

Chapter

INTRODUCTION

1

1. INTRODUCTION

1.1 Sector Development in the Philippines

The Government of the Philippines (GOP) has, over the last decade, with the assistance from external donors, made considerable progress in developing the water supply and sanitation sector. Development has covered physical and institutional framework nationwide.

Nevertheless, infrastructure service delivery including this sector during the period 1987 to 1997 has been insufficient to keep pace with the demand, which was magnified by natural calamities and economic status of the country.

About 68% (46.7 M) of the population nationwide enjoyed access to potable water supply in 1995 (66% in 1992). In urban areas outside Manila, 61% (11.6 M) had access to safe water supply services (47% in 1992), while in the rural areas, 70% (26.1 M) was covered by point water sources (80% in 1992). However, from the surveys conducted through the PW4SP, it was found out that about 20-30% of the existing water sources in the rural areas fall on the category of underserved or unserved in terms of safe or unsafe sources, damaged and non-functioning sources. Hence, of the rural population, it was estimated that only about 50-55% was served adequately by safe sources. This implies that around 60% of the total population enjoy water supply services at present.

Private sanitary toilets were available to 66% (45.3 M) of the total household nationwide in 1996 based on the DOH compiled reports. Communal toilet facilities are generally found only at schools, public markets and sometimes in bus terminals and town parks. For sewerage, only portions of the cities of Metro Manila, Cebu and Baguio have sewerage systems. Municipal refuse collection using service trucks is limited to urban areas. In 1996, majority of the households (55%) practiced individual disposal, mostly dumping, while the remaining 45% relied on municipal refuse collection and disposal services.

The policies and strategies on the sector are generally guided by the "Updated Medium-Term Philippine Development Plan (MTPDP: 1996-1998) in 1996" and the recently published "Philippine National Development Plan (PNDP: 1999-2025)". Activities in the sector have been directly guided by the "Water Supply, Sewerage and Sanitation Master Plan of the Philippines 1988-2000" since its issuance in 1988. The National Sector Master Plan (NSMP) sets ambitious targets to reach large segments of the population and to redress the imbalances between rural and urban areas. Meanwhile, the Updated MTPDP revised the targets for water

supply services based on updated conditions in 1996. The PNDP further modified the targets this year to suit current sector status.

Development in the sector had previously been directed to a high degree by central government agencies. However, the GOP has been instituting devolution and full decentralization of responsibilities for implementation of infrastructure projects to Local Government Units (LGUs), in line with the Local Government Code of 1991. Major initiatives towards this direction in the sector are the current projects being implemented such as the World Bank-assisted Local Government Unit-Urban Water Supply and Sanitation Project and the ADB-funded Rural Water Supply and Sanitation Project. Both projects aim at building/enhancing local level capacity in planning, implementation and management of water and sanitation services.

The GOP has also recently approved the Implementing Rules and Regulations (IRR) of Clause (g) of NEDA Board Resolution No. 4 (series 1994) providing detailed arrangements in accordance with broad reforms aimed at streamlining sectoral activities. The institutional framework therefore, presented in this provincial sector plan considers the direction of the central government agencies and LGUs in the sector.

1.2 Provincial Sector Planning

1.2.1 Objectives of Sector Planning

The main objectives of the provincial sector plan are:

- (1) To formulate a Long-Term Provincial Development Plan with a target year of 2010 for the water supply, sewerage and sanitation sector;
- (2) To propose a Medium-Term Sector Investment Plan covering the years 2001-2005 to form the basis for implementing foreign and locally funded projects;
- (3) To recommend arrangements and logistics for implementation; and
- (4) To provide measures to strengthen operational framework and institutional capabilities including community development and gender responsiveness.

1.2.2 Scope of Sector Planning

The study covers the following major elements to achieve the objectives mentioned above.

- (1) Collection and Review of Previous Studies and Existing Data, and Establishment of Data Base: Inventories on existing conditions and facilities

- 1) Natural conditions and geographical features
- 2) Socio-economic conditions
- 3) Population
- 4) Health status
- 5) Environmental conditions
- 6) Existing facilities and service coverage
 - Water Supply
 - Sanitation and Sewerage
- 7) Existing sector arrangements and institutional capacity
 - Sector institution
 - Current community development, gender and training approaches
 - Existing sector monitoring systems
- 8) Past financial performance in the sector development

(2) Long-Term Development Plan

- 1) Projection and assumption of planning framework: projection of population and relevant frame values, and targets of the sector plan
- 2) Service coverage by target year
 - Water Supply
 - Sanitation and Sewerage
- 3) Water source development
- 4) Service expansion plan
- 5) Estimation of project cost
- 6) Investment program

(3) Medium-Term Investment Plan (5-year)

- 1) Facilities and equipment, and rehabilitation required meeting target services
- 2) Identification of priority projects
- 3) Sector management plan
 - Institutional arrangements
 - Community development, gender and training
 - Procurement, construction and operation and maintenance
 - Sector coordination
- 4) Estimation of project cost
- 5) Financial arrangements
 - Sources of fund
 - Additional funding requirements

- Investment needs ranking of municipalities
- Implementation arrangements
- Cost recovery

(4) Monitoring for Evaluation of Provincial Plan Implementation

1.2.3 Financing of Sector Plan

The First Water Supply, Sewerage and Sanitation Sector Project (FW4SP) was implemented with financial assistance from the World Bank (IBRD). With reference to the Project, the technical assistance to help Provincial Governments prepare 37 provincial sector plans in Luzon area was financed by various bilateral and multilateral agencies, such as the United Nations Development Program (UNDP), the Danish International Development Agency (DANIDA) and the Japan International Cooperation Agency (JICA).

In September 1996, the GOP requested the Government of Japan to finance the preparation of the Study for 21 provinces in Visayas and Mindanao areas. Among these was Negros Occidental province, which was assisted by the JICA. The PW4SP will be the basis to permit execution of the sector development from the proceeds of the sector loan by foreign donors, LGUs budget including internal revenue allotment from National Government and private sector investment.

1.3 The Provincial Plan for the Province of Negros Occidental

1.3.1 Preparation of the Plan

The PW4SP for the Province was prepared by a Provincial Sector Planning Team (PSPT) organized by the provincial government. The members consist of the Provincial Planning and Development Coordinator (PPDC), the planning and development officers from PPDO, and the staff members from Provincial Engineers Office (PEO), Provincial Health Office (PHO) and Provincial Local Government Operations Office (PLGOO-DILG). The preparation of the plan was assisted by the Department of the Interior and Local Government (DILG), the Department of Public Works and Highways (DPWH), the Department of Health (DOH), the Local Water Utilities Administration (LWUA), the National Economic and Development Authority (NEDA), other national line agencies and non-government organizations (NGOs) active in the sector. The PSPT was also assisted by the JICA Study Team through technical grant assistance from the Japanese Government (refer to Minutes of Discussions between

DILG and JICA, and Figure 1.3.1 Organization Chart, 1.3.1 Preparation of the Plan, Supporting Report).

The PW4SP has been prepared at municipal level covering all sub-sectors for each municipality of the Province.

The report consists of three (3) volumes: I - Main Report, II - Supporting Report, III - Data Report.

1.3.2 Outline of the Report

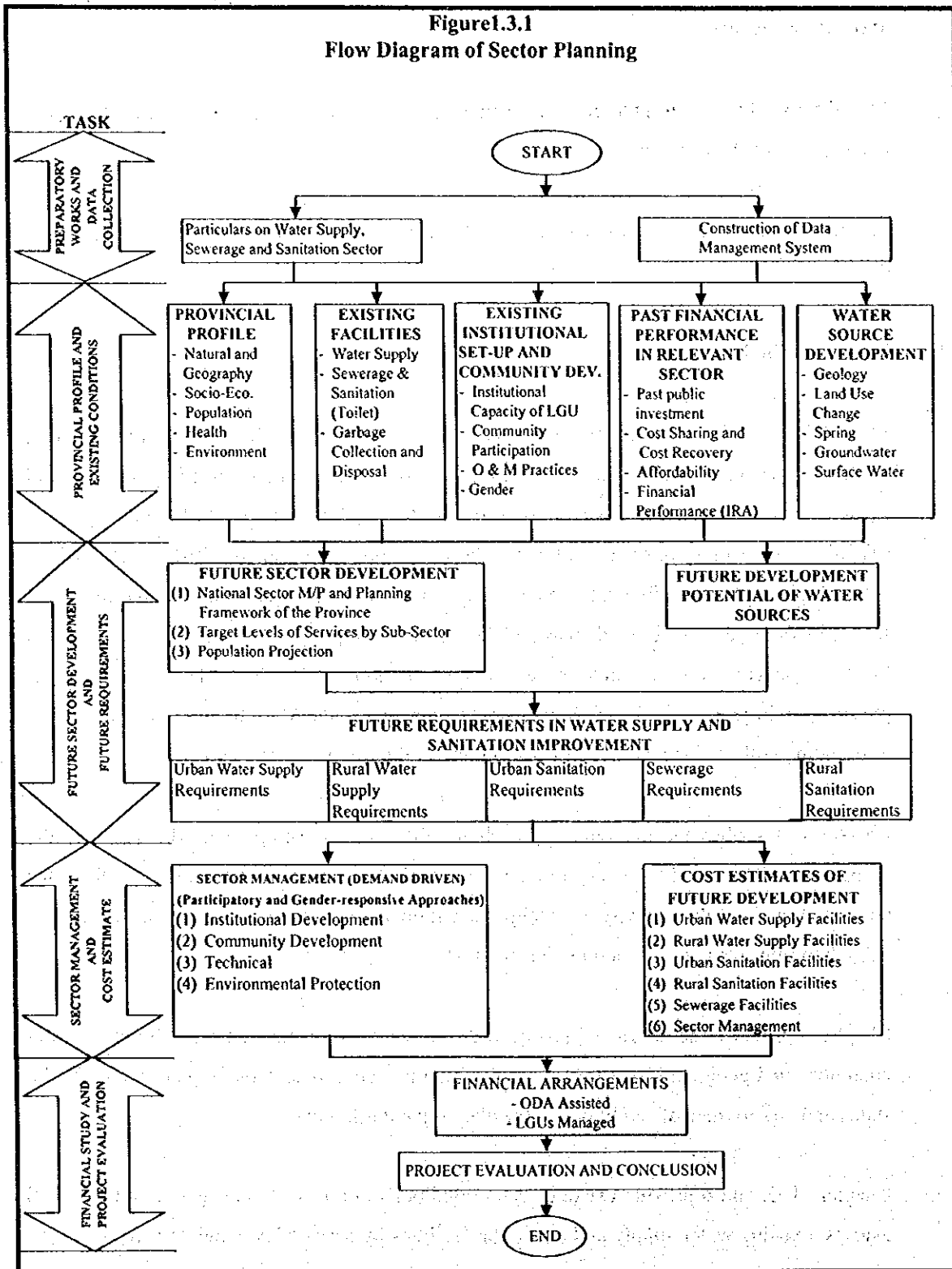
The PW4SP is a framework plan that would serve as the basis for the future implementation work in the sector. It will be carried out either as large-scale projects funded by international agencies or as a small size project carried out by local parties. It should be noted that the PW4SP is a sector development plan for the entire province and that it does not include detailed planning of individual projects. The individual projects will commonly cover selected sub-sector/s for limited areas and detailed planning/design work has to be conducted for the respective projects before start of construction work. The planning process is presented in Figure 1.3.1. The following are the contents of the Main Report (List of data and information collected is included in 1.3.2 Outline of the Report, Data Report).

