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 20 m 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. The groundwater availability in the aforesaid rocks is very low and usually released in the opened 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 through the future are summarized below.

(1) Shallow well area

The province has no solo shallow well area. The development of shallow wells is, however, possible in the "Deep Well Area" (recent alluvium and beach deposits), where shallow aquifers usually occur. The shallow wells in the province are driven to an average depth of 10.9m (7.4 m to 14.4 m). These wells have average static water level of 5.2 mbgs (1.0 m to 10.1 m) and average specific capacity of 0.2 lpsm (0.1 lpsm to 0.5 lpsm).

(2) Deep well Area

The deep well area covers approximately 60% of the province, widely distributed in the provincial area exclusive mountainous formed by volcanics and metamorphic rock units.

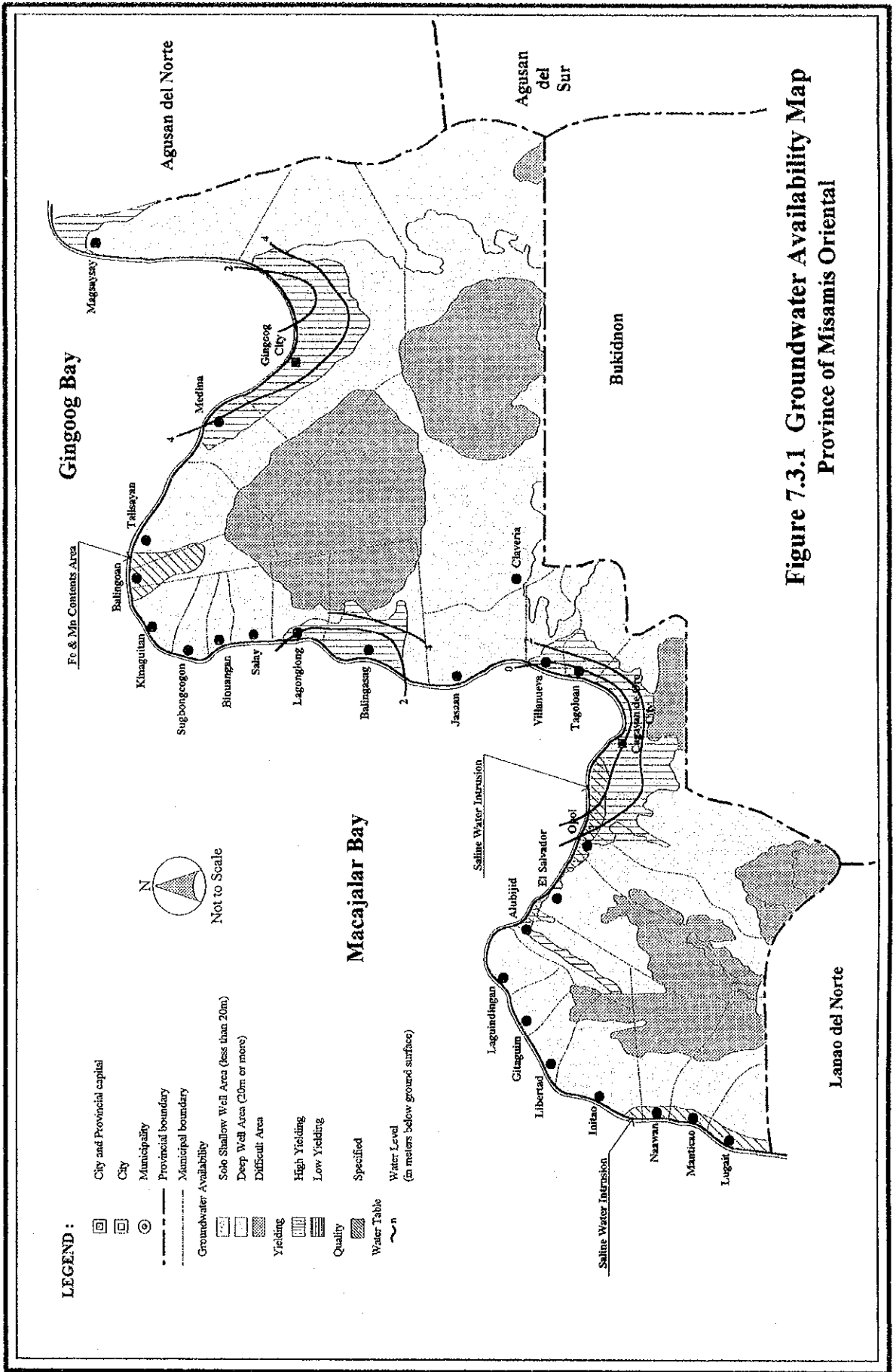


Figure 7.3.1 Groundwater Availability Map
Province of Misamis Oriental

The deep well area is composed of alluvial plain and low hills made of Plio-Pleistocene sediments. The alluvial plain is composed of recent deposits of clay, silt, sand, and gravel, which forms a groundwater storage basin for some aquifers. While, the sedimentary formations of Plio-Pleistocene epoch consist of conglomerates, sandstone, limestone, and shale.

