

The current major institutional issues are those of management of the transition process and of re-establishing leadership in the sector. Major resource realignments and capacity building initiatives are needed. The formulation of a new set of implementing rules and regulations will be started shortly.

(2) Sector finance

The water sector reform study reports that in order to increase nationwide water supply coverage to about 87% by 1998, new investments of about P39.3 B will be needed. Of this, only P12.8 B has been secured, i.e., carried over from existing projects. In addition, the level of public investment in water supply has declined in real terms in recent years. During the period 1988 through 1992, P17.268 B was allocated of which only P10.453 B was disbursed. Despite the declining trend in investments, the water sector fund utilization rate is only 60.5% - indicating serious institutional planning and implementation capacity issues. The delay in the institutional response to the policy shifts has invariably contributed to this decline in activity level.

If the new arrangements are to flourish, the issue of LGU access to external sources of capital development funds (backed by GOP guarantees) needs to be addressed.

5.4 Sector Agencies at the National Level

(1) Department of the Interior and Local Government (DILG)

Responsibility: The Department has the mandate of strengthening local capacity for delivery of basic services, including water and sanitation. It is responsible for providing general administration and institution-building support to LGUs including assistance in the formation and training of BWSAs; coordination of master plan preparation; sourcing of external funds; formulation and installation of sector management systems, including O&M and BWSA financial management systems. Ultimately, DILG is geared to provide a range of support activities to develop the capability of LGUs to provide, manage, operate and maintain water supply projects either directly or through community-based organizations, like BWSAs.

Current Activities: On a transitory basis, interagency provincial and municipal water task forces have been established in some provinces. These task forces (TFs) are the

current sector entry point of DILG. Through the TFs, barangays needing improved water supply and households needing sanitation improvements are identified and organizations are formed. Training activities are also done with the TFs. Conferences are held regularly to assess performance and review sector experiences. Training generally follows the cascade approach from the national up to the barangay level.

Resources: The PMO for Rural Water Supply and Sanitation is established under the Assistant Secretary for Plans and Programs. About sixty (60) staff members comprise the PMO. It has four (4) operating divisions (Administration; Finance and Procurement; Project Planning; and Field Operations). Its Work Program is integrated with the DILG Annual Plan of Implementation. Like other line Departments, DILG's annual budget allocation goes through the general appropriations review and approval process in Congress which usually requires a one-year lead time. Action officers are assigned for every active province. Monitoring and evaluation of project implementation are done by the provincial (and municipal) local government operations officers (PLGOOs/MLGOOs). Funds for sector training and BWSA formation are channeled through the regional and provincial DILG offices.

(2) Local Water Utilities Administration (LWUA)

Responsibility: LWUA is a specialized lending institution mandated to promote and oversee the development of provincial water utilities based on financial viability of projects. Most water utilities were under the LGUs until 1973, when some LGUs opted to waive their control over the utility and organize water districts (WDs) to qualify under the LWUA program. In 1987, LWUA responsibilities were expanded to include assistance to Level II Rural Waterworks and Sanitation Associations (RWSAs). The provision of Level II and III services and of wastewater disposal systems in communities outside Metropolitan Manila are largely coordinated through the LWUA. The WDs currently serve about 18.43 M consumers in about 703 cities and municipalities. NEDA Resolution No. 4 directs LWUA to focus on its development banking role and to fund only financially viable WDs. Since its establishment in 1972, LWUA has formed 544 WDs (486 of which have availed of loans totaling P 4.0 B). It has completed over 880 water supply projects.

Activities: LWUA has since developed a wide array of support services for WD development.

Institutional development services for WDs and RWSAs include: formation, management advisory services, training programs, management audits and operations reviews, installation of uniform commercial practices systems; information and marketing support.

Financial services include: economic and financial analysis, tariff analysis and fund sourcing. Various types of loans are available to finance the construction of water systems; reactivation of non-operating systems, rehabilitation and expansion of facilities; and training. Special loans finance watershed management projects; construction of administration buildings; purchase of service vehicles, communication and computer facilities; restoration of facilities damaged by calamities; initial or emergency operational needs. Commodity loans support generation of additional service connections.

Technical services: LWUA oversees the planning, design, construction, and control of quality standards to improve the water system facilities of WDs and RWSAs. LWUA formulates uniform standards for design, materials and construction to lower project costs and disseminates periodic water supply industry performance indicators.

LWUA consults with interested LGUs on the formation of WDs and RWSAs. Public hearings are held prior to the formation of WDs and tariff adjustments. Where tariff increases are not accepted, improvement projects are either reviewed or shelved altogether. LWUA collaborates with LGUs and consumers on all phases of WD improvement programs especially during the construction of water supply facilities.

Resources: LWUA maintains and fields a pool of management advisors, trainers, engineers and other professionals to give WDs and RWSAs proper guidance in their operation and administration. In addition, the Central Sewerage and Sanitation Program Support Office (CPSO) was recently established at LWUA to coordinate the implementation of sewerage and sanitation projects at the national level and to assist LGUs and WDs plan and manage sewerage and sanitation projects and programs at the local level.

LWUA training programs embrace efforts directed at the training and education needs of those who manage and operate water supply systems and those who provide assistance from the national level so that the water systems will succeed. Training for the water districts comprise about 20 technical and 20 management courses, while in-house courses cover cadetship training for fresh engineering graduates, management advisors, and supervisors courses on construction project management, and computer education.

(3) Department of Public Works and Highways (DPWH)

Responsibility: The Department is responsible for the construction and major repair/rehabilitation of rural water supply systems (Level 1) and for the planning and execution of sewerage projects in some cities and larger poblaciones in the country with participation of LGUs.

Activities: The actual construction of the projects are done thru contract or force account by the regional and district offices of the Department or other designated agencies under supervision of the PMO and in accordance with approved work programs. The following describes the current project planning and programming process for water supply projects. The central office advises regional office that funding will be available and requests for proposals for a specified number of projects. The regional office allocates the total number of projects among the district offices and directs preparation of a Program of Work (PoW) with a listing of sites. A draft PoW is submitted to the PPDO for comments. In most instances, this is reviewed by the Provincial Board. PPDO endorses the PoW to the DPWH Regional Office. The PoW is sent to the PMO-RWS at the central office which authorizes the release of budget allotment. DEO is now cleared to start construction. Reporting is done based on accomplishments.

Resources: The PMO for Rural Water Supply was established in 1981 (Ministry Order 14) to "manage and direct the planning, design, construction, organization and maintenance of foreign-assisted rural water supply projects" of the Department. It consists of a 44 technical and 26 administrative staff (regular). In addition, as the loan project packages may require, project staff are recruited on contract. At the field level, the Department maintains about 92 District Engineering offices. Most of the DEOs are staffed with a water engineer, drilling crews and equipment. In some DEOs, staff have been assigned to oversee BWSA formation and training activities.

(4) Department of Health (DOH)

Responsibility: The Department is the principal health policy-making and implementing agency. Its main function is to develop and implement sanitation programs nationwide and administer health education aimed at reducing morbidity due, among others, to waterborne and sanitation related illness specifically diarrhea diseases which ranked second leading cause of morbidity among the population in the past years. Its role in the water supply program is in the promotion of safe water supplies through water quality surveillance.

Activities: A major program of DOH (Environmental Health Service) is the improvement of the environmental sanitation conditions to make it more conducive to promotion and maintenance of the health of the people. The priority program components include water supply and sanitation (water treatment and disinfection, quality monitoring and surveillance), excreta and sewage disposal, wastewater collection and disposal. DOH also implements *Water for Life* project which calls for spring development for use in Level I systems and for organizing BWSAs. DOH is also responsible for the provision of sanitation facilities in rural areas.

Operating budgets come from general appropriations in the national budget. Capital expenditure funds to support construction of excreta and waste disposal systems come from project funds. Under the First Water Supply and Sanitation Project, DOH administered a project subsidy of P105.00 (cost of the bowl) per toilet. Similar arrangements are ongoing with the IBRD-assisted FW4SP. In addition, it supervises the construction of public school toilets, sullage removal units and the distribution of household toilet bowls.

Resources: The health care system is delivered through five organizational levels: Central headquarters; Regional Health Offices and general and special hospitals; Provincial Health Offices, including provincial and district hospitals; Municipal Health Offices; and, Rural Health Units/Barangay Health Stations. Its unique structure enables the Department to reach up to the barangay level through its grassroots network of barangay health workers and volunteers. DOH manages regional and provincial laboratories with technicians who carry out water quality tests. It should be noted that substantial segments of its institutional structure (from the provincial level downwards) have been devolved and are now supervised by the respective LGU.

Through its far-reaching network, DOH conducts health education campaigns which focus on women and children health in rural communities. The program is supported by centrally-produced information, education and communication materials. Enrichment of hygiene education lesson plans for the school curricula is undertaken by DECS and DOH. Together with UNICEF, CIDA and other bilateral agencies, DOH has produced and distributed IEC materials with key messages on water supply, sanitation and hygiene behavior.

DOH provides training focused on skills development of its health workers, volunteers and community artisans. Its training programs are either conducted by in-house staff or

commissioned through non-government organizations (NGOs). Provincial and district sanitary engineers and inspectors are trained on skills development and planning. Chemists and laboratory technicians are trained on tools and techniques to support ongoing drinking water quality programs. BWSAs are instructed, among others, on protection and disinfection of water supply sources, constructing and maintaining toilets.

(5) Other National Agencies

Other national agencies provide macro-planning, funding and support, and regulatory guidelines for the water supply and sanitation sector.

The National Economic and Development Authority (NEDA), as the central planning office, ensures that all agency plans and programs are consistent with national priorities in the Medium-Term Public Investment Program and the Priority Sub-Sector Activity Layout. External grants and loan proposals are reviewed and approved at NEDA. It also coordinates the establishment of a system for national sector master planning and the monitoring system (with DILG).

The Department of Finance (DOF) is responsible for the generation and management of the financial resources of the government. It reviews and approves all public sector debt; oversees the fiscal soundness of public investments based on equity, cost recovery and economic growth, and sets the fiscal deficit of major government corporations, as part of the public sector borrowing program.

The Department of Budget and Management (DBM) plans the budget allocations for the government agencies, including capital and operating expenditures, equity infusion to public corporations, grants and subsidies for Congressional approval. DBM also ensures that budget releases conform with approved plans and programs.

The Department of Environment and Natural Resources (DENR) formulates and enforces policies and guidelines for environmental protection and pollution control. It is responsible for watershed protection and water resources management. It checks compliance of major projects with environmental guidelines. DENR works with all environmental management agencies and special regulatory bodies.

The Department of Education, Culture and Sports (DECS) implements hygiene education programs through schools using the *Teacher-Child-Parent (TCP)* approach. Health and sanitation messages are integrated in the curricula and special activities are designed to make the parents and other family members learn and put them into practice. The program is supplemented by a wide range of learning materials (workbooks) while prototypes of safe water sources and water-sealed toilets are set up in schools. DECS assists in the GOP school toilet building project by identifying priority schools and by supporting DOH's integrated health information, education and communication campaign using the formal and non-formal educational system.

The National Water Resources Board (NWRB) coordinates the overall policy framework for water resources development and management. NWRB was created to guide an orderly and scientific development of all water resources in the Philippines consistent with the principles of optimum utilization, conservation and protection to meet present and future needs. NWRB also deals with water rights issues. NEDA Board Resolution No. 4 strengthens the NWRB by increasing its control over the private extraction of groundwater.

The Metropolitan Waterworks and Sewerage System (MWSS) provides for the potable water supply and sewerage needs of Metropolitan Manila and its contiguous areas.

5.5 Sector Agencies at the Local Level

(1) Provincial Level

- 1) The Provincial Planning and Development Office (PPDO) is the nerve center of all provincial planning activities (refer to Figure 5.5.1, Supporting Report). The Office conducts research and studies necessary to support plan formulation. It likewise integrates and coordinates sectoral plans and studies done by the different groups or agencies and monitors and evaluates the implementation of development programs and projects. It serves as the secretariat to various local bodies like Provincial Health Board, Provincial School Board and Provincial Development Council.

Under the 20% development fund, the sector is allotted a certain amount based on the prioritized lists submitted by the PEO and PHO. This includes requests coming from different barangays and NGOs. As a matter of policy, the recipient barangays are

requested to put up a counterpart either in cash, materials or labor. Evaluation of the sector projects to be implemented is done by PPDO also in coordination with PEO and PHO.

At present, the office is composed of 51 personnel deployed in five (5) divisions - - administrative (8), planning and project development (10), research, statistics and evaluation (7), community affairs (15), and special project (11).

- 2) The Provincial Engineer's Office (PEO) primarily takes charge of the construction, maintenance, improvement and repair of provincial roads, bridges and other public works projects (refer to Figure 5.5.2, Supporting Report). It provides engineering services like investigation and survey, engineering designs, feasibility studies, and project management. It exercises technical supervision of all engineering offices of the component municipalities.

The Office has five (5) divisions consisting of 121 regular personnel. Distribution of personnel by division is as follows :

Administrative	16
Construction and Maintenance	34
Planning and Programming	10
Equipment Pool	55
Quality Control	4
Building Permit (devolved)	2
Total	121

Specifically, the PEO's water sanitation section is under the Planning Division. Two (2) civil engineers are assigned to carry out its functions of providing adequate potable water supply to the different municipalities and barangays. The assigned personnel handle activities such as plan formulation, layout, work program preparation, feasibility study, inspection of actual construction and monitoring of implemented projects.

No specific planning process or set of criteria in project selection is being followed. Projects are generally prioritized based on the urgency as stated in the submitted resolutions of different barangays. The various water and sanitation projects

implemented during the last five years by the Office in coordination with the PPDO include the following:

<u>Foreign Assisted Projects</u>	<u>(Million Peso)</u>
1. Lumangbayan Waterworks Project - Level II	0.585
2. Poblacion San Teodoro Water System - Level III	6.675
3. Pakyas Water System - Level II	1.2
4. San Mariano Water System	1.6
5. Poblacion Bansud Water System - Level III	0.55
6. Laguna Water System - Level II	1.1
7. Pili Water System - Level II	1.6
<u>Locally Funded</u>	
1. Provincial Hospital Water System	0.3
2. Naujan Community Hospital Water System	0.175
3. Const. of Dugwell in Managpi	0.08
4. Const. of Water System in Alag	0.1
5. Water System in Poblacion, Mansalay (Phase I)	0.5
6. Const. of Water System in Quinabigan	0.0798
7. Const. of Bulusan Water System	0.3
8. Montelago Spring Development	0.064
9. Bahid Spring Development	0.11
10. Agong Spring Development	0.154
11. Water System in Poblacion, Mansalay (Phase II)	1.45

One (1) training activity was conducted by the PEO on the Design and Installation of Domestic Water Supply (Levels I, II, and III) in 1993.

3) Provincial Health Office

The Provincial Health Office (PHO) is composed of 66 personnel distributed into divisions/sections (refer to Figure 5.5.3, Supporting Report). This Office takes charge of the local health offices. It formulates program implementation guidelines and rules and regulations for its operations. It carries out efficient, effective and economical implementation of health-related services, programs and activities. Some of its impact programs include intensification of nutrition and micro nutrient complementation, communicable disease control program such as STD control,

leprosy control, and AIDS awareness; and improvement of health facilities, equipment and infrastructure support programs.

In 1994, the PHO submitted a project proposal on Environment Sanitation under the 20% Health Development Fund. This program aims to prevent and control food and water-borne diseases by ensuring safe and potable water supply and the construction of sanitary toilet facilities.

Under this program, a total of 15,000 sanitary toilets shall be constructed in coordination with the municipal and barangay officials. Likewise, 200 Level I potable and safe water sources on depressed barangays shall be constructed. The PHO shall also train 200 volunteers for 100 barangays for the construction of sanitary water sealed type toilets.

(2) Municipal and Barangay Level

1) Municipal Planning and Development Office (MPDO)

Mandate : The MPDO is mandated to monitor and evaluate the implementation of different development programs and activities in the municipality. It is also tasked to prepare municipal development plans and formulate an integrated economic, social and physical development plan.

Activities : The regular activities of MPDOs include : preparation of the Municipal Comprehensive Plans and other planning documents; assessment, monitoring and evaluation of different projects of the municipal government; and assistance in the integration and coordination of all sectoral plans.

Resources : The Municipal Planning and Development Office typically consists of the following personnel : Municipal Planning and Development Officer as head of office; Project Development Officers; Project Evaluation Officers; Community Officers and Draftsmen.

2) Municipal Engineer's Office (MEO)

Mandate : The Office is responsible for the administration, coordination, supervision of all construction, maintenance, improvement and repairs of the different public works projects in the municipality. It likewise initiates, reviews and recommends

innovations in policies and objectives, plans, programs, techniques, procedures and practices in infrastructure development in the municipality.

Activities : The MEO regularly performs engineering surveys to acquire required data for designs, layout or construction of waterworks system, sanitation facilities, roads, bridges and other infrastructure projects. It also inspect works of contractors based on presented plans and specifications.

Resources : The MEO is typically composed of the Municipal Engineer, an Engineer III, who prepares engineering plans, specifications and designs and a Draftsman who acts as rodman, maintains equipment records and drafts simple plans of infrastructure.

3) Barangay Councils

The Barangay Councils provide, among others, for the maintenance of barangay facilities related to general hygiene and sanitation and solid waste collection. It also submits recommendations to higher legislative bodies for the improvement of the barangay health and social welfare services.

4) Rural Health Units/Barangay Health Stations

RHUs are under the supervision of the Municipal Health Officer. In 1992, there were 92 barangay health stations and rural health units where a variety of medical services like, medical application, bandaging and inoculations are administered under the direction of Rural Health Officer.

(3) Field Offices of Central Sector Agencies

1) DPWH District Engineering Office

Mandate : The DEO mandate includes the implementation and rehabilitation of water supply projects in the province. Its basic functions include identification of possible well sites, drilling operations, equipment keeping, and continuous monitoring of implemented water supply projects.

Activities : Its present activities in terms of implementing projects are very minimal due to inavailability of funds. For CY 1994, only three (3) projects were implemented and these are as follows :

<u>Projects</u>	<u>Cost (Peso)</u>	<u>Status</u>
Hagupit Deep Well in Bongabong	100,000.00	On-going
Roxas Water Supply	100,000.00	Completed
La Fortuna Water System (Socorro)	475,000.00	On-going

Resources : The water and sanitation section of the DPWH District Office is a unit under the Construction Division. At present, existing positions under this unit include a Well Driller Supervisor and a Well Driller II. The available equipment include one (1) Drilling Machine (Power Rig) and three (3) units of jet rig.

About 12 pakiaw contractors were identified but only two use the more sophisticated equipment. Most of them utilize primitive equipment; payment is usually based on the cost of pipes drilled.

2) Local Development Council/Provincial Development Council

The main function of the LDC is to formulate long-term, medium-term and annual socio-economic development plans and to coordinate, monitor and evaluate the implementation of development programs and projects.

The PDC is headed by the Governor. It is composed of all mayors of component municipalities, chairman of the committee on appropriation of the Sangguniang Panlalawigan, the Congressman and representatives of NGO's operating in the province.