Chapter 2 describes the planning approach for the sector development, which guides the preparation of the plan: the background and rationale for provincial planning; as well as the planning tool that relies heavily on local participation and gender responsiveness, and flexible enough to improve planning and implementation.

Chapter 3 provides the provincial profile with reference to current sector conditions: natural conditions and geographical features, socio-economic conditions, demographic trends, health status and environmental conditions as the planning environment.

Chapters 4, 5, and 6 provide existing sector conditions in physical, managerial and financial aspects: existing water supply and sanitation facilities by service level and service coverage; sector institutions, community development, gender and training, as well as monitoring systems; and financial performances entailing cost recovery and affordability and new fiscal policies that are the basis and references to come up with future development plan.

Figure 1.3.1
Flow Diagram of Sector Planning



Chapter 7 analyzes the possibility of water source development for the water supply component: geological and hydrological conditions in the province, and future development potential of different water sources. Furthermore, water source availability by concerned municipality was presented with well specifications for the medium-term development.

Chapters 8, 9 and 10 develop the long-term Development Plan and the medium-term Investment Plan both for physical and sector management requirements. Emphasis is placed on the sector management for the medium-term development plan entailing institutional arrangements and operational framework, community development, gender and training and project implementation needs. Required costs for physical and institutional elements are also presented according to the implementation arrangements.

Chapter 11 presents the financial arrangements based on identified sources of funds. The financial shortfall is shown to meet provincial targets established for the Medium-Term Investment Plan. The manner of national budget allocation (IRA) to municipalities by sub-sector is illustrated and trial calculation is made for the target year considering the new cost sharing policy between the central government, the LGUs and the beneficiaries. Investment need ranking of municipalities as a factor of financial allotment is also considered based on synthetic evaluation of sector components. The financial viability study of Level I water supply and sanitation projects is highlighted with reference to ODA assisted projects for eligible municipalities. Finally, cost recovery by the beneficiaries and the LGUs is discussed.

Chapter 12 provides recommendations on monitoring of implemented projects covering procedures and responsibilities in different administrative levels. Periodic monitoring will allow for the updating of the PW4SP and modification of respective projects both in quality and quantity.

1.4 Acknowledgment

The Provincial Sector Planning Team (PSPT) which was responsible in the preparation of the PW4SP, acknowledges the extended cooperation, support and assistance of the Department of the Interior and Local Government (DILG), and other national, regional, provincial, municipal, city, and barangay institutions. These institutions had shared essential data and planning principles (List of individuals and their corresponding offices who directly participated in the preparation of the plan is included in 1.4 Acknowledgment, Data Report). The Japanese Government through JICA has generously provided technical assistance to the PSPT throughout the course of the planning work.

Chapter

2

**PLANNING APPROACH FOR
FUTURE SECTOR DEVELOPMENT**

2. PLANNING APPROACH FOR FUTURE SECTOR DEVELOPMENT

2.1 General

The primary basis of the PW4SP is summarized with reference to the national sector policy and strategies as well as the major legislation and regulations relevant to the sector. Planning framework is also discussed with reference to key measurable targets. Guiding principles for preparation of the plan are described in application of computer-aided planning approach.

2.2 Planning Framework

The GOP, through the Water Supply, Sewerage and Sanitation Master Plan of the Philippines: 1988-2000, the Philippine National Development Plan: 1999-2025, and the Updated Medium Term Philippine Development Plan (MTPDP): 1996-1998, has manifested its commitment to the development of safe and dependable water supply and sanitation facilities. Policies and investment programs are compiled in these documents which lay out the basis of a strategy to accelerate sector development through the equitable mobilization of resources between urban and rural areas and institutional reforms at all government levels. Guiding principles set in the aforementioned national development plans are sustained decentralization; private sector-led development; environmental protection; people participation; full cost recovery; social equity; accelerated information technology applications and macro-economic stability.

According to the Updated MTPDP targets for the year 1998, the population served with potable water shall be increased up to 76.4% (52.4 M). This corresponds to 81.6% (9.9M) of the Metro Manila population, 68.8% (16.3 M) in other urban areas, and 79% (29.5 M) in the rural areas. Sewerage facilities in Metro Manila and other highly urbanized areas will be constructed. About 1.8 million toilets will be built nationwide.

Given these updated MTPDP targets, as well as the goals set in the 1988 NSMP, the current indications and the planning cycle adopted for this provincial sector planning, the national targets as shown in Table 2.2.1 will be used as the basis for setting the provincial targets.

Table 2.2.1 National Sector Coverage Targets

Sub-Sector	Year 1995	Year 2003 ¹	Year 2010 ²
Urban Water Supply ³	61%	69%	95%
Rural Water Supply	70% ⁴	79%	93%
Sanitation	60% ⁵	68%	93%

Notes:

¹ Based on the Updated MTPDP targets for 1998.

² Based on the long-term targets set in the previous National Sector Master Plan (NSMP).

³ Excluding Metro Manila and its outlying areas.

⁴ Includes only point sources.

⁵ Service coverage for 1996.

2.3 Sector Objectives

The objectives of the sector are:

- (1) To provide safe and adequate water supply and sanitation to meet basic needs;
- (2) To pursue proper O & M of facilities for sustainable water supply;
- (3) To undertake the phased construction and installation of sewerage facilities; and
- (4) To develop the capabilities of LGUs to implement water supply, sewerage and sanitation programs with the national government providing assistance in the areas of community participation, sub-sector planning, program management, regulation of development, selection of technologies, financial management, construction supervision, monitoring and reporting.

2.4 Current Sector Policies and Strategies

- (1) One clear policy shift has been towards the **promotion of self-reliance and local community management** of services. Since the seventies, formation of local water districts in provincial urban areas has been aggressively pursued. During the eighties, this shift was further induced with the establishment of community-run BWSAs and RWSAs to provide services in smaller rural and peri-urban areas. Recently, more comprehensive **demand-driven** participatory approach and **gender sensitive** participation initiatives are given impetus to ensure success and sustainability of the sector's projects especially in rather small rural and urban fringe areas.
- (2) An **integrated approach to water, sanitation and hygiene education** has been prescribed in order to achieve full health benefits of improved services. The GOP promotes intensified health education and information programs to improve hygiene practices at the household level.

- (3) **Cost sharing arrangement** is enforced. In line with devolving the central government's functions and responsibilities, particularly those that have social and/or environmental objectives, projects/activities are implemented through a cost sharing arrangement between the central government agency and LGUs. As for the sector, national (central) government's (NG's) grant is to be extended only to Level I systems for eligible municipalities, and its share is within a range of 0 to 50% of the total capital cost. The remaining are managed by LGUs, communities, or BWSAs/RWSAs. No subsidies from the central government are to be provided for Levels II and III systems. For public toilets in public markets, the share of the NG is within 50 to 70%.
- (4) **Cost recovery of capital and O & M costs** of all water supply service levels by beneficiaries is to be encouraged. This is a distinct switch from subsidies, which characterized previous strategies. Current priorities also stress the need to promote the collection of such costs, especially in Levels I and II.
- (5) **Private sector participation** is encouraged to bring into the sector business principles and practices and private capital to accelerate social and economic development; to improve sector efficiencies; and to ease the burden on the GOP's budget and foreign borrowing. Public-private partnership is to be pursued through any of these mechanisms: build-operate-transfer, concession arrangements, privatization of WDs, LGU-private sector MOA, LGU-WDs collaboration and others.
- (6) **An integrated water resources strategy** has been adopted in areas combining irrigation, power, flood control, and domestic and industrial water supply. Small and medium-scale water resources projects through the active participation of the people are encouraged. **Watershed management**, water conservation and erosion and sediment control are deemed critical.

2.5 Major Legislation and Regulations Affecting the Sector

- (1) The **Local Government Code of 1991 (RA 7160)** provides for a more responsive and accountable local government structure. Local government units now exercise more authority and responsibilities and provide resources to accelerate the provision of basic services and facilities, including water supply, sanitation and sewerage. The **Implementing Rules and Regulations (IRR)** to effect the devolution of water and sanitation responsibilities and resources was recently approved. The IRR integrates the common

definition of terms for water supply and sanitation and defines the roles and functions of central government agencies and LGUs for the sector (details are referred to 5.2, Data Report).

(2) **The Water Code of the Philippines (PD 1067)** consolidates legislation relating to the ownership, development, utilization, exploitation and conservation of water resources. The Code established the basic principles and framework on the appropriation, control and conservation of water resources to achieve their optimum economic efficiency and rational development. In addition, PD 424 declares that the National Water Resources Board (NWRB) shall be responsible for coordinating and integrating all activities related to water resources. PD 1067 also pertains to the grant of water right privileges (water permits) to appropriate and use water. Water permit applications are reviewed and granted by the NWRB.

(3) **The Provincial Water Utilities Act of 1973 (PD 198)** authorizes the formation of local water districts in the provincial areas outside the Metropolitan Manila area, and provides for their administration and operation. It also created the Local Water Utilities Administration (LWUA) as a specialized lending institution for the promotion, development and financing of local water districts.

(4) **The Metropolitan Waterworks and Sewerage System (MWSS) Charter (RA 6234)** was enacted in 1971. The utility was formed to take over the facilities of NAWASA in 1971. The Charter was amended by virtue of PD 1046 expanding further its territorial jurisdiction to include areas that may be included in the growing metropolis.

(5) **The Philippine Environmental Policy (PD 1151)** requires all public and private entities to undertake an environmental impact assessment of all projects, which significantly affect the quality of the environment. **The Philippine Environmental Code (PD 1152)** established standards for air and water quality, and guidelines for land use management, natural resource management and conservation, utilization of surface and groundwater, and waste management.

(6) **The Sanitation Code (1975)** was promulgated to deal with water supply, excreta disposal, sewerage and drainage issues. **The Sanitation Code and the National Building Code (1977)** require that new buildings be connected to a water-borne sewerage system. Where such systems do not exist, sewage must be disposed of onto Imhoff tanks or septic

tanks with a subsurface absorption field. In addition, the facilities are required to conform to the 1959 National Plumbing Code.

- (7) The 1981 Rules and Regulations for Domestic Wastewater Disposal require all subdivisions and condominiums, etc. to have adequate sewage collection, conveyance, treatment and disposal facilities. A permit must be obtained prior to commissioning a new system.

2.6 Planning Principles and Data Management

2.6.1 Planning Principles

The PW4SP shall be prepared to ensure that the sector investments are optimized under the constraints of funds and water source availability as well as planning capability. Furthermore, the plan shall ensure its sustainability at the provincial level. The overviews of the plan will be progressively adjusted and refined at different detailed implementation stages. Accordingly, the demarcation is a prerequisite between a sector plan and succeeding detailed plan/s. Specifically, the following are required as planning principles.

- (1) The plan is conceived to be flexible, consistent and as simple as possible to respond to the changing socio-economic conditions of the province, accumulated technical information and updated policy of local governments allowing for periodic upgrading.
- (2) The plan is arranged to allow planners to run different scenarios for project implementation, especially with reference to the interface between the provincial plan and project proposals from municipalities (bottom-up).
- (3) The plan is conceived to be adaptable to the local planning capacity and to ensure its full "ownership" by LGUs.

In addition, the following shall be taken into account to help the provincial planners perform their tasks.

- (1) The plan follows existing provincial and municipal planning routines to minimize duplicated planning activities. It is essential to maintain and extend the involvement of local officials for data collection.

- (2) The plan, as a comprehensive tool, considers the consistency to derive the next level of planning.
- (3) The plan entails monitoring and evaluation of actual implementation progress, as investments are undertaken.

