

Chapter

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**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. Developments have 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.

The GOP has 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 1999-2003 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 Sarangani 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 Sarangani**

### **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.

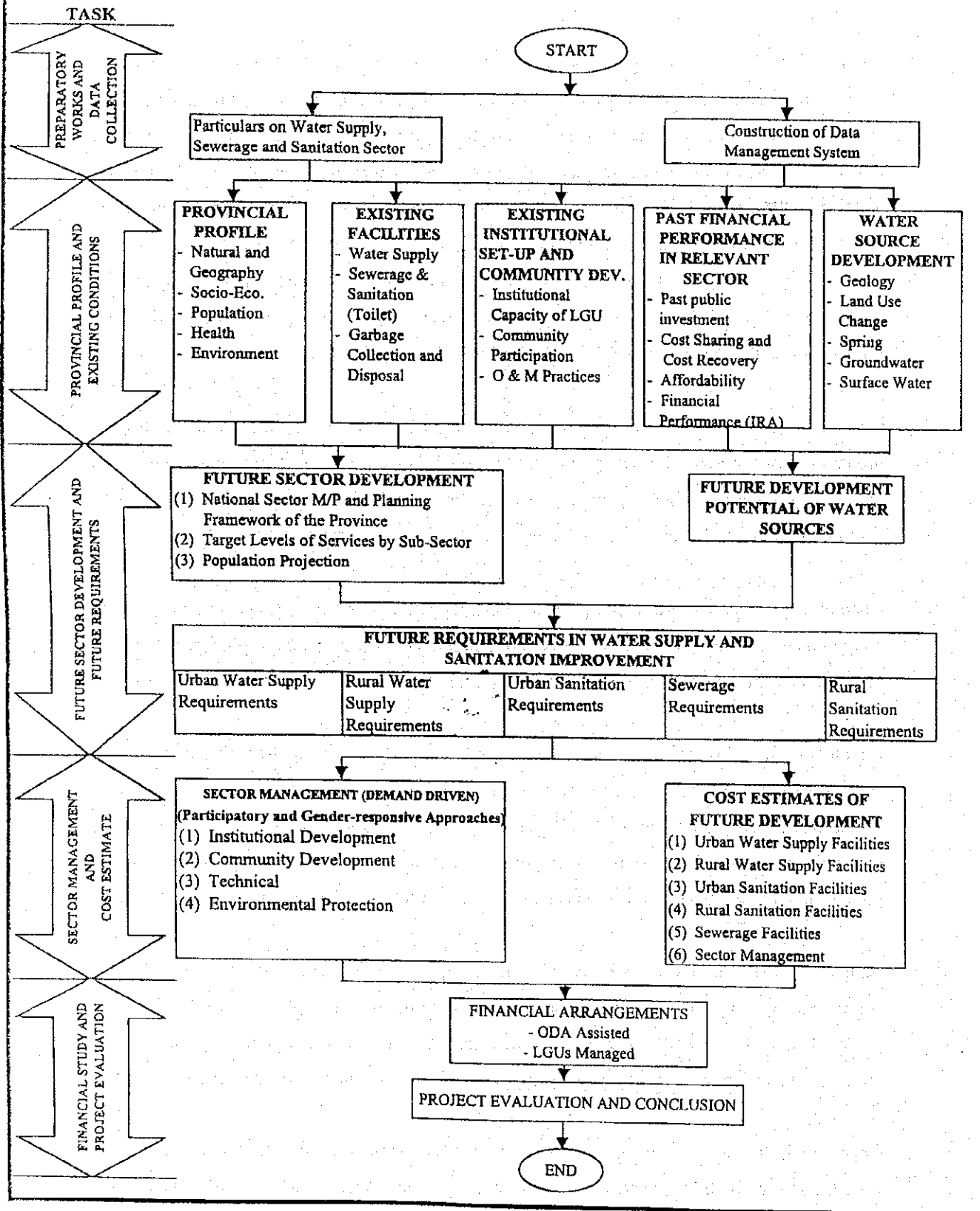
Chapter 3 provides the provincial profile with reference to current sector conditions: natural conditions and geographical features, socio-economic conditions, demographic trends, health status and environmental conditions as the planning environment.

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.

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

**Figure 1.3.1**  
**Flow Diagram of Sector Planning**



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 fund. 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 study on the financial viability of Level I water supply and sanitation projects is highlighted with reference to ODA assisted projects for eligible municipalities. Finally, cost recovery by both 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

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**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 <sup>1</sup>	Year 2010 <sup>2</sup>
Urban Water Supply <sup>3</sup>	61%	69%	95%
Rural Water Supply	70% <sup>4</sup>	79%	93%
Sanitation	60% <sup>5</sup>	68%	93%

Notes:

<sup>1</sup> Based on the Updated MTPDP targets for 1998.

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

<sup>3</sup> Excluding Metro Manila and its outlying areas.

<sup>4</sup> Includes only point sources.

<sup>5</sup> 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 is 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** 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 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 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 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 routine 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 report.

### 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 complete 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 routine 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.

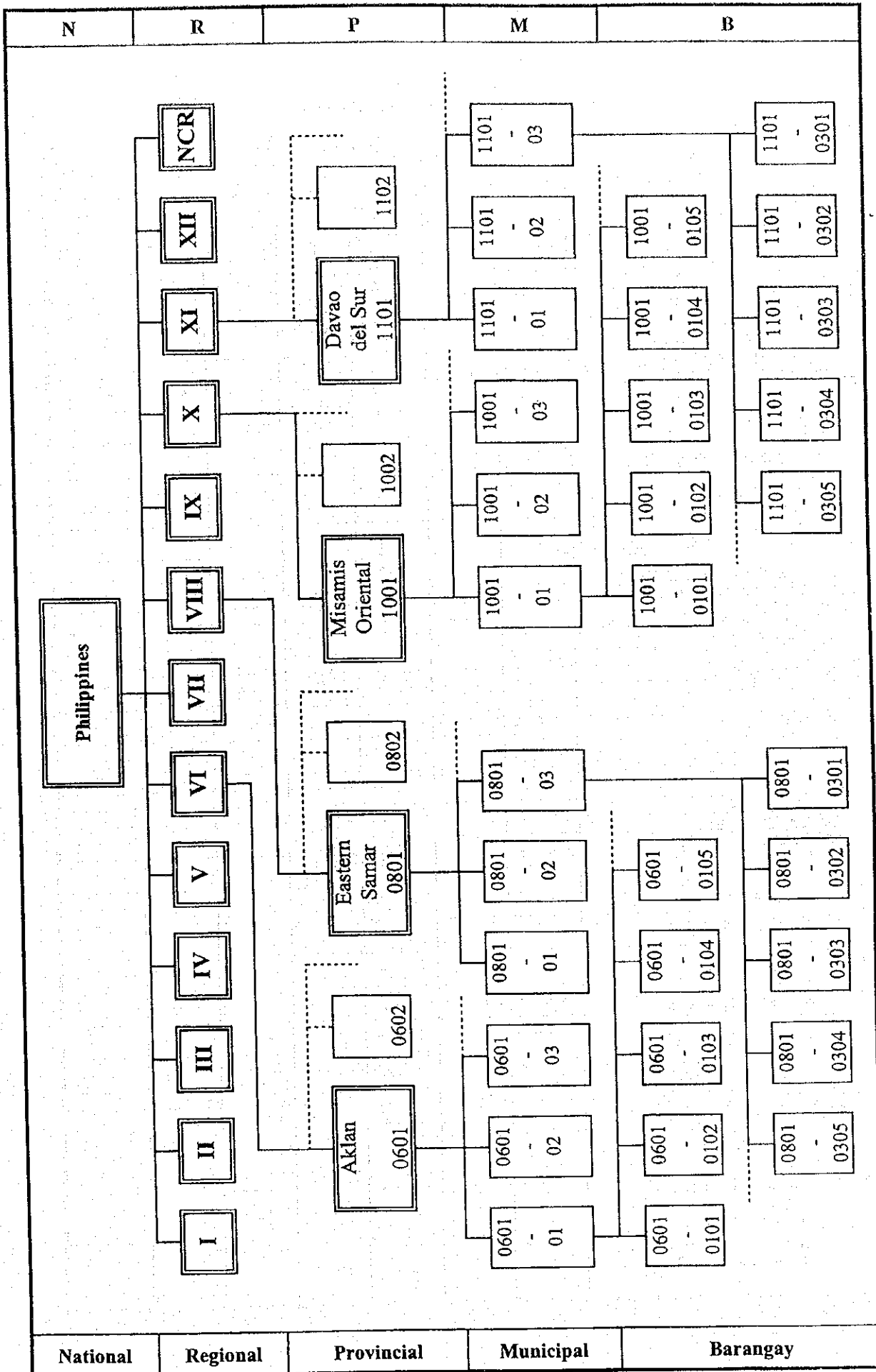


Figure 2.6.1 Institutional Hierarchical System by the NEDA Coding



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
<b>1. Socio-economic Data</b>							
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			
<b>2. Land Use Data</b>							
2.1 Existing Land Use			P.2.1				
2.2 Future Land Use			P.2.2				
<b>3. Health Data</b>							
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			
<b>4. Water Sources Data</b>							
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			
<b>5. Water Supply Data</b>							
5.1 Level I Facility			P.5.1	M.5.1			
5.2 Level II System						S.5.2.1	
						S.5.2.2	
						S.5.3.1	
						S.5.3.2	
						S.5.3.3	
						S.5.3.4	
5.3 Level III System							
<b>6. Environmental Sanitation</b>							
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			P.6.4.1	M.6.4.1			
			P.6.4.2	M.6.4.2			
			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			
<b>7. Investment Data</b>							
7.1 Past Annual Investment			P.7.1				
7.2 Project Description			P.7.2				
7.3 Planned Annual Investment			P.7.3.1				
			P.7.3.2				
7.4 Income/Expenditure of LGU			P.7.4				
<b>8. Model Study</b>							
8.1 Barangay Group Information					MS.8.1		
8.2 Key Informant Questionnaire				MS.8.2			
8.3 Community Development, Training, Gender and Development Data Survey			MS.8.3	MS.8.3		MS.8.3	
8.4 Institutional Development Questionnaire			MS.8.4	MS.8.4		MS.8.4	
8.5 Model Study			MS.8.5	MS.8.5		MS.8.5	
8.6 Data/Information Checklist on Beneficiaries Participation and Assistance Extended in the Sector			MS.8.6	MS.8.6	MS.8.6		
8.7 Guide Questions/Pointers for Discussion with Provincial, Municipal and Barangay LGUs			MS.8.7	MS.8.7			

