

10. Financial Arrangements for Medium-Term Development Plan

Financial arrangements to attain medium-term (Phase I) targets were sought focusing on available Internal Revenue allotment (IRA). The financial shortfall was first identified for this sector and recommendations were made to seek comprehensive logistics in terms of acquisition of various funds, augmentation of current practices in Government assistance to this sector and effective investments and cost recovery.

The projection of IRA to the relevant sector for Phase I period was made covering different administrative levels. Referring to the experience in other provinces, provincial allocation to the relevant sector was assumed to be 4% of total IRA (20% of 20% Development Fund) and the same percentage was applied for the allocation of municipal IRA to the sector. The fund available for this sector for 5-year implementation period from 1999 to 2003 was calculated as a sum of municipal and provincial allotments.

The combined provincial and municipal IRA to the sector was estimated at ₱149.89million (provincial IRA is 40.96% of the total IRA). In the overall IRA allocation to the sub-sectors, urban water supply has the largest allotment of 42.32%, followed by rural water supply (25.32%). While, the share of rural sanitation is 20.34 %, which is higher than that of urban sanitation of about ₱18.02 million.

The shortfall in funding on the current price level was figured out comparing with available fund for the relevant sector (IRA) in the province over the Phase I requirements. IRA can fund only 38.31% of the requirements as a provincial average. Hence, there is a big shortfall of ₱241.41 million in funding. It will become ₱297.02 million in consideration of price escalation with annual rate of 7%. In the municipal achievement percentage in finance, Norala (94%) is the highest among municipalities, followed by Banga (77%). Others are in the range between 49% and 62% to the requirements, while the provincial average is 38%.

Under the above situation, different levels of funding availability are discussed with reference to service coverage. Alternative countermeasures are also discussed in view of; i) acquisition of external funds, ii) augmentation of sector finance under current arrangements (IRA and others), iii) introduction of private sector participation to mitigate public investment needs, and iv) effective and economical investments. It is common to all sub-sectors that the service coverage in the year 2003 would not sustain even the present levels in the

provision of only projected IRA. Using computer-based programs, these scenarios may be modified by policy makers according to the updated information and policy on available fund and sector targets.

Investment need ranking of the municipalities is discussed to serve as a guide for implementation in order for the provincial government to effectively arrange its financial resources. The ranking for urban water supply is specifically studied and the result is employed for allocation of provincial IRA to the municipalities in the concerned sub-sector. For the provincial fund allocation, as a currently effective arrangement, it is assumed that 90% of the fund for urban water supply from the provincial government is equally distributed up to the third ranking municipalities, while the remaining 10% are equally distributed to the rest of the municipalities. In the synthetic investment need ranking of municipalities covering four sub-sectors, the top ranking municipality is T'boli, which indicates that it is given priority for investments in all sub-sectors, while Norala is the least priority in terms of investment.

With regard to Level I water supply and sanitation improvement for which GOP may provide possible assistance, the DILG is assumed to be the Executing Agency and the province the Implementing Agency in the meantime. The project may be merged with those of 1st batch provinces for preparation of the PW4SP. The implementation of a packaged project may be realized in the near future.

Project components including Level I water supply, public/school toilet facilities and distribution of toilet bowls were identified to meet the conditions in provision of GOP-assisted project. Since all municipalities of the province fall on the 1st to 4th class municipalities, there is no water supply component to meet the conditions in provision of GOP-assisted Level I water supply in the rural areas (limited to 5th to 6th municipalities), while there are 7 municipalities that meet the condition for GOP-assisted projects (limited to 3rd to 6th municipalities). The required services will cover technical and institutional/community development aspects of the project. The overall project cost for the implementation period 1999-2003 was estimated at ₱85.6 million or ₱60.3 million in 1997 price level.

Two alternatives for the financial arrangements were studied, these are; i) Case 1-Utilization of IRA only; and ii) Case 2-Utilization of IRA and MDF.

For Case 1, GOP shall share 50% of the overall project cost in combination of the foreign assisted loan and government counter part fund. The remaining 50% shall be shared by the

LGUs (47%) and the beneficiaries (3%). Comparing the estimated project cost to be shared by the LGUs, which is ₱28.3 million (at 1997 price level) and the available IRA of LGUs (₱28.6 million), the cost to be shouldered by the LGU meets the available IRA.

For Case 2, the utilization of the MDF is considered in case the LGUs will fail to furnish IRA for the cost to be shared (even if estimated IRA available meets the required cost to be shared by the LGU). The foreign loan may be availed of at the maximum financing limit of 75% of the overall project cost. Under this case, the IRA to be used by the LGU is about 36% of available IRA. GOP will possibly finance up to 75% of the total project cost in the portion of loan. Out of GOP finance through the loan, 45% of the total project cost shall be granted to the LGUs, aside from the 5% GOP counterpart fund. The remaining 30% of the total project cost shall be utilized for financing the LGUs to secure their budgetary capacity through MDF. Under this case, the IRA to be used by the LGU is 36% of the available IRA.

Cost recovery and cost sharing shall be promoted to attain the planned target based on the principle that adequate water, sewerage and sanitation facilities should be paid for. For Level I water supply systems, LGUs and beneficiaries are required to share the capital cost. While users need to pay water charge up to 2% of their monthly income to sustain the system (₱100/HH/month in 2003). For Level II water supply systems, full cost recovery is required for all capital and recurrent cost (₱89/HH/month in 2003, less than 2% of monthly income). For Level III water supply systems, a full recovery of capital and O&M cost is required (₱216/HH/month in 2003). Based on the experience that water fee must not exceed 5% of income (average monthly water consumption of 15 m³), users will be able to pay.

For sanitation, governmental support is limited to the provision of toilet bowl for pour-flush toilets as an incentive to increase the distribution of water-sealed toilets. To expedite the sanitation sector improvement, introduction of specific loans with low interest rate and longer repayment period may be effective. For urban sanitation, to cover the construction cost of sanitary toilets, a linkage with existing housing loan may be established.

11. Monitoring of the Medium-Term Development Plan

The sector monitoring system must support a well-defined and accepted sector development process-model. This will include information collection, tracing the flow of raw data from the field to the central level, information analysis, and data feedback. With the sector moni-

toring system in place, planners should be able to take a fresh objective view of the way current strategies are implemented.

The sector monitoring system should reinforce the linkage between water, sanitation and health. It should be reliable and involve the beneficiaries. It should be accepted by all sectors. It should be practical. It should be followed through with effective feedback. The best monitors are the community members themselves since accurate monitoring reports are in their best interest. A consensus on common and practical definition of terms for monitoring purposes is needed.

A three-phased monitoring system is proposed with each phase progressively increasing the number and complexity of indicators to be used. Detailed implementation of the first phase requirements is presented in this PW4SP, including institutional arrangements. It is envisaged that this will be linked with the national sector monitoring system being developed.

There are existing Project Monitoring Committees (PMCs) at the provincial and municipal levels tasked with the monitoring of local government projects funded by national and local governments. At the provincial level, projects to be monitored will be those implemented and managed at this level with funds directly released to the province as provided under MO 175. The PMC shall be established in the province and it shall consist of representatives from NGOs and the administration.

This PW4SP should be updated at least every five years. Based on the monitoring reports, an annual review of sector accomplishments compared with objectives and efficiency will be done. This will lead to the reformulation of objectives, strategies, new policies and policy revisions, and an updated sector investment program.

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. 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 South Cotabato 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 South Cotabato

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.

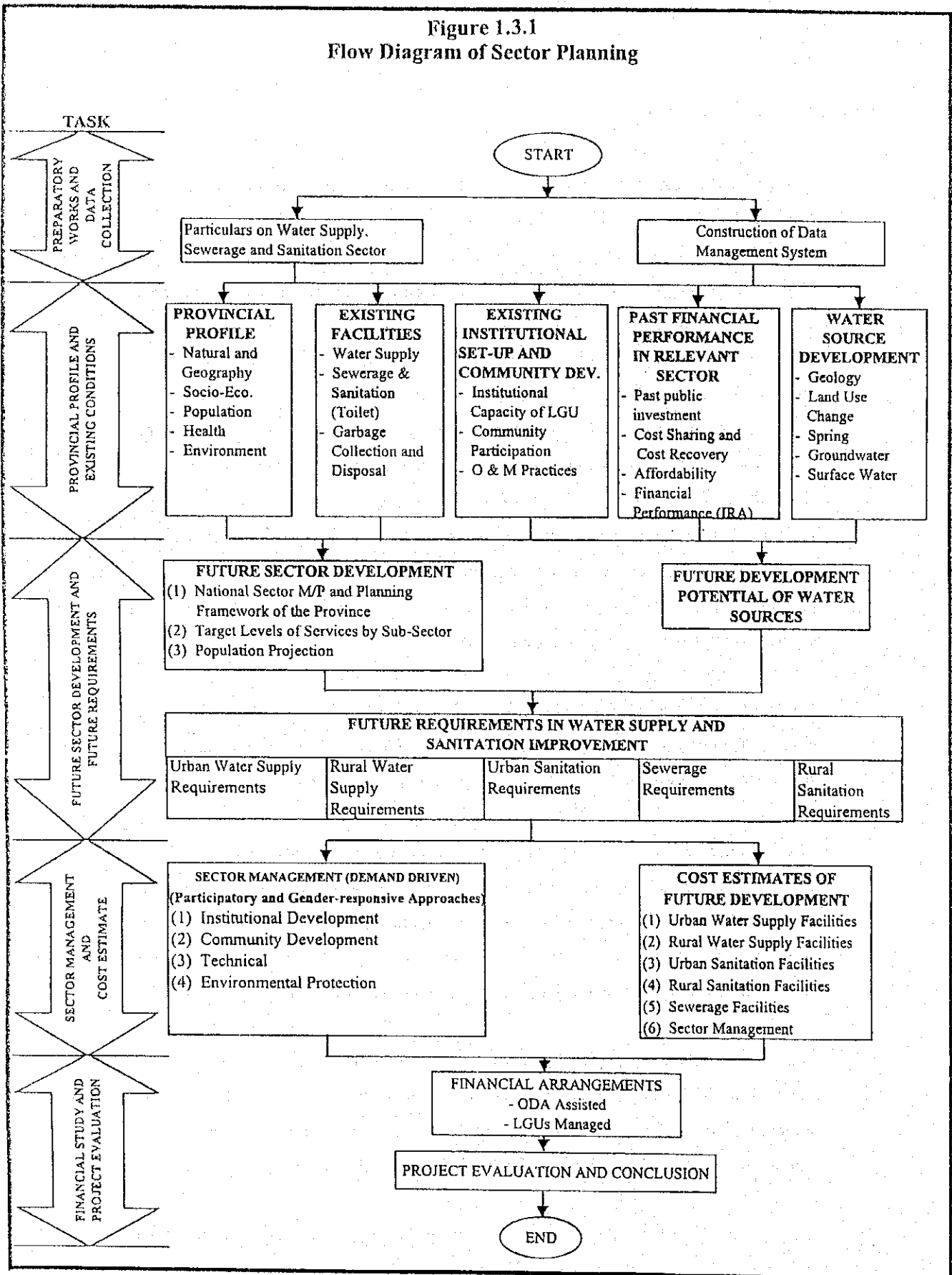
Chapter 3 provides the provincial profile with reference to current sector conditions: natural conditions and geographical features, socio-economic conditions, demographic trends, health status and environmental conditions as the planning environment.

