5.7.3 Financial Aspect

(1) Budgetary Allocation to the Sector

Due to limited resources of the province, it has to prioritize projects that require capital allocation in the budget. The GOP recently issued an administrative order directing all government agencies, government corporations, and units (including LGUs) to implement austerity measures, i.e. to limit government spending and to cut capital outlays in order to mitigate the negative effect of the peso devaluation. In view of the high social impact of the WATSAN sector however, the province gives the sector funding priority.

Projects being programmed for implementation in the Annual Implementation Plan are those funded only by the 20 % Development Fund for the very reason that the AIP forms part of the General Fund Annual Budget. However, in the Local Development Investment Program (LDIP) whish is a component of the Comprehensive Development Plan all the projects funded by the NLA's and municipalities find its way to the document to include the WATSAN sector.

(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 limitation that the province encounters is the lack of information by which it could access other financing options.

External assistance experienced by the province for the sector comes from foreign assisted projects in the past, although participation of the province in projects of foreign funding for the sector was minimal. But with the devolution of the sector, the LGUs, pursuant to the LGC, its participation has increased. Before the devolution of the sector, the province was a beneficiary of foreign assisted projects through central agencies. After the devolution, the province became a direct recipient of foreign grants.

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

During the period when the DPWH was still constructing Level I water supply facilities, the DPWH itself formed many BWSAs. A few of the BWSAs are still active and are collecting monthly fees. Most however are no longer functioning and therefore no longer collecting water fees. As a consequence, the users have to ask the government (usually barangay or municipal) to solve the problem. In some cases, the users still approach the DPWH for assistance. Although the DPWH has no budget for operations and maintenance, it extends assistance in the form of materials (such as gaskets or joint pipes) from their supplies, if these are available.

Recovery of the capital cost in the Sector is dependent on how the community or the beneficiaries perceive 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. For financing capital expenditures, a sense of ownership of the facilities can be achieved by asking the beneficiaries to contribute their labor when building the facility. This will translate to a sense of responsibility for the sustainability of the system.

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 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. For bigger projects, the LGU taps the PEO. For WATSAN projects, if the barangay is not able to finance the project from its own funds, the BDC endorses the project to the municipality. If the municipality has available funds, it finances the said project. This is in addition to providing technical and material support. If the municipality has no funds, the request is elevated to the provincial government.

The municipality, through the MPDO, prepares municipal development plans and formulates an integrated economic, social and physical development plan. It identifies and prioritizes water projects and secures the necessary funding. The MEO provides technical services such as investigation and survey, engineering design, feasibility studies, and

project management. It is also responsible for the organization and training of the BWSAs within the administrative boundary.

(2) Experiences in project implementation

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

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

There are LGU waterworks providing Level III water supply systems besides the WDs providing water supply services to their franchise areas. 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 the 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 Southern 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: i) The interviews undertaken with LGU officials during the study period; ii) The answers to the CD/GAD Questionnaire distributed to select provincial and municipal officials involved in sector development; iii) 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 iv) Other documents 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: i) The Result of the Group Interview Survey (details are referred to the Supporting Report); ii) The Result of the Barangay Key Informant Survey; and iii) The results of studies conducted on CD by the national/regional/provincial agencies.

Due to time limitation, only two barangays were made to participate in the group interviews and three barangays in the key informant survey. But the results of these group interviews and surveys 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 prob-

lems 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 21st 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. One such project was the FW4SP, implemented in Southern Leyte from 1992-1997, which was a collaboration of several agencies such as the DILG, PEO, PHO, PPDC DPWH and non-government organizations. Another was UNICEF'S Water for Life project, implemented in 1997-1998.

5.8.3 Assignment of CD Specialist to Sector Projects

There is no unit within the PPDO and the PHO that is responsible for conducting or implementing community development (CD) for the WATSAN sector. There is also no staff member who has been assigned to do CD work, particularly for the WATSAN sector, because of the lack of budget and plantilla for the purpose.

Generally, the MPDO and the MHO in the municipalities do not have a CD unit to undertake barangay-level community development work for the WATSAN sector. The municipality of Malitbog, however, is an exception where both the MPDO and the MHO have units that undertake and implement CD work. There is also a staff member assigned to undertake such CD work, although he/she is not assigned solely for the WATSAN sector because of the lack of a plantilla and/or the budget for said position.