The guideline for preparation of the PW4SP is included in the Planning Approach for Future Sector Development, Data Report. It identifies all tables and figures with respective forms by main, supporting and data reports.

2.6.2 Data Management

The data management system was established to come up with the basic outputs commensurate to the objectives of the provincial plan and at the same time reflect the planning approach mentioned above. It will provide a map of relative needs in the province allowing for adjustment and updating when further information becomes available. Monitoring and evaluation are to be done using the tool, thereby serving as baseline information for the improvement of planning and implementation. Different scenarios maybe worked out by planners using the program in application of variable parameters.

The need for full and continuous involvement of local officials is indispensable to establish a reliable database.

(1) Computer-based system

Data management system is designed to perform simple and direct interfaces in data processing. Since a limited number of municipalities is the planning level entailing data collection from the administrative units, EXCEL was selected to facilitate data storage, retrieval, updating and processing.

The data storage system was arranged to parallel the structure of questionnaires and contain the same system of logical categories under institutional hierarchical system of the Philippines as shown in Figures 2.6.1 and 2.6.2. Data are encoded by hierarchical level.

A series of EXCEL routines was established to allow summaries and consolidation of data into the forms required for analysis and presentation. Details together with User's Guide for computer-aided planning are included in 2.6.2 Data Management, Supporting Report.

Table 2.6.2 Structure of Questionnaire

Grouping of Questionnaire	Questionnaire to be addressed						
	National N	Regional R	Provincial P	Municipal M	Barangay B	System S	Independent I
1. Socio-economic Data							
1.1 Mun./City Status and no. of Brgy.			P.1.1				
1.2 Past Population			P.1.2	M.1.2			
1.3 Projected Population			P.1.3.1	M.1.3.1			
			P.1.3.2	M.1.3.2			
1.4 Number of Households			P.1.4	M.1.4			
1.5 Services			P.1.5	M.1.5			
1.6 Occupation			P.1.6	M.1.6			
1.7 Family Income			P.1.7	M.1.7			
1.8 Family Expenditure Pattern			P.1.8	M.1.8			
1.9 Agricultural Annual Income			P.1.9	M.1.9			
1.10 Education and Literacy			P.1.10	M.1.10			
2. Land Use Data							
2.1 Existing Land Use			P.2.1				
2.2 Future Land Use			P.2.2				
3. Health Data							
3.1 Morbidity and Mortality			P.3.1	M.3.1			
3.2 Health Facility			P.3.2	M.3.2			
3.3 Medical Practitioner			P.3.3	M.3.3			
4. Water Sources Data							
4.1 Water Source General Information			P.4.1				
4.2 Water Source Technical Information			P.4.2				
4.3 Untapped Spring Information				M.4.3			
4.4 Well Information				M.4.4			
4.5 Surface Water Sample Point for Water Quality Analysis				M.4.5			
5. Water Supply Data							
5.1 Level I Facility			P.5.1	M.5.1			
5.2 Level II System						S.5.2.1	
						S.5.2.2	
5.3 Level III System						S.5.3.1	
						S.5.3.2	
						S.5.3.3	
						S.5.3.4	
6. Environmental Sanitation							
6.1 Household Toilet			P.6.1	M.6.1			
6.2 School and Student			P.6.2	M.6.2			
6.3 School Toilets			P.6.3	M.6.3			
6.4 Public Toilets (Public Market)			P.6.4.1	M.6.4.1			
Public Toilets (Jeepney/Bus Terminal)			P.6.4.2	M.6.4.2			
Public Toilets (Parks/Playground)			P.6.4.3	M.6.4.3			
6.5 Drainage Facilities			P.6.5	M.6.5			
6.6 Solid Waste Collection and Disposal			P.6.6	M.6.6			
7. Investment Data							
7.1 Income and Expenditure			P.7.1				
7.2 Past Internal Revenue Allotment to the Province			P.7.2				
7.3 Available Funds for Capital Expenditures (20% DF)			P.7.3				
7.4 Sector Previous Investment to the Province by Concerned Agencies			P.7.4				
7.5 Sector Allocation in the Annual Investment Plan			P.7.5				
7.6 Allocation of the 20% Development Fund			P.7.6				
7.7 Financial Indicators of Water District/Waterworks			P.7.7				
7.8 Loan Status of Water District			P.7.8				
7.9 Affordability in Water Supply and Sanitation Services			P.7.9				

(2) Key Parameters

Establishment of criteria and assumptions are requisites in the planning process. In this connection, key parameters are identified to allow for preparation of alternative plans and updating in accordance with sector improvement policy in the future. The parameters for relevant sub-sectors are assumed on an urban and rural basis for respective municipalities referring to current conditions and practices on national and provincial levels. The following are the selected parameters.

- 1) Number of households to be served by a Level I facility
- 2) Safe and unsafe percentages of Level I facilities
- 3) Standard number of students to be served by a unit of sanitary toilet
- 4) Standard number of toilets for a public utility
- 5) Provincial sector targets by sub-sector
- 6) Composition of different types of toilets
- 7) Per capita water consumption for Level III system
- 8) Composition of different types of well sources and their specifications
- 9) Percentage of Level I wells to be rehabilitated
- 10) Unit construction cost of different facilities per person/household/facility/system
- 11) Percentage of sector management cost to construction cost
- 12) Physical and price contingencies
- 13) Unit recurrent cost of different systems/facilities
- 14) Allocation factors/percentages of IRA
- 15) Share of public investment
- 16) Funding levels/percentages for different financing scenarios
- 17) Scoring factors for municipal investment ranking
- 18) Annual distribution of investment cost (medium-term development)

The above-mentioned parameters are not included in the database program, since they are to be established through sensitivity analysis. Assumed figures are directly entered into a separate spreadsheet that is linked to the output files.

(3) Data Processing

Collected data are entered into the forms constructed in EXCEL database. The data are consolidated into final forms in application of small programs prepared for this planning. Linked outputs in tables and graphics are prepared in EXCEL spreadsheets for final

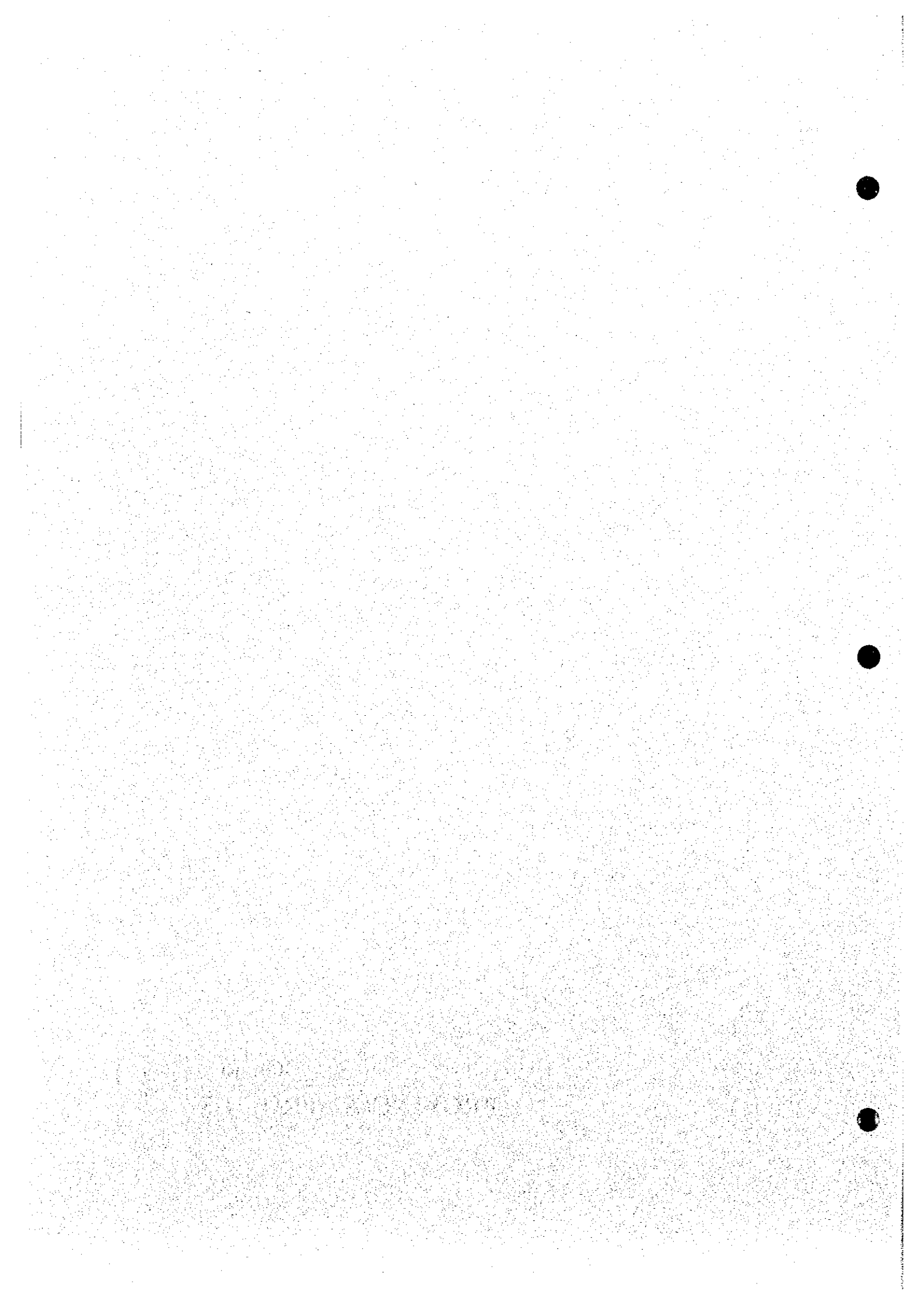
analysis and presentation. Key parameters are entered in a key parameter table linked to the output tables (refer to 2.6.2 Data Management, Supporting Report).

Data in the questionnaire forms (database) are transferred to the output tables for final calculations. Adjustments are made through manipulation of the key parameter table.

Chapter

PROVINCIAL PROFILE

3



3. PROVINCIAL PROFILE

3.1 General

Negros Occidental Province is located in the northwestern portion of Negros Island. It is one of the six provinces that compose Region VI, the Western Visayas Region. Bacolod City, a highly urbanized independent city is the provincial capital. The province is bounded by the Visayan Sea on the north, by the Guimaras Strait and Panay Gulf on the west, Tanon Strait and Negros Oriental on the east and Sulu Sea on the south as shown in the Location Map.

The province, including Bacolod City is classified as 1st class and has a total land area of 7,926.07km² that is almost 2.65% of the Philippine total land area of about 300,000km². It is composed of 22 municipalities and 10 cities. Based on the 1995 NSO records, the province (excluding Bacolod City) has 600 barangays, of which 195 are urban and 405 are rural. Provincial total population was 2,031,841 in 1995. About 65% of the population reside in rural areas, while the remaining 35% are in urban areas. At present, there are 17 water districts and one LGU/association managed Level III water supply systems that are operating in the province. Table 3.1.1 presents the breakdown per municipality of land area, population and density, as well as administrative composition.