(4) Water Districts

The Water District is a public corporation organized under P.D. 198 for the purpose of providing efficient water supply for urban population centers in the province. Its operations are guided by a five-man Board of Directors who appoints a General Manager.

It seeks to achieve commercial and financial viability of operation. Water tariffs are levied for its services. WDs are provided technical and management assistance and loans by the Local Water Utilities Administration. WDs are organized at the option of the LGUs and after public hearings.

At present, there are five (5) WDs in the province, including: Naujan, Pola, Pinamalayan, Roxas and Socorro.

(5) Rural Waterworks and Sanitation Association/Barangay Waterworks and Sanitation Association

The RWSA/BWSA is a voluntary association of at least 50 household heads organized for the purpose of mobilizing and utilizing their resources to provide for themselves adequate supply of safe and potable water. It is a non-stock cooperative which manages and owns a water supply system, constructed or installed through their own resources or with outside assistance. It aims to improve the health and economic well-being of its members, by providing them with safe and potable water for domestic use at a reasonable cost.

The association is mandated 1) to operate, manage and own a water supply system; 2) to mobilize the member's resources (financial contributions to the cooperative fund) for the construction, operation and maintenance of the system.

The organizational structure of the RWSA/BWSA consists of 1) the general assembly of members; 2) a board of directors; 3) an election committee; 4) an education and training committee; 5) an audit and supervisory committee and 6) the management staff.

The procedures of the organization of RWSA/BWSA are as follows: A community meeting is called before the LGU begins structural survey which will be the basis of the feasibility study. In this meeting, the barangay leaders are informed that the barangay has been selected by the LGU for a possible waterworks assistance project. After this, a structural survey is conducted in the barangay. Then, the LGU prepares a preliminary engineering report and feasibility study which is presented to the barangay for approval. After the PER and FS have been discussed and approved by the barangay, the LGU will submit the annual implementation plan (AIP), together with the FS to the appropriate agency (either DPWH or the LGU) for approval.

Upon approval of the AIP, the application to organize a BWSA/RWSA is filed with the PPDO who forwards the application to the Director of the Cooperative Development Authority.

(6) Others (including the private sector and NGOs/CBOs).

1) The private sector has been involved in water supply development in the form of investments, technical studies and construction of water supply and sanitation

facilities. Non-government organizations (NGOs) have also demonstrated capability to undertake project development and implementation with community participation.

- 2) The Alternative Mangyan Program for Development (AMPFOD), Inc. is a private, voluntary, non-stock and non-profit social development organization of concerned citizens from various fields united in a common vision of Mangyan assistance to the Mangyan leaders who form majority of its corps of volunteers. AMPFOD, being a non-stock, non-profit organization, depends strongly on local and foreign funds for its upkeep. All funds from local and foreign sources received go to the project beneficiaries and are being used to sustain the implemented projects.
 - a) Project identification and priority-setting. The Mangyan's extremely low income and illiteracy resulted in poor health and sanitation conditions. Through constant dialogue and consultation with Mangyans, problems and needs of the beneficiaries are recognized, thereby projects are identified and prioritized.
 - b) Establishment of community-based organization. The establishment of a CBO in Mangyan settlements focuses on raising awareness, dignity and pride of the Mangyans. The initial phase of the process focus on the breaking the Mangyan's culture of silence and fear. AMPFOD employs the integrated participatory development approach wherein Mangyan volunteers work together with AMPFOD community organizers. AMPFOD insures that all of its program components involve their Mangyan counterparts who are being trained so that Mangyan volunteers can take over some of the functions of the programs.
 - c) Project preparation and planning. Preparation and planning is done by the beneficiaries with the assistance of the staff. The advantages and disadvantages of the proposed projects are considered before the AMPFOD prepares the project proposal.
 - d) Project implementation. The beneficiaries implement the program. AMPFOD provides technical assistance and resources while the Mangyan counterpart provides labor and other project materials that can be found in the settlement.
 - e) Monitoring and evaluation. The project beneficiaries, together with a AMPFOD staff and the implementing agency (sometimes, project is implemented by other private organization in coordination with AMPFOD) collectively assess the merits and demerits of the project. If ever there are problems in the implementation, these are discussed and possible solutions are proposed so as to make the project more responsive to Mangyan's needs. Evaluation is done before and after every major activity and on a quarterly basis to assess if the targets are met.

- f) AMPFOD, having realized the importance of linking with other agencies, has been actively involved in the Municipal Development Council and the Municipal Peace and Order Council. The organization has also close working relationship with DOH, DSWD, DA, DENR, DTI and other NGO's supporting the Mangyan struggle for self determination and the recognition of their ancestral domain.
 - g) Sometimes, projects implemented by other sector (private and government) are not suited to Mangyan's needs resulting to waste of resources on both parts. New methods introduced contradict their traditional beliefs and cultural practices leading to rejection of the project.
- 3) The Foster Parents Plan International, Inc. is a private voluntary organization that is child-focused. Its global vision is a world in which all children realize their full potential in societies which respect people's rights and dignity. It strives to achieve lasting improvements in the quality of life of deprived children through a process that unites people across cultures.

In Oriental Mindoro, its operation started in July 1981. Its head office is located in Calapan with branches in the municipalities of Baco, Bansud, Bongabong, Gloria, Mansalay, Naujan, Pinamalayan, Pola, Roxas and Victoria. At present, it has a staff complement of 34.

Its water and sanitation-related projects include the provision of individual and communal latrines, individual and communal jetmatic pumps, construction of water systems including pumps and pipelines, and expansion of pipeline.

The target beneficiaries are 7,445 families and 81 barangays from depressed areas classified by DSWD. The requirements at family level are as follows: with children, below poverty level, and willing to cooperate in improving their situation.

The agency depends on foreign funds from the following countries - Japan, UK, West Germany, Netherlands, Australia, US, Belgium and Canada.

- a) Project identification and priority-setting. This includes preliminary social investigation which is actually a survey that aims to identify the basic problems of the family and community. The results of these are then validated in terms of prioritization of need to see if the agency's priority coincides with the community's priority. After this, a project proposal is then prepared by the beneficiaries.

- b) Establishment of community-based organization. The agency follows two (2) approaches in the establishment of the CBOs. One is by tapping existing CBOs for further development. This is done through leadership training (e.g. community planning, accounting, how to handle projects/organizations) and through orientation on the technical components of the project. The other way is through community-level training. This is done when there is no existing CBO. Here, the project is the entry point of the agency thus, support facilities are also provided in addition to leadership training.
- c) Project preparation and planning. Planning involves orientation on the whole package or the how, when, what and why of the project.
- d) Project implementation. The community is the implementor of the project. FPPH provides the necessary requirements not available in the community. "Ladderized training" is also practiced by the agency. This includes discussion of proposal, leadership training, community organizing and organization development, project development/evaluation, and project control or the identification of the do's and don'ts of bookkeeping and records keeping.
- e) Operation and maintenance. This is beneficiaries' responsibility. The agency provides assistance only when it is needed.
- f) Monitoring and evaluation. This is done by the agency to determine the impact of the project to the community.
- g) Problems : The problems encountered by the agency are usually organizational and technical in nature. Examples of these are debate in original plans, some materials are overlooked in planning which results to delay in actual implementation, spending pattern on large projects are affected by election ban, cutting down of budget allocation by the municipal government and the requirements/expectations of the project were not reached (i.e., potable water, permission by lot owner).
- h) Linkage with local and national government agencies. Foster Parents Plan International, Inc. had established linkages with LGU's, DSWD and DOH (i.e., Rural Health Units and Barangay Health Workers).

5.6 External Support Agencies Active in the Sector

(1) Multilateral Agencies

The World Bank (IBRD) currently supports the First Water Supply, Sewerage and Sanitation Sector Project or FW4SP (Loan 3242PH). This project provides capital funds

(US\$ 58.0 M) for rural water supply in Luzon provinces and sanitation nationwide based on completed provincial master plans. The project concept calls for a community-based approach through BWSAs. The project is due to close in 1995 and preparations for a successor project, with DILG as implementing agency, will be started shortly. In addition, the Bank is preparing two new loans for LWUA implementation - the Urban Water Supply Project and the Urban Sewerage and Sanitation Project. Through its various trust fund facilities, the Bank has arranged for various technical assistance grants and other support activities.

The Asian Development Bank (ADB) supports the Second Island Provinces Project (1052-PHI-SF). The project provides US\$24.0 M (loan) to a counterpart budget of Pesos 202.45 M. A small technical assistance component has been allocated for well drilling, training, water quality and installation of pumps. This DWPH-executed project was effective through 1994. Both of the island provinces projects focus on technology and the physical installation of facilities. A follow-on third "islands project" is under discussion. ADB is also supporting the LWUA Municipal Water Supply Project which includes a technical assistance grant for institution building activities at LWUA and the eight (8) participating WDs.

The United Nations Development Programme (UNDP), through its Danish Trust Fund facilities, has actively supported the preparation of provincial master plans. In addition, its Institution Building through Decentralized Implementation of Community-Managed Water and Sanitation Projects, is assisting DILG-PMO in developing models and approaches for community-based water and sanitation in selected pilot areas. The project bears a strong poverty alleviation focus. UNDP is also in the final stages of a country project to assist GOP in strengthening the groundwater databank in the country through a US\$ 682,500 grant.

The United Nations Children's Fund (UNICEF) supports the sector through the Philippines Plan of Action for Children. Apart from hardware support in priority project sites, UNICEF assists NBDA in updating of the national master plan. UNICEF works through the inter-agency committee on environmental health and through NGOs. With the World Health Organization (WHO), UNICEF is assisting in the preparation of information, education and communication (IEC) materials and in strengthening the sector monitoring system.

(2) Bilateral Agencies

The Japan International Cooperation Agency (JICA) extends technical cooperation in the basic design study for the Rural Environmental Sanitation Project (Phase III). This project, to be jointly implemented by DPWH and DOH, envisages the construction of Level I and II water systems and school toilet facilities in rural areas of ten (10) provinces through grants. With DPWH, rural water supply systems are being constructed at the evacuation centers for the Pinatubo refugees. JICA also supports the groundwater development study in Cavite province (with LWUA) and the institutional development activities at MWSS. JICA is providing the services of the Study Team preparing provincial sector plans in nine (9) provinces.

The Overseas Economic Cooperation Fund (OECF) is financing the RWS IV project through 1995. It provides a loan of up to Yen 5.08 B to counterpart funds of Pesos 400 M for the construction/rehabilitation of Level I systems, construction of workshop buildings and procurement of various equipment. OECF is supporting the Provincial Cities Water Supply Project of LWUA and the Angat Water Supply Optimization Project of MWSS.

The Australian International Development Assistance Bureau (AIDAB) is funding the Central Visayas Water and Sanitation Project through a A\$ 14.65 M grant. The project is implemented by the LGUs and the regional development council. Project components include: planning and monitoring information systems; infrastructure planning and rehabilitation; and institution building with an emphasis on community management based on experiences from other AIDAB-funded projects. The Project has been extended through 1997.

5.7 Current Community Development and Training Approaches

5.7.1 Community Development

PPDO's community development activities are done primarily by the community affairs division (CAD). The CAD is composed of 15 regular personnel, of which 12 community workers (CW) are deployed to different municipalities to perform various community works.

The CWs assist the community to identify their needs and problems, and consequently propose suitable and viable projects to be implemented in the community. The CWs also coordinate with different financial institutions to seek financial assistance for the proposed projects.

5.7.2 Human Resources Development & Training

There are very few training activities organized by the province. The few programs which have been organized were on general management and administrative issues. The province acknowledges the need for improving the capabilities of its staff. At present, however, staff training in the province is done on an ad hoc basis. Each of the provincial offices are responsible for training of their staff. Many of the training activities attended by the staff are those organized by central agencies or projects. Training materials and other resources are thus scattered among the various provincial units and project offices making planning and monitoring problematic.

The Department of Health, thru its Regional Health Office, conducts Rural Sanitary Inspector training/seminars on Environmental Health Program, training of food handlers and food operators on food safety.

5.7.3 Sanitation/Hygiene Education

The existing health/hygiene education programs of the PHO, focuses mainly on intensification of information, education and communication campaign through inter-agency coordination and collaboration. In implementing the Health Education Program on Sanitation, the PHO utilizes the Barangay Health Workers (BHW's), Rural Sanitary Inspector, Midwives, Rural Health Physicians, Public Health Nurse and health-oriented NGO's in disseminating information to different communities. Different modes of information dissemination include radio announcements, press releases, film showing and community assemblies. Health educational materials consist of posters, streamers, comics and stickers.

5.8 Existing Sector Monitoring

(1) National Level

The primary sources of sector data are the field office and staff of DPWH, DOH, LWUA, MWSS and NSO. Other agencies, including NEDA and LGUs, use data from these agencies. Each of these agencies runs its own project (or activity) monitoring systems largely based on required reports of its field offices. Current reporting requirements focus on physical accomplishments and capital expenditures. One serious shortcoming is the assumption that all constructed facilities are functioning and in use.

Apart from regular project monitoring, instructions are issued to conduct inventories of facilities (with actual status). The last completed inventory was done in 1990. These surveys are done in conjunction with sector or area planning studies. Only the NSO gathers and assesses information nationwide on a regular basis as part of its Census on Population and Housing (CPH). The CPH "long form" is administered on 10% of the households once every ten years. NSO plans to increase the CPH "short form" frequency to every five years. Water and sanitation is not included in the short form.

There is wide dissatisfaction among implementors themselves over the existing monitoring system. Monitoring report preparation is seen as a nuisance to performing one's job, and is thus haphazardly done. This leads to the problem of reliability of information coming from the field. There is a need to establish a system which is perceived as having a direct link to performance, similar to project-based monitoring.

(2) Local Level

Sector monitoring is done by PPDO personnel assigned in the area. However, only those projects under the level I system are being monitored by PPDO. The monitoring system of the PPDO is primarily concerned with the procurement and delivery of inputs, and adherence to work schedule. Thus, the number of hand pumps delivered and installed in a barangay, and its status (functional or non-functional) normally appear in the monitoring and evaluation form of waterworks projects.

The evaluation and monitoring mechanism being practiced in the province is designed to find out if the goals and objectives set forth for the project have been achieved and if the project implementation policies have been closely followed. The evaluation and monitoring system also requires to institutionalize reporting system relative to the project's progress and accomplishments. Feedback and comments on the proposed and implemented projects are also gathered.



Chapter 6

***PAST FINANCIAL PERFORMANCE
IN WATER SUPPLY AND SANITATION***



6. PAST FINANCIAL PERFORMANCE IN WATER SUPPLY AND SANITATION

6.1 General

As discussed in Chapter 5, the new direction by the Local Government Code of 1991 and NEDA Board Resolution No. 4 (1994) mandated the LGUs to play a larger role in planning and implementing water supply and sanitation projects. As a result, locally funded projects and programs for the sector had been devolved from central government agencies to LGUs since 1992, although some projects are still on going by central government agencies. The Implementing Rules and Regulations (IRR) to effect the devolution of water and sanitation sector responsibilities and resources are under preparation.

This chapter sets forth (1) past public investment in the recent years to the water supply and sanitation sector by central government agencies and LGUs; (2) roles of the internal revenue allotment; (3) cost recovery and financial performances of WDs/associations; and (4) affordability of users at present. These discussions will be a basis for the planning of financial arrangements.

6.2 Past Public Investment

6.2.1 Past Public Investment by the Central Government Agencies and LGUs

The recent development of the water supply and sanitation sector in the province was mainly achieved by line agencies such as DPWH, LWUA, DILG, DOH as well as the provincial government, which is shown in Table 6.2.1.

Table 6.2.1 Previous Sector Investment to the Province by Concerned Agency

Unit: 1,000 Pesos

Funding Category		1990-93				
Agency	Funds	Level I	Level II	Level III	Sewerage	Sanitation
DILG	BWP		550			
DPWH	Foreign and local	16,424				
LWUA				2,460	N.A.	
DOH					N.A.	N.A.
Province		3,613	1,455			
Municipality						
Others	LIUCP (ADB)	548				

Sources: Each central agency and PSPT of the provincial government

Note: (1) BWP: Barangay Water Program and (2) LIUCP: Low Income Upland Communities Project

Investments for Level I facilities by DPWH amounted to P16,424 thousand during the period 1990 to 1992 covering 269 shallow wells, 153 deep wells, 18 spring development, 4 rain collectors and 186 rehabilitation works. As locally funded projects were devolved to LGUs since 1992, the investment plan of DPWH does not include any projects from 1993 onwards.

The LWUA had released a total of P 2,460 thousand during the period of 1990 to 1992 to improve and expand the water supply facilities for 4 Water Districts; Naujan, Pinamalayan, Pola and Roxas WDs and 1 RWSA (Sta. Rosa) including the Feasibility Study and Detailed Engineering Design of Package 4 for Naujan and Pinamalayan WDs.

DILG financed a total of P 550 thousand in 1992 for one Level II system at Bayani-Laguna under the Barangay Water Program (BWP), but there are no additional investments after 1993.

DOH accomplished 7 school toilets in 1993 under the FW4SP program. The provincial government and LIUCP financed Level I facilities from 1990 to 1993 amounting to P3,613 thousand and P548 thousand, respectively.

6.2.2 Sources of Local Fund

According to the Local Government Code of 1991, 40% of the national internal revenue taxes of the 3rd fiscal year preceding the current year (from 1994 onwards) is allocated to LGUs nationwide, specifically to the administrative units of (1) province (23%); (2) city (23%); (3) municipality (34%); and (4) barangay (20%). Further, respective Internal Revenue Allotments (IRA) in different administrative levels are allotted to all administrative units concerned according to the manner of calculation in terms of population, land area and other factors.

As shown in Table 6.2.2, IRA allotted to each province ranged from 0.8 to 1.0 % of the national total IRA between 1990 and 1994. On the other hand, the total IRA to all municipalities of the province was arranged with 0.8 - 0.9 % to the national total IRA for nationwide municipalities (refer to Table 6.2.1, Supporting Report).