Considering the geological formations, the alluvial plain is categorized as a high potential area for deep well development. Alluvial plain areas are located on seashore belt where major river flows into the Gingoog Bay or the Macajalar Bay. In alluvial plain, the average depth of the existing deep wells is 43.6 m with average water level of 20.9 mbgs, and the average specific capacity is 1.2 lpsm.

In the sediment area made of Plio-Pleistocene series, the average depth of the existing deep wells is 88.6 m with an average water level of 43.3 mbgs, and a specific capacity of 0.3 lpsm.

(3) Difficult area

About 40% of the provincial area is classified as a difficult area to exploit groundwater. Such areas are characterized by volcanoes and metamorphic mountains, which are located in the central part of each peninsula.

The geology is made up of 1) metamorphic rocks of Cretaceous period to Paleocene epoch and 2) volcanic rocks of Oligocene to Miocene epoch. These rock units are in dense, massive and consolidated conditions and have impervious characteristics. The groundwater occurs only in fissures or fault fracture zones.

7.3.3 Groundwater Quality

There are water quality problems in both shallow and deep wells in seashore areas of the province. Major water quality problems are saline water intrusion and high Fe and Mn contents in the western and central peninsulas. Saline water intrusion is confirmed in seashore belt areas of the western peninsula. The results of water resources investigation for the province conducted by NWRB and the general information from DPWH-DEO and PPDO revealed the problem areas as shown in the Groundwater Availability Map in Figure 7.3.1. The following are the summary of the findings.

(1) High Fe & Mn Contents Area

High Fe and Mn contents are observed in groundwater of both deep wells and springs around the Bagacay Point, which area is located in the municipalities of Balingoan, Kinaguitan and Talisayan. Probably, the groundwater quality is transposed by the aspect of mineral rich volcanic rocks in upstream watersheds.

(2) Saline Water Intrusion Area

Saline water intrusion into the confined aquifers is reported in the coastal areas from Cagayan de Oro City to Alubijid and from Naawan to Lugait. Groundwater in this area has slightly high Cl ion (about 100 mg/l).

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 induced 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 provision of sanitary protection, 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 during the study, the province has 320 developed springs currently serving the province, which come out from volcanic mountain areas in central and western peninsulas. Of these springs, 315 have discharges of less than 2.8 lps, while 5 yield with 2.8 lps or more. Most of these springs are not dried up during the drought year with yields varying from 0.02 lps to 74 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 Odiongan, Mallig, Cagayan and Iponan Rivers. There are five (5) stream gauging stations in the province.

Surface water use in the province totaled only 4.4 m³/sec according to the NWRB's water rights registration database, as of March 1997. Of this usage, 25% of the water rights were registered for irrigation. The diversions of major flume, which are operated by the NGOs, are located in Tagoloan and Cagayan de Oro City at the Tagoloan and Cagayan Rivers, respectively. Other surface water rights are lodged to private companies for industrial and fishery users. Presently, the surface water is not utilized for domestic purpose. However, the Cagayan de Oro City WD had resolved the bulk-water supply project together with the NPC as a partnership, which is an ongoing status promoted by the BOT scheme. One hundred thousand (100,000) m³/day intake amounts transmitted from the hydropower station at the Cagayan River (Dam construction is not completed yet by the NPC.) will be supplied from year 2002.

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 at each stream meets the Class A limitation of "DENR Fresh Water Quality Criteria". However, high Fe and Mn contents were observed at The Tagoloan and Cagayan Rivers due to the existence of mineral rich rocks of volcanoes. It is noted that mining activities on chromite and gold are prevalent at the Tagoloan and Cagayan Rivers watersheds in the province of Bukidnon.

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 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 7.4 to 14.4 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 also depends if the wells are tap to comparatively deeper aquifer, then, 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 water level above the aquifers. In Recent deposits and Plio-Pleistocene series, good aquifers apparently occur from 30 m to 180 m 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 data: well type, well yield, water quality and static water level. Aquifer formations are 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 about 5%.

(2) Spring

A total of 19 untapped spring sources for future development are listed in Table 7.6.3 Untapped Spring Source Identification, Supporting Report. The list includes detailed 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 municipalities of the central peninsula, which is belonging to the Central Mindanao Cordillera. Other municipalities have a few untapped springs. Discharge rates of the springs are generally small ranging from 0.02 lps to 2.7 lps except for those in the central peninsula. The spring development potential in the province is shown in Table 7.6.1.

