

## 5.7 Project Management Arrangement, and Issues and Problems

With reference to project management of the province, current vision and policies and practices in the implementation of WATSAN projects were investigated. The findings are discussed in terms of technical, institutional, financial, and community development aspects. Problems/issues are also discussed by sub-component. Current conditions of the municipalities investigated are referred to. Furthermore, some of the discussion items covered the entire sector management field.

### 5.7.1 Technical Aspect

#### (1) Project Identification and Prioritization

##### 1) Project conceptualization and series of procedures to select a project

Every year, the provincial government identifies and prioritizes projects based on perceived needs, the PPDO consolidates WATSAN data extracted from the Barangay and Municipal Development Plans and resolutions. The PPDO conduct fieldwork together with their counterparts at the MPDO in order to identify and support project needs. This is accomplished through a series of meetings with barangay people/officials. They then conduct the required survey in the barangay where the project may be located.

Barangay Council/s (BC/s) regularly submit barangay resolutions regarding priority projects to the municipality, in addition to their Barangay Development Plan. These project proposal/s are incorporated in the Municipal Development Plan. The Municipal Development Council, through its sectoral committees, reviews and gives recommendations for endorsement to the Sangguniang Bayan (SB) for the adoption and approval.

Before incorporating it into the Provincial Development Plan, the PDC through its sectoral committees endorses the municipal development plan for consideration and prioritization.

##### 2) Criteria for selection of the projects

Project selection criteria are based on the indicators prepared by the NEDA Regional Office. These were meant to identify the existence of problems constraining the achievement of certain development objectives and/or to determine the perception of development potentials. However, it is still the Barangay Development Plan, which

was prepared by the barangay council and ratified during a barangay assembly, which serves as the benchmark for the realization of the people's aspiration.

To further ensure the sustainability of the project, it is essential to involve the people, starting from demand identification during the basic survey stage. This is especially true for Level I water supply systems. A simplified coordination mechanism showing responsibilities/activities required among concerned parties is necessary. Periodic follow-up by LGUs at the barangays is also important to ensure logistic support and manpower requirements of the LGUs.

After submission of a project request by the barangay, a series of steps including identification, validation and prioritization has to be undertaken by the concerned LGUs. These steps result in considerable time consumed before funding is finalized. A systematic and coherent project identification and prioritization among concerned parties is required.

With reference to the implementation of the medium-term target plan, review and modification of selection/prioritization criteria is done by LGUs considering the said barangay profile. The LGUs, together with barangay officials, should prepare the requirements (including barangay profile) in an expeditious manner as part of their annual activities.

(2) Preparation of Feasibility Studies (F/S) and Detailed Design (D/D) of Facilities, and Contract Procedures

1) Feasibility Study (F/S)

The F/S for developing water supply systems is usually done by the PEO in cooperation with PPDO. In addition to the preliminary study on water source development, water production and water demand determined as required by the project. Tentative locations of communal faucets are identified in a Level II system. The hydraulic profile (pipe size, length) and size of the intake box / reservoir are determined using methods learned in the International Training Network (ITN) / DILG training seminar. The BWP design standard is also applied in this case. Finally, a cost estimate of the required facilities is made.

The provincial government is able to conduct water source development for both spring and ground water sources. In the case of spring development, technical-related information is collected from the barangay. This involves the location of untapped

springs and determining its discharge rate during the dry season. The preliminary topographic survey (elevation and distance) is then conducted to prepare the hydraulic profile of the transmission pipeline. For groundwater development, its technical feasibility is evaluated based on available technical data along with information from the barangay duly supported by field inspection of the existing wells.

## 2) Detailed Design (D/D)

The D/D of WATSAN facilities is also prepared based on the F/S report. It must also be within the available budget. Design of Level II systems is made using existing manuals and references. Hydraulic calculation is limited to a single pipeline while the design of the spring box/reservoir is a standard design of the RWDC (Rural Waterworks Development Corporation). However, the PEO have no experience, since 1991, in planning and designing large waterworks facilities including pumping stations/water treatment facilities.

At this moment, a few water system engineers are in the PEO. There is only one engineer who has an experience in water supply system implementation, so that the capacity in carrying out the F/S (and also D/D) is quite limited.

Future water supply system/s will require water treatment facilities, particularly those using surface water sources. The PEO will need more knowledge/practice in hydraulic analysis, structural calculation, and water treatment technology. Measures to increase the capacity of LGU technical staff in the area of planning and designing have to be considered. This may also involve the utilization of consulting services.

## (3) Procurement of Materials and Equipment, and Facility Construction and Rehabilitation

### 1) Bidding and Procurement

In water supply sector, bidding is done to purchase materials (pipes, valves and fittings), but current practice of bidding is limited to purchase of materials for Level III project. Although PBAC handles the current bidding practices, technical capability in preparation of bidding documents and bid evaluation is minimal, while there are no experiences on the contract for construction work.

Because of the large workload required in implementing the Medium-Term Development Plan (which includes the preparation of the required tender documents), there must be a thorough evaluation of pre-qualification documents and the contract procedure. Presently, with the limited volume of work/projects, the procurement procedure

already requires a long process, which always results in delays in project implementation. The provincial government should examine the current procurement system so that it could handle/manage forthcoming projects more efficiently.

## 2) Construction and Rehabilitation

Construction of WATSAN facilities is usually done by the LGUs, either by the municipal or the provincial office. The barangay council and the users mobilizing labor. The PEO together with the MPDO and MEO manages project implementation by hiring skilled laborers. The PEO personnel supervised the construction work, and the technical personnel of the PPDO or MPDO regularly monitored the projects.

The PEO has machines and equipment necessary for constructing and maintaining roads, bridges and other infrastructure, however, for the well construction it has only a shallow-well construction machine which is now not-functioning (in 1980s, PEO had a deep well drilling machine). The province does not have a capability for well rehabilitation at present, so that the replacement of hand pump unit is a major rehabilitation work (even the measures were provided in limited cases).

## (4) Operation and Maintenance (O&M) of Facilities

### 1) Level I facilities

In most cases, the operating bodies for the facilities are not organized or non-functioning. Order-less private tapping to transmission line (spring water source) are also found at some Level I facilities, which caused insufficient water supply/water pressure. Most of the beneficiaries are not aware of the manner for O&M of the facilities. A considerable number of public wells are abandoned/non-functional due to lack of O&M, dried-up of wells and other reasons.

Beneficiaries still rely on the LGUs even for a simple replacement of parts (such as gasket). As for existing public Level-I, the barangay council takes care of O&M using IRA allotted to the barangay. In cases where major repair is required (replacement of hand pump unit/major parts), the barangay council submits a barangay resolution of request for the repair to the municipal government. The municipal government assists them in case financial sources are secured. The beneficiaries contribute free labor.

Considering the current situation of the beneficiaries, the LGUs shall lead them to recognize the need of formation of association and participation for sound O&M of

the facilities. Information dissemination to beneficiaries is a requisite.

## 2) Level-II system

Most Level II systems practice scheduled water supply due to insufficient water source/insufficient capacity of the facilities. Such problems are mainly caused by order-less expansion or tapping of individual connections. This resulted to insufficient water flow/reduction of water pressure. It is also common that water quality examination is not adequately conducted.

In some Level-II systems using spring sources, bursting of pipes occurred due to high water pressure in the system (a big elevation difference between intake point and service area), where a pressure-reducing tank is not installed and/or there exist poor/damaged pipe materials.

In case of major repair, the barangay council collects money required for repair work. In some cases, only the rich beneficiaries contribute money required for repair work.

## 3) Level-III

There are 10 WDs and 12 waterworks managed by LGUs (mostly municipality). Generally, those waterworks with spring sources are simply managed and do not require a higher expertise. They also provide lower water charges.

Some Level-III systems practice scheduled water supply (intermittent water supply) due to insufficient water source capacity. Even in cases where there are enough water sources, intermittent water supply is experienced due to insufficient capacity of the facilities (distribution pipe) against current water demand. The concerned municipalities relevant to the problem are Jaro, Calubian, Palompon, Baybay, Metro Iligon, Merida, Isabel and Metro Carigara. Lack of due consideration in D/D stage for expansion of the system was also observed.

All waterworks has O&M staff (engineer/technician/plumber/water fee collector) and practice chlorination using liquid chlorine gas (purchased in Cebu and Manila). They have ensured budget for the O&M cost, but the income is insufficient for expansion of the system.

## (5) Water Quality Examination

Currently, water quality examination in terms of bacteriological index is carried out at the

PHIO laboratory. Existing equipment includes incubator, autoclave, drying oven, water bath, refrigerator, beam balance, analytical balance, pH meter, colony counter, rotator and magnetic stirrer. The equipment was provided through FW4SP project. But, some of them are non-functional. Physical and chemical examination has not been practiced. Even bacteriological examination is not practiced periodically, due to insufficiency of equipment, required chemicals and manpower under financial constraints.

As for Leyte Metro WD, PHIO conducts bacteriological examination without charging the MWD. Provincial government and/or Leyte MWD supply the chemicals to the laboratory. DOH extends assistance for maintenance of equipment. Thus, the inter-agency collaboration is practiced at present.

For the municipalities, the laboratory (PHIO) supplies the PHC bottle upon request from the municipalities (usually 10 pcs./municipality/month). However, the results of bacteriological examination are not reported by most of the municipalities, since the reporting system has not been established properly.

Considering the current condition of water quality examination, the PHIO recognizes the need to establish two (2) additional laboratories at existing hospitals in Baybay and Kananga, and to upgrade the existing laboratory in Palo by providing appropriate equipment and materials to cover all municipalities/city in the province.

#### (6) Private Sector Capability for the Sector Project

For the Level I water supply facilities, locally based private contractors have no capability in the construction of deepwells because they do not have the necessary drilling equipment. The LGU need to have a list of qualified contractors in Luzon/Visayas areas so they can avail of their services when needed. There are also few constructors that are capable in construction and rehabilitation of Level II and small size Level III in the province. The same as for Level I, the LGUs need to have this list.

### 5.7.2 Institutional Aspect

#### (1) Implementing Capacity of LGUs

In spite of the LGUs' efforts, it is apparent that their present implementation capability is limited to a certain number of projects due to insufficiency of manpower resources, not clear procedure and the shortage of supporting vehicles/equipment. Contracting-out to the private sector may be practical. It is also necessary to increase the number of experi-

enced water supply engineers and establish clear procedure to consider and supervise future projects.

Implementing capacity of municipal government is also limited, though a larger water supply system is managed by WDs with a higher expertise. Sanitation projects are under the direct responsibility of municipalities and barangays with coordination of the province. Commonly, qualified staff members are lacking and training for strengthening capacity building is not sufficient due to budgetary constraint. The assistance from existing WDs to the associations (Level I & II) may be one of the practical arrangements to ensure transfer of technical and management know-how.

## (2) Linkages among Concerns

The PPDO is a lead provincial office responsible for the implementation of WATSAN projects, works either directly or indirectly with the national government's local offices and municipalities as well as other provincial offices. There is, however, no established arrangement and responsibility delineation among the agencies involved in the WATSAN sector implementation in the province wherein interrelationship/linkages are clearly shown. Administrative and functional linkages are not spelled out, although in the area of PBME the province is adopting the participatory monitoring and feed back mechanism developed through UNDP-assisted project (refer to 5.10.1 Project and Sector Monitoring). Subsequently fragmental planning and implementation of sector projects happens, and a number of agencies and offices had overlapping activities and functions.

For tri-agency program such as DPWH, DILG and DOH implementing water supply projects, weak coordination had been demonstrated. There was difficulty in synchronizing activities which deals on physical construction of facilities (DPWH) as to activities that entails training of provincial and municipal water and sanitation task forces and formation of BWSAs where target facilities will be constructed (DILG) and the installation of latrines and promotion of health and education programs (DOH). Effective and efficient WATSAN project implementation needs to the integrated approach in assistance extended by the NG agencies.

## (3) Organizational Set-up

LGUs is composed of province, municipality and barangay, and these units have respective responsibilities in implementing WATSAN project. However, to support the delivery of water and sanitation services, the operating structure at the province, municipality and barangay levels and identified organizational tasks should be put in place. This will

enable smooth implementation of the projects.

Before, organizing the association at the barangay level was undertaken by the PWDTF that was spearheaded by the DPWH. Since locally-funded water supply projects had been devolved to the LGUs, DPWH no longer initiated the organization of BWSAs. In the existing organization set up of the province, the implementation of the Provincial Water Program is placed under the PPDO and PEO. However, it has been observed that the provincial staff (and also municipal staff) responsible for planning, managing, coordinating, implementing and monitoring the WATSAN projects are unable to devote full time resulting from staff assigned to works of other various sectors.

#### (4) Operation bodies

In most cases, the operating bodies for the Level I facilities are not organized or non-functioning. A considerable number of public wells are abandoned/non-functional due to lack of O&M, dried-up of wells and other reasons. Most of the beneficiaries are not aware of the manner for O&M of the facilities. Beneficiaries still rely on LGUs even for a simple replacement of parts. Consequently, the barangay council mostly takes care of O&M. Considering the current situation of the beneficiaries involvement and experiences of abandoned/non-functional facilities, LGUs shall lead them to recognize the need of formation of association and participation for sound O&M of the facilities (Information dissemination to beneficiaries is a requisite), and encourage the formation of association responsible for facility O&M.

The organization responsible for the O&M of Level II has some complexity comparing with that of Level I facility. Most of the Level II systems (and small Level III) in the province are mostly managed by BCs. The merger or consolidation of these operation bodies can be explored for more effective and efficient system operation as well as system expansions and new developments. This arrangement entails collaboration and agreement among concerned parties and LGUs shall act as a coordinator and a facilitator for the purpose.

The idea for Level II systems can also be adopted for an effective and efficient operation and development of Level III water supply systems.

#### (4) Health and Hygiene Education with Typical Program

There was a time when PWDTF was active and performed the job of IEC campaign in selected barangays in the province. The current practice is that the PHO undertakes

health and hygiene education as part of its regular programs. However, due to lack of financial support to and manpower at the PHO, relevant activities are quite limited at the present time, unless it is a component of a DOH/UNICEF/NGO projects/program. It is recommended to put more attention to the needs of LGUs to ensure sustainable implementation for the development of the sector.

(5) Training programs

The central government agencies provide technical training for the LGUs staff on a project basis. The DILG-PMO conducted recently the "Trainers Training and Community Organizing Training/Workshop" for the WATSAN sector where some of the topics discussed dealt on gender and development (GAD). Since LGUs have employed the cascade type assistance in implementing WATSAN projects, strengthening LGUs' staff capability through technical and institutional training for effective and efficient project implementation is important and periodic trainers training program would be necessary.

The provincial government provides technical assistance to the municipalities and barangays on a project basis or when the training is requested. The PPDO, PEO and other departments and national government agencies who are members of the Provincial WATSAN Team usually conduct the training, which are aimed at strengthening the capability of O & M personnel at the municipal and barangay levels. The 3- day training course is to be participated in by BWSA officials. It covers technical and management matters of a Level I facility before its turnover. Effective training program/s should be continued by the LGUs to ensure demand-responsiveness in community development.

(6) Database management

The main problem concerning data-base management are the inadequacy of the network coverage, outdated monitoring equipment, scattered data collection responsibilities, lack of continuous data records and lack of an integrated water resources database. Most data collection efforts are project related and are usually discontinued once the project is terminated. Good database will contribute toward the effective and efficient sector planning and project implementation. It is necessary to establish the database management system, at both national and local levels, which defines what, when, by whom the data/information shall to be collected and where, how, how long it shall be kept.

### 5.7.3 Financial Aspect

#### (1) Budgetary Allocation to the Sector

Projects being programmed for implementation in the Annual Implementation Plan are those funded only by the 20 % Development Fund from IRA for the very reason that the AIP forms part of the General Fund Annual Budget. Presently, the provincial budget for the sector development is included in "Barangay Development Project". A total of 12 million pesos for water supply sector were proposed in the 1997 AIP, however, this amount has been carried over without actual allocation to a project in the 1999 AIP. The budget priority has been given to the Social Welfare and Livelihood sector and "Day Care Centers" for children.

#### (2) Access to External Funds

The provincial government is open to finding out other means by which the province can access funds to the sources other than its IRA, local taxes, and economic enterprises. The province coordinates with NEDA in seeking out funds for technical assistance and NEDA acts as the facilitator. The PPDO has also coordinated with the DTI in investment promotion for Level III as well as with the Leyte Chamber of Commerce.

In addition to its own funds source and foreign assistance, the province can also access funds from other sectors, such as the private sector through any of the Build-Transfer-Operating scheme that can provide incentives to the private sectors by minimizing the bureaucracy.

#### (3) Cost Recovery Practices by LGUs and by Users

Recovery of the capital cost in the Sector is dependent on how the community or the clientele perceives its role in the Sector. If the beneficiaries have a sense of ownership of the facilities, they will contribute to the sustainability of the facilities.

Similarly, for O&M cost recovery, the monthly contributions of beneficiaries for the sustainability of the water supply facilities establish a sense of ownership and responsibility towards the system. The government should initiate community empowerment programs and encourage active participation even before the start of the construction.

## **5.7.4 Institutional Arrangements/Capability of the Municipal Government**

### **(1) General scheme in WATSAN project implementation**

The municipalities are responsible for the construction of infrastructure facilities to service the needs of the residents of the municipality. Generally, however the technical capability of the municipal government is limited to construction/maintenance work for small-size water supply facilities using spring sources. It is also common that insufficient qualified staff members are provided for planning and designing in construction/expansion of the water supply system. Therefore, the role of the provincial government is important in technical assistance/cooperation to/with municipalities and WDs.

### **(2) Experiences in project implementation**

In most cases, Level I and Level II are developed by MEOs with barangay counterpart (mostly labor). The requests for assistance from the province will be made when the municipalities consider such to be beyond their funding capability. In addition, the provincial government extends direct assistance to barangay officials only upon request. O&M of Level I and II are the responsibility of the barangay LGUs or communities.

For such cases, the following are pre-requisites: i) formation of the association in the relevant barangays, ii) exchange of MOA with the association, iii) understanding that the association shall collect water charges. A certain amount will be remitted to the municipality and the rest retained for O&M.

There are LGU waterworks providing Level III water supply systems besides the WDs providing water supply services to their franchise area. Because of the low income generation at the initial operation stage, the employees of the municipality are required to work on the waterworks without additional compensation. Bookkeeping and accounting functions are also integrated into the regular municipal accounting function. However, to manage waterworks properly, at least the accounts of the waterworks shall be segregated from the general account of LGUs.

