JAPAN INTERNATIONAL COOPERATION AGENCY

DEPARTMENT OF THE INTERIOR AND LOCAL GOVERNMENT
THE REPUBLIC OF THE PHILIPPINES

# THE STUDY ON THE PROVINCIAL WATER SUPPLY, SEWERAGE AND SANITATION SECTOR PLAN IN THE REPUBLIC OF THE PHILIPPINES

## VOLUME I (2)

## MAIN REPORT

## PROVINCIAL WATER SUPPLY, SEWERAGE AND SANITATION SECTOR PLAN FOR THE PROVINCE OF

## AGUSAN DEL SUR

OCTOBER 1998

NIPPON JOGESUIDO SEKKEI CO., LTD.

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# MESSAGE

*I take this opportunity to highly acknowledge the efforts made by the Department of Interior and Local Government, particularly the Water Supply and Sanitation Program Management Office (WSS-PMO), headed by Program Manager Orville M. Roque, in securing assistance from the Japan International Cooperation Agency (JICA) for the formulation of the Provincial Water Supply, Sanitation and Sewerage Sector Plan (PW4SP) of the five priority provinces. In this undertaking, my province of Agusan del Sur is blessed to be chosen as the "Model Province".*

*I would also like to express my thanks to the JICA Consultants headed by Mr. Masatoshi Momose who extended their untiring technical assistance to our Provincial Sector Planning Team (PSPT) in formulating the plan for Agusan del Sur.*

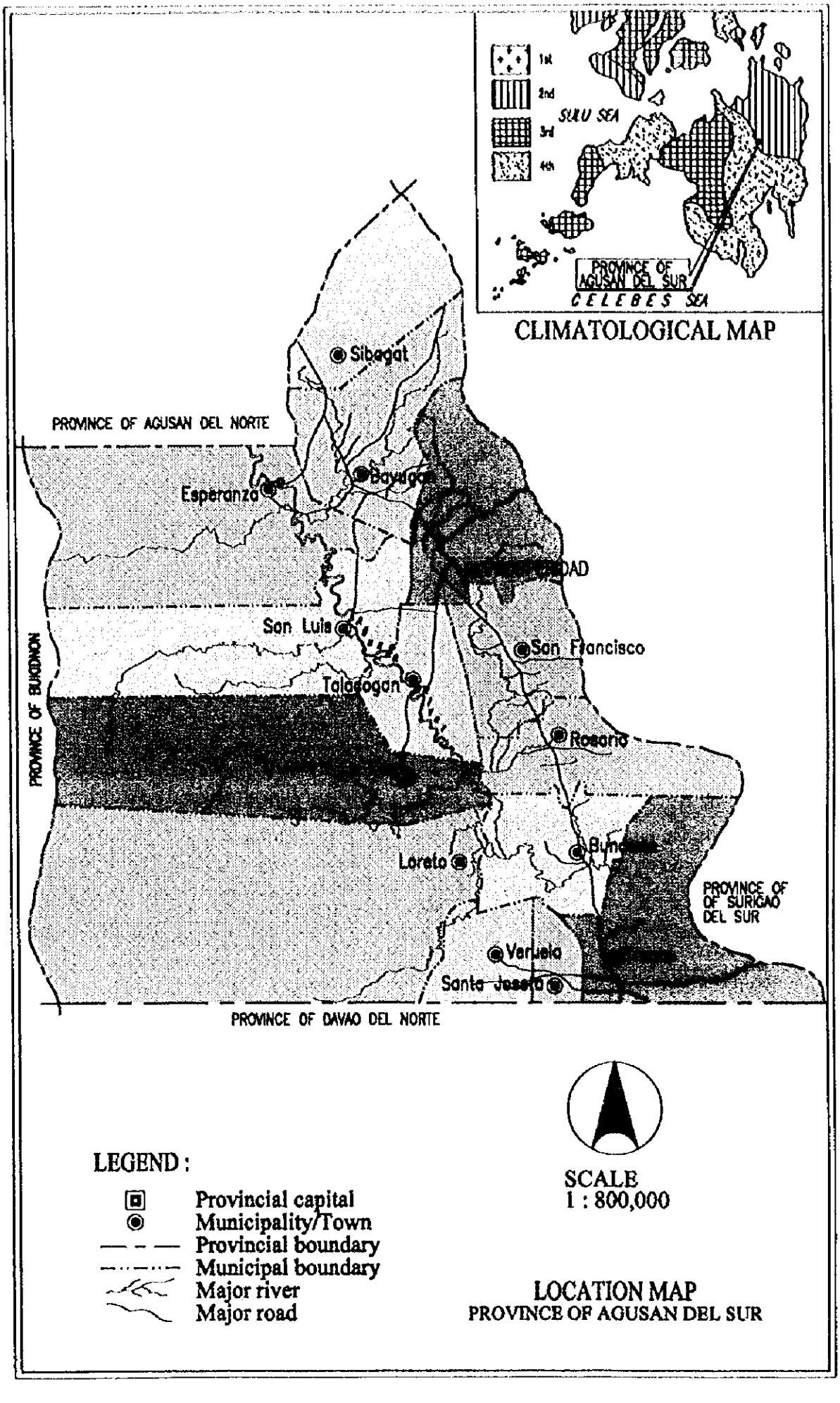
*This plan is toward the establishment of one of my six pillars of government. This is Social Development, with emphasis on health and sanitation, to be addressed through the provision of sufficient potable water and construction or installation of appropriate sanitation and sewerage facilities.*

*Indeed, Agusan del Sur has great potentials on water source development. However, the promise of a brighter tomorrow as envisioned by this Plan, shall come into reality only through the concerted efforts of the province's political leadership, the business sector, the non-government organization, and the people of the province in general and of course, with the full support of the national government and foreign funding institutions, like the JICA. It is therefore necessary that everyone rallies behind this plan that it may be put into motion swiftly and efficiently.*

Valentina G. Plaza

**VALENTINA G. PLAZA**

Provincial Governor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PROVINCE OF DAVAO DEL NORTE
PROVINCE OF BUKIDNON
LEGEND :
Provincial capital
Municipality/Town
Provincial boundary
Municipal boundary
Major river
Major road
SCALE
1 : 800,000
LOCATION MAP
PROVINCE OF AGUSAN DEL SUR
DISK NAME : AGUSAN DEL SUR(DISK1)
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# PROVINCIAL WATER SUPPLY, SEWERAGE AND SANITATION SECTOR PLAN

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## LIST OF ABBREVIATIONS

| | | |
|---|---|---|
| AC-PO | - | Area Coordinator-Project Officer |
| ADB | - | Asian Development Bank |
| AIDAB | - | Australian International Development Assistance Bureau |
| AIM | - | Asian Institute of Management |
| AIP | - | Annual Investment Plans |
| BC | - | Barangay Council |
| BDC | - | Barangay Development Council |
| BLGF | - | Bureau of Local Government Finance |
| BMGS | - | Bureau of Mines and Geo-Sciences (defunct), the now Mines and Geo-Sciences Bureau |
| BOD | - | Biochemical Oxygen Demand |
| BOD/Officers | - | Board of Director/Officers |
| BWP | - | Barangay Water Program |
| BWSA | - | Barangay Waterworks and Sanitation Association |
| CBO | - | Community-Based Organizations |
| CD | - | Community Development |
| CDA | - | Cooperative Development Authority |
| CDF | - | Countryside Development Fund |
| CDTS | - | Community Development and Training Specialist |
| CEP | - | Capacity Enhancement Program |
| CIDA | - | Canadian International Development Agency |
| CLGOO | - | City Local Government Operations Officer |
| CO-CD | - | Community Organization-Community Development |
| CPC | - | Country Program for Children |
| CPH | - | Census on Population and Housing |
| CPSO | - | Central Project Support Office |
| CSC | - | Civil Service Commission |
| D/D | - | Detailed Design |
| DA | - | Department of Agriculture |
| DAP | - | Development Academy of the Philippines |
| DBM | - | Department of Budget and Management |
| DECS | - | Department of Education, Culture and Sports |
| DENR | - | Department of Environment and Natural Resources |
| DEO | - | District Engineering Office |
| DF | - | Development Fund |
| DILG | - | Department of the Interior and Local Government |
| DOF | - | Department of Finance |
| DOH | - | Department of Health |
| DPWH | - | Department of Public Works and Highways |
| DSWD | - | Department of Social Welfare and Development |
| DTI | - | Department of Trade and Industry |
| EVS | - | Environmental Sanitation |
| F/S | - | Feasibility Study |
| FHSIS | - | Field Health Service Information System |
| FW4SP | - | First Water Supply, Sewerage and Sanitation Sector Project |
| GAD | - | Gender and Development |
| GFI | - | Government Financial Institution |
| GO | - | Government Office |
| GOP | - | Government of the Philippines |

| | | |
|---|---|---|
| GOJ | - | Goverment of Japan |
| HH | - | Household |
| IBRD | - | International Bank for Reconstruction and Development |
| IEC | - | Information, Education and Communication |
| IRA | - | Internal Revenue Allotment |
| IRR | - | Implementing Rules and Regulations |
| ITN | - | International Training Network |
| JICA | - | Japan International Cooperation Agency |
| LBP | - | Land Bank of the Philippines |
| LGC | - | Local Government Code |
| LGU | - | Local Government Unit |
| LWUA | - | Local Water Utilities Administration |
| MDC | - | Municipal Development Council |
| MDF | - | Municipal Development Fund |
| MEO | - | Municipal Engineer's Office |
| MHO | - | Municipal Health Office |
| MLGOO | - | Municipal Local Government Operations Officer |
| MOA | - | Memorandum of Agreement |
| MOOE | - | Maintenance Operating and Overhead Expenses |
| M/P | - | Master Plan |
| MPDO | - | Municipal Planning and Development Office |
| MS | - | Monitoring Specialist |
| MSL | - | Municipal Sector Liaison |
| MSLT | - | Municipal Sector Liaison Team |
| MTPDP | - | Medium-Term Philippine Development Plan |
| MWSS | - | Metropolitan Waterworks and Sewerage System |
| MWSTF | - | Municicipal Water and Sanitation Task Force |
| NAMRIA | - | National Mapping and Resource Information Authority |
| NCRFW | - | National Commission on the Role of Filipino Women |
| NDCC | - | National Disaster Coordinating Council |
| NEDA | - | National Economic and Development Authority |
| NGOs | - | Non-Governmental Organizations |
| NIA | - | National Irrigation Administration |
| NMP | - | National Master Plan |
| NMYC | - | National Manpower-Youth Council |
| NSDW | - | National Standard for Drinking Water |
| NSO | - | National Statistics Office |
| NSMP | - | National Sector Master Plan |
| NWRB | - | National Water Resources Board |
| O&M | - | Operation and Maintenance |
| ODA | - | Overseas Development Assistance |
| OECF | - | Overseas Economic Cooperation Fund |
| PA | - | Provincial Administrator |
| PAIASO | - | Provincial Accounting and Internal Audit Service Office |
| PBO | - | Provincila Budget Office |
| PD | - | Presidential Decree |
| PDC | - | Provincial Development Council |
| PEO | - | Provincial Engineer's Office |
| PHO | - | Provincial Health Office |
| PIO | - | Public Information Office |
| PGSO | - | Provincial General Services Office |
| PLGOO | - | Provincial Local Government Operations Officer |
| PMC | - | Project Monitoring Committee |
| PMO | - | Project Management Office |
| PMU | - | Provincial Monitoring Unit |

| | | |
|---|---|---|
| POPCOM | - | Population Commission |
| PoW | - | Program of Work |
| PPAC | - | Philippine Plan of Action for Children |
| PPDC | - | Provincial Planning and Development Coordinator |
| PPDO | - | Provincial Planning and Development Office |
| PSPT | - | Provincial Sector Planning Team |
| PST | - | Provincial Sector Team |
| PTA | - | Parent Teacher Association |
| PTO | - | Provincial Treasury Office |
| PW4SP | - | Provincial Water Supply, Sewerage and Sanitation Sector Plan |
| PWSC | - | Provincial Water Supply and Sanitation Coordinator |
| PWSO | - | Provincial Water and Sanitation Office |
| RA | - | Republic Act |
| RDC | - | Regional Development Council |
| RDCC | - | Regional Disaster Coordinating Council |
| RHO | - | Regional Health Of |
| RHUs | - | Rural Health Units |
| RPMC | - | Regional Project Monitoring Committee |
| RSI | - | Rural Sanitary Inspector |
| RWSA | - | Rural Waterworks and Sanitation Association |
| SB | - | Sanggunian Bayan |
| SP | - | Sanggunian Panlalawigan |
| SSI | - | Supervicing Sanitary Inspector |
| SWL | - | Static Water Level |
| TESDA | - | Technical Education and Skills Development Authority |
| TCP | - | Teacher-Child-Parent |
| UNDP | - | United Nations Development Programme |
| UNICEF | - | United Nations International Children's Emergency Fund |
| VIP | - | Ventilated Inproved Pit Latrine |
| WASAMS | - | Water and Sanitation Monitoring System |
| WATSAN | - | Water and Sanitation |
| WC | - | WATSAN Center |
| WD | - | Water District |
| WHO | - | World Health Organization |
| WID | - | Women in Development |
| WSSE | - | Water Supply and Sanitation Engineer |
| WSS-PMO | - | Water Supply and Sanitation-Project Management Office |

# EXECUTIVE SUMMARY

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# EXECUTIVE SUMMARY

## 1. Introduction

### Background and Objectives

The Provincial Water Supply, Sewerage and Sanitation Sector Plan (PW4SP) for the province of Agusan del Sur was prepared by the Provincial Sector Planning Team with technical assistance from Japan International Cooperation Agency (JICA). The PW4SP will be the basis for execution of sector development from proceeds of sector loan by foreign donors, LGU's budget including internal revenue allotment from the National Government and private sector investments.