(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 en-

Table 7.6.1 Groundwater Development Potential in the Province

Area	Groundwater Development Potential	Water Quality	Area Feature
Eastern Peninsula	<p>The potential water source in this area is groundwater developed by the deep well. The influential aquifers are recent deposits and un-consolidated sedimentary rocks. Such major formations are made of sand, gravel, reef limestone and sporadic terrace gravel deposits, which are located in Magsaysay.</p> <p>Numerous deep wells with depth of about 50 m were constructed. Probably, the thickness of the aquifer is more or less of 80 m. The water levels are observed 5 m to 10 mbgs in seashore area and 25 mbgs or deeper water levels in hilly side.</p>	<p>The water quality both springs and deep wells is potable.</p>	<p>This area covers the entire Magsaysay, the eastern part of Gingoog City and Claveria. Most of this area is covered by lowland hills, which are formed by the sedimentary rock units of Paleogene period.</p>
Central Peninsula	<p>Very rich spring sources are developed for water supply in this area. Spring fields are located in piedmont area of Mt. Balatucan. The distances from the spring fields to the supply areas, which are probably coastal populated belt, are estimated about 2 km to 3 km.</p> <p>The deep well development is also possible in areas formed by small-scale delta or alluvial fan, which are located in Balingasag, Gingoog City and Medina. In Claveria, the deep wells with depth of 100 m were constructed within areas below elevation of 500 masl. Those water levels are generally deep and ranging from 30 m to 50 mbgs. Their production capacity is estimated 100 m³/day or less. On the other hand, many spring eyes are found on the fault scarp of canyon in Claveria. The distances from the spring fields to service areas are longer than 3 km.</p>	<p>High Fe/Mn contents are experienced in Bagacay Point area. The examined water qualities have Fe of 3 mg/l to 5 mg/l. The water quality both deep wells and springs is potable in other area.</p>	<p>The Central Peninsula is part of the Central Mindanao Cordillera with the chain of volcanoes. There are two volcanoes in the province. This area has coastal line from the western Gingoog City to the southwestern of Claveria.</p>
Western Peninsula	<p>The groundwater potential is much greater than the Western Peninsula area. Recent deposits, which are deltaic sediments, have a high groundwater yielding in the Cagayan de Oro City area. The thickness of the younger age deposits is sounded 180 m. Some of the deep wells with depth of 120 m have a free flowing discharge. The capacities of deep wells vary from 30 lps to 50 lps.</p> <p>In other area, the major influential aquifers are the formation consists of limestone bodies. Majority of water sources in this area is deep wells with depth of 40 m to 120 m and productions of about 100 m³/day to 500 m³/day. These aquifers area distributed coastal area with width of around 10-km between Opol and Naawan. The spring sources are originated from the metamorphic or igneous rocks in inland areas of Lugait and Manticao.</p>	<p>The groundwater is potable. However, the saline water intrusion is observed in Opol and Manticao areas. The spring water quality is potable.</p>	<p>This area is west side of the Central Peninsula and covers eleven municipalities including a part of Cagayan de Oro City. The mountainous are formed by the mainly metamorphic rock units of Cretaceous period.</p>

sure 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, municipalities situated in the Tagoloan and Cagayan rivers basins are privileged to use larger amount of river water.

7.7 Water Source Development for Medium-Term Development Plan

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

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)	
Alubijid	Rural	SW	-	-	<D<	-	-	90:10
		DW	90	30	<D<	70	20	
	Urban	SW	-	-	<D<	-	-	100
		DW	100	60	<D<	120	5	
Balingasag	Rural	SW	-	-	<D<	-	-	30:70
		DW	60	20	<D<	50	5	
	Urban	SW	-	-	<D<	-	-	100
		DW	100	50	<D<	70	5	
Balingoan	Rural	SW	-	-	<D<	-	-	10:90
		DW	80	20	<D<	40	10	
	Urban	SW	-	-	<D<	-	-	100
		DW	100	30	<D<	40	5	

Table 7.7.1 Standard Specification of Wells by Municipality (contd)