Table 3.1.1 Outline of Municipalities

Municipality/City		Land Area (km ²)	1995 Population		Number of Barangay		
Name	Class		Number	Density (person/km ²)	Urban	Rural	Total
Bago City	1st	402.10	132,338	329	3	21	24
Binalbagan	3rd	185.40	54,664	295	7	9	16
Cadiz City	1st	516.50	125,943	244	6	16	22
Calatrava	2nd	439.60	69,902	159	5	35	40
Candoni	5th	191.70	17,004	89	1	8	9
Cauayan	1st	519.90	84,159	162	3	22	25
Enrique B. Magalona	3rd	113.32	54,421	480	9	14	23
Escalante	2nd	125.00	79,928	639	5	16	21
Himamaylan	1st	384.20	83,268	217	6	13	19
Hinigaran	2nd	160.80	71,519	445	4	20	24
Hinoba-an (Asia)	3rd	424.10	40,819	96	4	9	13
Ilog	3rd	281.70	43,905	156	7	8	15
Isabela	3rd	177.40	49,019	276	9	21	30
Kabankalan City	3rd	726.40	139,282	192	13	19	32
La Carlota City	3rd	137.32	56,414	411	4	10	14
La Castellana	3rd	216.51	59,620	275	2	11	13
Manapla	3rd	112.90	44,301	392	5	7	12
Moises Padilla	4th	143.70	31,350	218	9	6	15
Murcia	3rd	284.55	55,128	194	7	16	23
Pontevedra	4th	112.50	42,443	377	5	15	20

Table 3.1.1 Outline of Municipalities

(contd)

Municipality/City		Land Area (km ²)	1995 Population		Number of Barangay		
Name	Class		Number	Density (person/km ²)	Urban	Rural	Total
Pulupandan	4th	23.00	24,932	1,084	10	10	20
Sagay City	3rd	389.60	128,374	330	4	20	24
Salvador Benedicto	5th	170.56	17,635	103		7	7
San Carlos City	1st	384.00	101,429	264	6	12	18
San Enrique	5th	21.00	20,649	983	2	8	10
Silay City	2nd	214.80	122,748	571	8	8	16
Sipalay	1st	432.70	63,960	148	6	11	17
Talisay City	3rd	173.40	68,401	394	17	10	27
Toboso	4th	123.40	38,623	313	1	8	9
Valladolid	4th	48.01	31,380	654	7	9	16
Victorias City	3rd	133.90	78,283	585	20	6	26
Provincial Total	1st	7,769.97	2,031,841	261	195	405	600

Note: Bacolod City, a highly urbanized city, is excluded from the PW4SP study area.

3.2 Natural Conditions and Geographical Features

3.2.1 Meteorology

The province has 2 types of climate under the Coronas classification: Type I, which is experienced in the southern part and Type III, in the northern and central parts. Type I is characterized by two pronounced seasons, dry from December to May and wet from June to November, while Type III has no very pronounced maximum rain period, with a short dry season lasting only from one to three months as reflected in the Location Map. From the 6 years average (1986-1991) rainfall record of PAGASA, the average annual rainfall was registered at 2,074.3mm. The northern monsoon prevails during the dry season, while the southern monsoon dominates during the rainy season.

3.2.2 Land Use

Remaining forest area constitutes about 31% of the total land area of the province located mostly in Mt. Silay, Mandalagan, Kanla-on and Mt. Malapantao mountain ranges. Agricultural land occupies 67%, while fishponds and mangrove areas is limited to 2%. Primary settlements are concentrated along the coastal areas and major transport routes.

The existing land use pattern as presented in Table 3.2.1 must be enhanced by rehabilitation of watersheds in order to pursue a sustainable growth of the province. The remaining forest cover must be conserved to primarily serve as watershed rather than as source of timber. An efficiently managed watershed collects and regulates flow of water, controls soil erosion and

minimizes water pollution. Conversion of the remaining forestland to other uses will restrict its function as a watershed. Correspondingly, a significant increase in agricultural area will result in a high demand of water use.

Table 3.2.1 Current Land Use

Land Use	Area (km ²)	Percentage over Total Land Area
Forest Land	2,437.76	30.8
Grassland	-	
Built-up*	-	
Agricultural	5,310.17	67.0
Fishponds, Mangrove, Inland Water Area	178.14	2.2
Openlands	-	
Provincial Total	7,926.07	100.0

Source: 1998 Socio-economic Profile

Note:s Data include Bacolod City

* Included in agricultural

3.2.3 Topography and Drainage

The province of Negros Occidental has a wide level land on the southwestern side, rolling mountain area in the northwestern part and a mountain range in the northeastern and central portions. The northwestern mountain consists of a main coastal range flanked from the northern part to the west by a high conspicuous volcanic chain. The main range trends N-NE parallel the northeastern coast. It falls steeply to the northeast leaving a few coastal plains, the largest of which are the settlements of San Carlos City.

The chain of volcanic peaks consists from south to north of Mt. Canla-on (2,450 m), Mt. Mandalagan (1,879 m) and Mt. Silay (1,535). Mt. Canla-on, which is considered active and had a last eruption in 1997, is rather isolated from the two extinct volcanoes. The western plain is the widest and most important strategic area of the island, extending N-NE ward from Kabankalan near Panay Gulf for about 160km.

A number of big and small rivers provide good and natural drainage in the whole province, except in the plain of the southwestern part of Negros Occidental that has poor drainage. The major drainage system in the province is characterized mainly by radial or dendritic pattern. The former is typical of volcanic areas or peaks in northern part of the province, while the latter is confined to the southwestern plain and rolling hills. The principal rivers are the westward flowing Bago River in the northwest and the northward flowing Ilog River in the southwest. The former drains into the Guimaras Strait, while the latter into the Panay Gulf.

Figure 3.2.1 shows the natural drainage systems of the province. Table 3.2.2 is a list of the main rivers and their corresponding drainage areas with recorded flow rates at the site of the gauging station.

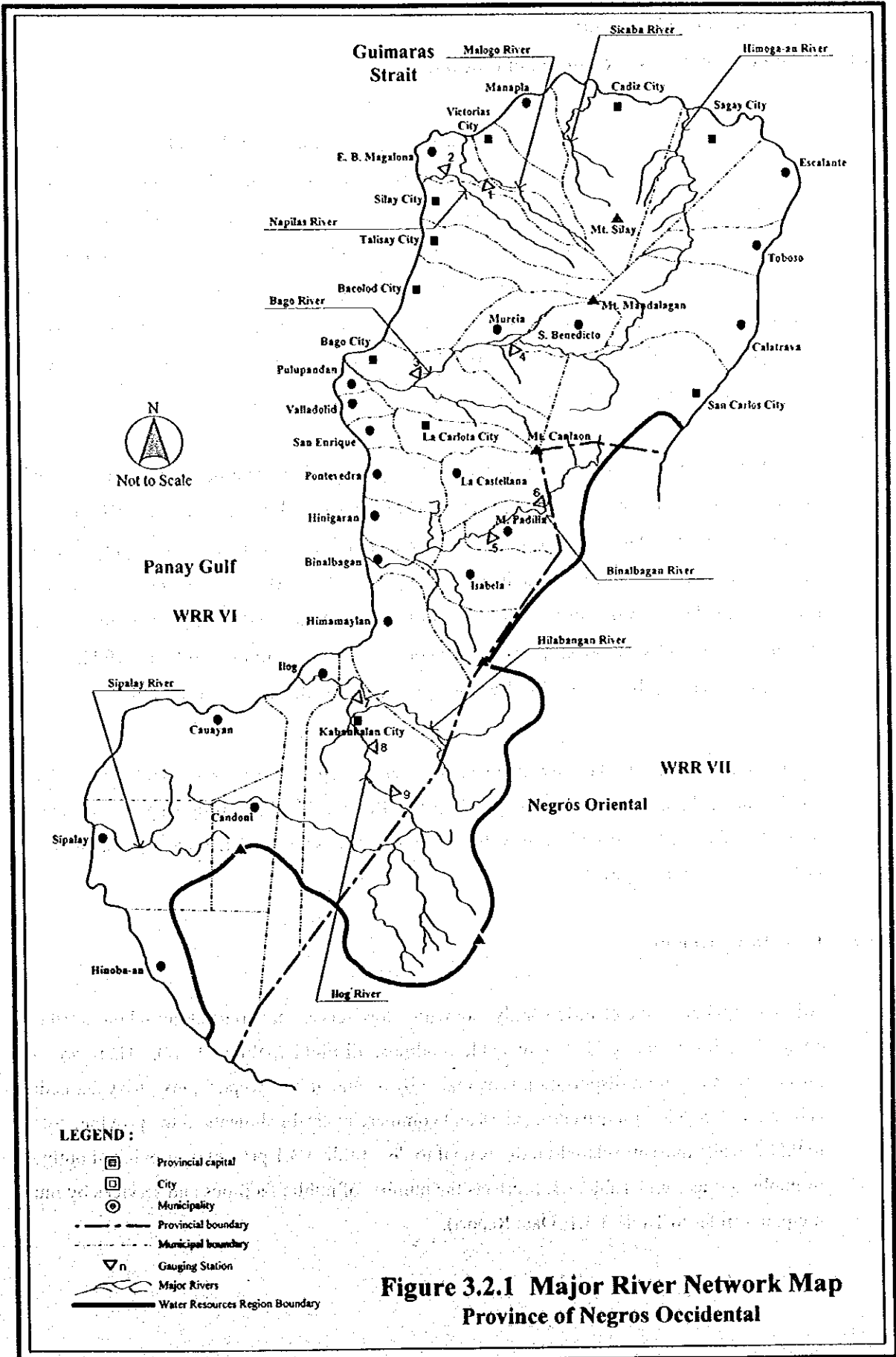
Table 3.2.2 Drainage Areas & Flow Rates of Major Rivers

Major River (No. of Gauging Station in Fig 3.2.1)	Drainage Area (km ²)	Flow Rate (m ³ /sec)			Water District (using river water)
		Peak	Maximum	Minimum	
Himoga-an	No gauging station in the watershed.			None	
Sicaba	No gauging station in the watershed.			None	
Malogo (1)	129	1,801.4	924.2	0.9	None
Napilas (2)	33	482.1	115.2	0.4	None
Bago (3)	683	3,425.0	1,147.5	3.9	None
Bago (4)	445	499.0	481.7	6.6	None
Binalbagan (5)	350	471.5	228.5	1.1	None
Binalbagan (6)	12	39.0	38.6	0.2	None
Hilabangan (7)	1,959	1,775.0	1,690.2	2.0	None
Hilabangan (8)	1,453	2,513.0	2,091.2	5.1	None
Hilabangan (9)	1,245	878.0	442.4	4.1	None
Sipalay	No gauging station in the watershed.			None	

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

Notes: Peak - Peak discharge of Daily Maximum Discharge
 Maximum - Maximum Daily Discharge of Weighted Daily Discharge
 Minimum - Minimum Daily Discharge of Weighted Daily Discharge

Seven typical rivers in the province were selected for water quality examination, namely; Himoga-an, Sicaba, Malogo, Bago, Binalbagan, Hilabangan and Sipalay rivers. Analyzed river waters were turbid and colored. The examination result shows that river waters in the southern part of the province are slightly ironic (refer to 7.5, Data Report).



**Figure 3.2.1 Major River Network Map
Province of Negros Occidental**

3.3 Socio-economic Conditions

3.3.1 Economic Activities and Household Income

Just like most of the provinces in the country, Negros Occidental is basically an agricultural province. Sugarcane, rice and coconut are its principal crops, although the province is presently promoting crop diversification especially for high value crops. A number of families also depend on commercial fishery and fishpond production for their livelihood. Agri-based industries are the production of refined sugar and the processing of fishery and other aquatic products that are being exported to other countries. These industries are major generators of employment in Negros Occidental. Currently, the province is actively supporting the development of more small-scale and cottage industries as well as tourism.

