

4. Existing Sector Arrangements and Institutional Capacity

Institutional Framework

The Local Government Code has essentially re-defined the roles, relationships, 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 NEDA Board Resolution No.4 (1994). To ensure common interpretation of the Resolution, the Implementing Rules and Regulations (IRR) for the relevant sector was prepared. The role of implementing water supply projects, which DPWH used to undertake, has been transferred to the LGUs. The functions of the then IPHO under the DOH have also been devolved to the LGUs. It is now the DILG, which provides overall coordination over the implementation of WATSAN projects of LGUs. The Water Supply and Sanitation-Project Management Office (WSS-PMO), a unit within DILG, is the main office 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 deliver the 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 coordination issues.

The current major institutional issues are: (1) managing the transition process, and (2) re-establishing the leadership for the sector. Major resource realignments and capacity building initiatives are needed. At the local level, the LGUs' capability to handle sector projects 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 similar to project-based monitoring which will have a direct link to performance.

Community Development

The community development aspect for WATSAN projects in the Province of Davao del Norte is being handled by a multi-sectoral team with members coming from the Provincial Planning and Development Office (PPDO), Provincial Cooperative Development Office (PCDO), Provincial Engineer's Office (PEO) and DILG-Provincial Office. The provincial government recently issued a memorandum transferring the supervision function of the management, operation and maintenance of barangay/rural water associations to the PCDO after they have been converted to water and sanitation cooperatives or WATSAN cooperatives. The PCDO also is charged with collecting the loan payments in favor of the province borrowed by of the WATSAN association/cooperatives.

The Province of Davao del Norte has had experience in community development work through many of the projects it has handled in the past. The Province believes in community participation as one of the basis of its comprehensive development. Thus it considers WATSAN sector projects as just a component in its over-all planning system. The manner by which CD/CO work is done is how it was done in past sector projects, particularly the Barangay Water Program; while CD/CO in the formation of water cooperatives is approached employing the universal principles of cooperativism. While a unit exists within the PPDO and PHO to take charge of CD work for its projects, this remains a box in their respective organization charts. As such, there is apparent lack of a permanent structure and identified major responsible players on CD in the LGUs, particularly for the WATSAN sector. These create 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. There have been training programs on social mobilization for community development; but for these programs to be effective, it should be made regular and should reach out to all the LGUs in the province.

Gender Consideration

The Province of Davao del Norte has been implementing GAD projects; but those under the WATSAN sector has been limited to health and sanitation as well as hygiene projects. Planning and implementing gender-sensitive WATSAN projects has still to be fully integrated in the mainstream of the provincial and municipal LGUs.

Key informant surveys and group interviews were conducted to determine the degree of community participation on the sector of barangay officials and their constituents, with emphasis on gender-related issues. The following were the findings, from the surveys and interviews:

- The barangay councils were male-dominated; all barangay captains were males.
- Two of the three barangays surveyed had operational BWSAs. The males outnumbered females in BWSA membership.
- NGOs/CBOs were actively working in the communities. Significantly, the areas of concern include women's welfare.
- There is no gender bias when it comes to awareness of sector related information. Women actively participated in the O&M of water facilities. The respondents agreed that women could be assigned as bookkeeper or to look after the cleanliness of the facilities.
- Women constituted the majority of the population in the two barangays.
- The people got their water from communal faucets (Level II system). The men (husbands) were responsible for fetching water, which was done three times a day for about 20 minutes per trip.
- Both men and women were not consulted on their roles and responsibilities on past WATSAN projects but indicated willingness to actively participate in future projects.
- The respondents attended various training programs in 1997, although not WATSAN-related. Both the male and female respondents wanted to attend WATSAN-related training courses, including health education, that maybe offered for BWSA members. Many opted for a one-day training sessions.
- The young female children mostly got sick in 1997. The leading causes of illnesses were skin disease, cholera and gastroenteritis.

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 1994-1998, IRA of the province represented about 76.18% of the total income. The province also derives income from the lease of equipment in road construction, upgrading and rehabilitation. On the other hand, actual expenditures were mainly broken down into personnel expenses (34% of total revenues), capital outlay (17%) and operation and maintenance expenses (49%). From 1994 to 1997, the province reported a net surplus in its operations.

The funds for the water supply sector are part of the capital outlay of the province. The amount of debt servicing capacity of the provincial government is computed to be ₱ 80.5 million for the year 1998, which represents the maximum loanable amount through the MDF.

Funds for the capital outlay are mainly derived from 20% DF of the IRA and part of which is the water supply and sanitation sector allotment. During the period 1995 to 1998, the 20% DF was sufficient to finance the capital outlay requirements. Due to the low availability of funds, the relevant sector accounts between less than .09% to 12.99% of DF or about 2.6% of IRA.

Planned sector investments during the period 1995-1998 amounted to about ₱ 50.497 million but the actual expenditures disbursed for the sector out of the 20% DF was 35.7% of the required investments or ₱ 18.036 million. Of the investments, Level II and III amounted to about ₱ 23.5 million, while Level I water supply was less than ₱ 11.2 million.

The sector projects in previous years were implemented by the DPWH (undertaken through OECF loan assistance up to 1995), the DILG (BWP – institutional building), the RWDC and the Tulungan sa Tubigan Foundation. The DPWH, through its DEOs, still receive requests for assistance from barangay people. 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. Level III systems are usually financed by the LWUA for a period of up to 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 had 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 ₱5 to ₱50 /household/month. For Level III system, 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. There are 5 WDs and 46 waterworks which are currently operational in the province.

The percentage of water fee to median monthly household income is about 1.68% for Level III and less than 1% for Level II and 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 the entire province. It gives an emphasis on groundwater availability 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: the Miocene and Older Systems, the Plio-Pleistocene Series, and Recent Deposits. The Miocene and Older systems are mainly distributed on the northwestern side of the province. The Plio-Pleistocene series are widely distributed in the northeastern, northern central, and western areas of the province and in the islands of Samal and Talikud. The Recent Deposits are largely distributed in the central basin area surrounded by the lowland hills, which are made of Plio-Pleistocene sediments.

For planning purposes in the development of groundwater sources, the provincial area is divided into shallow well, deep well and difficult areas. No solo shallow well area is defined in the province. Deep well area covers about 80% of Davao del Norte, while difficult area falls on the remaining area. Brackish groundwater occurs in the deep aquifers in most of the alluvial plain area where the municipalities of Asuncion, B. E. Dujali, Carmen and Panabo and the city of Tagum are located. Deep groundwater areas with high Fe and Mn contents are reported in the northeastern part of the alluvial plain. The areas that fall on this quality are the municipalities of Asuncion and New Corella. Groundwater of deep wells in Samal Island has slightly high Ca and Mg contents and a similar situation is anticipated to occur in Talikud Island. In the small alluvial plain at the western coastal area of Samal Island, saline water intrusion occurs due to over exploitation of groundwater for urban water supply.

Based on the inventory of water sources prepared during the study, the province has 157 developed springs currently serving the province. Usually, these come out from the high mountain areas in the northwestern part and the low hilly areas in the central part of the province, as well as the western abrasion cliff in Samal Island. A total of 26 untapped

springs for future development are reported in the mountainous municipalities of Kapalong, New Corella and Talaingod. Other municipalities have few untapped springs.

From the existing well inventory, the depth of potential aquifers occurs between 20 to 150 meters in the Recent alluvium and the Plio-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, with special attention 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 including geophysical prospecting and construction of test wells, prior to the detailed design or in the pre-construction stage. The areas that fall on this group are the cities of Tagum and Island Garden of Samal.

Untapped springs shall also be surveyed to confirm the development possibility in the detailed groundwater investigation. This will include items on the following: i) location and type of spring sources; ii) fluctuation of discharge rates throughout 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 to maintain the existing service coverage both in urban and rural areas 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

<i>Sub-Sector</i>	<i>Area/Type</i>	<i>Base Year Service Coverage</i>	<i>Provincial Sector Targets</i>	
			<i>Phase I</i>	<i>Phase II</i>
<i>Water Supply</i>	<i>Urban Area</i>	59	60	95
	<i>Rural Area</i>	44	45	93
<i>Sanitation</i>	<i>Urban HH Toilet</i>	83	90	95
	<i>Rural HH Toilet</i>	69	85	93
	<i>Public School Toilet</i>	41	70	90
	<i>Public Toilet</i>	100	100	100
<i>Sewerage</i>	<i>Urban Area</i>	0	<i>Not applicable</i>	50
<i>Solid Waste</i>	<i>Urban Area</i>	66	90	<i>Not applicable</i>

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 solid 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

<i>Sub-Sector</i>	<i>Area/Type</i>	<i>Unit</i>	<i>Additional Service Coverage</i>	
			<i>Phase I</i>	<i>Phase II</i>
<i>Water Supply</i>	<i>Urban Area</i>	<i>Persons</i>	29,501	227,922
	<i>Rural Area</i>	<i>Persons</i>	65,149	264,407
<i>Sanitation</i>	<i>Urban HH Toilet</i>	<i>No. of Households</i>	9,604	39,911
	<i>Rural HH Toilet</i>	<i>No. of Households</i>	35,756	43,019
	<i>Public School Toilet</i>	<i>No. of Public School Students</i>	69,705	81,478
	<i>Public Toilet</i>	<i>No. of Utilities</i>	26	18
<i>Sewerage</i>	<i>Urban Area</i>	<i>Persons</i>	<i>Not applicable</i>	174,899
<i>Solid Waste</i>	<i>Urban Area</i>	<i>No. of Households</i>	10,617	<i>Not applicable</i>

The necessary water supply facilities for Phase I include 6 deep wells/springs for 5,800 house connections in urban area, and 10 Level II systems with spring sources and 284 Level I wells/springs for rural area. For Phase II, 33 deep wells/springs for additional 57,000 connections and 4,400 Level I wells/springs are required for urban and rural water supplies, respectively. It is assumed that 40% of Level I facilities will be implemented by LGUs and 10% 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 set of water quality test instruments/equipment will be necessary to upgrade the existing provincial 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 system of the municipalities.