## **5.8 Community Development**

### **5.8.1 General**

This section presents the current status or the existing condition for community development (CD) in the Province of Leyte for the WATSAN sector from the side of the government, on one hand; and the point of view of the people and the communities served, on the other.

Thus, it traces the development of CD through policy measures promulgated and/or enacted on the national level and shows how CD has filtered down to the local level.

The discussions are focused on the experience of the LGUs in performing CD work with reference to the typical manner through which the participation of the community is secured for the sector, whether these be Level I, Level II or Level III projects. The experience reveals the degree of readiness of the LGUs in doing CD work by examining the structures and linkages in place in the province that may either enhance or be an obstacle to the successful execution of sector projects. It also provides the true state of information, education and communication (IEC) processes in the province in so far as these relate to supporting sector projects.

The valuable information were taken from the following: (1) The interviews undertaken with LGU officials during the study period; (2) The answers to the CD/GAD Questionnaire distributed to select provincial and municipal officials involved in sector development; (3) The Result of the Barangay Key Informant Survey, a survey administered to the officials of the select local communities (details are referred to the Supporting Report); and (4) Other documents researched on and provided by the national, regional, provincial, municipal and barangay level offices.

The other major part of this section presents the different levels of community participation in sector projects as determined by the people or the beneficiaries themselves. As such, it reveals the type and degree of involvement of the people in past sector projects and whether or not this involvement was adequate. It also illustrates the manner through which the beneficiaries want to actively participate in future sector projects, thereby demonstrating the predisposition and willingness of the community to commit themselves to new development projects.

The responses of the beneficiaries to the information desired are gender sensitive and were derived from the following: (1) The Result of the Group Interview Survey ((details are referred to the Supporting Report); and (2) The Result of the Barangay Key Informant Survey; and (3) The results of studies conducted on CD by the national/regional/provincial agencies.

Being the model province, 10 barangays were made to participate in both the key informant survey and the group interviews; thus the results of the key informant survey and group interviews are highly indicative of the situation prevailing in the entire province in so far as participatory community development is concerned on both the government's point of view and the side of the community. The current CD status is not without its share of problems; but this is exactly the purpose of the study, that is, to improve the WATSAN sector's performance by

plugging all leaks that may get in the way of the successful implementation of sector projects, CD included.

### **5.8.2 Provincial CD Structure and Linkages for WATSAN Sector Projects**

The 1987 Philippine Constitution recognizes and mandates the participation of every Filipino in attaining overall national development. Thus, community development is utilized as a national strategy and has been adopted in the Medium Term Philippine Development Plan-1993-1998 (MTPDP) and the Updated MTPDP (1996-1998) to address the country's problems of poverty and unemployment. As a general policy, the Plan gives the greater masses of the people a voice in charting and implementing programs in the country while encouraging the collaboration of the private sector, non-government organizations and all other sectors of society in the formulation and implementation of plans, policies and programs supportive of the development goals of the country.

The Philippine National Development Plan: Directions for the 21<sup>st</sup> Century which was released early 1998 gives more focus to building the capacities of communities for self-reliance. By recognizing the people's self-dignity and inherent capacity to improve their own lives, community-based approaches will be utilized when delivering basic services to the people. Towards this end, a development planning system that institutionalizes the bottom-up planning process was adopted.

In the 1980s up to the mid 1990s, sector projects under the Barangay Water Program (BWP) and those funded out of OECF, WB and ADB were required some level of community participation but this was limited to the provision of free labor by a few beneficiaries during the construction of Level I facilities.

### **5.8.3 Assignment of CD Specialist to Sector Projects**

There is no unit within the Provincial Planning and Development Office (PPDO) that is responsible for conducting or implementing community development (CD) nor is there any permanent staff that has been assigned to do CD work, particularly for the WATSAN sector, because of the lack of budget and plantilla for the purpose. While the province has a position for a CD Specialist, said position/employee is directly under the Office of the Provincial Governor.

The Provincial Health Office (PHO) has a unit plus a staff that is responsible for CD-CO work, but they are not concentrated on the WATSAN sector. The unit and its staff are utilized for the other sectors that the PHO is concerned with.

Generally, the municipal planning and development office (MPDO) and the municipal health office (MHO) in the municipalities do not also have a CD unit to undertake barangay-level community development work for the WATSAN sector. This prevailing situation was confirmed in the municipalities of Babatngon, Jaro, Hilongos and Burauen as well as the city of Ormoc.

Apparently, there is lack of identified major responsible players on CD in the LGUs that creates a serious gap to the critical linkage and support of sector projects, from the provincial to the municipal and as far down as the barangay levels. Firstly, there is no CD framework in place and no permanent structure within the LGUs that serve guideposts in doing CD work, except for the manner/experience done in the past WATSAN projects.

This leads to the second situation. CD work, to be successful, is a continuous and consistent undertaking. Without a CD framework, a permanent structure or identified responsible people for the undertaking, then any CD work started cannot prosper to its successful completion.

The third condition is really a question of whether the provincial and municipal officials are cognizant of and committed to the true importance of CD as a foundation activity for sustainable sector projects. This awareness on the importance of CD must be translated to giving full support – financial, human and material – to sector projects in their entirety. Although there is no existing position for a community development specialist in the province, or in most of the municipalities, the LGU officials are in agreement that there should be better community participation in future WATSAN activities and projects for the facilities to be sustained. However, there is a need to reorient staff who would be involved in sector-related projects in order for them to learn some up-to-date techniques and strategies that are otherwise not present in previous CD processes.

#### **5.8.4 Training on CD**

The only training on CD for the province was the one conducted by the Department of the Interior and Local Government in November 1998 entitled: "Community Organization and Organizational Development."

The provincial and municipal LGUs showed willingness to facilitate CD training programs that are pertinent to the achievement of the sector plan under preparation as borne out by the discussions with the relevant officials and the Results of the Barangay Key Informant Survey.

Water district personnel also attended various training and seminars conducted by the Local Water Utilities Administration (LWUA) and other private training institutions focused on administrative, financial and technical aspects of level III water supply systems. The varied skills that WD staff learned can also be made applicable to small systems and therefore can be replicated or transferred to BWSA/RWSA personnel.

#### **5.8.5 Utilization of NGOs**

The provincial and municipal governments consider non-government organizations or NGOs as partners in development in Leyte. Most of these NGOs' expertise, however, are focused on agriculture, livelihood and rural improvement. The PPDO and PHO have not been able to identify, as of the present time, of NGOs/CBOs which can be tapped to do community development or community organizing work for sector related projects.

In any case, the different NGOs currently working in the province are known to have wide experience in dealing with the grassroots levels and have knowledge of strategies on how to enter a community and blend with the local people. The provincial officials believe that they can tap the assistance of other NGOs should the need arise. The list of NGOs that have a track record of doing work in the province is updated on a yearly basis (refer to Supporting Report for the List of NGOs and CBOs for Leyte).

#### **5.8.6 Existing Community Development Processes**

##### **(1) Manner of Participation in Sector Development**

The practice of the LGUs in encouraging community participation for sector projects was generally confined to the organization of a BWSA for Level I systems, a RWSA for Level II systems and a water district or LGU waterworks for a Level III system or combination of a Level II and Level III system. Once formed, the organized BWSA, RWSA, LGU-WS and WD became responsible for soliciting the participation and involvement of the users-beneficiaries in ensuring the sustainability of the WATSAN organization and its various projects and activities.

For the BWSA/RWSA, the users' participation was usually in the provision of free labor and in the donation of cash during the construction phase of the sector project. Left to the central and local government planners was the responsibility for the other stages of project development such as planning and design, monitoring and evaluation which included activities as project identification, site selection, water rate setting, and operation and maintenance. As a result, only a few BWSA/RWSA are presently in operation because WATSAN facilities have not been properly maintained and very few users continue to pay their water fees.

The results of the group interviews show that there has been little participation of the people in sector projects. However, these same survey results indicate that a big majority of the people are now receptive to playing a more dynamic role in sector projects as well as assume the responsibilities that go with the benefits derived from improvements in their water and sanitation facilities. Both the male and female beneficiaries professed willingness to form themselves into water associations, contribute cash, materials, and even sites for the construction of WATSAN facilities. In addition, they are already primed to assume higher responsibilities in managing, operating and maintaining the self-reliant WATSAN facilities.

Water Districts (WDs), on the other hand, generally practice participatory community development. Users-beneficiaries are consulted on practically all phases of project development, that is, from the start of the water district's operation, before loans to be contracted, and before water rates are set and/or adjusted. Maintenance of the WATSAN facilities before the water meter, however, remains the responsibility of the water district.

## (2) Typical CD Work

According to the PPDO, the province has not set community development method or process (such as consultations or public hearings) being followed as of the present time before a water supply and sanitation association is organized in the community/barangay. Aside from the fact that putting up WATSAN organizations is not a priority and that new WATSAN projects are scarce, the "typical CD work" for the sector is still a carry over from the manner it was done in the past. This follows the general guidelines set forth by the government such as project orientation at the barangay level and the conduct of trainings participated in by members of the beneficiary community.

More often than not, the agreement to organize the BWSA/RWSA was reached after one general assembly or organizational meeting of the beneficiary community specifically

called for the purpose. The BWSA/RWSA was then tasked to operate and maintain the water supply and sanitation facilities where its members are given different types of training, such as pre-organizational teach-ins, pre-operational and post completion training and operation and maintenance seminars.

The result of the Barangay Group Interviews confirmed the lack of CO-CD process, or social preparation along all the major activities of the sector's projects as perceived by the beneficiaries themselves. The result of the Barangay Key Informant Survey, however, showed the willingness of the barangay councils to participate in sector projects, specifically on the operation and maintenance of WATSAN facilities. The barangay councils were also willing to facilitate and/or pay for the training cost of volunteers who would eventually operate and maintain constructed facilities. The same survey showed the willingness of local residents to contribute cash while others will provide free labor for the repair and maintenance works as a manifestation of their active involvement with the BWSA.

In forming the water districts, LWUA, in coordination with the LGUs concerned, conducts a series of sectoral consultation with the community. Since water districts are formed at the option of the LGU, LWUA first consults the people, through a series of public hearings, to arrive a consensus on whether or not to form the water district. LWUA also encourages the community to participate in the selection of the WDs' five-man board of directors, who are nominated from various sectors. Once formed and operating, the water district conducts regular dialogues with its concessionaires on various issues such as water rates formulation/adjustment, expansion program and other matters that may affect the people-WD relationship.

#### **5.8.7 Information, Education and Communication (IEC) As Foundation Activities for Community Development**

The province does not have an integrated IEC program on sector plans and programs. As such, CD, as the effective tool for getting full support and cooperation of the people toward the sustainability of WATSAN sector projects, is loosely established. The lack of an integrated provincial IEC program creates a gap in linking the municipalities and the barangays, important entities that could help generate the complete flow of community participation on sector projects. The provincial officials have attributed the lack of an IEC program to financial difficulties.

The Province of Leyte has an Office of Media Affairs in charge of disseminating important projects, pronouncements and activities of the entire province. This office, however, has its own list of media programs and the WATSAN sector is not given priority status or information focus.

In the municipal level, MPDOs collaborate with MHOs in undertaking comprehensive IEC programs. However, this has been limited in scale, again because of the lack of logistical support for such activities. What is done is the conduct of community assemblies, house-to-house and school visits to discuss health-related matters.

On the other hand, the water districts (WDs) generally implement a systematic and comprehensive IEC program. Most WDs produce printed information materials such as newsletters, leaflets and posters that are disseminated to the concessionaires. Regular press releases on WD development issues are submitted to local newspapers. There are some WDs that sponsor radio programs while others conduct regular dialogues with the community. Those that do not possess enough expertise are assisted by bigger WDs within the province/region (the concept of Godfather Water District) or by the Public Affairs Office of LWUA. A region-wide Water Information Network has been established with all WDs as members. This network undertakes regular public information drive and helps smaller WDs to disseminate information.

#### **5.8.8 Health and Hygiene Education**

Health and sanitation education is within the responsibility of the Provincial Health Office and its municipal counterparts. These offices have their own health and sanitation education programs collaborated in by the Rural Health Units (RHU) and the barangay health workers. Two programs being implemented by the PHO that have health and sanitation education components are the "Clean, Green and Grow," a campaign on solid waste management and "Healthy Initiatives," a campaign on cleanliness and sanitation aimed at food and commercial establishments. The media utilized in these programs are the "bandilio" and the radio.

The key informant survey and barangay group interviews revealed that the people recognize the importance of good health and hygiene practices. Most of them learned about health and sanitation matters mostly from health workers, health clinics, and hospitals. They also learned health education from radio/TV and the school.

## **5.9 Gender**

### **5.9.1 General**

This section presents the current status or the existing condition for gender and development in the Province of Leyte for the WATSAN sector from the side of the government, on one hand; and the point of view of the people and the communities served, on the other. As such, it elucidates on the evolvement of gender policies on the national level and shows how these have filtered down to the local level where gender responsive planning has become a requirement for all development efforts on the WATSAN sector. It also reveals the extent of the awareness that the people and/or beneficiary communities have on gender matters as seen through their participation in past sector projects as well as their perceived participation in future projects.

Gender-related information were taken from the following: (1) The interviews undertaken with LGU officials during the study period; (2) The answers to the *CD/GAD* Questionnaire distributed to select provincial and municipal officials involved in sector development; (3) The Result of the Barangay Key Informant Survey for Leyte administered to the officials of the select local communities; and (4) The Result of the Group Interviews for Leyte conducted at the barangay level; and (5) Other documents researched on and provided by the national, regional, provincial, municipal and barangay level offices.

### **5.9.2 The Evolution of Gender and Development**

The 1987 Philippine Constitution recognizes and ensures the fundamental equality of women and men before the law and cites their respective roles in nation building. The National Commission on the Role of Filipino Women (NCRFW), established in 1975, ensures the integration of gender concerns in all aspects of the project development. In 1991, Republic Act 7192, better known as "Women in Development and Nation Building" was enacted to strengthen the mandate of the NCRFW. The Act called for the allocation of a substantial portion of the official development assistance funds from foreign governments and multilateral agencies to support programs and activities for women.

The adoption of the Philippine Plan for Gender Responsive Development (1995-2025) paved the way for full participation of women and men in planning and implementation of technology for infrastructure projects, including those in the water supply and sanitation sector. In 1995, the Office of the President issued Memorandum Order No. 282 directing various government training institutions to incorporate "Gender and Development (GAD) Concerns and

Programs" in their respective curricula in order to further institutionalize gender and development programs. The General Appropriations Act of 1997 mandated all departments, offices and agencies to set aside a minimum amount of 5% out of their 1997 appropriations to be used for projects designed to address gender issues. The Local Government Code includes a provision giving political empowerment to women by creating sectoral seat for women to be elected in every local legislative assembly all over the country. To facilitate the whole process, a gender conscious system of data gathering, processing and generation was established.

The significance of RA 7192 has started to gradually filter down to the LGU levels. The DILG gives Gender Awareness Orientation and Training to its officials and employees, from the central down to the municipal level. The purpose for this is not only to establish a common awareness on gender, but also to recognize that they are catalysts of growth and development for LGUs. In compliance with the policies enunciated in RA 7192, all government departments and agencies were directed to revise, review all their regulations, circulars, issuance and procedures to remove any gender bias. Thus, recent projects that national government agencies have incorporated gender concepts including the projects from the water and sanitation sector.

The DILG implements gender responsive WATSAN projects. The DPWH implemented in 1991 the First Rural Water Supply and Sanitation Project which adopted the "Women in Development" (WID) approach aimed to create support mechanisms to enable women to surmount problems regarding water and sanitation thereby increasing their productivity efforts and giving them greater participation in decision-making. Most of the water and sanitation projects of the DOH are directed towards the improvement of women's health and physical condition as well as their social status in the community. As such, implementation of most health and sanitation projects, including water supply, utilizes the women's sector in the community.

### **5.9.3 The LGUs and Gender**

While the province of Leyte is aware of gender and development, there has been no instance where gender sensitive approaches to planning and implementing WATSAN projects has been included and/or utilized either by the PPDO or the PHO.

## 5.9.4 Gender in WATSAN Sector Projects

### (1) Gender Participation in Sector Development Projects

One of the objectives of the province-wide group interviews undertaken in this study was to assess gender sensitivity of the intended sector beneficiaries in the roles and modes of participation that they, as men and women, perceive for themselves in WATSAN projects. Another important objective was to identify potential service population and service level desired by the community, to assess the degree of involvement of both men and women in planning, managing, operating and maintaining WATSAN projects, and the willingness and capacity to pay of potential users.

The respondents in the group interviews were composed of 123 females and 106 males, the majority of whom belonged to the 26-45-age bracket. Ninety-nine interviewees completed their elementary education, with the females outnumbering the males, 50 to 49. Having graduated from high school were 77 respondents, again with 42 females graduating as compared to the 35 males. Only 40 respondents were able to complete college, 26 females and 14 males. The occupation of majority of the male and female respondents was farming/fishing.

In the 10 barangays surveyed for the group interviews, the total number of barangay council members was 97. Of this number, 61 were males and 36 were females. Only one out of 10 barangay captains was female.

#### On the formation/composition of the BWSA/RWSA and WD Board:

Only two barangays were serviced by a BWSA/RWSA, as manifested by the key informants in the 10 barangays surveyed. For the remaining eight barangays, it was the barangay council that provided safe water to the community through its committee on water and sanitation.

There are five sectors represented in the water district's Board of Directors, one of which is the women's sector. More often than not, the educational sector almost always nominates/appoints a female educator.

#### On participation in WATSAN training:

Only 55.46% of the respondents (71 females and 56 males) were able to attend training programs for the year 1998. As for sector-related training, very few were aware of the

caretakers' training, finance/collection and repair/O&M training. However, all the respondents were interested in attending future WATSAN-related training programs. Most of the respondents (102) desired to be trained for a total of three days; but quite a number (65) also felt that a single day would be sufficient.

On participation in health and hygiene:

While all those interviewed recognized the importance of good health and hygiene education, only 17 out of 106 males and 56 out of 123 females participated in health education and training. On water-related illnesses, the men suffered more in such illnesses as diarrhea, kidney trouble, gastro-enteritis and skin disease. More women, however, contracted schistosomiasis.