The NSO Family Income and Expenditures Survey in 1994 showed that the average annual family income of the province was P 56,601 while the expenditure was at P 53,010 or a net saving of P 3,591. Distribution of families by income class in the region and province is shown in Figure 3.3.1 (refer to Table 3.3.1, Supporting Report). Percentages of families of lower income levels in the province were almost equal with the average figures in the region. Based on the established poverty threshold income of P 47,133, in Region VI for 1994, about 44% of the total number of families lived within and below the poverty threshold.

As to the number of workers by major industry group, agriculture, fishery and forestry had the dominant share followed by services (refer to Table 3.3.2, Supporting Report). By class of worker, those who worked for private business/enterprise or farm had the highest share of 48% as reflected in Figure 3.3.2.

3.3.2 Basic Infrastructure

All municipalities have electric supply, but with a low service coverage at household level of 55%. Telephone service is also available in almost all municipalities (97%). There are 38 post offices and land transportation is available by means of bus, jeepney, taxi, tricycle, pedicab and motorcycle. Industrial/business and commercial establishments in the province total to 9,507, while tourism-related facilities total to 78. Table 3.3.1 presents a provincial outline of public services and Table 3.3.2 reflects the number of public facilities and services by municipality (refer to Table 3.3.1, Data Report).

3.3.3 Education

The province has a total of 1,217 schools consisting of 944 elementary schools, 224 high schools and 49 tertiary/technical schools. A large part of the population had attained elementary or high school levels of education as reflected in Figure 3.3.3 (refer to Table 3.3.3, Supporting Report).

Figure 3.3.1 Distribution of Families by Income Class

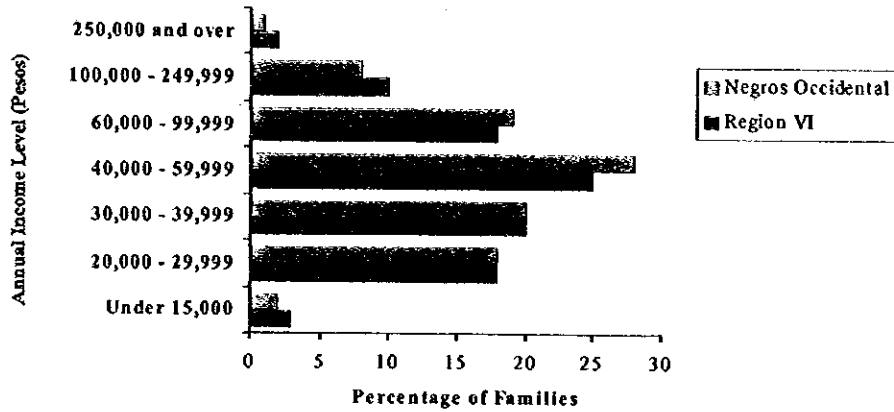


Figure 3.3.2 Employment Distribution by Major Industry and Class of Worker

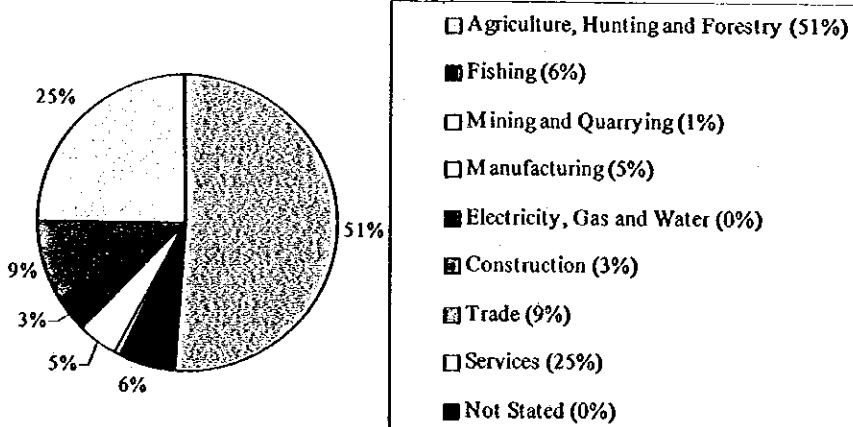


Figure 3.3.3 Population Distribution by Highest Educational Attainment

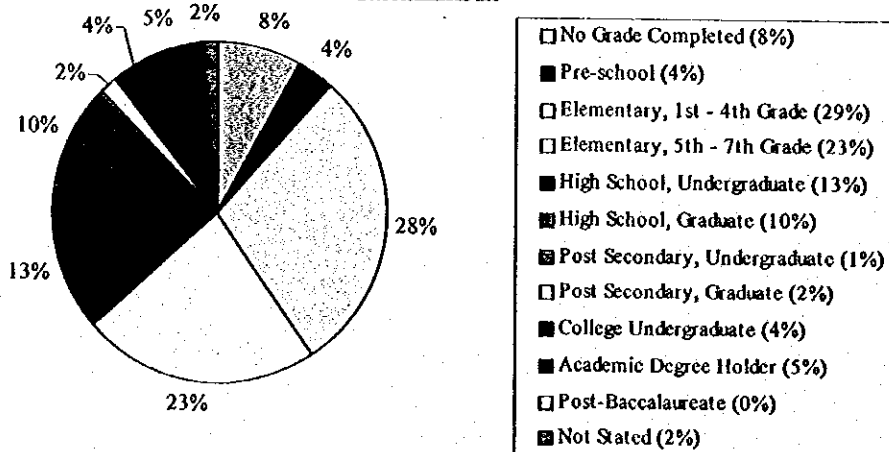


Table 3.3.1 Provincial Outline on Public Services

Item	Unit	Value	Item	Unit	Value
(1) Roads			(8) Tourism facilities	Number	149
a) Total length	Km	4,574.80	(Hotel resort, lodges, recreational facilities, etc.)		
b) Barangay roads	Percent	51			
(2) Electricity service coverage			(9) Schools		
a) Municipality	Percent	100	a) Elementary level	Number	944
b) Barangay	Percent	90	b) Secondary level	Number	224
c) Household	Percent	55	c) Tertiary level/Technical	Number	49
(3) Telecommunication Services			(10) Health Facilities		
a) Availability in municipality	Percent	96.97	a) Hospital	Number	31
b) Telegraph station	Number	32	b) Main health centers, rural health units, barangay health center, etc	Number	544
c) Telephone station/exchange	Number	None/3			
(4) Post Office	Number	38	(11) Labor		
			a) Labor force participation ratio	Percent	70
(5) Transportation services	Mode	Bus, jeepney, (ex. Bus, jeep, taxi,)	b) Employment rate	Percent	88.3
		tricycle, motorcycle, pedicab, taxi	(12) Average family income		
(6) Banking Facilities	Number	129	a) Monthly income	Pesos/Month	62,506
a) Private bank	(by Private and public)		b) Monthly expenditure	Pesos/Month	58,264
b) Public bank					
(7) Industrial/business/commercial establishment	Number	9,507			

Sources: PSPT, Provincial Socioeconomic Profile Development Plan, 1995 Population Census, 1994 Family Income and Expenditures Survey by NSO

Table 3.3.2 Public Facilities and Services by Municipality

Municipality/City	High School			Technical School	College	Hospital	Public Market	Bank and Financing Institution
	Public nos.	Private nos.	Total nos.					
Bago City	7	1	8	1	1	2	6	4
Binalbagan	5	3	8	2	3		5	6
Cadiz City	10	2	12	2	2	2	6	13
Calatrava	5		5			1	4	1
Candoni	3	1	4				1	
Cauayan	10	3	13			1	3	
Enrique B. Magalona	4	1	5				1	1
Escalante	7	1	8	1	1	2	2	6
Himamaylan	8	3	11			1	3	1
Hinigaran	4	2	6	1		1	1	5
Hinoba-an (Asia)	4	2	6			1	1	2
Ilog	6	4	10				3	1
Isabela	4	1	5			3	1	1
Kabankalan City	17	6	23	1	4	3	14	20
La Carlota City	4	1	5		2	2	4	4
La Castellana	3	1	4			1	6	1
Manapla	2	1	3			1	2	2
Moises Padilla	3	1	4				1	1
Murcia	4	2	6	1	1		2	1

Table 3.3.2 Public Facilities and Services by Municipality

(cont.d)

Municipality	High School			Technical-School	College	Hospital	Public Market	Bank and Financing Institution
	Public	Private	Total					
	Nos.	nos.	nos.					
Pontevedra	3	1	4				1	1
Pulupandan	1	1	2				4	
Sagay City	11	4	15		1	2	10	4
Salvador Benedicto	1		1				1	
San Carlos City	5	4	9	1	3	3	9	28
San Enrique	1	1	2				1	
Silay City	7	1	8	2	1	2	2	9
Sipalay	12	2	14	1	1	1	2	1
Talisay City	5	2	7	1	2		1	3
Toboso	4	1	5				2	1
Valladolid	3	3	6			1	4	1
Victorias City	4	3	7	2	2	1	4	10
Provincial Total	167	59	225	13	24	31	107	128

3.4 Population

3.4.1 Previous Population Development

A fluctuating provincial population growth rate had been experienced since the last six (6) census years (1960-1995). From an average annual growth rate of 1.37% during the period 1960 to 1970, it increased to 2.37% (1970-1975) and again decreased to 1.52% (1990-1995).

A summary of the average annual growth rates of the province is as follows:

<u>Year</u>	<u>Population</u>	<u>Ave. Annual Growth Rate (%)</u>	<u>Period</u>
1970	1,316,492	1.37	1960 - 1970
1975	1,562,400	2.37	1970 - 1975
1980	1,667,886	1.77	1975 - 1980
1990	1,892,728	2.10	1980 - 1990
1995	2,031,841	1.52	1990 - 1995

A consideration on how the population growth behaved in the past and how it is likely to behave in the future is important because of the issue of resource allocation including the water supply and sanitation sector requirements.

The 1998 population was estimated to provide the planning base for this Master Plan (refer to Section 8.3.1 Population Projection, Main Report). Figure 3.4.1 and Table 3.4.1 show how the past population development by municipality behaved from 1948 to 1995.