For the provincial government, the IRA had been the most important financial source of the total revenue. It accounted for 60 - 90 % of the total revenue of the provincial government

Table 6.2.2 Past Internal Revenue Allotment to the Province from Central Government

Unit: Pesos

		1990	1991	1992	1993
National	1. National Total of IRA *				
	(a) IRA to Provinces	2,031,174,331	2,697,482,707	4,571,136,402	8,445,600,000
	(b) IRA to Municipalities	3,054,601,475	4,046,838,742	7,127,522,550	12,484,800,000
Provincial	2. IRA to Ori. Mindoro Prov. *				
	(1) Total: (2)+(3)	63,171,817	82,884,345	143,640,406	255,589,029
	(2) Provincial Government	25,760,063	33,703,114	59,061,537	104,244,159
	Percentage of (a)	(1.27)	(1.25)	(1.29)	(1.23)
	(3) Municipalities	37,411,754	49,181,231	84,578,869	151,344,870
	Percentage of (b)	(1.22)	(1.22)	(1.19)	(1.21)
	3. Total Revenue of the Percentage of IRA of Prov. Government	44,817,792 (57.48)	53,989,578 (62.43)	65,941,727 (89.57)	128,124,180 (81.36)
Municipalities	4. IRA to Municipalities **				
	Total	37,411,754 (100.0)	49,181,231 (100.0)	84,578,869 (100.0)	151,344,870 (100.0)
	Baco	1,752,954 (4.7)	2,353,890 (4.8)	4,424,000 (5.2)	7,806,872 (5.2)
	Bansud	2,048,616 (5.5)	2,598,468 (5.3)	4,720,806 (5.6)	8,326,279 (5.5)
	Bongabong	3,515,736 (9.4)	4,665,734 (9.5)	7,789,908 (9.2)	14,905,029 (9.8)
	Bulalacao	1,806,331 (4.8)	2,401,492 (4.9)	4,646,489 (5.5)	8,181,083 (5.4)
	Calapan (Capital)	4,549,192 (12.2)	6,109,847 (12.4)	9,003,365 (10.6)	16,196,872 (10.7)
	Gloria	2,134,278 (5.7)	2,739,716 (5.6)	4,826,358 (5.7)	8,511,766 (5.6)
	Mansalay	2,641,916 (7.1)	3,394,132 (6.9)	6,295,360 (7.4)	11,287,471 (7.5)
	Naujan	4,761,429 (12.7)	6,079,411 (12.4)	9,540,094 (11.3)	17,303,031 (11.4)
	Pinamalayan	3,522,656 (9.4)	4,566,857 (9.3)	7,150,262 (8.5)	12,779,302 (8.4)
	Pota	1,790,857 (4.8)	2,253,276 (4.6)	3,968,980 (4.7)	6,973,888 (4.6)
	Puerto Galera	1,389,816 (3.7)	1,931,131 (3.9)	3,837,588 (4.5)	6,741,919 (4.5)
	Roxas	1,819,142 (4.9)	2,477,698 (5.0)	4,199,786 (5.0)	7,329,171 (4.8)
	San Teodoro	1,533,452 (4.1)	2,039,505 (4.1)	4,378,852 (5.2)	7,696,570 (5.1)
	Socorro	1,877,455 (5.0)	2,455,962 (5.0)	4,329,894 (5.1)	7,574,976 (5.0)
	Victoria	2,267,924 (6.1)	3,114,112 (6.3)	5,467,127 (6.5)	9,730,641 (6.4)

Sources: (1) Department of Budget and Management, (2) Bureau of Local Government Finance (MOF) and (3) Provincial Annual Report (1993)

Notes: *IRA to barangays is not included. ** Figures in bracket are shares (%) in the total of all municipalities in the province.

during 1990 and 1992. A large part of the investments financed by LGUs to the water and sanitation sector therefore, was coming from IRA.

As for municipality, distribution share to each municipality in the province was within a certain range between 1990 and 1993. Only Naujan and Calapan had shares with more than 10% of the provincial total in 1993.

The expenditures of the provincial government for the relevant sector in 1993 were reported at P 2,663 thousand, about 2.6% of the IRA.

6.3 Cost Recovery

The capital cost for Level I systems is free to the community, while operation and maintenance is the responsibility of the associations. As for Level II systems, the capital cost is shouldered by the RWSA through a loan or grants. Water charges collected by each association cover cost of operation and maintenance and loan amortization. According to the Loan Department of LWUA, the new loan disbursement to RWSAs is being stopped for the last couple of years.

For Level III system, WDs or RWSAs bear the entire capital cost financed by LWUA through loans with concessional terms of 8.5% - 12.5% interest rate and repayment period extending up to 30 years. Less capable WDs are granted to receive soft loans which are interest free during the first 5 years of operation. At the initial time, 100% of the total investment will be covered by a loan. After the second time or more, 90 % will be granted by a loan and 10% will be by equity. The cost of amortizing the loan and operating and maintaining the system is recovered through monthly water bills. Details of financial performance with cost recovery is discussed in section 6.5.

Regarding sanitation sector, toilet bowls have been distributed to households without charges, although construction of the superstructure and the depository of household toilet is through self-help.

6.4 Affordability

Table 6.4.1 indicates the affordability by level of sector service. At present, the current water bills in the province seem to be within an affordable range based on the experiences, although actual income is different from municipality to municipality and barangay to barangay.

On the other hand, construction cost of household toilet seems to be expensive comparing with the family income. If users pay a 5% of the monthly family income, the total costs shall be amortized with a period of more than 28 months. Therefore, subsidy from LGUs may be necessary.

Table 6.4.1 Affordability in Water and Sanitation Services

Income/Level of Services	Amount (Peso)	% to Monthly Income	Affordable Range (%) 5)
Median of Monthly Income 1)	3,295	100.0	-
Average Level III: Monthly Water Bill 2)	70	2.1	5.0 or less
Average Level II: Monthly Water Bill 3)	30 - 60	0.9 - 1.8	2.0 - 3.0
Mo. Level I Expenditure 3)	5 - 10	0.2 - 0.3	1.0 or less
Private Toilet Construction Cost 4)	4,700	-	-

Notes:

- 1) 1991 Family Income and Expenditures Survey, NSO
(Median of the provincial figure is inflated to 1994 prices.)
- 2) LWUA, (as of April 1994). It is assumed that 20 m³ will be used per family.
- 3) Common figures in the province.
- 4) First Stage Feasibility Report for Sanitation and Sewerage, Dagupan, 1993, WB.
(The figure is inflated to 1994 prices.)
- 5) Based on the experiences mainly from LWUA, DPWH and DILG.

6.5 Past Financial Performance of WDs and RWSAs/BWSAs

There are 5 water districts in Oriental Mindoro. Table 6.5.1 shows the financial indicators of these water districts in 1994, except Socorro WD which is not operational. Operation and maintenance costs of the 4 WDs exceeded the revenues. To raise water rates within an appropriate range is one of the solutions in view of the cost recovery.

Loan status of these 4 WDs are shown in Table 6.5.2. All of these Wds have received loans amounting to a total of P 4,026 thousand from LWUA, of which 3 are in arrears.

Most of the facilities managed by RWSAs and BWSAs were constructed under grant conditions by central government agencies and LGUs with the recipient providing some equity contribution in the form of materials or labor. The associations are responsible for the operation and maintenance of the systems, but financial performance of the associations

tends to face difficulties partly because the beneficiaries do not recognize the cost requirements. According to LWUA, Masaguing RWSA in Naujan had a total of P 117.1 thousand loan and arrears of P 57.5 thousand with an average monthly amortization of P 710 as of August 1994.

Table 6.5.1 Financial Indicators of Water Districts

Water District	Descriptions						
	No. of Metered Connections	No. of Flat Rate Connections	Average Monthly Rate	Average Consump. per Conn.	Average O&M Costs	Average Revenue	Collection Efficiency
	Nos.	Nos.	Pesos/cu.m.	cu.m./month	Pesos/month	Pesos/month	Percent(%)
Naujan	396	3	4.05	19.00	30,258	5,919	98
Pola	592	0	2.86	19.59	36,746	4,438	94
Roxas	248	0	4.00	16.40	28,657	7,040	70
Pinamalayan	1,863	6	3.87	19.73	134,773	71,670	89

Source: IDS, LWUA

Note: Socorro WD is not operational.

Table 6.5.2 Loan Status of Water Districts

Water District	Descriptions			
	Total Loan Availed	Remaining Payment Period 1)	Average Monthly Amortization	Current Arrears
	1000 Pesos	Months	Pesos	Pesos
Naujan	473	154	7,892	299,490
Pola 2)	773	143	6,667	30,554
Roxas 2)	1,837	-	212	581
Pinamalayan	943	144	9,200	0

Source: Loans Operation Dept., LWUA (as of August 30, 1994).

Note: 1) The longest remaining payment period among several loans is indicated.

2) A part of loan amortization is deferred.

Chapter 7

WATER SOURCE DEVELOPMENT



7. WATER SOURCE DEVELOPMENT

7.1 General

Water source development study was made covering the entire province to come up with a "Groundwater Availability Map" to identify available potable water sources. An emphasis has been placed on groundwater sources rather than surface water based on current practices and assessment of the groundwater potential in the province.

The study entailed two major components: (1) clarification of existing geological conditions and groundwater situation, and (2) preparation of Groundwater Availability Map to show groundwater potential under three kinds of categorized areas. Standard well specifications by municipality are also studied for the reference of water supply plan.

The major study bases for the study are data and reports prepared by concerned agencies (NAMRIA, BMGS, NWRB, LWUA, DPWH and PPDO) supplemented by collected data in the province through this study. Among the effective information, Groundwater Resource Survey Report by BMGS, Water Resource Investigation Report by NWRB and Well Inventory Database by NWRB are essential for the analysis of geological characteristics, projection of high yielding area and possible area of salt water intrusion, and classification of groundwater potential, respectively.

The Groundwater Availability Map map be used for provincial level master plan at present. However, updating the map is a requisite to increase individual well information using the questionnaire form prepared for the study. Annual review and updating of the data will enable the LGUs to implement water source development on a project site basis.

Database in the province confirmed existing groundwater sources and conditions as summarized in Table 7.1.1 (Data by municipality are included, 7.1.1 Water Source Information, Data Report). There are existing 27,392 shallow wells, 410 deep wells and 298 springs in the province. Of the total shallow wells, 27,155 or almost 100 percent of the provincial total are privately owned. Water quality problem was identified in about 12 percent of the total wells, while non-functional wells were reported to be about 20 percent of the total number. The number of untapped spring sources was found to be 161, some of which may be utilized for water supply.

Table 7.1.1 Existing Groundwater Sources in the Province

Data Description	Shallow Well	Deep Well	Spring	Total
1. Number of water Source	27,392	410	298	28,100
2. Profile of different Sources	97%	2%	1%	100%
3. Own by Government Agency	237	410	78	673
4. Privately owned	27,155	0	220	27,357
5. Sources with Quality Problem	3,251	146	77	3,474
6. Non-Functional Well	5,402	218		5,620
7. Untapped Spring			161	161

7.2 Geology

The geologic rock units observed in the province have been categorized into three (3) main groups based on the ages of the different rock formations: Pliocene and Older Rock units; Pliocene to Pleistocene rock units; and Recent Deposits. Boundaries between these rock groups are shown in the Geological Map of the Province (refer to Figure 7.2.1).

(1) Pliocene and Older rock units

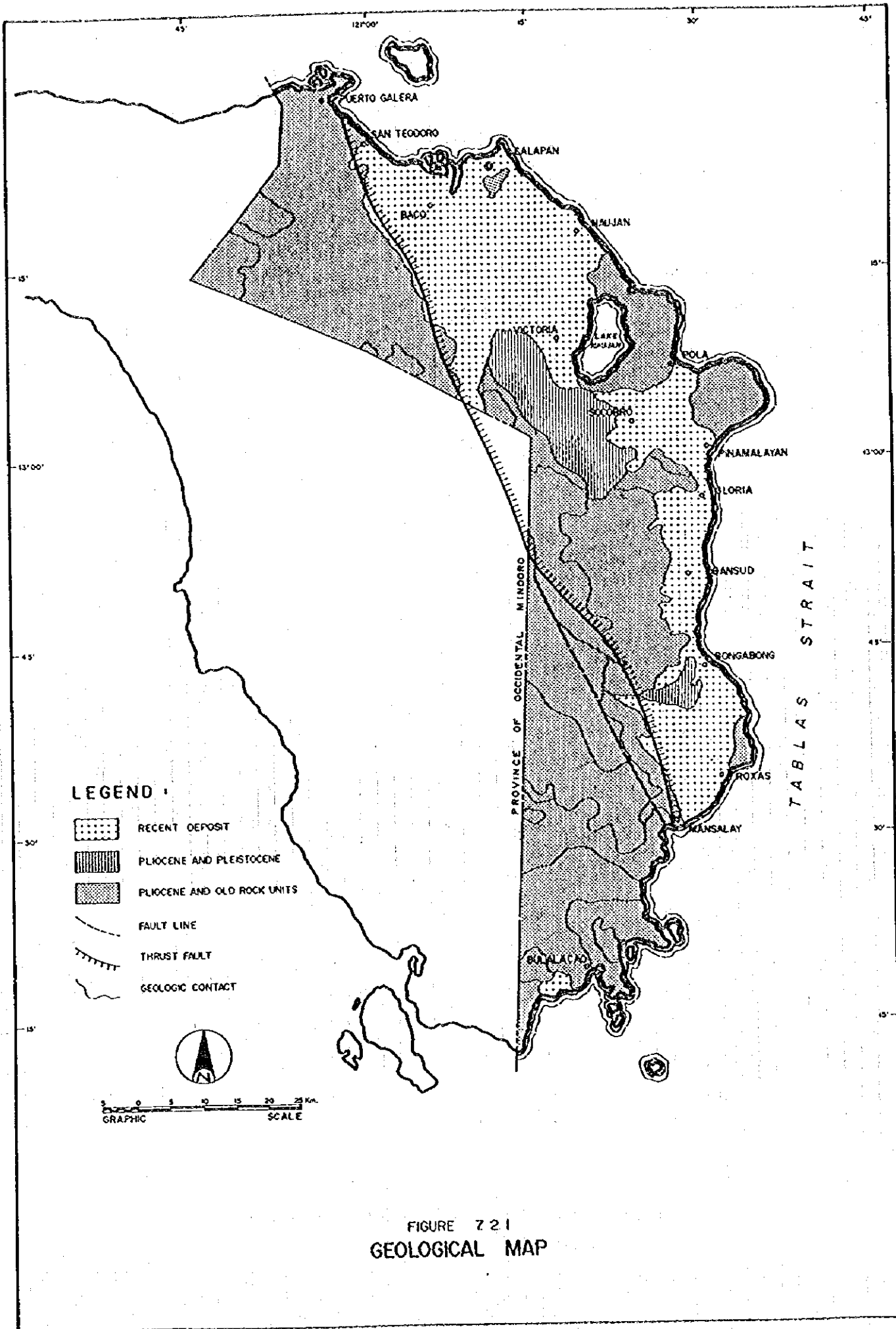
Mindoro Island is dominated by a broad expanse of basement complex rocks. The basement rocks consist of schist and quartzite exposed along the north-south trending Mindoro mountain range, which in parts are overlain by younger volcanic rocks. These rocks cover about 50% of the total land area of the province. Groundwater potential is low in these rock units. A rare possibility of exploiting groundwater may be through fissures.

(2) Pliocene to Pleistocene

Limited deposits of the Pliocene to Pleistocene rocks exist in the province. These deposits comprised about 15% of the rocks covering the province. A fairly extensive deposit occurs in the south-southwestern section of the Naujan lake. These are semi-consolidated rocks consisting of marine and terrestrial sediments associated with terrace deposits. Groundwater potential is generally high with sufficient thickness of aquifer to allow for groundwater development by means of deep wells.

(3) Recent Deposits

The Recent deposits constitute approximately 35% of the province. These consist mainly



of unconsolidated clay, silt, sand and gravel deposits and are widespread in the municipalities of Baco, Calapan, Naujan, Mansalay, Roxas, Bongabong, Bansud, Gloria and Pinamalayan. The deposits have potential groundwater both in shallow and deep aquifers.

7.3 Groundwater Sources

7.3.1 Classification of Groundwater Sources

For planning purpose, the provincial area is divided into the following sub-areas in terms of groundwater availability.

(1) Shallow well area

Generally, there exists Recent deposit in the shallow well area underlain by basement rock units or impervious formation, where alluvial deposits exist covering river flood plains, valleys and coastal areas. The extent of sole shallow well area is limited, because some Recent formation is underlain by Pleistocene to Late Pliocene formations where deeper aquifers commonly exist.

(2) Deep well area

Deep aquifers may be available under Recent to Pleistocene, and Pliocene pervious and semi-pervious formations. In most of these areas, several aquifers are available including those for shallow well development.

(3) Difficult area

The area falls in Pliocene and older rock units. Groundwater availability is very low in the area.

The potential areas with a high yield from deep aquifers and a problem of salt water intrusion are also presented based on NWRB's well database (geo-resistivity survey) and water quality examination results at some wells.

7.3.2 Groundwater Availability in the Province

The Groundwater Availability Map is presented in Figure 7.3.1. The major database used were prepared by BMGS and NWRB. The methodology and study processes with respective

