Chapter 6

PAST FINANCIAL PERFORMANCE IN WATER SUPPLY AND SANITATION

6. PAST FINANCIAL PERFOMANCE 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, institutional capacity building and limited financial assistance.

The financial arrangements which have been adopted and implemented, since the sector's devolution to the LGUs, by the province with special attention to the subject sector are reviewed and discussed in this chapter. The past experience serves as the basis to formulate 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 for the period covering the years 1995 to 1999 was investigated. Actual financial data were obtained for the years 1995 to 1998, while the financial figures in 1999 are only budgetary estimates. The municipalities' past financial performance in the same period (1995 to 1998) are presented 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, 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 – LGU's share in the national internal revenue taxes is based on the collection of the 3rd fiscal year preceding the current fiscal year and is shown as follows: 1st year of effectivity of the LGC of 1991- 30% (1992), 2nd year (1993) – 35% and on the 3rd year (1994) and thereafter is 40% of the gross national internal revenue collections. A

standard formula, which considers parameters such as population (50%), land area (25%), and equal sharing (25%) is used to determine the LGU share in the IRA. Provided, however, that in the 1st year LGUs were, in addition to the 30% IRA which included the cost of devolved functions for essential public services, entitled to receive the amount equivalent to the cost of devolved personnel services.

(b) Tax Revenues – mainly consist of real property tax, accounting for an average of 2.36% of the total income of the province.

(c) Grants, Aids and Subsidies – There are no grants and subsidies reported by the province. However, there are national projects being contracted by the province that are considered as grants.

(d) Other Income – there are no economic enterprises, but receives minimal income from various fees and charges on certain services.

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 Capiz during the period 1995-1999. Local tax revenues, which were 2.36% of the total income of the province, consist of real property tax, business taxes and licenses, and miscellaneous taxes. IRA's annual average share to total income was 94.22%, which indicates that the province has historically been dependent on IRA with its low tax and non-tax revenue collections.

In order to mobilize fund sourcing, the 1987 Constitution and the 1991 Local Government Code granted the Provincial Government to have its initiative to create new revenue sources. The LGU financing options are discussed in Section 6.4 and in the Supporting Report.

Table 6.2.1 Income and Expenditures between 1995 and 1999

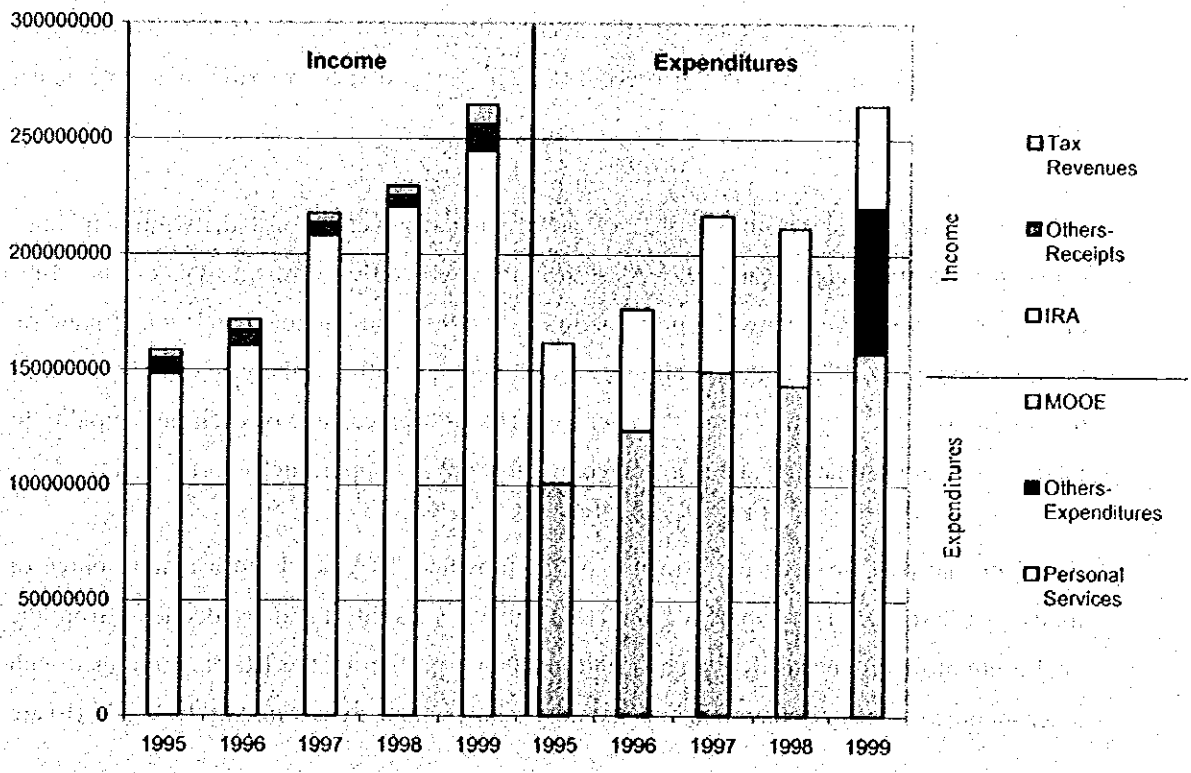
Province	1995	1996	1997	1998	1999
Receipts					
Tax Revenue					
- Real Property Tax	3,422,495.43	4,071,855.38	3,767,558.25	3,664,959.12	8,088,861.02
- Business Tax	189,118.09	343,652.17	415,774.83	366,531.94	-
- Others	-	-	-	-	246,928.66
IRA	148,063,639.00	160,495,428.00	208,199,737.33	220,712,612.00	244,893,211.20
Other (Non-tax)	6,852,808.94	6,800,389.93	5,519,163.01	4,881,802.67	11,619,210.40
Sub-total	158,528,061.46	171,711,325.48	217,902,233.42	229,625,905.73	264,848,211.28
Expenditures					
Personal Services	100,966,441.40	124,120,909.38	149,396,646.91	143,455,746.12	157,649,121.32
MOOE	60,863,171.71	52,464,575.86	67,472,039.81	68,248,034.42	44,317,787.86
Others	-	-	-	-	62,648,052.80
Sub-total	161,829,613.11	176,585,485.24	216,868,686.72	211,703,780.54	264,614,961.98
Net Operating Income	(3,301,551.65)	(4,874,159.76)	1,033,546.70	17,922,125.19	233,249.30
Add: Borrowings	-	-	-	-	-
Surplus (Income from prior	32,695.57	20,637.72	25,988.24	553,853.39	-
Less: Capital Outlays	871,126.09	2,534,589.51	6,222,333.50	32,192.30	20,000.00
Net Income	(4,139,982.17)	(7,388,111.55)	(5,162,798.56)	18,443,786.28	213,249.30

Source: PPDO and Provincial Accountant's Office

Note: 1/ Includes Tax Revenues (Real Property Tax, Transfer Tax, Franchise Tax, Tax on Peddlers, Occupation, Immigration Tax, Mining Tax, Sand and Gravel Tax, Community Tax, Amusement Tax, Miscellaneous, etc)

2/ Includes Secretary's Fees, and other charges.

Figure 6.2.1
Income and Expenditures of Capiz, 1995-1999



(2) Uses of Funds in the Province

Actual expenditures of the provincial government during the period from 1995 to 1998 show that personnel expenses comprise majority of expenses with an average of 64.80% to the total revenue, as a result of devolution. Maintenance and operating expenses of the province was 28.14% of total revenues. In addition, the province has a capital outlay with an average share of 0.93% to the total revenue. The funds for the water supply sector were part of the capital outlays of the province.

From 1995 to 1998, the province had an average of ₱11.01 million net operating income from operations. For 1999 however, the province has a projected net operating income of only ₱233.2 thousand. After deducting capital outlay and non-office expenditures, the province projects a net income of ₱213.2 thousand.