The PW4SP covers a Long-Term Development Plan (2004-2010) and a Medium-Term Investment Plan (1999-2003) to achieve the provincial targets of water supply, sewerage and sanitation sector. The plan includes arrangements and logistics for implementation and measures to strengthen operational frameworks and institutional capabilities that embody community development and gender responsiveness. As an initial step towards capability building, the Study was designed with the end view of strengthening the LGUs capability in sector plan preparation through conduct of series of workshop and hands-on training.

### Planning Approach for Future Sector Development

The primary bases of the PW4SP are national sector policies and strategies, as well as major legislation and regulations relevant to the sector. The guidelines for setting the provincial sector targets are the three national level plans: the Philippine National Development Plan (1999-2024), the Water Supply, Sewerage and Sanitation Master Plan of the Philippines (1988-2000) and the Updated Medium Term Philippine Development Plan (1996-1998). The GOP recently approved the IRR providing detailed arrangements on the devolution of WATSAN responsibilities and resources. Parallel to this are the current sector policies and strategies, to wit: i) self-reliance and local community management of services; ii) an integrated approach to water, sanitation and hygiene education; iii) cost sharing arrangement; iv) cost recovery of capital and O&M; v) private sector participation; and vi) an integrated water resources strategy.

The PW4SP will help ensure that sector investments are optimized in consideration of fund and water source availability constraints as well as planning capacity. It is envisaged that the Plan

will be progressively updated as its implementation proceeds. Furthermore, future detailed studies and plans for project implementation shall be conducted in the context of the PW4SP.

A data management system was established as a tool to come up with the outputs commensurate to the objectives of the provincial plan and at the same time reflect the planning approach. It will provide a map of relative needs in the province allowing for adjustment and updating when further information becomes available. Different scenarios maybe worked out by planners using the program by changing key parameters based on planning assumptions and conditions.

Report Composition

Three (3) study reports were prepared as follows: i) Main Report (Volume I) which presents the results of the whole study consisting of 12 chapters; ii) Supporting Report (Volume II); and iii) Data Report (Volume III). Supporting materials including alternative studies and detailed calculations, and data/information constitute the last 2 reports.

## 2. Provincial Profile

Agusan del Sur is one of the 4 provinces in Caraga Region. The capital town of Prosperidad, is about 75km south of Butuan City. It is composed of 14 municipalities with 314 barangays broken down into 25 urban and 289 rural. The province is classified as 1st class. At the municipal level, only 1 municipality belongs to 5th class, the rest has higher classification. The population of the province was 514,736 in 1995 with an annual growth rate of 3.85% between 1990 to 1995.

Physical Features

There are 2 types of climate being experienced in the province: Type II in the eastern part and Type IV in the western part. The average annual rainfall was registered at 3,320mm. The topography of the province is generally characterized by the wide alluvial plains formed by Agusan River and its tributaries and high mountain ranges in the western side. Agusan River, the 3rd largest in the country, is the principal natural drainage system in the area. About 65% of the total land area of the province constitute forestland, while 23% are agricultural and built-up areas.

Socio-economic Aspects

Agriculture is the major economic activity in the province. The average annual family income in 1994 was ₱46,264 which was well below the national average of ₱83,161. Moreo-

ver, about 70% of the total number of families lived within and below the established poverty threshold income of ₱43,659 in Region X (the province was formerly a part of Region X).

All municipalities have electric supply service with 39% household coverage. Telecommunication is available to 42% of the municipalities. Land transportation is available by means of jeepneys and buses. There are only 44 banking institutions and 52 industrial/commercial and tourism-related establishments. With regard to social services, there are 457 schools, 12 hospitals, and 125 health units and barangay health stations.

Provincial population growth rates had been declining for the last 6 censal years. The 1997 population was estimated to provide the planning base for this provincial plan. Urban-rural classification of barangays was modified to reflect actual conditions of the area and using this classification, rural population accounts for 68%, while the remaining 32% is urban.

An indicator of health problem related to water supply and sanitation is the high incidence of water-related diseases. The reported cases in the province were typhoid, viral hepatitis, diarrhea, intestinal parasitism, skin disease, malaria, dengue fever and schistosomiasis.

Environmental problems related to wastewater discharge and unsanitary solid waste disposals are occurring in parts of the province. Major pollution sources in urban areas are domestic wastewater and dumped garbage. Only 13% of the total households in the province relied on the municipal refuse collection services.

## 3. Existing Facilities and Service Coverage

The service coverage of each sub-sector is estimated as percentages of served population/ households/utilities against the total number. In water supply, safe classification of Level I facilities is introduced and further categorized into public or private. Aside from household toilets, school toilets and public toilets are included in the sanitation components in view of public hygiene improvement. Preliminary discussions on solid waste management are also considered.

Water Supply

The province has 16 Level III systems in 9 municipalities, namely; Bayugan, Bunawan, Esperanza, Prosperidad, Rosario, San Francisco, Santa Josefa, Sibagat and Trento. A total of 12 systems utilize springs and the remaining 4 are deep wells. Most of these systems adopt the combined system with communal faucet (Level II service). Common issues encountered

are insufficient water pressure resulting to limited connections and rationing, inadequate capacity of distribution pipes due to inappropriate planning and designing, and no regular disinfection. Collection efficiency of water charges is quite high at bigger waterworks, but at small waterworks, even the analysis on charge collection is not practiced due to weak management practice.

Fifty seven (57) Level II systems, mostly using springs, are operating in all the municipalities covering 11 urban and 48 rural barangays. However, in some of these systems, expansion of distribution line and installation of additional 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. Only 60% of the Level II systems impose a flat rate water charge and the rest supplies water free of charge. This practice has negative implications on the financial savings to cope with future repair and depreciation. Cost recovery is a prerequisite in sector management.

The 4,022 operational Level I facilities in the province consist of shallow, deep and dug wells, springs, and rain water collectors. Of these facilities, 1,819 are considered as safe sources. Among the unsafe sources are 240 shallow wells and 1,872 open dug wells. Most of these unsafe sources are located in nearby potential pollution sources, hence, for new construction of shallow wells, proper site selection and appropriate construction method shall be applied together with periodic water quality monitoring. Percentage shares between public and private Level I facilities for rural water supplies are 65% and 35%, respectively. Nonetheless, non-functioning public Level I facilities account for 42% and 39% of the total number of deep and shallow wells, respectively. The share of developed springs in public facilities is 21%. The BWSA or beneficiaries are responsible on O&M, however it is almost negligible.

About 53% or 295,000 of the present population (555,000 comprising 32% in urban area and 68% in rural area) are adequately served. Under area classification, 67% of urban population and 47% of rural population have access to safe water sources/facilities. Of the served population, only 11% or 33,000 persons are served by Level III systems. About 71% or 210,000 persons depend on Level I facilities, while the rest relies on Level II systems.

Sanitation

The service coverage with sanitary toilets in the province is 61% or 63,000 of the total households, which is slightly lower than the national coverage of 66%. These toilets consist of 8% flush type and 92% pour-flush type. In municipalities that have higher water service

age, higher sanitation coverage occurs and adversely, in lower water supply coverage, lower sanitation coverage also occurs. Service coverage in urban area is 73%, while in rural area, the coverage is 56%. Although high percentage of sanitary toilets is disclosed 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. Sullage management is unheard of.

The province has a total of 1,591 toilets installed at 444 schools. Only 30% of the students is adequately served by sanitary toilets. The present average ratio of 133 students per sanitary toilet is well below the service level standard of 40 students per sanitary facility. Some of these facilities are not being used due to lack of water supply, destroyed plumbing fixtures and water tank seepage. There are 32 public utilities; public markets, bus/jeepney terminals, and parks or plazas. All these public utilities are served with sanitary toilets. However, the manner of usage and maintenance are improper rendering the facilities unsanitary.

## 4. Existing Sector Arrangements and Institutional Capacity

Institutional Framework

The Local Government Code has essentially re-defined the role, relationship and linkages of central, provincial, municipal and barangay institutions in the provision of social basic services, including water and sanitation. The new direction mandates the LGUs to play a larger role in planning and implementing water supply and sanitation projects, however, this has raised serious institutional capacity and resource reallocation issues.

Drastic changes took place among the DPWH, DILG, DOH and LGUs after the government's decentralization and issuance of the NEDA Board Resolution No.4 (1994). With the purpose of ensuring common interpretation of the Resolution, the Implementing Rules and Regulations (IRR) for the relevant sector was prepared. Those of implementing water supply projects, DPWH used to undertake, are now transferred to the LGUs. The functions of the then IPHO under the DOH have been devolved to the LGUs. Thus, DILG now undertakes the overall coordination function for the implementation of the WATSAN projects of LGUs. The Water Supply and Sanitation-Project Management Office (WSS-PMO), a unit within DILG, is primarily responsible for water and sanitation activities.

At the provincial and municipal levels, there are central agency field offices (DPWH and DILG) and LGU offices working on the sector. Water districts, RWSAs and BWSAs have been organized to deal with the actual delivery of services. Some LGUs implement and operate municipal or provincial water and sanitation systems. Project management offices

(PMOs at the central level), ad hoc inter-agency committees and task forces have been organized to address co-ordination issues.

The current major institutional issues are those of management of the transition process and of re-establishing the leadership for the sector. Major resource realignments and capacity building initiatives are needed. At the local level, LGUs' capacity for the sector project is insufficient and will require substantial input and support.

There is wide dissatisfaction among implementers themselves over the existing monitoring system. This leads to the problem of reliability of information coming from the field. There is a need to establish a system, which is perceived as having a direct link to performance, similar to project-based monitoring.

Community Development

The province of Agusan del Sur has had recent experience in implementing participatory community development in sector projects through the "Institution Building for Decentralized Implementation of Community Managed Water and Sanitation Project" in 1996-1997. The project paved the way for the creation of a WATSAN Center to plan and execute sector projects and put into a workable framework with the processes in organizing communities. However, the WATSAN Center is not yet fully operational, and there is an apparent lack of a permanent structure and of the identified major responsible players on CD in the LGUs. This situation creates a serious gap to the critical linkage and support of sector projects, from the provincial to the municipal and as far down as the barangay levels. Also, there is an urgent need to replicate the training programs given to some provincial and municipal planning officers until all the municipalities/barangays are covered.

Gender Consideration

The Philippine Government recognizes gender responsiveness as a catalyst of growth and development and adopts the "Philippine Plan for Gender Responsive Development (1995-2025). The Plan aims to pave the way for full participation of women and men in planning and implementation of technology for infrastructure projects, including the WATSAN sector. All government agencies were directed to revise and review regulations and procedures to remove any gender bias and to incorporate gender concepts in their projects. The DILG implements gender responsive WATSAN projects. Sector projects in the past, especially for rural water supply and sanitation that were funded by ADB, UNDP and World Bank had emphasized women's participation in the association or O&M activities.

In the province, the concept of gender and development is still relatively new and government policies have not yet trickled down the LGU officials and beneficiaries. As such, gender disaggregated information/data that will give a clearer perspective to guide sector planners in designing gender-sensitive projects are lacking, among others, type of participation, practices, and health. In this regard, a province-wide survey and group interviews were undertaken to assess gender sensitivity of barangay officials and constituents in the roles of both men and women as well as their modes of participation in sector projects.

The findings are enumerated below. In general, there is no gender bias in the manner by which WATSAN activities are being practiced:

- water fetching responsibility - There is no designated gender as to who is responsible for fetching water. The responsibility lies on whoever is available.
- operation and maintenance activities - Most community members could not determine who is responsible for the O&M of water supply facilities. But they expressed willingness to contribute for the O&M of future projects.
- barangay organizations - These are still male-dominated. Most chairpersons/heads are males, while women occupy the traditional roles, such as secretary or treasurer.
- consultation and project participation - Most of the men and women were not consulted during project planning and implementation.
- training - Both men and women have access to training and are interested to learn new skills. Health education training programs, however, are usually attended by females.

## 5. Past Financial Performance in Water Supply and Sanitation

Since the devolution of the water supply and sanitation project to the LGUs in 1992, the LGUs have been dependent on the Internal Revenue Allotment (IRA) for their financial requirements. For the period 1995-1997, IRA of the province represented about 90% of the total income. Other sources of income are profit from operation of its economic enterprises and rental income from the lease of equipment that was procured by the province through a loan from the LBP. On the other hand, actual expenditures for the same period were 88% of the total revenue, which were mainly broken down into personnel (42%), capital outlay (24.8%), and operation and maintenance expenses (21%).

The funds for the development are part of the capital outlay of the province. The amount of debt servicing capacity of the provincial government is computed to be ₱53.50 million for the year 1998, which represents the maximum loanable amount through the MDF.

Funds for the capital outlay is mainly derived from 20% DF of the IRA. During the period 1994-1996, the total funds available for the capital outlay represented only 50% of the planned capital outlay requirements. In 1997, the 20% DF was sufficient to finance the capital outlay requirements, while for 1998, the allocation is projected to cover only 51.5% of the total capital expenditures as previously experienced. Due to the low availability of funds, the relevant sector accounts between 2 to 5% of DF or about 1% of IRA.