On participation in operation and maintenance:

For future projects, the respondents generally showed their willingness to participate to the fullest extent possible. All the male and female respondents said that they would participate in operating and maintaining the WATSAN facilities; and such other activities as the formation of a WATSAN association and the construction of water facilities. None of the females wanted to get involved in the selection of sites and levels of service; while only half of the males were interested in the formulation of water rates. Most of the females and the males agreed that it was a male member of the community who was responsible for minor repairs on the WATSAN facilities.

(2) Gender in Water Supply and Sanitation Practices

The same survey also indicated gender sensitivity in water supply and sanitation practices, as presented in the following findings:

Responsibility in Fetching Water

According to the 55 female respondents, the wife was still the one responsible for fetching water. Only 37 female respondents said that the husband helped. The male child helped in the task, according to 34 female respondents; but for another 26 female respondents, the female children also assisted in fetching water from source to home. For 81 male respondents, it was the husband who was the one responsible for hauling drinking water for family use, although 17 of them admitted that the wife assisted in this task. Eighteen male respondents pointed to their male children as being responsible for fetching water, although another 10 said that the female children also helped out.

## 5.10 Existing Project and Sector Monitoring

### (1) Sector Monitoring

The primary sources of sector data are the field office and staff of DPWH, DOH, LWUA, DILG and NSO. Other agencies, including NEDA and LGUs, use data from these agencies. Each of these agencies runs its own project and/or activity-monitoring system based on required reports of its field offices. Only the NSO gathers and assesses information nationwide on a regular basis as part of its Census on Population and Housing (CPII).

Periodical WATSAN sector monitoring shall be conducted aside from project monitoring to study and evaluate: existing sector development conditions, against national and provincial sector targets for making necessary arrangements at the sector level. The sector monitoring activities needs an appropriate budgetary allocation annually. Participatory monitoring with associations/barangays and municipalities would be practical and cost saving method. Formulating sector development strategies and planning the development projects can not practiced without sector monitoring, so that establishment of sector monitoring and reporting mechanism with responsibilities for all concerned parties is an urgent requirement.

### (2) Project Monitoring

Project monitoring has been conducted by different government levels depending on the characteristics of the project i.e., local funded or foreign assisted projects. However, only projects handled by the local offices of central government agencies are monitored, mainly focusing on physical accomplishments and capital expenditures of projects, by respective central government line agencies.

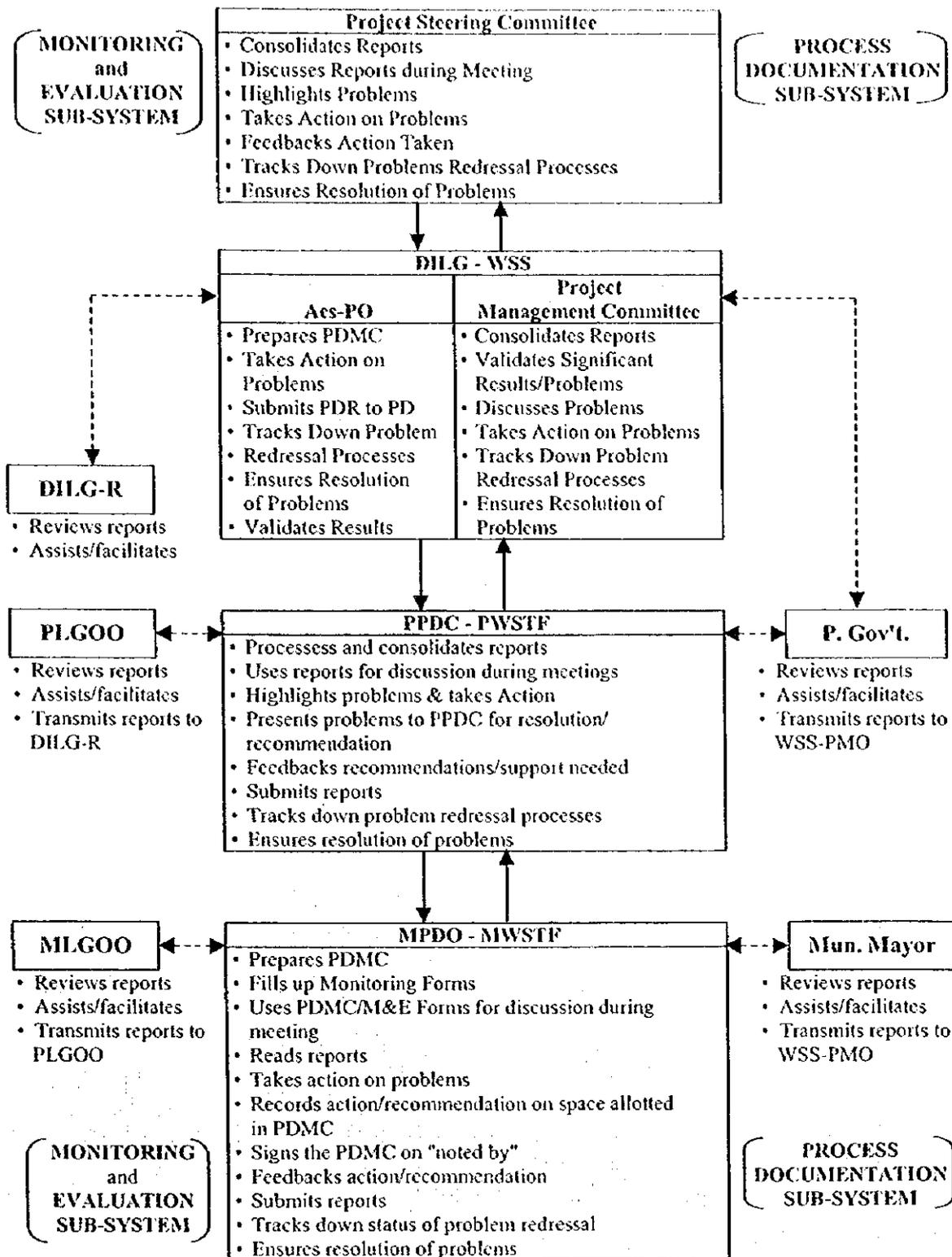
Monitoring activities under the Regional Development Council cover four components: Macro, Economic, Social welfare and Infrastructure. Monitoring report on the foreign assisted infrastructure projects, including water supply project is submitted from PPDO to the national government agencies. Agencies to which the reports are submitted and reporting schedule are defined in the Implementing Guidelines of the projects. The monitoring report submitted to agencies concerned is also sent to the NEDA Central Office. The central government agencies also report to the foreign assistance agencies such as ADB, WB, etc.

It was field confirmed at the NEDA Regional Office that there are some foreign assisted projects directly provided to the regional office, such as grass root assistance with a limited amount. The NEDA is not involved in the occasion of signing with the foreign donor for such projects. However, the reporting on the project is usually made from regional office to the central office of NEDA. In this connection, the central office of NEDA sometimes overlooks the projects.

There are no significant differences in the current project monitoring systems at the LGU level. The monitoring for WATSAN related projects are conducted under the Regional Monitoring and Evaluation System. The PPDO/MPDO concerned conducts monitoring from the start until completion of the project. Projects that are getting negative feedback and require validation and verification are closely monitored. The report covers status of implementation, finance, percentage of accomplishment and slippage/problems as well as evaluation and countermeasures. Figure 5.10.1 shows an example of UNDP assisted project illustrating the linkages among concerned agencies.

In both sector and project monitoring, the exchange of information between concerned agencies seems to be insufficient/not systematic, though there are opportunities to do so, like during the RDC regular meetings. In addition, the absence of a reliable data management system not only adds burden to the monitoring work but also causes wide dissatisfaction among project implementors themselves. The preparation of monitoring reports is seen by some as a nuisance to performing more important tasks, thus the monitoring reports are haphazardly done. When this happens, the reliability of information presented in the reports is compromised. An effective monitoring mechanism and data management system must be in place and put to work by the concerned agencies.

**UNDP/PHI/93/010 PROJECT  
PARTICIPATORY MONITORING FEEDFORWARD  
AND FEEDBACK MANAGEMENT MECHANISM**



**Figure 5.10.1 UNDP Monitoring Mechanism**

Chapter

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

**6**

## **6. PAST FINANCIAL PERFORMANCE IN WATER SUPPLY AND SANITATION**

### **6.1 General**

Based on the Local Government Code of 1991 and NEDA Board Resolution No. 4 (1994), the locally funded programs and projects for the water supply and sanitation sector have been devolved from the central government agencies to the LGUs since 1992. However, the central government still retains its role of providing support to LGUs in the form of technical, institutional capacity building and limited financial assistance.

The financial arrangements which have been adopted and implemented, since the sector's devolution to the LGUs by the province, with a special attention to the subject sector are reviewed and discussed in this chapter. The past experience served as the basis to formulate for appropriate financial arrangements for the medium term development. The essential study components are: (1) LGUs' past financial performance; (2) past public investment and present plans; (3) LGUs' present financing sources and management participation in the sector, (4) existing practices by the LGUs on cost recovery and (5) affordability by users.

### **6.2 LGU's Past Financial Performance**

The provincial government's past financial performance for the period covering the years 1995 to 1999 was investigated. Actual financial data were obtained for the years 1995 to 1998, while the financial figures in 1999 are only budgetary estimates. The municipalities' past financial performance in the same period (1995 to 1998) are not presented in the Supporting Report since the data on income and expenditures of the forty-one (41) municipalities are not available.

#### **6.2.1 Sources and Uses of Funds**

##### **(1) Sources of Funds in the Province**

The sources of income of the LGU are Internal Revenue Allotments (IRA), local tax revenues, non-tax revenues such as grants, aids and subsidies, as shown below. At the present time, IRA is a major financial source of the LGUs.

- (a) IRA – LGU's share in the national internal revenue taxes is based on the collection of the 3<sup>rd</sup> fiscal year preceding the current fiscal year and is shown as follows: 1<sup>st</sup> year of

effectivity of the LGC of 1991- 30% (1992), 2<sup>nd</sup> year (1993) -- 35% and on the 3<sup>rd</sup> year (1994) and thereafter is 40% of the gross national internal revenue collections. A standard formula, which considers parameters such as population (50%), land area (25%), and equal sharing (25%) is used to determine the LGU share in the IRA. Provided, however, that in the 1<sup>st</sup> year LGUs were, in addition to the 30% IRA which included the cost of devolved functions for essential public services, entitled to receive the amount equivalent to the cost of devolved personnel services.

- (b) Tax Revenues -- mainly consist of real property tax, accounting for an average of 7.16% of the total income of the province.
- (c) Grants, Aids and Subsidies -- the province have received grants more for health services (from UNICEF, POPCOM, etc.).
- (d) Other Income -- there are no economic enterprises, but receives minimal income from various fees and charges on certain services. The province has a government center, with the lots being rented to the post office and tourism office, although the income is minimal due to low rental rates being charged to these national government offices.

Based on the Local Government Code of 1991, 40% of the national internal revenue taxes of the 3<sup>rd</sup> fiscal year preceding the current year (from 1994 onwards) is allocated to the LGUs nationwide, specifically to the administrative units of (1) province (23%); (2) city (23%); (3) municipality (34%), and barangay (20%). Further, respective IRAs in different administrative levels are allotted to all administrative units concerned.

Table 6.2.1 presents the income and expenditures of Leyte during the period 1995-1999. Local tax revenues, which were 7.16% of the total income of the province, consist of real property tax, business taxes and licenses, and miscellaneous taxes. IRA's annual average share to total income was 87.48%, which indicates that the province has historically been dependent on IRA with its low tax and non-tax revenue collections.

The provincial government has no economic enterprises, but it receives rental income from the lease of its lots by national government offices. It manages eleven (11) district hospitals as a result of devolution subsidizing for their operation, since hospital fees that being charged are very low and are not even sufficient to cover the costs of operation and maintenance of the system. In addition, it has a day care center, which are being subsidized by the province, with counterpart from the municipalities. There is no cost recovery scheme for the equity provided by the province in the day care center.

In order to mobilize fund sourcing, the 1987 Constitution and the 1991 Local Government Code granted the Provincial Government to have its initiative to create new revenue sources. The LGU financing options are discussed in Section 6.4 and in the Supporting Report.

**Table 6.2.1 Income and Expenditures, 1995 – 1999**

Unit: Pesos

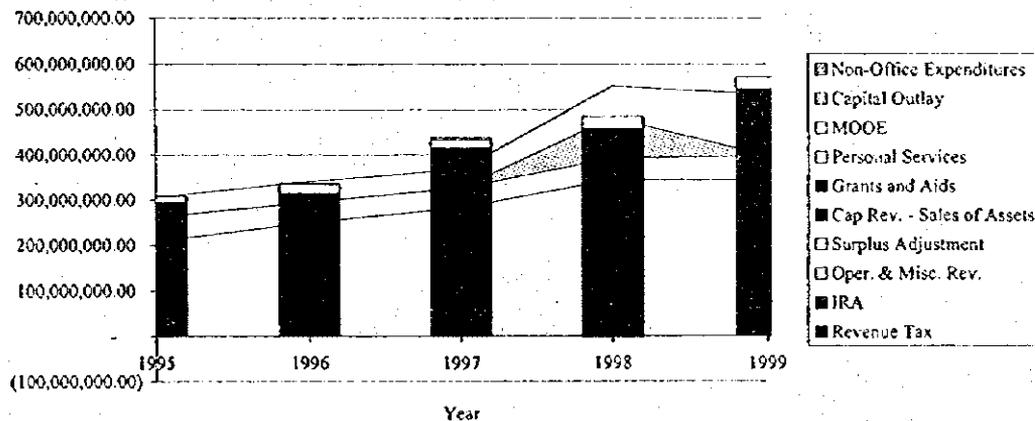
PARTICULARS	1995	1996	1997	1998	1999
<b>RECEIPTS</b>					
Revenue Tax <sup>1/</sup>	22,776,204.23	23,286,318.53	30,100,016.29	21,292,757.70	54,000,000.00
IRA	271,062,743.00	290,967,625.00	385,651,091.00	436,516,814.00	490,739,559.00
Operating & Misc. Rev. <sup>2/</sup>	15,231,414.60	19,888,775.83	18,177,650.17	27,121,240.83	26,613,000.00
Surplus Adjustment	-	2,934,407.86	4,214,988.48	(2,669,847.00)	1,500,000.00
Capital Rev. – Sales of Assets	3,240.00	6,480.00	2,025.00	5,400.00	11,500.00
Grants and Aids	599,200.00	-	-	-	-
Total Revenues	309,672,801.83	337,083,607.22	438,145,770.94	482,266,365.53	572,864,059.00
<b>EXPENDITURES</b>					
Current Operating Revenues	261,247,151.65	295,773,197.48	326,126,014.42	392,386,266.49	398,036,675.60
Personal Services	207,217,478.93	250,846,625.83	282,720,479.00	345,260,902.05	343,413,849.00
Maintenance & Operating Exp. (Travelling & Maintenance Exp.)	54,029,672.72	44,926,571.65	43,405,535.42	47,125,364.44	54,622,826.60
<b>NET OPERATING INCOME</b>	48,425,650.18	41,310,409.74	112,019,756.52	68,053,903.24	163,510,024.56
Less: Capital Outlay	413,349.90	318,970.00	56,497.05	90,322,501.00	-
Non-Office Expenditures	44,292,573.98	45,261,351.80	42,196,685.71	69,519,995.74	135,385,524.40
<b>NET INCOME</b>	3,719,726.30	(4,269,912.06)	69,766,573.76	(69,962,397.70)	39,441,859.00

Source: PPDO and Provincial Accountant's Office

Note: <sup>1/</sup> Includes Tax Revenues ( Real Property Tax, Transfer Tax, Franchise Tax, Tax on Peddlers, Occupation, Immigration Tax, Mining Tax, Sand and Gravel Tax, Community Tax, Amusement Tax, Miscellaneous, etc)

<sup>2/</sup> Includes Secretary's Fees, and other charges.

**Figure 6.2.1**  
Income and Expenditures of Ieyte, 1995-1999



## (2) Uses of Funds in the Province

Actual expenditures of the provincial government during the period from 1995 to 1998 show that personnel expenses comprise majority of expenses with an average of 65.27%

to the total revenue, as a result of devolution. Maintenance and operating expenses of the province was 12.85% of total revenues. In addition, the province has a capital outlay with an average share of 3.82% to the total revenue. The funds for the water supply sector were part of the capital outlays of the province.

From 1995 to 1998, the province had an average of ₱72.91 million net operating income from operations. For 1999, the province has likewise projected a net operating income of ₱174.83 million. After deducting capital outlay and non-office expenditures, the province projects a net income of ₱39.44 million (or 6.89% of the total revenues).

### 6.2.2 Availability of Funds

As previously noted, the IRA comprises 87.48% of the total income of the province, which is tapped to finance most of its expenditures including capital outlays and even non-office expenses (incidental). According to the Provincial Treasurer's Office, the amount of IRA that will be received by the province is known in advance before the end of the preceding year. Thus, for budgeting purposes, the province just uses the actual amount of IRA it received in the preceding year as its estimate of IRA for the budget year. In the case where the IRA received is larger than that of the preceding year, the province prepares a supplemental budget.

Table 6.2.2 presents the historical IRA of the provincial government and its municipalities between 1995 and budget year 1999. As shown, the average IRA of the province was 2.16% of the provincial IRA nationwide in the period 1995-1998 and budget year 1999. Likewise, the total amount of IRA allotted to all its municipalities in the years 1995-1999 was 2.30% in the average. The IRA percentage of each municipality to total municipal IRA nationwide is presented in Table 6.2.2, Supporting Report.

Based on the past financial performance of the province, IRA has been a major source of funds. At first, 20% Development Fund (DF) and 5% Calamity Fund are deducted from the total amount of provincial IRA. Then, the remaining portion of the IRA is combined with other income sources. Contractual and statutory items, which are covered by R.A. 324 (b) are deducted from the pooled income (75% IRA + all other income) before other appropriations are made.