6.2.2 Availability of Funds

As previously noted, the IRA comprises 94.22% 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 1995 and budget year 1999. As shown, the average IRA of the province was 1.14% of the provincial IRA nationwide in the period 1995-1998 and budget year 1999. Likewise, the total amount of IRA allotted to all its cities and municipalities in the years 1995-1999 was 0.73% and 0.95%, respectively, in the average. 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 Past Internal Revenue Allotment to Province from Central Government

Unit: Pesos

	Distribution of IRA	1995	1996	1997	1998	1999
National	1. National Total of IRA	55,202,000,000	58,022,990,000	71,049,000,000	80,990,763,000	96,780,000,000
	a) IRA to All Provinces	12,696,644,000	13,755,011,803	17,813,000,000	20,054,018,925	22,259,400,000
	b) IRA to All Cities	12,696,460,000	13,345,287,700	16,341,270,000	18,627,875,490	22,259,400,000
	c) IRA to All Municipalities	18,768,952,000	19,607,715,553	24,849,000,000	28,245,815,434	32,905,200,000
Provincial	2. IRA to the Province of Capiz					
	a) Total: (b)+(c)+(d)	414,889,129	467,319,585	579,607,940	587,583,144	720,254,858
	b) Provincial Government	148,063,639	160,756,074	207,932,161	209,096,159	259,781,957
	Percentage of 1.a)	(1.17)	(1.17)	(1.17)	(1.04)	(1.17)
	c) Cities	100,323,942	107,868,311	124,600,264	127,297,347	138,667,936
	Percentage of 1.b)	(0.79)	(0.81)	(0.76)	(0.68)	(0.62)
	d) Municipalities	166,501,548	198,695,200	247,075,515	251,189,638	321,804,965
	Percentage of 1.c)	(0.89)	(1.01)	(0.99)	(0.89)	(0.98)
	3. Total Revenue of the Provincial Gov't.	158,528,061	171,711,325	217,902,233	229,625,906	264,848,211
	Percentage of IRA of the Provincial Gov't	(93.40)	(93.62)	(95.42)	(91.06)	(98.09)
Municipalities	4. IRA to Municipalities					
	Total	166,501,548	198,695,200	247,075,515	251,189,638	321,804,965
	Cuartero	8,292,564	9,824,038	13,093,273	13,446,814	17,202,897
	Dao	11,501,535	12,415,439	13,450,591	13,793,301	17,673,884
	Dumalag	9,588,028	10,381,255	13,273,111	13,674,491	17,556,191
	Dumarao	11,704,435	14,632,236	17,998,958	18,637,526	23,910,306
	Ivisan	8,270,868	8,954,648	11,402,808	11,634,942	14,850,914
	Jamindan	13,149,443	15,024,740	19,669,691	20,621,004	26,437,854
	Ma-ayon	11,196,839	11,982,283	14,825,126	15,243,107	19,494,015
	Mambusao	11,324,169	12,164,439	15,798,327	16,110,654	20,704,873
	Panay	12,154,927	13,160,087	16,612,463	17,032,891	21,842,856
	Panitan	10,911,171	11,809,023	14,508,787	14,871,999	19,074,479
	Pilar	12,404,289	13,419,672	16,457,589	15,476,488	19,869,880
	Pontevedra	0	15,308,829	18,984,116	17,033,262	21,840,925
	President Roxas	8,721,071	9,449,486	11,849,891	12,586,226	16,074,766
	Roxas City (Capital)	100,323,942	107,868,311	124,600,264	127,297,347	138,667,936
	Sapi-an	10,756,147	11,567,655	14,363,922	14,888,491	18,972,408
	Sigma	9,416,273	10,197,278	12,600,191	12,966,065	16,621,039
	Tapaz	17,109,789	18,404,092	22,186,671	23,172,377	29,677,678

Source: Provincial Treasurer's Office.

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 have been inadequate to cover operating, capital and non-office expenses in 1995 and 1996. It was only in 1998 that there was significant income that was more than enough for expenses.

For the planned capital expenditures of the province, the 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 the allotted funds for capital expenditures (20% DF) between 1995 and 1999. The 20% DF of the province was sufficient to cover the actual expenditures for the years 1995 to 1998. For 1999, it is projected that the 20% DF amounting to ₱48.98 million will cover 100% of the capital expenditures of the province.

Table 6.2.3 Actual Funds for Capital Expenditures (20% DF), 1994-1999

Unit: Pesos

Year	IRA of the Province (a)	Planned 20% DF [1] (b)	Actual Expenditures on 20% DF [2] (c)	Surplus/(Deficit)
1995	148,063,639.00	31,354,993.23	29,312,943.33	2,042,049.90
1996	160,495,428.00	27,220,173.00	20,218,933.20	7,001,239.80
1997	208,199,737.33	38,475,657.00	37,055,120.19	1,420,536.81
1998	220,712,612.00	46,651,949.40	30,607,197.10	16,044,752.30
1999[3]	244,893,211.20	48,978,642.24	-	48,978,642.24

Source: Provincial Treasurer's Office

1/ The 20% DF allotted may not be equal to the computed 20% of IRA.

2/ These figures are not necessarily similar with the capital expenditures shown in Table 6.2.1 from Provincial Accountant's Office. Includes current and previous years. For 1999, no expenditures incurred have not been consolidated.

3/ Actual expenditures for 1999 is the non-office expenditures in Table 6.2.1

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, as well as 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. According to the MDF Policy Governing Board Resolution 4-95, the average annual growth rate to be used should not exceed 15%.

DSC =[{RINC 1 (1+AGR) + RINC 1} + IRA 2] x 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 ₱47.38 million for the year 1999. This amount reflects the maximum loan that can be availed of from MDF. The local tax income (current year) and IRA of the province are projected at ₱8.09 million and ₱220.71 million (preceding year), respectively. The province has not incurred any loan.

6.3 Past Public Investment and Present Plans

6.3.1 Past and Current Annual Investment Plans

The past and recent development of the water supply and sanitation sector in the province was undertaken mainly by the provincial government through the Provincial Engineering Office (PEO) and PPDO (mainly monitoring), the DILG, and DPWH. The water supply sector obtained ₱10.0 million during the period 1995-1999 from various agencies. Investments for sanitation for the same period are insignificant, and are provided only for water quality expenditures. Level I systems accounted for 96% of the total investment for the period (refer to Table 6.3.1), followed by Level II projects.

Table 6.3.1 Previous Sector Investment to the Province by Concerned Agencies

Item		1995 - 1999				
Agency	Source of Funds	Level I	Level II	Level III	Sub-total	Sanitation
Unit: Pesos						
DILG	PAF-2/UNDP	3,146,186.00	243,611.00		3,389,797.00	
DPWH/DILG		4,278,272.48			4,278,272.48	
LWUA					-	
DOH (1996-1998)					-	
UNDP		1,227,340.00			1,227,340.00	
Province	CDF Sanggunian	690,455.71	84,258.00		774,713.71	7,500.00
City					-	
Roxas City					-	4.00
Municipality	LGU Counterpart	284,593.40	48,722.00		333,315.40	
Total		9,626,847.59	376,591.00	-	10,003,438.59	7,500.00

(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 Capiz for the sector for the period 1995 to 1999 are summarized in Tables 6.3.2 and 6.3.3.

Table 6.3.2 shows the annual planned activities in the water supply sector, the corresponding funding sources and the amount of investment from 1995 to 1999, while Table 6.3.3 summarizes annual sector investments by service level for the same period. Level I systems accounted for almost all of the total sector allocation for the period.

In the AIP of the province, a total investment cost of ₱10.9 million was planned for the water supply sector for the period 1995-1999. Actual expenditures however for the sector out of the 20%DF was very small at ₱ 2.84 million.

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 and graphically

shown in Figure 6.3.4, the social development and infrastructure sectors obtained 29.92% and 21.66% of the DF in 1998 (out of ₱46.65 million actual expenditures). However, the WATSAN sector was not a priority sector and on the average, only 1.66% of actual expenditures was allotted to the WATSAN sector.

6.3.3 Existing Plans of the LGUs for the Sector

(a) Logistic support with required funding

The LGUs through the course of project implementation shall ensure the 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.

Also, the province shall determine financial arrangements for the implementation of Medium-Term Development Plan (2000-2004) to be prepared, entailing the share to the relevant sector from development fund of IRA and other financial sources to be availed of.

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

The province provides the subsidies to support capital development at the municipal and barangay levels through its 20% DF. However, barangays and municipalities that request funding must be prompt in submitting the necessary documents to PPDO for processing. Out of the 20% DF, the province may provide logistics for manpower requirement for devolved functions.