Currently, 2 out of the total 10 municipalities/cities have no Level III system in their urban areas, namely: Braulio E. Dujali and Talaingod. At present, there is no particular planned/on-going project in the province.

With regard to water source development, among various untapped spring sources identified during the course of PW4SP preparation, the untapped sources located in the municipalities of Asuncion, Carmen and New Corella are considered to have favorable conditions for use in Level III services, while deep wells for other municipalities.

Due to water source problem, merged systems shall be studied for the following municipalities/city.

- Long-term: Braulio.E. Dujali, Carmen and Panabo
- Medium-term: Tagum City, New Corella and Asuncion.

Conditions to be studied include water source availability, willingness by concerned municipalities and technical study on cost recovery/economical construction.

Merging of small Level III in terms of integration of management system shall be sought, although these waterworks are currently managed individually. Island Garden City of Samal, in particular, shall be studied for its three administrative districts.

Moreover, Phase I sanitation will require 9,604 household toilets, 111 public school toilets and 26 public toilets for urban area. In rural area, 35,756 household toilets and 236 public school toilets are necessary. Solid waste disposal will need 7 refuse collection trucks. For Phase II, urban area will require 39,911 household toilets, 150 public school toilets and 18 public toilets. In rural area a total of 43,019 household toilets and 688 public school toilets are necessary.

8. Sector Management for Medium-Term Development Plan

Institutional Framework

To effectively manage the water and sanitation sector, the provincial and municipal governments will have to make 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 share 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 emphasis on sustainability
- Project selection and prioritization based on commitment of the beneficiaries, beneficiaries' willingness to pay, current water and sanitation and health conditions, and potential for growth
- Technologies appropriate to local conditions and resources. Economical facilities, without 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 concern for 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 national and external funds although diminishing, will continue to be channeled through local offices of central agencies in the medium-term.

In the medium-term, a full-time Provincial Water Supply and Sanitation Unit (PWSU) shall be operational, which may be augmented at the existing PCDO/PPDO/PEO. The LGU should ensure that adequate logistics and incentives are provided for the Unit. In the long term, the Unit may be promoted to the same level as the PPDO. The PWSU 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 PWSU.

For institutional arrangements, the formation of BWSAs for Level I systems and RWSAs for Level II and III systems will be a prerequisite. The community, especially the women's sector, shall be involved in all phases of project management (planning, construction and O&M) and in undertaking health and hygiene education programs. To provide the members with the necessary skills, training programs will 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 the LGUs 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 proposed Provincial Water Supply and Sanitation Unit. A permanent CD Specialist shall be appointed to take charge of promoting, developing and coordinating CD and IEC programs

of the province, even looking 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 existing Municipal WATSAN Liaison Task Force 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) 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 and implemented on the national, provincial and municipal levels. The program will promote a better awareness and understanding of the responsibilities of sector planners as well as the benefits due to the project beneficiaries so that the gains of the sector can be sustained on a long term basis.

It shall be the DILG who shall retain the central role as the national government agency that promotes and develops the capacities of the province and the municipalities 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 and utilize these to enhance and assist the LGUs in organizing project beneficiaries. Another national agency, the LWUA, shall on the other hand, continue to promote community participation in the formation of LGU-WS into water districts and to provide regular CD assistance particularly in consultation with the community on projects, loans, and water rates adjustments. The Cooperative Development Authority (CDA), on the other hand, shall continue to provide the mandated support to all duly formed and registered water cooperatives around the country.

The LGUs and the intended beneficiaries can both participate in sector development: Level 1 – for the planning and implementation of sector projects and in the formation and management of a water supply and sanitation association/cooperative; Level 2 – for the formation of a water supply and sanitation association/cooperative or a waterworks; while Level 3 – for the formation of water districts or LGU-operated waterworks. Thus, it is important that the LGUs make the decision on the projects it can afford to implement.

To achieve this, the LGU must encourage active community participation and involvement through four approaches. These are: (1) sharing relevant information on the project with the beneficiaries, (2) consulting with users on all phases of project development; (3) giving am-

ple room to the beneficiaries to make project-related decisions; and (4) providing opportunities to the community to initiate actions for their own benefit.

On the other hand, recommended are four ways that beneficiaries themselves can participate in sector projects, some of which have been tried in the province. These are: (1) the provision of free labor and/or materials by community members; (2) the sharing of costs between project proponent and the users; (3) expressed participation of all parties through MOAs and, (4) the participation through a firm involvement and commitment of the community in the management, operation, maintenance of the system itself.

For Levels I and II, the WATSAN Unit should utilize the recommended Community Development Framework (modified from the UNDP-WATSAN Project) consisting of three phases of activities: Phase 1 is Formation of Organization; Phase 2 is Development of Organization; and, Phase 3 is Consolidation of Organization.

Gender Consideration

Since sustainability of WATSAN services depends on responding to the demands of men and women in the community, LGUs must recognize and give vital emphasis on the role of gender sensitive participation because the use, maintenance and financing of WATSAN systems require the participation of both the men and women. Thus, 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 Trainor'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.

Table 9.1 Investment Cost Required by Phase

Unit: 1,000 Pesos

Item	Component	Phase I	Phase II
Construction/ Rehabilitation	Water Supply		
	Urban Area	106,311	735,495
	Rural Area	120,647	446,861
	Sanitation		
	Household Toilet	17,600	33,936
	School Toilet	85,245	196,804
	Public Toilet	8,947	8,947
	Disinfection of Well	738	329
	Urban Sewerage	N/A	1,276,763
	Sub-Total	339,488	2,696,381
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	100	0
	Water Quality Testing Kits	15	0
	Sub-Total	985	26,782
Water quality Laboratory		2,032	0
Sector Management	Engineering Studies	41,795	181,278
	Community Development and Training	28,970	125,500
	Sub-Total	70,765	306,777
Total Direct Cost		413,270	3,029,941
Contingencies	Physical Contingency	41,322	302,994
	Price Contingency	74,910	N/A
	Value-Added Tax (VAT)	38,425	N/A
Total Investment Cost		567,928	3,332,935
Total Investment Cost (excluding Price Contingency)		492,972	3,332,935

The investment cost for Phase I is estimated at about ₱568 million. A total of ₱ 339.5 million (in 1997 price level) is required as the construction/rehabilitation cost (including cost for well disinfection) in Phase I, of which urban water supply and rural water supply share 31% and 36%, respectively. While, the remaining 33% 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: 1 set/unit each of well drilling equipment and service truck with crane; 1 set/unit each of well rehabilitation equipment and support vehicle; and 7 units of refuse collection truck. The total procurement cost is estimated at approximately ₱ 41 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.

Likewise, annual recurrent cost in 1997 price level is estimated at ₱ 36.7 to ₱ 52.1 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). 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 ₱ 180.799 million (provincial IRA is 48% of the total IRA). In the overall IRA allocation to the sub-sectors, rural sanitation has the largest allotment of 30.92%, followed by rural water supply (28.83%). While, the share of urban water supply is 25.9%, which is higher than that of urban sanitation of about ₱ 25.88million.

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 36.68% of the requirements as a provincial average. Hence, there is a big shortfall of ₱ 312.17 million in funding. It will become ₱ 389.1 million in consideration of price escalation with annual rate of 7%. In the municipal achievement percentage in finance, Kapalong (100%) is the highest among municipalities, followed by Talaingod (84%). Others are in the range between 30% and 50% to the requirements, while the provincial average is 37%.

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

modified by policy makers according to the updated information and policy on available fund and sector targets.

Investment need ranking of the municipalities is discussed to serve as a guide for implementation in order for the provincial government to effectively arrange its financial resources. The ranking for urban water supply is specifically studied and the result is employed for allocation of provincial IRA to the municipalities in the concerned sub-sector. For the provincial fund allocation, as a currently effective arrangement, equal distribution was made to all concerned municipalities, since the investment need is limited to those municipalities with ranking of 1st to 4th. In the synthetic investment need ranking of municipalities covering four sub-sectors, the top ranking municipalities are Asuncion, Carmen, Panabo, Island Garden City of Samal and New Corella which indicate that they are given priority for investments in all sub-sectors, while Kapalong is the least priority in terms of investment.

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

Project components including Level I water supply, public/school toilet facilities and distribution of toilet bowls were identified to meet the conditions in provision of GOP-assisted project. Since all municipalities of the province are 1st to 4th class municipalities, there is no water supply component to meet the conditions in the provision of GOP-assisted Level I water supply in the rural areas, while there are 6 municipalities that meet the condition in sanitation sub-sector. The required services will cover technical and institutional/community development aspects of the project. The overall project cost for the implementation period 1999-2003 was estimated at ₱ 76.1 million or ₱53.7 million in 1997 price level.