Sector investments during the period 1995-1998 amounted to about ₱148.9 million, 75% of which was funded by the province. Of the investments, Level III amounted to about ₱114.4 million, while Level I and II water supply were much smaller with combined percentage of only 23%.

The sector projects in previous years were implemented by the DPWH and the DILG. In the recently completed UNDP-WATSAN project, which involved some physical development, cost-sharing arrangement was made among the following: UNDP (24%), DPWH (18%), municipal government (11%), province (41%) and BWSA/the barangay/DSWD contributed in kind.

With regard to the capital cost recovery for Level I water supply, it was free to the community in the past. For Level II systems, the capital cost is shouldered by the RWSAs through a loan or grant, while for Level III, the WDs or RWSAs bear the entire cost. Those for Level III are usually financed by the LWUA for a period of up to thirty (30) years with interests ranging from 8.5-12.5 %. For less capable WDs, soft loans without interest for the first 5 years of operations are available. Regarding sanitation sector, construction of the superstructure and the depository of household toilet is through self-help.

In 1998, a cost-sharing scheme was authorized, which prescribed that for any central government grants that are provided for the development of Level I water supply and sanitation facilities to the limited municipalities, the LGUs and beneficiaries concerned shall share the capital cost required. No subsidies from the central government will be provided for the construction of Level II and Level III water supply systems.

The O&M cost for Level I and II water supply systems is the responsibility of the users. It is mandatory that the community shall organize themselves into an association, which handles collection of water charges as well as O&M of the facility. However, most of the RWSAs and BWSAs reportedly face difficulty to manage the systems, since beneficiaries do not recognize the cost requirements. The monthly fees for Level I in the active association range

from ₱10 to ₱20 /household /month, while those for Level II are ₱55 to ₱60. For Level III systems, the O&M cost is basically covered by the user's fees. LWUA's policy is to make WDs financially viable, self-sufficient and be able to repay their loans obtained to improve water supply services. Three (3) WDs and 11 waterworks are currently operational in the province, 2 WDs of which have current loan arrears with LWUA.

The percentage of water fee to median monthly household income is about 3% for Level III, 1.5% for Level II and less than 1% for Level I. Thus, the current water rates in all service levels are within an affordable range. On the other hand, construction cost of household toilet seems to be expensive comparing with the family income.

## 6. Water Source Development

The study on water source development covers all the municipalities of the province. It gives an emphasis on groundwater sources rather than surface water considering its economic advantages and current practices in potable water use.

The geologic rock units observed in the province are classified into three (3) main groups based on the ages of the rock formations: Miocene and Older Rocks, Pliocene to Pleistocene Rocks, and Recent Deposits. The Miocene and Older rock units cover about 53% of the total provincial area and are largely distributed on the western, northern, and eastern sides of the province. Rocks classified as Pliocene to Pleistocene, which underlie about 34% of the total land area of Agusan del Sur, are widely distributed on the western and eastern sides of both banks of the Agusan River that flows through the province. The Recent Deposits formed by the Agusan River and its tributaries make up about 13% of the province and are widespread in the southern part of the province.

For planning purposes in the development of groundwater sources, the provincial area is divided into shallow well, deep well and difficult areas. Deep well area covers about 50% of Agusan del Sur, while difficult area falls on the remaining area. The groundwater in most areas of the province has water quality problems both in shallow and deep aquifers. Water has high iron content and often contains methane gas, and in some places, even salt. To remove the iron in the water, DPWH-DEO installed iron removal facilities at some sites, some of which are being used at present. Difficult areas are mostly occupied by the mountainous areas. Springs in these areas are the most possible water sources for development.

Based on the inventory of water sources prepared through the study, the province has 266 developed springs currently serving the province, which emerge from high mountain areas in northern and eastern parts, and from low hilly areas in central part. A total of 65 untapped springs are reported in the municipalities of Sibagat, Bayugan, Prosperidad, San Francisco, Talacogon, Rosario, Trento, Esperanza, San Luis and Veruela.

According to existing well inventory, the depth of potential aquifers occurs between 5 to 115 mbgl in the Recent alluvium and the Pliocene-Pleistocene rocks. The development of deep wells is more advantageous than shallow wells considering the safe quality and invariable yield of deeper aquifers.

For the preparation of the medium-term development plan in terms of water source development, utilization of spring sources was given first priority, especially with reference to the development of Level III systems. Groundwater source availability as second priority was presented by municipality with standard specifications of wells, including parameters such as well depth, static water level and specific capacity.

For the furtherance to design the concrete specifications of the planned wells, recommendations are made to conduct detailed groundwater investigations entailing electric resistivity survey and the construction of test wells, prior to the detailed design or pre-construction stages. The municipalities that fall on the requirements are San Francisco, Rosario and San Luis. While, only electric resistivity survey may be carried out in the areas of Loreto and La Paz.

Untapped springs shall also be surveyed to confirm the development possibility in the detailed groundwater investigation in the following items: i) locations and type of spring sources; ii) fluctuation of discharge rates through the year; iii) distance from spring sources and proposed served areas; and iv) elevation differences between the two points.

## 7. Future Requirements in Water Supply and Sanitation Improvement

Physical Targets and Service Coverage

Phased requirements for the sector development in the province are assessed to meet the provincial targets established as percentages of beneficiaries or utilities to be served by sub-sector. Targets of service coverage for water supply in Phase I development are established in consideration of about 10% increase from base year both in urban and rural area as shown in Table 7.1. Sanitation sector target is applied in order to attain sufficiency and balanced distribution of the facilities in urban and rural area as embodied in the PNDP. Sewerage target is set for only part

of urban centers in the long-term development, while solid waste management considered the medium-term household requirements. Logistic support is considered as a minimum requirement of LGUs for the implementation of PW4SP. The types and number of well drilling/rehabilitation equipment and supporting vehicle for Level I facilities are identified as reference information. Also, minimum requirements for setting up a provincial laboratory to support drinking water quality surveillance and monitoring activities are described.

**Table 7.1 Present Service Coverage and Sector Targets**

| *Sub-Sector* | *Area/Type* | *Base Year Service Coverage* | *Provincial Sector Targets* | |
|---|---|---|---|---|
| | | | *Phase I* | *Phase II* |
| *Water Supply* | *Urban Area* | *67* | *80* | *95* |
| | *Rural Area* | *47* | *60* | *90* |
| *Sanitation* | *Urban HH Toilet* | *73* | *80* | *93* |
| | *Rural HH Toilet* | *64* | *75* | *85* |
| | *School Toilet* | *30* | *60* | *90* |
| | *Public Toilet* | *100* | *100* | *100* |
| *Sewerage* | *Urban Area* | *0* | *Not applicable* | *50* |
| *Solid Waste* | *Urban Area* | *40* | *60* | *Not applicable* |

Frame values are projected by municipality for respective sub-sectors; future population by urban and rural area, the number of students in public schools and the number of public utilities.

Required Facilities to Meet Target Services

Types of required facilities and their implementation criteria are determined according to service level standards as adopted by the NSMP and NEDA Board Resolutions. Urban population is planned to be served by Level III systems, however, existing Level I and II facilities are to be used during Phase I period. Level I facilities are adopted for rural water supply with limited application of Level II system where houses are clustered and suitable untapped springs are confirmed. However, it does not exclude from being implemented Level I and II facilities in urban area as individual cases in the future as well as Level III systems in rural area. Rehabilitation work is planned only for new deep wells (Level I) to be constructed under PW4SP, considering the difficulty of rehabilitation for existing wells constructed by means of traditional methods. Facilities for the provincial laboratory are determined, taking into account the existing facilities and the exigency to examine the water samples at the right time.

In sanitation sector, pour flush and/or flush type household toilets are planned, while VIP type household toilet and sanitary pit latrine are considered in rural area as an intermediate measure. Sewerage program is planned in Phase II for limited urban area. The study on

waste considered only the number of required trucks for the year 2000. Additional service coverage of the sector by phase is shown in Table 7.2.

**Table 7.2 Additional Service Coverage by Phase**

| *Sub-Sector* | *Area/Type* | *Unit* | *Additional Service Coverage* | |
|---|---|---|---|---|
| | | | *Phase I* | *Phase II* |
| *Water Supply* | *Urban Area* | *Persons* | *55,900* | *177,058* |
| | *Rural Area* | *Persons* | *127,491* | *266,444* |
| *Sanitation* | *Urban HH Toilet* | *No. of Households* | *10,536* | *29,957* |
| | *Rural HH Toilet* | *No. of Households* | *27,169* | *59,761* |
| | *School Toilet* | *No. of Students* | *87,000* | *85,050* |
| | *Public Toilet* | *No. of Utilities* | *29* | *10* |
| *Sewerage* | *Urban Area* | *Persons* | *Not applicable* | *121,760* |
| *Solid Waste* | *Urban Area* | *No. of Households* | *11,969* | *Not applicable* |

The necessary water supply facilities for Phase I include 15 deep wells/springs for 10,000 house connections in urban area, and 65 Level II systems with spring sources and 827 Level I wells/springs for rural area. For Phase II, 30 deep wells/springs for additional 44,000 connections and 4,400 Level I wells/springs are required for urban and rural water supplies, respectively. It is assumed that 80% of Level I facilities will be implemented by the LGUs and 20% of these public facilities will be allocated to spring development. Rehabilitation requirements are assumed to be 10% of the total number of deep wells to be constructed under PW4SP. A new laboratory building will be constructed to augment the existing provincial laboratory. Two (2) sets of water quality test instruments/equipment will be necessary; one (1) set to upgrade the existing laboratory, and the other set, for the new laboratory.

For urban water supply, 1 Level III system is, in principle, considered for urban area of every municipality. In the municipalities with existing Level III system/s, the expansion of the existing system/s was first considered. In case there are no Level III system, a new system was recommended. Existing plan/s on the development of Level III/WD are also taken into account to determine respective systems of the municipalities.

Currently, 7 out of fourteen 14 municipalities, namely; Bayugan, La Paz, Loreto, San Luis, Talacogon, Trento and Venuela have no Level III system in the respective urban areas. At present, there is no particular plan/on-going project for the development of Level III/WD.

Possibility and necessity to merge service area of some neighboring municipalities to one urban water supply system were also studied from the view points of water source constraints,

economical development, etc. Since the municipalities taken up in this PW4SP are scattered throughout the province, an individual system was recommended by municipality.

Preference is made to utilize spring sources owing to less O&M activities and cost compared to deep well with electric motor pump. Application of deep wells for water source is regarded as the second priority in principle. Surface water is, on the other hand, not adopted at this moment, in view of large capital investment needs and complexity of surface water treatment.

Moreover, Phase I sanitation will require 11,000 household toilets, 235 public school toilets and 29 public toilets for urban area. In rural area, 27,000 household toilets and 503 public school toilets are necessary. Solid waste disposal will need 10 refuse collection trucks. For Phase II, urban area will require 30,000 household toilets, 453 public school toilets and 10 public toilets. In rural area a total of 60,000 household toilets and 709 public school toilets are necessary.

## 8. Sector Management for Medium-Development Plan

Institutional Framework

To effectively manage the water and sanitation sector, the provincial and municipal governments will have to make some adjustments in their current policies and structures. One glaring basic institutional need at the local level is a common vision and mission statement for the sector. A critical mass of people with resources, who shares in the vision must be identified and harnessed for sector management. Local planners need to focus on the long-term requirements.

The following policy and strategy statements will be adopted by the Provincial Government:

- Facility management with the priority on sustainability.
- Project selection and prioritization on commitment of the beneficiaries, willingness to pay, the current water and sanitation and health conditions, potential for growth and costs
- Appropriate technology to local conditions and resources. Economical facilities, not necessarily insisting on low-cost construction.
- An integrated approach to the provision of potable water supply, sanitation and hygiene education.
- Equitable provision of water supply and sanitation between rural and urban areas; between wealthy and depressed areas.
- Self cost recovery and rational cost sharing (Subsidy)

- Private sector participation
- Seeking potential sources of local and external funds (loans and grants) to finance the capital requirements of the sector.
- Broader concerns for the environmental protection and management in sector development
- Provision of water supply and sanitation services under emergency conditions

In coordination with appropriate national and local agencies, the LGU shall endeavor to set up a coordinated regulatory framework considering, among others, the following: water allocation and water rights policies (conflict resolution); water rate review; association registration; water quality, etc.

It is assumed that, in the medium-term, national and external funds will, although diminishing, continue to be channeled through local offices of central agencies.

In the medium-term, a full-time Provincial Water Supply and Sanitation Office (PWSO) shall be set up possibly under the PPDO. The LGU should ensure that adequate logistics and incentives are provided for the Office. In the long term, the Office may be promoted to the same level as PPDO. The PWSO will continue to implement, assist and monitor all water supply and sanitation services in cooperation with the municipalities. The DILG-PMO shall continue to provide technical and managerial assistance in the formative years of the PWSO.

For institutional arrangement, the formation of BWSA for Level I and RWSA for Level II and III is a prerequisite. The community, especially the women sector, shall be involved in all phases of project management (planning, construction and O&M) and in undertaking health and hygiene education program. To provide the members with the necessary skills, training programs are to be implemented by concerned national agencies and by the provincial and municipal governments.

Community Development

To ensure that the full participation of the beneficiary community in sustaining sector projects is realized, it is recommended that LGUs shall provide the needed human, financial and other material resources for community development work to take-off. To institute the linkage among all the actors in sector development, a CD Unit should be established within the WATSAN Center and a permanent CD Specialist be appointed to take charge of promoting, developing and coordinating CD and IEC programs of the province. The Unit should look into how it can harness the participation of the private sector and train project beneficiaries.