Table 6.2.2 Internal Revenue Allotment to the Provinces, 1995 - 1999

Unit: Pesos

	1995	1996	1997	1998	1999	
National	I. National Total of IRA	55,202,000,000	58,022,990,000	71,049,000,000	80,990,763,000	96,780,000,000
	(a) IRA to all Provinces	12,696,644,000	13,755,011,803	17,813,000,000	20,054,018,925	22,535,543,437
	(b) IRA to all Cities	112,696,460,000	13,345,287,700	16,341,270,000	18,627,875,490	20,370,081,167
	(c) IRA to all Municipalities	18,768,952,000	19,607,715,553	24,849,000,000	28,245,815,434	31,830,589,345
Provincial	II. IRA to Leyte					
	(1) Total: (2) + (3)	809,195,839	872,150,672	1,113,161,920	1,289,044,443	1,446,106,490
	(2) Provincial Government	271,062,743	290,967,625	385,651,091	436,516,814	490,739,559
	Percentage (a)	2.13	2.12	2.16	2.18	2.20
	(3) Cities	119,233,472	127,849,393	155,464,012	195,905,776	192,920,092
	Percentage (b)	0.94	0.96	0.93	1.05	0.87
	(3) Municipalities	418,899,624	453,333,654	572,046,817	656,621,853	762,446,839
Percentage (c)	2.23	2.31	2.30	2.32	2.32	
Provincial	III. Total Income of the Provincial Government	309,672,801.83	337,083,607.22	438,145,770.94	482,266,365.53	572,864,059.00
	Percentage of IRA	87.53	86.32	88.02	90.51	85.66
Municipalities	IV. Total Income of the Municipalities	n.a.	n.a.	n.a.	n.a.	n.a.
	Percentage of IRA	n.a.	n.a.	n.a.	n.a.	n.a.
Municipalities	V. IRA to Municipalities					
	TOTAL	418,899,624	453,333,654	572,046,817	656,621,853	780,367,828
	Abuyog	21,724,730	23,303,816	28,324,489	33,312,602	38,190,477
	Alangalang	11,839,330	12,804,466	16,801,251	19,232,460	22,235,968
	Albuera	13,444,026	14,493,590	17,775,490	20,594,977	23,799,958
	Babatangan	8,316,369	8,973,095	11,541,829	13,189,144	15,137,917
	Barugo	8,979,910	9,726,224	12,431,875	14,187,238	16,370,104
	Bato	9,506,307	10,322,836	12,855,219	14,679,229	16,999,725
	Baybay	25,403,186	27,468,896	33,550,976	38,738,470	44,987,324
	Burauen	15,693,914	16,967,180	21,372,813	24,660,527	28,588,149
	Calubian	9,397,093	10,193,653	13,381,199	15,368,710	17,842,180
	Capoocan	10,170,122	10,981,553	13,884,386	16,022,795	18,509,743
	Carigara	12,306,766	13,347,739	16,893,033	19,305,001	22,464,744
	Dagani	8,899,464	9,656,553	12,151,978	13,814,717	18,564,648
	Dulag	11,119,570	12,051,537	15,010,711	17,153,954	19,837,645
	Hilongos	15,317,756	16,589,825	20,456,528	23,448,986	27,165,367
	Hindang	7,158,911	7,753,777	9,373,895	10,674,653	12,280,731
	Inopacan	7,709,880	8,336,372	10,687,270	12,232,160	14,081,941
	Isabel	10,422,255	11,329,583	14,257,133	16,272,828	18,893,097
	Jaro	12,168,131	13,141,088	16,159,488	18,594,199	21,458,985
	Javier (Bugho)	8,784,381	9,482,007	12,194,256	14,046,438	16,197,978
	Julita	5,785,305	6,257,111	8,186,870	9,333,771	10,706,649
	Kananga	11,907,396	12,921,522	16,167,568	18,607,074	21,638,813
	La Paz	6,865,844	7,430,450	9,604,419	10,982,864	12,644,976
	Leyte	11,143,070	12,080,687	14,875,772	17,074,874	20,980,607
	Macarthur	6,356,831	7,033,150	9,494,614	10,826,097	12,457,973
	Mahaplag	8,980,289	9,719,204	12,172,294	13,929,565	16,064,005
	Matag-ob	7,547,912	8,155,003	10,441,384	11,970,832	13,773,205
	Matalom	10,448,422	11,308,231	13,740,147	15,742,081	18,165,306
	Mayorga	7,100,700	7,644,152	9,560,567	11,026,508	12,634,751
	Merida	8,657,490	9,383,995	11,700,205	13,415,410	15,512,678
	Palo	13,687,667	14,786,521	19,010,720	21,849,528	25,269,316
	Palompon	13,489,800	14,664,612	18,407,154	21,135,897	24,636,509
Pastrana	6,752,390	7,294,230	9,448,151	10,812,260	12,418,755	
San Isidro	9,334,424	10,058,709	14,382,145	16,517,242	19,159,062	
San Miguel	7,737,054	8,334,200	10,525,803	12,111,139	13,891,846	
Santa Fe	6,313,371	6,825,375	8,896,354	10,114,384	11,589,543	
Tabango	10,127,319	10,989,969	13,711,689	15,703,924	18,202,605	
Tabontabon	4,857,434	5,259,000	6,728,537	7,625,444	8,717,880	
Tacloban City (Capital)	119,233,472	127,849,393	155,464,012	195,905,776	192,920,092	
Tanauan	11,787,507	12,789,463	16,170,298	18,395,693	21,281,471	
Tolosa	6,061,285	6,573,805	8,340,349	9,449,039	10,844,158	
Tunga	4,197,955	4,556,418	5,983,603	6,786,136	7,771,362	
Villaba	11,398,008	12,344,057	15,394,354	17,683,003	20,478,688	

Source: Provincial Treasurer's Office.

Based on the income statement of the province, available funds of the province are mainly spent to cover personnel salaries, benefits, the MOOE and capital expenditures. The provincial government's combined income from IRA and its tax, and non-tax revenues was just sufficient to cover operating, capital and non-office expenses. Thus, there was little surplus income that could be tapped for additional capital expenditures.

For the planned capital expenditures of the province, the 20% Development Fund (DF) of the IRA are appropriated. The percentages allotted as the DF are the minimum requirement that should be arranged for capital projects as stated in the memorandum circulars of the DILG.

Table 6.2.3 presents the allotted funds for capital expenditures (20% DF) between 1995 and 1999. The 20% DF of the province, were not sufficient to cover the actual expenditures for the years 1995, 1996 and 1998. For 1999, it is projected that the 20% DF amounting to P121.4 million will not be adequate to cover the capital expenditures of the province, which is projected at P135.38 million. Thus, the province has a shortfall in funding of about P13.98 million in 1999.

**Table 6.2.3 Actual Funds for Capital Expenditures (20% DF), 1994-1999**

Unit: Pesos				
Year	IRA of the Province (a)	Planned 20% DF <sup>1/</sup> (b)	Actual Expenditures on 20% DF <sup>2/</sup> (c)	Surplus/(Deficit)
1995	271,062,743.00	54,212,548.60	84,917,090.00	(30,704,541.40)
1996	290,967,625.00	58,193,525.00	68,617,000.00	(10,423,475.00)
1997	385,651,091.00	77,370,214.40	61,370,214.00	16,000,000.40
1998	436,516,814.00	83,906,942.60	90,322,501.00	(6,415,558.40)
1999 <sup>3/</sup>	490,739,559.00	121,400,000.00	135,385,524.00	(13,985,524.00)

Source: Provincial Treasurer's Office

<sup>1/</sup> The 20% DF allotted may not be equal to the computed 20% of IRA.

<sup>2/</sup> These figures are not necessarily similar with the capital expenditures shown in Table 6.2.1 from Provincial Accountant's Office. Includes current and previous years. For 1999, no expenditures incurred have not been consolidated.

<sup>3/</sup> Actual expenditures for 1999 is the non-office expenditures in Table 6.2.1

### 6.2.3 Financial Indicators

In order to determine the debt servicing capability of the province, the formula used by the Bureau of Local Government Finance (BLGF) under the Department of Finance (DF) was employed. It takes into account the regular income of the LGU referring to revenues (real property and business taxes), receipts from economic enterprises, as well as fees and charges that are collected regularly. Receipts from borrowings, grants and inter-fund transfers are not considered as regular income.

The following is the formula adopted by BLGF in computing the debt servicing capacity. According to the MDF Policy Governing Board Resolution 4-95, the average annual growth rate to be used should not exceed 15%.

$$DSC = \{ [RINC 1 (1+AGR) + RINC 1] + IRA 2 \} \times 20\% - AMORT$$

Where:

DSC = debt servicing capacity of the LGU

RINC = regular income

AGR = average growth rate

IRA = internal revenue allotment

20% = debt servicing ceiling percentage imposed by the Local Government Code of 1991 under Section 324 (b).

AMORT = amortization of the LGU's outstanding loan

1 = current year

2 = preceding year

Based on the above formula, the amount of the debt servicing capacity of the provincial government was computed to be ₱98.1 million for the year 1999. This amount reflects the maximum loan that can be availed of from MDF. The local tax income (current year) and IRA of the province are projected at ₱54.0 million and ₱436.50 million (preceding year), respectively. The province has not incurred any loan.

### **6.3 Past Public Investment and Present Plans**

#### **6.3.1 Past and Current Annual Investment Plans**

The past and recent development of the water supply and sanitation sector in the province was undertaken by the provincial government through the Provincial Engineering Office (PEO) and PPDO (mainly monitoring). Based on the limited available data, there were minimal investments on water supply and sanitation sector for the period 1995-1998.

According to the Provincial Accountant and Treasurer, the province has financed in 1997 small-scale water supply projects which are part of the Infrastructure Fund amounting to about ₱12 million. In 1998, the province invested ₱136,000 for Leyte Sub-Provincial Jail in Palompon (refer to Table 6.3.1 and Figure 6.3.1). At present, the province does not allocate its IRA funds to WATSAN sector. The priority is given to Social Welfare and livelihood sector and "Day Care Centers" for children.

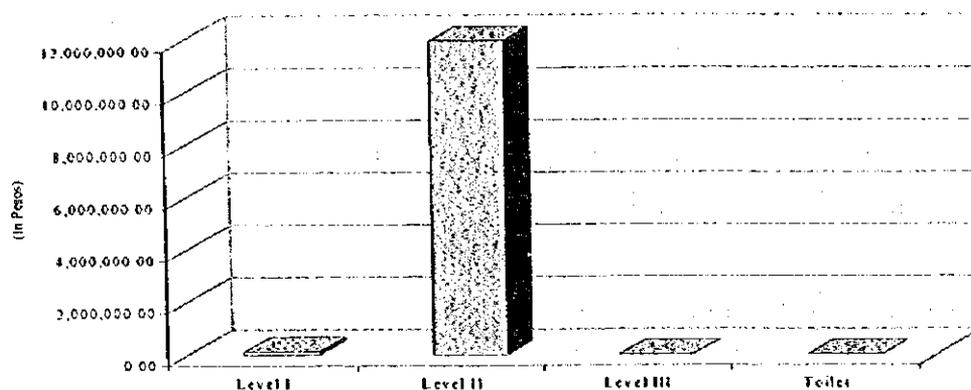
**Table 6.3.1 Actual Amount of Sector Investment to the Province  
by Concerned Agencies, 1995 - 1998**

Unit: Pesos

Funding Category		1995-1998				Sub-Total	Toilet
Agency	Funds	Level I	Level II	Level III			
DILG							
DPWH							
LWUA							
DOH							
NGO (IPHC-DMSE)							
UNICEF							
PROVINCE I/			12,000,000.00		12,000,000.00		
MUNICIPALITY					136,000.00		
Prov./Mun./Rehab./Repair		136,000.00					
<b>Total</b>		<b>136,000.00</b>	<b>12,000,000.00</b>		<b>12,136,000.00</b>		

Source: Provincial Accountant, Treasurer and Budget Officer  
Note: I/ Includes other non-WATSAN projects.

**Figure 6.3.1  
Actual Amount of Sector Investment to the Province  
by Concerned Agencies, 1995 - 1998**



The Annual Investment Plan (AIP) in 1999 with ₱121.2 million is biased towards infrastructure development with ₱78.8 million (65% of the AIP budget) as well as other sectors: social development with ₱ 32.0 million (26%), economic development (7%) and development administration ₱6.17 million (5%). For Social Development, Day Care Center Construction/Improvement, which is a priority project has been allotted ₱5.2 million. Further, water facilities for depressed barangays was allotted ₱2.0 million. There is a feasibility study to establish water district for selected municipalities through the Provincial Governor's Office with ₱200,000 allotted amount for each municipality.

Further, there is a project proposal for the expansion of Leyte Water District that is envisioned to cover additional nine (9) municipalities (Abuyog, Dagami, Dulag, Javier, Julita, La Paz, Mac Arthur, Mayorga and Tabontabon) for 19,552 households.

Further, there is a project proposal for the expansion of Leyte Water District that is envisioned to cover additional nine (9) municipalities (Abuyog, Dagami, Dulag, Javier, Julita, La Paz, Mac Arthur, Mayorga and Tabontabon) for 19,552 households.

#### (1) Budgetary Allocation to the Sector

The Budget Office of the province consolidates the budget proposal submitted by all offices of the Provincial Government. While, the DBM issues a Local Budget Memorandum every October of the preceding budget year to guide the provinces in their budget preparation. The sector obtains allotment from the 20% DF allocation by the Provincial Development Council (PDC).

Once the budgetary arrangement is completed, the local chief executive (Governor) endorses it to the SP for approval and appropriation. The SP usually approves the budget, ideally before January of the budget year. In case the budget is not approved, the province operates on a re-enacted budget, which is based on the last year's budget, until the budget for the current year is approved.

#### (2) Capital Expenditures in the Sector

The projects programmed for implementation in the province by sector, by funding source, and by implementing agency are consolidated and presented by the PPDO in the Provincial Annual Investment Plan (AIP). The AIP is based on the planned investment of the province, as well as on the submission to the PPDO from the municipalities on their planned investments for the coming year. The AIPs of Leyte for the Sector from 1995 to 1998 are summarized in Tables 6.3.2 and 6.3.3.

Table 6.3.2 shows the annual planned activities in the water supply sector, the corresponding funding sources and the amount of investment from 1995 to 1998. (Table 6.3.3 summarizes annual sector investments by service level for the period 1995 to 1998). The Provincial government has not given priority to WATSAN sector. It was in 1997 when province-wide municipal and barangay projects including WATSAN sector was allotted funds, but there was no available data on the actual expenditures for WATSAN sector.

Table 6.3.2 Annual Investment Plan, 1995 – 1998

Unit: Pesos

Item	1995	1996	1997	1998	1999	Total	% Share
Construction (DW, SW, Spring Box, Reservoir, Tank) Various Foreign Assisted (OECE) National (DPWH/CDF/DILG/PAF2) Various Local Funding (Prov / Mun)	-	-	12,000,000.00	136,000.00		12,136,000.00	100.00
Spring Development with L2 Various Foreign Assisted (OECE) National (DPWH/CDF) National/Local Funding (DOH) Various Local Funding (Prov/Mun)							
Spring Development with L3 Construction Levels 2/3 (Municipal) National (DPWH/CDF) Local funding (Municipal) Maintains/Rehabs/Improve L1/L2/L3 & SD (Prov/Mun) Expansion L2/L3 (Prov/Mun) Construction of Health Center/Stations-Barangay (DOH) Water Disinfection/Chlorination of Water Sources (DOH) Barangay Sanitation/Sanitary Toilets (DOH/DILG/MUN)							
Special Water Supply Projects (Gov't Center, Hospital – Local) – Municipal							
<b>Total</b>			<b>12,000,000.00</b>	<b>136,000.00</b>		<b>12,136,000.00</b>	<b>100.00</b>

Source: Provincial Planning and Development Office and Provincial Accountants.

Note: 1/ Includes non-WATSAN project.

Table 6.3.3 Sector Allocation in the Annual Investment Plan, 1995 – 1998

Unit: Pesos

Item	1995	1996	1997	1998	Total
<b>Level 1</b>					
Foreign Assisted					
National	n.a.	n.a.	n.a.	n.a.	n.a.
Local					
<b>Level 2/3</b>					
Foreign Assisted					
National	n.a.	n.a.	n.a.	n.a.	n.a.
Local					
<b>Other :</b>					
Expansion					
Repair/Maintenance					
Special Water Supply Projects (Gov't. Centers, Hosp.) – Local	n.a.	n.a.	12,000,000.00	136,000.00	12,136,000.00
Water Quality *					
Sub-Total Water Supply					
Health Centers					
Sanitation Toilet (DOH)					
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Sub-Total Sanitation					
<b>Grand Total</b>			<b>12,000,000.00</b>	<b>136,000.00</b>	<b>12,136,000.00</b>

Note: \* -includes non-WATSAN project.

Source: Provincial Planning and Development Office, Provincial Accountant.

In the AIP of the province, there were no definite projects identified for water supply and sanitation sector during the period of 1995-1999 since WATSAN was combined with other projects. The actual expenditures for the sector out of the 20% DF of the province were almost zero (refer to Table 6.3.4).

### 6.3.2 Past and Current Breakdown of 20% Development Fund

The allocation of the 20% DF is guided by DILG Memorandum Circular No.95-215 as amended by Memorandum Circular No. 96-263 issuing 'the Policies and Guidelines on the utilization of the DF and other related matters'. As presented in Table 6.3.4 and graphically shown in Figure 6.3.4, the infrastructure sector obtained 69.3% of the DF in 1998 (i.e. P58.15 million out of P83.90 million). However, the WATSAN sector was not a priority sector and thus, it had no budgetary allocation.

Table 6.3.4 Allocation of the 20% Development Fund, 1995-1999

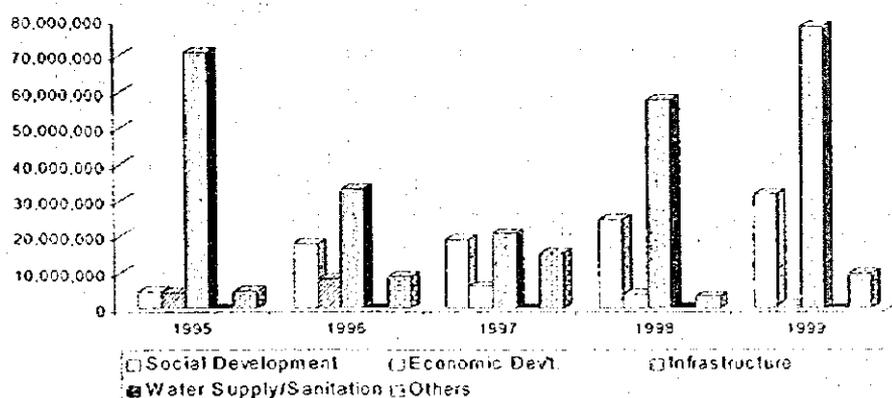
Unit: Pesos

Year	Planned 20% Dev't. Fund	Actual Expenditures						% of Water Supply to Actual Disbursed Amount of 20% DF
		Social Development	Economic Development	Infrastructure	Water Supply/Sanitation	Others	Sub-Total	
1995	54,212,548.60	4,737,275	4,430,560	71,057,000	-	4,692,255	84,917,090	-
1996	58,193,525.09	17,965,000	8,150,000	33,200,000	-	9,602,000	68,317,000	-
1997	77,370,214.40	19,095,000	6,100,000	20,800,000	-	15,375,214	61,370,214	-
1998	83,906,942.60	24,871,501	3,950,000	58,151,000	136,000	3,350,000	90,322,501	0.15
1999	121,400,000.00	32,000,000	849,800	78,800,000	-	9,750,200	121,400,000	-

Source: Provincial Budget Office and Provincial Accountant's Office.