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 said undertaking, 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 National Economic Development Authority (NEDA) Region VIII sometime in 1997 entitled: "Community Organization and Organizational Development Course." This was attended by some PPDO and a few municipalities' MPDO staff members. As for the PHO, training on CD has been limited to trainors' training on BWSA organization and the WATSAN Training for the Provincial Task Force conducted in 1998 by the DILG.

Likewise, only a few municipalities have had their MPDO personnel trained on CD. One such municipality is Malitbog, whose MPDC attended the "Training of Barangay Leaders on Community Organization for Child Survival, Development and Protection" conducted by the UNICEF, the MUDA and MMIAC in 1992.

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 government considers non-government organizations or NGOs as partners in development in Southern Leyte. Most of these NGOs' expertise, however, are focused on agriculture, livelihood and rural improvement. Only one has been identified which can be tapped to do work for sector related projects. This NGO is known as CONSOLE, headed by Mr. Fred Alvarez, whose experience in community organizing can be utilized in CD groundwork needed for the WATSAN sector

In any case, the different NGOs currently working in the province are known to have wide experience in dealing with the grassroots levels; they have knowledge of strategies on how to enter a community and blend with the local people. The provincial officials believe that tapping the assistance of other NGOs will not be difficult for the sector. The list of NGOs that have a track record of doing work in the province is updated on a yearly basis (refer to the Supporting Report for the List of NGOs and CBOs for Southern 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. 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 are 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

The typical CD work for the sector is a carry over from the manner it was done in past WATSAN programs. This includes the formation of the water supply and sanitation association that follow 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 called for the purpose. The BWSA/RWSA was tasked to operate and maintain the water supply and sanitation facilities. Their members are given different types of training, such as pre-organizational teach-ins, pre-operational and post completion training and operation and maintenance seminars.

According to the PHO, their typical CD work begins with identifying the potential leaders of the community. Next is coming up with a community profile that would indicate the resources of the barangay. Then the community's problems and needs are identified. It is

important, said the PHO, to "get the full trust and confidence of the people in the community" such that one must continuously be with the people and understand their way of life. The CD work to be completely successful should include regular education on health and sanitation as well as various skills and leadership training.

In the result of the Barangay Key Informant Survey among the barangay officials and other community heads, it was found out that the barangay councils are willing to participate in sector projects specifically on the operation and maintenance of WATSAN facilities. The barangay councils are 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 such 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.

In a few municipalities, 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, 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 PHO and its municipal counterpart. These offices have their own health and sanitation education programs collaborated in by PPDO, MPDO, DECS, DSWD/MSWD, DILG, and various NGOs. Other units that assist in health and hygiene education up to the barangay level are the RHU)s, the nutrition scholars, the CIDSS workers, the food handlers and the barangay health workers.

Two programs being implemented by the PHO that have health and sanitation education components are the Primary Health Care (PHC) and the Environmental Health and Sanitation Programs. Printed fliers are distributed to the target audiences, augmented by community assemblies, house-to-house and school visits to discuss health-related matters. The PHO, together with the municipal/barangay staff, also sponsors formal discussions through the Mothers' Class and Food Handlers' Class.

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 Southern 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: i) The interviews undertaken with LGU officials during the study period; ii) The answers to the CD/GAD Questionnaire distributed to select provincial and municipal officials involved in sector development; iii) The Result of the Barangay Key Informant Survey for Southern Leyte administered to the officials of the select local communities; iv) The Result of the Group Interviews for Southern Leyte conducted at the barangay level; and v) 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 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 has been 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 and 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

The province of Southern Leyte is aware of gender and development where some of the provincial and municipal officials have already undergone gender sensitivity training. The inclusion or utilization of gender sensitive approach to planning of WATSAN projects has been limited, however, more on the health, sanitation and hygiene projects.

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 34 females and 23 males, the majority of whom belong to the 26-45-age bracket. The majority of the interviewees received elementary education, where the females outnumbered the male in this level. Some of the respondents graduated from high school, again with more females graduating as compared to the male. Of the very few who completed college, four were males and three were females. The occupation of a big majority of the male respondents is farming/fishing while that of the female respondents is being a laborer.

In the two barangays surveyed for the group interviews, the total number of barangay council members is 14. Of this number, 10 were males and 4 females. All barangay captains are male.

<u>On the formation/composition of the BWSA/RWSA and WD Board:</u>

The key informants in three barangays indicated that there was no BWSA/RWSA in their respective barangays although each of the three barangays has a committee on water and sanitation within the barangay council.

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.