It is also recommended that a CD Specialist be assigned to the prospective Municipal WATSAN Liaison Task Force (some municipalities have project-based TF) to coordinate and implement all CD/CO and IEC work at the municipal level. At the barangay level, it is recommended that each Barangay Development Council (BDC) shall establish a WATSAN Committee that will coordinate all sector projects in the barangay as well as designate one person who can be trained on CD work.

The power of information, education and communication as a necessary foundation activity for CD has not been fully realized and maximized. It is, therefore, recommended that a comprehensive IEC program be conceptualized on a long term basis and implemented on the national, provincial and municipal levels. This will help promote a better awareness and understanding of the responsibilities of sector planners as well as the benefits that will be derived by the project users.

The DILG shall retain central role as the national government agency that will promote and develop the capacities of the LGUs in participatory CD approaches and IEC programs for the sector. It shall also encourage and institutionalize the participation of national NGOs, with local networks or offices that specialize in community management program. Another national agency, the LWUA, shall continue to promote community participation in the formation of LGU-WS into water districts and to provide regular CD assistance.

On the manner of participation in sector development, it is important for the LGUs to make the decision together with the users on the appropriate service level (Level I/II/III water supply) it can afford to implement. To achieve this, the LGU must encourage active community participation and involvement through the following: i) sharing relevant information on the project with the users; ii) consulting with users on all phases of project development; iii) giving ample room to the beneficiaries to make project-related decisions; and iv) providing opportunities to the community to initiate actions for their own benefit.

On the other hand, users shall participate in the following (some communities in the province have been tried): i) the participation through a firm involvement and commitment of the community at different implementation stages; expressed participation of all parties through MOAs is a requisite; ii) the sharing of capital costs between project proponent and the users entailing the provision of land, right-of-way, free labor and/or materials by community members; and iii) O&M practices as required by service level.

For Levels I and II water supply, the WATSAN Center/Unit should continue to utilize, with some modifications, the "Community Development Process" developed by the UNDP-assisted project.

Gender Consideration

The sustainability of WATSAN services depends on responding to the demands of men and women in the community. The LGUs must recognize the requirements and give vital emphasis on the role of gender sensitive participation, especially with reference to maintenance and financing of WATSAN systems. They should be given equal voice and opportunities in serving the community as well as in the planning, implementation and monitoring and evaluation of sector projects. To ensure the gender responsiveness of WATSAN projects, the LGUs should be trained through a Trainer's Training Program on Gender Responsive Planning as envisioned by the Philippine Plan for Gender Responsive Development (1995-2025).

## 9. Cost Estimates for Future Sector Development

The investment cost includes direct cost for construction/rehabilitation of required facilities, procurement of vehicle/equipment, construction/upgrading of laboratory, sector management, physical and price contingencies, and value-added tax. The recurrent cost is incurred for operation and maintenance of facilities. Unit construction cost per person/household/ facility was first prepared under contract-out basis in 1997 price level. In this regard, the cost for procurement and distribution of toilet bowl for pour-flush toilets is only counted for household toilets. Investment cost required by phase for the province is summarized in Table 9.1. The investment cost for Phase I is estimated at about ₱1,015 million. A total of ₱570 million is required as the construction/rehabilitation cost in Phase I, of which urban water supply and rural water supply share 34% and 35%, respectively. While, the remaining 31% is required for urban and rural sanitation.

Required equipment and vehicle for construction/rehabilitation of Level I facilities and solid waste management are roughly estimated: 10 sets/units each of well drilling equipment and service truck with crane; 2 sets/units each of well rehabilitation equipment and support vehicle; and 10 units of refuse collection truck. The total procurement cost is estimated at approximately ₱290 million. Out of the requirements, however, only one set/unit each of well rehabilitation equipment, support vehicle and maintenance tools/water quality testing kits is incorporated in the medium-term investment plan due to budgetary constraints and technical capability of LGUs at present.

Table 9.1 Investment Cost Required by Phase

Unit: 1,000 Pesos

| Item | Component | Phase I | Phase II |
|---|---|---|---|
| Construction/ Rehabilitation | Water Supply | 396,885 | 1,088,996 |
| | Urban Area | 195,386 | 561,804 |
| | Rural Area | 201,499 | 527,192 |
| | Sanitation | 172,905 | 916,035 |
| | Household Toilet | 1,043 | 9,658 |
| | School Toilet | 161,701 | 255,257 |
| | Public Toilet | 9,977 | 3,440 |
| | Disinfection of Well | 184 | 350 |
| | Urban Sewerage | - | 647,330 |
| | Sub-Total | 569,790 | 2,005,031 |
| Procurement of Vehicle/ Equipment/Maintenance Tools | Well Drilling Rig & Service Truck | 0 | 26,782 |
| | Support Vehicle | 590 | 0 |
| | Well Rehabilitation Equipment | 280 | 0 |
| | Maintenance Tools | 140 | 0 |
| | Water Quality Testing Kits | 15 | 0 |
| | Sub-Total | 1,025 | 26,782 |
| WaterQuality Laboratory | | 2,032 | 0 |
| Sector Management | Engineering Studies | 73,935 | 175,412 |
| | Community Development and Training | 50,643 | 121,439 |
| | Sub-Total | 124,578 | 296,851 |
| Total Direct Cost | | 697,425 | 2,328,664 |
| Contingencies | Physical Contingency | 69,775 | 232,903 |
| | Price Contingency | 183,652 | N.A |
| | Value-Added Tax (VAT) | 64,707 | N.A |
| Total Investment Cost | | 1,015,899 | 2,561,936 |
| Total Investment Cost (excluding Price Contingency) | | 832,227 | 2,561,936 |

Likewise, annual recurrent cost in 1997 price level is estimated at ₱15 to ₱31 million/year during Phase I period.

## 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 ₱178.1 million (provincial IRA is 42.5% of the total IRA). In the overall IRA allocation to the sub-sectors, rural water supply has the largest allotment of 35.2%, followed by urban water supply (32.3%). While, the share of rural sanitation is 20%, which is higher than that of urban sanitation.

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 21.4% of the requirements as a provincial average. Hence, there is a big shortfall of ₱654.1 million in funding. It will become ₱809.6 million in consideration of price escalation with annual rate of 7%. In the municipal achievement percentage in finance, Loreto (39.3%) is the highest among municipalities, followed by San Luis (34%). Others are in the range between 10% and 30% to the requirements.

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.

In the synthetic investment need ranking of municipalities covering four sub-sectors, the top ranking municipalities are La Paz and Veruela, while Rosario 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. There is only one eligible municipality (Santa Josefa) in terms of 5th and 6th class municipality for Level I water supply in the province, while there are 5 municipalities to meet the condition in sanitation sub-sector. The required services will cover technical and institu-

tional/community development aspects of the project. The overall project cost was estimated at ₱81.3 million in 1997 year 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 beneficiaries (3%). As a result of cost comparison between the estimated project cost to be shared by the LGUs (₱38.2 million in the current price level) and available IRA of LGUs (₱19.8 million), it was identified that ₱18.4 million are in short achieving only 52% of the proposed requirements. As an option to solve this financial shortage, the provincial government may re-arrange IRA allocation; about 80% of replenishment from the remaining provincial IRA allotted to rural water supply sub-sector after reducing allotted amount to the eligible municipality. Another option suggested is to utilize all provincial sector IRA (₱49.7million) without limiting to the available IRA for rural water supply subsector, as the possible financial source, to supplement municipal IRA allotted to the eligible municipality. In this case about 55% of the provincial sector IRA is required.

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. 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 80% of available IRA. GOP will possibly finance up to ₱61.0 million or 75% of the total project cost in the portion of loan. Out of GOP finance through the loan, 46.5% of the total project cost shall be granted to the LGUs, aside from GOP counterpart fund. The remaining 28.5% of the total project cost shall be utilized for financing the LGUs to secure their budgetary capacity through MDF.

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 (₱77/HH/month in 2003). For Level II water supply systems, full cost recovery is required for all capital and recurrent cost (₱67/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 (₱231/HH/month in 2003). Based on the experience that water fee must not exceed 5% of income (average monthly water consumption of 15 $m^3$), only households with median monthly

income will be able to pay the amount (low income households can afford to pay for less than 10 $m^3$/HH/month).

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 for Medium-Term Development Plan

The sector monitoring system must support a well-defined and accepted sector development process-model. It includes information collection, tracing the flow of raw data from the field to the central level information analysis and data feedback. With the sector monitoring, planners should be able to take fresh objective view of the way it implements current strategies. A sector monitoring system should reinforce the linkage between water, sanitation and health; be reliable and involve the beneficiaries; be accepted by all sectors; be practical; and 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 purpose 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 up 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 from national and local governments. At the provincial level, monitoring will include projects 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 consisting of NGOs and representatives from 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 updated sector investment program.

# Chapter 1
# INTRODUCTION

# 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 of 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 area fall on the category of underserved/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. It implies that around 60% of the total population enjoy water supply service at the present time.

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 in some cases 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

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

Development in the sector had previously to a high degree been directed 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 frameworks 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 DataBase: 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 them was Agusan del Sur 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 Agusan del Sur

### 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 consisting 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). Preparation of the plan was also 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), and other national line agencies as well as Non-Government Organizations (NGOs) active in the sector. The PSPT was assisted in the preparation of the plan 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 and 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, and a planning tool that would rely heavily on local participation and gender responsiveness and is flexible enough to improve planning and implementation.

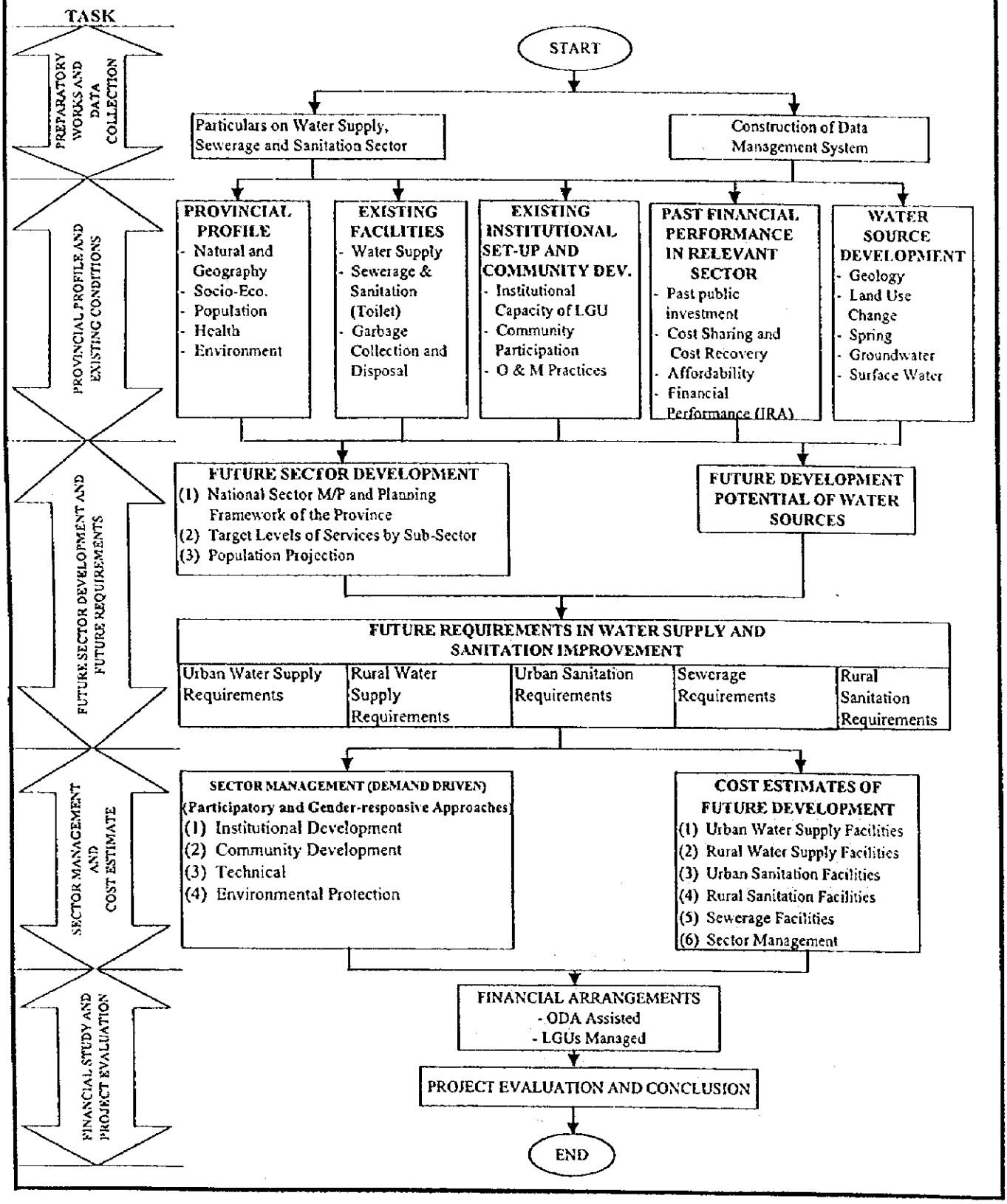
Chapter 3 provides provincial profile with reference to current sector conditions: natural conditions and geographical features, socio-economic conditions, demographic trends, health status and environmental conditions as the planning environment.

Chapter 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, which 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.