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

For Case 1, GOP shall share 50% of the overall project cost in combination of the foreign assisted loan and government counter part fund. The remaining 50% shall be shared by the LGUs (47%) and beneficiaries (3%). Comparing the estimated project cost to be shared by the LGUs of ₱ 25.2 million (at 1997 price level) and the available IRA of LGUs (₱ 27.3 million), the cost to be shouldered by the LGU is about 90% of the available IRA.

For Case 2, the utilization of the MDF is considered in case the LGUs will fail to furnish IRA for the cost to be shared (even if estimated IRA available meets the required cost to be shared by the LGU). The foreign loan that may be availed of at the maximum financing limit is 75% of the overall project cost. GOP will possibly finance up to 75% of the total project cost in the portion of the loan. Out of GOP finance through the loan, 43.9% of the total project cost shall be granted to the LGUs, aside from the 6.1% GOP counterpart fund. The remaining 31.1% of the total project cost shall be utilized for financing the LGUs to secure their budgetary capacity through MDF. Under this case, the IRA to be used by the LGU is about 30% of available IRA.

Cost recovery and cost sharing shall be promoted to attain the planned target based on the principle that adequate water, sewerage and sanitation facilities should be paid for. For Level I water supply systems, LGUs and beneficiaries are required to share the O&M cost. While, users need to pay water charge up to 2% of their monthly income to sustain the system (₱92/HH/month in 2003). For Level II water supply systems, full cost recovery is required for all capital and recurrent cost (₱90/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 (₱219/HH/month in 2003). Based on the experience that water fee must not exceed 5% of income (average monthly water consumption of 15 m³), users will be able to pay the amount.

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

11. Monitoring of the Medium-Term Development Plan

The sector monitoring system must support a well-defined and accepted sector development process-model. This will include information collection, tracing the flow of raw data from the field to the central level, information analysis, and data feedback. With the sector monitoring system in place, planners should be able to take a fresh objective view of the way current strategies are implemented.

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

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

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

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

Chapter
INTRODUCTION

1

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1. INTRODUCTION

1.1 Sector Development in the Philippines

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

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

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

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

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

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

Development in the sector had previously been directed to a high degree by central government agencies. However, the GOP has been instituting devolution and full decentralization of responsibilities for implementation of infrastructure projects to Local Government Units (LGUs), in line with the Local Government Code of 1991.

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

1.2 Provincial Sector Planning

1.2.1 Objectives of Sector Planning

The main objectives of the provincial sector plan are:

- (1) To formulate a Long-Term Provincial Development Plan with a target year of 2010 for the water supply, sewerage and sanitation sector;
- (2) To propose a Medium-Term Sector Investment Plan covering the years 1999-2003 to form the basis for implementing foreign and locally funded projects;
- (3) To recommend arrangements and logistics for implementation; and
- (4) To provide measures to strengthen operational framework and institutional capabilities including community development and gender responsiveness.

1.2.2 Scope of Sector Planning

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

- (1) Collection and Review of Previous Studies and Existing Data, and Establishment of Data Base: Inventories on existing conditions and facilities
 - 1) Natural conditions and geographical features
 - 2) Socio-economic conditions
 - 3) Population
 - 4) Health status
 - 5) Environmental conditions

- 6) Existing facilities and service coverage
 - Water Supply
 - Sanitation and Sewerage
- 7) Existing sector arrangements and institutional capacity
 - Sector institution
 - Current community development, gender and training approaches
 - Existing sector monitoring systems
- 8) Past financial performance in the sector development

(2) Long-Term Development Plan

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

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

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

(4) Monitoring for Evaluation of Provincial Plan Implementation

1.2.3 Financing of Sector Plan

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

In September 1996, the GOP requested the Government of Japan to finance the preparation of the Study for 21 provinces in Visayas and Mindanao areas. Among these was Davao del Norte 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 Davao del Norte

1.3.1 Preparation of the Plan

The PW4SP for the Province was prepared by a Provincial Sector Planning Team (PSPT) organized by the provincial government. The members consist of the Provincial Planning and Development Coordinator (PPDC), the planning and development officers from PPDO, and the staff members from Provincial Engineers Office (PEO), Provincial Health Office (PHO) and Provincial Local Government Operations Office (PLGOO-DILG). The preparation of the plan was assisted by the Department of the Interior and Local Government (DILG), the Department of Public Works and Highways (DPWH), the Department of Health (DOH), the Local Water Utilities Administration (LWUA), the National Economic and Development Authority (NEDA), other national line agencies and non-government organizations (NGOs) active in the sector. The PSPT was also assisted by the JICA Study Team through technical grant assistance from the Japanese Government (refer to Minutes of Discussions between DILG and JICA, and Figure 1.3.1 Organization Chart, 1.3.1 Preparation of the Plan, Supporting Report).

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

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

1.3.2 Outline of the Report

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

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

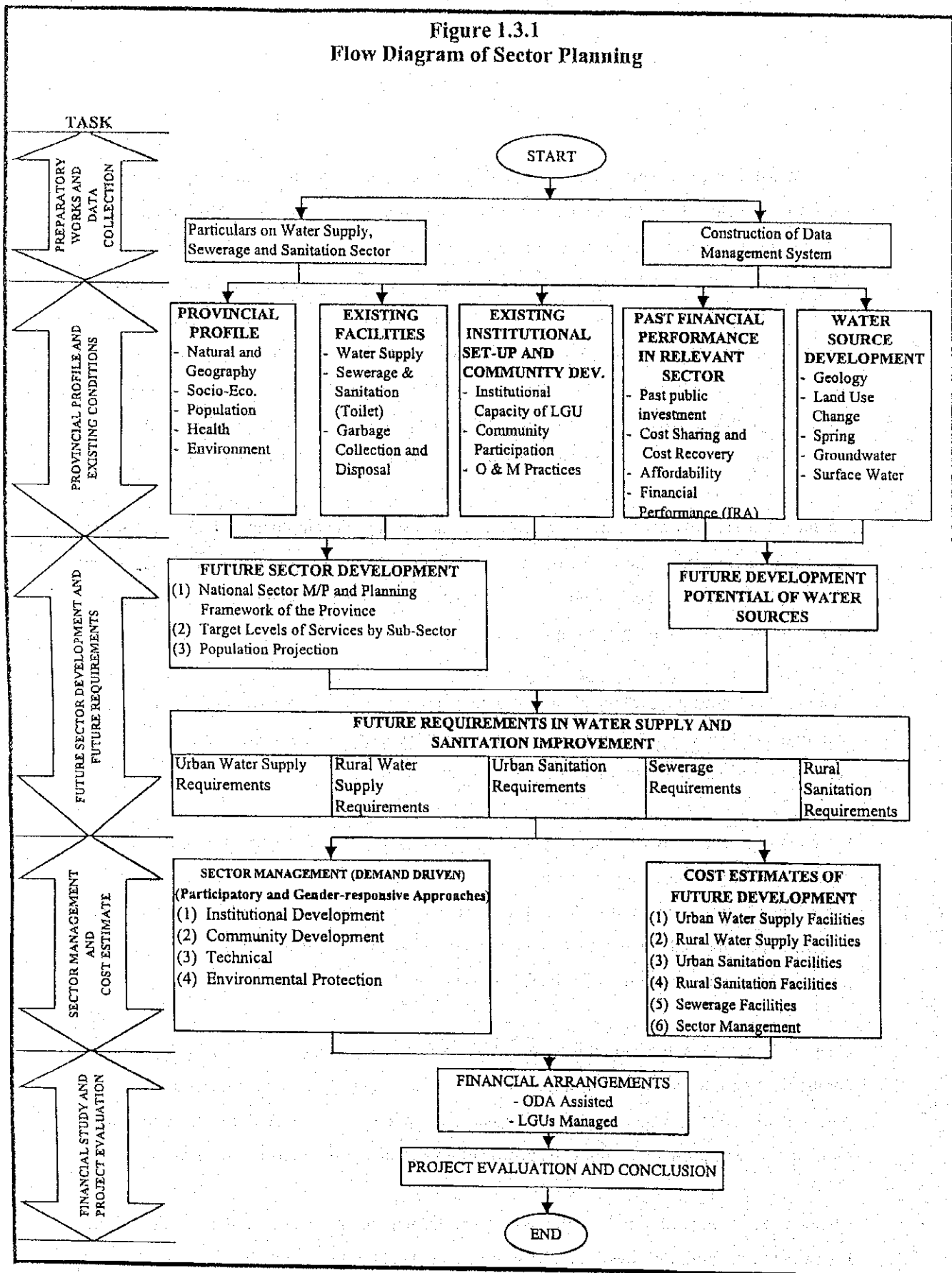
Chapter 3 provides the provincial profile with reference to current sector conditions: natural conditions and geographical features, socio-economic conditions, demographic trends, health status and environmental conditions as the planning environment.

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

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

Chapters 8, 9 and 10 develop the long-term Development Plan and the medium-term Investment Plan both for physical and sector management requirements. Emphasis is placed

Figure 1.3.1
Flow Diagram of Sector Planning



on the sector management for the medium-term development plan entailing institutional arrangements and operational framework, community development, gender and training and project implementation needs. Required costs for physical and institutional elements are also presented according to the implementation arrangements.

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

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

1.4 Acknowledgment

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

Chapter
PLANNING APPROACH FOR
FUTURE SECTOR DEVELOPMENT

2

2. PLANNING APPROACH FOR FUTURE SECTOR DEVELOPMENT

2.1 General

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

2.2 Planning Framework

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

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

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

Table 2.2.1 National Sector Coverage Targets

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

Notes:

¹ Based on the Updated MTPDP targets for 1998.