<u>On participation in WATSAN training:</u>

Only 35% of the respondents (13 females and 7 males) were able to attend training programs for the year 1998. As for sector-related training, all the female respondents said they were not aware of or did they attend any training for the same period; while half of the male respondents were aware of the caretakers' training, finance/collection and re-

pair/O&M training. All the male respondents were interested to attend training programs for the WATSAN sector compared to only less than half of the female respondents. Females were spilt between a one-day training and a more-than-three-day training schedule; while all the male interviewees said that about 3 days is the desirable training period.

On participation in health and hygiene:

While all those interviewed recognized the importance of good health and hygiene education, only two out of 23 males and nine out of 34 females attended any training on said topic. On water-related illnesses, it was found out that women were more afflicted than men with diseases such as diarrhea, kidney trouble, and skin diseases.

On participation in operation and maintenance:

For future projects, the respondents showed varying degrees of their willingness to participate. Less than half of both the male and female respondents said that they would participate in operating and maintaining the WATSAN facilities. Only the male respondents indicated the type of contribution for future facilities, which is provision of labor and materials. The female respondents were generally non-responsive. Most of the females were uncertain as to who was responsible for minor repairs on the facilities, while the male interviewees indicated that it was mostly the male members of the community.

(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 22 female respondents, the wife was still the one responsible for fetching water. Only 10 female respondents said that the husband helped. The male child helped in the task, according to 13 female respondents; but for another nine female respondents, the female children also assisted in fetching water from source to home. For 19 male respondents, it was the husband was the one responsible for hauling drinking water for family use, although six of them admitted that the wife assisted in this task. Ten male respondents pointed to their male children in being equally responsible for fetching water, although another four 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 of DPWH, DOH, LWUA, DILG and NSO. Other agencies, including NEDA and LGUs, use data from these agencies. These agencies runs its own project and/or activity-monitoring system largely 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 (CPH).