The 1999 figures for expenditures are allotted amounts only. Actual figures are not available.

Figure 6.3.4 Allocation of the 20% Development Fund, 1995-1999



It was only in 1998, that the provincial government provided some funds for WATSAN projects; but these were combined with barangay projects funded under the social services sector.

The actual expenditures on 20% DF in 1996 and 1997 as shown in Table 6.2.3 are higher than those in Table 6.3.4 (sectoral disbursements) since the latter's figures may reflect only capital outlays and exclude incidental expenses, etc.

In 1998, out of the planned 20% DF of ₱ 83.9 million, only the amount of ₱136,000 was disbursed to WATSAN sector (which is equivalent to 0.16% of the planned 20% DF or 0.15% of the actual total disbursements from 20% DF).

**(a) Logistic support with required funding**

The LGUs through the course of project implementation shall ensure the provision of adequate logistic support with financial arrangements. The LGUs have not given priority to the requirements considering the budgetary constraint. The AIP needs to include the plan for the logistic support entailing manpower and vehicle allocation.

Also, the province shall determine financial arrangements for the implementation of Medium-Term Development Plan (2000-2004) to be prepared, entailing the share to the relevant sector from development fund of IRA and other financial sources to be availed of.

**(b) Raising funds and provision of subsidies to support capital development in municipalities**

At present, the province has been involved in Third Elementary Education Projects with DEC's and it subsidizes 3<sup>rd</sup> to 6<sup>th</sup> class municipalities equivalent to 10% - 15% of project cost. It builds schools and provides modernized facilities and equipment. There is no cost recovery scheme employed by the province to sustain continuity of the project.

The province provides the subsidies to support capital development at the municipal and barangay levels through its 20% DF. However, barangays and municipalities that request funding must be prompt in submitting the necessary documents to PPDO for processing. Out of the 20% DF, the province may provide logistics for manpower requirement for devolved functions.

Based on the policy of the province, the following annual activities are undertaken in the province:

- Project proposals from the different municipalities and barangays are compiled;
- Consultation with the representatives of municipalities and barangays as to prioritization of the sector projects. During the occasion, the Governor announces the policy on the sector project implementation including budgetary allocation, the planned and implemented projects, and the obligation of the people/ beneficiaries (cost-sharing

between province and municipalities according to financial capabilities of the municipalities concerned).

- For Level I and II water supply, LGUs implement the projects based on the available fund. Generally, projects are initiated by the BC. In case that project needs (finance, technology, etc.) exceed the capacity of BC, the request is made to municipality followed by action by the province. There are cases when BCs directly request projects to Governor's Office. For Level III water supply, PEO and PGO have not been involved in Level III project after implementation of Matalom Municipal Waterworks.

#### **6.4 LGUs' Present Financing Sources and Management Participation in the Sector**

##### **6.4.1 Cost Sharing Arrangements / Counterpart Funding**

The implementation of water supply projects funded by UNICEF was previously undertaken by PPDO, PEO and PHO. The PEO receives requests for assistance from barangay people although planning the sector projects is under the PPDO. The request, however, are granted on a case to case basis, usually if the manpower, materials and budget are available. It was assigned to the PEO for project implementation (Level I and II) since the PEO can undertake the design, construction and provide O & M assistance.

Currently, the sector projects receive funds under the allotment for social services sector. According to AIP, the province allocates part of 20% development fund of IRA to the prioritized municipalities. The experience of the province on the access to other donors is still minimal. Cost sharing among concerned parties (LGUs, central government agencies and barangay people) has been made within realistic arrangement/ current capacity (though the level of the practice is far from present GOP policy).

The following are other financial arrangements and issues based on discussions with Provincial Treasurer, Provincial Budget Officer and Provincial Accountant.

- a) There is no priority list of projects for the municipalities and no budget allocation was made in advance to reflect in the AIP. There is a Local Finance Committee to decide on priority projects for their financing, the members of which come from Budget Office, Treasurer's Office, PPDO and Accounting Office. All projects must have barangay resolutions. The PDC (Provincial Development Council) also prepares its justification for the prioritization of projects.

- b) The PEO implements the Provincial government-funded projects under the General Fund. The implementation of these projects is closely monitored with reference to progressive disbursements. For the sector implementation, the following are the local funding sources and corresponding implementing agencies.

<u>Funding Source</u>	<u>Implementing Agency</u>
Provincial Government	PEO
CDF (Congressmen)	DPWH – District Office
Municipal Government	Municipal Government

A new cost-sharing scheme was authorized in 1998 in accordance with the policy on national government grants. It is stated that "this scheme shall be applied to all new ODA-assisted projects that are currently being packaged in support of LGUs". Programs of central government agencies that involve devolved functions, particularly those that have social and/or environmental objectives are implemented through a cost-sharing arrangement between the central government agency and LGUs.

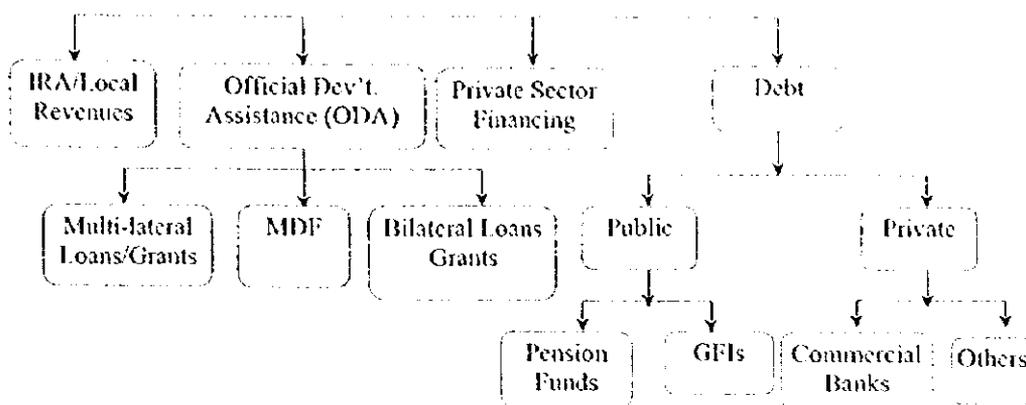
For any central government grants that are provided for the development of Level I water supply systems and sanitation facilities to the limited classes of municipalities, the LGUs and beneficiaries concerned shall share the capital cost required. No subsidies from the central government will be provided for the construction of Level II and III water supply systems.

#### **6.4.2 ODA Assisted Projects and Grant/Aid**

Other external source of funds of the province is foreign assisted projects either directly coursed through the province as in the case of the UNICEF funds (grant) and JICA (grant). Water districts in the province likewise avail of funding through loans that are directly obtained from LWUA.

As of now, there was no NGO counterpart funding experienced by the Province. Thus, LGUs have the following financing options (refer to Figure 6.4.1): IRA, ODA, private sector financing and debt (both public and private sector debts). A more detailed discussion of the different financing options is presented in the Supporting Report. Below are the major commonly availed or financing options by LGUs.

Figure 6.4.1 LGU Financing Options



Arrangement through Conduits

(1) Municipal Development Fund (MDF)

The MDF is a revolving fund created under Presidential Decree No. 1914 to provide LGUs access to foreign loans, assistance or grants. Operations of the MDF, as well as the evaluation and control of local government transactions of the fund, are guided by the financial policies defined in the Joint Circular No. 6-87 of the DOF, COA and DBM. The policies include, among others, the following:

- On-lending terms for local governments or government corporations to be in accordance with the terms and conditions of the international agreements with foreign financial institutions;
- Loan repayments to conform with the terms and conditions of the corresponding Loan and Project Agreements;
- Annual debt service liabilities to all creditors to be at least 120 per cent of total net annual revenues from all sources after operating costs, unless otherwise provided in a mutual agreement among all parties concerned;
- Repayment to MDF to take precedence over all subsequent borrowings incurred;
- Payment of additional interest, charges and fees on amounts to be relent to local governments may be required by the Secretary of Finance in consultation or agreement with foreign lending institutions and LGUs/Project Cities to cover foreign exchange risks, commitment charges and front-end fees applied on foreign borrowings by lending institutions; and
- Internal revenue/specific tax allotments to be withheld by the DOF in case of default or arrears for more than three (3) months.

The Policy on accessing loans through the MDF is currently under review by the central government to make the terms and conditions more concessional towards the lower classes of LGUs, such as the 4<sup>th</sup> to 6<sup>th</sup> class municipalities.

## (2) Governmental Financing Institutions (GFI)

In the past, the LGUs could not access financing institutions for direct assistance. But with the devolution of the sector to the LGUs, the LGUs could now access direct financing from banks and other financing institutions.

Among the GFIs through which LGUs can access ODA loans are the Land Bank of the Philippines (LBP), Philippine National Bank and the Development Bank of the Philippines (DBP). For the LGU to enter into a loan, the respective legislative council (Sangguniang Panlalawigan, SP for the Province; Sangguniang Panglunsod, SP for the City; and Sangguniang Bayan, SB for the Municipality) will authorize the Chief Executive Officer (Governor or Mayor, as the case may be). The collateral that the LGU may use in order to avail of loans from the bank could be any of the following: deposit hold out, public land and assignment of IRA.

In a deposit hold out loan, loanable amount is based on the amount in the time deposit account of the LGU in the bank. The LGU is allowed a maximum loanable amount of up to 90 per cent of the total amount of its time deposit account in the bank. One of the terms for this kind of loan includes deduction of the amount due from the LGU's IRA deposited in that bank.

Another condition that the bank usually imposes on the loan is the signing of a MOA between the LGU and the bank, where the LGU guarantees that the loan will be honored despite a change in administration in the next election. Interest rate is not fixed. Loanable amount may be based on the amount of time deposit of the province in the bank.

Other collaterals accepted by the bank are: public land and assignment of IRA. Interest rate is not fixed but fluctuating depending on the current interest rates prevailing during repayment. Penalty charges are imposed whenever the IRA of the province is delayed.

### (3) Foreign Lending Agencies

The external assistance to the Sector in the province comes from foreign assisted projects. Before the devolution of the sector, the province was a beneficiary of UNICEF and JICA health services. After the devolution, the province became the direct recipient of foreign grants. The most recent experience of the province in foreign grants was the UNDP-WATSAN project, where the province is a direct recipient from the donor.

There is currently a World Bank-assisted project, the Local Government Unit-Urban Water and Sanitation Project (LGUWSP), which was conceived in mid-1995 by the Government thru the DILG. The project is based on two underlying principles: "demand-driven approach in project development and implementation (the project shall provide services that the consumers want and are willing to pay for and that the services shall be managed at the lowest appropriate levels); and the "adoption of commercial principles" in the management/ operation of the water utilities by involving the private sector or the facilities must be operated as commercial entities, and water treated as an economic commodity.

The project promotes full cost recovery; that is, the tariff to be paid by the consumers should cover the cost of operation and maintenance and the repayment of the LGU DBP loan. The system shall be operated by a private operator under a long-term lease contract with the LGU. It aims to support the water supply requirement in the urban centers of approximately 250 small and medium sized municipalities, benefiting about 6 million people. There are two (2) sets of target markets, namely:

- (1) Municipalities/ cities, irrespective of income class, which have not formed a water district; and
- (2) Municipalities/ cities, irrespective of income class, which have water districts but are not in LWUA's current program of assistance (in which case, the LGU should secure a certification/ clearance to that effect). In the event that the local water district is receiving a loan from LWUA, it shall seek clearance from LWUA prior to entering into an agreement with LGU concerned in any program of system expansion/rehabilitation. The LGU equity ranges from 10-25% of the total project cost.

The overall cost estimated nationwide and implementation time table of the project are as follows:

Unit: US\$ Million			
Phase	World Bank	LGU	Total
1999 - 2002	23.3	13.7	37.0
2000 - 2004	60.0	20.0	80.0
2003 - 2006	100.0	33.0	133.0
Total	183.3	66.7	250.0

Relending Terms are as follows:

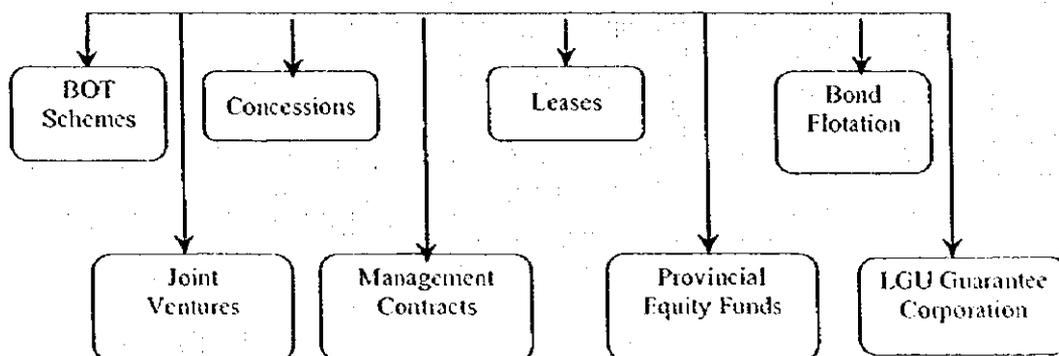
- 1) World Bank funds shall be channelled thru the Development Bank of the Philippines (DBP) which shall relend them as sub-project loans to the LGUs.
- 2) The DBP sub-project loan shall include the cost of feasibility study, technical design and construction of the water supply facility.
- 3) Basic terms of the loan are:
  - Interest per annum; 15%
  - Amortization Period; 15 years with 3-year grace period.

(4) Private Sector Financing Schemes

There are several private sector financing modalities that can be promoted to finance WATSAN sector projects particularly in urban areas, where existing service area coverage may warrant viability of WATSAN investments for a profit by the private sector proponent. Further, Level III water supply expansion projects are now increasingly financed thru private sector financing mainly thru concession contracts and BOT schemes.

Figure 6.4.2 presents the different modalities for private sector financing that may be tapped by LGUs for financing water supply and sanitation sector projects. A more detailed discussion of the private sector financing schemes is presented in the Supporting Report.

**Figure 6.4.2 Private Sector Financing**



### 6.4.3 LGU-Financed and Managed Waterworks/Water District

Rapid assessment survey was conducted covering Babatngon, Jaro, Burauen and Ormoc City.

For urban water supply, in the municipality of Babatngon, about 40% of the urban population are served by municipal waterworks. Since 1982, the municipality has expanded or improved the system for urban areas (converted from Level II to Level III System about 2-3 years ago).

Water charging and collection was started by the municipal treasurer's office upon upgrading of the service level to Level III. The flat charge is ₱30 per household and there has been no increase in the rates. It has a monthly collection of ₱12,000.00. Expenditures mainly include repair of pipes and purchase of chlorine materials. Although it is the intention of the MPDO to really make a plan to improve the services, it is necessary to get a prior concurrence from users to increase the water charges to cover the cost of proposed improvement.

For rural water supply, there are Level I and Level II systems. Two Level II systems utilizing deep wells are managed by associations: Malibago for 177 households and San Isidro for 144 households. Water charge of ₱5/household/month is collected for the payment of electric charges. Other Level II systems are operated by the respective Barangay Councils. While, majority of Level I facilities are privately owned, the publicly-owned Level I facilities are usually managed by Barangay Councils.

In the municipality of Jaro, Jaro WD provides for urban water supply for 720 households. The WD was established in 1993 through the assistance of LWUA. Water charge is ₱95 for the first 10 m<sup>3</sup> and is collected by the Municipal Treasurer's office. The WD is paying back the loan amounting to ₱5.296 million. The municipality has a plan for system expansion, but it was not yet completed due to the limited financial source.

For rural water supply, Level I and II systems are being managed by BWSAs/RWSAs which cover 8 barangays. Projects are prioritized considering the water sources and needs of barangay, which are determined by the local officials in all barangays. Associations were organized before construction works, while repair work is brought to the attention of the Mayor according to the situation. About 4% on the average of municipal IRA is allotted to the sector.

The municipality of Burauen has 77 barangays with a total population of about 55,000 people. Burauen WWs (Level III) is managed by the municipality and covers poblacion area, which use spring water source. The municipality has a plan to conduct feasibility study for rehabilitation of transmission and distribution pipelines due to the deterioration of the facilities, but the financial source is not yet secured.

Other rural barangays are served by either Level I or II systems. Among them, Level II system in Barangay Cansiboy was just inaugurated under the Agrarian Reform program.

In Ormoc City, the city water works (Level III) manages urban water supply covering 49 barangays (29 urban and 20 rural barangays) out of 110 barangays. The system has 9,000 household connections. Urban barangays and rural barangays have service coverage of 97% and 60%, respectively. The daily water consumption is about 11,000 m<sup>3</sup>/day (supply efficiency is 65% due to leakage of pipes: 50 years old).

Water charge at present is ₱25 for the first 10 m<sup>3</sup> and ₱3 per m<sup>3</sup> in excess of 10m<sup>3</sup>. New charge rate will be adopted from July 1999 (₱35/ 10m<sup>3</sup> and ₱4/m<sup>3</sup> in progressive amounts). Currently, the City government supports the WWs in case of financial shortage, however, the WWs expects a sound financial management upon implementation of the new water rates. Major expenditures of WWs are salaries of the staff, electrical charges and chlorine.

There exists a cooperative-based water supply system covering 7 barangays. The system started as Level II using spring sources. At present, the system is upgraded to Level III (with water meter provision) and serves about 50% of the households in the area. Progressive water charges are adopted by the system (₱12 for the first 10m<sup>3</sup> and ₱1.50 per m<sup>3</sup> for the additional m<sup>3</sup> consumption).