Municipalities with Classification		Type	Proportion (%)	Standard Specification			Ratio (%) well:spring
				Depth Range (m)	SWL (m)	Sp. Cap. (lpsm)	
Binuangan	Rural	SW DW	- 100	- <D< 20 <D< 40	- 10	- 0.1	10:90
	Urban	SW DW	- 100	- <D< 30 <D< 40	- 5	- 0.3	
Claveria	Rural	SW DW	- 40	- <D< 40 <D< 100	- 30	- 0.1	30:70
	Urban	SW DW	- 100	- <D< 90 <D< 100	- 50	- 0.3	
El Salvador	Rural	SW DW	- 50	- <D< 20 <D< 50	- 10	- 1.0	80:20
	Urban	SW DW	- 100	- <D< 60 <D< 120	- 10	- 2.0	
Gingoog City	Rural	SW DW	- 90	- <D< 30 <D< 60	- 20	- 1.0	80:20
	Urban	SW DW	- 100	- <D< 50 <D< 100	- 10	- 1.5	
Gitagum	Rural	SW DW	- 100	- <D< 30 <D< 70	- 20	- 0.5	90:10
	Urban	SW DW	- 100	- <D< 60 <D< 120	- 5	- 1.0	
Initao	Rural	SW DW	- 80	- <D< 30 <D< 70	- 20	- 0.5	80:20
	Urban	SW DW	- 100	- <D< 60 <D< 120	- 5	- 1.0	
Jasaan	Rural	SW DW	- 100	- <D< 20 <D< 40	- 10	- 0.1	10:90
	Urban	SW DW	- 100	- <D< 30 <D< 40	- 5	- 0.3	
Kinoguitan	Rural	SW DW	- 100	- <D< 20 <D< 40	- 10	- 0.1	10:90
	Urban	SW DW	- 100	- <D< 30 <D< 40	- 5	- 0.3	
Lagonglong	Rural	SW DW	- 40	- <D< 20 <D< 50	- 5	- 0.5	20:80
	Urban	SW DW	- 100	- <D< 50 <D< 70	- 5	- 1.0	
Laguindingan	Rural	SW DW	- 100	- <D< 30 <D< 70	- 20	- 0.5	90:10
	Urban	SW DW	- 100	- <D< 60 <D< 120	- 5	- 1.0	
Libertad	Rural	SW DW	- 60	- <D< 30 <D< 70	- 20	- 0.5	90:10
	Urban	SW DW	- 100	- <D< 60 <D< 120	- 5	- 1.0	
Lugait	Rural	SW DW	- 100	- <D< 30 <D< 70	- 20	- 0.5	80:20
	Urban	SW DW	- 100	- <D< 60 <D< 120	- 5	- 1.0	
Magsaysay	Rural	SW DW	- 100	- <D< 40 <D< 80	- 30	- 0.5	80:20
	Urban	SW DW	- 100	- <D< 50 <D< 80	- 10	- 1.0	

Table 7.7.1 Standard Specification of Wells by Municipality (contd)

Municipalities with Classification		Type	Proportion (%)	Standard Specification			Ratio (%) well:spring	
				Depth Range (m)	SWL (m)	Sp. Cap. (psm)		
Manticao	Rural	SW DW	- 40	- <D< 30 <D<	- 70	- 20	- 0.5	80:20
	Urban	SW DW	- 100	- <D< 60 <D<	- 120	- 5	- 1.0	
Medina	Rural	SW DW	- 50	- <D< 30 <D<	- 60	- 20	- 1.0	50:50
	Urban	SW DW	- 100	- <D< 50 <D<	- 100	- 10	- 1.5	
Naawan	Rural	SW DW	- 30	- <D< 30 <D<	- 70	- 20	- 0.5	80:20
	Urban	SW DW	- 100	- <D< 60 <D<	- 100	- 5	- 1.0	
Opol	Rural	SW DW	- 60	- <D< 20 <D<	- 50	- 10	- 1.0	90:10
	Urban	SW DW	- 100	- <D< 60 <D<	- 120	- 10	- 2.0	
Salay	Rural	SW DW	- 90	- <D< 20 <D<	- 40	- 10	- 0.1	10:90
	Urban	SW DW	- 100	- <D< 30 <D<	- 40	- 5	- 0.3	
Sugbongcogon	Rural	SW DW	- 100	- <D< 20 <D<	- 40	- 10	- 0.1	10:90
	Urban	SW DW	- 100	- <D< 30 <D<	- 40	- 5	- 0.3	
Tagoloan	Rural	SW DW	- 100	- <D< 20 <D<	- 50	- 10	- 1.0	100:0
	Urban	SW DW	- 100	- <D< 60 <D<	- 120	- 10	- 2.0	
Talisayan	Rural	SW DW	- 70	- <D< 20 <D<	- 40	- 10	- 0.1	10:90
	Urban	SW DW	- 100	- <D< 30 <D<	- 40	- 5	- 0.3	
Villanueva	Rural	SW DW	- 100	- <D< 20 <D<	- 50	- 10	- 1.0	70:30
	Urban	SW DW	- 100	- <D< 60 <D<	- 120	- 10	- 2.0	

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, well locations are assumed in terms of rural and urban areas by municipality referring to the classification of rural and urban barangays.