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 lim-

ited 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

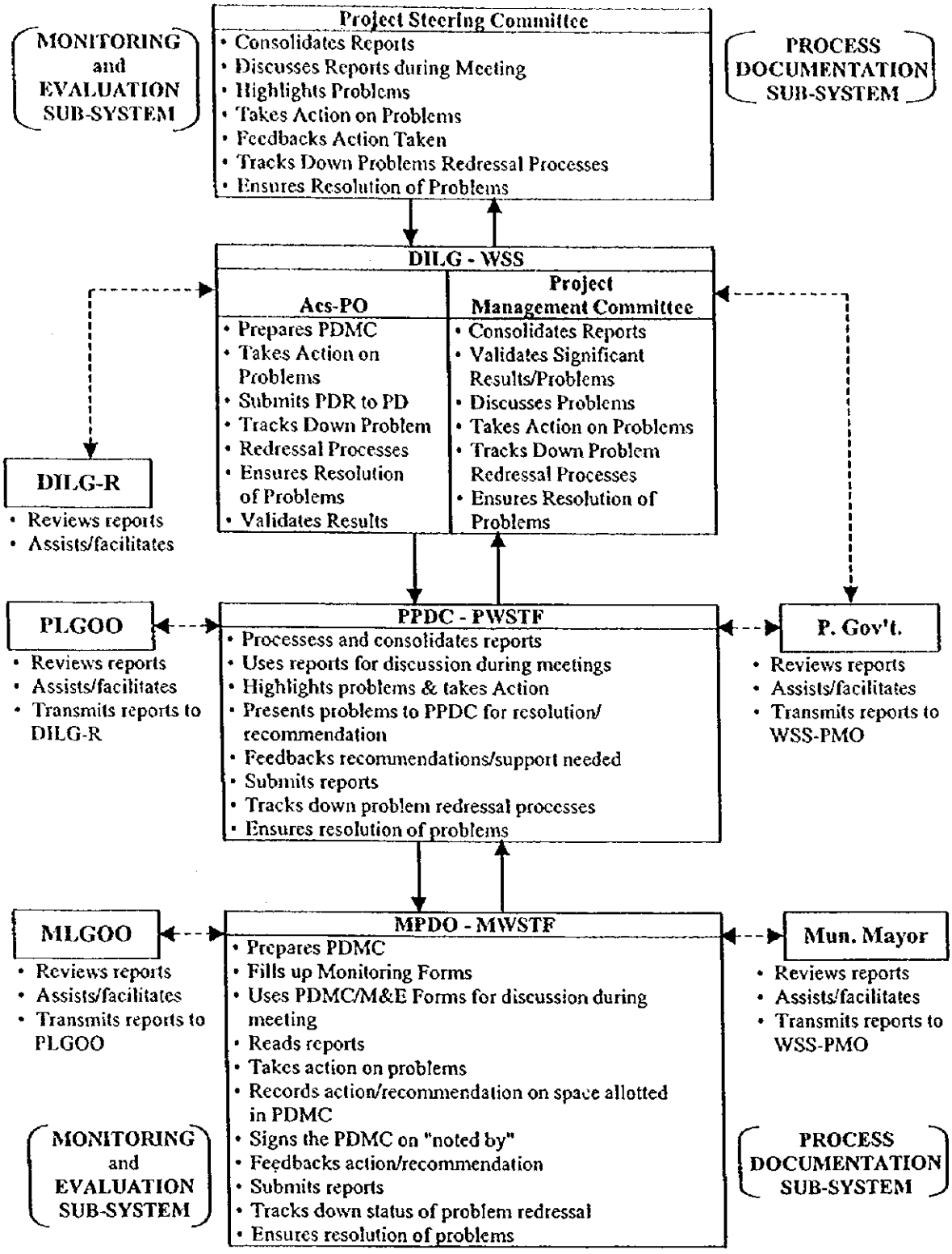


Figure 5.10.1 UNDP Monitoring Mechanism

Chapter 6

PAST FINANCIAL PERFORMANCE IN WATER SUPPLY AND SANITATION

6. PAST FINANCIAL PERFOMANCE 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 seek 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 nineteen (19) municipalities have not submitted their income and expenditures data in the same period (1995 to 1998).

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 3rd fiscal year preceding the current fiscal year and is shown as follows: 1st year of effectivity of the LGC of 1991 – 30% (1992), 2nd year (1993) – 35% and on the 3rd 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 1st 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 1.98% of the total income of the province.

(c) Grants, Aids and Subsidies – the province have received technical assistance grants from the ADB and other multi-lateral financial institutions.

(d) Other Income – there are no economic enterprises, but receives income from various fees and charges on private sector operations.

Based on the Local Government Code of 1991, 40% of the national internal revenue taxes of the 3rd fiscal year preceding the current year (from 1994 onwards) is allocated to 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 Southern Leyte during the period of 1995-1999. Local tax revenues, which were only 1.98% 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 95.12%, which indicates that the province has historically been dependent on the IRA with its low tax and non-tax revenue collections.

The provincial government has no economic enterprises, but it receives municipal income, not on a regular basis from fees and charges from small-scale mining as well as from sand and gravel operations.