Table 6.3.2 Annual Activities in the Water Supply Sector

Item	1995			1996			1997			1998			1999		
	IA	Fund Source	Amount (P '000)	IA	Fund Source	Amount (P '000)	IA	Fund Source	Amount (P '000)	IA	Fund Source	Amount (P '000)	IA	Fund Source	Amount (P '000)
Construction (DW,SW,Spring Box, Resevoir, Tank)															
Various Foreign Assisted								UNDP	1,227.34						
National								DPWH/DILG/ CDF	3,389.80		DPWH/DILG/ CDF	4,278.27			
Various Local Funding								CDF Sanggunian	1,108.03		CDF Sanggunian	983.57			
Construction of Rain Collectors/Water Tank															
Develop Spring Sources															
Various Foreign Assisted															
National															
Various Local Funding															
Spring Development with Level II															
Various Foreign Assisted															
National															
National/Local Funding															
Various Local Funding															
Spring Development with Level III															
Spring Dev. W/ pipes, water tank Construction Level II/III															
Various Foreign Assisted															
National															
Various Local Funding															
Loan															
Maintains/Rehab./Improve Level I/II/III & SD															
Expansion of Level II/III															
Construction of Health Center/BHS															
Water Disinfection/Chlrination of Water Sources															
Barangay Sanitation															
Construction of School/Public Toilet															

Source: PPDO/DILG

Table 6.3.3 Sector Allocation in the Annual Investment Plan

Item	1995	1996	1997	1998	Total
Unit: '000 Pesos					
Level I Facility and Level II System					
Foreign Assisted			1,227.34		1,227.34
National				7,668.07	7,668.07
Local (Provincial)			1,108.03	983.57	2,091.60
Level II/III System					
Foreign Assisted					
National					
Local					
Loan - DBP/LBP					
Expansion					
Repair/Maintenance					
Health Centers					
Water Quality	7.50				7.50
Total - Water Supply					
Total - Sanitation (Health)					
Grand Total	7.50		2,335.37	8,651.64	10,994.51

Table 6.3.4 Allocation of the 20% Development Fund, 1995-1999

Unit: Pesos

Year	Planned 20% Dev't. Fund	Actual Expenditures						
		Social Development	Economic Development	Infrastructure	Water Supply/ Sanitation	Others	Sub-Total	% of Water Supply to Actual Disbursed Amount of 20% DF
1995	31,354,993.23	1,307,697.00	5,844,790.24	5,200,000.00	2,060,000.00	16,942,505.99	31,354,993.23	6.57%
1996	27,220,173.00	2,064,000.00	5,337,306.00	3,200,000.00	200,000.00	16,418,867.00	27,220,173.00	0.73%
1997	38,475,657.00	14,645,788.40	3,617,000.00	6,245,131.40	40,000.00	13,927,737.20	38,475,657.00	0.10%
1998	46,651,949.00	13,958,460.40	3,762,495.00	10,105,994.00	40,000.00	18,425,000.00	46,651,949.40	0.86%
1999	48,978,642.24	11,950,000.00	7,300,000.00	8,826,000.00	500,000.00	20,402,642.24	48,978,642.24	1.02%

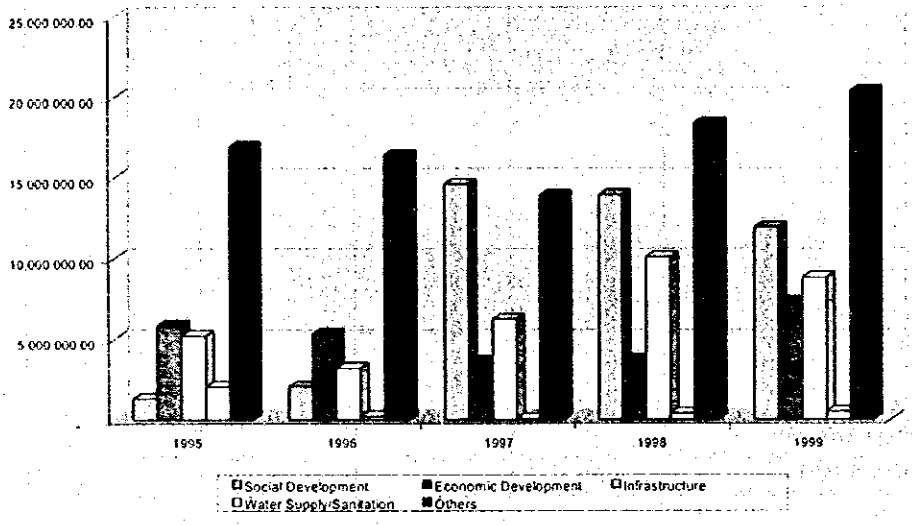
Source: Provincial Budget Office and Provincial Accountant's Office.
' The 1999 figures for expenditures are allotted amounts only. Actual figures are not available.

Based on the policy of the province, the following annual activities are undertaken in the province:

- Project proposals from the different municipalities and barangays are compiled;
- Consultation with the representatives of municipalities and barangays as to prioritization of the sector projects. During the occasion, the Governor announces the policy on the sector project implementation including budgetary allocation, the planned and implemented projects, and the obligation of the people/ beneficiaries (cost-sharing between province and municipalities according to financial capabilities of the municipalities concerned).
- For Level I and II water supply, LGUs implement the projects based on the available fund. Generally, projects are initiated by the BC. In case that project needs (finance,

technology, etc.) exceed the capacity of BC, the request is made to municipality followed by action by the province. There are cases when BCs directly request projects to Governor's Office.

Figure 6.3.4
Allocation of the 20% Development Fund



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

6.4.1 Cost Sharing Arrangements / Counterpart Funding

The implementation of rural water supply projects was previously undertaken by PPDO, PEO and PHO. The PEO receives requests for assistance from barangay people, although planning the sector projects is under the PPDO. The request, however, are granted on a case to case basis, usually if the manpower, materials and budget are available. It was assigned to the PEO for project implementation (Level I and II), since the PEO can undertake the design, construction and provide O & M assistance.

Cost sharing among concerned parties (LGUs, central government agencies and barangay people) has been made within realistic arrangement/ current capacity (though the level of the practice is far from present GOP policy). The following are other financial arrangements and issues.

a) There is no priority list of projects for the municipalities and no budget allocation was made in advance to reflect in the AIP. There is a Local Finance Committee to decide on priority projects for their financing, the members of which come from Budget Office, Treasurer's Office, PPDO and Accounting Office. All projects must have barangay

resolutions. The PDC (Provincial Development Council) also prepares its justification for the prioritization of projects.

b) The PEO implements the Provincial government-funded projects under the General Fund. The implementation of these projects is closely monitored with reference to progressive disbursements. For the sector implementation, the following are the local funding sources and corresponding implementing agencies.

Funding Source	Implementing Agency
Provincial Government	PEO
CDF (Congressmen)	DPWH – District Office
Municipal Government	Municipal Government

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 the UNICEF funds (grant) and JICA (grant). Water districts in the province likewise avail of funding through loans that are directly obtained from LWUA.

LGUs have the following financing options (refer to Figure 6.4.1): IRA, ODA, private sector financing and debt (both public and private sector debts). A more detailed discussion of the different financing options is presented in the Supporting Report. Below are the major commonly availed or financing options by LGUs.

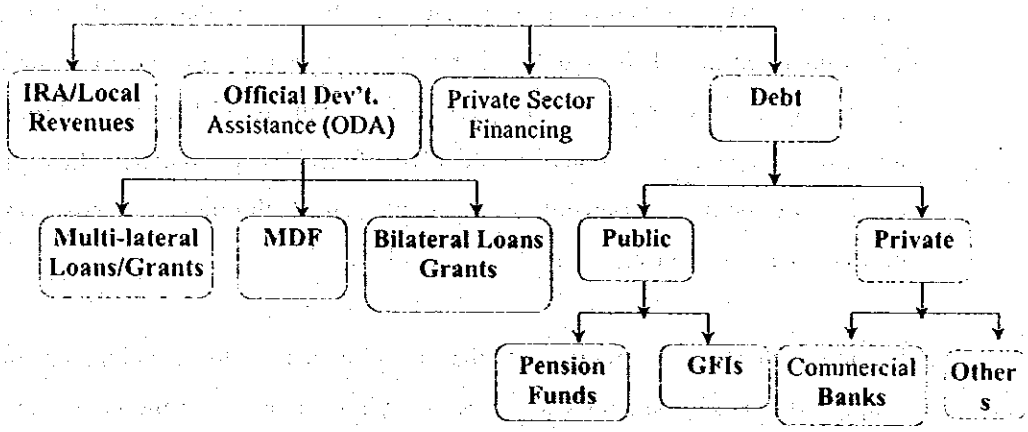
Arrangement through Conduits

(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

Figure 6.4.1 LGU Financing Options



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 relent 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 arrears 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 lower classes of LGUs, such as the 4th to 6th class municipalities.

(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), Philippine National Bank and the Development Bank of the Philippines (DBP). For the LGU to enter into a loan, the respective legislative council (Sangguniang Panlalawigan, SP for the Province; Sangguniang Panglunsod, 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 the amount due from the LGU's IRA deposited in that bank.

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

Loanable amount may be based on the amount of time deposit of the province in the bank.