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
PLANNING APPROACH FOR
FUTURE SECTOR DEVELOPMENT

2

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 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.

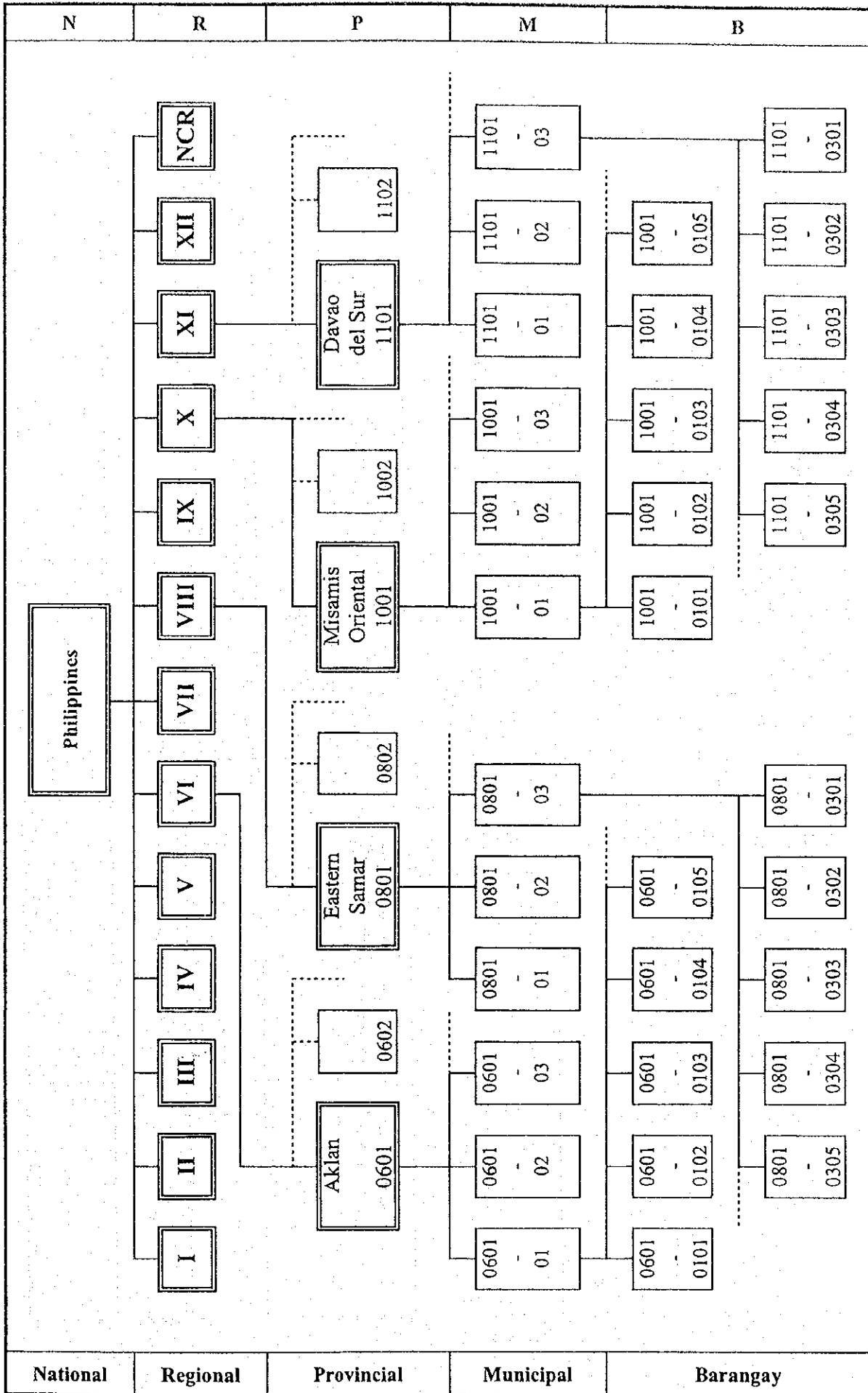


Figure 2.6.1 Institutional Hierarchical System by the NEDA Coding

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
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			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			
7. Investment Data							
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				
8. Model Study							
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 a in 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

South Cotabato is one of the 6 provinces comprising the Southern Mindanao Region (Region XI). Koronadal, the provincial capital, is about 58km from General Santos City, a chartered city. Sultan Kudarat bounds the province on the north and west and General Santos City and Sarangani on the east and south as shown in the Location Map.

The landlocked province is classified as 1st class and has a total land area of about 3,706sq.km, which is 1.24% of the Philippine total land area of about 300,000sq.km. It is composed of 11 municipalities. Based on the 1995 NSO records, the province has 198 barangays, of which 35 are urban and 163 rural. Provincial total population was 623,784 in 1995. About 52% of the population resided in rural areas while the remaining 48% in urban areas. The capital town of Koronadal and Polomolok are the trade and industry centers of the province. At present, there are 5 water districts and 10 barangay/association-managed Level III systems operating in the province. Table 3.1.1 presents the breakdown per municipality of the land area, population and its density, as well as administrative composition.

Table 3.1.1 Outline of Municipalities

Municipality	Class	Land Area (km ²)	1995 Population		Number of Barangay		
			Number	Density (person/km ²)	Urban	Rural	Total
Banga	3rd	240.35	69,200	288	5	17	22
Koronadal (Capital)	1st	284.25	118,231	416	8	19	27
Lake Sebu	3rd	891.38	47,617	53	2	17	19
Norala	4th	194.40	39,688	204	7	7	14
Polomolok	1st	339.97	96,274	283	1	22	23
Santo Niño	4th	109.04	32,103	294	3	7	10
Surallah	1st	241.08	61,509	255	5	12	17
Tampakan	4th	242.50	28,256	117	1	12	13
Tantangan	4th	125.82	30,044	239	1	12	13
T'Boli	2nd	809.06	54,206	67	1	24	25
Tupi	3rd	228.04	46,656	205	1	14	15
Provincial Total	1st	3,705.89	623,784	168	35	163	198

3.2 Natural Conditions and Geographical Features

3.2.1 Meteorology

The province has Type IV climate under the Coronas classification and is characterized by unpronounced dry and wet seasons with rainfall that is more or less evenly distributed

throughout the year as reflected in the Location Map. The average annual rainfall range is from 1,500 to 2,500mm.

The mean annual air temperature is 27.7°C. The hottest months are April and May (34°C), while the coolest are December and January (21.5°C). The province is located at latitude of about 65°15' north and about 125° longitude, which is considered as less visited area by typhoon.

3.2.2 Land Use

Remaining forest area constitutes a mere 23% of the total area of the province located mostly in the mountainous areas of Lake Sebu, T'boli, and Mt. Matutum. Agricultural land comprises approximately 40%, while Built-up area is limited in less than 1%. Openland and grassland represent an aggregate area of 36%. 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. Accordingly, 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 ²)	Percentage over Total Land Area
Forest Land	851.14	23
Grassland	22.62	1
Built-up	38.14	1
Agricultural	1,469.40	40
Fishponds, Mangrove, Inland Water Area	8.89	0
Openland	1,315.70	35
Provincial Total	3,705.89	100

3.2.3 Topography and Drainage

The province lies on the southern extension of 2 major geomorphic features, the Cotabato Cordillera and Cotabato Basin. The Cotabato Basin is a broad alluvium-filled valley that encompasses most of the areas adjoining the provinces at the north including a portion of South Cotabato. The other alluvial plain is located at the southeastern part of the province.

These 2 areas are formed by the tributaries of the Mindanao River, namely: the Cotabato Basin and the Silway River. The highest elevation of these alluvial plains is about 450m. These are mainly distributed along the boundary area between the 2 municipalities of Tupi and Polomolok. The Cotabato Cordillera is a northwest trending mountain range of moderate to high relief extension starting from Cotabato City and extending up to Sarangani Bay. Young volcanic mountains, the most prominent of which is Mt. Matutum with an elevation of 2,286m, constitute the central highlands of the province.

The large rivers, the Allah River, the Banga River and the Buluan River, are major tributaries of the Mindanao River with a total length of about 145km and a drainage area of 23,169 km². These rivers with swampy tracts along its extent meander and drain the northwestern half of the whole province including the central highlands. The south coastal river, the Silway River, is a short, swift stream with small mangrove swamps and narrow lowland plain near its mouth. The province has 4 lakes; Lake Sebu, Lake Lahit, Lake Siloton and Lake Maughan which is the crater of Parker Volcano. Most of these are believed to be volcanic in origin.

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.