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

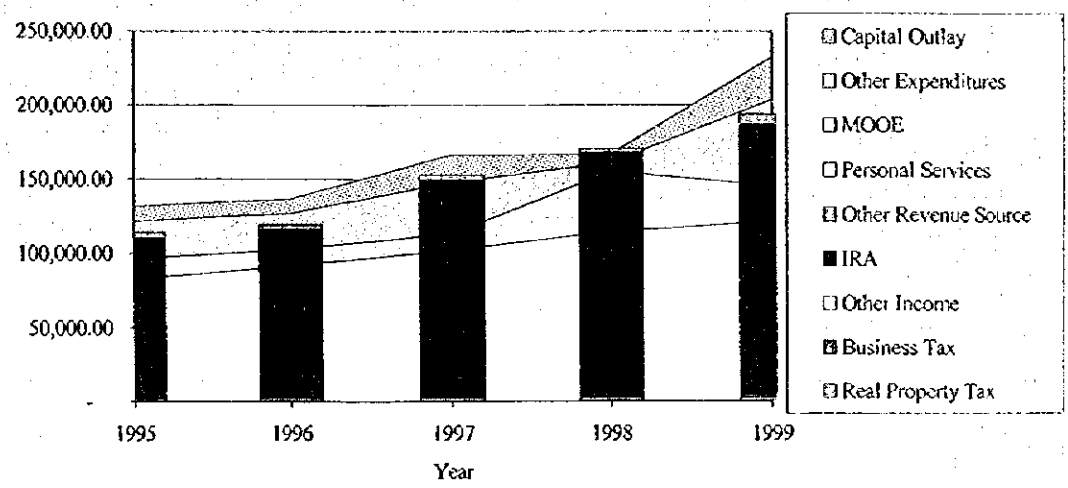
Unit: Pesos

PARTICULARS	1995	1996	1997	1998	1999
RECEIPTS					
Tax Revenue					
Real Property Tax	1,641,260.00	1,848,510.00	2,113,480.00	1,980,160.00	2,669,500.00
Business Tax	123,480.00	134,030.00	147,370.00	175,550.00	190,000.00
Others	803,050.00	715,500.00	638,640.00	615,570.00	1,114,000.00
IRA	107,530,000.00	112,991,987.00	146,454,612.38	164,850,731.00	182,711,552.00
Other Revenue Source	4,023,470.00	3,702,960.00	3,611,220.00	3,009,480.00	7,409,500.00
Sub-Total	114,121,260.00	119,392,987.00	152,965,322.38	170,631,491.00	194,094,552.00
EXPENDITURES					
Personal Services	82,619,360.00	91,580,820.00	102,365,590.00	114,605,750.00	121,612,480.00
MOOE	13,638,400.00	11,193,520.00	10,735,800.00	40,652,160.00	24,182,030.00
Others	25,386,330.00	24,235,160.00	34,704,010.00	5,680,850.00	57,859,030.00
Sub-Total	121,644,090.00	127,009,500.00	147,805,400.00	160,938,760.00	203,653,540.00
NET OPERATING INCOME	(7,522,830.00)	(7,616,513.00)	5,159,922.38	9,692,731.00	(9,558,988.00)
Add: Borrowings	-	24,050,140.00	8,400,000.00	2,800,000.00	-
Less: Capital Outlay	10,039,210.00	9,516,490.00	18,498,380.00	5,680,850.00	28,905,53000
NET INCOME	(17,562,040.00)	6,917,140.00	(4,938,460.00)	6,811,880.00	(38,464.52.00)

Source: Provincial Accountant's Office

Note: 1/ 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)
2/ Includes Secretary's Fees, and other charges.

Figure 6.2.1
Income & Expenditure of Southern Leyte, 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 68.26% to the total revenues. Maintenance and operating expenses of the province was 13.37%. In addition, the province has a capital outlay with an average of 9.67% to the total revenue. The funds for water supply sector were part of the capital outlays of the province.

From 1995 to 1998, the province had an average net operating loss of ₱ 71,672 from operations. For 1999, the province has projected a net operating loss amounting to ₱9.56 million. After deducting capital outlay and non-office expenditures, the province projects a negative net income of ₱38.46 million.

6.2.2 Availability of Funds

As previously noted, the IRA comprises 95.12% 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 0.83% 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 0.79% in 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	12,696,460,000	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 Southern Leyte					
	(1) Total: (2) + (3)	253,731,337	271,071,924	342,498,351	389,066,250	439,421,086
	(2) Provincial Government	107,530,000	112,991,987	146,454,612	164,850,731	182,711,552
	Percentage (a)	0.85	0.82	0.82	0.82	0.82
	(3) Municipalities	146,201,337	158,079,937	196,043,738	224,215,519	256,709,534
	Percentage (c)	0.78	0.81	0.79	0.79	0.78
	III. Total Income of the Provincial					
	Government	114,121,260	119,392,987	152,965,322	170,631,491	194,094,552
	Percentage of IRA	94.22%	94.64%	95.74%	96.61%	94.14%
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.
	V. IRA to Municipalities					
	TOTAL	146,201,337	158,079,937	196,043,738	224,215,519	256,709,534
	Anahawan	5,234,682	5,655,646	7,005,047	7,993,488	9,122,551
	Bontoc	9,314,566	10,090,880	12,113,568	13,862,096	15,990,585
	Hinunangan	9,734,699	10,503,841	12,848,003	14,152,158	16,263,475
	Hinundayan	5,914,105	6,390,716	8,144,510	9,280,286	10,620,138
	Libagon	6,527,919	7,048,238	8,781,454	10,066,267	11,525,683
	Liloan	7,995,461	8,650,290	10,347,124	11,840,499	13,610,705
	Limasawa	3,818,357	4,159,544	5,213,148	5,958,619	6,874,019
	Maasin (Capital)	18,975,054	20,544,203	25,029,596	28,532,984	32,948,604
	Macrohon	8,357,364	9,034,880	11,247,806	12,771,570	14,633,226
	Malitbog	7,591,575	8,199,924	11,419,609	13,105,183	15,044,339
	Padre Burgos	5,177,072	5,598,782	7,058,055	8,049,153	8,658,554
	Pintuyan	5,456,737	5,898,461	7,421,539	8,469,428	9,220,998
	Saint Bernard	8,561,404	9,262,285	11,494,487	13,144,921	15,134,829
	San Francisco	5,885,432	6,365,463	8,052,063	9,183,865	10,495,818
	San Juan (Cabalian)	5,655,785	6,141,455	8,247,354	10,023,556	11,507,317
	San Ricardo	5,519,088	5,981,297	7,002,805	7,989,837	9,205,435
	Silago	7,779,911	8,343,294	10,736,825	12,422,968	14,173,454
	Sogod	11,814,930	12,770,148	15,380,248	17,704,501	20,444,599
	Tomas Oppus	6,887,196	7,439,590	8,500,499	9,664,140	11,235,205