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

(3) Foreign Lending Agencies

The external assistance to the Sector in the province comes from foreign assisted projects. Before the devolution of the sector, the province was a beneficiary of UNICEF and JICA health services. After the devolution, the province became the direct recipient of foreign grants.

There is currently a World Bank-assisted project, the Local Government Unit-Urban Water and Sanitation Project (LGUUWSP), which was conceived in mid-1995 by the Government through the DILG. The project is based on two underlying principles: "demand-driven approach in project development and implementation (the project shall provide services that the consumers want and are willing to pay for and that the services shall be managed at the lowest appropriate levels); and the "adoption of commercial principles" in the management/ operation of the water utilities by involving the private sector or the facilities must be operated as commercial entities, and water treated as an economic commodity.

The project promotes full cost recovery; that is, the tariff to be paid by the consumers should cover the cost of operation and maintenance and the repayment of the LGU DBP loan. The system shall be operated by a private operator under a long-term lease contract with the LGU. It aims to support the water supply requirement in the urban centers of approximately 250 small and medium sized municipalities, benefiting about 6 million people. There are two (2) sets of target markets, namely:

(1) Municipalities/ cities, irrespective of income class, which have not formed a water district; and
(2) Municipalities/ cities, irrespective of income class, which have water districts but are not in LWUA's current program of assistance (in which case, the LGU should secure a certification/ clearance to that effect). In the event that the local water district is receiving a loan from LWUA, it shall seek clearance from LWUA prior to entering into an agreement with LGU concerned in any program of system expansion/rehabilitation. The LGU equity ranges from 10-25% of the total project cost.

The overall cost estimated nationwide and implementation time table of the project are as follows:

Unit:US$ Million

Phase	World Bank	LGU	Total
1999 -- 2002	23.3	13.7	37.0
2000 -- 2004	60.0	20.0	80.0
2003 – 2006	100.0	33.0	133.0
Total	183.3	66.7	250.0

Relending Terms are as follows:

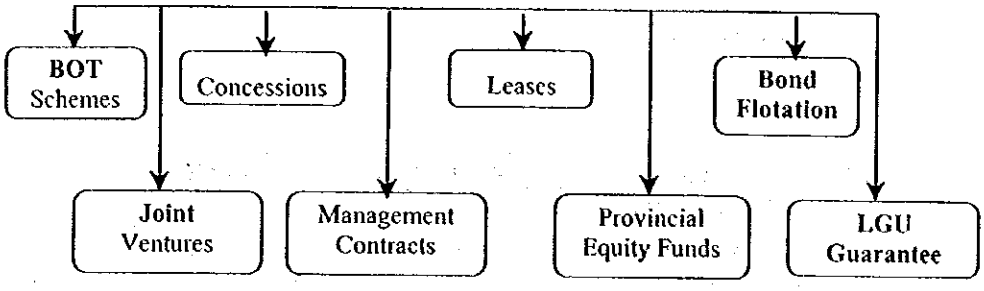
1) World Bank funds shall be channelled thru the Development Bank of the Philippines (DBP) which shall relend them as sub-project loans to the LGUs.
2) The DBP sub-project loan shall include the cost of feasibility study, technical design and construction of the water supply facility.
3) Basic terms of the loan are:
   - Interest per annum; 15%
   - Amortization Period; 15 years with 3-year grace period.

(4) Private Sector Financing Schemes

There are several private sector financing modalities that can be promoted to finance WATSAN sector projects particularly in urban areas, where existing service area coverage may warrant viability of WATSAN investments for a profit by the private sector proponent. Further, Level III water supply expansion projects are now increasingly financed through private sector financing mainly thru concession contracts and BOT schemes.

Figure 6.4.2 presents the different modalities for private sector financing that may be tapped by LGUs for financing sector projects. A more detailed discussion of the private sector financing schemes is presented in the Supporting Report.

Figure 6.4.2 Private Sector Financing



6.4.3 LGU-Financed and Managed Waterworks, and Water District

As presented in Table 6.4.1, there are six (6) WDs in the province with Metro Roxas Water District having the largest number of metered connections at more than 12,000 connections.

The WDs adopted progressive charge method and have achieved relatively high efficiency of water charge collection, which range from 70 to 96%. The average monthly consumption per connection is 13.37 cu.m. per month.

Shown in Table 6.4.2, is the status of existing loans of provincial/municipal waterworks and WDs. Metro Roxas WD had the highest loan amount availed, at P96.72 million. Metro Roxas is also paying the highest amortizations, at around ₱1.26 million per month.

Table 6.4.1 Financial Indicators of WD and Waterworks

Water District/ Waterworks	Number of Metered Connections	Number of Flat Rate Connections	Average Monthly Rate	Average Consumption per Connection	Average O&M Cost	Average Revenue	Collection Efficiency
	Number	Number	Pesos/m^3	m^3/Month	Pesos/Month	Pesos/Month	Percent (%)
Dumalag WS							
Dumarao WD	453		7.20	27.00	79,247.54	81,169.25	81.00
Metro Roxas WD	12,448		13.05	26.10	4,915,379.70	4,876,617.60	96.00
Mambusao WD	453		25.00	14.00	27,312.01	159,125.74	91.00
Panitan WD	386		12.40	20.15	162,182.09	96,280.69	91.00
Pilar WD	211		9.50	12.00	26,500.00	30,000.00	70.00
Pontevedra WD	1,471		15.00	12.00	362,403.60	389,763.38	95.00

Table 6.4.2 Loan Status of Water District

Water District	Description			
	Total Loan Availed (in '000 Pesos)	Remaining Payment Period (months)	Average Monthly Amortization (in Pesos)	Current Arears (in '000 Pesos)
Dumarao WD	1,262.40	517.00	10,407.00	
Metro Roxas WD (a)	96,719.68		1,263,539.56	
Mambusao WD	8,630.00	288.00	60,294.00	
Panitan WD				3,924.07
Pilar WD	75.00	97.55	2,800.00	97.55
Pontevedra WD	9,515.41	107.00	84,594.67	

6.5 Existing Practices by the LGU on Cost Recovery

6.5.1 Capital Cost

In the previous arrangements, the capital cost for Level I systems was free to the community. 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 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 and PEOs assisted to form many BWSAs. However, most of these BWSAs are no longer functioning, due to the non-collection of water fees. As a consequence, the users had to go to the LGUs (usually barangay or municipal governments) to address the problem. In some cases, the users likewise requested the PEOs for assistance.

Although the DEO had no budget for operation and maintenance, it extended assistance in the form of materials (such as gaskets or joint pipes) from their supplies, if these items are available. Because of this situation, the emphasis was placed on the need of monthly contributions from the users for the O & M. While, some of the active BWSAs for Level I water supply collected monthly fees ranging from ₱5.00 to as much as ₱20.00 per household per month.

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 of no payment by the users.

The Water Districts of Mambusao and Pontevedra are charging the highest amounts of ₱25 and ₱15 per cu.m., respectively. The other WDs of Dumarao and Pilar are charging much lower fees of ₱7.50 and ₱9.50, respectively.

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

6.6 Affordability of Users

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

6.6.1 Capital Cost Contribution

Based on the results of the key informant survey, majority of the respondents indicated that the barangay councils are willing to participate in sector projects by initiating the formation of a water and sanitation association. All the respondents indicated their willingness to contribute in cash or in kind for the construction of WATSAN facilities in their respective barangays.

Referring to the group interview results for Level I and II water supply conducted in this study, almost all of the respondents have participated by providing labor in past water supply construction projects. Only a few (8% of respondents) have contributed either cash, materials or donated site. The respondents, as a whole, were willing to participate and/or contribute for future WATSAN projects. There were a few who volunteered to participate depending on the activity to be undertaken such as in the formulation of water rates and in the selection of sites.

With respect to the construction cost of private toilet, its cost seems to be expensive as compared with the family income. The estimated cost of flush type toilet facility is about 6.87 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.

6.6.2 Operation and Maintenance Cost

Based on the key informant survey for Level I services, the most common problem cited by the respondents was the absence of maintenance work for these facilities due to the lack of sufficient funds to operate and maintain WATSAN facilities. It is noted by the respondents that most barangays were recipients of financial and institutional development assistance from the provincial and municipal government. The assistance included the funds for repair and maintenance of WATSAN facilities and the provision of various training programs.

Referring to the results of the group interview survey (Level I services), about 24% of the respondents claimed it was the barangay council that shouldered the cost of O & M of

WATSAN facilities. About 93% of the respondents expressed willingness to pay for the O & M of future WATSAN facilities. Of those who were willing to pay, majority or around 80% of the total respondents claimed they could pay from ₱11.00 to around ₱20.00. Around 2% wanted to pay water fees of below ₱5.00 only; the rest of the respondents would pay about ₱6.00 to ₱10.00 per month.