## (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 selected parameters in this context.

- 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)

These 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

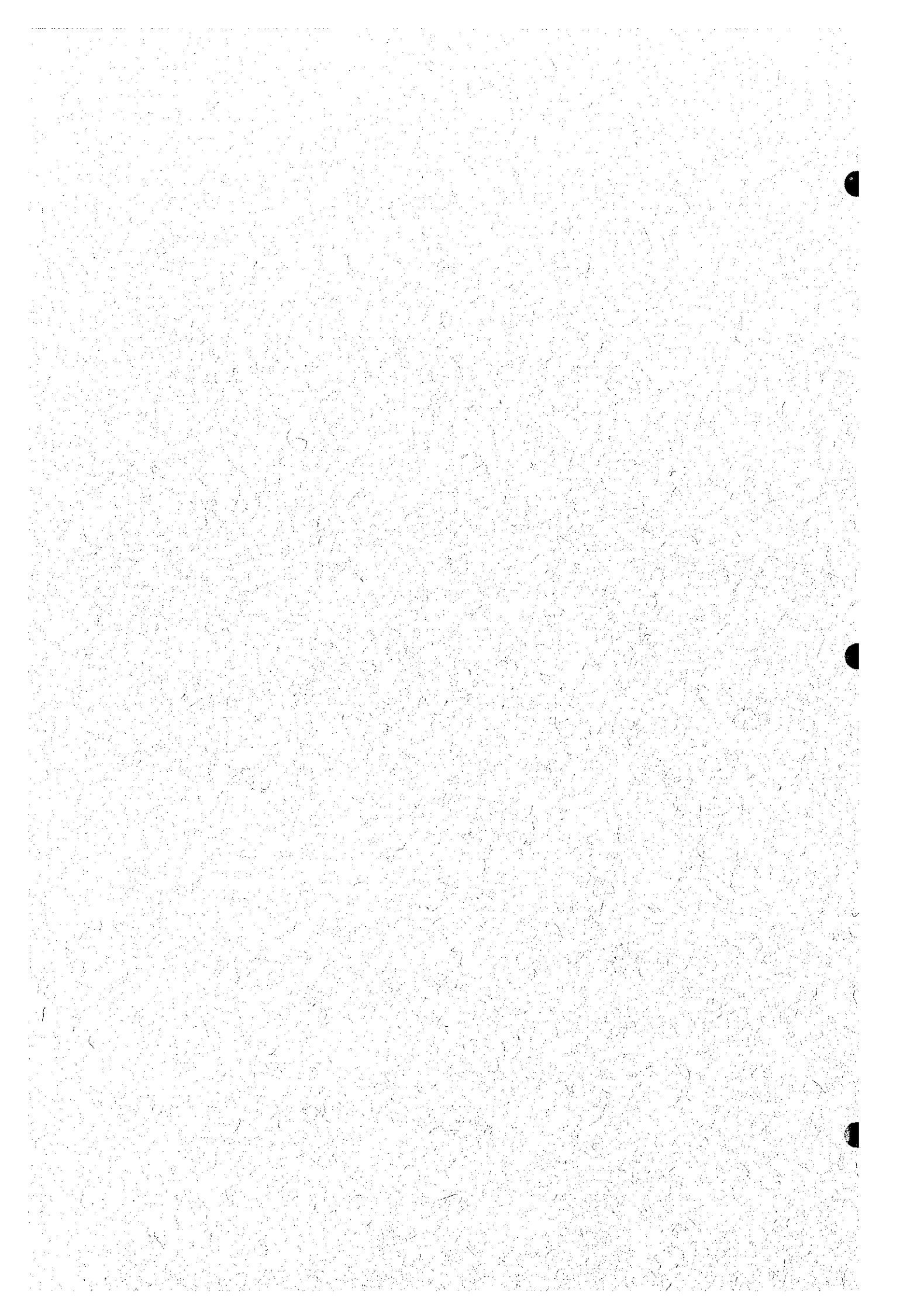
analysis and presentation. Key parameters are entered in a key parameter table linked to the output tables (refer to 2.6.2 Data Management, Supporting Report).

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.

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**Chapter**  
**PROVINCIAL PROFILE**

**3**



### 3. PROVINCIAL PROFILE

#### 3.1 General

Sarangani is located along the southernmost tip of Mindanao and belongs to Region XI, the Southern Mindanao Region. Alabel, the provincial capital, is just 16km from General Santos City, one of the region's major growth centers. South Cotabato bounds the province on the north, Sultan Kudarat on the west, Davao del Sur on the east and Celebes Sea on the south as shown in the Location Map. General Santos City divides the province into a western and eastern part.

The province is classified as 4<sup>th</sup> class and has a total land area of 4,441.78km<sup>2</sup> that is 1.48% of the Philippine total land area of about 300,000sq.km. It is composed of 7 municipalities, with 6 towns located along the coast. Based on the 1995 NSO records, the province has 140 barangays, of which 12% is urban and 88% rural. Provincial total population was 367,006 in 1995. About 70% of the population resided in rural areas while the remaining 30% in urban areas. At present, there are 2 water districts and 5 other Level III systems managed by various LGUs and associations in the province. Table 3.1.1 presents the breakdown per municipality of the land area, population and density, as well as administrative composition.

**Table 3.1.1 Outline of Municipalities**

Municipality	Class	Land Area (km <sup>2</sup> )	1995 Population		Number of Barangay		
			Number	Density (person/km <sup>2</sup> )	Urban	Rural	Total
Alabel (Capital)	3rd	540.50	46,527	86	1	11	12
Glan	2nd	697.60	73,768	106	3	28	31
Kiamba	3rd	418.28	39,717	95	2	17	19
Maasim	3rd	724.43	31,641	44	2	14	16
Maitum	3rd	324.35	35,009	108	3	16	19
Malapatan	2nd	840.00	47,911	57	3	9	12
Malungon	2nd	896.62	92,433	103	3	28	31
<b>Provincial Total</b>	<b>4th</b>	<b>4,441.78</b>	<b>367,006</b>	<b>83</b>	<b>17</b>	<b>123</b>	<b>140</b>

#### 3.2 Natural Conditions and Geographical Features

##### 3.2.1 Meteorology

The province has Type IV climate under the Coronas classification. It is characterized by a rainfall that is more or less evenly distributed throughout the year as reflected in the Location Map. Using the PAG-ASA rainfall records, the average annual rainfall was registered at

79.6mm. Maximum rainfall was observed during the months of June to August, while the minimum was experienced during March to May.

Mean annual air temperature is 27.1°C. The hottest month is April (33.7°C), while the coldest month is January (21.5°C). The province is considered as an area outside the typhoon belt.

### 3.2.2 Land Use

Remaining forest area constitutes a mere 31% of the total land area of the province located mostly in the mountain ranges of Mt. Alip and Mt. Busa. Agricultural land and grassland represent an aggregate area of 60%, while Built-up area is limited to only 1%. Most of the settlements are along the coasts and in 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 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 forestlands 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 for agricultural use.

**Table 3.2.1 Current Land Use**

Land Use	Area (km <sup>2</sup> )	Percentage over Total Land Area
Forest Land	1,359.93	31
Grassland	1,288.82	29
Built-up	59.15	1
Agricultural	1,391.46	31
Fishponds, Mangrove, Inland Water Area	51.12	1
Openlands	291.30	7
<b>Provincial Total</b>	<b>4,441.78</b>	<b>100</b>

### 3.2.3 Topography and Drainage

The province of Sarangani lies on the southern extension of two major geomorphic features, the Cotabato Cordillera and the Central Mindanao Cordillera. The Cotabato Cordillera is a northwest trending mountain range of moderate to high relief extension from Cotabato City to Sarangani Bay. Young volcanic mountains, the most prominent of the Central Mindanao

Cordillera is Mt. Matutum with an elevation of 2,286 m, constitute the central highlands of the province.