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 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 1996 and 1997. In 1998, the province had surplus funds amounting to ₱7.7 million due to delays in the release of funds. For 1999, it is projected that the 20% DF is more than adequate to cover the capital expenditures of the province, which is projected at ₱28.9 million. There will be surplus funds amounting to ₱9.5 million.

Table 6.2.3 Actual Funds for Capital Expenditures (20% DF), 1995-1999

Unit: Pesos

Year	IRA of the Province (a)	Planned 20% DF 1/ (b)	Actual Expenditures on 20% DF 2/ (c)	Surplus/(Deficit)
1995	107,530,000	21,092,630.00	14,325,590.00	6,767,040.00
1996	112,991,987	22,598,400.00	30,718,870.00	(8,120,470.00)
1997	146,454,612	20,185,230.00	24,145,120.00	(3,959,890.00)
1998	164,850,731	32,879,270.00	25,163,410.00	7,715,860.00
1999	182,711,552	38,454,110.00	28,905,530.00	9,548,580.00

Source: Provincial Treasurer's Office
1/ The 20% DF allotted may not be equal to the computed 20% of IRA.
2/ These figures are the capital expenditures shown in Table 6.2.1 from Provincial Accountant's Office.

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.

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] x 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 ₱32.164 million for the year 1999, ₱33.76 million minus loan amortization of about ₱1.6 million annually. This amount reflects the maximum loan that can be availed of from MDF. The local tax income and IRA of the province are ₱3.97 million (current year) and ₱164.85 million (preceding year), respectively. The province has total borrowings amounting to ₱35.35 million.

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 and DPWH. The fund from the CDF (Countrywide Development Fund) was also availed of. The water supply sector spent a total of ₱20.34 million for the period 1995-1998, while sanitation sector only ₱882,000. Thus, the actual amount of public investments to the WATSAN sector amounted to ₱21.22 million (refer to Table 6.3.1 and Figure 6.3.1). The largest investment registered so far is those for Level I water supply with an aggregate amount of ₱11.17 million during the said period, followed by Level II water supply with ₱9.16 million.

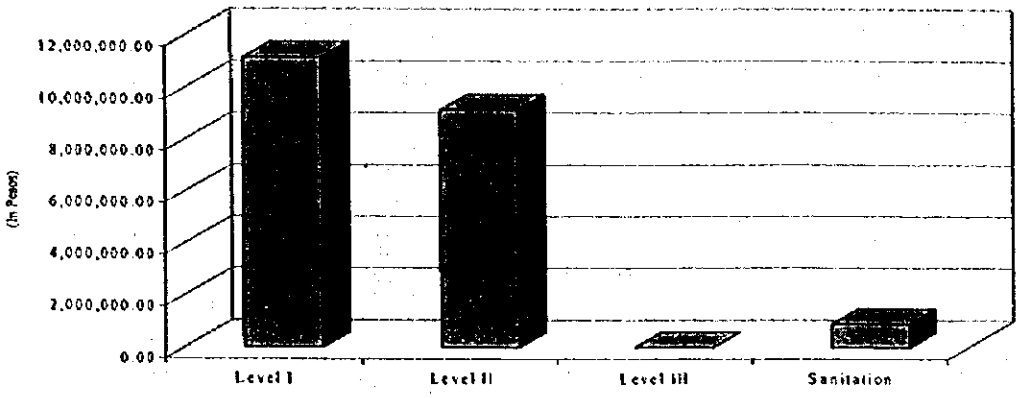
Table 6.3.1 Actual Amount of Sector Investment to the Province by Concerned Agencies, 1995 - 1998

Unit: Pesos

Funding Category		1995-1998				
Agency	Funds	Level I	Level II	Level III	Sub-Total	Toilet
DILG	PAF2	7,053,000	439,000		7,492,000	252,000
DPWH	Foreign Fund 1	2,500,000	960,000		3,460,000	380,000
	Local Fund 2	1,430,000	1,200,000		2,630,000	
LWUA						
DOH						
PROVINCE	Provincial Gov't.	190,000	6,564,900		6,754,900	250,000
	Municipal Gov't.					
MUNICIPALITY						
Total		11,173,000	9,163,900		20,336,900	882,000

Source: Various Government Agencies.