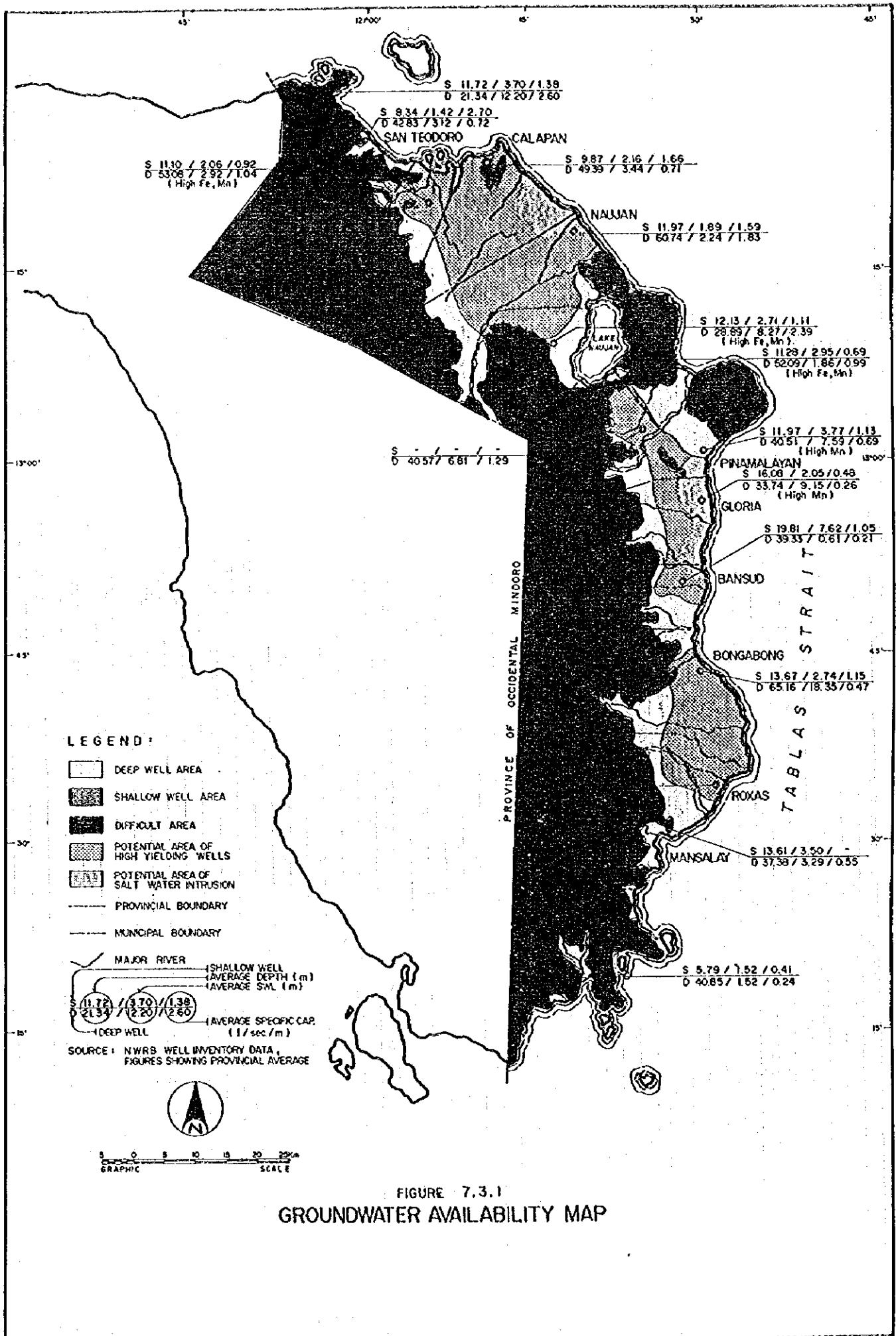


FIGURE 7.3.1
GROUNDWATER AVAILABILITY MAP

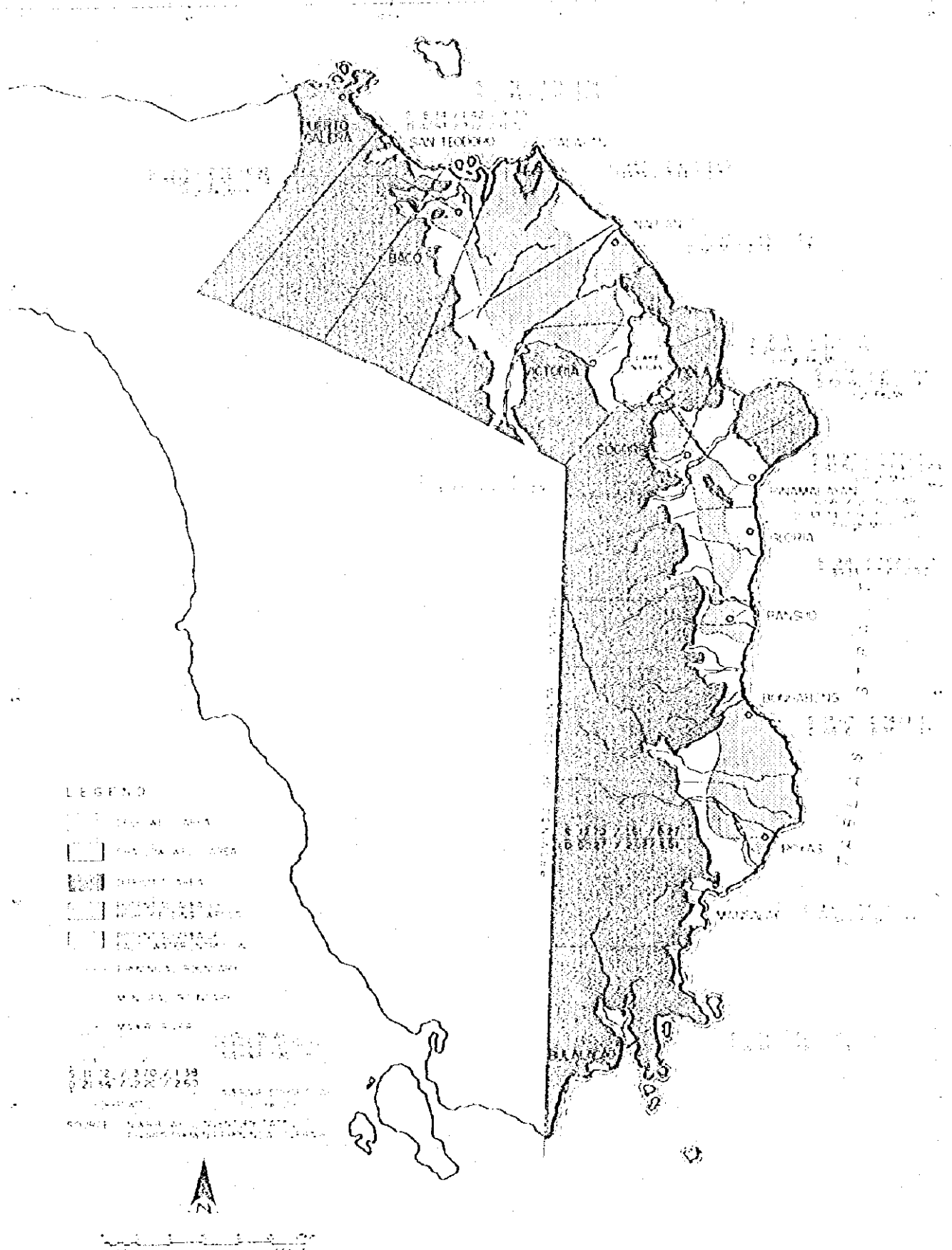


FIGURE 7.3.1
GROUNDWATER AVAILABILITY MAP



outputs are included in 7.3, Supporting Report. Technical information on the wells by municipality is also shown in the same Report.

(1) Shallow well area

Except for the islets, no sole shallow well area can be observed in the province. Wells are generally driven/drilled with an average depth of 5 to 10 mbgl and the water table is more or less 1 mbgl.

(2) Deep well area

The deep well area covers approximately 30 % of the province. The alluvial flats in San Teodoro, Baco, Calapan, Naujan and Victoria and the low land areas from Pola to Mansalay have high potential for deep well development. Average well depth of existing wells is 32 mbgl with average water table of 4.4 mbgl and specific capacity of 1.2 l/sec/m. However, many free flowing wells are observed in Naujan.

(3) Difficult area

About 70 % of the provincial area is classified as difficult area to exploit groundwater for water supply. The groundwater in the area is scarce and the chances to hit productive wells are low. The areas are hilly and mountainous situated in some part of the Mindoro mountain ranges, mainly the western portion of the province. It is underlain by a complex mix of igneous and metamorphic rocks which are dense, massive, and impervious in soil character.

(4) Water quality of groundwater

The groundwater is generally potable except in some areas with high content of iron and manganese, and salinity. Water resource investigation for the province conducted by NWRB revealed the problem areas with respect to water quality as follows:

1) Possible area for salt water intrusion

High saline water is identified at some deep and shallow wells in Calapan, Naujan and Pinamalayan. In addition, geo-electric survey revealed that the coastal sections along Naujan, Calapan, Pinamalayan and Gloria are possible areas of salt water intrusion.

2) Iron and manganese problem area

Some deep and shallow wells in Baco, Pola, Gloria, Victoria and Pinamalayan have

problems with high iron and manganese content. These problems are caused by the continuous erosion of the iron-copper rich Limestone formation (contact metamorphosed ore deposit) in Mount Burrurungan area and ultramafic rocks at Mindoro mountain range.

The possible areas of salt water intrusion and with high iron and manganese content are indicated in the Groundwater Availability Map.

7.4 Spring Sources

Spring is a natural outlet of groundwater at the surface of the ground. It occurs where the water table intersects the ground surface through the contacts of the pervious and impervious rock formations and along fractures of unconsolidated rock units. Because of the mountain ranges and highlands covered by the Pleistocene and older rock units, complex faulting systems and existence of permeable materials between volcanic rocks, there is favorable environment for the development of springs.

A number of springs can be found in the municipalities of Victoria, Baco, Pola, Bulalacao, Pinamalayan, Naujan, Bansud and Socorro. The yields of existing springs range from 1.2 to 4.6 l/sec. Untapped springs are available for water supply in Baco, Victoria, Socorro, Pola and Bansud areas, of which discharge rate is about 4 l/sec per spring. Technical information on the springs by municipality is presented in Table 7.4.1, Supporting Report.

7.5 Surface Water Sources

The province has numerous rivers, namely: Bongabong, Pola, Bucayao, Mag-asawang Tubig, Mansalay, Tangon, Balete, Banus, Asahin, Malitbog and Bansud rivers. Drainage systems are generally eastward flowing and emptying into the Tablas strait. Drainage areas of the larger river basins range from 435 to 148sqkm. Minimum flow rates recorded vary from 13.61 to 1.32 cu. m/sec. Current use of river water is primarily for irrigation purposes.

Water quality analysis of Bucayao and Mag-asawang Tubig rivers, comparatively large rivers in the province, were conducted to determine general characteristics of the surface quality in the province. River water was found to be turbid, with some color and high iron content (refer to 7.5, Water Quality Analysis Results, Supporting Report and Table 7.5.1, Data

Report). Based on the examination results, both rivers fall under Classification A of Water Quality Criteria for Fresh Water. It will require complete treatment for the use of water supply.

7.6 Future Development Potential of Water Sources

Based on the study of existing water sources, groundwater was identified as a safe and economical source for the water supply of the province.

Shallow wells are the most economical sources for Level I service. However, the yields of these wells are affected by the lowering of water table during dry season and exposed to the danger of bacteriological contamination.

Deep wells are generally safe and stable in quantity with a provision of appropriate technology for the development. Additional wells should be developed taking into account water quality problem and hydrogeological conditions entailing detailed survey.

Groundwater Availability Map as shown in Figure 7.3.1 presents basic information for the municipalities with available data; average depth, static water level and specific capacity. For planning purpose, potential water sources and their specifications by well type for the municipalities are further tabulated in Table 7.6.1, Supporting Report.

A number of untapped springs in the municipalities of Baco, Pola, Gloria, Pinamalayan, Naujan, Bansud and Socorro may be potential sources for water supply. Prior to spring development, supplementary studies should be conducted to determine seasonal fluctuation of the discharge rate.



Chapter 8

***FUTURE REQUIREMENTS IN WATER
SUPPLY AND SANITATION IMPROVEMENT***



8. FUTURE REQUIREMENTS IN WATER SUPPLY AND SANITATION IMPROVEMENT

8.1 General

Phased investments for provincial sector development are planned in the same manner as adopted in the National Sector Master Plan (NSMP); Medium-Term Investment covering the years 1996 to 2000 and Long-Term Development covering the period 2001 to 2010.

Targets of provincial service coverage for the two phases are established as percentages of beneficiaries or utilities to be served by sub-sector. Service coverage in the base year (1994) and national sector targets indicated in the NSMP and the Medium-Term Philippine Development Plan (MTPDP) are the bases of the study. Sector targets which are not prescribed in the national plan; school and public toilets as well as sewerage are assumed based on the current conditions. In addition, preliminary discussions on solid waste management are included as a vital component of sanitation sector.

Projection of frame values by municipality is undertaken for respective sub-sectors; future population by urban and rural area, the number of student enrollment to public schools and the number of public utilities. Base figures for the study of framework are referred to the 1990 Census of Population and Housing and the statistical data of the province and information from relevant agencies. NSO projection is employed for municipal population at the target years and base year (1994), while population distribution to urban and rural areas prepared by NSO in 1990 is modified to meet actual conditions in classification of the areas.

Types of required facilities and their implementation criteria according to service level standards are referred to the said Master Plan. Some planning conditions and assumptions not prescribed in the national plan are conferred to the relevant standards of sector agencies and provincial government. For sewerage requirements, the deficit in sanitation must first be addressed. Partial upgrading of on-site disposal to a sewerage system (off-site disposal) is envisaged in the final target year.

In estimating future requirements by municipality, additional population (or number of students/public utilities) to be served by sub-sector is first calculated as a shortfall at target years in comparison between target and base year service coverage. In this regard, planned/on-going projects to be completed by 1995 are considered as part of base year service coverage.

Required number of facilities by sector component is then estimated corresponding to the said additional population (or number of students/public utilities) to be served. Rehabilitation work for Level I facilities limited to new deep wells to be constructed under PW4SP is taken into account. Generally, rehabilitation of deep wells and shallow wells constructed by means of conventional method is difficult.

Logistic support was considered as a minimum requirement of LGUs for community development and training, and other relevant activities along with the implementation of PW4SP. The types and number of well drilling/rehabilitation equipment and supporting vehicle for Level I facilities are also suggested as reference information.

Project priority for medium-term development is discussed entailing general criteria to identify specific projects. However, at the provincial level master plan, municipal priority ranking is rather suggested to be used for allocation of provincial fund.

8.2 Targets of Provincial Sector Plan

Provincial sector targets for the year 2000 and 2010 are determined as the provincial average of the desirable minimum level for each sub-sector. Table 8.2.1 summarizes the target percentages to be served by sub-sector. Details by sub-sector are discussed in this sub-section.

(1) Water supply

The base year service coverage was calculated as a total of those in 1994 and expected by planned/on-going projects scheduled to be completed by 1995. Table 8.2.2 shows service coverage for the planning purpose (details are referred to Supporting Report).

The base year service coverage in urban area (82%) is already exceeding the national sector target (71% in 2000) of the MTPDP, while that in rural area (63%) is far behind 85% of the target. As identified in Chapter 4, the lower service coverage in rural area is caused by the presence of a large number of unsafe sources/facilities and/or no provision of water supply facilities.

Considering the existing conditions, water supply sector targets were determined by urban and rural area. Phase I development shall be focused on the rural water supply, to

Table 8.2.1 Provincial Sector Targets

		Phase I (1996-2000)		Phase II (2001-2010)	
Water Supply		Population Coverage (%)	Additional Population to be Served	Population Coverage (%)	Additional Population to be Served
Urban Water Supply		85	15,096	93	75,182
Rural Water Supply		85	159,888	95	134,486
Sanitation		Households Coverage (%)	Additional Households to be Served	Households Coverage (%)	Additional Households to be Served
Household Toilet		77	37,374	94	107,599
Urban	Flush	45	2,556	50	9,886
	Pour Flush	45	1,210	50	7,973
	VIP	10	768	0	0
Rural	Flush	20	1,056	20	2,794
	Pour Flush	65	28,851	80	86,947
	VIP	15	2,931	0	0
School Toilet		Coverage (%)	Additional Public School Students to be Served	Coverage (%)	Additional Public School Students to be Served
		50	34,083	70	61,191
Public Toilet		Coverage (%)	Additional Public Utilities with Sanitary Toilets	Coverage (%)	Additional Public Utilities with Sanitary Toilets
		70	18	100	6
Sewerage		Not Applicable		Coverage (%)	Population to be Served
				50	38,514
Solid Waste		Coverage (%)	Additional Households to be Served	Not Applicable	
		80	5,059		

Table 8.2.2 Base Year Service Coverage of Water Supply

Municipalities	Type	Population (1994)	Population Served by 1994 Facilities				% Coverage
			Level III	Level II	Level I	Total	
Baco	Urban	1,898	0	0	1,716	1,716	90
	Rural	24,654	1,431	2,638	19,354	23,423	95
	Total	26,552	1,431	2,638	21,070	25,139	95
Bansud	Urban	4,299	0	318	2,946	3,264	76
	Rural	23,771	0	0	15,504	15,504	65
	Total	28,070	0	318	18,450	18,768	67
Bongabong	Urban	4,278	0	0	2,516	2,516	59
	Rural	51,321	0	0	25,719	25,719	50
	Total	55,599	0	0	28,235	28,235	51
Bulalacao	Urban	2,829	0	0	658	658	23
	Rural	21,317	0	0	2,181	2,181	10
	Total	24,146	0	0	2,839	2,839	12
Calapan (Capital)	Urban	34,616	22,685	0	8,472	31,157	90
	Rural	61,548	12,964	0	34,305	47,269	77
	Total	96,164	35,649	0	42,777	78,426	82
Gloria	Urban	2,204	0	0	1,243	1,243	56
	Rural	30,555	0	0	17,050	17,050	56
	Total	32,759	0	0	18,293	18,293	56
Mansalay	Urban	2,561	0	0	1,163	1,163	45
	Rural	27,707	0	0	13,590	13,590	49
	Total	30,268	0	0	14,753	14,753	49
Naujan	Urban	5,143	2,009	221	1,909	4,139	80
	Rural	72,797	756	250	48,281	49,287	68
	Total	77,940	2,765	471	50,190	53,426	69
Pinamalayan	Urban	7,582	7,420	0	0	7,420	98
	Rural	56,217	24,284	2,195	18,326	44,805	80
	Total	63,799	31,704	2,195	18,326	52,225	82
Pola	Urban	1,637	1,142	0	0	1,142	70
	Rural	27,262	1,754	250	5,257	7,261	27
	Total	28,899	2,896	250	5,257	8,403	29
Puerto Galera	Urban	3,024	0	0	2,779	2,779	92
	Rural	16,889	0	3,086	12,506	15,592	92
	Total	19,913	0	3,086	15,285	18,371	92
Roxas	Urban	3,836	1,582	0	1,569	3,151	82
	Rural	33,475	0	0	23,045	23,045	69
	Total	37,311	1,582	0	24,614	26,196	70
San Teodoro	Urban	2,685	0	0	1,971	1,971	73
	Rural	10,253	0	0	3,767	3,767	37
	Total	12,938	0	0	5,738	5,738	44
Socorro	Urban	4,328	0	0	3,291	3,291	76
	Rural	28,506	0	0	14,950	14,950	52
	Total	32,834	0	0	18,241	18,241	56
Victoria	Urban	7,569	0	0	6,804	6,804	90
	Rural	31,800	0	590	24,136	24,726	78
	Total	39,369	0	590	30,940	31,530	80
Provincial Total	Urban	88,489	34,838	539	37,036	72,413	82
	Rural	518,072	41,189	9,009	277,969	328,167	63
	Total	606,561	76,027	9,548	315,005	400,580	66

catch up with the MTPDP target of 85%, while the urban water supply be moderately improved up to the same level as the rural water supply. Phase II targets are planned to increase both urban and rural water supply coverage to 93% and 95%, respectively as envisaged in the NSMP.

(2) Sanitation

1) Household toilets

As with water supply, the base year service coverage is calculated as shown in Table 8.2.3 reflecting any planned or on-going projects scheduled to be completed by 1995 (details are referred to Supporting Report).

The province has a base service coverage of 57% which is well below the current national average coverage of 77%. Urban area registers a high level of 85% that is close to the national target of 93% set by the MTPDP for the year 2000. Rural area however, has only 53% considering the numerous unsanitary facilities. By type of sanitary toilet facility, the existing percentage composition to total households is as follows:

Type	Urban (%)	Rural (%)
Flush	20	4
Pour-flush	51	32
VIP latrine	14	17

Taking into account the existing service coverage, the provincial target of Phase I for household toilets is planned to be 77% which is the current national average coverage. For Phase II, 94% as set by the National Sector Master Plan is adopted. The same targets are applied to both urban and rural areas to lessen the gap of the service coverage between the two (2) areas and to attain an equitable distribution of this basic facility.

The existing composition of the 3 facility types serves as an indicator in the distribution for Phase I, while for Phase II, VIP latrine is phased-out.

2) School toilets

The base year service coverage of public school students is shown in Table 8.2.4 counting expected coverage of any planned or on-going projects scheduled to be completed by 1995 (details are referred to Supporting Report).