In the water districts or Level III waterworks, O & M expenses are basically covered by the user fees depending on the amount charged for water consumption by water user category. The water tariff 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 more than the 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).

Table 6.6.1 Affordability in Water Supply and Sanitation Services

Income/ Level of Service	Amount (Pesos)	% to Monthly Income	Affordable Range (%) [5]
Median of Monthly Income [1]	4,384		-
Average Level III: Monthly Water Bill [2]	315.89	7.21	5.0 or less
Average Level II: Monthly Water Bill [3]			2.0 -3.0
Mo. Level I Expenditures [3]			1.0 or less
Private Toilet Construction Cost – Flush Type Toilet [4]	23,000.00	6.87	

Notes:
[1] 1994 Family Income and Expenditures Survey, NSO, escalated to 1998 prices using 7% inflation rate.
[2] Data from PSPT; It is assumed that 24.1 cu.m. will be consumed per family.
[3] No data available
[4] Current prices estimated in this study
[5] Based on the experiences mainly from LWUA, DPWH and DILG.

Chapter 7

WATER SOURCE DEVELOPMENT

7. WATER SOURCE DEVELOPMENT

7.1 General

The study on water source development covers the entire province in order to come up with water source potential exploitable mainly as domestic water supply. Emphasis is placed on groundwater availability due to its prevalent use and comparatively conservative development expected 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, with reference to river basin water resources management, surface water potential of major rivers was studied to provide information for the 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 geologic 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 saline water intrusion, and classification of groundwater potential areas, respectively (details are referred to Table 7.1.2, Data Report).

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

An 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 5,724 shallow wells, 1,101 deep wells and 79 developed springs in the province (functional sources). Majority of the wells is shallow wells. About 31% of these water sources are public facilities. Of the total existing wells, 415 shallow/deep wells are not functional at present. In addition to the above sources, 63 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	1,605	482	79	2,166
b. Privately owned sources	4,119	619	0	4,738
c. Number of water sources	5,724	1,101	79	6,904
d. % share of different sources	83%	16%	1%	100%
2. Water sources with problems and non-functional facilities				
a. Water quality problems*	1,145	0	0	1,145
b. Non-functional	415	274	5	694
3. Spring source information				
a. Undeveloped	-	-	0	0
b. Untapped	-	-	63	63

Note. 1: Number of water sources being availed at present including those with water quality problems.
2: Number of existing water sources with problems: being used, but with water quality problem/abandoned wells.
3: Number of springs availed, but not adequately protected; and those as candidate sources to be developed.
*: Assumed number of sources (unsafe category) based on the study on existing water supply facilities in Chapter 4.

7.2 Geology

In the province of Capiz, various rocks such as basalt, coralline limestone, sandstone, slate, shale, igneous and sedimentary rocks form the parent materials of the soils. The metamorphic rocks are either igneous or sedimentary rocks, the physical properties of which have been altered by pressure, tempt or both. These are found in the western mountains.

Basaltic rocks are the parent materials of pyroclastics in the basins, facies of that are dark brown, while the pyroclastic sediments are brown to reddish brown. These are found as outcrops in Ivisan, Sapi-an, Roxas City, Pilar, Maayon, Cuartero and Dumarao. Shale and sandstone are dominant rocks in the province, which are found in most of the upland, rolling and hilly regions. These sedimentary rocks appear in thin, yellowish brown to gray plates in hori-

zontal layers and stratification. Sometimes the sandstone is in massive boulders, which is one of the parent materials of the Iloilo Plain.

Coralline limestone rocks are found in the central part of the province consisting of Dumalag and Dumarao along the national highway. These inland plateaus are transected by crisscross joints and faults. The major movement formed a sort of vertical arc that trends in N-W direction dips. In general, faults are observed as the left lateral, which conform to the general movement of the Philippine fault. These clastics are rough rocks with many sharp and irregular edges with general facies of black clay and very sticky.

For the purpose of preparing the Groundwater Availability Map of the province, only rock units significant to groundwater storage and permeability are briefly described. The rock units in the province are classified into 3 main groups based on the geologic ages. In geologic age these are; 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 essential in groundwater development 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. Its geological features are described below.

(1) Miocene and Older Systems

Rock units of Miocene and older systems are impermeable, which are classified as aquicludes. These rock systems are found in the western Cordillera and the rolling mountain systems at both northwestern and southeastern parts in the province. Basement complex of Mesozoic era is composed of serpentine, basalt flows and metamorphic rocks, commonly fractures. Groundwater is limited to fractured and weathered zones.

In the border area between Capiz and Iloilo, volcanic rock units of Oligocene epoch are distributed. These volcanics are composed of three facies which are: 1) well-bedded, altered agglomerates and pyroclastics, 2) fine graded, altered andesite to andesite basalt and 3) fine to coarse grained altered gray-wacke. The fine-grained, altered andesite grading to basalt is mostly found at the southern and southeastern parts of Pilar municipality.

(2) Plio-Pleistocene Series

Sedimentary rocks of this series have various ranges of permeability. The sedimentary rocks of late Miocene to Pliocene epochs are composed largely of marine clastics and locally transgressive pyroclastics. The pyroclastics are chiefly tuff, tuffite and tuffaceous

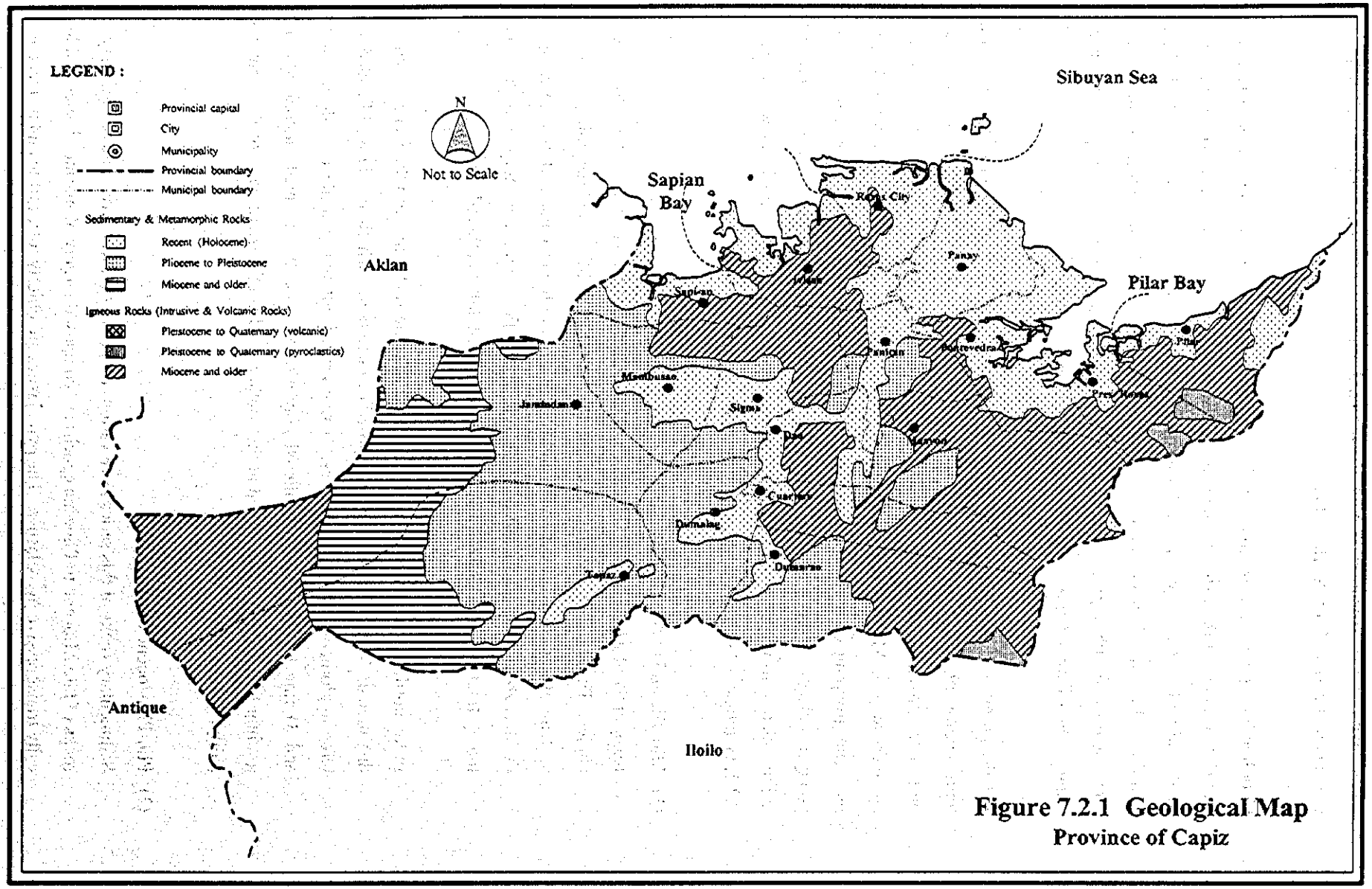


Figure 7.2.1 Geological Map
Province of Capiz

sedimentary rocks. These clastics are associated with silty limestone.