For the municipalities without any well data, the well parameters are appropriated using those in 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 entailing the pumping tests of existing deep wells and the construction of test wells shall be conducted. The municipalities that fall on this group are Gingoog City, Balingasag and Tagoloan. Table 7.7.2 summarizes the requirements.

Table 7.7.2 Detailed Groundwater Investigation Required

Municipality	Area	Investigation Activities and Specification
Gingoog City	Alluvial Plain	Test Deep Wells; possible existing deep wells owned by the WD Test; Pumping Test & Water Quality Examination Time Draw-down with maximum discharge of 3,000 m ³ /day Recovery Test Water Quality Examination to include of Cl Study on Groundwater Balancing River Flow; run-off measurement, Maintenance flow, etc. Meteorological Analysis; precipitation, etc.
Balingasag & Tagoloan	Alluvial Plain	Test Wells; One deep well each depth of 120 m, diameter of 250 mm and well screen of 30 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

The groundwater development for water supply in urban areas (Level II and III systems) may require the construction of deep wells with a 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 of the problem on pump-operation with excess electric consumption and deterioration of deep well life may be obliged. Thus, 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) locations and type of spring sources. (2) fluctuation of discharge rates through 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, which are not prescribed in the national plan: school and public toilets as well as sewerage are assumed based on the current conditions. In addition, preliminary discussions on solid waste management are included as a vital component of sanitation sector.

Projection of frame values by municipality is undertaken for respective sub-sectors; future population by urban and rural area, the number of student enrollment to public schools and the number of public utilities. Reference base figures for the study of framework are the 1995 Census of Population and Housing, the statistical data of the province and the information from relevant agencies. Provincial population by target year and the base year (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 (%)	Additional Population to be Served	Population Coverage (%)	Additional Population to be Served
Water Supply	Population Coverage (%)	Population Coverage (%)	Additional Population to be Served	Population Coverage (%)	Additional Population to be Served
<i>Urban Area</i>	87	87	34,177	95	147,152
<i>Rural Area</i>	72	75	57,481	93	135,139
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>	77	85	11,228	93	30,791
Flush	13	15	4,617	50	27,462
Pour Flush	81	75	3,933	50	3,329
VIP	6	10	2,678	0	0
<i>Rural Area</i>	60	75	21,294	93	53,009
Flush	1	0	0	25	12,649
Pour Flush	85	85	16,515	75	40,360
VIP	14	15	4,779	0	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
	66	80	38,333	90	42,776
<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	75	100	75
<i>Sewerage</i>	Urban Population Coverage (%)	Not Applicable		Urban Population Coverage (%)	Urban Population to be Served
	0			50	107,955
<i>Solid Waste</i>	Urban Household Coverage (%)	Urban Household Coverage (%)	Additional Urban Households to be Served	Not Applicable	
	53	90	24,706		

Table 8.2.2 Estimation of Base Year Service Coverage of Water Supply

Municipality/City	Area	Population (1997)	Population Served by 1997 facilities				Percentage Coverage
			Level III	Level II	Level I	Total	
Alubijid	Urban	5,714	3,050	200	1,666	4,916	86
	Rural	16,992		3,568	9,344	12,912	76
	Total	22,706	3,050	3,768	11,010	17,828	79
Balingasag	Urban	12,799			8,438	8,438	66
	Rural	35,114		875	18,443	19,318	55
	Total	47,913		875	26,881	27,756	58
Balingoan	Urban	3,628	1,720	210	1,236	3,166	87
	Rural	4,286		400	3,273	3,673	86
	Total	7,914	1,720	610	4,509	6,839	86
Binuangan	Urban	1,533		715	454	1,169	76
	Rural	3,953		2,535	983	3,518	89
	Total	5,486		3,250	1,437	4,687	85
Claveria	Urban	19,674	7,100	300	8,363	15,763	80
	Rural	22,991	21,027			21,027	91
	Total	42,665	28,127	300	8,363	36,790	86
El Salvador	Urban	6,207	5,817			5,817	94
	Rural	27,405	1,100	3,340	16,662	21,102	77
	Total	33,612	6,917	3,340	16,662	26,919	80
Gingoog City	Urban	32,098	11,710	2,766	11,304	25,780	80
	Rural	57,401	4,365	41,102	2,171	47,638	83
	Total	89,499	16,075	43,868	13,475	73,418	82
Gitagum	Urban	2,214	2,040			2,040	92
	Rural	9,238		2,550	4,499	7,049	76
	Total	11,452	2,040	2,550	4,499	9,089	79
Initao	Urban	6,112	6,094		5	6,099	100
	Rural	17,298		1,838	10,028	11,866	69
	Total	23,410	6,094	1,838	10,033	17,965	77
Jasaan	Urban	21,071	4,785	2,988	11,449	19,222	91
	Rural	14,454	7,840	1,144	3,254	12,238	85
	Total	35,525	12,625	4,132	14,703	31,460	89
Kinoguitan	Urban	1,968	1,280	678	4	1,962	100
	Rural	9,151		3,456	4,149	7,605	83
	Total	11,119	1,280	4,134	4,153	9,567	86
Lagonglong	Urban	3,459	1,520		935	2,455	71
	Rural	12,942	1,800	1,800	5,678	9,278	72
	Total	16,401	3,320	1,800	6,613	11,733	72
Laguindingan	Urban	2,497	2,497			2,497	100
	Rural	14,432	4,086	4,122	5,835	14,043	97
	Total	16,929	6,583	4,122	5,835	16,540	98
Libertad	Urban	3,554	1,780	690	539	3,009	85
	Rural	6,021		828	1,582	2,410	40
	Total	9,575	1,780	1,518	2,121	5,419	57