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

³ Excluding Metro Manila and its outlying areas.

⁴ Includes only point sources.

⁵ Service coverage for 1996.

2.3 Sector Objectives

The objectives of the sector are:

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

2.4 Current Sector Policies and Strategies

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

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

2.5 Major Legislation and Regulations Affecting the Sector

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

central government agencies and LGUs for the sector (details are referred to 5.2, Data Report).

- (2) The **Water Code of the Philippines (PD 1067)** consolidates legislation relating to 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.

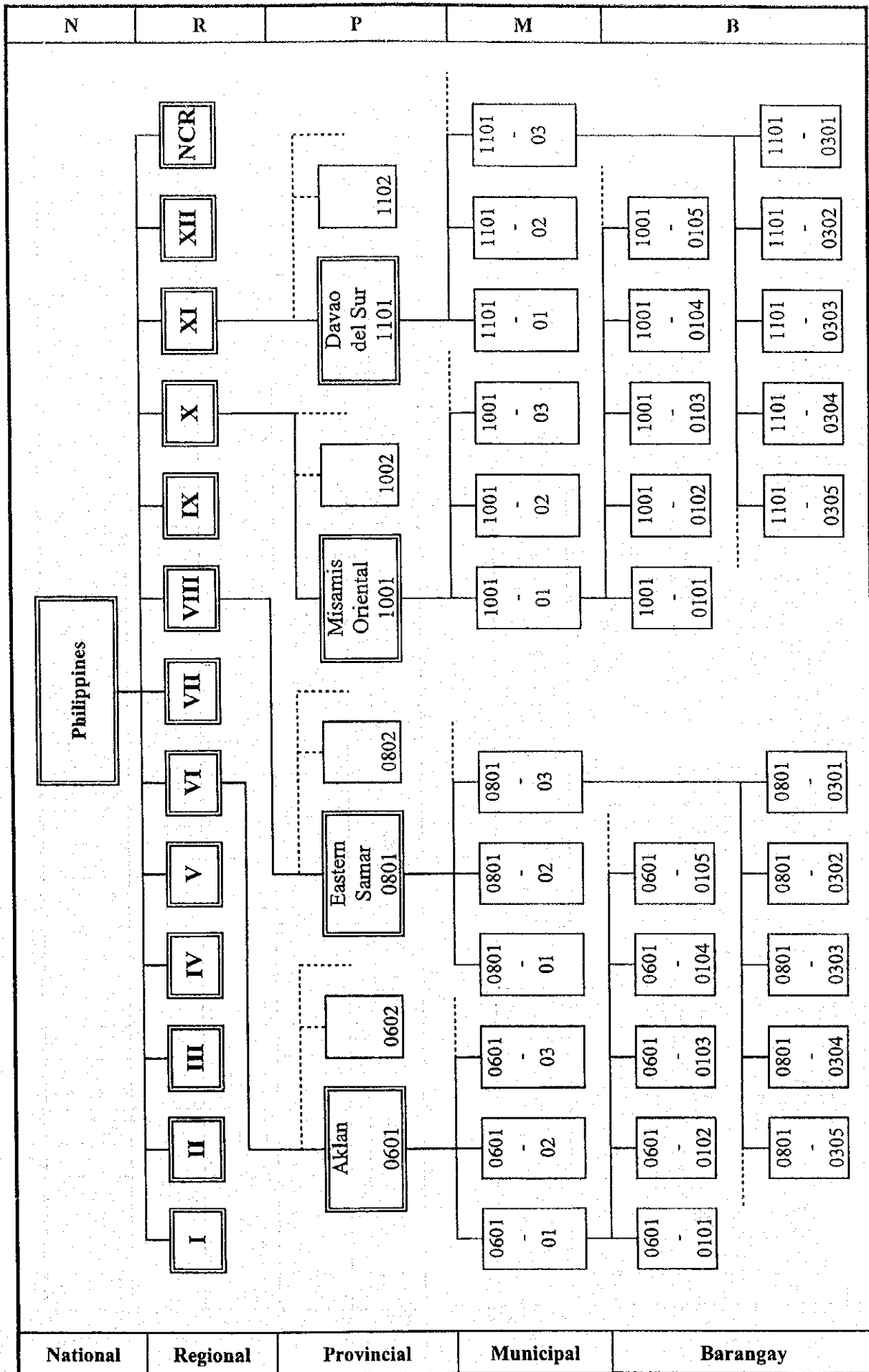


Figure 2.6.1 Institutional Hierarchical System by the NEDA Coding

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			
			P.1.3.2	M.1.3.2			
1.4 Number of Households			P.1.4	M.1.4			
1.5 Services			P.1.5	M.1.5			
1.6 Occupation			P.1.6	M.1.6			
1.7 Family Income			P.1.7	M.1.7			
1.8 Family Expenditure Pattern			P.1.8	M.1.8			
1.9 Agricultural Annual Income			P.1.9	M.1.9			
1.10 Education and Literacy			P.1.10	M.1.10			
2. Land Use Data							
2.1 Existing Land Use			P.2.1				
2.2 Future Land Use			P.2.2				
3. Health Data							
3.1 Morbidity and Mortality			P.3.1	M.3.1			
3.2 Health Facility			P.3.2	M.3.2			
3.3 Medical Practitioner			P.3.3	M.3.3			
4. Water Sources Data							
4.1 Water Source General Information			P.4.1				
4.2 Water Source Technical Information			P.4.2				
4.3 Untapped Spring Information				M.4.3			
4.4 Well Information				M.4.4			
4.5 Surface Water Sample Point for Water Quality Analysis				M.4.5			
5. Water Supply Data							
5.1 Level I Facility			P.5.1	M.5.1			
5.2 Level II System						S.5.2.1	
						S.5.2.2	
5.3 Level III System						S.5.3.1	
						S.5.3.2	
						S.5.3.3	
						S.5.3.4	
6. Environmental Sanitation							
6.1 Household Toilet			P.6.1	M.6.1			
6.2 School and Student			P.6.2	M.6.2			
6.3 School Toilets			P.6.3	M.6.3			
6.4 Public Toilets			P.6.4.1	M.6.4.1			
			P.6.4.2	M.6.4.2			
			P.6.4.3	M.6.4.3			
6.5 Drainage Facilities			P.6.5	M.6.5			
6.6 Solid Waste Collection and Disposal			P.6.6	M.6.6			
7. Investment Data							
7.1 Past Annual Investment			P.7.1				
7.2 Project Description			P.7.2				
7.3 Planned Annual Investment			P.7.3.1				
			P.7.3.2				
7.4 Income/Expenditure of LGU			P.7.4				
8. Model Study							
8.1 Barangay Group Information					MS.8.1		
8.2 Key Informant Questionnaire				MS.8.2			
8.3 Community Development, Training, Gender and Development Data Survey			MS.8.3	MS.8.3		MS.8.3	
8.4 Institutional Development Questionnaire			MS.8.4	MS.8.4		MS.8.4	
8.5 Model Study			MS.8.5	MS.8.5		MS.8.5	
8.6 Data/Information Checklist on Beneficiaries Participation and Assistance Extended in the Sector			MS.8.6	MS.8.6	MS.8.6		
8.7 Guide Questions/Pointers for Discussion with Provincial, Municipal and Barangay LGUs			MS.8.7	MS.8.7			