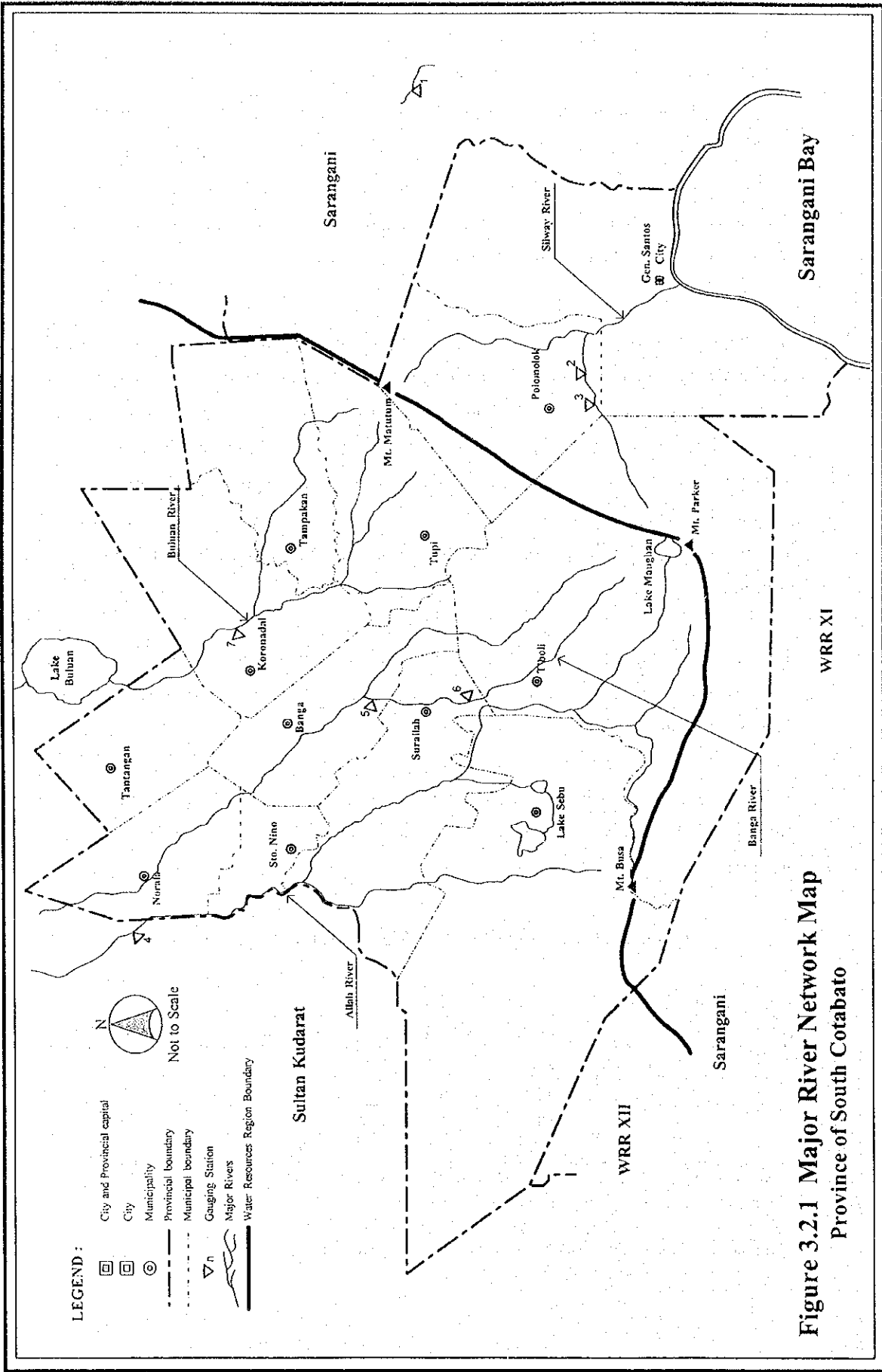
Four (4) typical rivers in the province were selected for water quality examination, namely: Silway, Allah, Banga and Buluan. Analyzed river waters were turbid (refer to 7.5, Data Report).

Table 3.2.2 Drainage Areas & Flow Rates of Major Rivers

Major River	Drainage Area (km ²)	Flow Rate (m ³ /sec)			Water District (using river water)
		Peak	Maximum	Minimum	
Silway	65	83.8	35.5	2.0	None
Allah	936	159.3	135.3	15.2	None
Banga	324	50.4	33.8	3.7	None
Buluan	290	42.4	36.9	2.7	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



3.3 Socio-economic Conditions

3.3.1 Economic Activities and Household Income

Agriculture is the major economic activity in South Cotabato. The province is considered as the breadbasket of the South because of its fertile agricultural lands that yield various crops for both local and foreign consumption. Major crops cultivated are corn, rice, pineapple and coconut. Other crops include banana, mango, coffee and cassava. Agro-based industries such as food processing, hybrid corn seed production, and furniture/woodcraft industry also largely contribute to the economy of the province. The greater bulk of commercial activities are seen in Koronadal and Polomolok.

The National Statistics Office (NSO) Family Income and Expenditures Survey (FIES) in 1994 indicated that the average annual family income of the province was ₱ 61,435, while the expenditure was at ₱ 53,155 or an average net saving of ₱ 8,280. Distribution of households 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 households of lower income levels were lower than the average figures in the region. Based on the established poverty threshold income of ₱ 41,579, in Region XI for 1994, about 35% of the total number of families in the province 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 and trade (refer to Figure 3.3.2 and Table 3.3.2, Supporting Report). By class of worker, those who worked for private business/enterprise or farm had the highest share of 29%, followed by those who were self-employed without any paid employee as indicated in Table 3.3.2, Supporting Report.

3.3.2 Basic Infrastructure

All municipalities have electric supply, although the service coverage at household level is only 75%. Telecommunication services also cover 100% of the municipalities. There are 11 post offices in the province. Land transportation is available by means of bus, jeepney, car, taxi and motorcycle. There are 47 business establishments and 31 tourism-oriented facilities. Table 3.3.1 shows the provincial outline of services and Table 3.3.2 reflects the number of public facilities and services by municipality.

Figure 3.3.1 Distribution of Families by Income Class

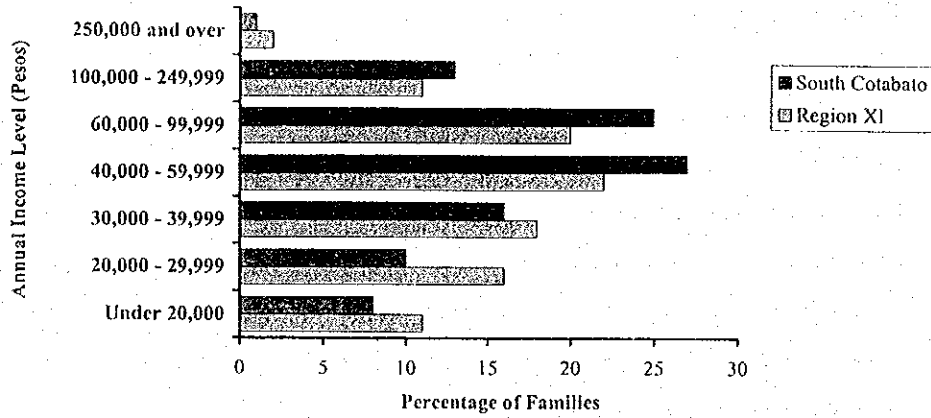


Figure 3.3.2 Population Distribution by Major Industry and Class of Worker

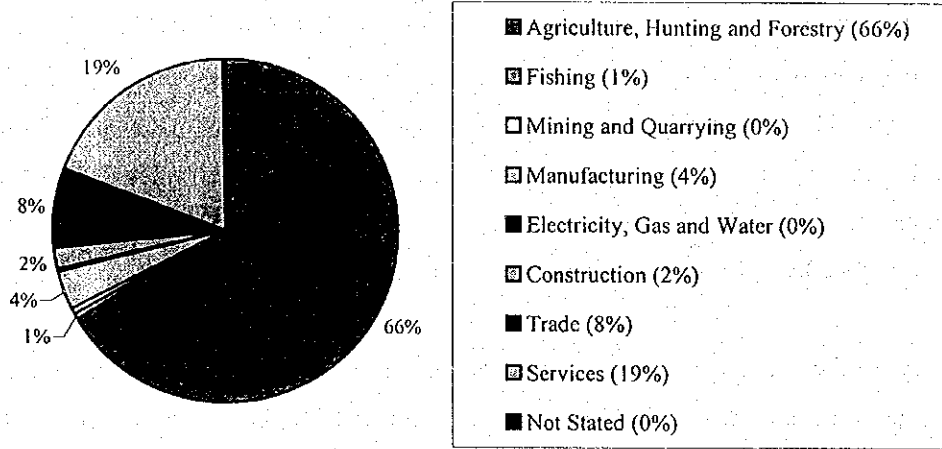


Figure 3.3.3 Population Distribution by Highest Educational Attainment

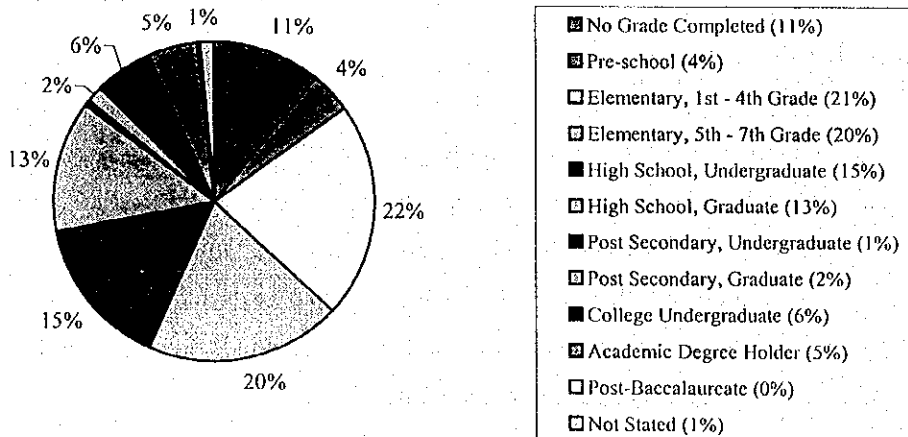


Table 3.3.1 Provincial Outline on Public Services

Items	Unit	Value	Items	Unit	Value
(1) Roads			(7) Industrial/business/commercial		
a) Total Length	Km	2,880.00	Establishment	Number	47
b) Barangay roads	Percent	58.12			
(2) Electricity service coverage			(8) Tourism facilities	Number	31
a) Municipality	Percent	100	(Hotel resort, lodges, recreational facilities, etc.)		
b) Barangay	Percent	76.26			
c) Household	Percent	74.51	(9) Schools		
(3) Telecommunication Services			a) Elementary level	Number	348
a) Availability in municipality	Percent	100	b) Secondary level	Number	57
b) Telegraph station	Number	12	c) Tertiary level/Technical	Number	18
c) Telephone station	Number	4	(10) Health Facilities		
(4) Post Office	Number	11	a) Hospital/clinics	Number	28
(5) Transportation services	Mode	Bus, jeep, (ex. Bus, jeep, taxi, motorcycle & van taxi)	b) Main health centers, rural health units, barangay health center, etc	Number	
			(11) Labor		
(6) Banking Facilities	Number		a) Labor force participation ratio	Percent	60.34
a) Private bank	(by Private and public)	34	b) Employment rate	Percent	90.88
b) Public bank		5	(12) Average family income		
			a) Monthly income	Pesos/Month	5,120
			b) Monthly expenditure	Pesos/Month	4,430

Sources: PSPT, Socio-economic Profile, Provincial Physical Framework Plan/Comprehensive Provincial Land Use Plan, 1995 Population census, 1994 Family Income and Expenditures Survey by NSO.