On financial arrangements, about 5% (₱500,000) of total IRA allotted to the city (about ₱11 million) is used for this sector (for the maintenance of the WWs system, electricity, etc.). Thus, the WWs is supported by the City government.

The water revenues collected by the City WWs are managed by the City Treasurer's office and goes to the general fund. The city has no experience in using external financial sources (such as loan).

Barangay Limburan, Burauen Leyte has about 140 households in the barangay. The Barangay council manages Level I facilities using spring source and the service is free of charge to users. The municipality is eager to upgrade the existing service level to Level II together with the other two (2) rural barangays.

As presented in Table 6.4.1, there are eight (8) WDs in the province with Ormoc City Works having the largest number of metered connections which is more than 8,000 connections. However, Ormoc City Waterworks registered the lowest collection efficiency of 60 percent as compared with the other waterworks such as Baybay Water District, which has a very high collection efficiency ratio of 94%.

Further, Ormoc WD's average monthly expenditures even exceed the average monthly revenues and the same is true for Palompon WD (refer to Table 6.4.1). There were only three (3) WDs which do not have any loans – Isabel WD, Merida WD and Ormoc WD. The other WDs have availed of loans from LWUA and there are three WDs which have current arrears – Abuyog WD, Jaro WD, and Palompon WD (refer to Table 6.4.2).

**Table 6.4.1 Financial Indicators of Provincial/Municipal Waterworks in the Province (as of June 1999)**

Waterworks	Description						
	No. of Metered Connections	No. of Flat Rate Connections	Average Monthly Rate	Average Consumption per III	Average Expenditures	Average Revenue	Collection Efficiency
	Nos.	Nos.	Pesos/cu.m.	Cu.m./mo.	Pesos/mo.	Pesos/mo.	Percent (%)
Abuyog Water District	905	22	7.62	14.70	197,685.78	198,521.40	74.45
Baybay Water District	4,954	-	6.30	23.00	543,436.28	681,281.01	94.00
Metro Carigara WD	2,964	-	9.35	20.00	593,257.62	726,761.76	77.00
Isabel Water District	1,435	-	2.75	43.00	150,000.00	190,688.00	90.00
Jaro Water District	687	687	9.50	15.00	89,346.00	134,286.00	92.00
Merida Water District	500	-	3.00	25.00	50,895.37	57,549.97	77.00
Ormoc City Waterworks	8,400	-	3.00	39.00	910,000.00	589,650.00	60.00
Palompon Water District	829	2	4.50	14.25	75,000.00	65,912.00	88.00

Source: Water Districts.

**Table 6.4.2 Loan Status of Provincial/Municipal Waterworks (as of June 1999)**

Waterworks	Description			
	Total Loan Availed (1,000 Pesos)	Remaining Payment Period Months	Average Monthly Amortization	Current Arrears
Abuyog Water District	3,500,000.00	228 months	30,041.00	90,000.00
Baybay Water District	9,321,033.00	387 months	90,000.00	None
Metro Carigara WD	8,448,501.33	312 months	49,360.00	None
Isabel Water District	None	None	None	None
Jaro Water District	5,031,851.68	263 months	16,131.00	200,747.50
Merida Water District	None	None	None	None
Ormoc City Waterworks	None	None	None	None
Palompon Water District	888,068.67	24.30 months	16,658.00	526,314.30

Source: Local Water Utilities Administration.

## 6.5 Existing Practices by the LGU on Cost Recovery

### 6.5.1 Capital Cost

In the previous arrangements, the capital cost for Level I systems was free to the community. As for Level II systems, the capital cost was shouldered by the RWSA through loan or grants. Water charges collected by each association cover the cost of operation and maintenance and

loan amortization. According to the Loan Department of LWUA, the new loan disbursement to RWSAs has been stopped.

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 thirty (30) years. Less capable WDs are granted soft loans that are interest free during the first five (5) years operation. In the occasion of the first assistance by LWUA, the loan for the full investment required could be provided for the WDs.

For the expansion/rehabilitation works of the WDs, 90% of required investment may be granted by a loan and the remaining 10% shall be arranged by the equity of WDs. The cost of amortizing the loan and operation and maintenance of the system is recovered through monthly water bills. In case of LGU's operating Level III systems, the capital cost is managed by the LGU using part of DF and other financial sources (borrowings and aids).

Regarding the sanitation sector, the construction of the superstructure and the depository of household toilets is through self-help.

#### **6.5.2 Operation and Maintenance Cost**

The operation and maintenance cost for Level I and II water supply systems is envisioned to be the responsibility of the users. As such, the users shall form an organization (or association) to handle the collection of water charges.

When DPWH had been undertaking the construction of Level I water supply facilities, the DPWH through DEOs and PEOs assisted to form many BWSAs. However, most of these BWSAs are no longer functioning, due to the non-collection of water fees. As a consequence, the users had to go to the LGUs (usually barangay or municipal governments) to address the problem. In some cases, the users likewise requested the PEOs for assistance.

Although the DEO had no budget for operation and maintenance, it extended assistance in the form of materials (such as gaskets or joint pipes) from their supplies, if these items are available. Because of this situation, the emphasis was placed on the need of monthly contributions from the users for the O & M. While, some of the active BWSAs for Level I water supply collected monthly fees ranging from ₱5.00 to as much as ₱30.00 per household per month. Of the four BWSAs organized, two BWSAs depended on the barangay council for O & M,

while the other two BWSAs had association members who were trained to operate and maintain the facilities.

Cost recovery for Level III systems, particularly those covered by Water Districts is managed through different systems. The households covered by the Water District can be disconnected in case of no payment by the users.

The Water Districts of Abuyog, Metro Carigara, Baybay and Jaro are charging the higher amounts of P7.60, P9.35, P6.30 and P9.50 per cu.m., respectively. The other WDs of Isabel, Merida, Ormoc and Palompon are charging much lower amount of fees of P2.75, P3.00, P3.00 and P4.50 per cu.m, respectively. The water rate structure is based on LWUA's guidelines for capital expenditure requirements of the system for the period, and it should not exceed 5% of the low-income group's household income. Water rates are kept minimal since the Water District should be service-oriented and not profit-oriented.

## **6.6 Affordability of Users**

This sub-section presents the affordability of users by sector service level. However, base information for the analysis is limited to the results from field survey at selected barangays and from the water districts in the province.

### **6.6.1 Capital Cost Contribution**

Based on the results of the key informant survey, the respondents indicated that all the barangay councils are willing to participate in sector projects by initiating the formation of a water and sanitation association. About 99% of the respondents indicated their willingness to contribute in cash or in kind for the construction of WATSAN facilities in their respective barangays.

Referring to the group interview results for Level I and II water supply conducted in this study, majority of respondents or 67% have participated by providing labor in past water supply construction projects. Only a few (2-4% of respondents) have contributed either cash, materials or donated site. For future projects, the respondents, as a whole, were willing to participate and/or contribute for future WATSAN projects. There were a few who volunteered to participate depending on the activity to be undertaken such as in the formulation of water rates and in the selection of sites.

With respect to the construction cost of private toilet, its cost seems to be expensive as compared with the family income. The estimated cost of flush type toilet facility is about 5.47 times higher than the median monthly family income in the province and since this is the case, subsidy may be provided by the LGU concerned.

#### 6.6.2 Operation and Maintenance Cost

Based on the key informant survey for Level I services, the most common problem cited by the respondents was the absence of maintenance work for these facilities due to the lack of sufficient funds to operate and maintain WATSAN facilities. It is noted by the respondents that most barangays were recipients of financial and institutional development assistance from the provincial and municipal government. The assistance included the funds for repair and maintenance of WATSAN facilities and the provision of various training programs.

Referring to the results of the group interview survey (Level I services), about 77% of the respondents claimed it was the barangay council that shouldered the cost of O & M of WATSAN facilities. About 97% of the respondents expressed willingness to pay for the O & M of future WATSAN facilities. Of those who were willing to pay, majority or around 67% of the total respondents claimed they could pay from ₱ 6.00 to around ₱10.00. Around 29% wanted to pay water fees of below ₱5.00 only; the rest of the respondents would pay about ₱11.00 to ₱20.00 per month.

In the water districts or Level III waterworks, O & M expenses are basically covered by the user fees depending on the amount charged for water consumption by water user category. The water tariff system was established by LWUA to compel water districts to be self-sufficient, financially viable and be able to repay any loans obtained to improve water supply services.

Table 6.6.1 presents the affordability of households by service level. At present, the current water bills in the province seem to be within an affordable range based on experience, although the actual income level varies from municipality to municipality and barangay to barangay (urban barangay population have higher income than those in rural barangays, because of the more diverse economic and commercial activities).

**Table 6.6.1 Affordability in Water Supply and Sanitation Services**

Income/Level of Service	Amount (Pesos)	% to Monthly Income	Affordable Range (%) <sup>1</sup>
Median of Monthly Income <sup>1</sup>	4,201		-
Average Level III Monthly Water Bill <sup>2</sup>	63.00	1.49	5.0 or less
Average Level II Monthly Water Bill	30.00 - 50.00	0.71 - 1.19	2.0 - 3.0
Mo. Level I Expenditures	10.00	0.23	1.0 or less
Private Toilet Construction Cost - Flush Type Toilet <sup>3</sup>	23,000.00	5.47	

Notes:

<sup>1</sup> 1994 Family Income and Expenditures Survey, NSO. Average mean income is ₱51,042 annually for Leyte and median income is ₱35,944. In 1999, average mean income is ₱71,589 and ₱50,413 for the median income. For Region VIII, the mean income and median income in 1994 were ₱49,912 and ₱34,780, respectively and in 1999, the mean income is estimated to be ₱70,004 and median income is ₱48,780.75

<sup>2</sup> Data from PSPT; It is assumed that 21 cu m. will be consumed per family.

<sup>3</sup> Current prices estimated in this study

<sup>4</sup> Based on the experiences mainly from LWUA, DPWH and DILG.

Chapter

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**WATER SOURCE DEVELOPMENT**

**7**

## 7. WATER SOURCE DEVELOPMENT

### 7.1 General

The study on water source development covers the entire province in order to come up with water source potential exploitable mainly as domestic water supply. Emphasis is placed on groundwater availability due to its prevalent use and comparatively conservative development through the future in the jurisdiction of the provincial government. It is also advantageous to utilize groundwater for domestic water supply because of better quality and economical use. Nevertheless, with reference to river basin water resources management, surface water potential of major rivers was studied to provide information for the future use.

A "Groundwater Availability Map" was prepared, which identifies the areas with available potable water sources. The study has two major components: (1) interpretation of existing geologic and groundwater conditions, and (2) preparation of Groundwater Availability Map to show groundwater potential areas under three categorized areas. Furthermore, standard well specifications by municipality were also established to reflect in the medium-term sector development plan.

The major data used in the study were obtained from concerned agencies (NAMRIA, BMGS, NWRB, LWUA, DPWII and PPDO) and supplemented by the information gathered through questionnaires from relevant local offices in the field (including spring inventories with verifications). The field information directly collected by the Study Team was also used to increase the accuracy of the Map. Among the information, the Geologic Map published by BMGS, the Water Resource Investigation Report and the Well Inventory Database of NWRB are essential for the analysis of geological characteristics, projection of high yielding area and possible area with saline water intrusion, and classification of groundwater potential areas, respectively (details are referred to Table 7.1.2, Data Report).

The Groundwater Availability Map may be used for provincial level master plan and feasibility study at present. However, recommendations on the required investigations were presented for specific areas with scope of survey, as reference for LGUs, to conduct these prior to D/D and construction work. Aside from the requirements, updating the map is a requisite to gain more information on prevailing groundwater conditions using the questionnaires prepared for the study. An annual review and updating of the database will enable the LGUs to implement water source development on a project site basis.

An overview on current groundwater use with the conditions is summarized in Table 7.1.1 (well data collected from each municipality are presented in Table 7.1.1, Water Source Information, Data Report). There are 13,164 shallow wells, 1,520 deep wells and 900 developed springs in the province (functional sources). Majority of the wells is shallow wells. About 45% of these water sources are public facilities. Of the total existing wells, 2,053 shallow/deep wells are not functional at present. In addition to the above sources, 162 untapped springs are accounted.

**Table 7.1.1 Existing Groundwater Sources in the Province**

Category and Classification	Shallow Well	Deep Well	Spring	Total
1. Water source being availed				
a. Public sources	5,581	568	900	7,049
b. Privately owned sources	7,583	952	0	8,535
c. Number of water sources	13,164	1,520	900	15,584
d. % share of different sources	84%	10%	6%	100%
2. Water sources with problems and non-functional facilities				
a. Water quality problems*	5,266	0	0	5,266
b. Non-functional	1,672	381	76	2,129
3. Spring source information				
a. Undeveloped	-	-	0	0
b. Untapped	-	-	162	162

Note. 1: Number of water sources being availed at present including those with water quality problems.

2: Number of existing water sources with problems: being used, but with water quality problem/abandoned wells.

3: Number of springs availed, but not adequately protected; and those as candidate sources to be developed.

\*. Assumed number of sources (unsafe category) based on the study on existing water supply facilities in Chapter 4.

## 7.2 Geology

Volcanic mountains, the most prominent of which is Alto Peak and classified as inactive volcano, constitute the Leyte Central Highlands of the province. The volcanoes occupy present topographic highs and form rugged ridges with irregular slopes. They were extruded during the early to middle Miocene epoch with a violent late phase resulting in the deposition of agglomerates and explosive breccia along the slopes of the ridges.

Volcanic cones and associated flows are distributed along a northwest trending belt controlled by a major fault structure which runs parallel to the Philippine Rift Zone. These probably emerged contemporaneous with extensive volcanism prevalent throughout the archipelago during the Quaternary. The evolution of Biliran Island is related to this period of volcanism.

The clastic rocks and limestone are found unconformably overlying the clastic rocks with late Miocene to early Pliocene epoch. The clastic rocks occur along the eastern and western slopes of the central highlands.

The most extensive exposure of the schist body during Pre-Cretaceous period is found east of San Miguel, Alangalang and west of Babatngon. Evidences of close folding and crenulation of schistosity planes indicate a strong compressive force in an E-W direction. In cross section, these rocks occur deeper in northern Leyte and become shallower in the southern portion, until they become topographically prominent in Dinagat Island and Surigao.

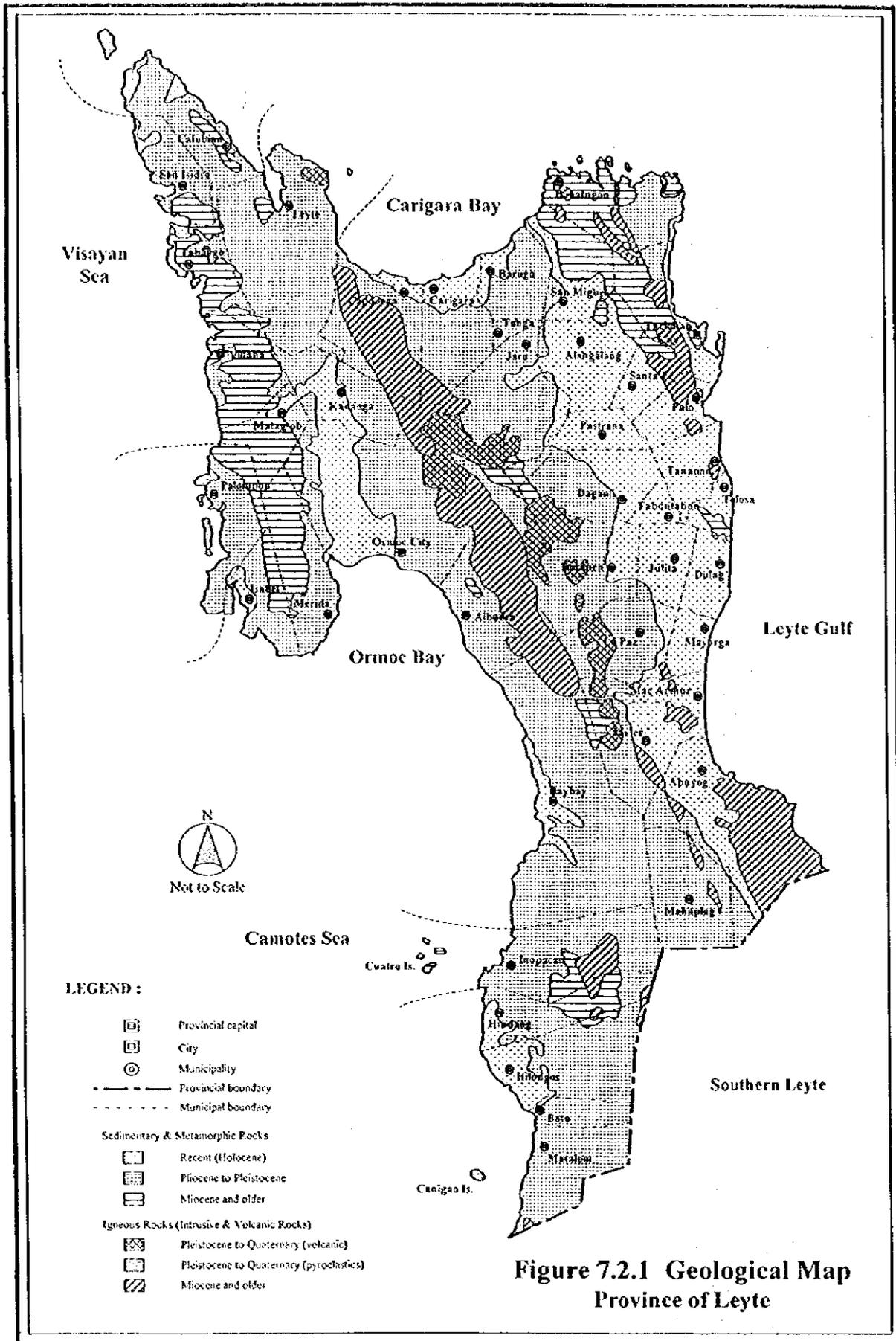
The Taaloban Volcanic of Cretaceous period generally forms rugged ridges with irregular slopes. These rocks are bounded at the eastern and southern margins by faults that crushed the rock to granular bits. At these places, it was converted to cataclasite with attendant mineral reconstitution.