Figure 3.4.1 Previous Population Development of the Province

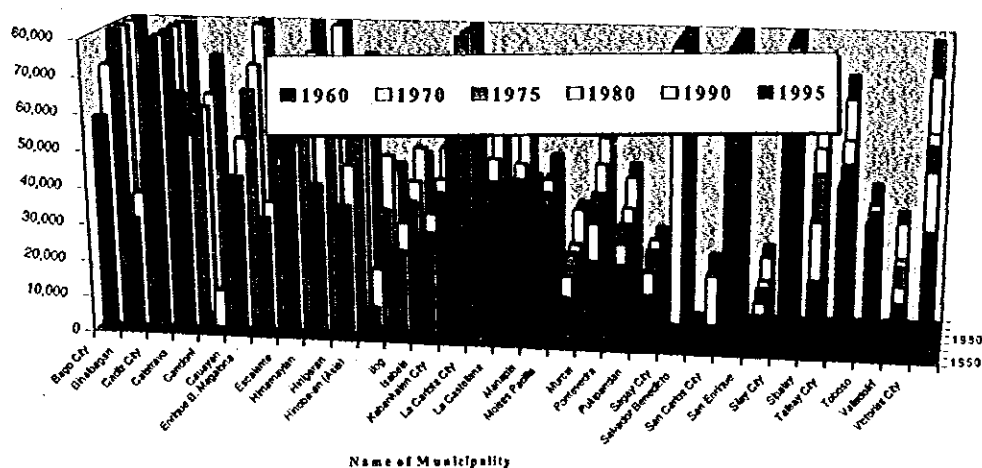


Table 3.4.1 Previous Population Development by Municipality

Municipality/ City	Previous Population						
	1948	1960	1970	1975	1980	1990	1995
Bago City	56,693	58,834	71,663	89,213	99,631	122,863	132,338
Binalbagan	19,748	31,160	36,765	43,968	49,428	52,073	54,664
Cadiz City	48,960	88,542	124,108	127,653	129,632	119,772	125,943
Calatrava	53,805	65,888	53,151	58,867	58,163	60,228	69,902
Candoni			10,258	12,614	10,831	16,638	17,004
Cauayan	34,946	43,384	52,508	64,244	70,017	81,063	84,159
Enrique B. Magalona	19,204	32,340	35,201	43,185	44,411	48,866	54,421
Escalante	56,846	59,768	52,060	63,969	71,293	72,685	79,928
Himamaylan	33,984	41,985	53,663	65,521	70,467	81,014	83,268
Hinigaran	29,017	36,240	46,010	52,018	54,717	68,739	71,519
Hinoba-an (Asia)		8,630	17,475	32,357	45,819	40,813	40,819
Ilog	21,645	24,455	30,573	34,977	38,956	46,599	43,905
Isabela	33,743	29,769	33,636	37,400	39,704	47,010	49,019
Kabankalan City	47,817	59,341	72,567	89,695	92,109	127,000	139,282
La Carlota City	45,789	56,772	38,321	40,984	45,812	56,443	56,414
La Castellana	24,654	35,630	34,881	41,821	44,684	54,368	59,620
Manapla	35,218	46,809	31,097	38,357	40,524	40,095	44,301
Moises Padilla		13,301	17,565	22,106	22,916	30,742	31,350
Murcia	28,243	23,482	32,176	38,668	45,162	50,996	55,128
Pontevedra	18,060	22,751	27,007	30,575	33,258	40,094	42,443
Pulupandan	11,726	14,844	19,476	23,665	24,824	22,983	24,932
Sagay City	67,152	7,135	79,702	95,421	99,118	112,700	128,374
Salvador Benedicto						13,538	17,635
San Carlos City	92,250	124,756	90,058	90,982	91,627	105,713	101,429
San Enrique	8,117	10,476	12,368	14,055	14,662	19,255	20,649
Silay City	35,570	60,324	69,200	104,887	111,131	101,031	122,748
Sipalay		20,325	34,771	45,773	51,264	61,892	63,960
Talisay City	43,610	46,308	45,084	48,518	53,624	63,260	68,401
Toboso	29,278	36,378	28,358	35,737	36,415	34,621	38,623
Valladolid	13,393	14,891	17,961	21,176	21,728	29,742	31,380
Victorias City	27,858	34,290	48,829	53,994	55,959	69,892	78,283
Provincial Total	937,326	1,148,808	1,316,492	1,562,400	1,667,886	1,892,728	2,031,841

3.4.2 Classification of Urban and Rural Areas

NSO classifies a barangay as urban when it satisfies any of the following conditions on the economic and social functions.

- (1) In their entirety, all cities and municipal jurisdictions having a population density of at least 500 persons per square kilometer.
- (2) Poblaciones or central districts of municipalities and cities, which have a population density of at least 500 persons per square kilometer.
- (3) Poblaciones or central districts (not included in nos. 1 and 2) regardless of population size, which have the following:
 - 1) Street pattern, i.e., network of streets either at parallel or in right angle orientation;
 - 2) At least six establishments (commercial, manufacturing, recreational and/or personal services); and
 - 3) At least three of the following:
 - a) a town hall, church or chapel with religious services at least once a month;
 - b) a public plaza, park or cemetery;
 - c) a market place or building where trading activities are carried on at least once a week; and
 - d) a public building like school, hospital, health center or library.
- (4) Barangays having at least 1,000 inhabitants, that meet the condition set forth in no. 3 above, and in which the occupation of the inhabitants is predominantly non-farming/fishing.

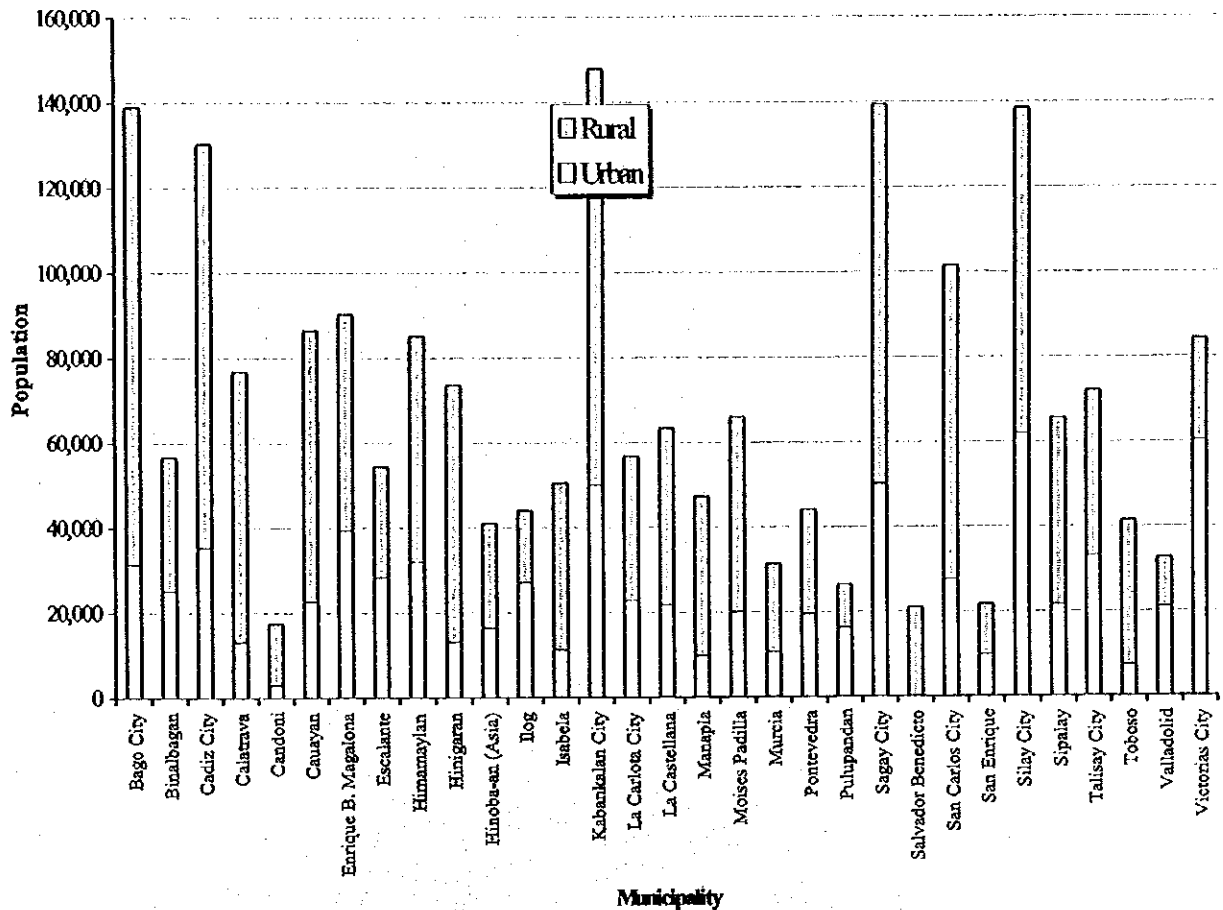
All areas not falling under the urban classification are defined as rural area. Considering the 1995 NSO classification of urban and rural barangays, there are 195 urban barangays and 405 rural barangays for a total of 600 barangays in 1998. Distribution of the classified areas is shown in Figure 3.4.1, Supporting Report.

3.4.3 Present Population Distribution

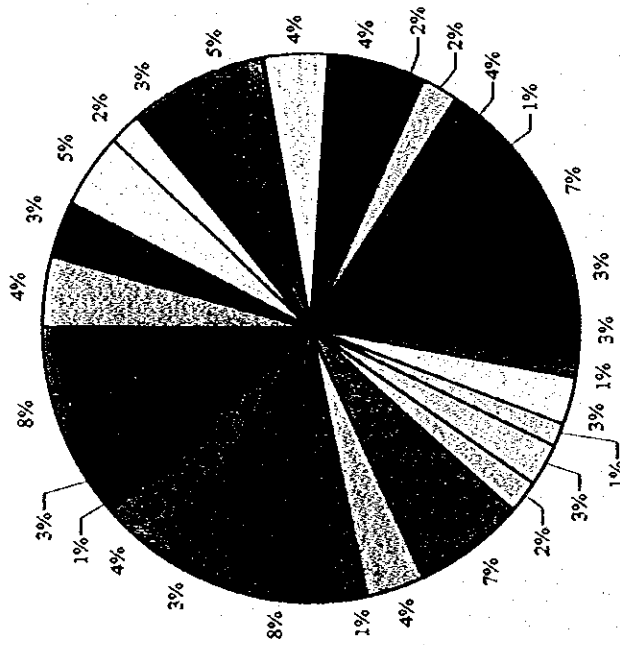
From the 1995 NSO census, the 1998 urban-rural population was estimated for the study area. Rural population accounts for 64.5% of the provincial total, while 35.5% is urban as reflected in Figure 3.4.2. Table 3.4.2 presents the breakdown of the number of urban and rural barangays by municipality and its corresponding present population distribution.

There are 408,317 households with 263,129 residing in rural areas and 145,188 households in urban areas. The average provincial household size is 5.25 persons/household. Table 3.4.3 presents a breakdown per municipality on the number of households and household sizes by urban and rural area.