(3) Recent Deposits (Holocene Series)

The alluvium consists of lenticular, intertonguing loose coastal and river deposits of boulders, cobblers, pebbles, granules, sands, silt and mud. These are the detrital fragments weathered and eroded from the pre-existing rocks and transported mainly by water into the river valleys, coastal plains and beaches of the area. It also includes the coral reefs fringing and is still growing on the coastal plains. The gravel and boulder clastics mostly of metamorphic rocks and coralline limestone or limy shale cemented with travertine are found along creeks which dry up periodically.

The sand and gravel with clay and silt in minor proportions are considered permeable. However, most members of alluvial sediments in the inland plain consist predominantly of silt and clay layers, which are considered semi-permeable to impermeable, with occasional lenses of permeable sand and gravel. These fine sediments were deposited into shallow sea during final stage of isostatic uplifting of the landmass. Therefore, alluvial sediments in the plain have a poor recharging capacity and most of groundwater has high mineral contents. Additionally, extensive floods sometimes occur on the inland plain because of a superposed valley located at Panitan.

7.3 Groundwater Sources

7.3.1 Classification of Groundwater Availability

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

(1) Solo shallow well area

Solo shallow well area is defined in this study as the area where only shallow well is available. These areas have water bearing rock formations extending not more than 20m in depth below the ground surface. Solo shallow well areas are usually located in alluvial, coastal plains and inland small basins, where recent unconsolidated materials overlie on the impervious rocks at shallow depth. The extent of completely solo 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 20m below the ground sur-

face. These areas could be found in portions underlain by the Plio-Pleistocene series and Recent formations. Most of these areas have several aquifers occurring at various depths. In this area, shallow wells can also be developed.

(3) Difficult area

This area is 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 water is rarely 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 presented based on NWRB's geo-resistivity survey.

7.3.2 Groundwater Availability in the Province

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

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

(1) Solo 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 essential definition of shallow well is to develop an unconfined aquifer. However, it is difficult to classify an aquifer into confined or unconfined. In this study, therefore, the well classification was made referred to the well depth of 20m as the boundary. The depths of shallow wells in the province were assumed ranging from 1.0m to 19.2m. The static water levels may be from 1.0 to 20.0 mbgs (actual data are not available at present) and specific capacities from 0.1 lpsm to 3.5 lpsm.

(2) Deep well Area

The deep well area covers approximately 70% of the province, widely distributed in the central to northeastern part of the province - Inland Plain and Panay Plain. The deep well

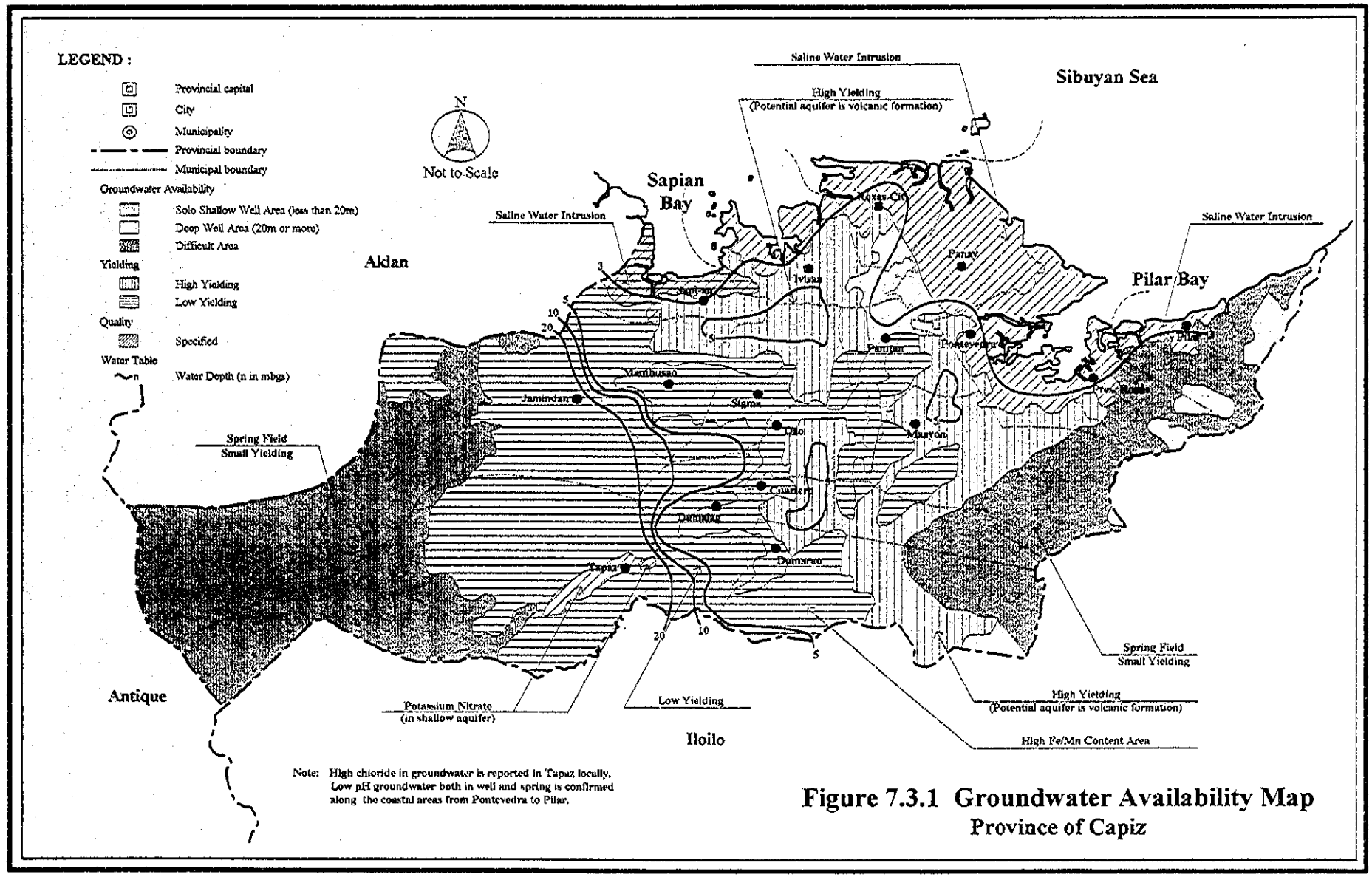


Figure 7.3.1 Groundwater Availability Map
Province of Capiz

area is composed of alluvial plain and low hills made of sedimentary rocks. The alluvial plain is composed of recent deposits of boulders, cobblers, pebbles, granules, sands, silt and mud, which form a groundwater storage basin for some aquifers. While, the sedimentary formations of Plio-Pleistocene epoch consist of conglomerates, sandstone, and shale with limestone in upland of the central plain of the province.

Considering the geological formation, the volcanic hill is categorized as a high potential area for deep well development, while the inland plain deposits and the sedimentary rock units of Plio-Pleistocene epoch are classified as a low-yielding area. In these deep well areas, the average depth of the existing deep wells is 33.5 m with an average specific capacity of 0.8 lpsm. There is no data available on static water level at present. However, water levels were assumed at 10 mbgs or shallower based on the field observation.

(3) Difficult area

About 30% of the provincial area are classified as the difficult area to exploit groundwater, in which the Cordillera and mountain system areas exist. These are located in the western and southeastern portions of the province.

The geology is made up of 1) serpentine, basalt flows and metamorphic rocks of Mesozoic era and 2) volcanic rock units of Oligocene epoch. These rocks and formations are in dense, massive and consolidated conditions and have impervious characteristics. Groundwater occurs only in fissures or fault fracture zones.

7.3.3 Groundwater Quality

The water quality problem in deep wells is found in the central inland plain and the coastal plain (details are referred to Table 7.3.2, Data Report). Major water quality problem is ironic groundwater and saline water intrusion. The results of water resources investigation for the province conducted by NWRB and the general information from DPWH-DEO and PPDO revealed these problem areas and are shown in the Groundwater Availability Map in Figure 7.3.1.