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.					
Banga	1	4	5			2	1	1
Koronadal (Capital)	4	4	8	10	3	6	4	21
Lake Sebu	2	3	5		1	2		
Norala	3	1	4			2	1	1
Polomolok	6	5	11	1		3	1	6
Santo Niño	5	1	6			2	1	1
Surallah	3	3	6	1		4	2	7
Tampakan	3		3			3	1	
Tantangan	1	2	3				1	1
T'Boli	2		2			1	1	
Tupi	3	1	4	2		3	2	1
Provincial Total	33	24	57	14	4	28	15	39

3.3.3 Education

The province has a total of 364 schools consisting of 348 elementary schools, 57 high schools and 18 colleges/vocational institutions. The 1990 N5SO census indicated that the province had 90.20% literacy of household population 10 years old and over. A large part of 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).

3.4 Population

3.4.1 Previous Population Development

A declining provincial population growth rate had been experienced since the last 6 census years (1960 - 1970) as indicated in Figure 3.4.1. From a high average annual growth rate of 6.34% during the period 1960 to 1970, it gradually decreased to 4.16% (1990-1995). 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	252,612	6.34	1960 - 1970
1975	329,534	4.72	1970 - 1975
1980	401,705	5.60	1975 - 1980
1990	539,458	3.37	1980 - 1990
1995	621,155	4.16	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 1995 population.

Figure 3.4.1 Previous Population Development of the Province

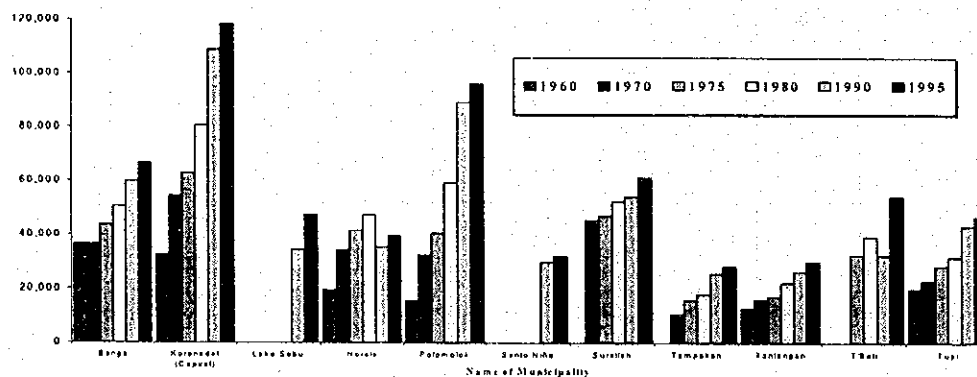


Table 3.4.1 Previous Population Development by Municipality

Municipality	Previous Population						
	1948	1960	1970	1975	1980	1990	1995
Banga		36,468	36,319	43,452	50,460	59,743	66,571
Koronadal (Capital)	53,563	32,437	54,413	62,764	80,566	108,738	118,231
Lake Sebu						34,350	47,617
Norala		19,579	34,131	41,570	47,397	35,566	39,688
Polomolok		15,536	32,570	40,544	59,312	89,372	96,274
Santo Niño						30,076	32,103
Surallah			45,631	47,165	52,703	54,136	61,509
Tampakan			10,731	15,867	18,057	25,526	28,256
Tantangan		12,644	15,943	17,147	22,207	26,346	30,044
T'Boli				32,602	39,412	32,373	54,206
Tupi		19,945	22,874	28,423	31,591	43,232	46,656
Provincial Total	53,563	136,609	252,612	329,534	401,705	539,458	621,155

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 municipalities having 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, 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. Distribution of the classified area is shown in Figure 3.4.1, Supporting Report.

For this Master Plan, however, the 1995 NSO classification of urban and rural barangays was modified by the PPDO to reflect the actual conditions prevailing in the area. Seventeen (17) rural barangays were re-classified as urban. With the re-classification, there are now 52 urban barangays and 146 rural barangays for a total of 198 barangays in 1997. Distribution of the classified area is shown in Figure 3.4.1, Supporting Report.

3.4.3 Present Population Distribution

Utilizing the modified classification of the barangays, the urban-rural population was estimated. Rural population accounts for 63% of the provincial total, while 37% 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.

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
Banga	10	12	22	12,926	56,274	69,200
Koronadal (Capital)	11	16	27	64,071	57,643	121,714
Lake Sebu	1	18	19	8,362	45,654	54,016
Norala	3	11	14	26,584	14,695	41,279
Polomolok	3	20	23	51,028	47,703	98,731
Santo Niño	6	4	10	14,894	17,908	32,802
Surallah	3	14	17	24,229	40,209	64,438
Tampakan	2	11	13	9,972	19,322	29,294
Tantangan	5	8	13	9,170	22,351	31,521
T'Boli	3	22	25	13,894	52,422	66,316
Tupi	5	10	15	10,015	37,867	47,882
Provincial Total	52	146	198	245,145	412,048	657,193

There are an estimated 129,411 households with 62% residing in rural area and 38% households in urban area. The average provincial household size is 5.08 persons/household. Table 3.4.3 presents the breakdown per municipality the number of households in 1995 and the estimated number in 1997 as well as the household size by urban and rural area.

Table 3.4.3 Household Numbers and Household Size

Municipality	Number of Households (1995)			Number of Households (1997)			1995 Household Size (person/household)		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Banga	2,498	10,510	13,008	2,596	10,927	13,523	4.98	5.15	5.12
Koronadal (Capital)	13,050	11,006	24,056	13,432	11,325	24,757	4.77	5.09	4.91
Lake Sebu	1,479	8,104	9,583	1,679	9,186	10,865	4.98	4.97	4.97
Norala	4,948	2,600	7,548	5,142	2,706	7,848	5.17	5.43	5.26
Polomolok	10,039	9,024	19,063	10,288	9,263	19,551	4.96	5.15	5.05
Santo Niño	2,768	3,320	6,088	2,826	3,392	6,218	5.27	5.28	5.27
Surallah	4,543	7,645	12,188	4,760	8,010	12,770	5.09	5.02	5.05
Tampakan	1,768	3,646	5,414	1,833	3,781	5,614	5.44	5.11	5.22
Tantangan	1,673	3,917	5,590	1,757	4,109	5,866	5.22	5.44	5.37
T'Boli	2,254	8,483	10,737	2,757	10,381	13,138	5.04	5.05	5.05
Tupi	1,954	7,069	9,023	2,007	7,254	9,261	4.99	5.22	5.17
Provincial Total	46,974	75,324	122,298	49,077	80,334	129,411	4.99	5.13	5.08

3.5 Health Status

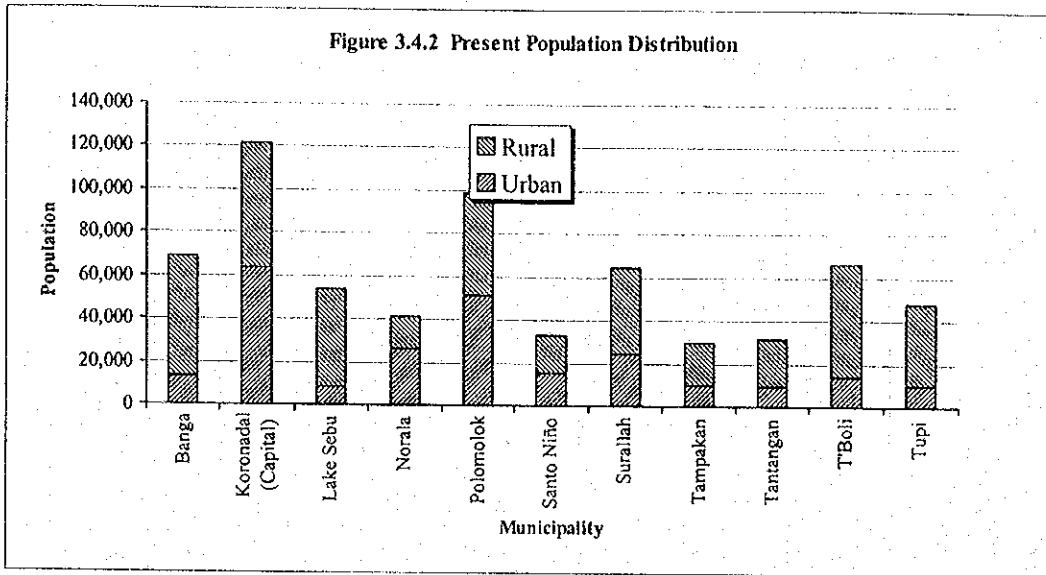
3.5.1 Morbidity, Mortality and Infant Mortality

The number one cause of morbidity was influenza followed by diarrhea and pneumonia. Bronchitis and tuberculosis ranked fourth and fifth, respectively. Other causes of morbidity in descending order were: dengue fever, heart diseases, typhoid, schistosomiasis and malaria. Regarding mortality, the number one cause was vascular diseases followed by pneumonia. Accidents and tuberculosis ranked third and fourth, respectively. Pneumonia, septicemia, prematurity and tetanus were the 4 leading causes of infant mortality in the province.

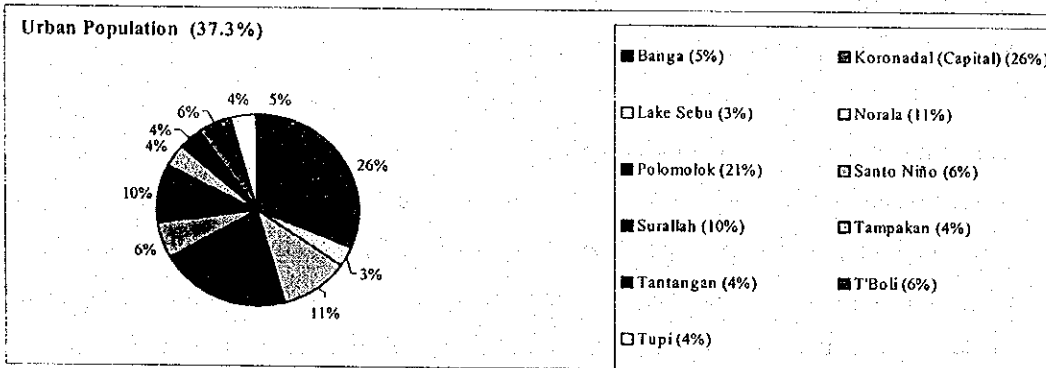
The general health status of the populace of the province was relatively inferior compared with the national condition. The incidence of diseases was higher in South Cotabato than the Philippines as a whole. Table 3.5.1 presents a comparative statistics on the leading causes of morbidity, mortality and 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 include diarrhea (rank 2nd), dengue fever (6th), typhoid (8th) schistosomiasis (9th) and malaria (10th).