Chapter 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 frameworks, 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 financial arrangements based on identified sources of fund. The financial shortfall is shown to meet provincial targets established for the Medium-Term Investment Plan. Manner of national budget (IRA) allocation to municipalities by sub-sector is illustrated and trial calculation was made for the target year in consideration of the new cost sharing policy among central government, LGUs and beneficiaries. Investment need ranking of municipalities as a factor of financial allotment is considered based on synthetic evaluation of sector components. The study of the financial viability on Level I water supply and sanitation projects was highlighted with reference to ODA assisted projects for eligible municipalities. Cost recovery by both beneficiaries and LGUs is finally 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 Acknowledgments

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 and/or 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 Acknowledgments, Data Report). The Japanese Government through JICA has generously provided technical assistance to the PSPT throughout the course of the planning work.

Chapter 2

# PLANNING APPROACH FOR FUTURE SECTOR DEVELOPMENT

# 2. PLANNING APPROACH FOR FUTURE SECTOR DEVELOPMENT

## 2.1 General

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

## 2.2 Planning Framework

The GOP, through the Water Supply, Sewerage and Sanitation Master Plan of the Philippines: 1988-2000, the Philippine National Development Plan: 1999-2025, and the Updated Medium Term Philippine Development Plan (MTPDP): 1996-1998, has manifested its commitment to the development of safe and dependable water supply and sanitation facilities. Policies and investment programs are compiled in these documents which lay out the basis of a strategy to accelerate sector development through the equitable mobilization of resources between urban and rural areas and institutional reforms at all government levels. Guiding principles set in the aforementioned national development plans are sustained decentralization; private sector-led development; environmental protection; people participation; full cost recovery; social equity; accelerated information technology applications and macroeconomic 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% | 93% |
| Rural Water Supply | 70% [4] | 79% | 95% |
| Sanitation | 66% [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 the ownership, development, utilization, exploitation and conservation of water resources. The Code established the basic principles and framework on the appropriation, control and conservation of water resources to achieve their optimum economic efficiency and rational development. In addition, PD 424 declares that the National Water Resources Board (NWRB) shall be responsible for coordinating and integrating all activities related to water resources. PD 1067 also pertains to the grant of water right privileges (water permits) to appropriate and use water. Water permit applications are reviewed and granted by the NWRB.

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

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

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

(6) The **Sanitation Code (1975)** was promulgated to deal with water supply, excreta disposal, sewerage and drainage issues. The Sanitation Code and the **National Building Code (1977)** require that new buildings be connected to a water-borne sewerage system. Where such systems do not exist, sewage must be disposed of onto Imhoff tanks or septic tanks with a subsurface absorption field. In addition, the facilities are required to conform to the **1959 National Plumbing Code.**

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

## 2.6 Planning Principles and Data Management

### 2.6.1 Planning Principles

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

(1) The plan is conceived to be flexible, consistent and as simple as possible to respond to the changing socio-economic conditions of the province, accumulated technical information and updated policy of local governments allowing for periodic upgrading.

(2) The plan is arranged to allow planners to run different scenarios for project implementation, especially with reference to the interface between the provincial plan and project proposals from municipalities (bottom-up).

(3) The plan is conceived to be adaptable to the local planning capacity and to ensure its full "ownership" by LGUs.

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

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

(2) The plan, as a comprehensive tool, considers the consistency to derive the next level of planning.

(3) The plan entails monitoring and evaluation of actual implementation progress, as investments are undertaken.

The guideline for preparation of the PW4SP is included in the Planning Approach for Future Sector Development, Data Report. It identifies all tables and figures with respective forms by main, supporting and data 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 full and continuous involvement of local officials is indispensable to establish a reliable database.

(1) Computer-based system

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

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

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

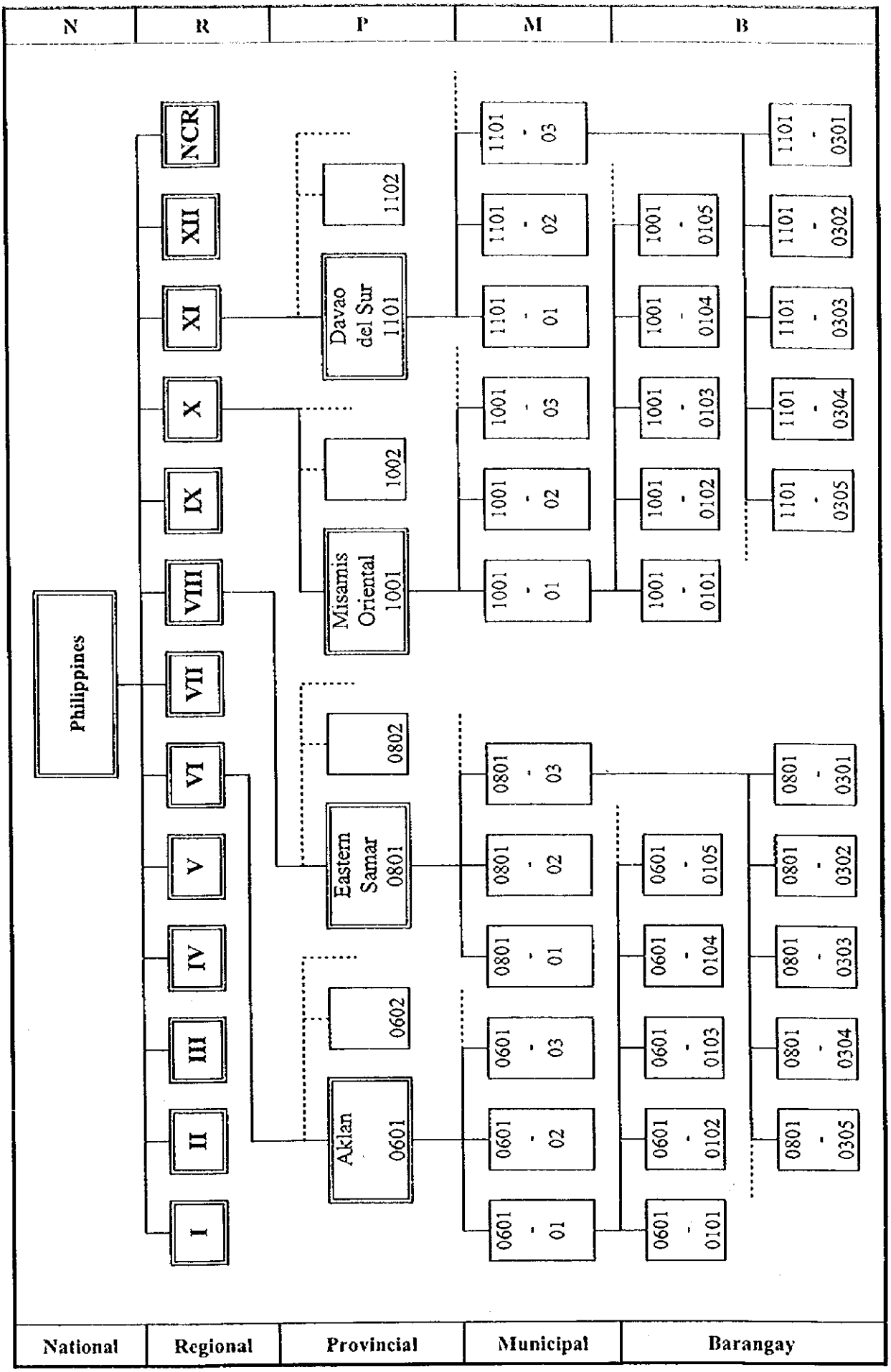



*Figure 2.6.1 Institutional Hierarchical System by the NEDA Coding*

## Table 2.6.2 Structure of Questionnaire

| Grouping of Questionnaire | Questionnaire to be addressed | | | | | | |
|---|---|---|---|---|---|---|---|
| | National | Regional | Provincial | Municipal | Barangay | System | Independent |
| | N | R | P | M | B | S | 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 | | | |
| | | | P1.3.2 | 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 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 3

# PROVINCIAL PROFILE

# 3. PROVINCIAL PROFILE

## 3.1 General

Agusan del Sur is one of the 4 provinces comprising Caraga Region (Region 13) in Mindanao. Prosperidad, the provincial capital is about 75km south of Butuan City, the regional center. Agusan del Norte bounds the province on the north, on the east by Surigao del Sur, on the west by Misamis Oriental and Bukidnon, and on the south by Davao Province as shown in the Location Map.

The landlocked province is classified as 1st class and has a total land area of 9,167km$^2$ that is 3.06% of the Philippine total land area of about 300,000km$^2$. It is composed of 14 municipalities. The town of San Francisco is the most highly urbanized municipality. Based on the 1995 NSO records, the province has 314 barangays, of which 24 are urban and 288 rural. Provincial total population was 514,736 in 1995. About 77% of the population reside in rural areas, while the remaining 23% in urban areas. At present, there are 3 water districts and 9 LGU managed Level III water supply systems operating in the province. Table 3.1.1 presents the breakdown per municipality of the land area, population and density, as well as administrative composition.

**Table 3.1.1 Outline of Municipalities**

| Municipality | | Land Area (km$^2$) | 1995 Population | | Number of Barangay (1995) | | |
|---|---|---|---|---|---|---|---|
| Name | Class | | Number | Density (person/km$^2$) | Urban | Rural | Total |
| Bayugan | 1st | 504.98 | 89,999 | 178.22 | 3 | 40 | 43 |
| Bunawan | 3rd | 512.19 | 24,615 | 48.06 | 2 | 9 | 11 |
| Esperanza | 1st | 1,151.40 | 42,118 | 36.58 | 1 | 46 | 47 |
| La Paz | 2nd | 1,148.18 | 23,044 | 20.07 | 1 | 14 | 15 |
| Loreto | 1st | 1,422.76 | 24,022 | 16.88 | 1 | 16 | 17 |
| Prosperidad (Capital) | 1st | 601.90 | 61,804 | 102.68 | 1 | 31 | 32 |
| Rosario | 4th | 378.44 | 26,836 | 70.91 | 1 | 10 | 11 |
| San Francisco | 1st | 475.82 | 50,844 | 106.86 | 5 | 22 | 27 |
| San Luis | 2nd | 853.77 | 21,910 | 25.66 | 2 | 23 | 25 |
| Santa Josefa | 5th | 341.80 | 21,190 | 62.00 | 1 | 10 | 11 |
| Sibagat | 4th | 567.32 | 28,185 | 49.68 | 1 | 23 | 24 |
| Talacogon | 4th | 267.36 | 27,517 | 102.92 | 4 | 11 | 15 |
| Trento | 2nd | 555.70 | 36,946 | 66.49 | 1 | 15 | 16 |
| Veruela | 3rd | 385.45 | 35,706 | 92.63 | 1 | 19 | 20 |
| **Provincial Total** | 1st | 9,167.07 | 514,736 | 56.15 | 25 | 289 | 314 |

Source: PSPT, NSO-1995 Population Agusan del Sur.
Number of barangays includes the 2 newly created in 1991 that were excluded in the 1995 NSO census.

## 3.2 Natural Conditions and Geographical Features

### 3.2.1 Meteorology

The province has 2 types of climate under the Coronas classification: Type II, which is experienced in the eastern part and Type IV, in the western part. Type II is characterized by the absence of dry season with a very pronounced maximum rain period, while Type IV has a rainfall that is more or less evenly distributed throughout the year as reflected in the Location Map. Using the 12-year (1986-1997) rainfall records of the different NIA stations in the province, the average annual rainfall was registered at 3,320.35mm. Maximum rainfall was observed during the month of January, while the minimum was in October.

The average annual temperature is 27°C with a range of 31.6°C in October to 22.4°C in February. The province is located south of the typhoon belt hence tropical depressions are minimal. The prevailing wind is 5km/hr with wind speed varying by the month.

### 3.2.2 Land Use

Forest areas and timberland constitutes about 65% of the total area of the province located mostly in the Mt. Kinabalin and Mt. Kumakata mountain ranges. Grassland, openland and idleland occupy an aggregate area of 11%, while agricultural and built-up areas have 23%. Settlements are often concentrated along the national highway and the banks of Agusan River. The existing land use pattern as presented in Table 3.2.1 depicts a sustainable growth deserving and enhancing its present trend. The forest that still constitutes over half of the land area primarily serves 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 forestland to other uses will restrict its function as a watershed. Correspondingly, a significant increase in agricultural area will result in a high demand of water uses.

**Table 3.2.1 Current Land Use**

| Land Use | Area ($km^2$) | Percentage over Total Land Area (%) |
|---|---|---|
| Forest Land/Timberland | 6,000 | 65.45 |
| Grassland/Openland/Idleland | 1,029 | 11.23 |
| Agricultural/Built-up | 2,138 | 23.32 |
| Total | 9,167 | 100.00 |

### 3.2.3 Topography and Drainage

The topography of the province generally consists of the wide alluvial plains formed by the Agusan River and its tributaries and high mountain ranges in the western side of the province. Low hills with elevation of about 60m to 100m are distributed in the alluvial plain. The mountains in the east side of the national highway running from south to north have elevations of about 200m to 600m and are strongly dissected. The mountain ranges of Mt. Kinabalin and Mt. Kumakata occupy a wide width of 30km and extend from north to south covering most part of the westernmost section of the province. These ranges have high elevations of 600m to 1,400m and slopes that are very steep.