The eastern part, which has a common boundary with Davao del Sur, assumes an elbow-like configuration characterized by an acutely trending mountain range of moderate relief. The elevation of these mountains range from about 1,000 m to 1,600 m. On the other hand, the western part with a common boundary with South Cotabato is southern piedmont, part of the Cotabato Cordillera, which stretches on WNW-ESE direction. Elevation of the mountains ranges from around 2,000 masl. The coastal belt of this part has the same characteristics as the eastern part of the province.

The province of Sarangani faces the Sarangani Bay on the eastern part and the Celebes Sea on the western part. There are five (5) major rivers, namely: Glan, Lun Padidu, Buayan, Siguel and Kalaong Rivers. The Buayan River is the largest in the province with a watershed of 1,434 km<sup>2</sup> and drains to Sarangani Bay passing through Alabel. The other south coastal rivers are short, swift streams with small mangrove swamps and narrow lowland plain near their mouths.

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 gauging station.

**Table 3.2.2 Drainage Areas & Flow Rates of Major Rivers**

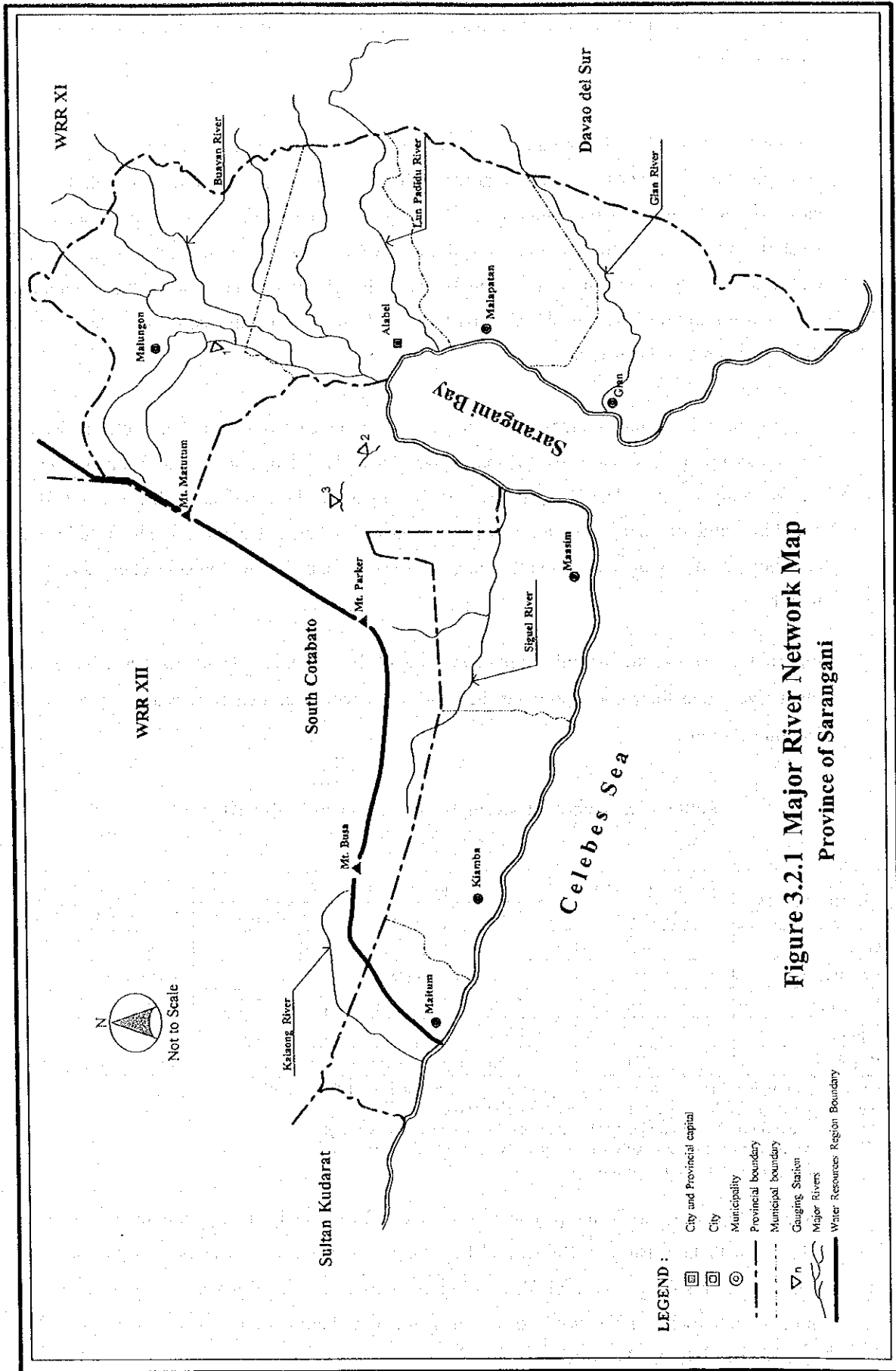
Major Rivers	Drainage Area (km <sup>2</sup> )	Flow Rate (m <sup>3</sup> /sec)			Water District (using river water)
		Peak	Maximum	Minimum	
Glan	483	No gauging station present			None
Lun Padidu	314	No gauging station present			None
Buayan	208	12.6	10.9	1.4	None
Siguel	65	83.8	35.5	2.0	None
Kalaong	256	No gauging station present			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  
 Inc. - Incomplete/Lacks record

Five (5) typical rivers in the province were selected for water quality examination, namely: Glan, Lun Padidu, Buayan, Siguel and Kapitalong. Analyzed river waters were turbid. The examination result showed high Fe and Mg contents from Siguel River probably due to the mineral rich rocks of the volcanoes. Glan and Lun Padidu rivers had high Ca and Mg contents (refer to 7.5, Data Report).





**Figure 3.2.1 Major River Network Map**  
Province of Sarangani

### **3.3 Socio-economic Conditions**

#### **3.3.1 Economic Activities and Household Income**

Agriculture is the major economic activity in the province. Major crops cultivated are coconut, corn and rice. Fishing and livestock production are also important livelihood. Alabel is envisioned to be the center of trade and commerce of the province. Tourism and mining are also promising economic activities in the province.

The National Statistics Office (NSO) Family Income and Expenditures Survey in 1994 showed that the average annual family income of the province was ₱47,555, higher than the regional figure of ₱44,861. 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). However, the percentage of households of lower income levels was greater than that of the region. Based on the established poverty threshold income of ₱41,579 in Region XI for 1994, approximately 60% 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 community, social and personal services, and wholesale and retail trade (refer to Table 3.3.2, Supporting Report). By class of worker, those who were self-employed without any paid employee had the highest share of 35% followed by those worked without pay in family-owned operated farm or business as shown in Figure 3.3.2.

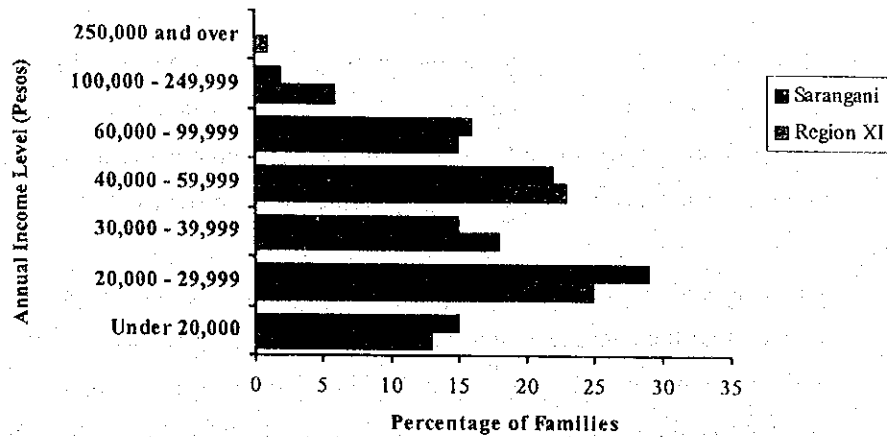
#### **3.3.2 Basic Infrastructure**

All municipalities have electric power supply and telecommunication service. The total road length of the province is 2,692km, of which more than half (67%) are barangay roads. Land transportation is available by means of bus, jeepneys and tricycles. There are 8 post offices in the entire province and 22 tourism-related facilities. 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.

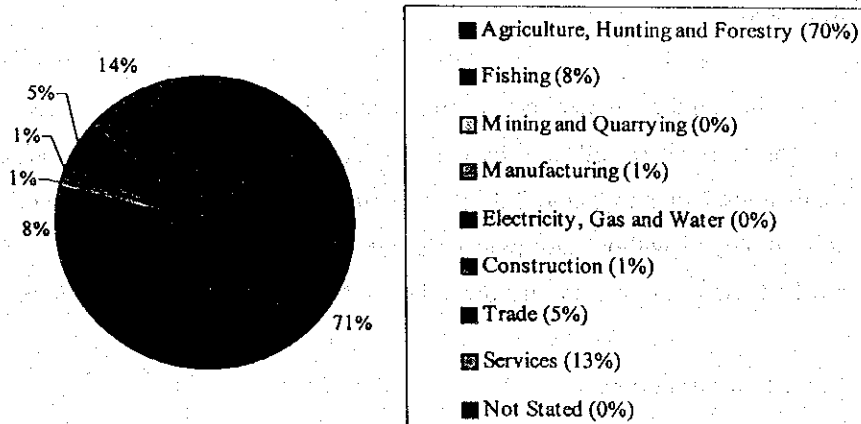
#### **3.3.3 Education**

The province has a total of 179 schools consisting of 146 elementary schools, 31 high schools and 2 colleges/technical schools. A large part of the population had attained elementary or high school education as reflected in Figure 3.3.3 (refer to Table 3.3.3, Supporting Report).