(2) Key Parameters

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

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

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

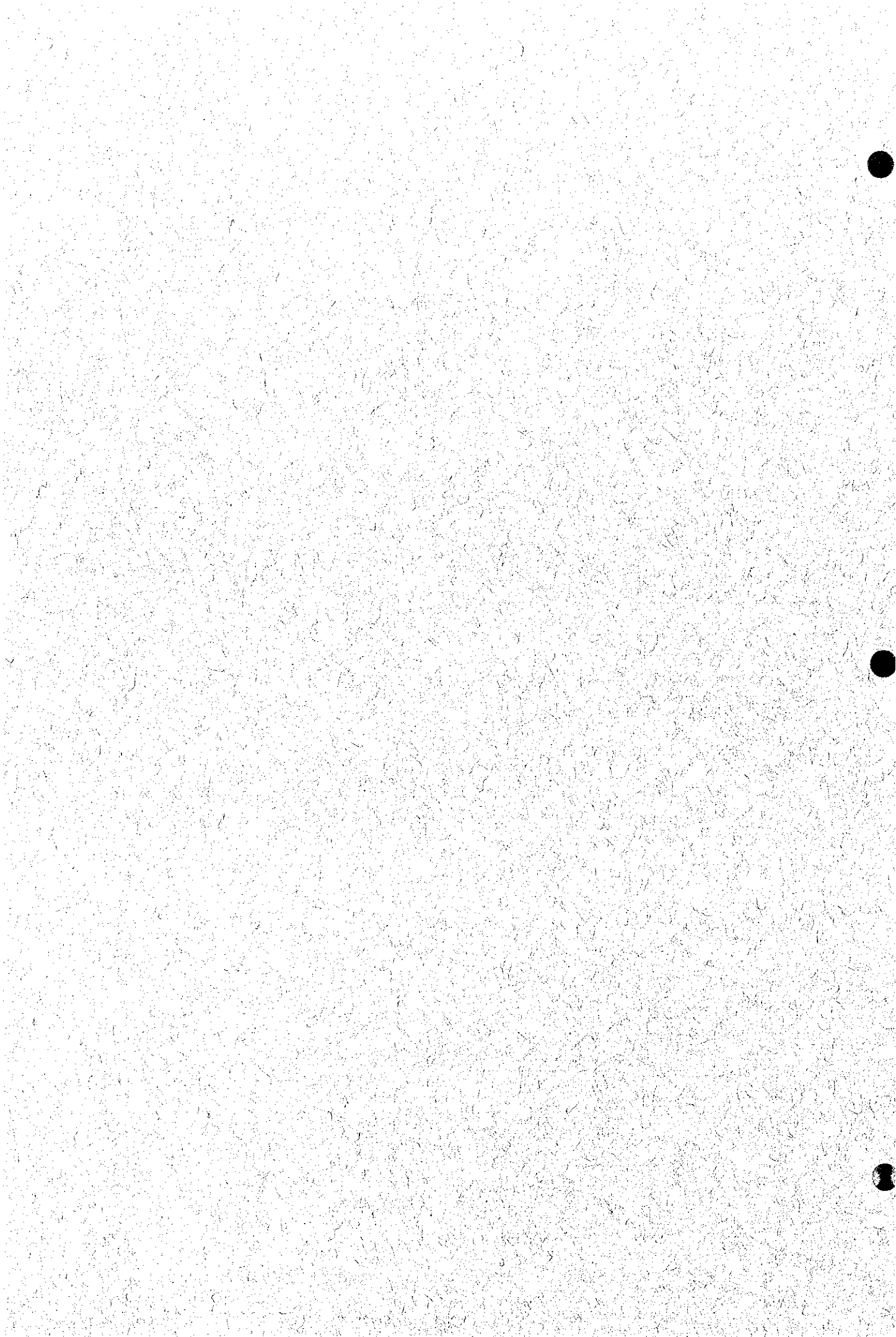
(3) Data Processing

Collected data are entered into the forms constructed in EXCEL database. The data are consolidated into final forms in application of small programs prepared for this planning. Linked outputs in tables and graphics are prepared in EXCEL spreadsheets for final analysis and presentation. Key parameters are entered a key parameter table linked to the output tables (refer to 2.6.2 Data Management, Supporting Report).

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

Chapter
PROVINCIAL PROFILE

3



3. PROVINCIAL PROFILE

3.1 General

Davao del Norte, with Tagum City as its provincial capital, is 55km north of Davao City. It is one of the 6 provinces and 2 chartered cities that comprise Region XI, the Southern Mindanao Region. Agusan del Sur bound the province on the north, on the east by the newly created province of Compostela Valley, on the south by Davao City/Davao Gulf, and on the west by the provinces of Bukidnon and Davao del Sur as shown in the Location Map. The province has an island off the Davao Gulf that forms the Island Garden City of Samal.

The province is classified as 1st class and has a total land area of 3,481.32 sq.km that is 1.16% of the Philippine total land area of about 300,000sq.km (some land areas of municipalities are still being resolved). It is composed of 8 municipalities and 2 component cities, namely: Tagum and the newly formed Island Garden City of Samal. Based on the 1995 NSO records, the province has 224 barangays, of which 20 are urban and 204 rural. Provincial total population was 671,333 in 1995. About 70% of the population resided in rural areas while the remaining 30% in urban areas. Tagum City and the municipality of Panabo are the trade and industry centers of the province, while the Island Garden City of Samal is the tourism center.

At present, there are 5 water districts and 21 LGU/association/private-managed Level III water 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/Cities

Municipality/City	Class	Land Area (km ²)	1995 Population		Number of Barangay		
			Number	Density (person/km ²)	Urban	Rural	Total
Asuncion	3rd	187.12	57,072	305	1	25	26
Braulio E. Dujali*	4th	91.00	14,318	157		5	5
Carmen	3rd	306.78	51,055	166	1	19	20
Island Garden City of Samal	4th	276.78	76,995	278	4	42	46
Kapalong	1st	1,112.72	62,183	56	1	20	21
New Corella	4th	314.57	41,615	132	1	20	21
Panabo	1st	221.18	121,472	549	5	35	40
Santo Tomas	1st	320.41	77,182	241	1	18	19
Tagum City (Capital)	1st	195.80	156,588	800	6	17	23
Talaingod	4th	454.96	12,853	28		3	3
Provincial Total	1st	3,481.32	671,333	193	20	204	224

Note: * Land area is still being resolved.

3.2 Natural Conditions and Geographical Features

3.2.1 Meteorology

The province has Type IV climate under the Coronas classification and is characterized by unpronounced dry and wet seasons as reflected in the Location Map. Rainfall is more or less evenly distributed throughout the year with no pronounced rainy season and dry season. The province is located south of the typhoon belt hence, the occurrence of typhoons is minimal. Also, the province is naturally protected by the mountain ranges that act as barriers from the onslaught of typhoons.

3.2.2 Land Use

Remaining forest area constitutes a mere 26% of the total area of the province located mostly in the mountain ranges on the eastern and western part. Agricultural land comprises about 44%, while Built-up areas are limited to 5%. These settlements are concentrated along the major transport routes. Openland and grassland represent an aggregate area of 23%. The existing land use pattern as presented in Table 3.2.1 must be enhanced by rehabilitation of watersheds in order to pursue a sustainable growth of the province. The forest cover must be conserved to serve as watershed rather than as source of timber. An efficiently managed watershed collects and regulates flow of water, controls soil erosion and minimizes water pollution. Conversion of forestlands to other uses will restrict its function as a watershed. Accordingly, a significant increase in agricultural area will result in a high demand of water for agricultural use.

Table 3.2.1 Current Land Use

Land Use	Area (km ²)	Percentage over Total Land Area
Forest Land	893.33	26
Grassland	16.19	0
Built-up	179.58	5
Agricultural	1,475.87	44
Fishponds, Mangrove, Inland Water Area	47.23	1
Openlands	778.11	23
Provincial Total	3,390.31	100

Source: PPDO

3.2.3 Topography and Drainage

The topographic feature of Davao del Norte is characterized by a wide alluvial plain on the central lowland area, a rugged, mountainous part on the eastern portion, and a moderately to steeply sloping topography on the western part. Comprising the major portion of the alluvial plain is a flat tract of land. However, in some places, the areas are gently undulating and exhibit a rolling topography. Elevation varies from a few meters to more than 200 masl.

The location of the outer eastside cordillera with N-S stretching is on the eastern edge of Mindanao Island with elevations of about 1,000 m to 1,300 m, which mountains are mainly distributed in Surigao del Norte and Compostela Valley. Samal and Talikud Islands are part of the piedmont of this cordillera. The mountainous western side of the province is part of the Mindanao Central Cordillera. This cordillera is located on the central part of Mindanao Island with N-S stretching. The chain of volcanoes, both active and inactive, covers the Mindanao Central Cordillera like Mt. Hibok-hibok, Mt. Matutum, Mt. Parker and others.

The province of Davao del Norte faces the Davao Gulf in the southern side. The Tagum River with a total length of about 95km is the only major river in the province and has a total watershed area of 3,064 km². It originates from the eastern hillside of the Mindanao Central Cordillera and flows to the Central Alluvial Plain, and then extends to the Davao Gulf. The other rivers are Lasang River and Davao River. All these rivers drain to the Davao Gulf.

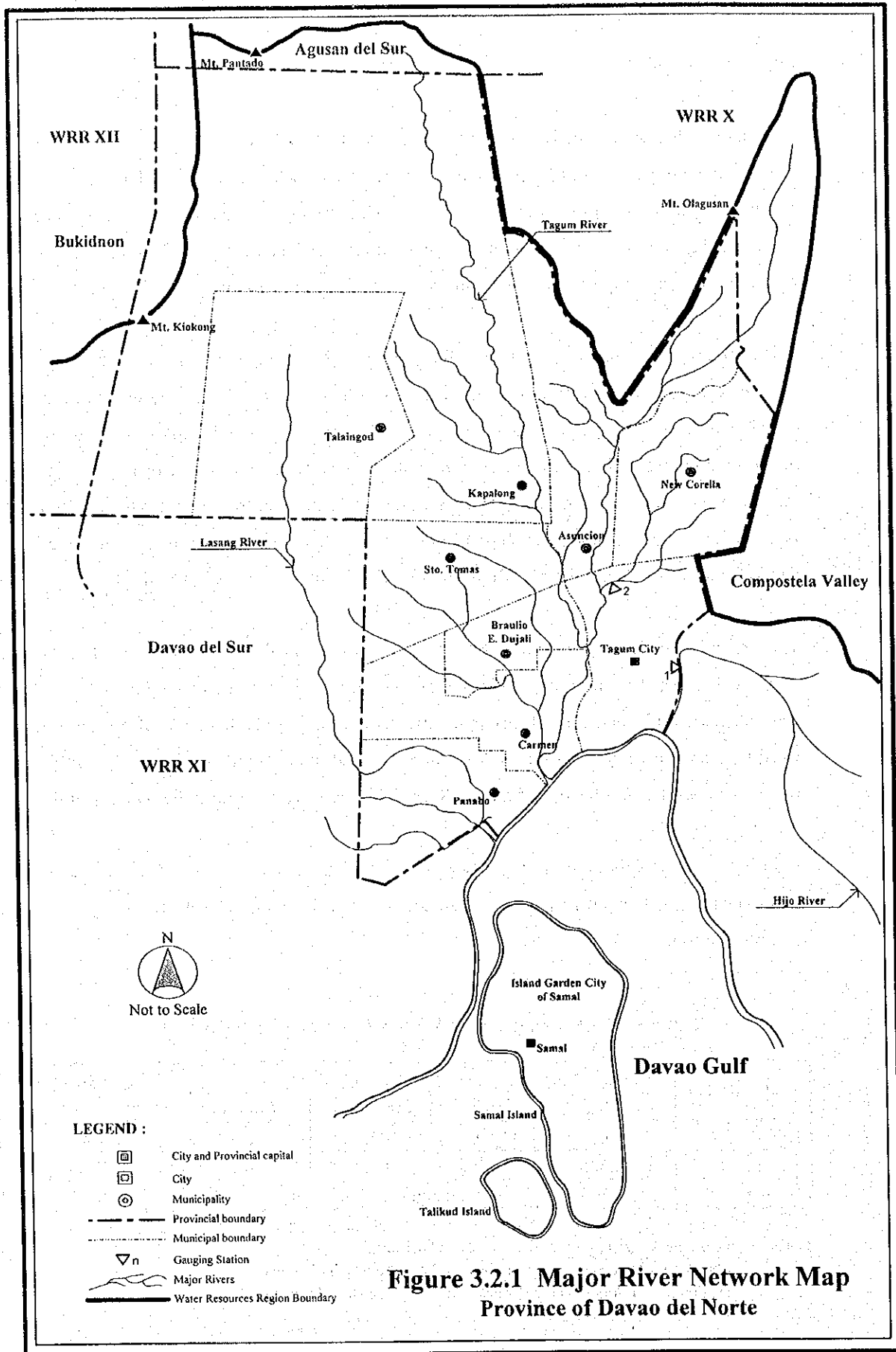
Figure 3.2.1 shows the natural drainage systems of the province. Table 3.2.2 is a list of the main rivers and their corresponding drainage areas with recorded flow rates at the site of gauging station.