Table 8.2.2 Estimation of Base Year Service Coverage of Water Supply (Cont.)

Municipality/City	Area	Population (1997)	Population Served by 1997 facilities				Percentage Coverage
			Level III	Level II	Level I	Total	
Lugait	Urban	6,356	6,172	100		6,272	99
	Rural	7,083	756	4,685	612	6,053	85
	Total	13,439	6,928	4,785	612	12,325	92
Magsaysay	Urban	1,546		1,353	41	1,394	90
	Rural	22,843			10,361	10,361	45
	Total	24,389		1,353	10,402	11,755	48
Manticao	Urban	6,601	3,660		1,845	5,505	83
	Rural	16,497		120	10,680	10,800	65
	Total	23,098	3,660	120	12,525	16,305	71
Medina	Urban	5,820	5,650			5,650	97
	Rural	18,113	460	7,407	6,002	13,869	77
	Total	23,933	6,110	7,407	6,002	19,519	82
Naawan	Urban	3,140	1,760		762	2,522	80
	Rural	11,946		708	6,572	7,280	61
	Total	15,086	1,760	708	7,334	9,802	65
Opol	Urban	7,205	510	450	1,950	2,910	40
	Rural	18,280			8,504	8,504	47
	Total	25,485	510	450	10,454	11,414	45
Salay	Urban	6,861		6,747	86	6,833	100
	Rural	12,381		2,077	6,746	8,823	71
	Total	19,242		8,824	6,832	15,656	81
Sugbongcogon	Urban	3,700	970	2,730		3,700	100
	Rural	3,589	522	2,086	952	3,560	99
	Total	7,289	1,492	4,816	952	7,260	100
Tagoloan	Urban	44,079	39,230	4,849		44,079	100
	Rural						
	Total	44,079	39,230	4,849		44,079	100
Talisayan	Urban	4,505		3,250	431	3,681	82
	Rural	16,426		2,230	8,176	10,406	63
	Total	20,931		5,480	8,607	14,087	67
Villanueva	Urban	10,281	7,154		1,452	8,606	84
	Rural	12,953	3,993	100	3,157	7,250	56
	Total	23,234	11,147	100	4,609	15,856	68
Provincial Total	Urban	222,622	114,499	28,026	50,960	193,485	87
	Rural	391,789	45,949	86,971	147,663	280,583	72
	Total	614,411	160,448	114,997	198,623	474,068	77

The base year service coverage in urban area (87%) is much higher than the updated MTPDP sector target (69%) for the year 1998, while rural area (72%) is slightly behind the sector target of 79%. As identified in Chapter 4, the lower service coverage in rural area is affected the current service coverage in some municipalities.

For Phase I development, target of service coverage for urban water supply shall be kept existing service coverage of 87% considering that higher coverage was already achieved in the province. While target for rural water supply is set up at 70% in consideration of moderate from the base year. 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 66%, which is a little above the current national average coverage of 60%. Urban area registers a level of 77% that is well above the national average coverage. Rural area however, has only 60% owing to the presence of numerous unsanitary facilities. By type of sanitary toilet facility, the existing percentage composition to total households is as follows:

<u>Type</u>	<u>Urban (%)</u>	<u>Rural (%)</u>
Flush	13	1
Pour-flush	81	85
VIP latrine	6	14

To attain sufficiency and equitable access to basic services, provincial target of Phase I for urban household toilets is planned at 85%, while, for rural household toilets, 75% is projected. This is almost equal to the existing urban service coverage of 77% 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 both urban and rural household toilets.