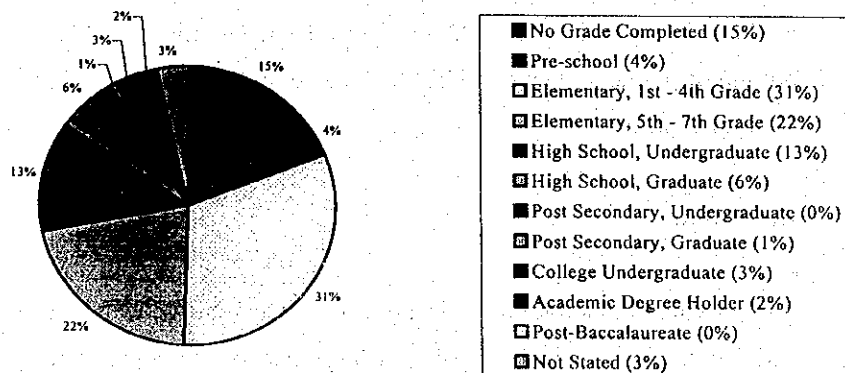
**Figure 3.3.1 Distribution of Families by Income Class**



**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) Road			(8) Tourism facilities	Number	14
a) Total Length	Km	2,692.7	(Hotel, resort, lodges, recreational)		
b) Barangay Road	Percent	66.97			
(2) Electricity service coverage			(9) Schools		
a) Municipality	Percent	100	a) Elementary level	Number	146
b) Barangay	Percent	62	b) Secondary level	Number	31
c) Household	Percent	21.31	c) Tertiary level/Technical	Number	2
(3) Telecommunication Services			(10) Health Facilities		
a) Availability in municipality	Percent	100	a) Hospital	Number	6
b) Telegraph station	Number	7	b) Main Health Center, Rural	Number	75
c) Telephone station	Number	6	Health Unit, Barangay Health		
			Station		
(4) Post Office	Number	8	(11) Labor		
			a) Labor force participation ratio	Percent	83.4
(5) Transportation services	Mode	Bus, jeep,	b) Employment rate	Percent	94.7
	(ex. Bus,	tricycle			
	jeep, etc)		(12) Average family income		
			a) Monthly income	Pesos/Mo.	3,335
(6) Banking Facilities	Number	7	b) Monthly expenditure	Pesos/Mo.	2,646
(7) Industrial/Commercial					
Establishment	Number	553			

**Table 3.3.2 Public Facilities and Services by Municipality**

Municipality	High School			Vocational School	College	Hospital	Public Market	Bank and Financing Institution
	Public	Private	Total					
	nos.	nos.	nos.					
Alabel (Capital)	4		4				2	2
Glan	4	1	5	1		2	9	1
Kiamba	3	2	5			1	5	1
Maasim	1	1	2			1	2	
Maitum	2	2	4		1	1	2	2
Malapatan	2		2				1	
Malungon	7	2	9			1	12	1
<b>Provincial Total</b>	23	8	31	1	1	6	33	7

### 3.4 Population

#### 3.4.1 Previous Population Development

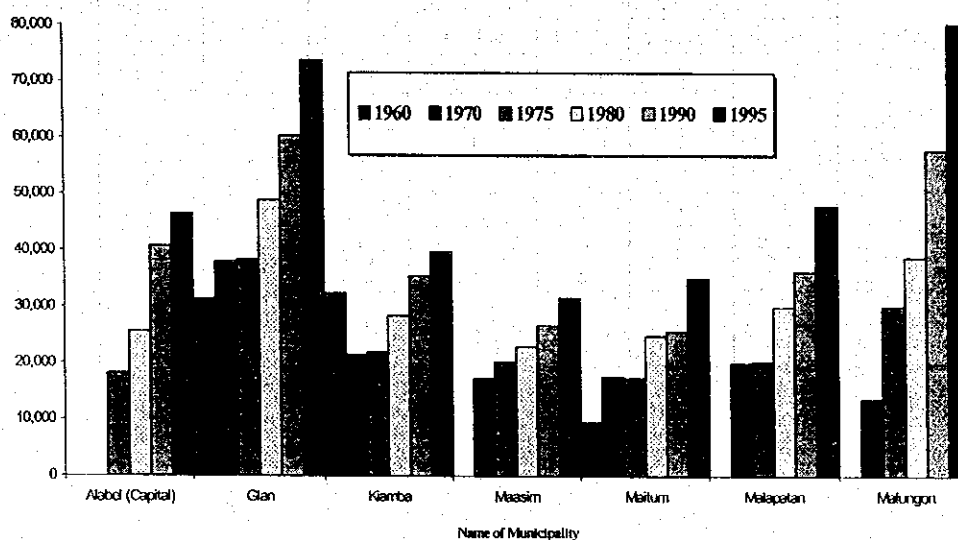
An almost steady and high provincial population growth rate had been experienced since the last 6 census years (1960-1995) as indicated in Figure 3.4.1 except for the 10 year period covering the census years of 1980-1990. A summary of the average annual growth rates is as follows:

<u>Year</u>	<u>Population</u>	<u>Ave. Annual Growth Rate (%)</u>	<u>Period</u>
1970	127,637	5.73	1960 - 1970
1975	166,179	5.42	1970 - 1975
1980	219,372	5.71	1975 - 1980
1990	283,141	2.58	1980 - 1990
1995	367,006	5.52	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 1997 population was estimated to provide the planning base for the Master Plan (refer to Section 8.3.1, Population Projection, Main Report). Table 3.4.1 shows a breakdown of the past population development by municipality including the 1997 projected population.

Figure 3.4.1 Previous Population Development of the Province



**Table 3.4.1 Previous Population Development by Municipality**

Municipality	Previous Population						
	1948	1960	1970	1975	1980	1990	1995
Alabel (Capital)				18,186	25,620	40,730	46,527
Glan		31,320	37,879	38,218	48,882	60,382	73,768
Kiamba	15,824	32,358	21,424	21,986	28,467	35,418	39,717
Maasim			17,201	20,227	22,915	26,734	31,641
Maitum		9,484	17,511	17,278	24,846	25,640	35,009
Malapatan			19,993	20,224	29,965	36,255	47,911
Malungon			13,629	30,060	38,677	57,982	92,433
<b>Provincial Total</b>	<b>15,824</b>	<b>73,162</b>	<b>127,637</b>	<b>166,179</b>	<b>219,372</b>	<b>283,141</b>	<b>367,006</b>

### 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 municipal jurisdictions which, whether designated as chartered cities, provincial capital or not, have a population density of at least 1,000 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 and 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 17 urban barangays and 123 rural barangays for a total of 140 barangays in 1997. Distribution of the classified area is shown in Figure 3.4.1, Supporting Report.

### 3.4.3 Present Population Distribution

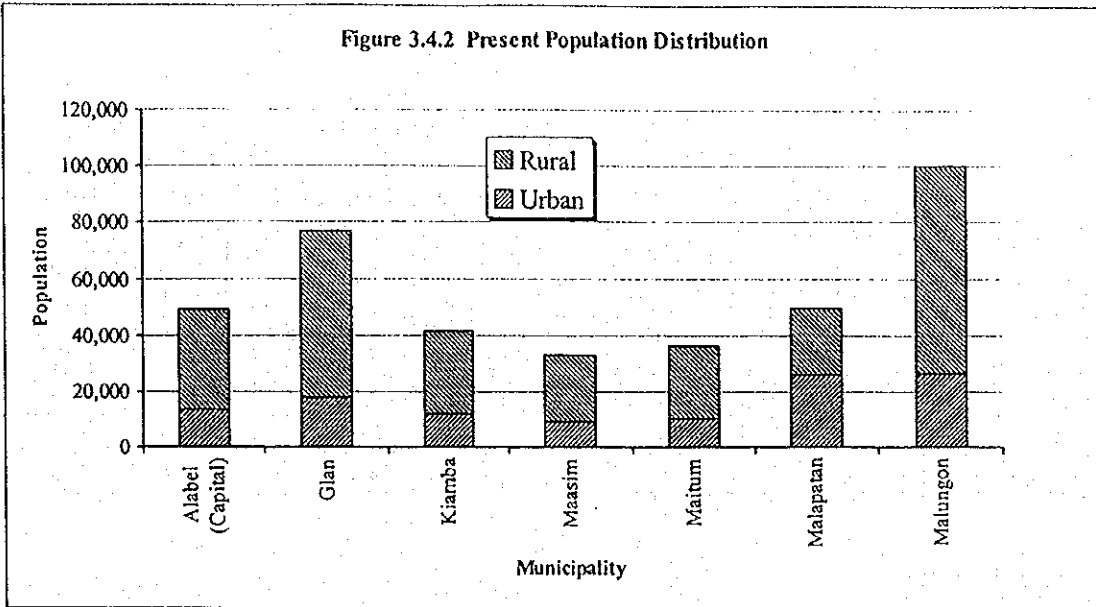
From the 1995 NSO census, the 1997 urban-rural population was estimated. Rural population accounts for 70% of the provincial total, while 30% is urban as reflected in Figure 3.4.2. Table 3.4.2 presents the breakdown of the number of urban and rural barangays by municipality and its corresponding present population distribution.