Table 3.2.2 Drainage Areas & Flow Rates of Major Rivers

Major Rivers	Drainage Area (km ²)	Flow Rate (m ³ /sec)			Water Districts (using river water)
		Peak	Maximum	Minimum	
Hijo	617	150.9	102.5	8.3	None
Tagum	2,326	654.7	601.9	24.1	None
Lasang	808	No gauging station present.			None

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

Notes: Peak - Peak discharge of Daily Maximum Discharge
 Maximum - Maximum Daily Discharge of Weighted Daily Discharge
 Minimum - Minimum Daily Discharge of Weighted Daily Discharge
 Inc. - Incomplete/Lacks record



Three (3) typical rivers in the province were selected for water quality examination, namely: Hijo, Tagum and Lasang. Analyzed river waters were generally turbid. The results showed high Fe and Mg contents from the Hijo River probably due to the mineral rich rocks of the volcanoes (refer to 7.5, Data Report).

3.3 Socio-economic Conditions

3.3.1 Economic Activities and Household Income

Agriculture is the major economic activity in the province with food, commercial and cash crops being cultivated. Rice is the primary food and cash crop. Commercial crops include banana, pineapple, coffee and coconut. Agro-industrialization using the commercial crops raised in the province is also a significant economic contributor. With the opening of gold mining areas in the province, the sub-sector of mining and quarrying played an important part on the economic activities.

The NSO Family Income and Expenditures Survey (FIES) in 1994 showed that the average annual family income of the province was ₱ 59,584, while the expenditure was at ₱ 50,461 or a net saving of ₱ 9,123. Distribution of families by income class in the region and province is shown in Figure 3.3.1 (refer to Table 3.3.1, Supporting Report). Percentage of families of lower income levels in the province was higher than the average figures in the region. Based on the established poverty threshold income of ₱ 41,579 in Region XI for 1994, about half the 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 (refer to Table 3.3.2, Supporting Report). By class of worker, self-employed without any paid employee had the highest share of 33% as indicated in Figure 3.3.2.

3.3.2 Basic Infrastructure

All municipalities have electric supply and telecommunication services. Land transportation is available by means of tricycles, jeepneys, minibuses and buses. The province relies on Davao International Airport in Davao City for commercial air travel, although there are a number of private small-scale airstrips that caters to the different agriculture-based establishments. There are 1,189 business establishments and 85 tourism facilities. Table 3.3.1 presents an 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 400 schools consisting of 296 elementary schools, 67 high schools and 37 colleges/technical institutions. A large part of the population had attained elementary or high school levels of education as shown in Figure 3.3.3 (refer to Table 3.3.3, Supporting Report).

Table 3.3.1 Provincial Outline on Public Services

Items	Unit	Qty.	Items	Unit	Qty.
(1) Roads a) Total Length b) Barangay roads	Km Percent	2,781.94 48.68	(8) Tourism facilities (Hotel resort, lodges, recreational facilities, etc.)	Number	16
(2) Electricity service coverage a) Municipality b) Barangay c) Household	Percent Percent Percent	100 75 48	(9) Schools a) Elementary level b) Secondary level c) Tertiary level/Technical	Number Number Number	296 67 37
(3) Telecommunication Services a) Availability in municipality b) Telegraph station c) Telephone station	Percent Number Number	100 9 7	(10) Health Facilities a) Hospital/clinics b) Main health centers, rural health units, barangay health center, etc	Number Number	30 122
(4) Post Office	Number	12	(11) Labor a) Labor force participation ratio b) Employment rate	Percent Percent	69.4 94.4
(5) Transportation services	Mode (ex. Bus, jeep, taxi,.)	Motorcycle, cars, jeepneys & buses	(12) Average family income a) Monthly income b) Monthly expenditure	Pesos/Month Pesos/Month	4,965 4,205
(6) Banking Facilities a) Private bank b) Public bank	Number (by Private and public)	32 29 3			
(7) Industrial/business/commercial establishment	Number	1,189			

Sources: PSPT, Provincial Socio-economic Profile Development Plan, 1995 Population Census, 1994 Family Income and Expenditures

Table 3.3.2 Public Facilities and Services by Municipality

Municipality/City	High School			Vocational School	College	Hospital	Public Market	Bank and Financing Institutions
	Public	Private	Total					
	nos.	nos.	nos.					
Asuncion	3	1	4			1	2	
Braulio E. Dujali	3		3					
Carmen	3		3			1	1	3
Island Garden City of Samal	10	4	14	1	1	1	6	2
Kapalong	6	2	8	1	1	4	1	1
New Corella	3	1	4			1	2	1
Panabo	6	3	9	5	4	11	2	5
Santo Tomas	5	3	8	2	4	4	1	2
Tagum City (Capital)	7	6	13	14	4	7	1	18
Talaingod	1		1				1	
Provincial Total	47	20	67	23	14	30	17	32

Figure 3.3.1 Distribution of Families by Income Class

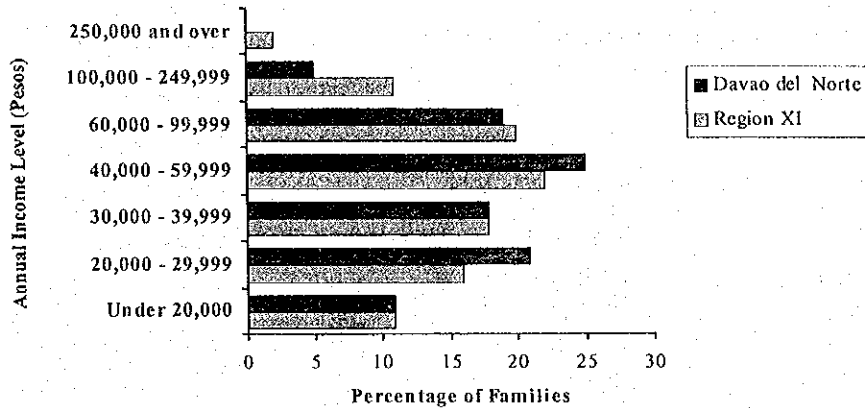


Figure 3.3.2 Employment Distribution by Major Industry and Class of Worker

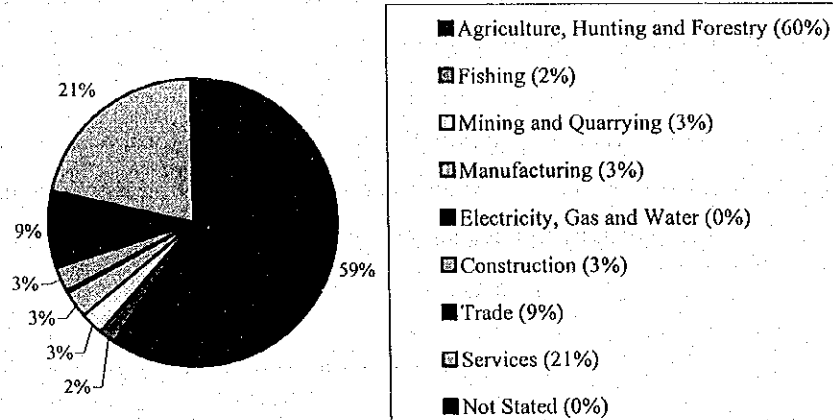
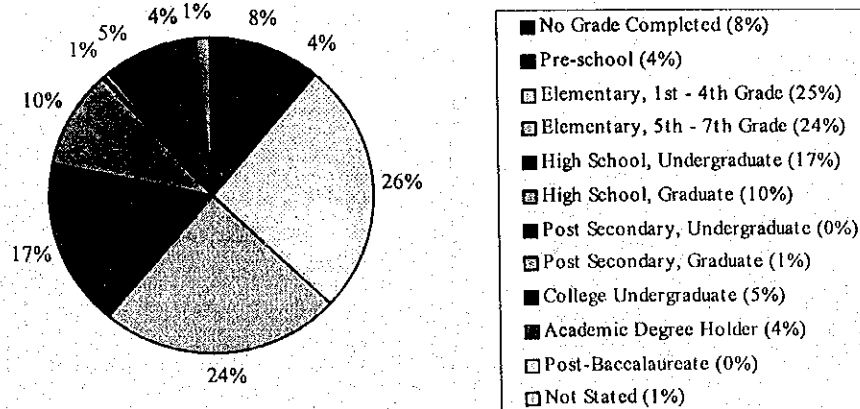