Table 8.2.3 Base Year Service Coverage of Household Toilets

Municipality/ City	Area	1997		Households and Population Using Sanitary Toilets								
		Population	HHs	Number of Households				Population	Service Coverage (%)			
				Flush	Pour Flush	VIP/Dry	Total		Flush	Pour Flush	VIP/Dry	Total
Alubijid	Urban	5,714	1,198	40	821	11	872	4,172	3	69	1	73
	Rural	16,992	3,615	11	1,336	42	1,389	6,457		37	1	38
	Total	22,706	4,813	51	2,157	53	2,261	10,629	1	45	1	47
Balingasag	Urban	12,799	2,410	8	1,143	150	1,301	6,912		47	6	54
	Rural	35,114	6,503	8	2,861	683	3,552	19,313		44	11	55
	Total	47,913	8,913	16	4,004	833	4,853	26,225		45	9	54
Balingoan	Urban	3,628	687	3	510		513	2,721		74		75
	Rural	4,286	831		587		587	3,044		71		71
	Total	7,914	1,518	3	1,097		1,100	5,765		72		72
Binuangan	Urban	1,533	276	3	218		221	1,227	1	79		80
	Rural	3,953	794	4	575		579	2,886	1	72		73
	Total	5,486	1,070	7	793		800	4,113	1	74		75
Claveria	Urban	19,674	3,597		2,063	585	2,648	14,559		57	16	74
	Rural	22,991	4,322		569	1,170	1,739	9,197		13	27	40
	Total	42,665	7,919		2,632	1,755	4,387	23,756		33	22	55
El Salvador	Urban	6,207	1,219		808		808	4,097		66		66
	Rural	27,405	5,384		2,278		2,278	11,511		42		42
	Total	33,612	6,603		3,086		3,086	15,608		47		47
Gingoog City	Urban	32,098	6,197	3,477	1,862	857	6,196	32,098	56	30	14	100
	Rural	57,401	11,322		8,396	685	9,081	45,921		74	6	80
	Total	89,499	17,519	3,477	10,258	1,542	15,277	78,019	20	59	9	87
Gitagum	Urban	2,214	451	6	337		343	1,683	1	75		76
	Rural	9,238	1,909	2	1,200	10	1,212	5,820		63	1	63
	Total	11,452	2,360	8	1,537	10	1,555	7,503		65		66
Initao	Urban	6,112	1,298		1,080		1,080	5,073		83		83
	Rural	17,298	3,596		1,488	280	1,768	8,477		41	8	49
	Total	23,410	4,894		2,568	280	2,848	13,550		52	6	58
Jasaan	Urban	21,071	3,968	43	2,858	37	2,938	15,593	1	72	1	74
	Rural	14,454	2,732	6	1,469	167	1,642	8,673		54	6	60
	Total	35,525	6,700	49	4,327	204	4,580	24,266	1	65	3	68
Kinoguitan	Urban	1,968	351	1	240		241	1,358		68		69
	Rural	9,151	1,691		736		736	4,027		44		44
	Total	11,119	2,042	1	976		977	5,385		48		48
Lagonglong	Urban	3,459	654		464		464	2,456		71		71
	Rural	12,942	2,433		1,466		1,466	7,766		60		60
	Total	16,401	3,087		1,930		1,930	10,222		63		63
Laguindingan	Urban	2,497	510	2	373	84	459	2,248		73	16	90
	Rural	14,432	2,988		2,091	266	2,357	11,402		70	9	79
	Total	16,929	3,498	2	2,464	350	2,816	13,650		70	10	81

Table 8.2.3 Base Year Service Coverage of Household Toilets (Cont.)