Table 8.2.3 Base Year Service Coverage of Household Toilets

Municipality	Area	1994		Households and Population Using Sanitary Toilets								
		Population	No. of HHs	Number of Households				Served Population	Coverage (%)			
				Flush	Pour Flush	VIP Latrine	Total		Flush	Pour Flush	VIP Latrine	Total
Baco	Urban	1,898	380	0	256	124	380	1,898	0	67	33	100
	Rural	24,654	4,483	133	2,257	1,288	3,678	20,216	3	50	29	82
	Total	26,552	4,863	133	2,513	1,412	4,058	22,038	3	52	29	83
Bansud	Urban	4,299	811	0	177	484	661	3,525	0	22	60	82
	Rural	23,771	4,571	0	609	2,113	2,722	14,263	0	13	46	60
	Total	28,070	5,382	0	786	2,597	3,383	17,684	0	15	48	63
Bongabong	Urban	4,278	807	0	284	379	663	3,508	0	35	47	82
	Rural	51,321	9,683	0	936	4,199	5,135	27,200	0	10	43	53
	Total	55,599	10,490	0	1,220	4,578	5,798	30,579	0	12	44	55
Bulalacao	Urban	2,829	479	0	50	320	370	2,178	0	10	67	77
	Rural	21,317	3,948	0	1,010	543	1,553	8,314	0	26	14	39
	Total	24,146	4,427	0	1,060	863	1,923	10,383	0	24	19	43
Calapan (Capital)	Urban	34,616	6,410	2,101	3,632	18	5,751	31,154	33	57	0	90
	Rural	61,548	11,191	1,179	5,416	269	6,864	37,544	11	48	2	61
	Total	96,164	17,601	3,280	9,048	287	12,615	69,238	19	51	2	72
Gloria	Urban	2,204	408	0	199	55	254	1,366	0	49	13	62
	Rural	30,555	5,765	0	1,364	1,343	2,707	14,361	0	24	23	47
	Total	32,759	6,173	0	1,563	1,398	2,961	15,724	0	25	23	48
Mansalay	Urban	2,561	466	0	372	0	372	2,049	0	80	0	80
	Rural	27,707	5,131	0	2,692	0	2,692	14,408	0	52	0	52
	Total	30,268	5,597	0	3,064	0	3,064	16,647	0	55	0	55
Naujan	Urban	5,143	1,050	205	609	171	985	4,834	20	58	16	94
	Rural	72,797	13,481	70	3,587	1,469	5,126	27,663	1	27	11	38
	Total	77,940	14,531	275	4,196	1,640	6,111	32,735	2	29	11	42
Pinamalayan	Urban	7,582	1,431	793	327	130	1,250	6,596	55	23	9	87
	Rural	56,217	10,411	2,249	2,816	944	6,009	32,606	22	27	9	58
	Total	63,799	11,842	3,042	3,143	1,074	7,259	38,917	26	27	9	61
Pola	Urban	1,637	341	119	187	0	306	1,473	35	55	0	90
	Rural	27,262	5,345	172	1,129	575	1,876	9,542	3	21	11	35
	Total	28,899	5,686	291	1,316	575	2,182	10,982	5	23	10	38
Puerto Galera	Urban	3,024	605	0	597	8	605	3,024	0	99	1	100
	Rural	16,889	3,187	0	2,001	223	2,224	11,822	0	63	7	70
	Total	19,913	3,792	0	2,598	231	2,829	14,935	0	69	6	75
Roxas	Urban	3,836	710	147	447	6	600	3,261	21	63	1	85
	Rural	33,475	6,086	0	1,460	616	2,076	11,382	0	24	10	34
	Total	37,311	6,796	147	1,907	622	2,676	14,551	2	28	9	39
San Teodoro	Urban	2,685	488	0	200	128	328	1,799	0	41	26	67
	Rural	10,253	1,831	0	762	465	1,227	6,870	0	42	25	67
	Total	12,938	2,319	0	962	593	1,555	8,668	0	41	26	67
Socorro	Urban	4,328	801	0	375	213	588	3,159	0	47	27	73
	Rural	28,506	5,482	0	1,370	773	2,143	11,117	0	25	14	39
	Total	32,834	6,283	0	1,745	986	2,731	14,119	0	28	16	43
Victoria	Urban	7,569	1,352	0	645	348	993	5,525	0	48	26	73
	Rural	31,800	5,782	0	3,176	1,425	4,601	25,440	0	55	25	80
	Total	39,369	7,134	0	3,821	1,773	5,594	30,703	0	54	25	78
Provincial Total	Urban	88,489	16,539	3,365	8,357	2,384	14,106	75,152	20	51	14	85
	Rural	518,072	96,377	3,803	30,585	16,245	50,633	272,746	4	32	17	53
	Total	606,561	112,916	7,168	38,942	18,629	64,739	348,098	6	34	16	57

Table 8.2.4 Base Year Service Coverage of Public School Toilets and Public Toilets

Municipality	Public School Toilets			Public Toilets		
	1994 Total No. of Public School Students	Std. No. of Public School Students that can be Served by Base Year (1994) Sanitary Toilets	Coverage (%)	Number of PU with Toilets in 1994	Number of PU with Sanitary Toilets in Base Year (1994)	Coverage (%)
Baco	4,541	1,800	40	2	2	100
Bansud	6,365	2,100	33	1	0	0
Bongabong	11,820	3,900	33	2	2	100
Bulalacao	4,644	1,500	32	1	0	0
Calapan (Capital)	16,994	5,650	33	2	0	0
Gloria	7,547	2,500	33	1	0	0
Mansalay	6,570	2,150	33	1	1	100
Naujan	16,958	5,650	33	1	1	100
Pinamalayan	15,182	5,050	33	2	0	0
Pola	5,194	1,700	33	1	0	0
Puerto Galera	3,844	1,300	34	1	1	100
Roxas	7,529	2,500	33	2	1	50
San Teodoro	842	300	36	1	1	100
Socorro	8,580	2,850	33	1	1	100
Victoria	5,394	1,800	33	3	3	100
Provincial Total	122,004	40,750	33	22	13	59

Note: PU - Public Utilities

Present service coverage is a mere 33% applying the standard number of students to be served by one (1) unit of toilet facility. The very low level is due to a large number of unsanitary or absence of facilities.

In the absence of national targets for school toilets, the existing level of service coverage is the base in setting up the targets. For Phase I and II, 50% and 70% are set, respectively.

3) Public toilets

The base year service coverage considering expected additional coverage by 1995 as planned is shown in Table 8.2.4 (details are referred to Supporting Report).

About 59% of the public utilities is served with sanitary toilets as shown in Table 8.2.4. This can be attributed by the fact that almost half of the public utilities (mostly public markets) are not provided by sanitary toilet facilities.

In setting up the targets without national targets as of now, the indicator would be the existing level of coverage. Accordingly, a 70% coverage for Phase I and a 100% coverage for Phase II are assumed.

(3) Sewerage

Given the non-existence of sewerage systems in any municipality at the present time, this plan does not consider the service during Phase I. For Phase II, a target of 50% coverage is applied to urban population of municipalities with more than 10,000 urban population provided by Level III water supply systems.

(4) Solid waste

The municipal level data in 1994 on the number of households served by the municipal refuse collection revealed that the current practice is concentrated to urban areas. The base year service coverage for urban area by municipality is reflected in Table 8.2.5.

Table 8.2.5 Base Year Service Coverage of Municipal Solid Waste System in 1994

Municipality	Total No. of Households	No. of Urban Households	No. of Households Served*	Coverage of Households (%)	Coverage of Urban HHs (%)
Baco	4,863	380	364	7	96
Bansud	5,382	811	917	17	113**
Bongabong	10,490	807	1,302	12	161
Bulalacao	4,427	479	0	0	0
Calapan (Capital)	17,601	6,410	4,008	23	63
Gloria	6,173	408	0	0	0
Mansalay	5,597	466	1,010	18	217**
Naujan	14,531	1,050	460	3	44
Pinamalayan	11,842	1,431	1,146	10	80
Pola	5,686	341	0	0	0
Puerto Galera	3,792	605	351	9	58
Roxas	6,796	710	1,320	19	186**
San Teodoro	2,319	488	398	17	82
Socorro	6,283	801	587	9	73
Victoria	7,134	1,352	714	10	53
Provincial Total	112,916	16,539	12,577	11	76

* Equivalent to total number of urban households served

** Covers some rural barangays / households

Only 11% of the total households in the province relied on the municipal refuse collection using trucks or a 76% urban household coverage. These municipalities have a total of 17 units of collection truck.

No national targets have yet been set. However, considering the present level of coverage, an 80% urban household coverage is applied for the medium-term period (2000).

8.3 Projection of Frame Values

8.3.1 Population Projection

Future population for all municipalities by urban and rural area was projected for the target years of 2000 and 2010 together with the present population in 1994 as a planning base year.

Reference figures used for the study were the population census data of 1980 and 1990, and the future population projected by NSO at different administrative levels; region, province and municipality with breakdown to urban and rural areas.

The study was carried out in the following manner (details are included in the Supporting Report).

- 1) Review of past population development including 1990 population distribution to urban and rural areas.
- 2) Review of NSO projection both in total population and annual growth rate at regional, provincial and municipal levels.
- 3) Review of population distribution (NSO projection) to urban and rural areas at municipal level in comparison with 1990 population distribution.

The past population development during the census period from 1980 to 1990 revealed that:

- The province recorded 2.1% of annual growth rate, lower than that of the region at 3.1%; and
- Percentage of provincial population to the regional population decreased from 7.3% in 1980 to 6.6% in 1990, although rural population percentage increased.

The future population may therefore remain under similar conditions as experienced in the last census decade, unless specific development takes place in the province.

Through the review of NSO projection, it was confirmed that:

- Total population of the province and its growth rates by target year reflect the trend of past population development; and
- Municipal population is also within the range of the past population development (moderate increase of population).

However, municipal population distribution to urban and rural areas was adjusted corresponding to the re-classification of some barangays as identified for the year 1990.

Population by target year and in 1994 is presented in Table 8.3.1 covering all municipalities broken down to urban and rural areas. Number of households by target year was also studied and included in Table 8.3.5, Supporting Report.

Table 8.3.1 Future Population by Urban and Rural Area by Municipality

Municipality	1990			1994			2000			2010		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Baco	1,713	22,087	23,800	1,898	24,654	26,552	2,200	27,772	29,972	2,812	32,153	34,965
Bansud	4,003	22,222	26,225	4,299	23,771	28,070	4,785	26,140	30,925	5,721	30,357	36,078
Bongabong	3,961	46,252	50,213	4,278	51,321	55,599	4,781	55,224	60,005	5,756	64,246	70,002
Bulalacao	2,642	18,674	21,316	2,829	21,317	24,146	3,113	23,801	26,914	3,669	27,730	31,399
Calapan (Capital)	31,230	54,668	85,898	34,616	61,548	96,164	40,680	67,866	108,546	54,567	72,064	126,631
Gloria	2,040	28,062	30,102	2,204	30,555	32,759	2,382	32,977	35,359	2,782	38,468	41,250
Mansalay	2,400	25,115	27,515	2,561	27,707	30,268	2,812	31,055	33,867	3,286	36,224	39,510
Naujan	4,768	67,435	72,203	5,143	72,797	77,940	5,788	81,730	87,518	7,080	95,020	102,100
Pinamalayan	7,248	51,529	58,777	7,582	56,217	63,799	8,630	63,040	71,670	10,710	72,901	83,611
Pala	1,540	25,293	26,833	1,637	27,262	28,899	1,786	30,565	32,351	2,067	35,674	37,741
Puerto Galera	2,447	14,753	17,200	3,024	16,889	19,913	4,155	18,370	22,525	7,056	19,222	26,278
Roxas	3,379	29,799	33,178	3,836	33,475	37,311	4,641	36,874	41,515	6,375	42,057	48,432
San Teodoro	2,555	9,668	12,223	2,685	10,253	12,938	2,897	12,148	15,045	3,300	14,252	17,552
Socorro	3,780	26,026	29,806	4,328	28,506	32,834	5,325	31,362	36,687	7,604	35,196	42,800
Victoria	6,823	27,937	34,760	7,569	31,800	39,369	8,879	35,260	44,139	11,749	39,744	51,493
Provincial Total	80,529	469,520	550,049	88,489	518,072	606,561	102,854	574,184	677,038	134,534	655,308	789,842

8.3.2 School Enrollment Projection

From the 1994 total population of the province, the number of children who would be enrolling in elementary and high school levels for all municipalities is derived.

School age population is extrapolated from the NSO age group classification of 5-9, 10-14 and 15-19 years old bracket by municipality. The age group for the elementary level is from 7 to 13 years, while that for the high school level is from 14 to 17 years. The percentages of school age population for the target years are based on the existing composition or structure of the 1990 population.

From the school age population, the number of children who would attend either private or public school, by target year is computed using the projected participation rate. The participation rate by target year varies depending on the socio-economic condition of the province. Generally, an improved economy will result to a higher participation rate. For the province, an increase in the participation rate in both private and public schools is foreseen by year 2010.

The number of public school students by target year is then derived from the projected number of children who will attend school. A participation rate for public school enrollment is established based on the existing participation rate of public school students to the total school age population. The participation rate of 1994 is assumed to be maintained for the year 2000. However, a slight increase of 8% from the 2000 rate is foreseen for the year 2010 (refer to Table 8.3.6, Supporting Report).

Table 8.3.2 shows the projected number of public school students by municipality, by target year. A total of 149,656 and 194,319 public school students is estimated to enroll for years 2000 and 2010, respectively.

Table 8.3.2 Projected Public School Enrollment and Number of Public Utilities by Municipality

Municipality	Number of Public School Students			No. of Public Utilities		
	1994	2000	2010	1994	2000	2010
Baco	4,541	5,691	7,338	2	4	4
Bansud	6,365	7,467	9,652	1	3	3
Bongabong	11,820	14,060	17,975	2	3	4
Bulalacao	4,644	5,860	7,596	1	1	1
Calapan (Capital)	16,994	21,582	27,615	2	4	4
Gloria	7,547	8,863	11,280	1	2	2
Mansalay	6,570	8,054	10,323	1	2	2
Naujan	16,958	20,449	26,143	1	2	2
Pinamalayan	15,182	18,415	23,870	2	3	4
Pola	5,194	6,267	8,042	1	2	2
Puerto Galera	3,844	5,055	6,496	1	3	3
Roxas	7,529	9,445	12,137	2	2	2
San Teodoro	842	1,016	2,154	1	2	2
Socorro	8,580	10,563	13,468	1	2	2
Victoria	5,394	6,869	10,230	3	3	3
Provincial Total	122,004	149,656	194,319	22	38	40

8.3.3 Projection of the Number of Public Utilities

The number of public utilities (public markets and bus/jeepney terminals) by target year is projected in urban areas for all municipalities. The provincial physical framework plan and the hierarchy of urban settlements study serve as references in the projection. Bus or jeepney terminals are considered in major transport routes of the province.

Sixteen (16) public markets/bus terminals are planned to be constructed by year 2000, and another two (2) by year 2010. Refer to Table 8.3.2 for the total number of public utilities by municipality by target year (details are referred to Supporting Report).

8.3.4 Planning Area and Population to be Served by the Sewerage System

Urban areas with more than 10,000 population provided by Level III water supply systems in 2010 are assumed as the planning area. Population in the area is considered as the potential population to be served.

A total of 3 municipalities with 77,026 urban population are considered (refer to Table 8.5.5).

8.3.5 Number of Households to be Served by Municipal Solid Waste Collection System

The number of urban households in 2000 is the potential households for the planning (refer to Table 8.3.5, Supporting Report)

8.4 Types of Facilities and Implementation Criteria

In principle, types of facilities and their implementation criteria as prescribed in the National Sector Master Plan are adopted to this PW4SP.

8.4.1 Water Supply

The following are major conditions and assumptions applied to urban and rural water supply, which are intended as a guide for the implementation of sector projects.

(1) Urban water supply

1) Service level

It shall be noted that a national policy for urban water supply is a Level III system in general as the most suitable measure. Therefore, for the investment needs of the sector development, it is assumed in this PW4SP that underserved and/or unserved urban population at present and in the future will be provided with individual house connections. However, it does not intend to exclude Level I and II facilities from being implemented in urban area in the future as individual cases.

2) Utilization of existing facilities

The existing Level I and II facilities are considered to be utilized during the Phase I period. However, the population served by these facilities are assumed to be absorbed by Level III service in Phase II.

3) Water source

Majority of existing Level III systems are utilizing deep wells in view of economy and easy O&M. In this context, priority is given to deep wells wherever applicable.

The groundwater productivity of deep wells was assumed at an average 1,000 cu.m/day (16 hours a day of operating period) based on the data of operating wells at WDs.

4) Number of systems

In principle, one Level III system is considered for urban area of every municipality. When any Level III system exists, the future requirements are considered as an expansion of the existing system, otherwise a new system was considered.

In addition to the above, any rural barangay/s being served by the existing urban Level III system are considered to be continued through the future. A merged Level III system covering more than two municipalities is also considered, if conditions meet technically and economically.

5) Rehabilitation

Rehabilitation of existing and future facilities is assumed to be undertaken by the operating bodies.

(2) Rural water supply

1) Service level

The Level I systems are generally planned for rural areas where houses are scattered (deep and/or shallow wells). The spring development is excluded from the Level I planning in view of cost effectiveness. Level II systems are considered where houses are clustered and suitable untapped spring is available.

Service level standards are set forth as 15 households per source for Level I and 5 households per communal faucet for Level II, as defined in the national plan.

Application of Level III systems in rural areas may be considered as case-by-case basis in actual implementation.

2) Utilization of existing facilities

The existing facilities/systems in all service levels were considered to be utilized through the future.

3) Water source

For Level I facilities, deep well construction is given priority wherever applicable in view of safety against possible contamination and stable water supply. Standard specifications of shallow and deep wells are summarized in Table 8.4.1 based on the water source evaluation results presented in Chapter 7. Conventional construction method (driven well) may be employed under the favorite substrata/hydrogeological conditions. The standard structure of wells in application of "open-hole drilling and gravel pack" is presented in Figure 8.4.1, Supporting Report.

Table 8.4.1 Standard Specifications of Level I Wells

Specification	Shallow Well	Deep Well
Construction Method	Open-hole drilling and gravel pack	
Casing Diameter	50 mm	100 mm
Borehole Diameter	150 mm	200 mm
Ranges of Well Depth	Standard Depth	
0 - 20 m	20 m	N.A.
21 - 50 m	N.A.	40 m
51 - 100 m	N.A.	80 m
101 - 150 m	N.A.	120 m

For Level II systems, only untapped springs suitable for water supply purpose are considered. However, no Level II system is taken up in this PW4SP since no suitable untapped spring has been confirmed yet.

4) Number of systems/facilities

Number of Level I wells is estimated based on the service level standard. While, number of springs coincides with the number of Level II systems.

5) Rehabilitation

Rehabilitation of existing Level I wells is not considered in the fact that most of existing wells constructed by driving method are not suitable for rehabilitation to recover their functions. However, minor repair work for handpump and concrete apron is a requisite.

8.4.2 Sanitation

The conditions and assumptions are established for the different sanitation components to serve as guides in the implementation of projects.

(1) Household toilets

Three types of sanitary toilet facilities for individual houses are considered for Phase I; flush, pour-flush and VIP. While for Phase II, flush and pour-flush are planned considering the improvement of living standard.