The Agusan River with a total length of about 250m is the third largest in the country and has a drainage area of 7,390km$^2$. It originates from the north boundary of Davao Province and flows to the central part of Agusan del Sur from southeast to northwest and extends to Butuan City where it empties. The river has many large tributaries such as Panusugan, Haoan-Umayam, Simulao-Gibong, Adgawan-Kawayan, Kasilayan, Maasim, Libang, Busilao and Wawa-Andanan rivers. These tributaries have drainage areas ranging from 180km$^2$ to 1,559km$^2$. 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. Four (4) typical rivers in the province were selected for water quality analysis, namely: Simulao-Gibong, Kasilayan, Maasim and Wawa-Andanan. Examined river waters were turbid (Simulao-Gibong and Wawa-Andanan) and showed very high iron and manganese contents (Wawa-Andanan) probably due to the mineral rich rocks of the mountain ranges (refer to 7.5, Data Report).

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

| River Name | Drainage Area (km$^2$) | Flow Rate (m$^3$/sec) | | | Water Districts (using river water) |
|---|---|---|---|---|---|
| | | Peak | Maximum | Minimum | |
| Agusan | 7,390 | 3,149.75 | 3,392.72 | 241.53 | None |
| Panusugan | 180 | 60.20 | Inc. | 2.73 | None |
| Haoan-Umayayam | 1,559 | 1,200.06 | 1,113.72 | 51.30 | None |
| Simulao-Gibong | 427 | 282 | 239.00 | 2.30 | None |
| Adgawan-Kawayan | 348 | 720.48 | 557.75 | 6.88 | None |
| Kasilayan | 209 | 95.30 | Inc. | 2.45 | None |
| Busilao | 316 | 209.00 | 199.90 | 1.40 | None |
| Wawa-Andanan | 201 | 147.50 | 128.75 | 0.52 | 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

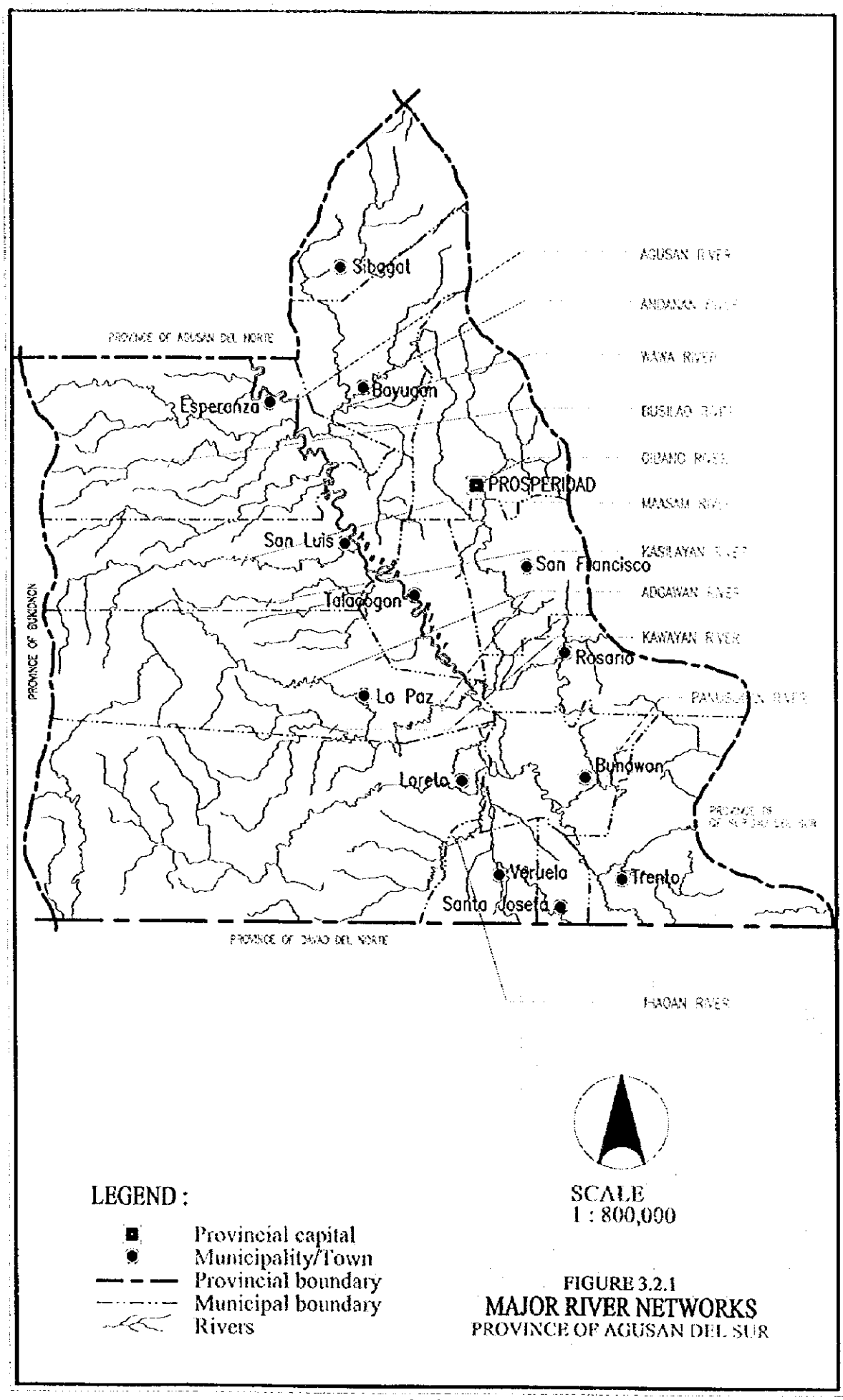



FIGURE 3.2.1
**MAJOR RIVER NETWORKS**
PROVINCE OF AGUSAN DEL SUR

DISK NAME : AGUSAN DEL SUR(DISK1)
FILENAME : AGUSAN-DELSUR(NETWORK)

## 3.3 Socio-economic Conditions

### 3.3.1 Economic Activities and Household Income

Agusan del Sur is basically an agricultural province. The major economic activities are farming and mining. Major crops cultivated are rice, corn, and abaca. Commercial crops such as African oil palm trees and rubber are other important agricultural commodities. At present, the province is promoting tourism as another income-generating activity.

The NSO Family Income and Expenditures Survey in 1994 showed that the average annual family income of the province was ₱ 46,264, while the median was at ₱ 31,984. 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 greater than the average figures in the region. Based on the established poverty threshold income of ₱ 43,659, in Region X for 1994 where the province was once belonged, about 70% of the total number of families lived within and below the poverty threshold.

As to the number of workers by major industry group, agriculture, fishery and forestry had the dominant share followed by social and personal services, and wholesale and retail trade (refer to Table 3.3.2, Supporting Report). By class of worker, those who worked without pay in own family operated farm or business had the highest share of 40%, followed by those who are self-employed without any paid employee as shown in Figure 3.3.2.

### 3.3.2 Basic Infrastructure

All municipalities have electric supply, although the service coverage at household level is quite low at 39%. Telephone service is still limited. There are 16 post office or stations in the province. Land transportation is available by means of jeepneys, buses and tricycles. There are 41 business establishments. Table 3.3.1 presents a provincial outline of public services and Table 3.3.2 reflects the number of public facilities and services by municipality (refer to Table 3.3.1, Data Report).

### 3.3.3 Education

The province has a total of 457 schools consisting of 399 elementary schools, 48 high schools and 10 colleges/technical school. The 1990 NSO census indicated that the province had 89% literacy rate of household population 5 years old and over. A large part of the population had attained elementary or high school levels of education as reflected in Figure 3.3.3 (refer to Table 3.3.3, Supporting Report).

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

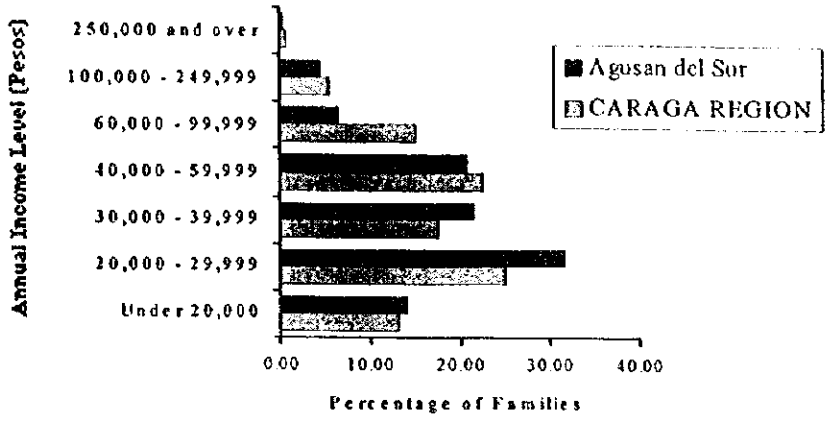



**Figure 3.3.2 Employment Distribution by Major Industry Group**

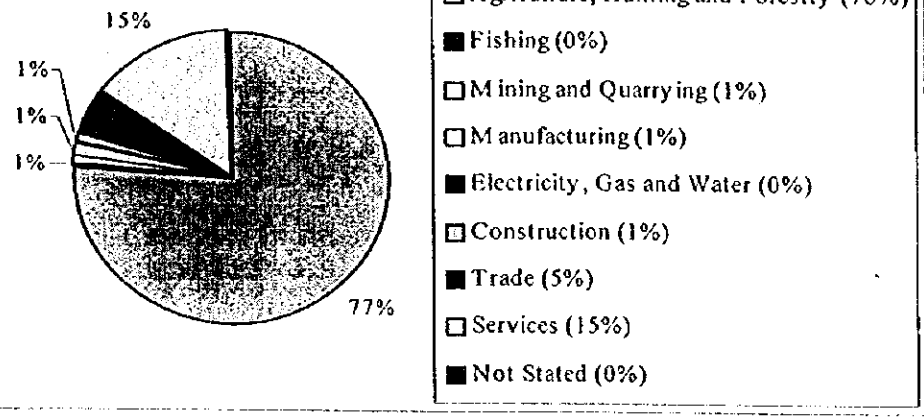
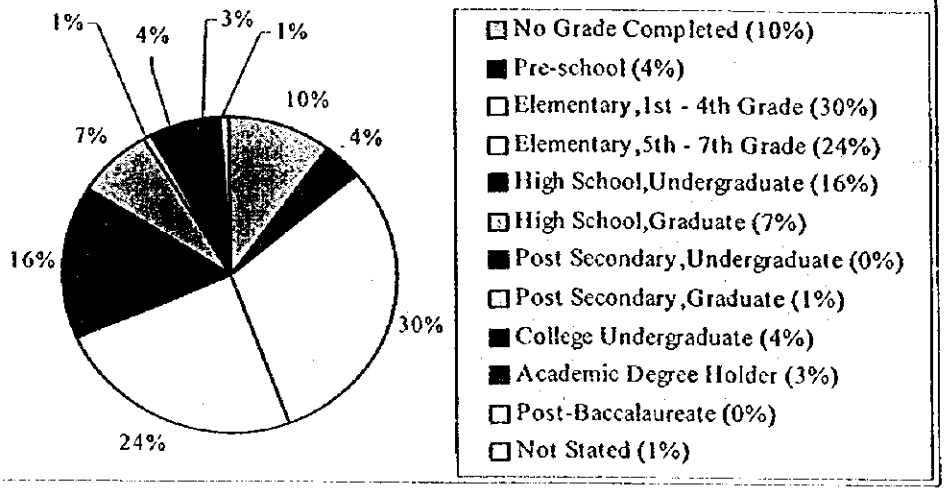



**Figure 3.3.3 Population Distribution by Highest Educational Attainment**



## Table 3.3.1 Provincial Outline on Public Services

| Items | Unit | Qty. | Items | Unit | Qty. |
|---|---|---|---|---|---|
| **(1) Roads** | | | **(8) Tourism facilities** | Number | 11 |
| a) Total Length | km | 2,185.67 | (Hotel resort, lodges, recreational | | |
| b) Barangay roads | Percent | 63.15 | facilities, etc.) | | |
| **(2) Electricity service coverage** | | | **(9) Schools** | | |
| a) Municipality | Percent | 100 | a) Elementary level | Number | 399 |
| b) Barangay | Percent | 56 | b) Secondary level | Number | 48 |
| c) Household | Percent | 39 | c) Tertiary level (college & technical) | Number | 10 |
| **(3) Telecommunication Services** | | | **(10) Health Facilities** | | |
| a) Availability in municipality | Percent | 42 | a) Hospital | Number | 12 |
| b) Telegraph station | Number | 6 | b) Main health centers, rural health | Number | 125 |
| c) Telephone station | Number | 7 | units, barangay health center, etc. | | |
| **(4) Post Office** | Number | 16 | **(11) Labor** | | |
| | | | a) Labor force participation ratio | Percent | 64.53 |
| **(5) Transportation services** | Mode | Bus, jeeps | b) Employment rate | Percent | 97.08 |
| | (ex. Bus, | Tricycles, | | | |
| | jeep, taxi,) | Motorcycles | **(12) Average family income** | | |
| | | | a) Monthly income | Pesos/Month | ₱ 3,855 |
| **(6) Banking Facilities** | Number | 44 | b) Monthly expenditure | Pesos/Month | ₱ 3,339 |
| a) Private bank | (by Private | | | | |
| b) Public bank | and public) | | | | |
| **(7) Industrial/business/** | | | | | |
| **commercial establishment** | Number | 41 | | | |