Municipality/ City	Area	1997		Households and Population Using Sanitary Toilets								
		Population	IHIs	Number of Households				Population	Service Coverage (%)			
				Flush	Pour Flush	VIP/Dry	Total		Flush	Pour Flush	VIP/Dry	Total
Libertad	Urban	3,554	724	2	505	63	570	2,808		70	9	79
	Rural	6,021	1,160	3	719	31	753	3,914		62	3	65
	Total	9,575	1,884	5	1,224	94	1,323	6,722		65	5	70
Lugait	Urban	6,356	1,284	20	863		883	4,386	2	67		69
	Rural	7,083	1,686		677		677	2,834		40		40
	Total	13,439	2,970	20	1,540		1,560	7,220	1	52		53
Magsaysay	Urban	1,546	294		139	32	171	897		47	11	58
	Rural	22,843	4,393		1,157	830	1,987	10,280		26	19	45
	Total	24,389	4,687		1,296	862	2,158	11,177		28	18	46
Manticao	Urban	6,601	1,302	199	689	111	999	5,083	15	53	9	77
	Rural	16,497	3,306	356	1,339	904	2,599	13,033	11	41	27	79
	Total	23,098	4,608	555	2,028	1,015	3,598	18,116	12	44	22	78
Medina	Urban	5,820	1,109		704		704	3,667		63		63
	Rural	18,113	3,398		1,695	91	1,786	9,600		50	3	53
	Total	23,933	4,507		2,399	91	2,490	13,267		53	2	55
Naawan	Urban	3,140	632		584	12	596	2,952		92	2	94
	Rural	11,946	2,468		1,503	316	1,819	8,841		61	13	74
	Total	15,086	3,100		2,087	328	2,415	11,793		67	11	78
Opol	Urban	7,205	1,435	12	536	16	564	2,810	1	37	1	39
	Rural	18,280	3,663	10	2,519	500	3,029	15,173		69	14	83
	Total	25,485	5,098	22	3,055	516	3,593	17,983		60	10	70
Salay	Urban	6,861	1,348	8	1,019		1,027	5,215	1	76		76
	Rural	12,381	2,516		1,488		1,488	7,305		59		59
	Total	19,242	3,864	8	2,507		2,515	12,520		65		65
Sugbongcogon	Urban	3,700	668		633		633	3,515		95		95
	Rural	3,589	642		495		495	2,764		77		77
	Total	7,289	1,310		1,128		1,128	6,279		86		86
Tagoloan	Urban	44,079	8,477	274	6,368		6,642	34,382	3	75		78
	Rural											
	Total	44,079	8,477	274	6,368		6,642	34,382	3	75		78
Talisayan	Urban	4,505	824		444		444	2,433		54		54
	Rural	16,426	3,065		1,459	126	1,585	8,542		48	4	52
	Total	20,931	3,889		1,903	126	2,029	10,975		49	3	52
Villanueva	Urban	10,281	2,012	52	1,352	136	1,540	7,917	3	67	7	77
	Rural	12,953	2,501		1,194	256	1,450	7,513		48	10	58
	Total	23,234	4,513	52	2,546	392	2,990	15,430	1	56	9	66
Provincial Total	Urban	222,622	42,925	4,150	26,613	2,094	32,857	170,262	10	62	5	77
	Rural	391,789	76,918	400	39,297	6,357	46,054	234,293	1	51	8	60
	Total	614,411	119,843	4,550	65,910	8,451	78,911	404,555	4	55	7	66

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

Municipality/ City	Public School Toilets			Public Toilets		
	Total Number of Public School Students (1997)	Std. No. of Public School Student that can be Served by Base Year (1997) Sanitary Toilets	Service Coverage (%)	Number of Public Utilities with Toilets in 1997	Number of Public Utility with Sanitary Toilets in Base Year (1997)	Service Coverage (%)
Alubijid	5,901	2,760	47	2	2	100
Balingasag	13,874	6,880	50	2	2	100
Balingoan	2,129	800	38	2	2	100
Binuangan	1,769	800	45	4	4	100
Claveria	12,096	12,096	100	4	4	100
El Salvador	6,482	6,482	100	2	2	100
Gingoog City	22,544	12,440	55	6	6	100
Gitagum	2,145	1,680	78	2	2	100
Initao	6,755	4,480	66	4	4	100
Jasaan	8,879	5,760	65	4	4	100
Kinoguitan	2,171	2,080	96	1	1	100
Lagonglong	3,859	2,160	56			
Laguindingan	4,474	4,474	100	1	1	100
Libertad	3,106	2,440	79	2	2	100
Lugait	3,882	1,360	35	1	1	100
Magsaysay	7,535	4,040	54	3	3	100
Manticao	5,203	5,080	98	3	3	100
Medina	7,803	4,000	51	1	1	100
Naawan	3,624	3,624	100	1	1	100
Opol	7,666	3,120	41	1	1	100
Salay	5,919	2,680	45	1	1	100
Sugbongcogon	2,395	2,395	100	1	1	100
Tagoloan	9,977	6,000	60	2	2	100
Talisayan	5,528	4,720	85	1	1	100
Villanueva	6,029	4,160	69	1	1	100
Provincial Total	161,745	106,511	66	52	52	100

Base year service coverage is 66% 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, 80% 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.

About 19% of the total households in the province relied on municipal refuse collection using trucks or a 53% urban household coverage. These municipalities have a total of 19 units of collection truck.

No national targets have yet been set. However, considering the present level of coverage, a 90% urban household coverage is applied for the medium-term period (1999-2003).