Figure 3.4.2 Present Population Distribution

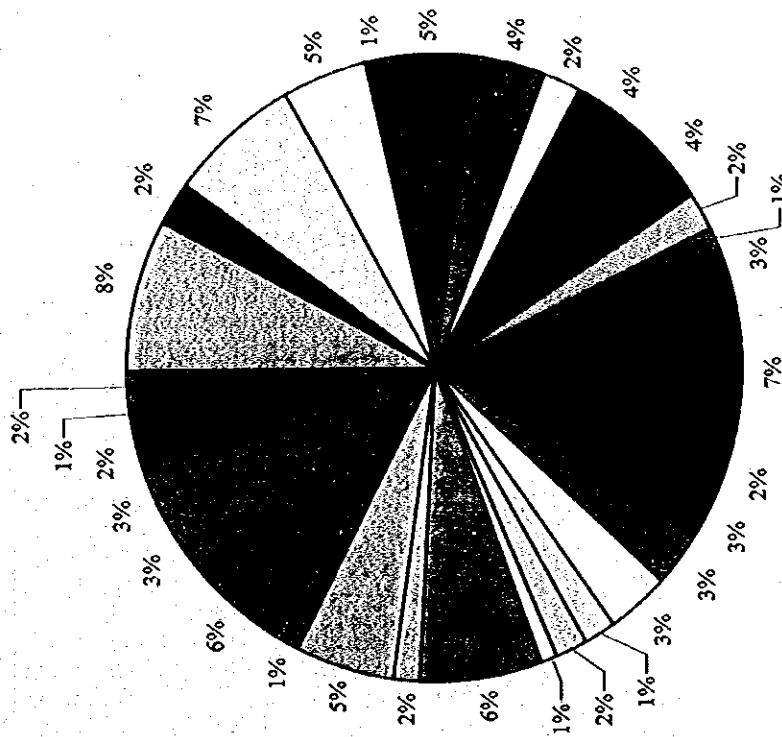


Urban Population (35.5%)



■ Bago City (4%)	■ Binalbagan (3%)
□ Cadiz City (5%)	□ Calatrava (2%)
■ Candoni (0%)	■ Cauayan (3%)
▨ Enrique B. Magalona (5%)	□ Escalante (4%)
■ Himamaylan (4%)	■ Hinigaran (2%)
□ Hinoba-an (Asia) (2%)	▨ Ilog (4%)
■ Isabela (1%)	■ Kabankalan City (7%)
■ La Carlota City (3%)	■ La Castellana (3%)
▨ Manapla (1%)	□ Moises Padilla (3%)
□ Murcia (1%)	□ Pontevedra (3%)
□ Pulupandan (2%)	▨ Sagay City (7%)
▨ Salvador Benedicto (0%)	□ San Carlos City (4%)
▨ San Enrique (1%)	▨ Silay City (8%)
■ Sipalay (3%)	▨ Talisay City (4%)
■ Toboso (1%)	■ Valladolid (3%)
■ Victorias City (8%)	

Rural Population (64.5%)



■ Bago City (8%)	■ Binalbagan (2%)
□ Cadiz City (7%)	□ Calatrava (5%)
■ Candoni (1%)	■ Cauayan (5%)
■ Enrique B. Magalona (4%)	□ Escalante (2%)
■ Himamaylan (4%)	■ Hinigaran (4%)
□ Hinoba-an (Asia) (2%)	■ Ilog (1%)
■ Isabela (3%)	■ Kabankalan City (7%)
■ La Carlota City (2%)	■ La Castellana (3%)
□ Manapla (3%)	□ Moises Padilla (3%)
□ Murcia (1%)	□ Pontevedra (2%)
□ Pulupandan (1%)	□ Sagay City (6%)
□ Salvador Benedicto (2%)	□ San Carlos City (5%)
□ San Enrique (1%)	□ Silay City (6%)
□ Sipalay (3%)	□ Talisay City (3%)
■ Toboso (2%)	■ Valladolid (1%)
■ Victorias City (2%)	

Table 3.4.2 Outline of Urban and Rural Areas in the Province

Municipality/ City	Number of Barangay			Population (1998)		
	Urban	Rural	Total	Urban	Rural	Total
Bago City	3	21	24	31,326	107,584	138,910
Binalbagan	7	9	16	25,064	31,464	56,528
Cadiz City	6	16	22	35,245	95,008	130,253
Calatrava	5	35	40	13,016	63,675	76,691
Candoni	1	8	9	2,799	14,541	17,340
Cauayan	3	22	25	22,626	63,758	86,384
Enrique B. Magalona	9	14	23	39,368	50,814	90,182
Escalante	5	16	21	28,301	26,120	54,421
Himamaylan	6	13	19	32,039	52,950	84,989
Hinigaran	4	20	24	13,078	60,418	73,496
Hinoba-an (Asia)	4	9	13	16,316	24,661	40,977
Ilog	7	8	15	27,123	16,782	43,905
Isabela	9	21	30	11,114	39,324	50,438
Kabankalan City	13	19	32	49,917	97,855	147,772
La Carlota City	4	10	14	22,818	33,850	56,668
La Castellana	2	11	13	21,679	41,597	63,276
Manapla	5	7	12	9,549	37,634	47,183
Moises Padilla	9	6	15	19,986	45,931	65,917
Murcia	7	16	23	10,634	20,716	31,350
Pontevedra	5	15	20	19,428	24,668	44,096
Pulupandan	10	10	20	16,232	10,035	26,267
Sagay City	4	20	24	50,130	89,156	139,286
Salvador Benedicto		7	7		20,925	20,925
San Carlos City	6	12	18	27,579	73,850	101,429
San Enrique	2	8	10	9,841	11,773	21,614
Silay City	8	8	16	61,928	76,542	138,470
Sipalay	6	11	17	21,495	43,987	65,482
Talisay City	17	10	27	33,110	38,821	71,931
Toboso	1	8	9	7,262	34,119	41,381
Valladolid	7	9	16	21,016	11,513	32,529
Victorias City	20	6	26	60,275	23,832	84,107
Provincial Total	195	405	600	760,294	1,383,903	2,144,197

Table 3.4.3 Household Numbers and Household Size

Municipality/ City	Number of Households (1995)			Number of Households (1998)			1995 Household Size (person/household)		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Bago City	5,719	19,560	25,279	6,001	20,531	26,532	5.22	5.24	5.24
Binalbagan	4,567	5,710	10,277	4,720	5,903	10,623	5.31	5.33	5.32
Cadiz City	6,820	17,587	24,407	7,049	18,201	25,250	5.00	5.22	5.16
Calatrava	2,465	11,711	14,176	2,706	12,838	15,544	4.81	4.96	4.93
Candoni	520	2,644	3,164	530	2,698	3,228	5.28	5.39	5.37
Cauayan	4,174	11,490	15,664	4,285	11,785	16,070	5.28	5.41	5.37
Enrique B. Magalona	5,389	4,709	10,098	7,499	9,156	16,655	5.25	5.55	5.39
Escalante	6,800	8,816	15,616	5,517	5,112	10,629	5.13	5.11	5.12
Himamaylan	5,707	9,425	15,132	5,825	9,627	15,452	5.50	5.50	5.50
Hinigaran	2,307	10,894	13,201	2,369	11,189	13,558	5.52	5.40	5.42
Hinoba-an (Asia)	3,123	4,601	7,724	3,138	4,618	7,756	5.20	5.34	5.28
Ilog	5,161	3,226	8,387	5,156	3,227	8,383	5.26	5.20	5.23
Isabela	2,127	7,252	9,379	2,188	7,462	9,650	5.08	5.27	5.23
Kabankalan City	8,543	16,577	25,120	9,059	17,600	26,659	5.51	5.56	5.54
La Carlota City	4,218	6,336	10,554	4,233	6,363	10,596	5.39	5.32	5.35
La Castellana	3,881	7,663	11,544	4,121	8,140	12,261	5.26	5.11	5.16

Table 3.4.3 Household Numbers and Household Size

(contd)

Municipality/ City	Number of Households (1995)			Number of Households (1998)			1995 Household Size (person/household)		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Manapla	1,703	6,545	8,248	1,815	6,969	8,784	5.26	5.40	5.37
Moises Padilla	2,105	3,966	6,071	3,958	8,799	12,757	5.05	5.22	5.16
Murcia	3,268	7,334	10,602	2,081	3,953	6,034	5.11	5.24	5.20
Pontevedra	3,673	4,533	8,206	3,817	4,708	8,525	5.09	5.24	5.17
Pulupandan	2,965	1,886	4,851	3,122	1,987	5,109	5.20	5.05	5.14
Sagay City	8,738	16,146	24,884	9,476	17,516	26,992	5.29	5.09	5.16
Salvador Benedicto		3,367	3,367		3,993	3,993		5.24	5.24
San Carlos City	5,425	14,965	20,390	5,429	14,980	20,409	5.08	4.93	4.97
San Enrique	1,808	2,114	3,922	1,893	2,213	4,106	5.20	5.32	5.26
Silay City	10,192	12,913	23,105	11,489	14,579	26,068	5.39	5.25	5.31
Sipalay	4,030	8,129	12,159	4,126	8,315	12,441	5.21	5.29	5.26
Talisay City	6,174	7,158	13,332	6,492	7,523	14,015	5.10	5.16	5.13
Toboso	1,342	6,029	7,371	1,438	6,462	7,900	5.05	5.28	5.24
Valladolid	4,008	2,156	6,164	4,153	2,236	6,389	5.06	5.15	5.09
Victorias City	10,701	4,139	14,840	11,503	4,446	15,949	5.24	5.36	5.28
Provincial Total	137,653	249,581	387,234	145,188	263,129	408,317	5.24	5.25	5.25

3.5 Health Status

3.5.1 Morbidity, Mortality and Infant Mortality

The number one cause of morbidity in Negros Occidental was diarrhea, a water-related disease, followed by pneumonia and bronchitis. Influenza and vascular diseases ranked fourth and fifth, respectively. Regarding mortality, the number one cause was pneumonia, followed by tuberculosis. Heart diseases and vascular diseases ranked third and fourth, respectively. Pneumonia, congenital anomalies and respiratory infection in fetus/newborn were the 3 leading causes of infant mortality in the province (refer to Table 3.5.1, Data Report).

The general health status of the populace of the province in 1998 was relatively poor compared with the national condition. The incidence of diseases was relatively lower in Negros Occidental than the country as a whole. Table 3.5.1 presents a comparative statistics on the ten leading causes of morbidity, mortality and infant mortality of the province as well as of the Philippines.

Water-related diseases in the ten leading causes of morbidity include diarrhea (rank 1st), scabies (7th), dengue fever (9th) and typhoid/paratyphoid (10th). Diarrhea (rank 4th) is also among the ten leading causes of infant mortality.

3.5.2 Water Related Diseases

An indicator of health problems related to water supply and sanitation is the incidence of water-related diseases. The World Health Organization (WHO) has classified diseases related to water into four (4) categories: 1) water-borne diseases e.g., cholera, typhoid, hepatitis A, diarrhea and dysentery; 2) water-based diseases e.g., schistosomiasis; 3) water-washed diseases e.g., diarrhea, intestinal parasitism, scabies, conjunctivitis (sore eyes), and skin diseases; and 4) water-vector related diseases e.g., malaria, filariasis and dengue or H-fever. As with malaria, the control of filariasis is beyond this Master Plan. A safe water supply, sanitary toilet and proper hygiene practices are conditions necessary for the control and prevention of these diseases.

Water-related diseases reported in the province in 1998 were diarrhea, typhoid/paratyphoid, dysentery, viral hepatitis, gastroenteritis, skin disease, scabies, dengue fever, malaria and schistosomiasis. Table 3.5.2 presents the reported cases and deaths of notifiable water-related diseases in the province.

3.5.3 Health Facilities and Practitioners

Present facilities serving the health care of the populace are 30 hospitals, 32 rural health units and 512 barangay health stations. The ratio of the population to these facilities and to the health practitioners are relatively higher as compared to the national average figures (refer to Table 3.5.1 number and ratio of population to health facilities and/or medical practitioners, Supporting Report).