There are 74,335 households with 70% residing in rural areas and 30% households in urban areas. The average provincial household size is 5.19 persons/household. Table 3.4.3 presents a breakdown per municipality in the number of households and household sizes by urban and rural area.

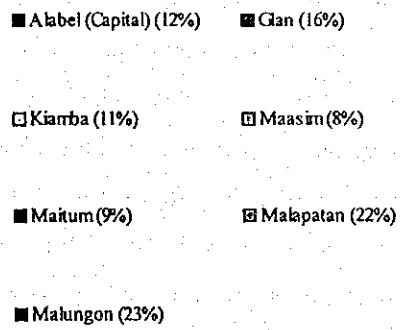
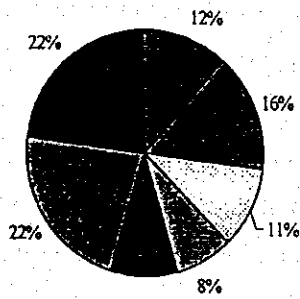
**Table 3.4.2 Outline of Urban and Rural Areas in the Province**

Municipality	Number of Barangay			Population (1997)		
	Urban	Rural	Total	Urban	Rural	Total
Alabel (Capital)	1	11	12	13,361	35,887	49,228
Glan	3	28	31	17,851	59,093	76,944
Kiamba	2	17	19	12,098	29,191	41,289
Maasim	2	14	16	8,973	23,656	32,629
Maitum	3	16	19	10,398	25,705	36,103
Malapatan	3	9	12	25,730	24,038	49,768
Malungon	3	28	31	26,359	73,867	100,226
<b>Provincial Total</b>	<b>17</b>	<b>123</b>	<b>140</b>	<b>114,750</b>	<b>271,437</b>	<b>386,187</b>

Figure 3.4.2 Present Population Distribution



Urban Population (29.7%)



Rural Population (70.3%)

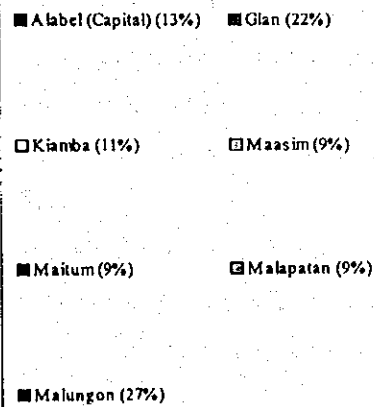
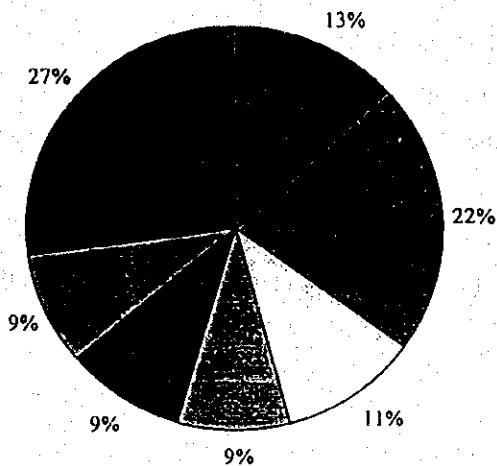




Table 3.4.3 Household Numbers and Household Size

Municipality	Number of Households (1995) Census			Number of Households (1997) Estimated			1995 Household Size (person/household)		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Alabel (Capital)	2,501	6,883	9,384	2,644	7,277	9,921	5.04	4.91	4.95
Glan	3,117	10,802	13,919	3,250	11,263	14,513	5.48	5.24	5.30
Kiamba	2,413	5,606	8,019	2,509	5,829	8,338	4.81	5.01	4.95
Maasim	1,703	4,373	6,076	1,762	4,526	6,288	5.11	5.24	5.21
Maitum	1,865	4,826	6,691	1,924	4,977	6,901	5.35	5.16	5.21
Malapatan	4,655	4,522	9,177	4,838	4,699	9,537	5.32	5.12	5.22
Malungon	4,497	12,873	17,370	4,877	13,960	18,837	5.39	5.29	5.32
<b>Provincial Total</b>	<b>20,751</b>	<b>49,885</b>	<b>70,636</b>	<b>21,804</b>	<b>52,531</b>	<b>74,335</b>	<b>5.25</b>	<b>5.16</b>	<b>5.19</b>

### 3.5 Health Status

#### 3.5.1 Morbidity, Mortality and Infant Mortality

The number one cause of morbidity was acute respiratory infection, followed by anemia. Skin diseases and nutritional deficiencies ranked fourth and fifth, respectively. Other causes of morbidity in descending order were: diarrhea, other digestive diseases, influenza, pneumonia, bronchitis and intestinal parasitism. Regarding mortality, the number one cause was vascular disease, followed by pneumonia. Tuberculosis and heart diseases ranked third and fourth, respectively. Other causes include meningitis, nutritional deficiencies, other accidents, septicemia and measles. Pneumonia, congenital anomalies and septicemia were the 3 leading causes of infant mortality in the province.

The general health status of the populace of the province was relatively good as compared with the national condition, although a number of water-related diseases exist. The incidence of diseases was lower in Sarangani than the Philippines 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 (details are referred to Table 3.5.1, Data Report).

Water-related diseases in the ten leading causes of morbidity were skin diseases, ranked 3<sup>rd</sup>, diarrhea (5<sup>th</sup>) and intestinal parasitism (10<sup>th</sup>). Diarrhea (ranked 6<sup>th</sup>) was among the 10 leading causes of infant mortality.

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

Rate: 1/100,000

Causes	Sarangani		Philippines			
	Number	Rate	Number	Rate	Ranking	
Morbidity	1. ARI	16,217	4,199.26	-	-	-
	2. Anemias	5,396	1,397.25	-	-	-
	3. Skin Diseases	5,106	1,322.16	-	-	-
	4. Nutritional Deficiencies	4,749	1,229.72	-	-	-
	5. Diarrhea	4,262	1,103.61	1,337,449	1,9996.7	1
	6. Other Diges. Diseases	3,955	1,024.12	-	-	-
	7. Influenza	2,593	671.44	609,471	909.9	3
	8. Pneumonia	1,781	461.18	470,574	702.5	4
	9. Bronchitis	910	235.64	903,508	1,348.9	2
	10. Intestinal Parasites	706	182.81	-	-	-
Mortality	1. Vascular Diseases	75	19.42	37,358	55.8	2
	2. Pneumonia	58	15.02	35,582	53.1	3
	3. Tuberculosis	33	8.55	24,580	36.7	5
	4. Heart Diseases	22	5.70	48,582	69.1	1
	5. Meningitis	10	2.59	-	-	-
	6. Nutritional Deficiencies	8	2.07	-	-	-
	7. Congenital Anomalies	6	1.55	-	-	-
	8. Other Accidents	6	1.55	13,477	20.1	6
	9. Septicemia	5	1.30	-	-	-
	10. Measles	5	1.30	-	-	-
Infant Mortality	1. Pneumonia	12	3.11	7,631	4.5	1
	2. Congenital Anomalies	6	1.55	2,366	1.4	3
	3. Septicemia	5	1.30	1,252	0.7	5
	4. Prematurity	4	1.04	-	-	-
	5. Meningitis	3	0.78	-	-	-
	6. Diarrhea	2	0.52	1,661	1.0	4
	7. Tetanus	2	0.52	-	-	-
	8. Influenza	2	0.52	-	-	-
	9. Measles	1	0.26	765	.0.5	7
	10. Other Digestive Diseases	1	0.26	-	-	-

### 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 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 parasites, scabies, conjunctivitis (sore eyes), and skin diseases; and 4) water-vector related diseases i.e., malaria, filariasis and dengue or H-fever, although the control of malaria and filariasis is beyond the scope of this Master Plan. A safe water supply, sanitary latrine and proper hygiene practices are conditions necessary for the control and prevention of these diseases.

Water-related diseases reported in the province were typhoid/paratyphoid, intestinal parasitism, diarrhea, conjunctivities, cholera, dengue fever, viral hepatitis, malaria, filariasis, skin diseases and scabies. Table 3.5.2 presents the reported cases and deaths of notifiable water-related diseases in the province.

**Table 3.5.2 Reported Cases and Deaths of Notifiable Water Related Diseases**

Rate: 1/100,000

Disease	Morbidity		Mortality		Infant Mortality	
	Number	Rate	Number	Rate	Number	Rate
<b>Water-borne</b>						
1. Typhoid/Parathyphoid	446	115.49				
2. Diarrhea	4,262	1,103.61			2	0.52
3. Vital hepatitis	23	5.96	2	0.52		
4. Cholera	33	5.96				
<b>Water-washed</b>						
1. Skin disease	5,106	1,322.16				
2. Intestinal parasitism	706	182.81				
3. Conjunctivities	7	1.81				
4. Scabies	323	83.04				
<b>Water vector</b>						
1. Filariasis	14	3.63				
2. Dengue fever	192	49.72				
3. Malaria	607	152.18				

### 3.5.3 Health Facilities and Practitioners

Present facilities servicing the health care of the population are 6 hospitals, 7 rural health units and 68 barangay health stations. The number and ratio to population of health facilities and medical practitioners in the province as well as in the Philippines are presented in Table 3.5.1, Supporting Report (details are referred to Table 3.5.2, Data Report).