Among the water quality problems of the province, ironic water is serious with a high percentage of affected existing wells (most of the numbers of deep wells) in populated area. The problem is extended to the inland plain area in the municipalities of Dao, Cuartero, Dumarao, Dumalag, Sigma, Mambusao, Jamindan and Tapaz. Groundwater with saline water intrusion is prevalent in most of seashore of the province, extensively distributed in Panay. Slight po-

tassium nitrate in groundwater was reported in the central town of Tapaz that may be caused by fertilizers commonly used in rice fields.

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 sanitary protection provided, otherwise it is classified as undeveloped spring, which is considered as unsafe water source. An untapped spring, as the name implies, is unutilized and flowing in its natural state.

Based on the inventory of water sources prepared throughout the study, the province has 79 developed springs currently serving the province. Such spring sources come out from the Cordillera and from the rolling hills in the western and eastern parts of the province. Of these springs, 17 have discharge rates of less than 2.0 lps (2.0 lps is enough for Level II water supply with service population of about 2,000 and can be applicable for small Level III water supply), while only 6 springs exceed discharge rates of 2.0 lps. The other 56 developed springs have no data available on discharge rates at present. Most of these springs are not dried up during a drought year or dry season, though yields varying from 0.03 lps to 14.0 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 source in the province is only Panay River and its tributaries, namely Maayon, Mambusao and Badbaran rivers. There are 3 gauging stations at Panay River in the province.

Surface water amount used in the province totaled to only 7.8 m^3/sec according to the NWRB's water rights registration database as of March 1997. Of this usage, 98.8% of the water rights were registered for irrigation. The diversions for major flume, which are presently operated by private associations, are located at Panitan, Mambusao and Cuartero. These

facilities had been turned over from Farm System Development Corporation (FSDC) and NIA. Other surface water rights are lodged to private companies for sugar refinery and fishery uses. For domestic water supply, the Metro Roxas Water District fed surface water from the Panay River with an amount of 0.24 m^3/sec (about 20,500 m^3/day) for their water supply system but there is no registration of water rights.

Data on river flow including 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 tributaries were conducted during this study. Except for the parameters of turbidity and color, the examined water quality meets the Class A limitation of "DENR Fresh Water Quality Criteria" in the upstream areas, while the Class B/C limitation in the downstream areas.

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 rural 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 1.0 to 19.2 mbgs. One disadvantage of shallow wells is the lowering of water level during dry season that reduces the discharge rate of the wells or disturbs the hand-pump operation. Another disadvantage is the usual high susceptibility of shallow aquifers to direct infiltration of surface pollutants.

In general, deep wells have better water quality and invariable yields when developed with appropriate technology. This depends if the wells tap to comparatively deeper aquifer. It reduces the hazards of groundwater pollution. In addition, lowering of static groundwater level does not affect the discharge rate and the hand-pump operation. In Recent deposits and Plio-Pleistocene series, good aquifers apparently occur from 20 mbgs to 95 mbgs in depth.

Additional wells can still be developed to meet future water supply demand of the province. For future planning purpose, the Groundwater Availability Map includes basic information for municipal groundwater development with the following information: well type, well yield, water quality and static water level. Aquifer 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. However, the area where the natural gravel packed well is applicable for the future plan could not be identified due to lack of information available on the sieve analysis and no construction experiences of this method by concerned agencies in the province. Therefore, the construction ratio of natural gravel packed well to the total requirements of the province is assumed to be nil at present. Nevertheless, the expected municipality areas where there is still possibility to apply the natural gravel packed wells, are shown in Table 7.6.3, Supporting Report for the future reference.

Most of the Level-I deep well facilities had been designed with well materials made of either galvanized iron, mild steel or low carbon steel. However, in the area where groundwater with acidic pH is observed, anti-metallic (polyvinyl chloride; PVC) for well casing pipes and screens, and anti-corrosive metals (stainless steel; SUS) for pump facility are required. The municipalities requiring such countermeasures are recommended in Table 7.6.4, Supporting Report. The ratio of deep wells using PVC materials to the total requirements of the province is assumed at about 5%.

(2) Spring

A total of 63 untapped spring sources identified by the PSPT is listed in Table 7.6.5 Untapped Spring Source Identification, Supporting Report. The list includes detailed data on barangay name, owner, discharge rate in dry season, transmission line length and relative elevation between spring source and served area. Such springs are mainly located in the mountain systems in southeastern part of the province. Other areas have few untapped springs. Of these springs, 47 untapped springs with discharge rates ranging from 0.5 lps to 20.0 lps (actual data base) are generally applicable for Level-II water supply. Spring development potential in the province is shown in Table 7.6.5, Supporting Report.

Table 7.6.1 Groundwater Development Potential in the Province

Area	Groundwater Development Potential	Water Quality	Area Feature
Lowland Delta Area	This district is classified as deep well area. The depths of existing deep wells are ranging from 30 to 150m. The productivity of both deep and shallow wells varies from low to high yields. Free flowing deep wells are found in the coastal areas during rainy season. Such flowing deep wells exist at fractured formation of metamorphic rocks. There is no spring.	Both saline water intrusion and ironic groundwater are observed. Slightly acidic groundwater is reported in Pontevedra.	This area covers the northern part of the province. Topography of this area is characterized by lowland delta formed by Panay River. The extensive swamps and marshes exist throughout the year.
Basaltic Lava Flow Area	Areas where basalt formation is distributed are classified as deep well area. The deep well has sufficient capacity for Level-III water supply, but available amount is depending on the thickness of volcanic formations and the ability of recharge into the sediments. Static water level is comparatively shallow ranging from 5 to 10mbgs. There are a few spring sources in this district.	Existence of high Fe contents in groundwater is confirmed along Panay River. In other area groundwater is potable.	This district covers the central part of the province. The topographical features are represented as plateaus and hills. The basaltic lava flow had blocked the flow of Panay River and formed the superposed valley at Panitan.
Inland Plain Area	This area is classified as deep well area. The deep well capacity is very low that is only good for Level-I water supply. High yielding deep well is found along the rivers locally. Static water level is ranging from 5 to 20mbgs. There are very few spring sources in this district.	High iron and color unit in groundwater is common. Potassium nitrate and chloride in groundwater were reported in Tapaz.	This inland plain covers the central part of the province. The dominant topographical feature is flat land. Extensive floods sometimes occur because of a superposed valley formed by the basaltic lava flow.
Eastern Rolling Hills Area	The difficult area covers this district. Very few spring sources are found in this rolling hill area. There are few deep well areas in the small basins of Pilar and Pres. Roxas locally. Static water levels both in deep and shallow wells are about 10 mbgs.	Groundwater both well and spring is potable.	This area covers the eastern part of the province. Topographic features are represented as small plateaus and basins.
Western Highland Area	This district is classified as difficult area. Only fissure water can be developed locally. Potential water source is spring but it is scattered in mountain areas. Many rainwater collector facilities are found.	Spring water is potable.	This district covers the western mountain part of the province. The dominant topographical features are highland hills and mountain peak of 2,049 masl at Mt. Nangtud.

(3) Surface Water

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

The calculation results are shown in Table 7.5.2, Supporting Report. In particular, municipalities situated along the Panay River basins are privileged to use larger amount of river water.

Two water supply projects in use of surface water source are planned and arranged. Due to limited groundwater availability, surface water will be used. These projects are: (1) Capiz Inter-Municipal Water Supply System (CIMWSS) Project studied by the province and (2) Provincial City Water Supply Project-III (PCWSP-III), Metro Roxas Water Districts (MRWD). The intake points at Panay River for the both projects will be selected among several options in the near future. General information on these projects is summarized below.

<Capiz Inter-Municipal Water Supply System Project>

Study area is located in inland plain and the water source to be developed is river water from Panay River and its tributaries. The planned service area is divided into 3 sub-areas to allow for gravity flow. These areas are: (1) Jamindan, Mambusao, Sigma and Dao along Mambusao River, (2) Tapaz, Dumalag and Cuartero along Panay River and (3) Dumarao beside of Badbaran River. There are 4 options in terms of system/s and water intake point/s. These are: (a) 1 system with 1 intake point, (b) 2 systems with 1 intake point, (c) 1 system with 4 intake points and (d) 3 systems by sub-area with 3 intake points. This project is planned to implement through the BOT scheme.