Unconformably, overlying the volcanic rocks in western side of the island is corraline limestone with marly facies. It exhibits its topographic prominence in the form of north-northwest trending ridges. Solution channels and extensive caves are common features at the Palompon and Mt. Bugabuga areas.

In Leyte Valley, tuffaceous sediments are rich and are the major deposits. On the other hand, the recent deposits in Ormoc Valley are well sorted along the rivers in form with varying thickness, width and length.

On the island of Leyte, four broad lithologic classifications have been identified: (1) a schist body, (2) an igneous complex with serpentized facies of probable Cretaceous period to Oligocene epoch, (3) the sedimentary sequence equivalent to that of Samar Island during early Miocene to Pleistocene epoch, and lastly, (4) Quaternary volcanics.

For the purpose of preparing the Groundwater Availability Map of the province, only rock units significant to groundwater storage and permeability are briefly described. The rock units in the province are classified into 3 main groups based on the geologic ages. In geologic age these are; the Miocene and Older Systems, the Plio-Pleistocene Series and Recent Deposits. The grouping of rock units is related to their potential as groundwater sources. The younger rocks are essential groundwater development because of their porosity and permeability relative to the older rocks. The distribution of these rock groups is shown in Figure 7.2.1, Geological Map. Its geological features are described below.



Not to Scale

**LEGEND :**

-  Provincial capital
-  City
-  Municipality
-  Provincial boundary
-  Municipal boundary
- Sedimentary & Metamorphic Rocks**
  -  Recent (Holocene)
  -  Pliocene to Pleistocene
  -  Miocene and older
- Igneous Rocks (Intrusive & Volcanic Rocks)**
  -  Pleistocene to Quaternary (volcanic)
  -  Pleistocene to Quaternary (pyroclastics)
  -  Miocene and older

**Figure 7.2.1 Geological Map  
Province of Leyte**

### (1) Miocene and Older Systems

Rock units of Miocene and older have impermeability. They are classified as aquicludes. These rock systems are found in central highlands and two mountain systems at both eastern and western parts in the province.

Volcanic rock units of the Leyte Central Highland volcanics are porphyritic hornblende-pyroxene andesite. Major rifting along the northwest trend crushed the rock to angular fragments. The rock units of early to middle Miocene epochs generally consist of conglomerate, sandstone, and shale. In the highland areas, light to medium gray volcanics occur. In general, the rock units of middle Miocene to early Pliocene epochs are composed of tuffaceous elastics that have been greatly folded and intruded by volcanic flows and dikes.

The Tacloban Volcanic is predominantly andesitic in composition as seen from the mottled lathes of andesite. Slight sulfide mineralization within these volcanics was observed in southwest of Tacloban City. The schist bodies during Pre-Cretaceous period in eastern mountain system are composed of the epidote-actinolite-albite schist of the green schist facies. Serpentinized peridotite and gabbro intrude these rocks, which form the basement in the island. Around the western coast of the island, tar-sand marks the base of unit. These sands contain the only rock asphalt deposit in the country.

### (2) Plio-Pleistocene Series

Sedimentary rocks of this series have various range of the permeability. This formulation overlaps the older sedimentary/metamorphic/volcanic series and fringes the broad alluvial basin of Leyte and Ormoc Valley.

The rock units of Plio-Pleistocene epochs are composed of clastic rocks and limestone. The clastic rocks are made up chiefly of pyroclastic materials and a sequence of low-dipping beds of conglomerates, sandstone, and shale with limestone. The overlying limestone contains minor facies of conglomerate, sandstone and shale at its base. This limestone is white, porous, corraline and is poorly bedded to massive. The sandstone and shale bed is calcareous and exhibits cross bedding.

### (3) Recent Deposits (Holocene Series)

The Quaternary volcanics are represented by the Leyte Central Highlands such as Alto Peak (Mt. Danao) and the Mt. Cancajanag. The volcanic cone is a hornblende-pyroxene andesite characterized by a porphyritic texture with trachitic ground mass.

The recent deposits cover a broad area at the east where the southeastern extension of the Leyte Valley is located. Wide alluvial plain fringes the Leyte Gulf area. The deposit consists of unconsolidated fine sand, silt, clay with minor gravel and rich tuffaceous sediments. In Ormoc Valley, they are well sorted along the rivers in form with varying thickness, width and length.

### 7.3 Groundwater Sources

#### 7.3.1 Classification of Groundwater Availability

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

##### (1) Solo shallow well area

Solo shallow well area is defined in this study as area where only shallow well is available. These areas have water bearing rock formations extending not more than 20m in depth below the ground surface. Solo shallow well areas are usually located in alluvial and coastal plains, where recent unconsolidated materials overlies impervious rocks at shallow depth. The extent of completely solo shallow well area is limited, because most of the recent formations are thick or deposited on the Late Plio-Pleistocene series that usually have multiple aquifers located at greater depths.

##### (2) Deep well area

In deep well areas, the lower aquifers are located more than 20m below the ground surface. These areas could be found in portions underlain by the Plio-Pleistocene series and Recent formations. Most of these areas have more than one aquifer occurring at various depths. Areas where both shallow and deep wells could be developed are categorized as deep well areas.

##### (3) Difficult area

This area is not suitable for well development. The areas under this category largely consist of rock formations older than Miocene epoch. The groundwater availability in the aforesaid rocks is very low and usually released in the opened rock fractures. Springs are the common sources of water supply in these areas.

In addition to the above classification, potential areas to have high yielding deep aquifers are also presented based on NWRB's geo-resistivity survey.

### 7.3.2 Groundwater Availability in the Province

The Groundwater Availability Map is presented in Figure 7.3.1. The major databases used in the preparation of the map were obtained from BMGS and NWRB. The methodology and study procedures with respective outputs are discussed in 7.3.2, Supporting Report.

Technical information on the wells by municipality is also shown in the Data Report. The groundwater development potential areas in the province for the future are summarized.

#### (1) Solo shallow well area

The province has a few solo shallow well areas. The development of shallow wells is, however, possible in the "Deep Well Area" (recent alluvium and beach deposits), where shallow aquifers usually occur.

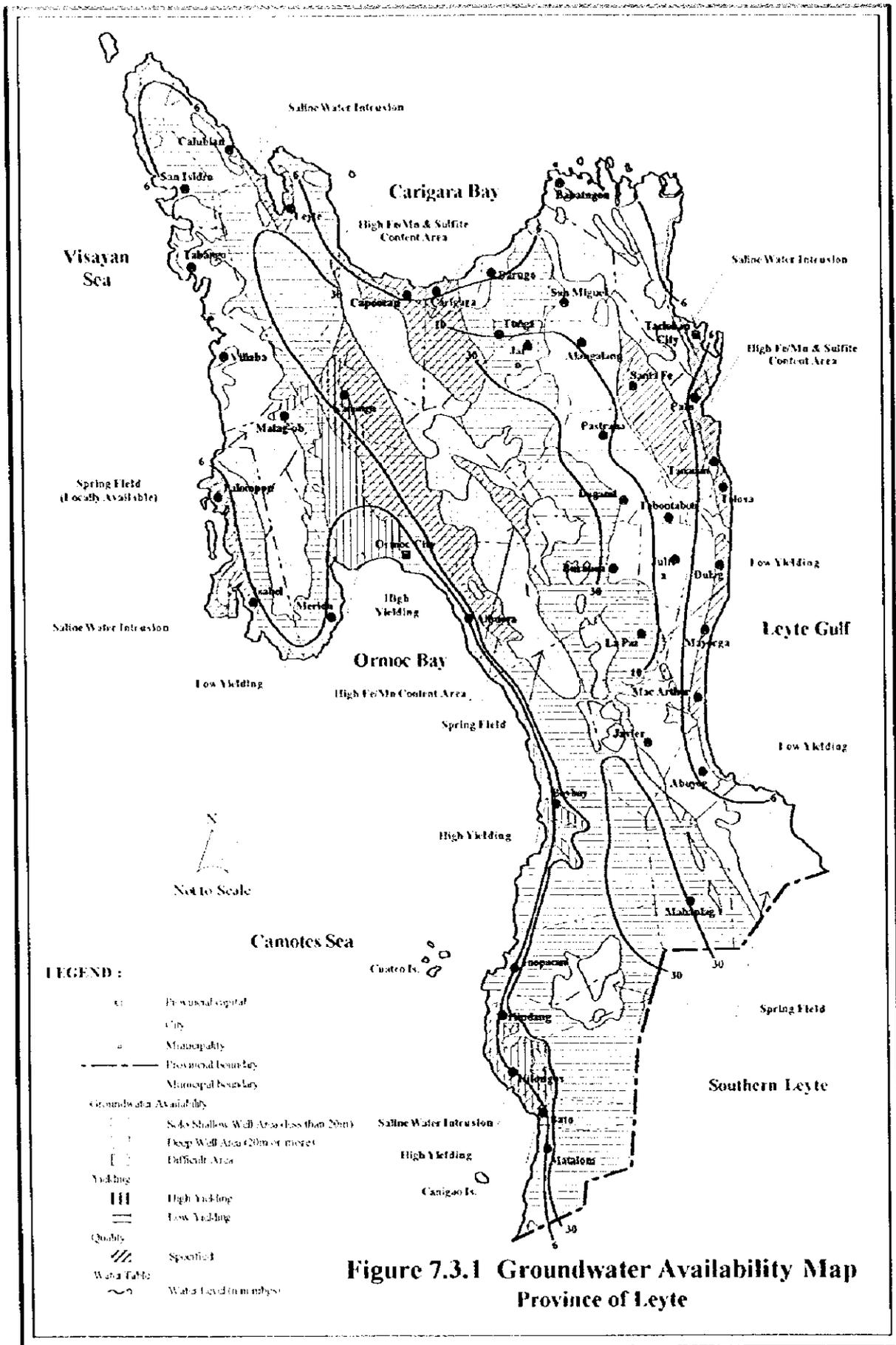
The essential definition of shallow well is to develop an unconfined aquifer. However, it is difficult to classify an aquifer clearly into whether confined or unconfined. In this study, therefore, the well classification was derived from the well depth of 20m. Hence, the shallow wells in the province are driven to depths ranging from 1.0m to 19.0m. These wells have static water levels from free flowing to 12.1 mbgs and specific capacities from 0.1 lpsm to 3.5 lpsm.

#### (2) Deep well Area

The deep well area covers approximately 65% of the province, widely distributed in western and eastern half-parts of the province – Leyte Valley and Ormoc Valley. The deep well area is composed of alluvial plain and low hills made of sedimentary rocks. The alluvial plain is composed of recent deposits of clay, silt, sand and gravel, which form a groundwater storage basin for some aquifers. While, the sedimentary formations of Plio-Pleistocene epoch consist of conglomerates, sandstone, and shale with limestone in both slopes of the central highlands of the province.

Considering the geological formation, the alluvial plain is categorized as a high potential area for deep well development, while the sedimentary rocks of Plio-Pleistocene epoch are classified as a low-yielding area for deep well development. In alluvial plain, the average depth of the existing deep wells is 33.5 m with an average water level of 7.6 mbgs. The average specific capacity is 0.8 lpsm.





In the western slope area of the Leyte Central Range made of Plio-Pleistocene series, groundwater development is not performed yet due to sufficient spring sources located near populated towns. When deep well development becomes necessary in this area, the average depth of the planned deep wells would probably be 40 m with an average water level of 20 mbgs. However, the specific capacity will be good for only Level-I service.

(3) Difficult area

About 35% of the provincial area are classified as a difficult area to exploit groundwater, in which the Leyte Central Highlands and two mountain system areas belong. These are located in the central, northeastern and northwestern portions of the province.

The geology is made up of 1) metamorphic rocks of Cretaceous period to Paleocene epoch, 2) well-compacted sediments of Oligocene to Miocene epoch including conglomerate, sandstone and shale, and 3) volcanic and igneous rocks of Oligocene to Miocene epoch. These rocks and formations are in dense, massive and consolidated conditions and have impervious characteristics. Groundwater occurs only in fissures or fault fracture zones.

### 7.3.3 Groundwater Quality

The water quality problem in deep wells is found in the Leyte and Ormoc Valley (details are referred to Table 7.3.2, Data Report). Major water quality problem is ironic and acidic groundwater. The results of water resources investigation for the province conducted by NWRB and the general information from DPWH-DEO and PPDO revealed these problem areas and are shown in the Groundwater Availability Map in Figure 7.3.1.

Among the water quality problems of the province, ironic water is serious with a high percentage of affected existing wells (about half of the numbers of deep wells) in populated area. The problem is extended to most of the areas in the municipalities of Santa Fe, Palo, Tanauan, Carigara, Capocan, Kananga, Ormoc City and Albuera. Acidic groundwater is examined mainly in the Leyte Valley. Groundwater with saline water intrusion is developed in most of seashore in the province exclusive along the Ormoc Bay. Slight sulfite groundwater was reported in the southwest of Tacloban City and the seashore area along Carigara Bay, due to mineralization within the volcanics vicinity.

#### 7.4 Spring Sources

Spring is a natural outlet of groundwater at the ground surface. It occurs when water table intersects the ground surface, usually along the contacts of pervious and impervious rock formation and through rock features. Because of the intense fracturing, particularly older formation, and the presence of large solution openings in limestone, secondary permeability is induced to the rocks that favors spring development.

For the study, springs are categorized into developed, undeveloped and untapped springs. A developed spring is utilized with sanitary protection provided, otherwise it is classified as undeveloped spring, which is considered as unsafe water source. An untapped spring, as the name implies, is unutilized and flowing in its natural state.

Based on the inventory of water sources prepared throughout the study, the province has 900 developed springs currently serving the province. Such spring sources come out from the Leyte Central Highlands and from the mountain system area in the northeastern and northwestern parts of the province. Of these springs, 164 have discharge rates of less than 2.0 lps (2.0 lps is enough for Level II water supply with service population of about 2,000 and can be applicable for small Level III water supply), while 192 springs exceed discharge rates of 2.0 lps. The other 544 developed springs have no data on discharge rates. Most of these springs are not dried up during a drought year or dry season with yields varying from 0.01 lps to 180 lps. The technical information of springs in each municipality is presented in Table 7.4.1 Existing Spring Sources, Supporting Report.

#### 7.5 Surface Water Sources

The major surface water sources in the province are Sangputan, Lingayon, Daguitan, Bito, Layog, Payonjan, Pagsanghan and Palaypay Rivers. The Dapdap, Cadacan, Baelon and Calingcaguin rivers are tributaries of the major rivers. There are 6 gauging stations at the major rivers in the province.

Surface water use in the province totaled to 29.5 m<sup>3</sup>/sec according to the NWRB's water rights registration database as of March 1997. Of this usage, 96.6% of the water rights were registered for irrigation. The diversions for major flume, which are operated by NIA, are located at Abuyog, the Cadacan and Bito Rivers; at Alangalang and Pastrana, the Lingayon River; at Burauen and La Paz, the Daguitan River; and at Ormoc City, the Pagsanghan River, respectively. Other surface water rights are lodged to waterworks and private companies for

domestic and industrial uses. For domestic water supply, the Leyte Metropolitan Water District had a registration of 1.00 m<sup>3</sup>/sec intake amount at Pastrana in 1977 from the Binahaan River for the domestic water supply. Actually, the Leyte Metropolitan Water District only utilizes river water of 0.33 m<sup>3</sup>/sec. Also, the Carigara Water District fed surface water from the Maulaog River with an amount of 0.02 m<sup>3</sup>/sec for their water supply system but there is no registration of water rights.

Data on river flow together with maintenance flow and water use of the major rivers/streams were obtained from available runoff records at the gauging stations (refer to Table 7.5.1, Supporting Report). The inflow to and the outflow from the respective municipalities are estimated as the exploitable potential of the major rivers in the province as shown in Table 7.5.2, Supporting Report.

Water quality analyses at selected rivers were conducted during this study. The examined water quality at each river meets the Class AA or A limitation of "DENR Fresh Water Quality Criteria". It is noted that mining activities on copper and chromite are prevalent in the western watersheds (municipalities of Palompon, Isabel and Merida), while manganese-mining sites are in the Bito river watershed (municipality of Javier). These operations have caused chemicals contamination to the surface water. Recently, the DENR Regional Office reviewed the reclassification of the Bao River (a tributary of Pagsanghan River) and regarded as Class C/D because of pollution from factory wastes.

## **7.6 Future Development Potential of Water Sources**

### **(1) Groundwater**

Based on the study of existing water sources, groundwater is considered as a safe and more economical source for future water supply requirements of the province.

Shallow wells are the possible source for Level-I service. Considering the existing wells in the province, the potential aquifers for shallow wells occur between 1.0 to 19.0 mbgs. One disadvantage of shallow wells is the lowering of water level during dry season that reduces the discharge of the wells. Another disadvantage is the usual high susceptibility of shallow aquifers to direct infiltration of surface pollutants.

In general, deep wells have better water quality and invariable yields when developed with appropriate technology. This depends if the wells tap to comparatively deeper aquifer. It reduces the hazards of groundwater pollution. In addition, lowering of ground-

water level does not affect the discharge, since usual confinement of deep aquifer rises water level above the aquifers. In Recent deposits and Plio-Pleistocene series, good aquifers apparently occur from 20 mbgs to 100 mbgs.

Additional wells can still be developed to meet future water supply demand of the province. For future planning purpose, the Groundwater Availability Map includes basic information for municipal groundwater development with the following information: well type, well yield, water quality and static water level. Aquifer formations are shown in Table 7.6.2, Supporting Report. The groundwater development potential in the province is shown in Table 7.6.1.

The well design with gravel placement is required for additional well development. However, the natural gravel packed well for Level-I water supply is also adaptable within limited areas in the province. The percentages of the natural gravel packed wells in the expected municipality area are assumed in Table 7.6.3, Supporting Report. The construction ratio of natural gravel packed well to the total requirements of the province is assumed merely at 5%.

Most of the Level-I deep well facilities had been designed with well materials made of either galvanized iron, mild steel or low carbon steel. In the area where groundwater with acidic pH is observed, anti-metallic (polyvinyl chloride; PVC) for well casing pipes and screens, and anti-corrosive metals (stainless steel; SUS) for pump facility are required. The municipalities requiring such countermeasures are recommended in Table 7.6.4, Supporting Report. The ratio of deep wells using PVC materials to the total requirements of the province is assumed at more than 15%.