## 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 sewerage systems in other urban areas of the province. Majority of the drainage facilities is 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 the province is domestic wastewater. Graywater generated by households is simply allowed to discharge into nearby channels. Effluent from septic tanks/cesspool 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 and seashores. In rural areas, natural assimilation may be expected to purify organic substances. However, pollution or contamination is anticipated caused by agricultural activities especially with reference to fertilizers and pesticides.

Food processing industries as well as mining and its processing are identified as potential sources of water pollution in Sarangani. As of now, the rivers of the province are not yet 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**

Only Malungon has no municipal refuse collection and disposal service. The 6 municipalities with service have 1 to 2 units of open/closed dump truck. In the province, only 11% of the households is served, while majority (89%) is unserved. Table 3.6.1 reflects the breakdown of the manner of solid waste collection and disposal, and service coverage by municipality (details are referred to Table 3.6.1, Data Report).

Open dumping is commonly practiced by the LGUs as a 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 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, 1997

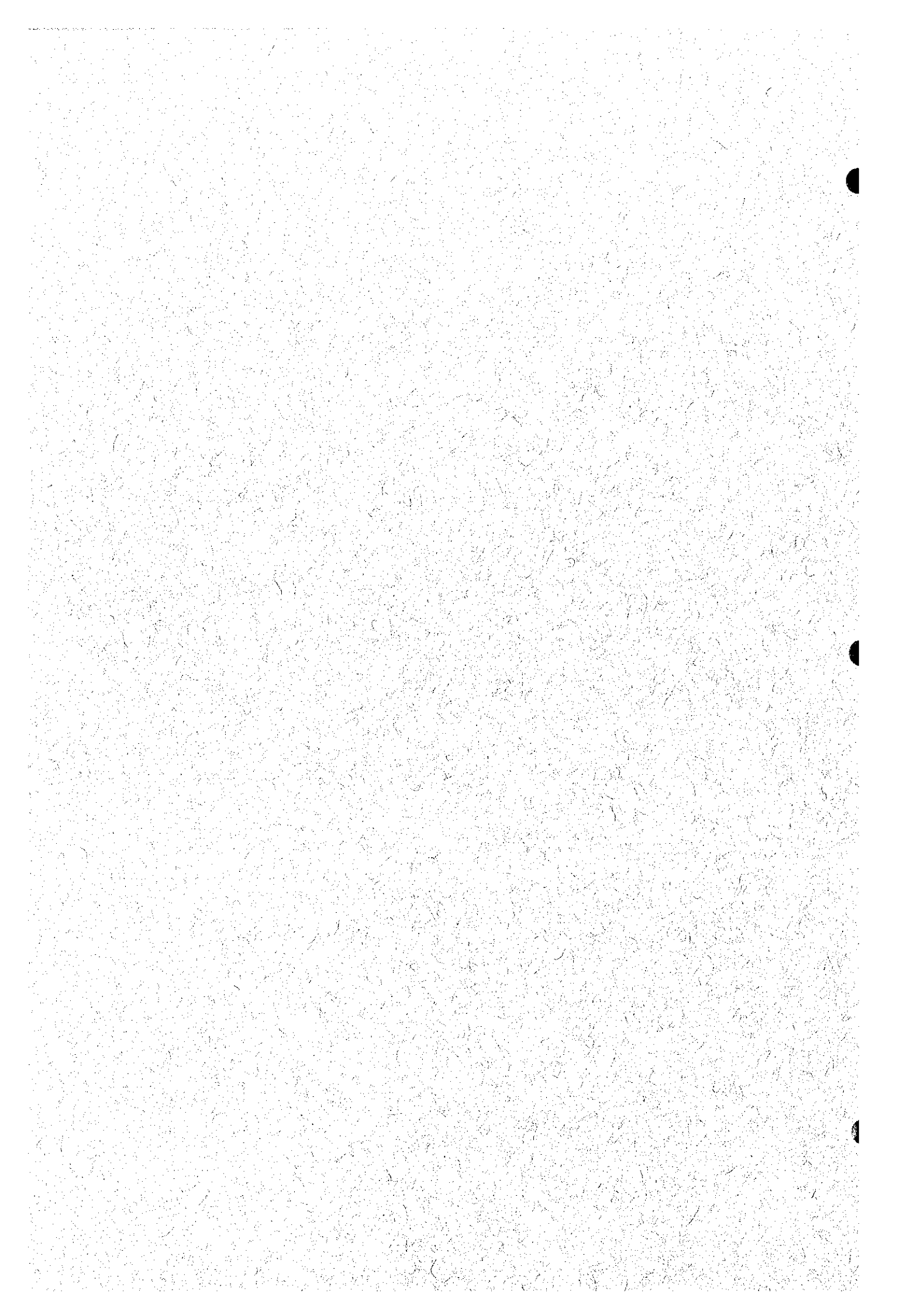
Name of Municipality	Number of Households 1997	With Service					Without Service					Percentage of Households Served	Percentage of Households Unserved
		Number of Collection Trucks			Disposal		Manner of Disposal (Number of Household)			Total Households Unserved			
		Open Dump Trucks	Closed Type Trucks	Total Units	Number of Households Served by Open Dump Site	Number of Households Served by Sanitary Landfill	Total Households Served	Dumping (Land and Water)	Burying		Composting		
Alabell (Capital)	9,921	1		1	1,713		1,713	7,254	807	147	8,208	17	83
Glan	14,513		1	1	1,021		1,021	8,250	3,268	1,974	13,492	7	93
Kiamba	8,338	1	1	2	1,200		1,200	2,741	2,524	1,873	7,138	14	86
Maasin	6,288	1		1	738		738	3,526	1,206	818	5,550	12	88
Matium	6,901		1	1	900		900	4,122	1,515	364	6,001	13	87
Malapatan	9,537		1	1	2,731		2,731	4,525	2,180	101	6,806	29	71
Malungon	18,837							15,578	1,623	1,636	18,837		100
<b>Provincial Total</b>	<b>74,335</b>	<b>3</b>	<b>4</b>	<b>7</b>	<b>8,303</b>		<b>8,303</b>	<b>45,996</b>	<b>13,123</b>	<b>6,913</b>	<b>66,032</b>	<b>11</b>	<b>89</b>

Chapter

4

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**EXISTING FACILITIES AND  
SERVICE COVERAGE**



## **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 1998 and regarded as a figure in 1997). 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 1997.

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 57% of the present population (of which 30% in urban area and 70% in rural area) is considered as adequately served (refer to 4.1, Supporting Report for the detailed study). Under the area classification, 70% of urban population and 52% of rural population have access to safe water sources/facilities, while the rest is underserved or unserved. About 195,700 persons or 80% of the served population depend on Level I facilities, while about 24,800 persons or 11% are served by Level III and/or Level II systems. Lower service coverage in rural area appears to be the result of a considerable numbers of unsafe Level I facilities or no provision of facilities.

#### **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

### 4.1.3 Level III Systems

Level III (individual house connection) systems at municipal level are usually established and operated by WD under the technical and financial assistance of LWUA. Some LGUs also implement and operate Level III systems commonly at barangay level.

There are 7 Level III systems in the province operated under different kinds of ownership (authority or association) as shown in Table 4.1.2 together with their service coverage in 1997. These are:

- 2 Water Districts in the municipalities of Glan and Maasim;
- 5 waterworks operated by LGU/association in the municipalities of Alabel (3 systems) and Malapatan (2 systems).

Glan WD is the largest system in the province, covering 1 urban and 1 rural barangay with a total served population of 4,400 (23% and 1% of urban and rural population, respectively) using deep well sources. System expansion with water source augmentation is needed, however deep well sources have water quality problems such as high iron content.

Following Glan WD, Alabel WS is the second largest system in the province. The municipality operates this system. The WS covers 1 urban barangay with a served population of about 1,500 that corresponds to about 20% of the urban population.

**Table 4.1.2 Information on Existing Level III System**

Municipality	Name of Operating Body	Water Consumption			Service Coverage								
		Type of Water Source	Water Consumption (cu.m/day)	Domestic Supply (%)	No. of Brgys. Served			No. of Household Served			No. of Population Served		
					Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Alabel (Capital)	Alabel WS	DW	170	99	1		1	248		248	1,488		1,488
	San Miguel Coop.	DW	49	98		1	1		70	70		350	350
	Sto. Niño Coop.	DW	136	99	1		1	186		186	1,150		1,150
	Municipal Total		355	99	2	1	3	434	70	504	2,638	350	2,988
Glan	Glan WD	DW	627	94	1	1	2	737	56	793	4,100	336	4,436
Maasim	Maasim WD	SP	114	91	2		2	174		174	870		870
Malapatan	Malapatan WS	DW	75	97	1		1	150		150	900		900
	Lun Padidu WS	DW	66	98	1		1	115		115	690		690
	Municipal Total		141	98	2		2	265		265	1,590		1,590
<b>Provincial Total</b>			<b>1,236</b>	<b>96</b>	<b>7</b>	<b>2</b>	<b>9</b>	<b>1,610</b>	<b>126</b>	<b>1,736</b>	<b>9,198</b>	<b>686</b>	<b>9,884</b>

Note: 1. Type of Water Source: DW - Deep Well, Surf. - Surface Water (River), SP - Spring  
2. \* - Estimated at 100 lpcd.