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

## Table 3.3.2 Public Facilities and Services by Municipality

| Name of Municipality | High School | | | Vocational School | College | Hospital | Public Market | Bank and Financing Institutions |
|---|---|---|---|---|---|---|---|---|
| | Public | Private | Total | | | | | |
| | nos. | nos. | nos. | nos. | nos. | nos. | nos. | nos. |
| Bayugan | 3 | 9 | 12 | | 2 | 4 | 1 | 4 |
| Bunawan | 2 | | 2 | | 1 | 1 | 1 | 3 |
| Esperanza | 2 | | 2 | | | 1 | 1 | |
| La Paz | 1 | 1 | 2 | | | 1 | 1 | 2 |
| Loreto | 4 | | 4 | | | 1 | 1 | |
| Prosperidad (Capital) | 1 | 2 | 3 | | 1 | 1 | 1 | 5 |
| Rosario | 1 | 3 | 4 | | | | 3 | |
| San Francisco | 2 | 3 | 5 | 1 | 3 | 1 | 1 | 16 |
| San Luis | 1 | | 1 | | | | 1 | |
| Santa Josefa | 1 | | 1 | | | | 1 | 1 |
| Sibagat | 2 | 1 | 3 | | | | 1 | |
| Talacogon | 3 | | 3 | | | | 1 | 6 |
| Trento | 2 | 1 | 3 | | 2 | 2 | 1 | 5 |
| Veruela | 2 | 1 | 3 | | | | 1 | 2 |
| **Provincial Total** | 27 | 21 | 48 | 1 | 9 | 12 | 16 | 44 |

## 3.4 Population

### 3.4.1 Previous Population Development

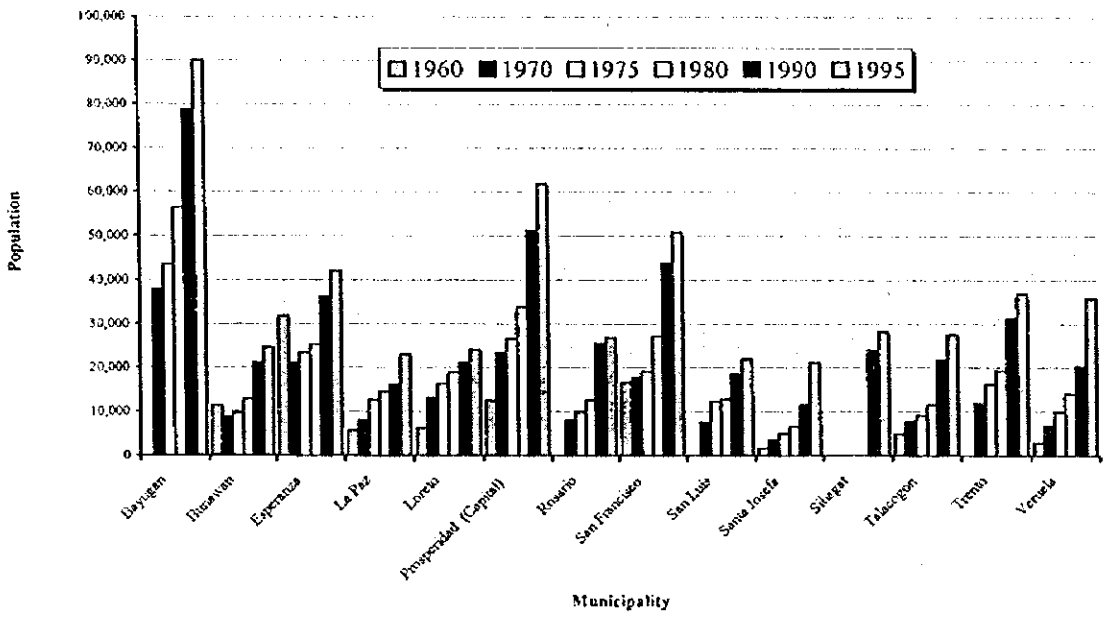
A declining provincial population growth rate had been experienced since the last six (6) census years (1960-1995) as indicated in Figure 3.4.1. From an average annual growth rate of 6.047% during the period 1960 to 1970, it gradually decreased to 3.85% (1990-1995). A summary of the average annual growth rates of the province is as follows:

| Year | Population | Ave. Annual Growth Rate (%) | Period |
|---|---|---|---|
| 1970 | 174,682 | 6.04 | 1960 - 1970 |
| 1975 | 213,216 | 4.07 | 1970 - 1975 |
| 1980 | 265,030 | 4.45 | 1975 - 1980 |
| 1990 | 420,763 | 4.73 | 1980 - 1990 |
| 1995 | 514,736 | 3.85 | 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 this 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 from 1948 to 1995.

**Figure 3.4.1 Previous Population Development of the Province**



## Table 3.4.1 Previous Population Development by Municipality

| Municipality | Previous Population Census | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1948 | 1960 | 1970 | 1975 | 1980 | 1990 | 1995 |
| Bayugan | 0 | 0 | 37,816 | 43,603 | 56,367 | 78,725 | 89,999 |
| Bunawan | 6,384 | 11,423 | 8,646 | 9,603 | 12,715 | 21,045 | 24,615 |
| Esperanza | 8,488 | 31,825 | 21,051 | 23,377 | 25,257 | 36,139 | 42,118 |
| La Paz | 2,701 | 5,746 | 7,971 | 12,637 | 14,389 | 16,144 | 23,044 |
| Loreto | 4,125 | 6,248 | 13,057 | 16,264 | 18,781 | 21,113 | 24,022 |
| Prosperidad (Capital) | 4,417 | 12,438 | 23,328 | 26,557 | 33,824 | 51,189 | 61,804 |
| Rosario | 0 | 0 | 7,885 | 9,774 | 12,443 | 25,436 | 26,836 |
| San Francisco | 5,434 | 16,535 | 17,636 | 19,097 | 27,153 | 43,878 | 50,844 |
| San Luis | 0 | 0 | 7,531 | 12,226 | 12,793 | 18,521 | 21,910 |
| Santa Josefa | 835 | 1,687 | 3,601 | 4,972 | 6,604 | 11,392 | 21,190 |
| Sibagat | 0 | 0 | 0 | 0 | 0 | 24,004 | 28,185 |
| Talacogon | 3,186 | 4,861 | 7,719 | 9,110 | 11,452 | 21,655 | 27,517 |
| Trento | 433 | 0 | 11,815 | 16,084 | 19,257 | 31,313 | 36,946 |
| Veruela | 1,528 | 2,914 | 6,626 | 9,915 | 13,991 | 20,129 | 35,706 |
| Provincial Total | 37,531 | 93,677 | 174,682 | 213,219 | 265,026 | 420,683 | 514,736 |

### 3.4.2 Classification of Urban and Rural Areas

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

(1) In their entirety, all cities and municipal jurisdictions having a population density of at least 500 persons per square kilometer.

(2) Poblaciones or central districts of municipalities and cities, which have a population density of at least 500 persons per square kilometer.

(3) Poblaciones or central districts (not included in nos. 1 and 2) regardless of population size, which have the following:

1) Street pattern, i.e., network of streets either at parallel or in right angle orientation;
2) At least six establishments (commercial, manufacturing, recreational and/or personal services); and
3) At least three of the following:
   a) a town hall, church or chapel with religious services at least once a month;
   b) a public plaza, park or cemetery;
   c) a market place or building where trading activities are carried on at least once a week; and

d) a public building like school, hospital, puericulture and health center or library.

(4) Barangays having at least 1,000 inhabitants, which meet the condition setforth 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 areas is shown in Figure 3.4.1, Supporting Report.

For this Master Plan, the 1995 NSO classification of urban and rural barangays is the basis, however, some barangays were modified by the PPDO to reflect the actual conditions prevailing in the area. A total of 14 rural barangays was re-classified as urban, while 3 urban barangays were reverted to rural barangays. The urban barangay of Dona Maxima in the municipality of San Luis and the rural barangay of Hubang in Bunawan, both created in 1991 were excluded in the 1995 NSO list and were therefore included in this study. With the re-classification and inclusion, there are 36 urban barangays and 278 rural barangays for a total of 314 barangays in Agusan del Sur.

### 3.4.3 Present Population Distribution

Utilizing the modified classification of the barangays, urban-rural population was derived. Rural population accounts for 68% of the provincial total, while the remaining 32% 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.

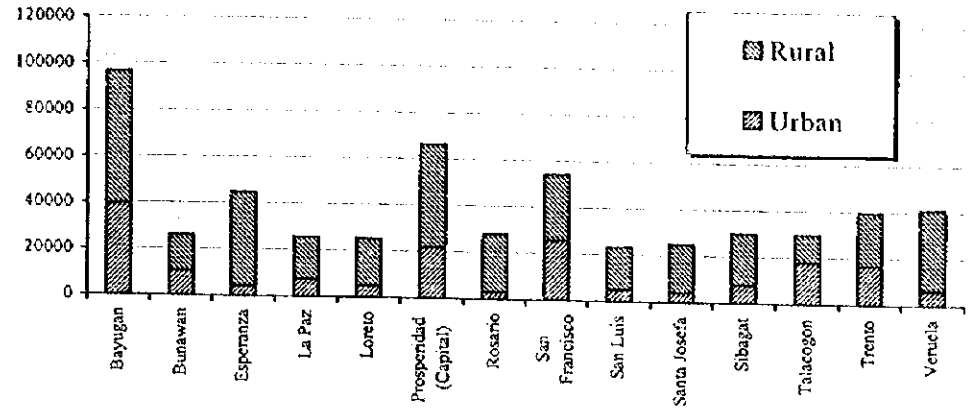
There are 95,188 households with 64,974 residing in rural areas and 30,214 households in urban areas. The average provincial household size is 5.39 persons/household. Table 3.4.3 presents a breakdown per municipality on the number of households and household sizes by urban and rural area.

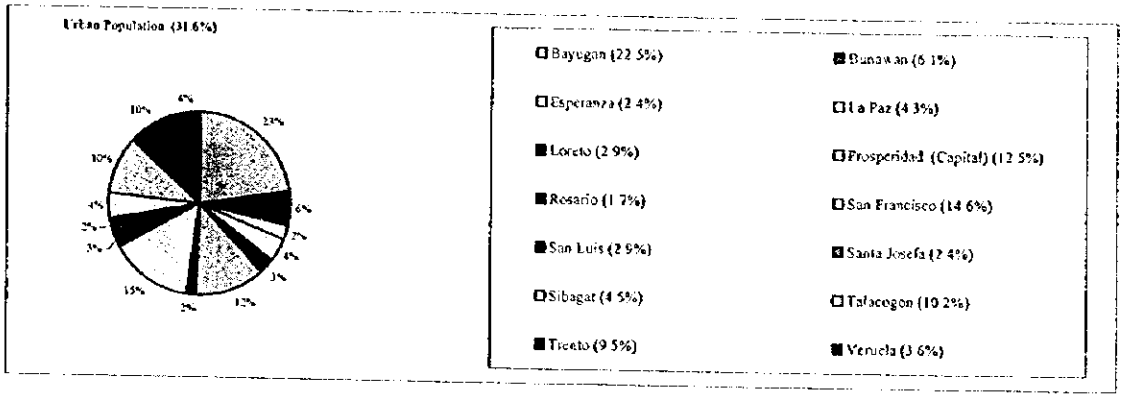
## 3.5 Health Status

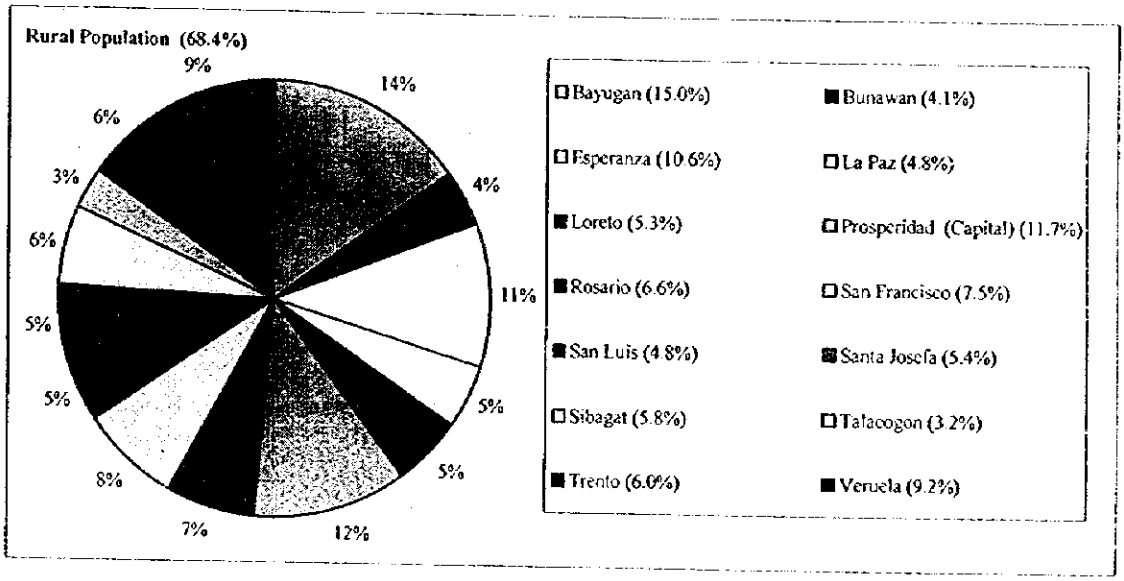
### 3.5.1 Morbidity, Mortality and Infant Mortality