Table 3.5.1 Number and Rates of Ten Leading Causes of Morbidity, Mortality and Infant Mortality

Rate: 1/100,000

Causes	Negros Occidental		Philippines			
	Number	Rate	Number	Rate	Ranking	
Morbidity	1. Diarrhea	33,341	1,566.9	1,337,449	1,997	1
	2. Pneumonia	21,029	988.3	470,574	703	4
	3. Bronchitis	20,999	986.9	903,508	1,349	2
	4. Influenza	19,252	904.8	609,471	910	3
	5. Vascular Diseases	8,035	377.6	-	-	-
	6. Tuberculosis	5,253	246.9	159,049	238	6
	7. Scabies	3,573	167.9	-	-	-
	8. Varicella, Chickenpox	2,730	128.3	71,317	107	9
	9. Dengue Fever	1,061	49.9	-	-	-
	10. Typhoid/Paratyphoid	967	45.4	-	-	-
Mortality	1. Pneumonia	848	39.9	35,582	53	3
	2. Tuberculosis	745	35.0	24,580	37	5
	3. Heart Diseases	508	23.9	48,582	69	1
	4. Vascular Diseases	469	22.0	37,358	56	2
	5. Other Accidents	431	20.3	13,477	20	6
	6. Malignant Neoplasms	390	18.3	25,399	38	4
	7. Kidney/ Nephritis	188	8.8	5,510	8	10
	8. Obstructive Pulmonary	170	8.0	11,154	17	7
	9. Other Diges. Diseases	130	6.1	-	-	-
	10. Nutritional Deficiencies	114	5.4	-	-	-
Infant Mortality	1. Pneumonia	111	5.2	7,631	4.5	1
	2. Congenital Anomalies	39	1.8	2,366	1.4	3
	3. Resp. Fetus/Newborn	33	1.6	5,651	3.4	2
	4. Diarrhea	31	1.5	1,661	1.0	4
	5. Septicemia	29	1.4	1,252	.07	5
	6. Other Prenatal Causes	14	0.7	-	-	-
	7. Prematurity	10	0.5	-	-	-
	8. Birth Trauma	9	0.4	1,190	0.7	5
	9. Heart Diseases	8	0.4	-	-	-
	10. Nutritional Deficiencies	5	0.2	925	0.6	6

Table 3.5.2 Reported Cases and Deaths of Notifiable Water Related Diseases in 1998

Rate: 1/100,000

Diseases	Morbidity		Mortality		Infant Mortality	
	Number	Rate	Number	Rate	Number	Rate
Water-borne						
1. Typhoid/Paratyphoid	967	48	17	0.84		
2. Dysentery			9	0.44		
3. Viral hepatitis	248	12	27	1.33	1	0.05
4. Diarrhea	33,341	1641	94	4.63	31	1.5
5. Gastroenteritis			5	0.25		
Water-based						
1. Schistosomiasis			1	0.05		
Water-washed						
1. Scabies	3,573	176				
2. Skin disease	4	0.20	1	0.05		
Water vector						
1. Dengue fever	1,061	52	20	0.98		
2. Malaria			1	0.05		

3.6 Environmental Conditions

3.6.1 General

Environmental issues and problems directly affecting the sector and/or how the sector affects these environmental concerns are dealt with in this sub-section. Specifically, the problems of water pollution and solid waste disposal spawned by rapid population growth and increasing industrial and economic activities are discussed. These problems put a strain on the provincial water resources and hinder their optimum utilization.

3.6.2 Water Pollution

There are no existing sanitary sewerage systems in the province. Most of the drainage facilities in all municipalities are open canals or ditches. The rivers and streams function as the drainage system. These rivers receive the domestic wastewater and storm water collected by the segmented drainage facilities in urban centers or poblacions.

A major water pollution source in urban areas is domestic wastewater. Graywater generated by households is simply allowed to discharge into nearby channels. Effluent from septic tanks or cesspools is also flowing into the streams. The other major pollutant is dumped refuse that finds its way to the river systems during rain or is thrown indiscriminately into the rivers. In rural areas, natural assimilation of the river may be expected to purify organic substances. However, pollution or contamination is anticipated caused by agricultural activities especially with reference to fertilizers and pesticides.

Mining industries and agro-industrial establishments are identified as potential pollution sources in the province if no control measures are in place. The rivers must be protected and conserved for their intended or beneficial use. However, as of now, the rivers in the province have not been classified as to their usage by the Department of Environment and Natural Resources (refer to general information in Table 3.6.1 DENR Water Quality Criteria/Water Usage and Classification, Supporting Report).

3.6.3 Solid Waste Disposal

Of the 31 municipalities/cities 28 have municipal refuse collection and disposal services as of 1998 (details are referred to Table 3.6.1, Data Report). These municipalities/cities have a total of 52 units of open dump truck and 17 units of closed type truck. In the province, 24% of the households is served, while 76% is unserved. Table 3.6.1 reflects the manner of solid waste collection and disposal, and service coverage by municipality in 1998.

Open dumping is commonly practiced by the LGUs as disposal of solid wastes. The dumped refuse is usually burned or left unattended. Some significant negative effects associated with this unsanitary method are surface and groundwater pollution, air pollution, scattered solid waste, breeding grounds for insects, rodents and other disease vectors and fire hazard. At the household level, unserved households by the LGUs primarily depend on individual waste disposal such as dumping in vacant lots or body of water, burying and composting.

Table 3.6.1 Municipal Solid Waste Collection and Disposal, and Service Coverage, 1998

Name of Municipality	Number of Households 1998	Number of Collection Trucks				With Service				Without Service				Percentage of Households Served	Percentage of Households Unserved
		Open Dump Trucks	Closed Type Trucks	Total Units	Number of Households Served by Open Dump Site	Number of Households Served by Sanitary Landfill	Total Households Served	Manner of Disposal (Number of Household)			Total Households Unserved				
								Dumping (Land and Water)	Burying	Composting					
Bago City	26,532	5	4	9	1,894	1,894	1,894	3,750	8,499	12,453	24,702	7	93		
Binalbagan	10,623	2		2	1,930		1,930	6,404	812	1,502	8,718	18	82		
Cadiz City	25,250	5	2	7	10,622		10,622	14,688			14,688	42	58		
Calarava	15,544		2	2	759		759	1,556	5,006	7,075	13,637	5	95		
Candon	3,228	1		1	935		935		1,512	788	2,300	29	71		
Cauayan	16,070	1		1	500	500	500	6,870	7,800	938	15,608	3	97		
Enrique B. Magalona	16,655	1		1	1,036		1,036	2,178	903	6,717	9,798	10	90		
Escalante	10,629	1	1	2	1,507		1,507	14,511	303	303	15,117	9	91		
Himamaylan	15,452	2		2	4,800		4,800	6,632	2,536	1,521	10,689	31	69		
Hinigaran	15,558	1		1	2,178		2,178	6,567	3,421	1,424	11,412	16	84		
Hinob-an (Asia)	7,756	1		1	288		288	2,919	2,360	2,207	7,486	4	96		
Ilog	8,383							2,384	5,999		8,383		100		
Isabela	9,650	1		1	842	1,001	1,843	1,571	3,485	2,974	7,830	19	81		
Kabankalan City	26,659		2	2	3,550		3,550	13,704	8,062	1,407	23,173	13	87		
La Carlota City	10,596	2	1	3	5,914	5,914	5,914	267	1,124	3,317	4,708	56	44		
La Castellana	12,261	3		3	3,229		3,229	6,837	1,697	528	9,062	26	74		
Manapla	8,784	1		1	1,447		1,447	6,407	902	50	7,359	16	84		
Moises Padilla	12,757	1		1	767		767	5,414			5,414	12	88		
Murcia	6,034	2		2	1,300		1,300	9,951			9,951	12	88		
Pontevedra	8,525		1	1	1,006	1,006	1,006	6,351	1,183	5	7,539	12	88		
Pulupandan	5,109	1		1	1,980		1,980		3,041	100	3,141	39	61		
Sagay City	26,992	2	3	5	9,950		9,950	16,237	672	198	17,107	37	63		
Salvador Benedicto	3,993							1,329	955	1,263	3,547		100		
San Carlos City	20,409	3		3	8,149		8,149	7,886	4,550	833	13,269	38	62		
San Enrique	4,106	1		1				2,935	650	530	4,115		100		
Silay City	26,068	4	1	5	17,000		17,000	3,019	1,449	2,889	7,357	70	30		
Sipalay	12,441	4		4	209	17	226	5,397	6,827	21	12,245	2	98		
Talisay City	14,015	4		4				7,232	3,009	558	10,799	23	77		
Toboso	7,900	2		2	600		600	7,165	53	100	7,318	8	92		
Valladolid	6,389	1		1	2,209		2,209	3,220	975		4,195	34	66		
Victorias City	15,949	4		4	9,939		9,939	4,713	1,180	155	6,048	62	38		
Provincial Total	408,317	52	17	69	85,226	10,332	95,558	177,894	78,965	49,856	306,715	24	76		

Chapter

**EXISTING FACILITIES AND
SERVICE COVERAGE**

4



4. EXISTING FACILITIES AND SERVICE COVERAGE

4.1 Water Supply

4.1.1 General

Existing water supply facilities and conditions were surveyed by municipality under the category of urban and rural areas (as of October 1999 and regarded as a figure in 1998). Facilities are classified into three service levels, of which Level I facilities are further classified into safe and unsafe for drinking purpose.

The percentages of service coverage by different service level were estimated covering urban and rural areas by municipality. The served population is defined as "population served adequately with access to safe water sources/facilities." The rest of the population with unsafe sources/facilities and without access to water supply facilities was then defined as "underserved population" and "unserved population," respectively. The service coverage was figured out using estimated population in 1998.

Service profile and operating conditions of existing facilities are summarized by service level to come up with problem areas and need of rehabilitation to reflect in the development plan.

As a provincial total, approximately 76% of the present population (of which 36% in urban area and 64% in rural area) is considered as adequately served (refer to 4.1, Supporting Report for the detailed study). Under the area classification, 81% of urban population and 73% of rural population have access to safe water sources/facilities, while the rest is underserved or unserved. About 1,269,700 persons or 79% of the served population depend on Level I facilities, while about 339,000 persons or 21% are served by Level III and/or Level II systems.

4.1.2 Types of Facilities and Definition of Service Level Standard

(1) Composition of water supply system/facility

The NSMP defines service level and system components of the water supply systems/facilities as shown in Table 4.1.1. NEDA Board Resolution No. 12 (s. 1995) also provides the approved definition of terms relative to water supply including levels of service (refer to 4.1.2 Data Report). These terms are to be adopted by all government agencies including LGUs.

Table 4.1.1 Composition of Water Supply System/Facility by Service Level

Description	Level I (Point Source Facility)	Level II (Communal Faucet System)	Level III (Individual House Connection)
1. Water Source	Drilled/driven shallow well Drilled/driven deep well Dug well Spring Rain collector	Drilled shallow/deep well Spring Infiltration gallery	Drilled deep well Spring Infiltration gallery Surface water intake
2. Water Treatment	Generally none. Disinfection of wells is conducted periodically by local health authorities. Iron removal facilities are provided in problem areas.	Generally none	Disinfection is provided. Systems with surface water source have series of water treatment facilities.
3. Distribution	None	Piped system provided with reservoir/s	Piped system provided with reservoir/s and pumping facilities.
4. Delivery & Service Level	At point (within 250m radius)	Communal faucet (within 25m radius)	Individual house connection/household tap
5. Consumption Rate (Adequately Served)	At least 20 lpcd	At least 60 lpcd	At least 100 lpcd

(2) Safe and unsafe classification of water sources

DOH has classified Level I water source facilities as safe (reliable water source) and unsafe sources/facilities based on the National Standard for Drinking Water (NSDW).

Safe source: Protected deep well, protected shallow well, improved/covered dug well and developed spring

Unsafe source: Unprotected deep well, unprotected shallow well, open dug well, undeveloped/unprotected spring and rainwater collector

Water sources other than the above, such as untreated surface water of rivers, lakes and ponds are also considered unsafe sources. On the other hand, Levels II and III water supply systems are regarded to have safe/reliable sources with provision of adequate treatment.

(3) Service level standard

The NSMP and NEDA Resolution No. 12 define "adequate service level" by different water supply system. Improvement in the number of households per water source/facility may be expected for Level I service in the future. On the contrary, the number of households served by a unit of private/public source is sometimes beyond the standard on a current basis.

Level III: 1 household/connection

Level II: 5 (4 to 6) households/communal faucet

Level I: 15 households/point source
1 household/private well