Aside from the Alabel WS, there are 2 other systems being operated by cooperatives. The San Miguel Cooperative serves 70 households in 1 rural barangay and the Sto. Niño Coop-

erative serves about 190 HHs in the urban barangay. All Level III systems in Alabel have been utilizing deep wells as water sources. Major problems encountered were non-supply caused by lowering water table which, had happened twice and power supply interruption. Water quality of high pH (8-8.5) and high iron and manganese contents (200-300 ppm.) are also common problems.

In the municipality of Maasim, the WD supplies drinking water to 174 HHs in 1 urban barangay utilizing 2 spring sources. Service coverage is only 10% of the urban population.

In the municipality of Malapatan, 2 systems supply drinking water to urban barangays. The Malapatan WS, being operated by the municipality, covers 1,000 HHs and adopts the combined system with communal faucets. The Lun Padidu WS supplies to 690 HHs using a deep well source. Present service coverage totals to 1,590 persons (15% of urban area).

Other municipalities such as Kiamba, Maitum and Malungon have no Level III system at present.

**Table 4.1.3 Information on Water District**

Name of Water District	Number of Connections						Production (cu. m/mon)	Accounted for Water (cu. m/mon)
	Domestic	Institutional	Commercial	Industrial	Total	Metered		
Glan WD	691	5	41		737	737	21,690	18,804
Maasim WD	160	4	10		174	174	4,752	3,407

#### 4.1.4 Level II Systems

Level II (communal faucet) systems are designed to cater for barangay level water supply with limited service coverage and supply capacity. These systems have been implemented by different agencies (DPWH, LWUA, DILG, LGUs) and usually promote the use of spring sources. These are mainly operated by either the LGUs or by the RWSAs.

There are 56 Level II systems in the province. Except for 6 systems in Malapatan and a system in Malungon, majority of these is utilizing spring sources (49 systems). The municipality of Malungon has the largest number, 16 systems or 29% of the total as shown in Table 4.1.4 together with service coverage in 1997 (details are referred to in Table 4.1.2, Supporting Report). Most of the Level II systems that utilize deep well sources have encountered intermittent water supply (less than 8 hours a day) due to difficulty in payment of electric bills and insufficient capacity of facilities to meet the demand. Some of the systems using spring sources have experienced bursting of pipes due to inappropriate pipe installation and high water pressure. This supply interruption has also resulted to dirty water.

Table 4.1.4 Information on Existing Level II System

Municipality	Name of Operating Body	Service Coverage									
		No. of Brgys. Served			No. of Household Served			No. of Population Served			
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	
Alabel (Capital) Glan	Spring L-II Ass.		1	1		140	140			840	840
	Batotoling WS		1	1		20	20			120	120
	Calabanit WS		1	1		15	15			90	90
	Cross WS		1	1		18	18			108	108
	Gumasa WS		1	1		14	14			84	84
	Pangyan WS	1		1	18		18	108			108
	San Vicente WS		1	1		16	16			96	96
	Small Margus WS		1	1		24	24			144	144
	Tapon WS		1	1		15	15			90	90
	Municipal Total	1	7	8	18	122	140	108		732	840
Kiamba	Badtasan WS		1	1		150	150			900	900
	BKWASA		1	1		114	114			684	684
	Gasi WS		1	1		60	60			360	360
	Katubao WS		1	1		36	36			216	216
	Kayupo WS		1	1		36	36			216	216
	Maligang WS		1	1		72	72			432	432
	Nalus WS	1		1	102		102	612			612
	Tablao WS		1	1		45	45			270	270
	Tamadang WS		1	1		60	60			360	360
	Municipal Total	1	8	9	102	573	675	612		3,438	4,050
Maasim	Amsipit WS		1	1		20	20			120	120
	Daliao WS		1	1		45	45			270	270
	Kabatol WS		1	1		18	18			108	108
	Kanalo WS		1	1		40	40			240	240
	Lumatil WS		1	1		90	90			540	540
	Nomoh WS		1	1		65	65			390	390
	Seven Hills WS		1	1		15	15			90	90
	TWASA		1	1		30	30			180	180
	Municipal Total		8	8		323	323			1,938	1,938
	Maitum	BUWASA		1	1		50	50			300
Kalaong WS			1	1		45	45			270	270
Kiyap WS			1	1		165	165			990	990
New La Union WS			1	1		150	150			900	900
Zion WS			1	1		30	30			180	180
Municipal Total			5	5		440	440			2,640	2,640
Malapatan	Bahasuan WS		1	1		30	30			180	180
	Daan Suyan WS		1	1		40	40			240	240
	Kihan WS		1	1		56	56			336	336
	Malaygang WS		1	1		30	30			180	180
	Pag-asa WS		1	1		50	50			300	300
	Purok I WS		1	1		30	30			180	180
	Purok II WS		1	1		24	24			144	144
	Suib WS		1	1		35	35			210	210
	ULCA		1	1		30	30			180	180
	Municipal Total		9	9		325	325			1,950	1,950
Malungon	Ampon WS		1	1		20	20			120	120
	Banate WS	1		1	30		30	180			180
	B'laan WS		1	1		18	18			108	108
	Datal Batong WS		1	1		40	40			240	240
	Datal Tampil WS		1	1		15	15			90	90
	J.P. Laurel WS		1	1		18	18			108	108
	Malalag Cogon WS		1	1		20	20			120	120
	Malandag WS		1	1		50	50			300	300
	Malungonamay WS		1	1		40	40			240	240
	Nagpan WS		1	1		30	30			180	180
	Panamun WS		1	1		20	20			120	120
	Poblacion WS	1		1	35		35	210			210
	San Roque WS		1	1		18	18			108	108
	Talus WS		1	1		28	28			168	168
	Tamban WS		1	1		25	25			150	150
	Upper Lumabat WS		1	1		15	15			90	90
	Municipal Total	2	14	16	65	357	422	390		2,142	2,532
<b>Provincial Total</b>		4	52	56	185	2,280	2,465	1,110	13,680	14,790	

Problem areas, both in managerial and technical aspects, identified on existing Level II systems and necessary countermeasures for the improvement are discussed hereunder.

(1) Management practice

Most of the waterworks using spring sources supply water to the users free of charge. Also, the systems utilizing deep well sources have been facing difficulty in water fee collection. Regarding repair works, they resort to requesting assistance from the PEO, as needed. This fact shows that current management practices will lead to any one of these systems to become non-operational sooner or later. This is because the financial savings to cope with future repair and depreciation of existing facilities are not duly considered under the current management practice, and furthermore, cost recovery by the operating bodies is a prerequisite in sector management.

To attain financial and managerial sustainability, reinforcement of RWSAs or other operating bodies shall be promoted with reference to institutional development.

(2) Technical skill for O&M of facilities

Utilization of spring source usually leads to less attention to the daily O&M practice, owing to gravity flow of water to the service area. However, inappropriate care of spring box and pipeline results to various problems, e.g. turbid water, less water flow by clogging at spring box and pipeline, etc. Physical damage may also happen to the transmission line exposed on the ground in the mountainous area due to landslide, etc. associated with heavy rainfall, when proper protection of pipeline is not taken up.

Expansion of distribution line and installation of additional public faucets are usually undertaken without appropriate technical study on the capacities of water sources and distribution facilities, resulting to decrease of supply pressure and quantity.

To attain technical sustainability of existing facilities, an appropriate technical guidance and skills training for operating bodies shall be arranged by concerned agencies/LGUs.

#### 4.1.5 Level I Facilities

Level I facilities (point source) are common in rural barangays, mostly privately owned. Usually, these are several kinds of well or developed spring with transmission line and one communal faucet.

Level I facilities are classified in terms of safe and unsafe sources referring to the definition of DOH and the data from PPDO as presented in Table 4.1.5 (details are referred to in Supporting Report). Served population in 1997 is also estimated as shown in the same table.

Of the 6,728 operational Level I facilities, 62% are shallow wells. According to the PHO, as the provincial average, 30% of shallow wells are estimated to be unsafe. On the other hand, all deep wells, covered/improved dug wells and developed springs are regarded as safe water sources. By applying the unsafe percentage to the number of shallow wells for each municipality, 3,780 Level I facilities are classified as safe sources, while 2,948 facilities belong to unsafe sources.

Percentage shares between public and private Level I facilities for rural water supply is 15.6% and 84.4%, respectively. The share of developed springs in public facilities is 11% (details are referred to in Supporting Report).

Problem areas observed on Level I facilities and the necessary countermeasures for the improvement are summarized in terms of potability and functionality.

(1) Unsafe water sources

Most of the sources regarded as unsafe are driven shallow wells that are unprotected against seepage of surface water and are usually located within flood level or nearby potential pollution sources, such as septic tank and piggery. (The Code on Sanitation requires a minimum distance of 25m between water source and pollution sources.)