Figure 3.4.2 Present Population Distribution



Urban Population (37.3%)



Rural Population (62.7%)

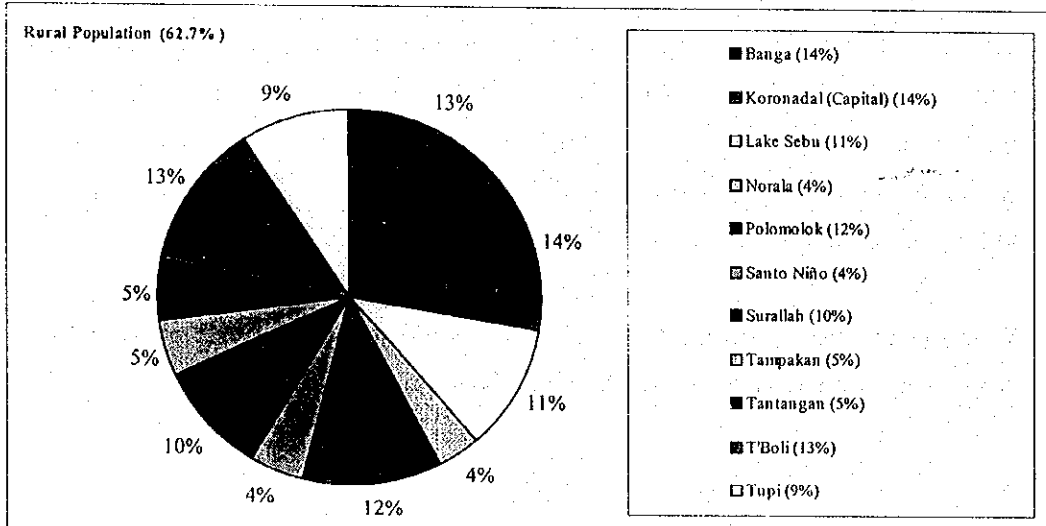


Table 3.5.1 Number and Rates of Ten Leading Causes of Morbidity Mortality and Infant Mortality

Rate: 1/100,000

Causes		South Cotabato		Philippines		
		Number	Rate	Number	Rate	Ranking
Morbidity	1. Influenza	74,607	12,011	609,471	910	3
	2. Diarrhea	45,226	7,281	1,337,449	1,997	1
	3. Pneumonia	42,754	6,883	470,574	703	4
	4. Bronchitis	18,498	2,978	903,508	1,339	2
	5. Tuberculosis	10,429	1,679	159,049	238	6
	6. Dengue Fever	2,627	423	-	-	-
	7. Heart Diseases	2,565	413	111,874	167	7
	8. Typhoid/Paratyphoid	1,367	220	-	-	-
	9. Schistosomiasis	1,224	197	-	-	-
	10. Malaria	1,168	188	49,506	74	10
Mortality	1. Vascular Diseases	2,267	365	37,358	56	2
	2. Pneumonia	1,354	218	35,582	53	1
	3. Other Accidents	1,143	184	13,477	20	6
	4. Tuberculosis	963	155	24,580	37	5
	5. Other Diges. Diseases	553	89	-	-	-
	6. Septicemia	348	56	-	-	-
	7. Nutritional Deficiencies	292	47	-	-	-
	8. Diabetes Mellitus	242	39	-	-	-
	9. Chronic Liver Disease	143	23	-	-	-
	10. Tetanus	87	14	-	-	-
Infant Mortality	1. Pneumonia	75	12	7,631	4.5	1
	2. Septicemia	62	10	1,252	0.7	5
	3. Prematurity	50	8	-	-	-
	4. Tetanus	19	3	-	-	-
	5. Nutritional Deficiencies	19	3	925	0.6	6
	6. Heart Diseases	12	2	-	-	-
	7. Congenital Anomalies	12	2	2,366	1.4	3
	8. Vascular Diseases	6	1	-	-	-
	9. Chronic Liver Disease	6	1	-	-	-

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 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 diarrhea, dysentery, typhoid, dengue fever, viral hepatitis, malaria, schistosomiasis and filariasis. 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 in 1995

Rate: 1/100,000

Diseases	Morbidity		Mortality	
	Number	Rate	Number	Rate
Water-borne				
1. Diarrhea	45,226	7,281		
2. Dysentery	6	6		
4. Viral hepatitis	36	36		
4. Typhoid/Paratyphoid	1367	220	12	2
Water-based				
1. Schistosomiasis	1,224	197		
Water vector				
1. Malaria	1,168	188	19	3
2. Dengue/H-fever	2,627	423	12	2
3. Filariasis	205	33		

3.5.3 Health Facilities and Practitioners

Present facilities servicing the health care of the population are 28 hospitals/clinics, 10 rural health units, and 198 barangay health stations. The ratio of the population to these health facilities is above the national average figures (refer to Table 3.5.1, Supporting Report and 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 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. Greywater 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. In rural areas, natural assimilation may be expected to purify organic substances. However, pollution or contamination is anticipated caused by agricultural and mining activities especially with reference to fertilizers, pesticides and mercury.

Food processing industries and small-scale mining operations are identified as potential pollution sources if no control measures are in place. As of now, the Department of Environment and Natural Resources has not yet classified the rivers of the province as to their beneficial use (refer to general information in Table 3.6.2 DENR Water Quality Criteria/Water Usage and Classification, Supporting Report).

3.6.3 Solid Waste Disposal

Eight (8) of the 11 municipalities have municipal refuse collection and disposal services with a total of 9 units of open dump trucks. In the province, about 8% of the households are served, while the remaining 92% 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 and burying.

Table 3.6.1 Municipal Solid Waste Collection and Disposal, and Service Coverage, 1997

Name of Municipality	Number of Households 1997	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				
Banga	13,523	1		1	712		712	7,080	3,870	1,861	12,811	5	95	
Koronadal (Capital)	24,757	2		2	5,338		5,338	11,058	5,962	2,399	19,419	22	78	
Lake Sebu	10,865							9,118	638	1,109	10,865		100	
Norala	7,848	1		1	849		849	4,757	1,846	396	6,999	11	89	
Polomolok	19,551	1		1	1,936		1,936	6,556	5,292	5,767	17,615	10	90	
Santo Niño	6,218	1		1	365		365	3,677	1,476	700	5,853	6	94	
Surallah	12,770	1		1	630		630	7,308	1,277	3,555	12,140	5	95	
Tampakan	5,614	1		1	126		126	3,591	1,475	422	5,488	2	98	
Tambangan	5,866							2,983	1,757	1,126	5,866		100	
TBoli	13,138							10,399	1,469	1,270	13,138		100	
Tupi	9,261	1		1	150		150	6,337	1,087	1,687	9,111	2	98	
Provincial Total	129,411	9		9	10,106		10,106	72,864	26,149	20,292	119,305	8	92	

Chapter

4

**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 59% of the present population (of which 37% in urban area and 63% in rural area) is considered as adequately served (refer to 4.1, Supporting Report for the detailed study). Under the area classification, 63% of urban population and 56% of rural population have access to safe water sources/facilities, while the rest is underserved or unserved. About 267,700 persons or 69.5% of the served population depend on Level I facilities, while about 117,400 persons or 30.5% 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 15 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:

- 5 Water Districts in the municipalities of Koronadal, Norala, Polmolok, Surallah and Tupi;
- 10 waterworks operated by barangays/associations in the municipalities of Koronadal (2), Polomolok (3), Surallah (2), T'Boli (2) and Tupi.

Polomolok WD is the largest system in the province covering 3 urban barangays and 4 rural barangays in the municipality of Polomolok. It has a served population of 33,500 using deep well sources. Presently, the WD covers 57% and 9% of urban and rural population of the municipality, respectively. Expansion of service with augmentation of deep well sources is planned.

Aside from the WD, Polomolok has 3 other individual waterworks being operated by respective rural barangays. Two (2) of these adopt the combined system with communal faucets and the population coverage totaled to about 3,500 including the beneficiaries using communal faucets. (details are referred to in Table 4.1.1, Supporting Report).

Following Polomolok WD, Norala WD is the second largest system in the province. The WD utilizing deep well sources covers one urban barangay with served population of about 11,100 persons which corresponds to 42% of urban population.

In Koronadal, the provincial capital, there are 3 Level III systems. The Koronadal WD covers urban barangays with provision of deep well sources. Since the current service coverage of 2,900 is very low (10% of urban population), people in these areas resort to using their private shallow wells. The need to expand the service is quite large however, implementation of system expansion is quite delayed. The other two waterworks being operated by associations cover two rural barangays with served population 1,500 and 2,700.

There are three systems in the municipality of Surallah. Surallah WD supplies drinking water to 400 HHs in one urban barangay using deep well sources. The other two systems

Table 4.1.2 Information on Existing Level III Systems

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
Koronadal	Esperanza Brgy WS	DW				1	1		215	215		1,500	1,500
	Koronadal WD	DW	1,580	80				614		614	2,930		2,930
	Zulueta BWP WS					1	1		150	150		2,200	2,200
	Municipal Total		1,580	80		2	2	614	365	979	2,930	3,700	6,630
Norala	Norala WD	DW	199	86	1	1		2,158		2,158	11,105		11,105
Polomolok	Glanang WS	DW	340	100		1	1		170	170		3,000	3,000
	Khinan WS	DW							500	500		3,000	3,000
	Palkan WS	SP							250	250		3,500	3,500
	Polomolok WD	DW	3,552	92	3	4	7	5,369	831	6,200	28,993	4,487	33,480
	Municipal Total		3,892	93	3	5	8	5,369	1,751	7,120	28,993	13,987	42,980
Surallah	Colongolo RWSA					1	1		14	14		71	71
	Lambontong WS	DW				1	1		175	175		2,200	2,200
	Surallah WD		193	66	1		1	406		406	2,436		2,436
	Municipal Total		193	66	1	2	3	406	189	595	2,436	2,271	4,707
Tboli	Edwards	DW				1	1		248	248		1,345	1,345
	New Dumangan WS	SP				1	1		150	150		820	820
	Municipal Total					2	2		398	398		2,165	2,165
Tupi	Palian WS	SP				1	1		150	150		2,000	2,000
	Tupi WD	SP	175	76	1		1	350		350	1,750		1,750
	Municipal Total		175	76	1	1	2	350	150	500	1,750	2,000	3,750
Provincial Total			6,039	88	6	12	18	8,897	2,853	11,750	47,214	24,123	71,337

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

(Colongolo RWSA and Lambontong WS) are also utilizing deep well sources covering two rural barangays. At present, Colongolo RWSA supplies to only 14 HHs. In Surallah, new urban development (agri-industry) is proceeding and the need for water supply augmentation is highly rising.