Figure 3.3.3 Population Distribution by Highest Educational Attainment



3.4 Population

3.4.1 Previous Population Development

A declining provincial population growth rate had been experienced since the last 6 census years (1960-1995) as indicated in Figure 3.4.1. From an average annual growth rate of 5.00% during the period 1960 to 1970, it gradually decreased to 2.28% (1990-1995). A summary of the average annual growth rates is as follows:

<u>Year</u>	<u>Population</u>	<u>Ave. Annual Growth Rate (%)</u>	<u>Period</u>
1970	206,873	5.00	1960 - 1970
1975	298,260	5.91	1970 - 1975
1980	343,240	4.22	1975 - 1980
1990	520,015	3.83	1980 - 1990
1995	671,333	2.28	1990 - 1995

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

The 1998 population was estimated to provide the planning base for the Master Plan (refer to Section 8.3.1, Population Projection, Main Report). Table 3.4.1 shows a breakdown of the past population development by municipality including the 1998 estimated population.

Figure 3.4.1 Previous Population Development of the Province

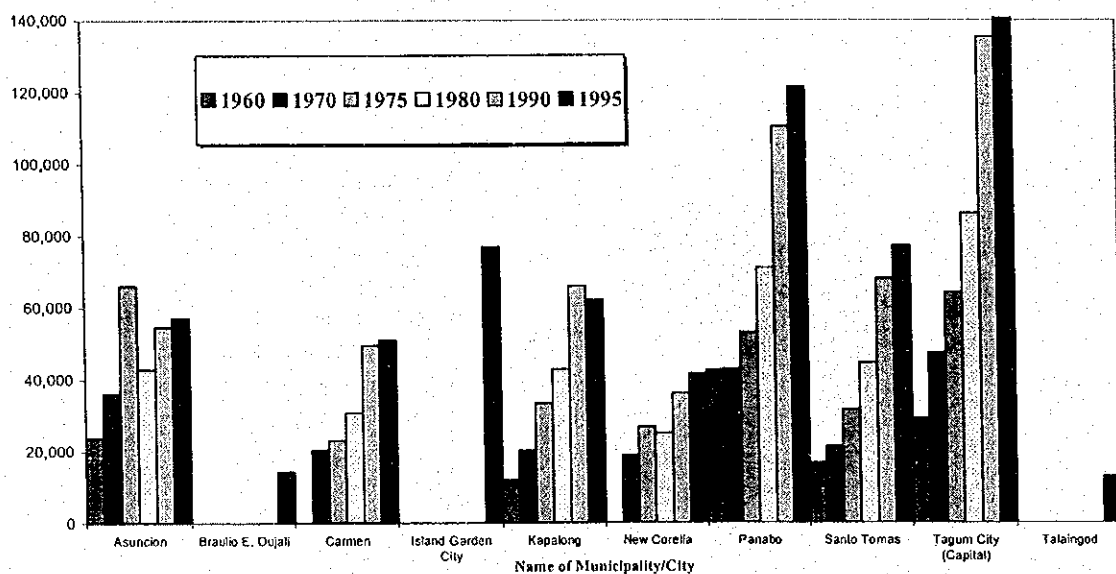


Table 3.4.1 Previous Population Development by Municipality/City

Municipality/City	Previous Population						
	1948	1960	1970	1975	1980	1990	1995
Asuncion	8,594	23,653	36,033	66,102	42,915	54,594	57,072
Braulio E. Dujali*							14,318
Carmen			20,385	23,163	30,719	49,507	51,055
Island Garden City of Samal*							76,995
Kapalong	5,878	12,067	20,225	33,362	42,869	66,030	62,183
New Corella			18,745	26,809	24,926	36,138	41,615
Panabo		42,509	42,920	53,015	71,098	110,390	121,472
Santo Tomas		16,687	21,241	31,584	44,512	67,916	77,182
Tagum City (Capital)	29,678	28,982	47,324	64,225	86,201	135,440	156,588
Talaingod							12,853
Provincial Total	44,150	123,898	206,873	298,260	343,240	520,015	671,333

Note: The 2 municipality/city were created in 1998.

3.4.2 Classification of Urban and Rural Areas

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

- (1) In their entirety, all cities and municipalities having a population density of at least 1,000 persons per square kilometer.
- (2) Poblaciones or central districts of municipalities and cities, which have a population density of at least 500 persons per square kilometer.
- (3) Poblaciones or central districts (not included in nos. 1 and 2) regardless of population size which have the following:
 - 1) Street pattern, i.e., network of streets either at parallel or in right angle orientation;
 - 2) At least six establishments (commercial, manufacturing, recreational and/or personal services); and
 - 3) At least three of the following:
 - a) a town hall, church or chapel with religious services at least once a month;
 - b) a public plaza, park or cemetery;
 - c) a public market place or building where trading activities are carried on at least once a week; and

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

- (4) Barangays having at least 1,000 inhabitants, that meet the conditions set forth in no. 3 above, and where the occupation of the inhabitants is predominantly non-farming/fishing.

For this Master Plan, however, the 1995 NSO classification of urban and rural barangays was modified to reflect the actual conditions prevailing in the area. There are 20 urban barangays and 204 rural barangays for a total of 224 barangays in 1997. Distribution of the classified area is shown in Figure 3.4.1, Supporting Report.

3.4.3 Present Population Distribution

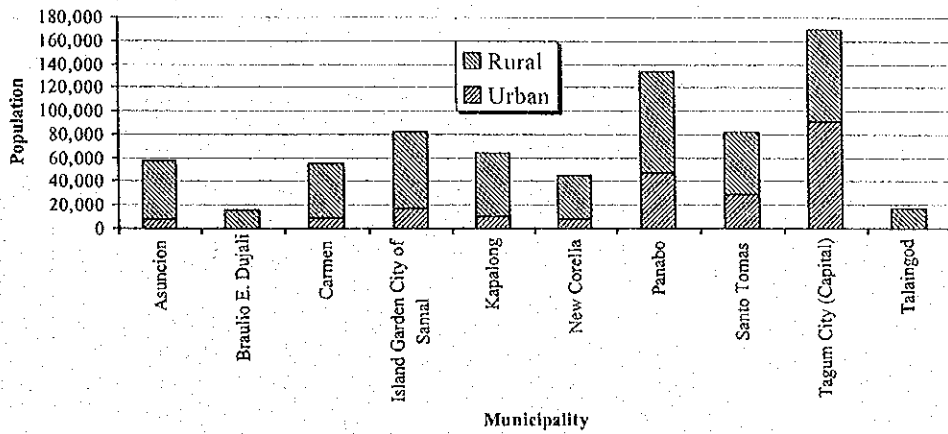
From the 1995 NSO census, the 1998 urban-rural population was estimated. Rural population accounts for 68% of the provincial total, while 32% is urban as reflected in Figure 3.4.2. Table 3.4.2 presents the breakdown of the number of urban and rural barangays by municipality and its corresponding present population distribution.

Table 3.4.2 Outline of Urban and Rural Areas in the Province

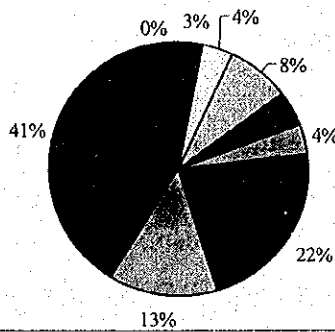
Municipality/City	Number of Barangay			Population (1998)		
	Urban	Rural	Total	Urban	Rural	Total
Asuncion	1	25	26	7,325	50,556	57,881
Braulio E. Dujali		5	5		15,577	15,577
Carmen	1	19	20	8,716	45,937	54,653
Island Garden City of Samal	4	42	46	16,699	65,160	81,859
Kapalong	1	20	21	10,224	53,930	64,154
New Corella	1	20	21	8,389	36,514	44,903
Panabo	5	35	40	47,762	85,598	133,360
Santo Tomas	1	18	19	29,421	53,201	82,622
Tagum City (Capital)	6	17	23	91,030	78,334	169,364
Talaingod		3	3		17,141	17,141
Provincial Total	20	204	224	219,600	501,914	721,514

There are 140,911 households with 98,454 (70%) residing in rural areas and 42,457 (30%) households in urban areas. The average provincial household size is 5.17 persons/household. Table 3.4.3 presents the number of household in 1995, the estimated number in 1998, as well as the household size by urban and rural area per municipality.