The type of toilet facilities is dependent on the existing or planned service level of water supply in the community. In urban and rural areas with Level I or II water supply facilities, only pour-flush and/or VIP are considered, while in urban areas with Level III water supply systems, flush type toilets requiring a piped water connection are included.

(2) School toilets

Standard service level currently used by DECS (50 students per unit facility) is employed for both phases.

The standard toilet facility (1 building) with 5 units of toilet bowl to serve for 250 students is adopted for the planning purpose, which is modified from FW4SP design to provide a shallow well as a water source.

(3) Public toilets

As a minimum requirement, at least 1 sanitary toilet facility is assumed to be provided for respective utilities: public market and bus/jeeptney terminal.

The standard FW4SP design with 6-units of toilet bowl for the market is adopted. In this design, it is assumed that water supply will be tapped from the existing system, hence an elevated water tank is provided.

8.4.3 Urban Sewerage

The commencement of staged implementation of the sewerage program is planned in Phase II for the limited urban area (50% of urban population served by Level III system for the municipalities with urban population of more than 10,000). It is practical to start the program

using fully the existing facilities to allow for lower initial investment cost than starting at once a conventional sewerage system (refer to Figure 8.4.2 Staged Improvement in Sewage Collection Method, Supporting Report).

Low cost off-site technologies such as small bore sewer for collection of effluent from septic tank are to be adopted. Improvement of sewage collection method may be gradually achieved from combined to separate sewerage system.

Sewage treatment facilities may range from community scale septic tank or inhoff tank to aerated lagoon systems and to a more advanced treatment process such as oxidation ditch. For this PW4SP, aerated lagoons are assumed as a representative treatment facility for planning purpose. Daily average wastewater quantity is assumed to be 100 liters per capita per day.

8.4.4 Solid Waste

In terms of facility requirements, this PW4SP only studied the number of refuse collection trucks required for the year 2000. A rated capacity of 5 cu.m truck/vehicle is considered for calculation of required units of truck. Disposal of solid waste shall be studied in detail through investigations, F/S and D/D. Unit solid waste generation for urban area is assumed to be 0.418 kg. per capita per day.

8.5 Service Coverage by Target Year

8.5.1 Water Supply

The service coverage in terms of population to be served by target year was estimated by urban and rural area by municipality. The service coverage in rural area was further subdivided by service level (Level I & Level II) to finally come up with physical requirements.

Base figures applied to estimate the future service coverage and the additional population to be served are:

- provincial sector targets,
- population projection by target year, and
- base year service coverage (served population) by existing facilities.

Future requirements in terms of additional population to be served were then estimated by urban (Level III) and rural (Level I & II) area by municipality as a shortfall to meet the population to be served in each target year. The population served in base year is adopted as the population served in target year, when the former population exceeds the population to be served in the target year/s. Manner of calculation is more specifically presented by phase.

(1) Phase I requirements

Additional service coverage was estimated as a shortfall of the population to be served in Phase I comparing with the population served in base year. In this connection, existing facilities both in urban and rural areas are assumed to be utilized during the Phase I period.

The utilization of untapped springs for Level II systems is given priority during Phase I period for rural water supply. However, no such springs are reported

(2) Phase II requirements

Additional service coverage was estimated as a shortfall of the population to be served in Phase II comparing with the population served in Phase I. In this regard, existing facilities in rural area were assumed to be utilized through the two Phases, while urban population served by Level I and II facilities in base year was assumed to be absorbed by Level III service during Phase II period.

Table 8.5.1 exhibits the population to be served by target year, while Figures 8.5.1 and 8.5.2 present maps showing service coverage by 2000 and 2010, respectively (details are referred to Supporting Report).

Through the Phase I development, approximately 175,000 persons in the PW4SP area will be served by additional water supply service, of which 15,000 persons or 9% will be urban population and 160,000 persons or 91% will be rural population.

In the Phase II period, a total of 210,000 persons, of which 75,200 persons or 36% in urban area and 134,800 persons or 64% in rural area, will be further benefited by water supply services. This additional service coverage in urban area includes upgrade of service level for 37,600 persons served by Level I and II facilities in 1994.

Table 8.5.1. Population to be Served by Target Year (Water Supply)

Municipalities	Type	Phase I (2000)												Phase II (2010)											
		Total Population			Service Coverage			Additional Population to be Served			Total Population			Service Coverage			Additional Population to be Served								
		Level III	Level II	Level I	Level III	Level II	Level I	Level III	Level II	Level I	Level III	Level II	Level I	Level III	Level II	Level I	Level III	Level II	Level I						
Baco	Urban	2,300	0	1,715	1,870	154	0	154	2,812	2,613	0	2,613	0	2,613	0	2,613	0	0	0	0					
	Rural	27,772	1,431	19,537	23,606	183	0	183	32,153	1,431	2,638	26,476	30,545	0	30,545	0	0	0	0	0					
	Total	29,972	1,583	21,253	25,476	154	0	154	34,965	4,046	2,638	26,476	31,100	2,461	0	0	0	0	0	0					
Bansud	Urban	4,785	803	3,18	2,946	803	0	803	30,152	5,721	0	26,839	26,839	0	26,839	0	0	0	0	0					
	Rural	26,140	0	22,219	22,219	0	0	0	36,078	5,321	0	26,839	34,160	4,518	0	0	0	0	0	0					
	Total	30,925	803	25,165	26,266	803	0	803	66,236	11,042	0	53,533	60,999	9,036	0	0	0	0	0	0					
Bongabong	Urban	4,781	1,548	2,516	4,064	1,548	0	1,548	64,246	61,034	0	61,034	66,387	3,805	0	0	0	0	0	0					
	Rural	55,224	0	46,940	46,940	0	0	0	70,002	5,353	0	61,034	66,387	3,805	0	0	0	0	0	0					
	Total	60,005	1,548	49,456	51,004	1,548	0	1,548	134,248	66,387	0	122,068	132,774	7,610	0	0	0	0	0	0					
Buntalaco	Urban	3,113	1,988	658	2,646	1,988	0	1,988	3,669	3,412	0	3,412	26,344	26,344	0	0	0	0	0	0					
	Rural	23,801	0	20,231	20,231	0	0	0	27,730	3,412	0	26,344	26,344	1,424	0	0	0	0	0	0					
	Total	26,914	1,988	20,889	22,877	1,988	0	1,988	31,399	6,824	0	26,344	29,756	1,424	0	0	0	0	0	0					
Cajapan (Capital)	Urban	40,680	26,186	8,472	34,578	3,421	0	3,421	54,367	50,747	0	55,497	66,461	0	0	0	0	0	0	0					
	Rural	67,866	12,964	44,722	57,886	0	0	0	72,064	12,964	0	55,497	119,208	24,641	0	0	0	0	0	0					
	Total	108,546	39,070	53,194	92,264	3,421	0	3,421	126,428	63,711	0	110,994	185,676	24,641	0	0	0	0	0	0					
Gloria	Urban	2,382	782	1,243	2,025	782	0	782	2,782	2,382	0	2,382	36,545	36,545	0	0	0	0	0	0					
	Rural	32,977	0	28,050	28,050	0	0	0	38,468	2,382	0	36,545	36,545	1,805	0	0	0	0	0	0					
	Total	35,359	782	29,273	30,055	782	0	782	41,250	4,764	0	38,930	38,930	1,805	0	0	0	0	0	0					
Mangalay	Urban	2,812	1,227	1,163	2,390	1,227	0	1,227	3,296	3,056	0	3,056	3,056	1,829	0	0	0	0	0	0					
	Rural	33,867	1,227	27,560	28,787	1,227	0	1,227	36,224	3,056	0	34,413	34,413	1,829	0	0	0	0	0	0					
	Total	36,679	2,454	29,117	31,177	2,454	0	2,454	39,511	6,112	0	38,887	38,887	3,658	0	0	0	0	0	0					
Nauyan	Urban	5,788	2,790	2,21	1,909	4,920	781	0	7,080	6,384	0	6,384	90,269	90,269	0	0	0	0	0	0					
	Rural	81,730	756	68,465	69,471	0	0	0	95,020	756	250	89,263	90,269	0	0	0	0	0	0	0					
	Total	87,518	3,546	70,374	74,391	781	0	781	102,100	7,140	250	89,263	90,269	0	0	0	0	0	0	0					
Panamalayan	Urban	8,630	7,420	0	0	0	0	0	10,710	9,960	0	9,960	2,540	0	0	0	0	0	0	0					
	Rural	63,040	24,234	2,195	27,105	53,584	0	0	72,901	24,234	2,195	42,777	69,256	0	0	0	0	0	0	0					
	Total	71,670	31,764	2,195	27,105	61,004	0	0	83,611	34,244	2,195	42,777	72,316	2,540	0	0	0	0	0	0					
Pala	Urban	1,789	1,518	0	1,518	376	0	376	2,067	1,922	0	1,922	404	0	0	0	0	0	0	0					
	Rural	30,563	1,784	250	23,976	25,940	0	0	35,674	1,784	250	31,886	33,690	0	0	0	0	0	0	0					
	Total	32,351	3,272	250	23,976	27,498	0	0	37,741	3,566	250	31,886	33,690	0	0	0	0	0	0	0					
Puerto Galera	Urban	4,155	753	2,779	3,532	753	0	753	7,056	6,562	0	6,562	5,809	0	0	0	0	0	0	0					
	Rural	18,370	0	3,086	12,529	15,615	23	23	19,222	0	3,086	15,175	18,261	0	0	0	0	0	0	0					
	Total	22,525	753	3,086	15,308	19,147	23	23	26,278	6,562	3,086	15,175	24,823	5,809	0	0	0	0	0	0					
Ronas	Urban	4,641	2,376	1,569	3,945	794	0	794	6,375	5,929	0	5,929	3,553	0	0	0	0	0	0	0					
	Rural	36,874	0	31,343	31,343	0	0	0	42,057	0	0	39,954	39,954	0	0	0	0	0	0	0					
	Total	41,515	2,376	32,912	35,288	794	0	794	48,432	5,929	0	39,954	39,954	3,553	0	0	0	0	0	0					
San Teodoro	Urban	2,897	491	1,971	2,462	491	0	491	3,300	3,069	0	3,069	2,578	0	0	0	0	0	0	0					
	Rural	12,148	0	10,326	10,326	0	0	0	14,252	0	0	13,539	13,539	0	0	0	0	0	0	0					
	Total	15,045	491	12,297	12,788	491	0	491	17,552	3,069	0	13,539	16,608	2,578	0	0	0	0	0	0					
Secoto	Urban	5,325	1,235	3,291	4,526	1,235	0	1,235	7,004	7,072	0	7,072	5,837	0	0	0	0	0	0	0					
	Rural	31,362	0	26,658	26,658	0	0	0	35,196	0	0	33,436	33,436	0	0	0	0	0	0	0					
	Total	36,687	1,235	29,949	31,184	1,235	0	1,235	42,200	7,072	0	33,436	33,436	5,837	0	0	0	0	0	0					
Victoria	Urban	8,879	743	6,804	7,547	743	0	743	11,749	10,927	0	10,927	10,184	0	0	0	0	0	0	0					
	Rural	35,260	0	29,381	29,381	0	0	0	39,744	0	0	37,163	37,163	0	0	0	0	0	0	0					
	Total	44,139	743	35,765	37,931	743	0	743	51,493	10,927	0	48,090	47,347	10,184	0	0	0	0	0	0					
Provincial Total	Urban	102,854	46,934	37,037	47,510	15,096	0	15,096	134,534	125,116	0	125,116	75,182	0	0	0	0	0	0	0					
	Rural	574,184	41,189	437,559	448,057	159,888	0	159,888	653,308	41,189	9,009	572,945	622,343	0	0	0	0	0	0	0					
	Total	677,038	91,123	574,596	595,567	274,984	0	274,984	1,007,842	166,305	9,009	574,945	622,343	75,182	0	0	0	0	0	0					

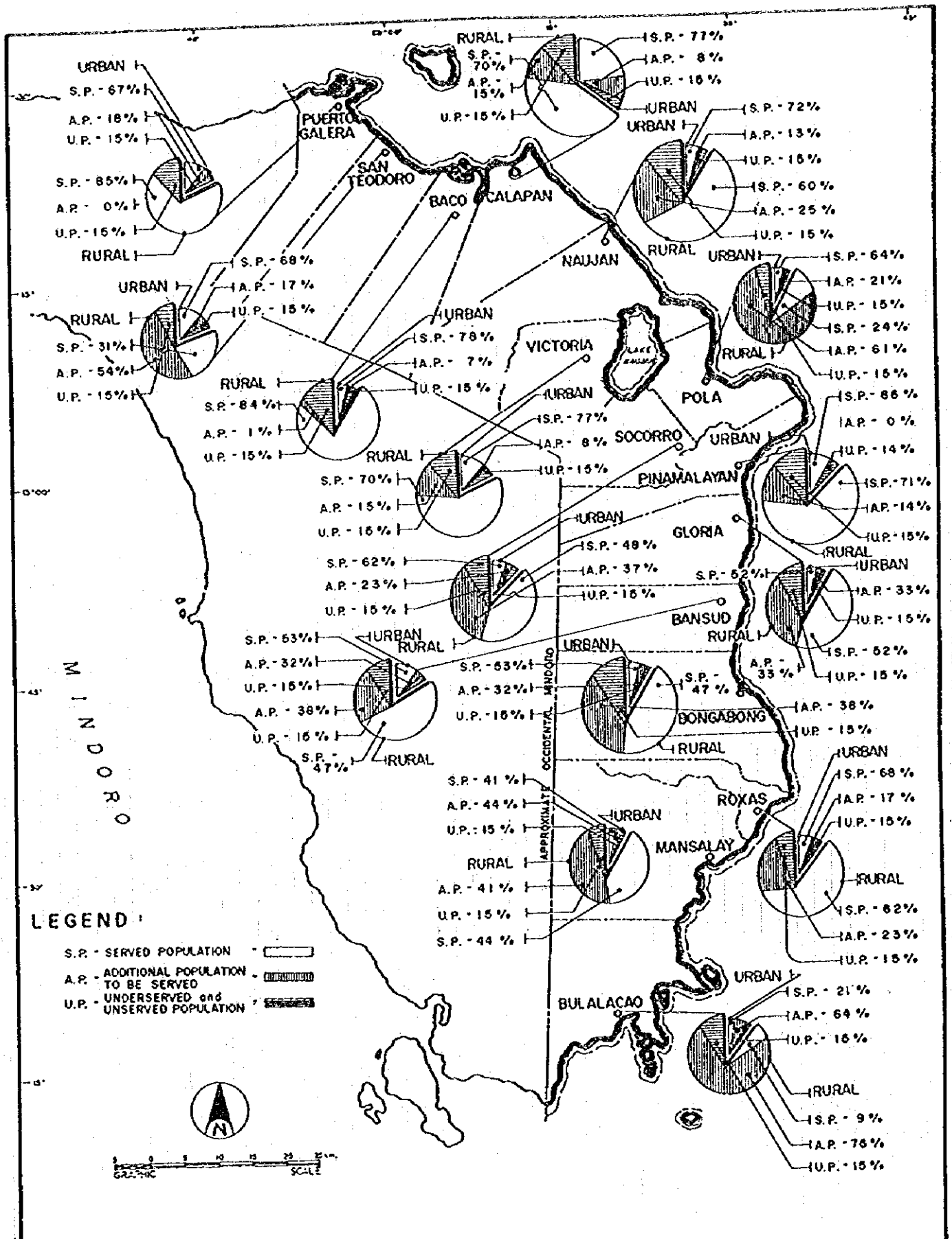


FIGURE 8.5.1
 MAP SHOWING FUTURE WATER SUPPLY SERVICE COVERAGE BY 2000

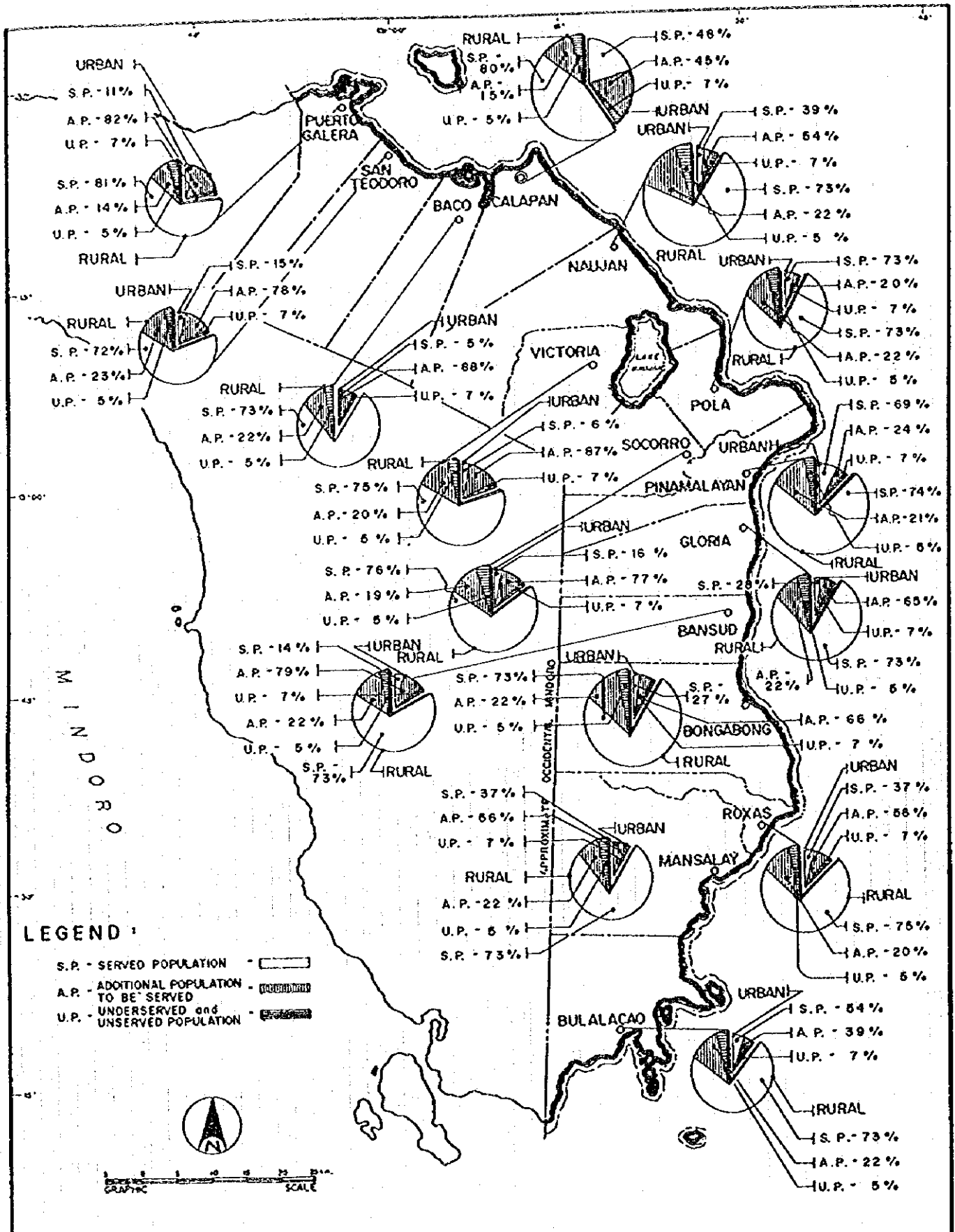


FIGURE 8.5.2
 MAP SHOWING FUTURE WATER SUPPLY SERVICE COVERAGE BY 2010

8.5.2 Sanitation

(1) Household toilets

The service coverage (number of households to be served) by different types of sanitary facility is estimated by urban and rural area by municipality for the years 2000 and 2010.