In the municipality of T'Boli, there are two systems being operated by associations. Edwards WS covers one rural barangay with served population of 1,350 using a deep well source and New Dumangan WS adopts the combined system with communal faucets that supplies to 280 HHs using a spring source. At present, no Level III system exists in the urban area.

In the municipality of Tupi, there are two systems utilizing spring sources. Tupi WD covers one urban barangay with a current served population of 1,750 and Palian WS adopts the combined system with communal faucets covering one rural barangay with a served population of 2,800. Presently, Tupi WD is planning to expand its system to cover the entire Poblacion by providing additional water sources, transmission and distribution pipelines, through the assistance of LWUA.

Other municipalities such as Banga, Lake Sebu, Santo Nino, Tampakan and Tantangan have no Level III system at present.

Table 4.1.3 Information on Water Districts

Name of Water District	Number of Connections						Production (cu. m/mon)	Accounted for Water (cu. m/mon)
	Domestic	Institutional	Commercial	Industrial	Total	Metered		
Koronadal WD	1,744		248	0	1,992	1,992	100,535	47,408
Norala WD	315	8	21	0	344	305		5,980
Polomolok WD	5,884	76	240	0	6,200	6,200	131,666	106,560
Surallah WD	256		129	0	385	385		5,775
Tupi WD	282		83	0	365	350	17,280	5,235

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 operated by either the LGUs or by the RWSAs.

There are 67 Level II systems and most of these are utilizing spring sources (54 systems). The municipalities of Lake Sebu and Surallah have the largest number, 12 systems each, or a combined 36% 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 supply interruption caused by power failure or pump breakdown. Water quality problems such as occasional dirty water, are common in the systems utilizing deep well and spring sources.

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

(1) Management practice

Most of the waterworks using spring sources supply water to the users free of charge. The systems utilizing deep well sources impose flat rate water billing ranging from ₱ 5 to ₱ 45 monthly per HH at the minimum level. 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.

Table 4.1.4 Information on Existing Level II System

Name of Municipality	Name of System (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
Banga	Et Nonok		1	1		168	168		1,008	1,008
	Lake Sebu									
	Klubi WS		1	1		132	132		792	792
	Lamcade WS		1	1		132	132		792	792
	Lamfugon WS		1	1		40	40		240	240
	Lake Lahit WS		1	1		75	75		450	450
	Lamdalag WS		1	1						
	Lamlalak WS		1	1		65	65		390	390
	Luhid WS		1	1		125	125		750	750
	Ned WS		1	1		80	80		480	480
	Sitio Dawang WS		1	1		50	50		350	350
	Takmel WS		1	1		102	102		612	612
	Talisay WS		1	1		70	70		420	420
	Upper Maculan WS		1	1		63	63		378	378
Municipal Total		12	12		934	934		5,654	5,654	
Norala	Puti RWSA		1	1		75	75		450	450
Polomolok	Benteng RWSA		1	1		30	30		150	150
	Crossing Palkan RWSA		1	1		90	90		525	525
	Kiniis RWSA		1	1		42	42		215	215
	Klinan RWSA		1	1		180	180		1,080	1,080
	Lamcaliaf RWSA		1	1		32	32		192	192
	Landan RWSA		1	1		102	102		612	612
	Maligo RWSA		1	1		57	57		285	285
	Silway 7 RWSA		1	1		180	180		970	970
	Sumbakil RWSA		1	1		31	31		155	155
	Municipal Total		9	9		744	744		4,184	4,184
	Santo Niño	Manual Roxas RWSA		1	1		50	50		300
	Panay RWSA		1	1		50	50		300	300
Municipal Total		2	2		100	100		600	600	
Surallah	Buenavista RWSA		1	1		75	75		450	450
	Canahay BSWA		1	1		100	100		600	600
	Colongulo WS		1	1		125	125		750	750
	Duengas WS		1	1		35	35		210	210
	Lamian		1	1		70	70		420	420
	Lamsugod BSWA		1	1		100	100		600	600
	Lamual		1	1		20	20		120	120
	Little Bagulo WS		1	1		175	175		1,050	1,050
	Moloy WS		1	1		40	40		240	240
	Tubi-ala RWSA		1	1		60	60		360	360
	Upper Sepaka WS		1	1		30	30		180	180
	Veteran WS		1	1		125	125		750	750
	Municipal Total		12	12		955	955		5,730	5,730
	Tampakan	Albagan RWSA		1	1		135	135		810
Danlag RWSA			1	1		60	60		360	360
Kipalbig RWSA			1	1		85	85		510	510
Lambayong RWSA			1	1		75	75		450	450
Lampitak RWSA			1	1		150	150		900	900
Libery RWSA			1	1		60	60		360	360
Palo RWSA			1	1		35	35		210	210
Pulabato RWSA			1	1		25	25		150	150
San Isidro RWSA			1	1		125	125		750	750
Tablu RWSA			1	1		90	90		540	540
Municipal Total			10	10		840	840		5,040	5,040
Tantangan	Bukay Pait WS		1	1		100	100		500	500
	Dumadalg WS		1	1		60	60		480	480
	Lebas WS		1	1		40	40		280	280
	Maibu WS		1	1		60	60		480	480
	Municipal Total		4	4		260	260		1,740	1,740
Tboli	Basag		1	1		330	330		1,978	1,978
	Datal-dlanag				412	108	520	2,060	540	2,600
	Kemahu		1	1		383	383		1,868	1,868
	Lacunon		1	1		90	90		540	540
	Lemsolon WS		1	1		50	50		300	300
	Maan		1	1		93	93		553	553
	Sinolon		1	1		93	93		563	563
Municipal Total		6	6	412	1,147	1,559	2,060	6,342	8,402	
Tupi	Aefao WS		1	1		50	50		300	300
	Acntonan		1	1		476	476		2,520	2,520
	Bololmala		1	1		95	95		515	515
	Bunao		1	1		174	174		905	905
	Cebuano WS		1	1		75	75		450	450
	Kablon		1	1		324	324		1,688	1,688
	Liman WS		1	1		15	15		950	950
	Lunen		1	1		66	66		390	390
	Miasong		1	1		170	170		1,010	1,010
	Tubeng		1	1		290	290		1,280	1,280
Municipal Total		10	10		1,735	1,735		10,008	10,008	
Provincial Total			67	67	412	6,958	7,370	2,060	40,756	42,816

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 PHO 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 37,664 operational Level I facilities, 93% are shallow wells. According to the data from PHO, as a provincial average, 50% of the 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 total number of shallow wells for each municipality, 19,959 Level I facilities are classified as safe sources, while 17,705 facilities belong to unsafe sources.

Percentage shares between public and private Level I facilities for rural water supply is 3.4% and 96.6%, respectively. The share of developed springs in public facilities is 5.1% (details are referred to Supporting Report).

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	Number of Household		Number of Population			
											Urban	Rural	Urban	Rural		
Banga	15	2,764	773		3,522	2,764	7			2,771	1,948	5,571	7,519	9,699	28,693	38,392
Koronadal (Capital)	517	7,099	45		7,661	7,099				7,099	7,551	6,551	14,101	36,016	33,343	69,359
Lake Sebu	5	31	67	10	113	31	8			39	483	3,826	4,309	2,406	19,015	21,421
Norala	8	2,204	50	7	2,209	2,204				2,204	1,809	1,832	3,640	9,351	9,946	19,297
Polomolok	68	280			348	280				280	2,056	1,588	3,644	10,196	8,179	18,375
Santo Niño	41	291			332	291				291	1,573	1,911	3,484	8,292	10,089	18,381
Surallah	103	2,664	33	1	2,801	2,664	20			2,684	2,559	3,622	6,181	13,023	18,183	31,206
Tampakan	46	288	509	11	854	288	22			310	911	1,679	2,590	4,956	8,580	13,535
Tantangan	19	1,347	12	3	1,381	1,347	7			1,354	960	2,169	3,129	5,013	11,799	16,812
T'boli	4			9	13		82			82	561	1,140	1,701	2,825	5,759	8,584
Tupi	41	592		4	637	592	1			593	757	1,635	2,392	3,778	8,537	12,315
Provincial Total	867	17,558	1,489	45	19,959	17,558	147			17,705	21,167	31,524	52,691	105,556	162,122	267,678

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 very few non-functioning wells in the province as shown in Table 4.1.6.

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.	329	592	538	34,526	35,985
	Percent	99.1%	100%	100%	100%	
Non-Functioning	No.	3				3
	Percent	0.9%	0%	0%	0%	0.8%
Total Number		332	592	538	34,526	35,988

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 NSO, and the Provincial Physical Framework Plan/Comprehensive Provincial Land Use Plan. However, the population distribution in 1995 census by urban and rural barangays prepared by NSO was adjusted to reflect the 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 the 1990 population census data on "Households by Main Source of Drinking Water and City/Municipality" with some modifications.
- 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 to be 23 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, 59% of the population is adequately served (63% of urban population and 56% of rural population).

The percentage of underserved population is estimated at 24% of the total population (27% of urban population and 22% of rural population) who are depending on unsafe sources/facilities.