## (2) Spring

A total of 162 untapped spring sources identified by the PSPT is listed in Table 7.6.5 Untapped Spring Source Identification, Supporting Report. The list includes detailed data on barangay name, owner, discharge rate in dry season, transmission line length and relative elevation between spring source and served area. Such springs are mainly located in the central highlands, and mountain systems in northeastern and northwestern parts of the province. Other areas have few untapped springs. Of these springs, 153 untapped springs with discharge rates ranging from 0.5 lps to 84 lps (actual data base) are generally applicable for Level-II water supply. Spring development potential in the province is shown in Table 7.6.5, Supporting Report.

Table 7.6.1 Groundwater Development Potential in the Province

Area	Groundwater Development Potential	Water Quality	Area Feature
Eastern Mountain System	Most area of this district is classified as difficult area and there is a deep well area along the seashore belt. There are locally possible areas of fissure groundwater development in Babatngon. Spring sources are found but their discharge rates are mostly small.	Saline water intrusion is found in seashore areas. Areas where groundwater has high Fe and sulfite contents are observed in deep well areas.	This district is a mountainous area and covers the whole municipality of Babatngon, Tacloban City, the eastern parts of San Miguel, Alangalang, Santa Fe and Palo.
Leyte Valley	This district is classified as a deep well area. There are numerous spring sources on the eastern slope side of the Central Leyte Highlands Range. Low yielding deep well area is observed in the western half side of the Central Highlands Range. Most part of this deep well area is occupied by groundwater problems in terms of quality and quantity.	Saline water intrusion is found in areas facing Leyte Gulf. Groundwater with high Fe/Mn and sulfide contents bears near eastern and western mountains. The pH value indicates acidic in most areas.	This district is plain with small-scale plateau between the central highlands and the northeastern mountain system. This area passes through Carigara at north-end and Abuyog at south-end, and faces Carigara Bay and Leyte Gulf.
Central Highlands Range	This district is classified as a difficult area. Potential water source is spring located in the piedmont areas of Alto Peak and Mt. Maganhan. Many clean surface water sources (including Lake Danao) originated from this mountain range and most of them flow to Leyte Valley.	Spring sources are potable.	There are volcanic cones and associated flows distributed along the northwest trending belt controlled by major fault structures.
Ormoc Valley, & Baybay and Hilongos Plains	Most area of this district is classified as a deep well area. Three areas with high yielding deep wells are observed in Ormoc City and the municipalities of Baybay and Hilongos. Free flowing deep wells are found in Ormoc City and the municipality of Hindang.	Groundwater quality with high Fe/Mn contents is observed in areas along the Central Highland Range. Chemicals of fertilizers and waste liquid are potential pollutants in Ormoc Valley.	This district is lowland area between Leyte and Ormoc City, and the seashore area up to Matalom.
Western Mountain System	Most of this district is classified as a difficult area. Solo shallow well areas are found in small plain areas along the western seashore. Spring is a major potential source in this mountain system.	Saline water intrusion is reported in the municipalities of Palompon and Isabel.	This district is located in the northwestern mountain system fronting the Visayan Sea.

### (3) Surface Water

The potential surface water volume exploitable from major rivers for the use of domestic water supply was estimated by municipality. It was arranged in this calculation to ensure maintenance flow of the rivers under the drought flow in the 10-year return period with due consideration of the present water rights.

The calculation results are shown in Table 7.5.2, Supporting Report. In particular, municipalities situated in the Layog and Pagangahan River basins are privileged to use larger amount of river water.

Lake Danao on the southern slope of the Alto Peak is a potential surface water source. This lake is probably a dammed lake caused by mudflow from Alto Peak's eruption. It has a catchment area of about 6.5km<sup>2</sup> and a water level of 560 masl. The Leyte Metropolitan Water District draws surface water of 0.28 m<sup>3</sup>/sec from the downstream of the lake. The feasibility study on surface water development in Binahaan river basin was conducted by LWUA in 1991. The available river water to be further developed was estimated at more than 1.00 m<sup>3</sup>/sec. The river water quality was examined and classified into Class AA based on the DENR water quality criteria for fresh water.

## 7.7 Water Source Development for Medium-Term Development Plan

For the preparation of the medium-term development plan in terms of water source development, standard specifications of wells by municipality were prepared. The parameters, such as: proportion of well type, well depth, static water level and specific capacity are shown in Table 7.7.1. These were established using the well information from NWRB and the province (detailed database is included in Table 7.1.1, Data Report), and the hydrogeological assessment presented in Table 7.6.2, Supporting Report.

Groundwater source availability (well and spring) is reflected in Table 7.7.1 that was assumed based on water sources study considering the limited information on geology, topography, water sources inventory, etc. The groundwater source availability indicates the general profile of the different types of groundwater source available in the municipalities. Hence, the descriptions have no projected meaning on future development values of its groundwater source. Considering the present water sources utilization, the percentages of spring development compared with well development for the future demand of the entire province are studied in Chapter 8 of this report.

Shallow wells are currently used in some municipalities. The municipal areas are categorized into deep well and solo shallow well areas considering the on-going practices. The proportions (%) by deep well and shallow well area are determined with reference to groundwater development potential in the Groundwater Availability Map. Furthermore, well locations are assumed in terms of rural and urban areas by municipality using the classification of rural and urban barangays.

For municipalities without any well data, the well parameters are estimated using the data of adjoining towns, provided they have similar hydrogeologic features.

**Table 7.7.1 Standard Specification of Wells by Municipality**

Municipalities With Classification	Type	Type	Proportion (%)	Standard Specification			Availability of Sources
				Depth Range (m)	SWL (m)	Sp. Cap. (lpsm)	
Abuyog	Rural	SW	-	<D<	-	-	Fair DW and Few SP
		DW	30	80	<D<	0.4	
	Urban	SW	-	<D<	-	-	
		DW	10	80	<D<	0.6	
Alangalang	Rural	SW	-	<D<	-	-	Good DW and Poor SP
		DW	90	20	<D<	100	
	Urban	SW	-	<D<	-	-	
		DW	100	20	<D<	100	
Albuera	Rural	SW	-	<D<	-	-	Fair DW and Rich SP
		DW	30	24	<D<	32	
	Urban	SW	-	<D<	-	-	
		DW	100	24	<D<	32	
Babatngon	Rural	SW	-	<D<	-	-	Risky DW and Few SP
		DW	40	20	<D<	25	
	Urban	SW	-	<D<	-	-	
		DW	-	<D<	-	-	
Barugo	Rural	SW	-	<D<	-	-	Good DW and Poor SP
		DW	100	20	<D<	61	
	Urban	SW	-	<D<	-	-	
		DW	100	20	<D<	61	
Bato	Rural	SW	-	<D<	-	-	Fair DW and Few SP
		DW	100	20	<D<	48	
	Urban	SW	-	<D<	-	-	
		DW	100	20	<D<	48	
Baybay	Rural	SW	-	<D<	-	-	Good DW and Few SP
		DW	90	40	<D<	-	
	Urban	SW	-	<D<	-	-	
		DW	100	40	<D<	-	
Burauen	Rural	SW	-	<D<	-	-	Fair DW and Few SP
		DW	50	80	<D<	-	
	Urban	SW	-	<D<	-	-	
		DW	100	40	<D<	-	
Calubian	Rural	SW	-	<D<	-	-	Fair DW and Few SP
		DW	80	80	<D<	-	
	Urban	SW	-	<D<	-	-	
		DW	50	40	<D<	-	

Table 7.7.1 Standard Specification of Wells by Municipality

(cont'd)

Municipalities With Classification	Type	Type	Proportion (%)	Standard Specification			Sp. Cap. (lpsm)	Availability of Sources
				Depth Range (m)	SWI. (m)			
Capoocan	Rural	SW	-	-	<D<	-	-	Good DW and Few SP
		DW	20	80	<D<	-	0.2	
	Urban	SW	-	-	<D<	-	-	Good DW and Poor SP
		DW	90	40	<D<	-	0.9	
Carigara	Rural	SW	-	-	<D<	-	-	Good DW and Poor SP
		DW	90	40	<D<	80	12	
	Urban	SW	-	-	<D<	-	-	Good DW and Poor SP
		DW	100	40	<D<	80	12	
Dagami	Rural	SW	-	-	<D<	-	-	Good DW and Few SP
		DW	90	20	<D<	40	3	
	Urban	SW	-	-	<D<	-	-	Good DW and Poor SP
		DW	100	20	<D<	40	3	
Dulag	Rural	SW	-	-	<D<	-	-	Good DW and Poor SP
		DW	90	48	<D<	80	ff	
	Urban	SW	-	-	<D<	-	-	Good DW and Poor SP
		DW	100	48	<D<	80	ff	
Hilongos	Rural	SW	-	-	<D<	-	-	Good DW and Few SP
		DW	90	20	<D<	40	5	
	Urban	SW	-	-	<D<	-	-	Good DW and Few SP
		DW	100	20	<D<	40	5	
Hindang	Rural	SW	-	-	<D<	-	-	Good DW and Few SP
		DW	60	24	<D<	40	8	
	Urban	SW	-	-	<D<	-	-	Good DW and Few SP
		DW	100	24	<D<	40	8	
Inopacan	Rural	SW	-	-	<D<	-	-	Fair DW and Few SP
		DW	50	40	<D<	-	-	
	Urban	SW	-	-	<D<	-	-	Fair DW and Few SP
		DW	100	40	<D<	-	-	
Isabel	Rural	SW	-	-	<D<	-	-	Fair DW and Few SP
		DW	40	30	<D<	40	6	
	Urban	SW	-	-	<D<	-	-	Fair DW and Few SP
		DW	100	30	<D<	40	6	
Jaro	Rural	SW	-	-	<D<	-	-	Fair DW and Few SP
		DW	80	33	<D<	40	-	
	Urban	SW	-	-	<D<	-	-	Fair DW and Few SP
		DW	100	33	<D<	40	-	
Javier	Rural	SW	-	-	<D<	-	-	Fair DW and Few SP
		DW	60	24	<D<	45	5	
	Urban	SW	-	-	<D<	-	-	Fair DW and Few SP
		DW	50	24	<D<	45	5	
Jubita	Rural	SW	-	-	<D<	-	-	Good DW and Few SP
		DW	100	38	<D<	90	17	
	Urban	SW	-	-	<D<	-	-	Good DW and Few SP
		DW	100	38	<D<	90	17	
Kananga	Rural	SW	-	-	<D<	-	-	Good DW and Poor SP
		DW	80	24	<D<	80	13	
	Urban	SW	-	-	<D<	-	-	Good DW and Poor SP
		DW	100	24	<D<	40	13	
Lapaz	Rural	SW	-	-	<D<	-	-	Fair DW and Few SP
		DW	90	20	<D<	80	5	
	Urban	SW	-	-	<D<	-	-	Fair DW and Few SP
		DW	100	20	<D<	40	5	

Table 7.7.1 Standard Specification of Wells by Municipality

(cont'd)

Municipalities With Classification		Type	Proportion (%)	Standard Specification			Availability of Sources	
				Depth Range (m)	SWL (m)	Sp. Cap. (lpsm)		
Leyte	Rural	SW	-	-	<D<	-	-	Fair DW and Few SP
		DW	90	24	<D<	36	3	
	Urban	SW	-	-	<D<	-	-	
		DW	100	24	<D<	36	3	
Mac Arthur	Rural	SW	-	-	<D<	-	-	Fair DW and Poor SP
		DW	80	43	<D<	56	24	
	Urban	SW	-	-	<D<	-	-	
		DW	90	43	<D<	56	24	
Mahaplag	Rural	SW	-	-	<D<	-	-	Fair DW and Rich SP
		DW	90	24	<D<	100	6	
	Urban	SW	-	-	<D<	-	-	
		DW	100	24	<D<	80	6	
Matagob	Rural	SW	-	-	<D<	-	-	Poor DW and Few SP
		DW	10	80	<D<	-	-	
	Urban	SW	-	-	<D<	-	-	
		DW	40	40	<D<	-	-	
Matalom	Rural	SW	-	-	<D<	-	-	Fair DW and Few SP
		DW	90	20	<D<	40	3	
	Urban	SW	-	-	<D<	-	-	
		DW	100	20	<D<	40	3	
Mayorga	Rural	SW	-	-	<D<	-	-	Good DW and Poor SP
		DW	90	20	<D<	80	4	
	Urban	SW	-	-	<D<	-	-	
		DW	100	20	<D<	40	4	
Merida	Rural	SW	-	-	<D<	-	-	Good DW and Few SP
		DW	30	27	<D<	53	4	
	Urban	SW	-	-	<D<	-	-	
		DW	100	27	<D<	53	4	
Palo	Rural	SW	-	-	<D<	-	-	Fair DW and Poor SP
		DW	60	40	<D<	-	-	
	Urban	SW	-	-	<D<	-	-	
		DW	40	40	<D<	-	-	
Patompon	Rural	SW	-	-	<D<	-	-	Fair DW and Few SP
		DW	60	25	<D<	40	22	
	Urban	SW	-	-	<D<	-	-	
		DW	80	25	<D<	40	22	
Pastrana	Rural	SW	-	-	<D<	-	-	Good DW and Few SP
		DW	100	20	<D<	40	3	
	Urban	SW	-	-	<D<	-	-	
		DW	100	20	<D<	40	3	
San Isidro	Rural	SW	-	-	<D<	-	-	Fair DW and Few SP
		DW	60	30	<D<	100	12	
	Urban	SW	-	-	<D<	-	-	
		DW	40	30	<D<	100	12	
San Miguel	Rural	SW	-	-	<D<	-	-	Good DW and Few SP
		DW	30	24	<D<	40	3	
	Urban	SW	-	-	<D<	-	-	
		DW	80	24	<D<	40	3	
Santa Fe	Rural	SW	-	-	<D<	-	-	Good DW and Few SP
		DW	30	40	<D<	-	-	
	Urban	SW	-	-	<D<	-	-	
		DW	90	40	<D<	-	-	

Table 7.7.1 Standard Specification of Wells by Municipality

(cont'd)

Municipalities With Classification		Type	Proportion (%)	Standard Specification			Availability of Sources	
				Depth Range (m)	SWL (m)	Sp. Cap. (lpsm)		
Tabango	Rural	SW	10	6 <D<	18	3	0.2	Poor DW and Few SP
		DW	20	80 <D<	-	-	0.2	
	Urban	SW	60	6 <D<	18	3	0.2	
		DW	-	- <D<	-	-	-	
Tabontabon	Rural	SW	-	- <D<	-	-	-	Good DW and Few SP
		DW	100	35 <D<	40	-	0.4	
	Urban	SW	-	- <D<	-	-	-	
		DW	100	35 <D<	40	-	0.6	
Tacolban City	Rural	SW	-	- <D<	-	-	-	Poor DW and Few SP
		DW	10	40 <D<	-	-	0.4	
	Urban	SW	-	- <D<	-	-	-	
		DW	40	40 <D<	-	-	0.6	
Tanauan	Rural	SW	-	- <D<	-	-	-	Good DW and Poor SP
		DW	90	20 <D<	40	3	0.4	
	Urban	SW	-	- <D<	-	-	-	
		DW	40	20 <D<	40	3	0.6	
Tolosa	Rural	SW	-	- <D<	-	-	-	Good DW and Poor SP
		DW	50	40 <D<	-	-	0.4	
	Urban	SW	-	- <D<	-	-	-	
		DW	60	40 <D<	-	-	0.6	
Tunga	Rural	SW	-	- <D<	-	-	-	Good DW and Few SP
		DW	100	20 <D<	40	6	0.2	
	Urban	SW	-	- <D<	-	-	-	
		DW	100	20 <D<	40	6	0.4	
Villaba	Rural	SW	10	5 <D<	18	4	0.2	Poor DW and Few SP
		DW	-	- <D<	-	-	-	
	Urban	SW	60	5 <D<	18	4	0.2	
		DW	-	- <D<	-	-	-	

Note: The mark of "ff" in the column of SWL means free flowing well.

For the furtherance in collecting accurate information to design the concrete specifications of the planned wells, the following recommendations are made (details are referred to Chapter 7.7.1, Supporting Report). Prior to the detailed design or pre-construction stages, additional detailed groundwater investigations entailing the construction of test wells shall be conducted. The municipalities that fall on this group are Alangalang, Pastrana, Dagami, Tabontabon, Jutila and Kananga. Table 7.7.2 summarizes these requirements.

**Table 7.7.2 Detailed Groundwater Investigation Required**

Municipality	Area	Investigation Activities and Specification
Alangalang, Pastrana, Dagami, Tabontabon and Julita	Urban	Groundwater Database; Parameters include geologic log, well structures, SWL, discharge and water quality Electric Prospecting; Sounding Depth and Points; 200 m x 50 points Test Wells; five deep wells depths of 50m to 150m, diameter of 150 mm and length of well screen 15m and 25m Installation of Test; Pumping Test & Water Quality Examination Water Quality Examination to include Fe, Mn, pH, SO <sub>4</sub> , etc.
Kananga (Ormoc City)	Urban	Groundwater Database; Parameters include geologic log, well structures, SWL, discharge and water quality Hydraulic Database; Parameters include of precipitation, river flow and river water quality Test Wells; One deep wells (to be observation well) depths of 100m, diameter of 200 mm and length of well screen 20m Installation of Test; Pumping Test & Water Quality Examination Water Quality Examination to include pH, SO <sub>4</sub> , N, P, Hg, etc.

Groundwater development for water supply in urban areas (Level-II and -III systems) may require the construction of deep wells with larger casing diameter of 6 inches or more to ensure larger production rates. In these cases, short spacing intervals between the adjacent wells often cause the well interference due to the large lowering of pumping water level when the adjacent wells are operated simultaneously in a longer period. As the remedy of the problem pump-operation with excess electric consumption and deterioration of deep well life may be obliged. Thus, appropriate spacing interval and number of wells to be constructed per km<sup>2</sup> shall be considered. Table 7.7.1, Supporting Report presents reference information on spacing arrangements for planned wells.

Spring sources, proposed by barangay level, for future developments are shown in Table 7.6.4, Supporting Report. They shall also be investigated to confirm the development possibility in the following items: (1) location and type of spring sources, (2) fluctuation of discharge rates throughout the year, (3) distance from spring sources and proposed served areas, and (4) elevation differences between the two points.

There is no possibility to develop potable groundwater using well or spring in the western islets, namely Canigao, Himokilan, Apid, Dijo, Malingin and Dawahon. These islets are populated compared with other small islets. Improved rainwater collector facility will be considered for the future plan with items of roof materials, reservoir with sand filtration and chlorination system.