Figure 3.4.2 Present Population Distribution

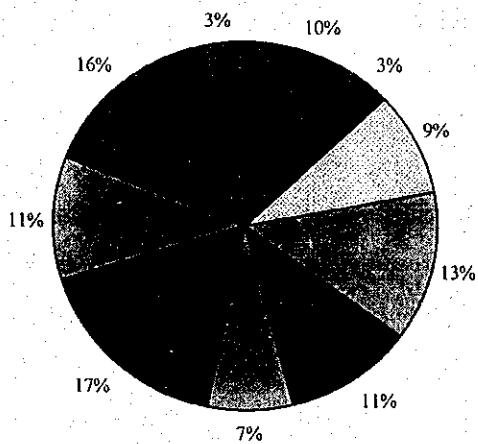


Urban Population (30.4%)



- Asuncion (3%)
- ▣ Braulio E. Dujali (0%)
- Carmen (4%)
- ▣ Island Garden City of Samal (8%)
- Kapalong (5%)
- ▣ New Corella (4%)
- Panabo (22%)
- ▣ Santo Tomas (13%)
- Tagum City (Capital) (41%)
- ▣ Talaingod (0%)

Rural Population (69.6%)



- Asuncion (10%)
- ▣ Braulio E. Dujali (3%)
- Carmen (9%)
- ▣ Island Garden City of Samal (13%)
- Kapalong (11%)
- ▣ New Corella (7%)
- Panabo (17%)
- ▣ Santo Tomas (11%)
- Tagum City (Capital) (16%)
- ▣ Talaingod (3%)

Table 3.4.3 Household Numbers and Household Size

Municipality	Number of Households (1995)			Number of Households (1998)			1995 Household Size (person/household)		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Asuncion	1,400	9,601	11,001	1,420	9,741	11,161	5.16	5.19	5.19
Braulio E. Dujali		3,033	3,033		3,300	3,300		4.72	4.72
Carmen	1,580	8,472	10,052	1,692	9,061	10,753	5.15	5.07	5.08
Island Garden City of Samal	3,099	11,955	15,054	3,300	12,695	15,995	5.07	5.13	5.11
Kapalong	1,915	10,596	12,511	1,978	10,939	12,917	5.17	4.93	4.97
New Corella	1,459	6,309	7,768	1,574	6,812	8,386	5.33	5.36	5.36
Panabo	8,605	15,078	23,683	9,439	16,557	25,996	5.06	5.17	5.13
Santo Tomas	5,247	9,723	14,970	5,615	10,411	16,026	5.24	5.11	5.16
Tagum City (Capital)	16,113	14,207	30,320	17,439	15,360	32,799	5.22	5.10	5.16
Talaingod		2,683	2,683		3,578	3,578		4.79	4.79
Provincial Total	39,418	91,657	131,075	42,457	98,454	140,911	5.17	5.10	5.12

3.5 Health Status

3.5.1 Morbidity and Mortality and Infant Mortality

The number one cause of morbidity in 1997 was influenza followed by pneumonia and diarrhea. Vascular diseases and bronchitis ranked fourth and fifth, respectively. Other causes of morbidity in descending order were: intestinal parasitism, malaria, ARI, dysentery and tuberculosis. Regarding mortality, the number one cause was tuberculosis, followed by pneumonia. Heart diseases, other accidents and diarrhea ranked third, fourth and fifth respectively. Pneumonia, diarrhea, gastroenteritis and bronchitis were the 4 leading causes of infant mortality in the province.

The general health status of the populace of the province was relatively poor as compared with the national condition. There are many water-related diseases in the 10 leading causes of mortality, mortality and infant mortality in Davao del Norte 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.

Water-related diseases in the ten leading causes of morbidity include diarrhea (rank 2nd), intestinal parasitism (6th), malaria (7th) and dysentery (9th). Diarrhea and gastroenteritis ranked 5th and 8th as the leading causes of mortality. Again, diarrhea (rank 2nd), gastroenteritis (3rd) and dysentery (9th) were among the 10 leading causes of infant mortality.

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

Rate: 1/100,000

Causes	Davao del Norte		Philippines			
	Number	Rate	Number	Rate	Ranking	
Morbidity	1. Influenza	25,712	3,830			
	2. Pneumonia	25,591	3,812	470,574	703	4
	3. Diarrhea	21,496	3,202	1,337,449	1,997	1
	4. Vascular Diseases	17,918	2,669			
	5. Bronchitis	15,736	2,344	903,508	1,349	2
	6. Intestinal Parasites	6,136	914	-	-	-
	7. Malaria	5,565	829	49,506	74	10
	8. ARI	4,270	636	159,049	238	6
	9. Dysentery	3,618	539			
	10. Tuberculosis	3,048	454			
Mortality	1. Tuberculosis	1,168	174	24,580	37	5
	2. Pneumonia	1,007	150	35,582	53	3
	3. Heart Diseases	832	124			
	4. Other Accidents	383	57	13,477	20	6
	5. Diarrhea	295	44	5,759	9	9
	6. Prematurity	208	31			
	7. Diabetes Mellitus	107	16			
	8. Gastroent. Colitis	101	15			
	9. Congenital Anomalies	74	11			
	10. Nutritional Deficiencies	60	9			
Infant Mortality	1. Pneumonia	336	50	7,631	4.5	1
	2. Diarrhea	81	12	1,661	1.0	4
	3. Gastroent. Colitis	60	9			
	4. Bronchitis	40	6			
	5. Congenital Anomalies	34	5	2,366	1.4	3
	6. Meningitis	27	4			
	7. Tuberculosis	20	3			
	8. Heart Diseases	13	2			
	9. Dysentery	7	1			
	10. Measles	7	1	765	0.5	7

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 i.e., malaria, filariasis and dengue or H-fever, although the control of malaria and filariasis is beyond the scope of this Master Plan. A safe water supply, sanitary latrine and proper hygiene practices are conditions necessary for the control and prevention of these diseases.

Water-related diseases reported in the province were typhoid/paratyphoid, dysentery, intestinal parasitism, diarrhea, conjunctivities, cholera, dengue fever, viral hepatitis, malaria, filariasis, schistosomiasis, skin diseases and scabies. It is important to note that Davao del Norte is an identified endemic area for schistosomiasis, a water-based disease, and malaria and filariasis, both water-vector diseases. 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 WaterRelated Diseases

Diseases	Morbidity		Mortality	
	Number	Rate	Number	Rate
Water-borne				
1. Viral Hepatitis	336	50	27	4
2. Cholera	81	12	13	2
3. Dysentery	3,618	539	13	2
4. Gasroenteritis			101	15
5. Typhoid/Paratyphoid	913	136		
6. Diarrhea	21,496	3,202	295	44
Water-based				
1. Schistosomiasis	322	48	34	5
Water-washed				
1. Intestinal parasitism	6,136	914		
2. Scabies	852	127		
3. Conjunctivities	470	70		
4. Skin Diseases	1,370	204		
Water vector				
1. Dengue Fever	1,564	233	8	1
2. Malaria	5,565	829		
3. Filariasis	27	4		

3.5.3 Health Facilities and Practitioners

Present facilities servicing the health care of the population are 30 hospitals/clinics, 12 rural health units, and 130 barangay health stations. The province being an endemic area of schistosomiasis, also has one (1) control unit for schistosomiasis. The number and ratio to population of health facilities and/or medical practitioners in the province are almost comparable with that of the country and are presented in Table 3.5.1, 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 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/cesspool is also flowing into the streams. The other major pollutant is dumped refuse that finds its way to the river systems during rain or is thrown indiscriminately into the rivers and seashores. In rural areas, natural assimilation may be expected to purify organic substances. However, pollution or contamination is anticipated caused by agricultural activities especially with reference to fertilizers and pesticides.

Large-scale agro-industrial establishments involved in food processing and mining activities in the upland areas are identified as potential pollution sources in the province if no control measures are in place. As of now, the rivers of the province are not yet classified as to their beneficial use 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 10 municipalities, 2 have no municipal refuse collection and disposal services, namely; B. E. Dujali and Talaingod. Except for Tagum that has 4 units of closed-type collection

truck, the other 7 municipalities with service have only 1 to 3 units each of open dump truck. In the province, only 20 % of the households are served, while majority (80%) is unserved. Table 3.6.1 reflects the breakdown of the manner of solid waste collection and disposal, and service coverage by municipality.

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

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

Municipality/City	Number of Households 1998	Number of Collection Trucks				With Service				Without Service					Percentage of Households Served	Percentage of Households Unserved
		Open Dump Trucks	Closed Type Trucks	Total Units	Disposal		Total Households Served	Manner of Disposal (Number of Household)			Total Households Unserved					
					Number of Households Served by Open Dump Site	Number of Households Served by Sanitary Landfill		Dumping (Land and Water)	Burying	Composting						
Asunción	11,161	1		1	220		220	9,827	305	809	10,941	2			98	
Braulio E. Dujali	3,300							2,934			2,934				89	
Carmen	10,753	2		2	956		956	4,383	3,236	2,156	9,797	9			91	
Island Garden City of Samal	15,995	3		3	1,132		1,132	7,990	4,966	1,908	14,864	7			93	
Kapalong	12,917	1		1	500		500	4,804	3,866	3,747	12,417	4			96	
New Corella	8,386	1		1	152		152	3,035	1,790	3,409	8,234	2			98	
Panabo	25,996	3		3	7,356		7,356	7,690	4,678	6,640	19,008	28			73	
Santo Tomas	16,026	1		1	1,586		1,586	6,680	3,776	3,984	14,440	10			90	
Tagum City (Capital)	32,799	2	4	6	16,113		16,113	10,350	3,651	2,685	16,686	49			51	
Talaingod	3,578							3,578			3,578				100	
Provincial Total	140,911	14	4	18	28,015		28,015	61,273	26,288	25,338	112,899	20			80	