The future service coverage and additional households to be served are estimated to meet provincial sector targets using the number of households served in the base year and the number of households in target years.

Additional number of households to be served by different type of facility by urban and rural areas by municipality is the shortfall of the number of households to be served in target years comparing with either that in base year or in Phase I (details are referred to Supporting Report). However, when the number of households to be served in target year/s is less than or equal to that in base year, no additional number of households to be served is counted.

In the determination of the number of households to be served by flush type toilet, when the number of households to be served in the target year is bigger than in base year, the target coverage is applied with conditions. When the target coverage is bigger than Level III water supply coverage, the latter coverage is adopted, while in the other case, the target coverage is applied. In cases where the target coverage is less than that in base year, the base year coverage is adopted.

For Phase I, any type of existing facilities both in urban and rural areas are to be utilized during Phase I period. For Phase II, water-seated toilet facilities in Phase I both in urban and rural areas are to be utilized.

The projected number of served households at the end of the Phase I period is 91,829. The additional households to be served totaled to 37,374, of which 12% is urban households and 88% is rural households. While at the end of Phase II period, the number of served households is 185,615 with an additional households to be served at 107,599. Table 8.5.2 summarizes the number of households to be served by target year for urban and rural areas by municipality. Figures 8.5.3 and 8.5.4 present maps showing service coverage by 2000 and 2010, respectively.

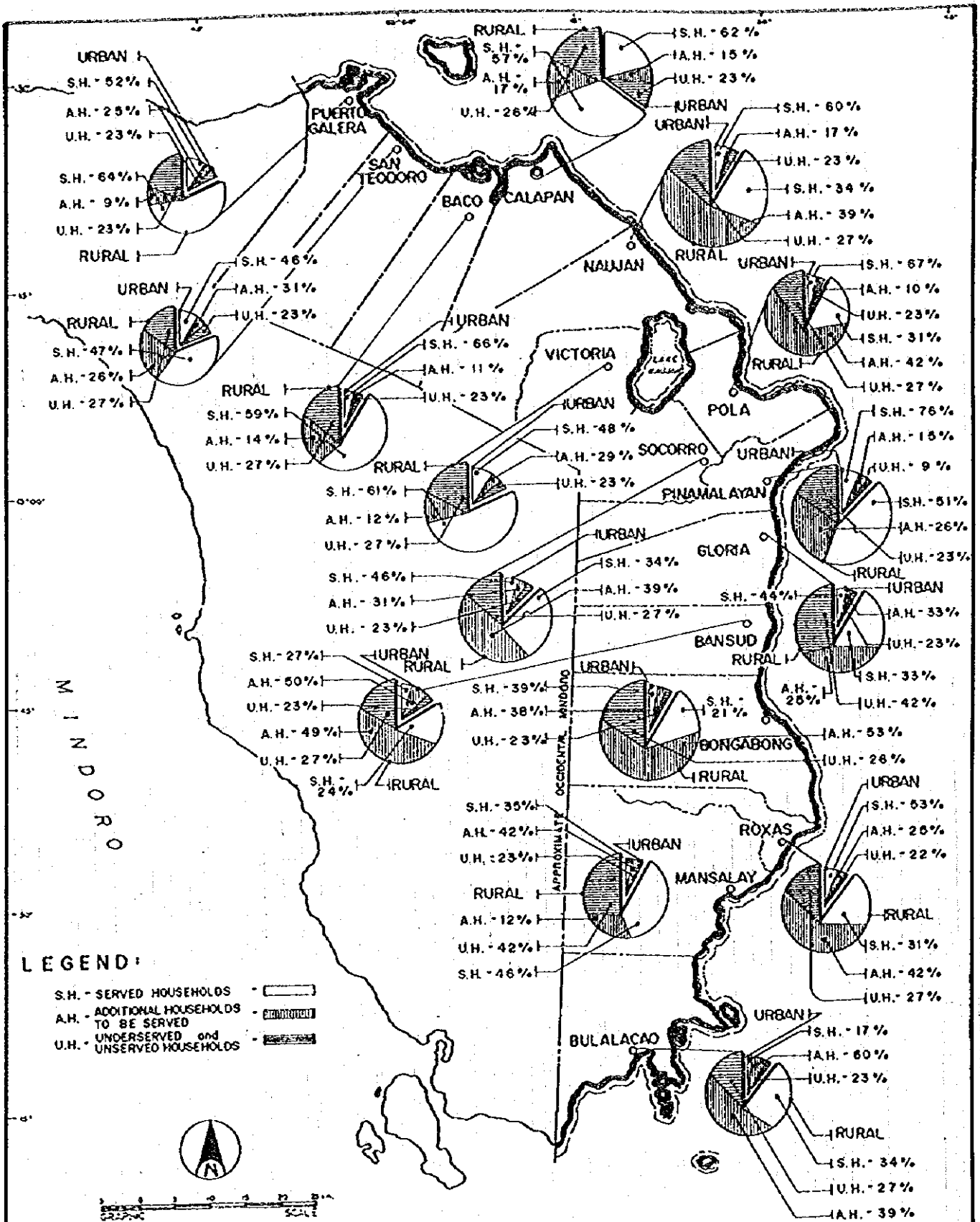


FIGURE 8.5.3
 MAP SHOWING HOUSEHOLD TOILETS SERVICE COVERAGE BY 2000

(2) School toilets

The service coverage (number of public school students to be served) is estimated by municipality for the years 2000 and 2010.

The future service coverage and additional number of students to be served are estimated using the number of students served in the base year, the number of students in target years and the provincial sector targets.

Additional number of students to be served by municipality is the shortfall of the number of students to be served in targets comparing with either that in base year or in Phase I (details are referred to Supporting Report). However, when the number of students to be served in target/s is less than or equal to the base year, no additional number of students to be served is considered.

The existing facilities are to be utilized during Phase I period, while the facilities in Phase I are to be utilized during Phase II period.

The projected number of served students at the end of Phase I period is 74,833. The additional students to be served totaled to 34,083. While at the end of Phase II period, the projected number of served students is 136,024 with an additional students to be served at 61,191. Table 8.5.3 summarizes the number of public school students to be served by target year.

Table 8.5.3 Additional Number of Public School Students to be Served by Target Year (School Toilets)

Municipality	Phase I (2000)			Phase II (2010)		
	Total No. of Public School Students	Std. No. of Public School Students to be Served	Add'l No. of Public School Students to be Served	Total No. of Public School Students	Std. No. of Public School Students to be Served	Add'l No. of Public School Students to be Served
Baco	5,691	2,846	1,046	7,338	5,137	2,291
Bansud	7,467	3,734	1,634	9,652	6,756	3,022
Bongabong	14,060	7,030	3,130	17,975	12,583	5,553
Bulalacao	5,860	2,930	1,430	7,596	5,317	2,387
Calapan (Capital)	21,582	10,791	5,141	27,615	19,331	8,540
Gloria	8,863	4,432	1,932	11,280	7,896	3,464
Mansalay	8,054	4,027	1,877	10,323	7,226	3,199
Naujan	20,449	10,225	4,575	26,143	18,300	8,075
Pinamalayan	18,415	9,208	4,158	23,870	16,709	7,501
Pola	6,267	3,134	1,434	8,042	5,629	2,495
Puerto Galera	5,055	2,528	1,228	6,496	4,547	2,019
Roxas	9,445	4,723	2,223	12,137	8,496	3,723
San Teodoro	1,016	508	208	2,154	1,508	1,000
Socorro	10,563	5,282	2,432	13,468	9,428	4,146
Victoria	6,869	3,435	1,635	10,230	7,161	3,726
Provincial Total	149,656	74,833	34,083	194,319	136,024	61,191

(3) Public toilets

The service coverage of public utilities with sanitary toilet facility is estimated by municipality for the years 2000 and 2010.

The future service coverage and additional coverage are estimated using the existing number of public utilities with sanitary toilets in the base year, the number of public utilities in target years, and provincial sector targets.

The additional number of public utilities with sanitary toilets needed by municipality is the shortfall of the number of public utilities in target year comparing with either existing coverage or Phase I coverage (details are referred to Supporting Report).

The existing sanitary facilities are to be utilized during Phase I period. The facilities in Phase I are to be utilized during Phase II period.

The projected number of served public utilities at the end of Phase I period is 31. The additional public utilities to be served are 18. While at the end of Phase II period, the number of served public utilities is 40 with an additional public utilities to be served at 6. Table 8.5.4 summarizes the additional number of public utilities to be served by municipality by target year.

8.5.3 Urban Sewerage

The service coverage in 2010 (Phase II) is estimated for the municipalities with population of more than 10,000 in urban area provided by Level III water supply. It is assumed that half of the population in the area/s is to be served by the sewerage systems. Table 8.5.5 shows the population to be served in Phase II.

8.5.4 Solid Waste

Future requirements in the sub-sector are studied giving priority to urban area for the Phase I. Staged improvement for the rural area shall be studied in the future.

Table 8.5.4 Additional Number of Public Utilities with Sanitary Toilets by Target Year

Municipality	Type	Phase I Coverage (2000)		Phase II Coverage (2010)	
		Additional No. of Public Utilities with Sanitary Toilets	Number of Public Utilities with Sanitary Toilets	Additional No. of Public Utilities with Sanitary Toilets	Number of Public Utilities with Sanitary Toilets
Baco	Public Market	1	3	0	3
	Bus/Jeep Terminal	1	1	0	1
	Total	1	3	0	4
Bansud	Public Market	1	1	1	2
	Bus/Jeep Terminal	1	1	0	1
	Total	2	2	1	3
Bongabong	Public Market	0	1	1	2
	Bus/Jeep Terminal	1	2	0	2
	Total	1	3	1	4
Bulalacao	Public Market	1	1	0	1
	Bus/Jeep Terminal	0	0	0	0
	Total	1	1	0	1
Calapan (Capital)	Public Market	1	1	1	2
	Bus/Jeep Terminal	1	1	1	2
	Total	3	3	2	4
Gloria	Public Market	1	1	0	1
	Bus/Jeep Terminal	1	1	0	1
	Total	1	1	0	2
Mansalay	Public Market	0	1	0	1
	Bus/Jeep Terminal	1	1	0	1
	Total	1	2	0	2
Naujan	Public Market	0	1	0	1
	Bus/Jeep Terminal	1	1	0	1
	Total	1	2	0	2
Pinamalayan	Public Market	1	1	2	3
	Bus/Jeep Terminal	1	1	0	1
	Total	2	2	2	4
Pola	Public Market	1	1	0	1
	Bus/Jeep Terminal	1	1	0	1
	Total	1	1	0	2
Puerto Galera	Public Market	1	2	0	2
	Bus/Jeep Terminal	1	1	0	1
	Total	1	2	0	3
Roxas	Public Market	0	1	0	1
	Bus/Jeep Terminal	1	1	0	1
	Total	1	2	0	2
San Teodoro	Public Market	0	1	0	1
	Bus/Jeep Terminal	1	1	0	1
	Total	1	2	0	2
Socorro	Public Market	0	1	0	1
	Bus/Jeep Terminal	1	1	0	1
	Total	1	2	0	2
Victoria	Public Market	0	2	0	2
	Bus/Jeep Terminal	0	1	0	1
	Total	0	3	0	3
Provincial Total	Public Market	8	19	5	24
	Bus/Jeep Terminal	10	12	1	16
	Total	18	31	6	40

Table 8.5.5 Population to be Served by Urban Sewerage in Phase II

Municipality	Urban Population in 2010	Level III Water Supply Coverage	Population to be Served
Calapan (Capital)	54,567	50,747	27,284
Pinamalayan	10,710	9,960	5,355
Victoria	11,749	10,927	5,875
Provincial Total	77,026	71,634	38,514

Service coverage in Phase I is assumed to be 90% with reference to the current service coverage of 76%. The effective urban service coverage is 80%, while the remaining 10% includes the peripheral rural barangays of urban areas in Bansud, Mansalay and Roxas. The additional service coverage in Phase I is calculated as a shortfall of target coverage in Phase I comparing with the existing service coverage. Table 8.5.6 presents the additional service coverage for Phase I in urban area.

Table 8.5.6 Add'l No. of Urban Households to be Served by Municipal Solid Waste System in Phase I

Municipality	No. of Urban Households Served in the Base Year	Phase I Coverage (2000)		
		No. of Urban Households	Urban Household Coverage	Add'l. No. of Urban Households to be Served
Baco	364	440	364	0
Bansud	917	903	917	0
Bongabong	1,302	902	1,302	0
Bulalacao	0	528	422	422
Calapan (Capital)	4,008	7,823	6,258	2,250
Gloria	0	441	353	353
Mansalay	1,010	511	1,010	0
Naujan	460	1,181	945	485
Pinamalayan	1,146	1,628	1,302	156
Pola	0	372	298	298
Puerto Galera	351	831	665	314
Roxas	1,320	859	1,320	0
San Teodoro	398	527	422	24
Socorro	587	986	789	202
Victoria	714	1,586	1,269	555
Provincial Total	12,577	19,518	17,636	5,059

8.6 Facilities, Equipment and Rehabilitation to Meet the Target Services

8.6.1 Water Supply

(1) Required facilities

Water supply facilities required by service level are estimated by urban and rural area by municipality based on the additional service coverage by target year and summarized in Table 8.6.1 (details are referred to Supporting Report).

Urban water supply:

Physical requirements of Level III systems are estimated as the number of required house connections. Mode of project indicates whether future urban water supply will be implemented as expansion of existing system or construction of a new system. Number of deep wells is also estimated based on the water source evaluation results in Chapter 7.

Table 8.6.1 Water Supply Facilities Required by Target Year

Municipality	Phase I (2000) Requirements										Phase II (2010) Requirements										
	Urban Water Supply (Level III)					Rural Water Supply (Level I)					Urban Water Supply (Level III)					Rural Water Supply (Level I)					
	Mode of Project	No. of Additional Deep Wells	Number of House Connections	Number of System	Number of House Connections	Number of Deep Wells			Number of Shallow Wells	Total No. of Wells	No. of Additional Deep Wells	Number of House Connections	Number of Deep Wells			Number of Shallow Wells	Total No. of Wells				
						40 m	80 m	120 m					40 m	80 m	120 m			40 m	80 m	120 m	
					Sub-total	Sub-total	Sub-total					Sub-total	Sub-total	Sub-total							
Baco	New	1	31	0	0	2	0	0	2	0	0	0	0	0	0	66	0	0	66	18	84
Bansud	New	1	152	0	0	69	0	0	69	17	86	1	1,130	0	0	68	0	0	68	17	85
Bongabong	New	1	292	0	0	160	0	160	107	267	1	951	0	106	0	106	0	106	71	177	
Bulalacao	New	1	337	0	0	178	0	178	45	223	1	356	60	0	0	60	0	60	15	75	
Calapan (Capital)	Expansion	1	658	0	0	25	0	25	99	124	4	6,160	26	0	0	26	0	26	102	128	
Ciordia	New	1	145	0	0	138	0	138	0	138	1	451	107	0	0	107	0	107	0	107	
Manalay	New	1	223	0	0	95	0	95	63	158	1	457	59	0	0	59	0	59	40	99	
Naujan	Expansion	1	159	0	0	249	0	249	0	249	1	949	257	0	0	257	0	257	0	257	
Panamalayan	Expansion	0	0	0	0	108	0	108	0	108	1	635	193	0	0	193	0	193	0	193	
Pola	Expansion	1	78	0	0	172	0	172	73	245	1	101	72	0	0	72	0	72	31	103	
Puerto Galera	New	1	151	0	0	0	0	0	0	0	1	1,452	33	0	0	33	0	33	0	33	
Roxas	Expansion	1	147	0	0	61	0	61	40	101	1	888	62	0	0	62	0	62	42	104	
San Teodoro	New	1	89	0	0	0	78	0	78	0	78	1	645	0	38	0	38	0	38	0	38
Socorro	New	1	229	0	0	0	90	0	90	60	150	1	1,459	0	52	0	52	0	52	35	87
Victoria	New	1	133	0	0	64	0	64	0	64	2	2,546	94	0	0	94	0	94	0	94	
Provincial Total	New	14	2,824	0	0	1,161	328	0	1,489	504	1,993	19	18,795	1,091	196	0	1,293	371	1,664		
	Expansion-5																				

Rural water supply:

Physical requirements of Level II systems are estimated as number of systems and number of communal faucets, while that of Level I wells are estimated as number of wells with classification of deep and shallow wells. Deep wells are further subdivided in terms of three different standard depth based on the water source evaluation results.

(2) Rehabilitation

Rehabilitation requirement is estimated as 10% of the total number of deep wells to be constructed under PW4SP. Rehabilitation work is mainly redevelopment of wells by means of air surging, while minor repair of concrete apron and handpump is considered to be undertaken by respective beneficiary organizations.

(3) Equipment

Logistic support:

For rural water supply development, each I unit or set of the following equipment is considered necessary for the provincial government to conduct various activities of PW4SP implementation;

Transportation- service vehicle.

Office equipment- computer with printer, typewriter, mimeo machine, scanning machine and copier.

Field equipment- water testing kit, sound system, tape recorder and tools for maintenance.

For urban water supply, no hardware is considered.

Well drilling and rehabilitation equipment:

As a reference information, necessary types and number of well drilling and rehabilitation equipment are studied considering the existing equipment of sector agencies in the province.

During the Phase I period, a total of 1,993 Level I wells (1,489 deep and 504 shallow wells) shall be newly constructed and 10% of these deep wells be rehabilitated annually. Although there are huge requirements, only 1 unit of truck-mounted rotary type drilling rig is available at the provincial government. DPWH-DEO has each one unit of truck-

mounted percussion drilling rig and portable mechanized rotary drilling rig (capable to drill shallow wells with less than 10 m depth).

Therefore, a total of 33 sets of drilling rig (6 sets of small size rotary type, 11 sets of medium size rotary type and 16 sets of medium size percussion type) together with 1 set of well rehabilitation equipment, 7 units of support vehicles and 27 units of service trucks for medium size rigs shall be mobilized/procured either by private sector or LGUs (details are referred to Supporting Report).

8.6.2 Sanitation

This sub-section refers to physical requirements by target year covering household, school and public toilet facilities. Table 8.6.2 presents the required sanitation facilities by target year.

Rehabilitation for the sanitation facilities is considered as part of recurrent cost.

(1) Household toilets

Future requirements in the number of household toilets by different type for urban and rural areas are estimated based on the additional households to be served by type of facility both for urban and rural areas by target year (details are referred to Supporting Report).