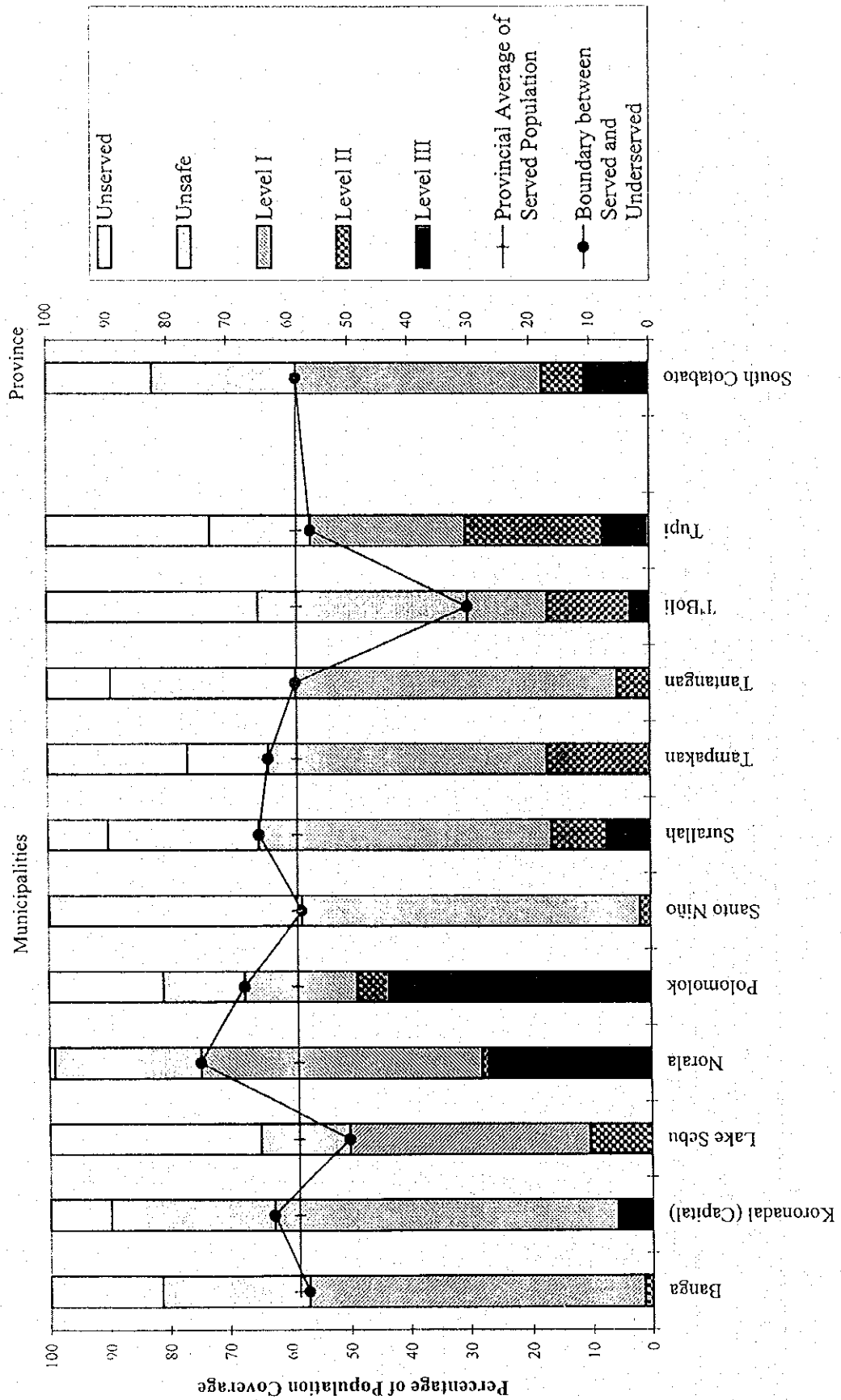
The provincial service coverage at present is reflected in Figure 4.1.1 (details are referred to Supporting Report).

Among different service levels, Level I water supply facilities have a predominant service coverage, in 9 municipalities, out of the 11 municipalities in the province.

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/Unserved			Served by Safe Source			Underserved/Unserved				
			Level III	Level II	Level I	Total	Unsafe Source	Unserved	Total	Level III	Level II	Level I	Total	Unsafe Source	Unserved	Total
Banga	Urban	12,926			9,699	9,699	652	2,574	3,227			75	75	5	20	25
	Rural	56,274	1,008	28,693	29,701	16,282	10,291	26,573		2	51	53	29	18	47	
	Total	69,200	1,008	38,392	39,400	16,934	12,865	29,800		1	35	57	24	19	43	
Koronadal (Capital)	Urban	64,071	2,930	36,016	38,946	22,736	2,389	25,125		5	56	61	35	4	39	
	Rural	57,643	3,700	33,343	37,043	10,259	9,841	20,100		6	58	65	18	17	35	
	Total	121,714	6,630	69,359	76,489	32,995	12,230	45,225		5	57	63	27	10	37	
Lake Sebu	Urban	8,362		2,406	2,406	2,058	3,898	5,956			29	29	25	47	71	
	Rural	45,654	5,654	19,015	24,669	5,974	15,010	20,985		12	42	54	13	33	46	
	Total	54,016	5,654	21,421	27,075	8,032	18,909	26,941		10	40	50	15	35	50	
Norala	Urban	26,584	11,105	9,351	20,456	6,055	73	6,128		42	35	77	23	0	23	
	Rural	14,695	450	9,946	10,396	4,011	288	4,299		3	68	71	27	2	29	
	Total	41,279	11,105	19,297	30,852	10,066	361	10,427		1	47	75	24	1	25	
Polomolok	Urban	51,028	28,993	10,196	39,189	8,087	3,751	11,839		57	20	77	16	7	23	
	Rural	47,703	13,987	8,179	22,166	5,298	15,055	20,353		29	17	57	11	32	43	
	Total	98,731	42,980	18,375	66,539	13,386	18,806	32,192		44	5	67	14	19	33	
Santo Niño	Urban	14,894		8,292	8,292	6,591	11	6,602			56	56	44	0	44	
	Rural	17,908	600	10,989	10,689	7,179	40	7,219		3	56	60	40	0	40	
	Total	32,802	600	18,381	18,981	13,770	51	13,821		2	56	58	42	0	42	
Surallah	Urban	24,229	2,436	13,023	15,459	7,437	1,333	8,770		10	54	64	31	6	36	
	Rural	40,209	2,271	18,183	26,398	8,736	5,075	13,811		6	15	45	22	13	34	
	Total	64,438	4,707	31,206	41,857	16,172	6,409	22,581		7	9	48	65	25	35	
Tampakan	Urban	9,972		4,956	4,956	3,544	1,472	5,016			50	50	36	15	50	
	Rural	19,322	5,040	8,580	13,620	3,666	5,337	5,702		26	44	70	2	28	30	
	Total	29,294	5,040	13,535	18,575	3,910	6,809	10,719		17	46	63	13	23	37	
Tamtangan	Urban	9,170		5,013	5,013	3,499	658	4,157			55	55	38	7	45	
	Rural	22,351	1,740	11,799	13,539	6,170	2,642	8,812		8	53	61	28	12	39	
	Total	31,521	1,740	16,812	18,552	9,669	3,300	12,969		6	53	59	31	10	41	
T'boli	Urban	13,894	2,060	2,825	4,885	4,238	4,771	9,009		15	20	35	31	34	65	
	Rural	52,422	2,165	7,074	5,759	14,998	18,956	18,468		4	13	11	29	36	71	
	Total	66,316	2,165	9,134	8,584	19,883	23,194	23,239		3	14	13	30	35	70	
Tupi	Urban	10,015	1,750	3,778	5,528	1,904	2,583	4,487		17	38	55	19	26	45	
	Rural	37,867	2,000	10,808	8,537	21,345	6,098	10,424		5	29	23	56	16	44	
	Total	47,882	3,750	10,808	12,315	26,873	8,002	13,007		8	23	26	56	17	44	
Provincial Total	Urban	245,145	47,214	2,060	105,556	154,830	66,802	23,513		19	1	43	63	27	10	37
	Rural	412,048	24,123	44,002	162,122	230,247	89,329	92,473		6	11	39	56	22	44	
	Total	657,193	71,337	46,062	267,678	385,077	156,131	115,986		11	7	41	59	24	18	41

Figure 4.1.1 Water Supply Coverage 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 represent major share of the service coverage in urban water supply in limited municipalities, such as Norala (42%) and Polomolok (57%).

Likewise, Level II system may take majority of the service coverage in the municipality of Tupi at present, but the figure indicates that only 29% of the rural population are covered. 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 11 municipalities in the province, 5 are above the average provincial service coverage of 59%. The highest coverage is seen in Norala at 75%, followed by Polomolok (67%), Surallah (65%), Koronadal (63%) and Tampakan (65%).

In contrast to the above, 5 municipalities are below the provincial average. The lowest is T'Boli at 30%, followed by Lake Sebu (50%). The low coverage of these municipalities is a result of the difficulty in water source development due to low availability of ground water sources.

4.2 Sanitation and Sewerage

4.2.1 General

The national strategy for sanitation and sewerage is demand-oriented. It aims to stimulate sustainable improvements in sanitation service coverage, public health, and environmental pollution abatement. To achieve this goal, the Government has made investment choices based on demand and the extent to which choices contribute to efficiency and cost-effectiveness.

This sub-sector focuses on household toilets, school toilets and public toilets (public markets, bus/jeepney terminals and parks/playgrounds). The latest data from the PHO on household and public toilets as well as from DECS on school toilets were gathered by municipality. In case of household toilets, data were consolidated by urban and rural area. These facilities were classified into sanitary and unsanitary in terms of structure rather than the surrounding conditions.

The Code on Sanitation of the Philippines provides the minimum standards for services dealing with public health. Specifically, Chapter XVII on Sewage Collection and Disposal, Excreta Disposal and Drainage defines alternatives for on-site sanitation and sewage collection and disposal. At present, the development of sewerage systems, even in the urban centers of the province is not given priority because of the huge investment cost it entails.

In the NEDA Board Resolution No. 12 (series of 1995), definitions of approved types of sanitary toilets were outlined (refer to 4.1.2, Data Report). There were 4 approved types of sanitary toilets including the sanitary pit privy where water is not used but provided with cover to minimize the emission of foul odor and also to keep away flies and rodents. These definitions were applied in this Master Plan.

4.2.2 Types of Facilities and Definition of Service Level Standard

As set forth in the above-mentioned Resolution, the types of household toilet facilities commonly used are categorized into: 1) sanitary toilets - approved types of toilet facilities include water-sealed pour flush or flush-type toilets either with receiving pit or septic tanks/vaults, and ventilated improved pit latrines and sanitary pit privy (dry type) considering its low construction cost especially in rural areas and in areas where water is scarce; and 2) unsanitary facilities - include the types of facilities used for receiving and disposing human waste which do not fall under the category of approved types of toilet facilities such as open pit privy and over-hung latrines (refer to Figure 4.2.1 DOH standard structure of a household toilet that meets the minimum requirements of a sanitary facility, Supporting Report).

In terms of service level, households are classified into: 1) served households - households with at least one (1) sanitary toilet; 2) underserved households - households with unsanitary toilets; and 3) unserved households - households without toilet. Coverage of adequately served households (with sanitary toilets) was estimated by urban and rural area of municipalities. The remaining households were considered as underserved or unserved. The service coverage was determined using the estimated number of households in 1997.

Service level standard for both elementary and secondary school toilets is translated in terms of: 1) served students - students who are adequately covered by the DECS standard ratio of one (1) unit per 40 students with access to sanitary toilets (number of sanitary toilet units multiplied by 40); and (2) underserved or unserved students - those with unsanitary and without toilet facilities, and students unserved (based on the standard ratio) even though they

have access to sanitary toilets. Service coverage of adequately served students was estimated both for public and private schools by municipality. Figure 4.2.2, Supporting Report shows a standard structure of a school toilet facility adopted by the DOH through the JICA-DPWH and DOH Rural Environmental Sanitation Project.

For public toilets, the service level is classified into: 1) served - utilities that have at least one (1) sanitary toilet, and 2) underserved or unserved - utilities that have unsanitary or without toilet facilities. Service coverage of public utilities was estimated as a percentage of sanitary facilities to the total number of utilities.