These shallow wells shall be provided with concrete apron on the ground surface and proper drainage facility at the surrounding area. Relocation of wells or pollution sources may be another countermeasure. For new construction of shallow wells, proper site selection and appropriate construction method shall be applied together with periodic monitoring of water quality.

(2) Non-functioning/abandoned wells

There are numerous non-functioning public wells in the province as shown in Table 4.1.6.

For Level I facilities, the BWSAs or beneficiaries have responsibility on O&M, however, it is almost negligible. This can be gleaned from the presence of numerous non-functioning/abandoned wells constructed by DPWH. These conditions arise from lack of spare parts, drying up of water source and water quality problems such as colored water.

Table 4.1.5 Information on Existing Level I Facilities

Municipality	Number of Safe Water Sources						Number of Unsafe Water Sources						Served by Safe Source			
	Deep Well	Shallow Well	Covered/Improved Dug Well	Developed Spring	Total	Shallow Well	Open Dug Well	Undeveloped Spring	Rain Water Collector	Total	Urban	Rural	Total	Urban	Rural	Total
Alabel (Capital)	100	366	17	8	491	157	11		3	171	1,601	4,990	6,590	8,067	24,499	32,566
Glan	53	469	53	1	576	201	53		18	272	1,605	6,577	8,182	8,794	34,463	43,257
Kiamba	31	1,184	5	10	1,230	508	52		24	584	1,734	3,295	5,029	8,341	16,510	24,851
Maasim	15	272	26	5	318	116			2	118	1,085	2,828	3,913	5,544	14,821	20,365
Marum	170	231	162	25	588	99	52		6	157	1,656	3,057	4,713	8,857	15,775	24,632
Malapatan	61	222	42	4	329	95	21		18	134	3,254	2,493	5,747	17,309	12,764	30,073
Malungon	54	162		32	248	70	1,212		230	1,512	2,404	1,323	3,726	12,955	6,997	19,952
<b>Provincial Total</b>	<b>484</b>	<b>2,906</b>	<b>305</b>	<b>85</b>	<b>3,780</b>	<b>1,246</b>	<b>1,401</b>		<b>301</b>	<b>2,948</b>	<b>13,337</b>	<b>24,563</b>	<b>37,900</b>	<b>69,867</b>	<b>125,828</b>	<b>195,695</b>

**Table 4.1.6 Operating Status of Existing Wells in the Province**

Operating Status	Unit	Public Facility		Private Facility		Total
		Deep Well	Shallow Well	Deep Well	Shallow Well	
Functioning	No.	262	481	222	3,671	4,636
	Percent	68%	83%	92%	98%	94%
Non-Functioning	No.	125	98	17	65	305
	Percent	32%	17%	8%	2%	6%
<b>Total Number</b>		<b>387</b>	<b>579</b>	<b>239</b>	<b>3,736</b>	<b>4,941</b>

Note: Number of non-functioning wells includes abandoned wells, but details in number and reasons are not available.

Among others, deep wells usually necessitate repair/replacement of mechanical parts and redevelopment of the well itself. Apart from the same problems as deep wells, shallow wells have primary disadvantages such as the use of shallow aquifer which is easily affected by surrounding environmental conditions and the simple construction method applied (driving well point) that makes rehabilitation works difficult.

To prolong the service life of public deep wells, periodic check-up entailing preventive maintenance and redevelopment of wells are to be performed. Meanwhile, proper site selection and protection of well sources are requisites for shallow wells.

#### 4.1.6 Water Supply Service Coverage

According to the definition of DOH in terms of safe and unsafe sources, service coverage was studied under "served", "underserved" and "unserved" categories.

The present population of the municipalities as of 1997, base year for planning purpose, was estimated referring to the NSO population census results (1980, 1990 and 1995), the 1995 Census-based National and Regional Population projection prepared by NSP, and the Provincial Physical Framework Plan/Comprehensive Provincial Land Use Plan (1993-2002). However, the population distribution in 1995 census by urban and rural barangays prepared by NSO was adjusted to reflect actual conditions in the classification of barangays. Details are referred to Section 8.3.1 Population Projection.

Water supply service coverage by service level is estimated for urban and rural areas covering all municipalities under the following conditions and assumptions:

- Service percentage/population by Level III and Level II systems was estimated based on the questionnaire survey results.
- Unserved population was estimated using the percentages of unserved households to the total number of households by urban and rural areas based on questionnaire survey results and 1990 population census data on "Households by Main Source of Drinking Water and City/Municipality" with some modification.



- The rest of the population was considered served by Level I facilities assuming that 50% of the private facilities were shared by neighbors to supplement insufficiency of public facilities.

The average number of households sharing at each Level I public/private facility was calculated at 15 households/facility under the above assumptions (details are referred to in Supporting Report).

Table 4.1.7 presents the profile of the service coverage in terms of served, underserved and unserved. As a provincial total, 57% of the population is adequately served (70% of urban population and 52% of rural population).

The percentage of underserved population is estimated at 31% of the total population (22% of urban population and 35% of rural population) who are depending on unsafe sources/facilities.

The provincial service coverage at present is reflected in Figure 4.1.1 (details are referred to Supporting Report). Among different service levels, Level I water supply facilities have a predominant service coverage in all municipalities of the province.

Percentage shares of population coverage by Level I public and private facilities in rural water supply are estimated at 7% and 93%, respectively (details are referred to in Supporting Report).

Level III systems do not take majority of the service coverage in any municipality of the province. The current service coverage, as provincial average, is only 8% and 0.3% in urban and rural areas, respectively. Likewise, the service coverage of Level II systems shows only 1% in urban area and 5% in rural area. As of now, piped systems (both Level II and III) have not fully been developed in the province.

Taking into account the municipal service coverage, of the 7 municipalities of the province, 6 are above the average provincial service coverage of 57%. The highest coverage is in Alabel at 74%, followed by Maasim (71%), Kiamba (70%), Malapatan (68%) and Glan (63%).

In contrast to the above, only the municipality of Malungon is below the provincial average. The low coverage of 22% in Malungon (51% in urban and 12% in rural area) is a result of the difficulty in water source development due to lower availability of ground water sources.

Table 4.1.7 Water Supply Service Coverage by Municipality

Municipality	Area	Population (1997)	Population Coverage						Percentage of Population Coverage							
			Served by Safe Source			Underserved/Unserviced			Served by Safe Source			Underserved/Unserviced				
			Level III	Level II	Level I	Total	Unsafe Source	Unserviced	Total	Level III	Level II	Level I	Total	Unsafe Source	Unserviced	Total
Alabel (Capital)	Urban	13,341	2,638		8,067	10,705	1,849	787	2,636	20		60	80	14	6	20
	Rural	35,887	350	840	24,499	7,232	2,967	10,198	1	2	68	72	20	8	28	
	Total	49,228	2,988	840	32,566	9,081	3,753	12,834	6	2	66	74	18	8	26	
Glan	Urban	17,851	4,100	108	8,794	13,002	2,590	2,259	4,849	23	1	49	73	15	13	27
	Rural	59,093	336	732	34,463	35,531	15,225	8,337	23,562	1	1	58	60	26	14	40
	Total	76,944	4,436	840	43,257	48,533	17,815	10,596	28,411	6	1	56	63	23	14	37
Kiamba	Urban	12,098		612	8,341	8,953	2,208	938	3,145		5	69	74	18	8	26
	Rural	29,191		3,438	16,510	19,948	5,483	3,760	9,243		12	57	68	19	13	32
	Total	41,289		4,050	24,851	28,901	7,691	4,697	12,388		10	60	70	19	11	30
Maasin	Urban	8,973	870		5,544	6,414	1,927	632	2,559	10		62	71	21	7	29
	Rural	23,656		1,938	14,821	16,759	4,387	2,510	6,897		8	63	71	19	11	29
	Total	32,629	870	1,938	20,365	23,173	6,314	3,142	9,456	3	6	62	71	19	10	29
Matrim	Urban	10,398			8,857	8,857	696	845	1,541			85	85	7	8	15
	Rural	25,705		2,640	15,775	18,415	4,174	3,116	7,290		10	61	72	16	12	28
	Total	36,103		2,640	24,632	27,272	4,871	3,961	8,831		7	68	76	13	11	24
Malapatan	Urban	25,730	1,590	90	17,309	18,989	5,334	1,407	6,741	6	0	67	74	21	5	26
	Rural	24,038		1,950	12,764	14,714	4,101	5,223	9,324		8	53	61	17	22	39
	Total	49,768	1,590	2,040	30,073	33,703	9,436	6,629	16,065	3	4	60	68	19	13	32
Malungon	Urban	26,359		390	12,955	13,345	10,139	2,875	13,014		1	49	51	38	11	49
	Rural	73,867		2,142	6,997	9,139	53,863	10,865	64,728		3	9	12	73	15	88
	Total	100,226		2,532	19,952	22,484	64,002	13,740	77,742		3	20	22	64	14	78
Provincial Total	Urban	114,750	9,198	1,200	69,867	80,265	24,743	9,742	34,485	8	1	61	70	22	8	30
	Rural	271,437	686	13,680	125,828	140,194	94,466	36,777	131,243	0	5	46	52	35	14	48
	Total	386,187	9,884	14,880	195,695	220,459	119,209	46,520	165,728	3	4	51	57	31	12	43

Figure 4.1.1 Water Supply Coverage of the Province