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



(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 Southern Leyte for the Sector from 1995 to 1998 are summarized in Tables 6.3.2 and 6.3.3.

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 (OECF) National (DPWH/CDF/DILG/PAF2) Various Local Funding (Prov / Mun.)		50,000		140,000	35,447,000	35,637,000	84.44
Spring Development with L2 Various Foreign Assisted (OECF) National (DPWH/CDF) National/Local Funding (DOH) Various Local Funding (Prov./Mun.)	440,000	455,000	1,090,000	4,580,000	-	6,565,000	15.56
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							
Total	440,000	505,000	1,090,000	4,720,000	35,447,000	42,202,000	100.00

Source: Provincial Planning and Development Office.

Table 6.3.3 Sector Allocation in the Annual Investment Plan, 1995 – 1999

Unit: Pesos

Item	1995	1996	1997	1998	1999	Total
Level I						
Foreign Assisted					12,757,000	12,757,000
National					15,601,000	15,601,000
Local		50,000		140,000	7,089,000	7,279,000
Level 2/3						
Foreign Assisted						
National						
Local	440,000	455,000	1,090,000	4,580,000		6,565,000
Loan – DBP/LBP						
Expansion						
Repair/Maintenance						
Special Water Supply Projects (Gov't. Centers, Hosp.) - Local						
Health Centers						
Construction of Public Toilets	50,000		150,000	50,000		250,000
Sub-Total Water Supply	440,000	505,000	1,090,000	4,720,000	35,448,000	42,203,000
Sub-Total Sanitation (Health)	50,000		150,000	50,000		250,000
Grand Total	490,000	505,000	1,240,000	4,770,000	35,448,000	42,453,000

Note: * - Part of DILG – PAF2
Source: Provincial Planning and Development Office

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). Given priority in the WATSAN are: a) Spring Development under Level II which appropriated an amount of ₱6.56 million equivalent to 15.6% of the WATSAN allotment for

the period 1995 – 1998. Levels I and II had the largest fund allocation, with the amounts of ₱11.17 million and ₱1.1 million, respectively.

The AIP of the province for the years between 1996 and 1998 included the repair and maintenance items of water supply facilities. It is important to consider the budget for repair and maintenance of the facilities.

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 5.26% of the DF in 1998 (i.e. ₱0.718 million out of ₱13.65 million). However, the water supply and sanitation was given low priority with minimal share of only 2.2% of the DF on the average for the period 1995 to 1998.

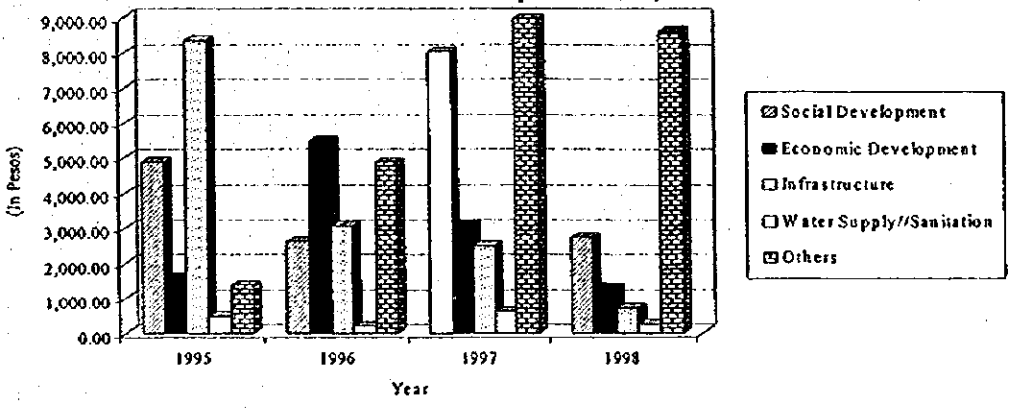
Table 6.3.4 Allocation of the 20% Development Fund, 1995-1999