4.2.3 Sanitation Facilities and Service Coverage

(1) Household Toilets

The service coverage of sanitary toilets in the province is 67% of the total number of households. The rest is underserved or unserved. Of this, a high 45% is without toilet facilities (refer to 4.2.1, Supporting Report and 4.2.3, Sanitation Facilities and Service Coverage, Data Report).

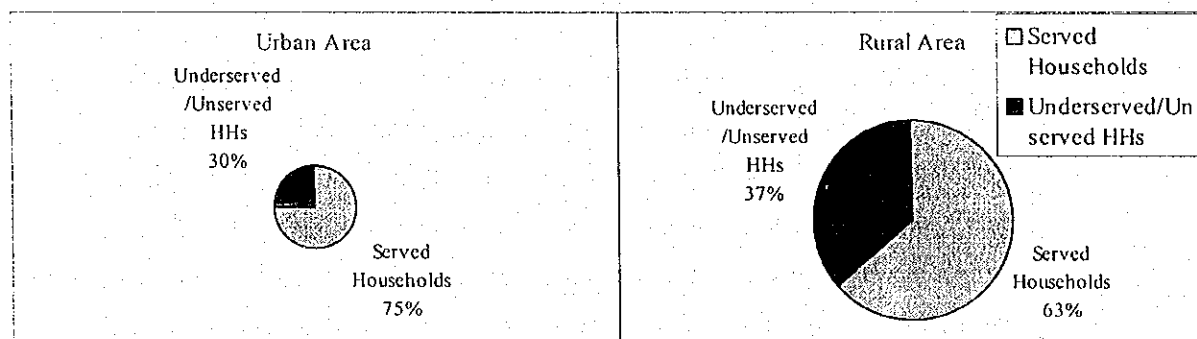
Municipalities that have higher or equal service coverage from the provincial average of 67% are Banga (82%), Norala (78%), Polomolok (77%), Santo Nino and Surallah (76%), Koronadal and Tupi (70%), and Tampakan and Tantangan (67%). On the other hand, only 2 municipalities registered a lower service coverage: Lake Sebu (37%) and T'Boli (40%). It was observed that in municipalities that have high water supply service coverage (Norala, Polomolok), high sanitation coverage occurs and correspondingly, in low water supply service coverage (Lake Sebu, T'Boli), low sanitation coverage also occurs. This can be attributed by the fact that the development of water supply almost always follows the upgrading of the household sanitation facilities because of access to water.

In urban areas, approximately 75% of the total households are served. A much lower served household of 63% exists in rural area. Table 4.2.1 shows the municipal breakdown in the number of urban and rural household toilets by category, and service coverage. Figure 4.2.1 reflects the provincial service coverage of household toilet facilities for urban and rural areas.

Table 4.2.1 Sanitation Facilities and Service Coverage of Household Toilets, Urban and Rural, 1997

Municipality	No. of Households, 1997			Household Toilets Facilities and Service Coverage											
	Urban	Rural	Total	Urban				Rural				Municipal Total			
				HHs Served by Sanitary Toilets		Underserved/Un-served HHs		HHs Served by Sanitary Toilets		Underserved/Un-served HHs		HHs Served by Sanitary Toilets		Underserved/Un-served HHs	
				Number	% of HHs	Number	% of HHs	Number	% of HHs	Number	% of HHs	Number	% of HHs	Number	% of HHs
Banga	2,596	10,927	13,523	2,476	95	120	5	8,562	78	2,365	22	11,038	82	2,485	18
Koronadal (Capital)	13,432	11,325	24,757	9,309	69	4,123	31	7,945	70	3,380	30	17,254	70	7,503	30
Lake Sebu	1,679	9,186	10,865	1,071	64	608	36	2,987	33	6,199	67	4,058	37	6,807	63
Norala	5,142	2,706	7,848	3,990	78	1,152	22	2,119	78	587	22	6,109	78	1,739	22
Polomolok	10,288	9,263	19,551	8,631	84	1,657	16	6,350	69	2,913	31	14,981	77	4,570	23
Santo Niño	2,826	3,392	6,218	2,172	77	654	23	2,542	75	850	25	4,714	76	1,504	24
Surallah	4,760	8,010	12,770	3,773	79	987	21	5,956	74	2,054	26	9,729	76	3,041	24
Tampakan	1,833	3,781	5,614	1,327	72	506	28	2,418	64	1,363	36	3,745	67	1,869	33
Tantangan	1,757	4,109	5,866	1,186	68	571	32	2,745	67	1,364	33	3,931	67	1,935	33
T'boli	2,757	10,381	13,138	1,258	46	1,499	54	3,938	38	6,443	62	5,196	40	7,942	60
Tupi	2,007	7,254	9,261	1,386	69	621	31	5,113	70	2,141	30	6,499	70	2,762	30
Provincial Total	49,077	80,334	129,411	36,579	75	12,498	25	50,675	63	29,659	37	87,254	67	42,157	33

Figure 4.2.1 Provincial Service Coverage of Household Toilet Facilities, 1997



Even if high percentages of sanitary toilets are revealed in urban areas, problems arise from the unsatisfactory disposal of the effluent from the septic tanks or the direct discharge of wastewater to the local drains. Generally, there is little concern about the unsatisfactory disposal of wastes once it is outside their dwelling units. Practically, almost all the households dispose their wastes in the manner that poses risks to public health. Sullage waste management is unheard of.

(2) School and Public Toilets

Toilet facilities in elementary and secondary schools for both public and private schools were investigated. The province has a total of 2,599 toilet units found in 405 schools. Sanitary toilets adequately serve 62% of the students. The rest, 38% is underserved or

unserved. Meanwhile, sanitary toilets adequately serve about 64% of the public school students. Table 4.2.2 provides the number and service coverage of school toilet facilities.

The number of sanitary school toilets is low to meet the service level standard of 40 students per sanitary facility. At present, the average ratio is 65 students per sanitary toilet, a little over the standard level. A number of school toilets are not being used due to lack of water supply, destroyed plumbing fixtures and water tank seepage. In some areas, this problem is compounded when access to the sanitary facility is limited to only the teachers and guests.

DECS is currently promoting the practice of having one toilet within the classroom. This practice should be thoroughly reviewed with respect to maintaining sanitary condition, provision of water faucet/supply in every toilet/unit, proper design of depository to avoid groundwater pollution, and provision of regular sludge collection and disposal.

There are 38 public toilets found in public markets, bus/jeepney terminals and parks/playgrounds in the province. About 97% of these public toilets are sanitary, while the remaining 3% or 1 public toilet is considered unsanitary. Table 4.2.3 shows the number and service coverage of public utilities.

Public toilets at markets, bus/jeepney terminals and parks/playgrounds, although culturally acceptable, are improperly used and maintained resulting to unsanitary conditions. In most cases, no specific arrangements are made for the operation and maintenance and for the collection of fees to cover such costs. Although considered as sanitary because of the structure, most of the facilities have unsanitary conditions due to inadequate/lack of water supply and destroyed appurtenances because of vandalism.

4.2.4 Sewerage Facilities

There are no existing sewerage facilities in the province. Most of the wastewater from the dwelling units with acceptable facilities finds its way to open drains and eventually to water-courses. These deficiencies are the major contributing factors to the poor condition of the water environment in some areas of the province.

Table 4.2.2 School Toilet Service Coverage by Municipality

Municipality	Number of School	Total No. of Student	Number of Toilet		Service Coverage				
			Sanitary	Unsanitary	Served	%	Unserved	%	
Banga	Public	31	13,129	289	8	11,560	88	1,569	12
	Private	7	2,264	14		560	25	1,704	75
	Total	38	15,393	303	8	12,120	79	3,273	21
Koronadal (Capital)	Public	45	28,941	529	10	21,160	73	7,781	27
	Private	8	4,177	64	2	2,560	61	1,617	39
	Total	53	33,118	593	12	23,720	72	9,398	28
Lake Sebu	Public	31	7,169	10		400	6	6,769	94
	Private	21	3,249	28	12	1,120	34	2,129	66
	Total	52	10,418	38	12	1,520	15	8,898	85
Norala	Public	23	10,171	155	4	6,200	61	3,971	39
	Private	4	888	14		560	63	328	37
	Total	27	11,059	169	4	6,760	61	4,299	39
Polomolok	Public	36	20,148	377	10	15,080	75	5,068	25
	Private	16	4,485	42	2	1,680	37	2,805	63
	Total	52	24,633	419	12	16,760	68	7,873	32
Santo Niño	Public	18	9,364	216	6	8,640	92	724	8
	Private	2	805	10		400	50	405	50
	Total	20	10,169	226	6	9,040	89	1,129	11
Surallah	Public	30	16,445	212	8	8,480	52	7,965	48
	Private	7	2,055	22	2	880	43	1,175	57
	Total	37	18,500	234	10	9,360	51	9,140	49
Tampakan	Public	17	7,737	113	2	4,520	58	3,217	42
	Private								
	Total	17	7,737	113	2	4,520	58	3,217	42
Tantangan	Public	18	6,487	134	4	5,360	83	1,127	17
	Private	2	435	6		240	55	195	45
	Total	20	6,922	140	4	5,600	81	1,322	19
T'Boli	Public	57	10,063	100	12	4,000	40	6,063	60
	Private								
	Total	57	10,063	100	12	4,000	40	6,063	60
Tupi	Public	26	13,037	162	4	6,480	50	6,557	50
	Private	6	1,290	16		640	50	650	50
	Total	32	14,327	178	4	7,120	50	7,207	50
Provincial Total	Public	332	142,691	2,297	68	91,880	64	50,811	36
	Private	73	19,648	216	18	8,640	44	11,008	56
	Total	405	162,339	2,513	86	100,520	62	61,819	38

Table 4.2.3 Public Toilet Facilities and Service Coverage in 1997

Municipality	Number of Sanitary Toilet			Number of Unsanitary Toilet			Total Number of PU Toilet	Served		Underserved	
	Public Market	Bus/Jeepney Terminal	Parks/ Playground	Public Market	Bus/Jeepney Terminal	Park/ Play-ground		Number of Sanitary Toilet	%	Number of Unsanitary Toilet	%
Banga	1	1	2				4	4	100		
Koronadal (Capital)	4	2	4				10	10	100		
Lake Sebu											
Norala		1		1			2	1	50	1	50
Polomolok	1	1	4				6	6	100		
Santo Niño	1	1	1				3	3	100		
Surallah	2	1	2				5	5	100		
Tampakan	1		1				2	2	100		
Tantangan	1						1	1	100		
T'Boli	1						1	1	100		
Tupi	2		2				4	4	100		
Provincial Total	14	7	16	1			38	37	97	1	3