(2) School toilets

The future requirements in the number of toilet facilities are estimated based on the standard number of students to be served by a 5-unit standard facility and the additional students to be served by target year (details are referred to Supporting Report).

Total required facilities are further broken down into urban and rural areas by applying the percentage share of urban and rural population.

(3) Public toilets

Future requirements in the number of toilet facilities are estimated based on the additional number of toilets for public markets and bus/jeepney terminals located in urban areas (details are referred to Supporting Report).

Table 3.6.2 Sanitation Facilities Required by Target Year

Municipality	Phase I (2000) Requirements														Phase II (2010) Requirements															
	Urban Sanitation							Rural Sanitation							Urban Sanitation							Rural Sanitation								
	Number of Household Toilets			No. of Public Toilets		Number of Public School Toilets		Number of Household Toilets			No. of Public Toilets		Number of Public School Toilets		Number of Household Toilets			No. of Public Toilets		Number of Public School Toilets										
	Flush	VIP Latrine	Total	Public Markets	Bus Terminal	Flush	Pour Flush	VIP Latrine	Total	Public Markets	Bus Terminal	Flush	Pour Flush	VIP Latrine	Total	Public Markets	Bus Terminal	Flush	Pour Flush	VIP Latrine	Total	Public Markets	Bus Terminal	Flush	Pour Flush	VIP Latrine	Total			
Baco	31	18	0	49	0	1	1	127	593	0	720	4	299	56	0	355	0	0	0	0	0	0	0	0	98	4,348	0	4,446	0	
Bansud	152	297	0	449	1	1	1	0	2,488	0	2,488	6	520	198	0	718	2	1	0	0	0	0	0	0	0	4,037	0	4,037	10	
Bongabong	292	49	0	341	0	0	0	0	5,483	0	5,483	13	384	343	0	727	2	1	0	0	0	0	0	0	0	8,680	0	8,680	20	
Bulacao	183	133	0	316	0	1	0	0	1,705	0	1,705	6	248	248	0	496	1	0	0	0	0	0	0	0	0	3,802	0	3,802	9	
Catapan (Capital)	610	0	584	1,194	8	1	1	687	183	1,131	2,001	13	3,701	3,701	0	7,402	15	1	1	1,375	8,095	0	0	0	0	6,165	0	6,165	14	
Cloria	145	0	0	145	0	1	0	0	1,511	0	1,511	8	182	166	0	348	0	0	0	0	0	0	0	0	0	5,856	0	5,856	12	
Mansalay	177	0	39	216	0	0	1	0	0	664	664	8	209	209	0	418	1	0	0	0	0	0	0	0	0	12,958	0	13,007	30	
Naujan	204	0	0	204	1	0	1	70	5,596	279	5,945	17	423	423	0	846	2	0	0	0	0	0	0	0	0	1,177	8,312	0	9,489	26
Panamlayan	0	237	0	237	2	1	1	0	2,577	404	2,981	15	466	695	0	1,161	4	2	0	0	0	0	0	0	95	4,597	0	4,692	10	
Prola	10	0	29	39	0	1	0	172	2,219	117	2,508	6	114	114	0	228	0	0	0	0	0	0	0	0	0	2,383	0	2,383	6	
Puerto Galera	151	0	56	207	0	1	1	0	134	177	311	5	678	404	0	1,082	2	0	0	0	0	0	0	0	0	5,754	0	5,754	13	
Roxas	151	0	60	211	0	0	1	0	2,670	158	2,828	9	451	451	0	902	2	0	0	0	0	0	0	0	0	2,015	0	2,015	4	
San Teodoro	89	76	0	165	0	0	0	0	574	0	574	1	299	112	0	411	0	0	0	0	0	0	0	0	0	4,556	0	4,556	14	
Socorro	229	79	0	308	1	0	1	0	2,345	0	2,345	9	664	439	0	1,103	3	0	0	0	0	0	0	0	0	5,391	0	5,391	12	
Victoria	133	321	0	454	1	0	0	0	773	0	773	6	1,247	414	0	1,661	3	0	0	0	0	0	0	0	0	2,994	86,947	0	89,741	208
Provincial Total	2,556	1,210	768	4,535	14	8	10	1,056	28,851	2,931	32,839	126	9,886	7,973	0	17,859	37	5	1	2,994	86,947	0	89,741	0	2,994	86,947	0	89,741	208	

8.6.3 Urban Sewerage and Solid Waste

Physical requirements for the sewerage facilities are not discussed in this sub-section. Further study shall be conducted in the future.

As reference information, the number of refuse collection trucks is estimated for the urban area in Phase I. Ten (10) additional units of truck are required to meet assumed service coverage as reflected in Table 8.6.3.

Table 8.6.3 Number of Refuse Collection Trucks Required in Phase I

Municipality	Additional Urban Households to be Served	Estimated Daily Amount of Refuse to be Generated (Kg)	Number of Collection Trucks Required
Baco	0	0	0
Bansud	0	0	0
Bongabong	0	0	0
Bulalacao	422	176	1
Calapan (Capital)	2,250	941	1
Gloria	353	148	1
Mansalay	0	0	0
Naujan	485	203	1
Pinamalayan	156	65	1
Pola	298	125	1
Puerto Galera	314	131	1
Roxas	0	0	0
San Teodoro	24	10	1
Socorro	202	84	1
Victoria	555	232	1
Provincial Total	5,059	2,115	10

8.7 Identification of Priority Projects for Medium-Term Development Plan

In general, the present service coverage by municipality with reference to the target coverage indicates the direction of development effort for implementing PW4SP by with municipal priorities.

Specific projects shall be selected subject to detailed studies and rather not discussed in provincial master plan. In addition, pertinent information to identify priority projects is not available both at provincial and municipal level during this PW4SP preparation, except some WDs for future expansion work.

The general criteria for identifying priority projects as guide for implementing the PW4SP are summarized below.

The first level of priority should be given to those projects with positive feasibility studies and identified funding. Next level of priority would be given to those projects with positive feasibility studies, although no funding source has been identified. The third level should be those for which feasibility study has been conducted. Within each level, if funds were insufficient, a ranking could be carried out in application of some factors such as willingness to pay, water-related diseases status and per capita cost. Under the above mentioned conditions, a list of projects shall be prepared by the implementors.

Due attention shall be given on the importance of integrated development of relevant sub-sectors to maximize the effects and benefits through simultaneous implementation of water supply and sanitation projects. On a municipal level priority, synthetic evaluation of sector components for concerned municipalities (which is studied in the financial study, Chapter 11) may be used for implementation arrangements.

Chapter 9

SECTOR MANAGEMENT PLAN



9. SECTOR MANAGEMENT PLAN

9.1 General

In order to effectively manage the water and sanitation sector, the provincial and municipal governments will have to make some adjustments in their current structures and policies. This Chapter proposes the mechanisms, processes and structures needed in the medium-term to achieve the coverage targets with sustainability. Not all recommendations can be laid out with the same level of detail at this time as some are dependent on further policy guidelines being formulated at the national level. These include, for example: the on-going study on access of LGUs to external financing assistance and the formulation of the Implementing Rules and Regulations to guide, among others, the sector devolution process.

9.2 Sector Management

(1) Development of the vision

One glaring institutional need at the local level is a common vision and mission statement for the sector. A critical mass of people and resources who share in the vision must be identified and harnessed for project implementation. Local planners need to focus on the long-term requirements i.e., beyond forming users' associations, drilling wells, distributing bowls, etc. Based on a realistic assessment of constraints, opportunities and demand, the province has set its vision and mission for the sector.

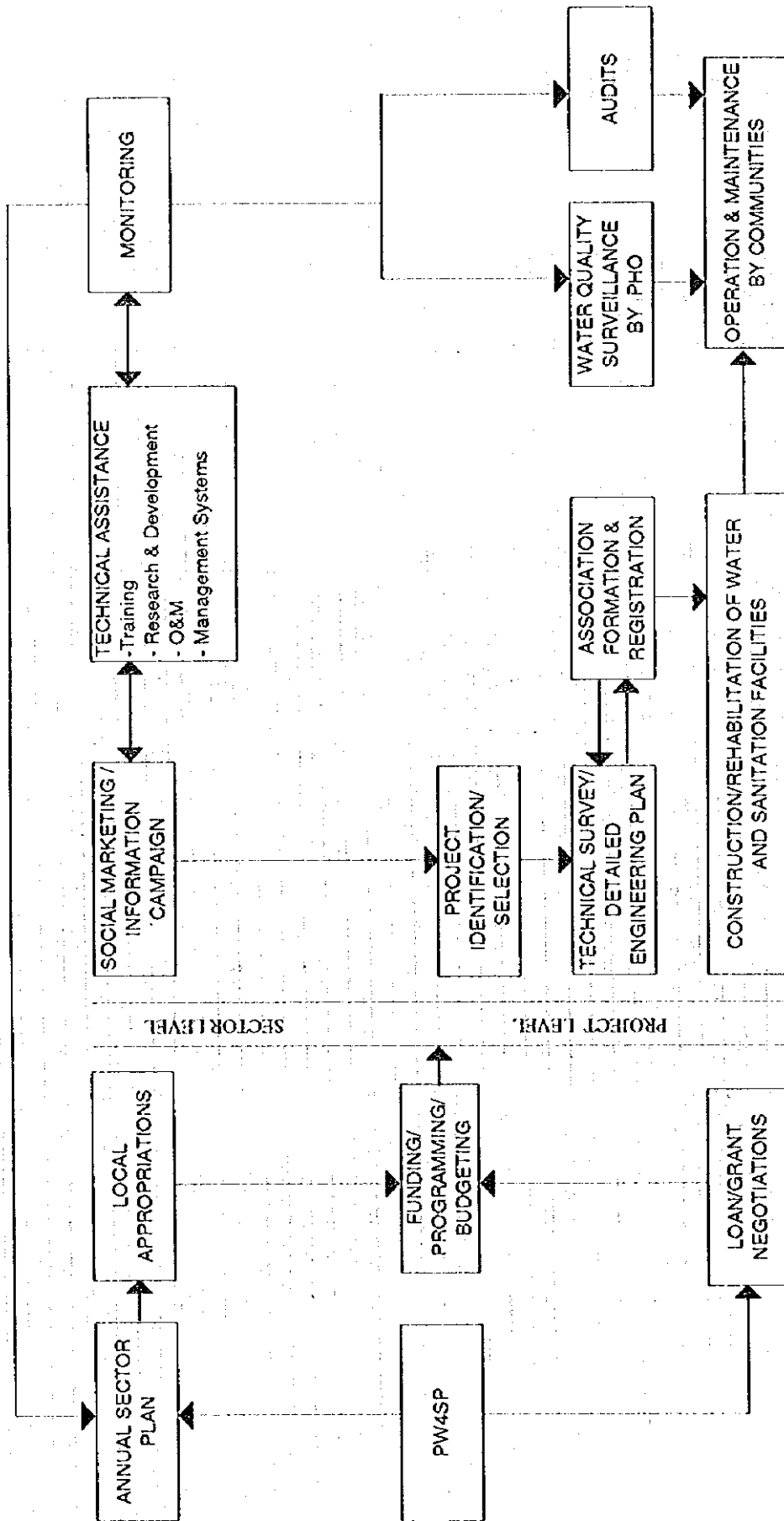
Initial vision statement: The province has formulated a two-phased plan which seeks to dramatically improve the provision of water supply and sanitation. In the medium-term (2000), the province seeks to increase water supply coverage in urban areas to 85% and in rural areas to 85%. Sanitation facilities will be made available to 77% of the population; 50% of the public school students will have adequate sanitary toilet facilities.

In the long-term (2010) urban water supply coverage will rise to 93%; rural water supply to 95%. Sanitation coverage will rise to 94%; public school students coverage will rise to 70%.

(2) Sector management

A Sector Management Model is presented in Figure 9.2.1 for sector management and project development. It is envisaged that this PW4SP will be used as a basis for the Annual

Figure 9.2.1 Sector Management Model



Sector Plan and/or input into Loan or Grant Negotiations in the future. The Annual Sector Plan, together with the budgets will be reviewed by the Governor and passed upon by the legislation as part of the annual provincial budget approval process.

The Sector Level Implementation activities consist principally of three (3) broad areas: social marketing; technical assistance; and monitoring. Project selection follows on from a self-selection process. The identification of a responsible community-based association and technical studies, as needed, will be done. Only after the institutional, financial and technical studies have been done, construction or rehabilitation will take place. Operation and maintenance, including arrangements for finances of the system will be the responsibility of the community organization. The Monitoring Function, on the other hand, will be augmented with water quality surveillance by the Provincial Health Office (PHO) and operational audits done by the LGU.

(3) Service provision policies and objectives

The LGU seeks to provide an adequate level of water and sanitation facilities defined as follows:

- 1) Level I facilities serve, at most, 15 (fifteen) households; Level II public taps serve 5 (five) households; and Level III provides individual household connections.
- 2) Water supply provision will be at least 20 lpcd for Level I; 60 lpcd for Level II; and 100 lpcd for Level III.
- 3) A critical mass of 70% of the individual households in every barangay has sanitary toilet facilities.
- 4) All schools shall have adequate water supply and at least one sanitary toilet facility for every 50 students.

(4) Operating policies

The following policy and strategy statements are adopted by the Provincial Government. These may be reviewed and revised from time to time by the Provincial Government. The key policy statements include the following:

- 1) Sustainability shall be promoted through increased community responsibility for management of facilities. Unless potential users demonstrate initiative and commitment (beyond making the request for assistance) to maintain the systems, no support shall be provided by the LGUs. To the extent possible, the LGUs should utilize existing local resources (self reliance).
- 2) Selection and prioritization of projects shall be based on demonstrated commitment of the beneficiaries to participate in the project, willingness to pay; the current water

and sanitation and overall health conditions; potentials for growth; and cost implications.

- 3) Technology to be used for the projects shall be appropriate to the local conditions and resources. However, construction of economical facilities shall be pursued not necessarily insisting on low-cost. Phased upward integration and future upgrading of systems and facilities shall also be promoted utilizing to the extent possible previously constructed facilities. In urban centers, a range of technologies may be adopted for wastewater collection and treatment, as well as for drainage.
- 4) An integrated approach to the provision of potable water supply, sanitation and hygiene education shall be promoted. All projects to be developed by the LGU must involve these three elements.
- 5) The LGU shall seek to provide water and sanitation in an equitable manner between rural and urban areas; between wealthy and depressed areas.
- 6) Cost Recovery and Cost Sharing (Subsidy Policies): The LGU shall enforce a rational and consistent policy on the application of subsidies and loans for water supply and sanitation. The current national policy is that 100% of the capital costs for Level I systems are provided as grant; communities, however, have to establish an O&M reserve fund and are responsible for all maintenance and operating costs. Water source development is provided as grants for Level II systems; full cost recovery is required for all other capital costs. Full capital and O&M cost recovery is required for Level III systems.
- 7) Private Sector Participation: The government shall give the private sector a substantial and preferential role in the attainment of the PW4SP objectives. In harnessing their participation, less government intervention shall be exercised in areas where the private sector is or can be a key player. An environment designed to empower them to absorb new social responsibilities and proactively convey to the government their aspirations and interests shall be established. The formation of private sector groups, NGOs, community organizations, cooperatives and people's organizations shall be encouraged. The implementation of programs to develop their capabilities in the sector development programs shall be promoted.
- 8) The province's fiscal management, in terms of capital funds generation capability, budget and disbursement, shall be improved. The assistance of legislative branch in the enactment of the proposed revenue-generating measures shall be sought. Financing through the private sector will also be encouraged.
- 9) Sector development shall be consistent with broader concerns for the environmental protection and management. Pollution control, conservation and proper utilization of

water and land resources are critical issues. An environmentally-responsive management approach to resource use shall be pursued. Specifically, this includes the need to:

- (a) Sustain the massive rehabilitative efforts for the province's degraded ecosystems (e.g. forests, watersheds, rivers and lakes) given the extensive deforestation that had already taken place. The enforcement of anti-illegal logging activities shall be pursued vigorously.
 - (b) Implement an active community-based resources management system through the devolution of the management of resources to the municipalities and barangays and to the source users themselves.
 - (c) Formulate and adopt a viable resource use policy for the protection of land, water, coastal and marine ecosystem in order to provide for various sectoral requirements while at the same time maintaining ecological balance and biodiversity.
 - (d) Encourage the generation and dissemination of locally adaptable resource-conserving and pollution control technologies.
 - (e) Institutionalize a resource revenue system that will enforce proper resource pricing through the imposition and collection of extraction and user fees/charges, taxes, fines, and other instruments that will compel resource users to internalize the costs of conservation and resulting negative externalities like pollution and biodiversity loss.
 - (f) Implement measures to prevent the indiscriminate use of inorganic fertilizers and pesticides and other petroleum-based products which cause pollution of water systems.
 - (g) Further improve the productivity of the lowland farm areas for agriculture while promoting more judicious use of upland areas using appropriate farming systems and erosion control devices.
 - (h) Strengthen residual management and pollution control through comprehensive framework of policies and programs that would encourage resource recovery, recycling, and utilization of product designs that are material- and energy-saving.
- 10) Disaster Response and Emergency Coordination: The LGU shall formulate, as part of its contingency plans, a program to address emergency conditions. The program shall include maintenance of stocks of chlorine, organization and training of local communities on restoration of water supplies and provision of emergency sanitary facilities. The LGU should coordinate closely and regularly with the focal officials of the Regional Disaster Coordinating Council (RDCC).

(5) Regulatory policies

In coordination with appropriate national and local agencies, the LGU shall endeavor to set up an effective regulatory framework considering the following:

- 1) Water allocation and water rights policies (conflict resolution) which are within the mandate of the National Water Resources Board. Studies are underway to strengthen the linkages between the Board and other agencies, including LGUs, particularly in the enforcement of NWRB policies.
- 2) Water Rate Review: While the rate setting and approval functions remain largely as a concern of the associations or the water districts (and LWUA), a vehicle for resolving grievances against unrealistic tariffs (or other practices) can be instituted by the LGUs. The court system, of course, remains as the final arbiter in conflicts.
- 3) Association Registration: The LGUs shall likewise adopt a registration and franchising system for associations responsible for water supply facilities outside the WD franchise areas. Annual reporting requirements will have to be established for monitoring and possibly, auditing purposes.
- 4) Water Quality: The National Drinking Water Standards have been established. The LGUs will have to establish a viable mechanism, including water testing and standards enforcement, to ensure that water delivered meet the potability standards. The DOH currently has the responsibility and the regulatory power to stop the operations of water systems not delivering potable water.

(6) Financing system

Current policy shifts present an opportunity for the LGU to establish the conduit for future local and foreign-assisted projects. Presently, funds are brought to the field level through government allotment and sub-allotment systems of central government agencies.

Apart from being cumbersome and subject to delays, the more critical idiosyncrasy of this system is that the actual project implementation "power" still lies in the hands of national agencies.

Overall, it is the LGU responsibility to raise funds to support capital development sector projects and to ensure that adequate O&M reserves are raised by the beneficiary communities.

In the medium-term, the primary source of funds are envisaged to be provincial & local taxes & allocation from the IRA 20% Development Fund. Also, in the medium-term, it is