<Provincial City Water Supply Project-III, Metro Roxas Water Districts>

Presently, the MRWD utilizes 0.24 m^3/sec at the downstream of Panay River. To expand its water supply system, 3 options were proposed with reference to water intake and treatment based on the study of cost recovery. These options indicated different construction sites for intake facility and treatment plant. These are: (1) at Roxas City – saving initial cost of transmission pipeline, (2) at mountainside of Tapaz – saving running cost of water treatment and ensuring gravity water supply and (3) at Panitan – middle plan between (1) and (2). The most advantageous site is Tapaz at present, because the expansion of service area along the transmission pipeline will be achieved effectively.

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. These were established using the well information from NWRB and the province (detailed database is included in Table 7.1.1, Data Report), and the hydrogeological assessment presented in Table 7.6.2, Supporting Report.

Groundwater source availability (well and spring) is reflected in Table 7.7.1 that was assumed based on water sources study considering the limited information on geology, topography, water sources inventory, etc. The groundwater source availability indicates the general profile of the different types of groundwater source available in the municipalities. Hence, the descriptions have no projected meaning on future development values of its groundwater source. Considering the present water sources utilization, the percentages of spring development compared with well development for the future demand of the entire province are studied in Chapter 8 of this report.

Shallow wells are currently used in some municipalities. The municipal areas are categorized into deep well and solo shallow well areas considering the on-going practices. The proportions (%) by deep well and shallow well area 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 using the classification of rural and urban barangays.

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

Table 7.7.1 Standard Specification of Wells by Municipality

Municipalities With Classification		Type	Proportion (%)	Standard Specification			Availability of Sources
				Depth Range (m)	SWL (m)	Sp. Cap. (lpsm)	
Cuartero	Rural	SW	0	- <D< -	-	-	Fair DW and Rich SP
		DW	60	80.0 <D< -	10	1.0	
	Urban	SW	0	- <D< -	-	-	
		DW	100	40.0 <D< -	5	0.2	

Table 7.7.1 Standard Specification of Wells by Municipality

(cont'd)

Municipalities With Classification		Type	Proportion (%)	Standard Specification					Availability of Sources
				Depth Range (m)			SWL (m)	Sp. Cap. (lpsm)	
Dao	Rural	SW	0	-	<D<	-	-	-	Fair DW and Few SP
		DW	100	80.0	<D<	-	10	1.0	
	Urban	SW	0	-	<D<	-	-	-	
		DW	100	40.0	<D<	-	5	0.2	
Dumalag	Rural	SW	0	-	<D<	-	-	-	Fair DW and Few SP
		DW	100	40.0	<D<	-	5	0.2	
	Urban	SW	0	-	<D<	-	-	-	
		DW	100	40.0	<D<	-	5	0.2	
Dumarao	Rural	SW	0	-	<D<	-	-	-	Fair DW and Rich SP
		DW	70	20.0	<D<	80.0	10	1.0	
	Urban	SW	0	-	<D<	-	-	-	
		DW	100	20.0	<D<	24.4	5	0.2	
Ivisan	Rural	SW	0	-	<D<	-	-	-	Fair DW and Few SP
		DW	100	80.0	<D<	-	10	1.0	
	Urban	SW	0	-	<D<	-	-	-	
		DW	100	80.0	<D<	-	10	1.0	
Jamindan	Rural	SW	0	-	<D<	-	-	-	Fair DW and Few SP
		DW	30	20.0	<D<	22.0	20	0.2	
	Urban	SW	0	-	<D<	-	-	-	
		DW	100	40.0	<D<	-	20	0.2	
Ma-ayon	Rural	SW	0	-	<D<	-	-	-	Fair DW and Few SP
		DW	60	20.0	<D<	80.0	10	1.0	
	Urban	SW	0	-	<D<	-	-	-	
		DW	100	20.0	<D<	22.0	5	1.0	
Mambusao	Rural	SW	0	-	<D<	-	-	-	Fair DW and Poor SP
		DW	100	20.0	<D<	23.0	5	0.2	
	Urban	SW	0	-	<D<	-	-	-	
		DW	100	40.0	<D<	-	5	0.2	
Panay	Rural	SW	0	-	<D<	-	-	-	Fair DW and Poor SP
		DW	100	40.0	<D<	-	3	0.6	
	Urban	SW	0	-	<D<	-	-	-	
		DW	100	40.0	<D<	-	3	0.6	
Panitan	Rural	SW	0	-	<D<	-	-	-	Fair DW and Poor SP
		DW	100	80.0	<D<	-	10	1.0	
	Urban	SW	0	-	<D<	-	-	-	
		DW	100	40.0	<D<	-	3	0.4	
Pilar	Rural	SW	0	-	<D<	-	-	-	Risky DW and Few SP
		DW	10	40.0	<D<	-	5	0.4	
	Urban	SW	0	-	<D<	-	-	-	
		DW	100	20.0	<D<	22.0	3	1.9	
Pontevedra	Rural	SW	0	-	<D<	-	-	-	Fair DW and Few SP
		DW	100	40.0	<D<	-	3	2.0	
	Urban	SW	0	-	<D<	-	-	-	
		DW	100	40.0	<D<	-	3	2.0	
President Roxas	Rural	SW	0	-	<D<	-	-	-	Fair DW and Poor SP
		DW	20	40.0	<D<	-	3	2.0	
	Urban	SW	0	-	<D<	-	-	-	
		DW	100	40.0	<D<	-	3	2.0	
Roxas City	Rural	SW	0	-	<D<	-	-	-	Fair DW and Poor SP
		DW	100	22.0	<D<	95.0	10	7.2	
	Urban	SW	0	-	<D<	-	-	-	
		DW	100	40.0	<D<	-	3	2.0	

Table 7.7.1 Standard Specification of Wells by Municipality

(cont'd)

Municipalities With Classification		Type	Proportion (%)	Standard Specification					Availability of Sources
				Depth Range (m)			SWL (m)	Sp. Cap. (lpsm)	
Sapi-an	Rural	SW	0	-	<D<	-	-	-	Fair DW and Few SP
		DW	100	80.0	<D<	-	10	1.0	
	Urban	SW	0	-	<D<	-	-	-	
		DW	100	40.0	<D<	-	3	0.6	
Sigma	Rural	SW	0	-	<D<	-	-	-	Fair DW and Poor SP
		DW	100	20.0	<D<	27.0	5	0.8	
	Urban	SW	0	-	<D<	-	-	-	
		DW	100	40.0	<D<	-	5	0.8	
Tapaz	Rural	SW	0	-	<D<	-	-	-	Fair DW and Few SP
		DW	60	40.0	<D<	-	20	0.2	
	Urban	SW	0	-	<D<	-	-	-	
		DW	100	40.0	<D<	-	20	0.2	

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 construction of test wells shall be conducted. The municipalities that fall on this group are Ivisan, Sapi-an, Sigma, Maayon, Dao and Cuartero, Jamindan, Mambusao, Dumarao, Dumalag and Tapaz. Table 7.7.2 summarizes these requirements.

Table 7.7.2 Detailed Groundwater Investigation Required

Municipality	Area	Investigation Activities and Specification
Ivisan, Sapi-an, Sigma, Maayon, Dao & Cuartero	Rural	Electric Prospecting (Sounding Depth and Points); 100 m x 60 points Test Wells; five deep wells depths of 40m to 80m, diameter of 200 mm and length of well screen 15m to 25m Conduct of Test; Pumping Test & Water Quality Examination to include Fe, Mn, pH, etc.
Jamindan, Mambusao, Sigma, Dao, Cuartero, Dumarao, Dumalag & Tapaz	Urban	Groundwater Database; well location, geologic log, well structures, static groundwater level, production (periodic monitoring) and water quality (especially at privately owned deep wells) Hydraulic Database; rainfall record, river flow measurement by auto recorder (periodical measurements of river section are also required), regular river water quality examination (including pH, N, P, Hg, etc.) Hydraulic Study; flood control, maintenance flow and return flow study, watershed management study for quality control and promotion of surface water regulation

Groundwater development for water supply in urban areas (Level-II and -III systems) may require the construction of deep wells with larger casing diameter of 6 inches or more to ensure larger production rates. In these cases, short spacing intervals between the adjacent wells often cause the well interference due to the large lowering of pumping water level when the adjacent wells are operated simultaneously in a longer period. As the remedy of the problem 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 km^2 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. They shall also be investigated to confirm the development possibility in the following items: (1) location and type of spring sources, (2) fluctuation of discharge rates throughout the year, (3) distance from spring sources and proposed served areas, and (4) elevation differences between the two points.

The groundwater development using deep well is very risky in the eastern rolling hills. Furthermore, spring inventories prepared by the PSPT for this study and information by the DPWH indicated that there are few untapped spring sources scattered in this area. Thus, improved rainwater collector (roof materials, reservoir with sand filtration and chlorination system) shall be promoted for the future rural water supply.