The number one cause of morbidity in Agusan del Sur was acute respiratory infection, followed by pneumonia and diarrhea, a water-borne and water-washed disease. Bronchitis and influenza ranked fourth and fifth, respectively. Other causes of morbidity in descending

Figure 3.4.2 Present Population Distribution



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

| Municipality | Land Area | Number of Barangay | | | Population (1997) Estimated | | |
|---|---|---|---|---|---|---|---|
| | ($km^2$) | Urban | Rural | Total | Urban | Rural | Total |
| Bayugan | 504.98 | 5 | 38 | 43 | 39,451 | 57,080 | 96,531 |
| Bunawan | 512.19 | 2 | 9 | 11 | 10,706 | 15,557 | 26,263 |
| Esperanza | 1,151.40 | 1 | 46 | 47 | 4,193 | 40,342 | 44,535 |
| La Paz | 1,148.18 | 2 | 13 | 15 | 7,456 | 18,046 | 25,502 |
| Loreto | 1,422.76 | 1 | 16 | 17 | 5,046 | 20,123 | 25,169 |
| Prosperidad (Capital) | 601.90 | 3 | 29 | 32 | 21,840 | 44,361 | 66,201 |
| Rosario | 378.44 | 1 | 10 | 11 | 3,031 | 25,080 | 28,111 |
| San Francisco | 475.82 | 7 | 20 | 27 | 25,519 | 28,665 | 54,184 |
| San Luis | 853.77 | 3 | 22 | 25 | 5,038 | 18,257 | 23,295 |
| Santa Josefa | 341.80 | 1 | 10 | 11 | 4,261 | 20,506 | 24,767 |
| Sibagat | 567.32 | 2 | 22 | 24 | 7,884 | 22,000 | 29,884 |
| Talacogon | 267.36 | 5 | 10 | 15 | 17,903 | 12,123 | 30,026 |
| Trento | 555.70 | 2 | 14 | 16 | 16,725 | 22,778 | 39,503 |
| Veruela | 385.45 | 1 | 19 | 20 | 6,267 | 34,802 | 41,069 |
| Provincial Total | 9,167.07 | 36 | 278 | 314 | 175,320 | 379,720 | 555,040 |

## Table 3.4.3 Household Numbers and Household Size

| Municipality | Number of Households (1995) | | | Number of Households (1997) Estimated | | | 1995 Household Size (person/household) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Urban | Rural | Total | Urban | Rural | Total | Urban | Rural | Total |
| Bayugan | 6,885 | 9,847 | 16,732 | 7,388 | 10,570 | 17,958 | 5.34 | 5.40 | 5.38 |
| Bunawan | 1,988 | 2,799 | 4,787 | 2,120 | 2,986 | 5,106 | 5.05 | 5.21 | 5.14 |
| Esperanza | 707 | 6,834 | 7,541 | 747 | 7,230 | 7,977 | 5.61 | 5.58 | 5.59 |
| La Paz | 1,017 | 2,780 | 3,797 | 1,126 | 3,074 | 4,200 | 6.62 | 5.87 | 6.07 |
| Loreto | 848 | 3,481 | 4,329 | 888 | 3,645 | 4,533 | 5.68 | 5.52 | 5.55 |
| Prosperidad (Capital) | 3,887 | 7,733 | 11,620 | 4,160 | 8,276 | 12,436 | 5.25 | 5.36 | 5.32 |
| Rosario | 578 | 4,371 | 4,949 | 605 | 4,577 | 5,182 | 5.01 | 5.48 | 5.42 |
| San Francisco | 4,526 | 5,111 | 9,637 | 4,824 | 5,450 | 10,274 | 5.29 | 5.26 | 5.28 |
| San Luis | 815 | 3,174 | 3,989 | 867 | 3,375 | 4,242 | 5.81 | 5.41 | 5.49 |
| Santa Josefa | 675 | 3,333 | 4,008 | 789 | 3,898 | 4,687 | 5.40 | 5.26 | 5.29 |
| Sibagat | 1,358 | 3,795 | 5,153 | 1,439 | 4,022 | 5,461 | 5.48 | 5.47 | 5.47 |
| Talacogon | 3,004 | 1,982 | 4,986 | 3,279 | 2,161 | 5,440 | 5.46 | 5.61 | 5.52 |
| Trento | 2,946 | 4,198 | 7,144 | 3,150 | 4,493 | 7,643 | 5.31 | 5.07 | 5.17 |
| Veruela | 980 | 5,536 | 6,516 | 1,127 | 6,362 | 7,489 | 5.56 | 5.47 | 5.48 |
| Provincial Total | 30,214 | 64,974 | 95,188 | 32,509 | 70,119 | 102,628 | 5.39 | 5.42 | 5.41 |

order were malaria, chickenpox, gastroenteritis, intestinal parasites and schistosomiasis. Regarding mortality, the number one cause was accidents, followed by tuberculosis. Pneumonia and malaria ranked third and fourth, respectively. Other causes include chronic liver disease, diarrhea, septicemia, measles, typhoid and senility. Pneumonia, diarrhea and congenital anomalies were the three (3) leading causes of infant mortality in the province (refer to Table 3.5.1, Data Report).

The general health status of the populace of the province in 1995 was relatively poor compared with the national condition. The incidence of diseases was higher in Agusan del Sur than the Philippines as a whole. Table 3.5.1 presents a comparative statistics on the ten leading causes of morbidity, mortality and infant mortality of the province as well as of the Philippines.

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

Rate: 1/100,000

| Causes | | Agusan del Sur | | Philippines | | |
|---|---|---|---|---|---|---|
| | | Number | Rate | Number | Rate | Ranking |
| Morbidity | 1. ARI | 11,397 | 2,214 | 159,049 | 238 | 6 |
| | 2. Pneumonia | 7,517 | 1,460 | 470,574 | 703 | 4 |
| | 3. Diarrhea | 7,276 | 1,414 | 1,337,449 | 1,997 | 1 |
| | 4. Bronchitis | 6,349 | 1,233 | 903,508 | 1,349 | 2 |
| | 5. Influenza | 4,982 | 968 | 609,471 | 910 | 3 |
| | 6. Malaria | 4,952 | 962 | 49,506 | 74 | 10 |
| | 7. Varicella, Chickenpox | 1,320 | 256 | 71,317 | 107 | 9 |
| | 8. Gastroent. Colitis | 1,126 | 219 | - | - | - |
| | 9. Intestinal Parasites | 932 | 181 | - | - | - |
| | 10. Schistosomiasis | 893 | 173 | - | - | - |
| Mortality | 1. Other Accidents | 155 | 30 | 13,477 | 20 | 6 |
| | 2. Tuberculosis | 98 | 19 | 24,580 | 37 | 5 |
| | 3. Pneumonia | 94 | 18 | 35,582 | 53 | 3 |
| | 4. Malaria | 34 | 7 | - | - | - |
| | 5. Chronic Liver Disease | 31 | 6 | 5,510 | 8 | 10 |
| | 6. Diarrhea | 30 | 6 | 5,759 | 9 | 9 |
| | 7. Septicemia | 21 | 4 | - | - | - |
| | 8. Measles | 10 | 2 | - | - | - |
| | 9. Typhoid/Paratyphoid | 9 | 2 | - | - | - |
| | 10. Senility | 9 | 2 | - | - | - |
| Infant Mortality | 1. Pneumonia | 48 | 9 | 7,631 | 4.5 | 1 |
| | 2. Diarrhea | 8 | 2 | 1,661 | 1.0 | 4 |
| | 3. Congenital Anomalies | 7 | 1 | 2,366 | 1.4 | 3 |
| | 4. Septicemia | 5 | 1 | 1,252 | 0.7 | 5 |
| | 5. Measles | 5 | 1 | 765 | 0.5 | 7 |
| | 6. Viral Hepatitis | 1 | 0 | - | - | - |
| | 7. Anemia | 1 | 0 | 925 | 0.6 | 6 |
| | 8. Birth Inj.& Diff. Labor | 1 | 0 | 1,190 | 0.7 | 5 |

Water-related diseases in the ten leading causes of morbidity include diarrhea (rank 3rd), gastroenteritis (8th), intestinal parasitism (9th) and schistosomiasis (10th). Malaria, diarrhea and typhoid also ranked 4th, 6th and 9th as the leading causes of mortality. Diarrhea, (rank 2nd) and viral hepatitis (6th) are among the ten leading causes of infant mortality.

### 3.5.2 Water Related Diseases

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

Water-related diseases reported in the province in 1995 were diarrhea, malaria, gastroenteritis, intestinal parasitism, schistosomiasis, typhoid and viral hepatitis. 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 | | Infant Mortality | |
|---|---|---|---|---|---|---|
| | Number | Rate | Number | Rate | Number | Rate |
| **Water-borne** | | | | | | |
| 1. Diarrhea | 7,276 | 1,414 | 30 | 6 | 8 | 2 |
| 2. Viral hepatitis | 93 | 17 | 8 | 2 | 1 | 0 |
| 3. Typhoid/Parathyphoid | 42 | 8 | 9 | 2 | 1 | 0 |
| **Water-based** | | | | | | |
| 1. Schistosomiasis | 893 | 173 | | | | |
| **Water-washed** | | | | | | |
| 1. Intestinal parasitism | 932 | 181 | | | | |
| 2. Skin disease | 883 | 159 | | | | |
| **Water vector** | | | | | | |
| 1. Malaria | 4,952 | 962 | 34 | 7 | | |
| 2. Dengue/H-fever | | | 1 | 0 | | |

### 3.5.3 Health Facilities and Practitioners

Present facilities serving the health care of the populace are 15 hospitals, 14 rural health units and 111 barangay health stations. The ratio of the population to these facilities and to the health practitioners are relatively higher as compared to the national average figures (refer to Table 3.5.1 number and ratio of population to health facilities and/or medical practitioners, Supporting Report).

## 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. Majority of the drainage facilities in all municipalities is open canals or ditches. The rivers and streams function as the drainage system. These rivers receive the domestic wastewater and storm water collected by the segmented drainage facilities in urban centers or poblacions (refer to the types of drainage facilities in Table 3.6.1, Supporting Report).

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

Gold milling, small-scale food processing and lumber milling establishments are identified as potential pollution sources in the province if no control measures are in place. The rivers must be protected and conserved for their intended or beneficial use. However, as of now, the rivers in the province have not been classified as to their usage by the Department of Environment and Natural Resources (refer to general information in Table 3.6.2 DENR Water Quality Criteria/Water Usage and Classification, Supporting Report).

### 3.6.3 Solid Waste Disposal

Of the 14 municipalities, 8 have municipal refuse collection and disposal service as of 1996 (details are referred to Table 3.6.1, Data Report). These municipalities have 1 to 2 units of open dump truck. Trento has one unit of closed type truck. In the province, 13% of the households is served, while the majority (87%) is unserved. Table 3.6.1 reflects the manner of solid waste collection and disposal, and service coverage by municipality in 1996.

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

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

| Municipality | No. of Hlls,1997 | With Service | | | | | | Without Service | | | | Percentage of Households Served | Percentage of Households Unserved |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Number of Collection Trucks | | | Disposal | | | Manner of Disposal (Number of Households) | | | | | |
| | | Open Dump Trucks | Closed Type Trucks | Total Units | Number of Households Served by Open Dump Site | Number of Households Served by Sanitary Landfill | Total Households Served | Dumping (Land and Water) | Burying | Composting | Total Households Unserved | | |
| Bayugan | 17,958 | 2 | | 2 | 748 | | 748 | 15,361 | 1,540 | 309 | 17,210 | 4 | 96 |
| Bunawan | 5,106 | 1 | | 1 | 1,643 | | 1,643 | 1,999 | | 1,464 | 3,463 | 32 | 68 |
| Esperanza | 7,977 | | | | | | | 6,469 | 754 | 754 | 7,977 | | 100 |
| La Paz | 4,200 | | | | | | | 3,440 | 190 | 570 | 4,200 | | 100 |
| Loreto | 4,533 | 1 | | 1 | 848 | | 848 | 2,936 | 430 | 319 | 3,685 | 19 | 81 |
| Prosperidad (Capital) | 12,436 | 1 | | 1 | 2,037 | | 2,037 | 6,582 | 2,246 | 1,571 | 10,399 | 16 | 84 |
| Rosario | 5,182 | | | | | | | 1,982 | 1,200 | 2,000 | 5,182 | | 100 |
| San Francisco | 10,274 | 1 | | 1 | 3,639 | | 3,639 | 4,267 | 1,361 | 1,007 | 6,635 | 35 | 65 |
| San Luis | 4,242 | | | | | | | 3,643 | 200 | 399 | 4,242 | | 100 |
| Santa Josefa | 4,687 | 1 | | 1 | 675 | | 675 | 1,346 | 1,333 | 1,333 | 4,012 | 14 | 86 |
| Sibagat | 5,461 | 1 | | 1 | 748 | | 748 | 2,864 | 1,540 | 309 | 4,713 | 14 | 86 |
| Talacogon | 5,440 | | | | | | | 3,944 | 997 | 499 | 5,440 | | 100 |
| Trento | 7,643 | 1 | 1 | 2 | 2,672 | | 2,672 | 2,614 | 1,414 | 943 | 4,971 | 35 | 65 |
| Veruela | 7,489 | | | | | | | 2,276 | 652 | 4,561 | 7,489 | | 100 |
| **Provincial Total** | **102,628** | **9** | **1** | **10** | **13,010** | | **13,010** | **59,723** | **13,857** | **16,038** | **89,618** | **13** | **87** |