Unit: Pesos

Year	Planned 20% Dev't. Fund	Actual Expenditures						
		Social Development	Economic Development	Infra-structure	Water Supply/ Sanitation	Others	Sub-Total	% of Water Supply to Actual Disbursed Amount of 20% DF
1995	21,092,600	4,882,300	1,575,000	8,354,900	491,500	1,372,600	16,676,300	2.95
1996	22,598,400	2,627,700	5,483,000	3,074,700	202,700	4,858,800	16,247,000	1.25
1997	30,185,200	8,043,000	3,089,700	2,489,700	621,800	8,988,200	23,232,400	2.68
1998	32,879,300	2,738,200	1,297,800	718,000	266,600	8,631,900	13,652,500	1.95
1999	38,454,100	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	

Source: Provincial Budget Office and Provincial Accountant's Office.
[1] The 1999 figures for expenditures are alloted amounts only. Actual figures are not available.

Figure 6.3.4
Allocation of the 20% Development Fund, 1995-1998



The provincial government provides the prioritized WATSAN projects with funds under the social services sector. Actual expenditures on 20% DF 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 1997, out of the 20% DF of ₱ 30.18 million, disbursed amount to WATSAN sector was only ₱0.621 million (which is equivalent to 2.05% of the planned 20% DF or 2.67% of the actual total disbursements from 20% DF). Furthermore, in 1998, WATSAN sector obtained a much lower percentage share of only 0.81% of the planned 20% DF or 1.95% of the actual disbursements of 20% DF of ₱13.65 million. Thus, in terms of allotment, the province has not provided WATSAN sector a consistent percentage of its planned 20% DF – in 1995, 2.33%, 1996 – 0.89%, 1997 – 2.06% and in 1998 it was 0.81%. It is noted that the province allocated a low percentage (an average share of 1 %) of its IRA funds to WATSAN sector.

The Provincial Government is involved in the ADB-assisted Rural Water Supply and Sanitation Project which covers sixteen (16) provinces nationwide including Biliran, Eastern Samar and Southern Leyte in Region VIII. The RW3SP project consists of two parts. Part A covers Institutional Development including (i) a capacity-building and training program for LGUs; (ii) a community participation program to help the communities design and set up WSS management organizations for cost recovery, and operation and maintenance; (iii) a health and hygiene education program; and (iv) a water quality control and surveillance program. Part B covers Construction and/ or rehabilitation of water supply facilities entailing simple and low-cost, point source development; provision of sanitation facilities in selected subprojects including public toilets and household toilets, and provision of consulting services to support Project implementation.

The total project cost is estimated at US$ 57.4 million including a foreign exchange component (US$ 20 million) and a local cost component (US$ 37.4 million). There are two loans, which will be utilized until 1 February 2002, with a combined total amount equivalent to US$ 37.0 million. These are: (i) loan of US$ 18.5 million equivalent from the Bank's ordinary capital resources (OCR), and (ii) a loan equivalent to US$ 18.5 million from the Bank's Special Funds resources.

The OCR loan will have an amortization period of 25 years, with a grace period of 5 years, an interest rate to be determined in accordance with the Bank's pool-based variable lending rate system for US$ loans, and a commitment charge of 0.75 percent per annum. The ADB loan

will have a repayment period of 35 years, including a grace period of 10 years and a service charge of 1 percent per annum. The executing agency is the Department of Public Works and Highways (DPWH).

The National Government will provide 80 percent of the cost of water supply subproject, including the proceeds of the loans, in the form of grant financing through the budget for the development of rural WSS facilities. The LGUs concerned will contribute 10 percent in cash as equity and the beneficiary barangay will contribute the remaining 10 percent of each subproject cost in kind through labor for construction works, and donation of land for WSS facilities.

With respect to sanitation facilities (except for private latrines) and district laboratories, the Government will provide all required infrastructure and the LGUs and school administrations concerned will provide the required land as their respective equity contributions. The cost-sharing arrangements follow the Government's national standard policy for financing of all rural WSS programs.

DPWH will be the Executing Agency for the Project. It will manage and coordinate Project activities with other National Government agencies, including DILG and DOH. DILG will be the Implementing Agency for Parts A (i) and (ii); and DOH will be the Implementing Agency for Parts (iii) and (iv). With appropriate inputs from DILG and the communities, LGUs with TA from DPWH through its District Engineers Offices (DEOs) will design and construct, mainly through private contractors, the water supply facilities. The PMO-RWS, headed by a Project Director, and established for the implementation of foreign-assisted water supply projects including the Bank-financed second rural water supply sector project in the Philippines, will be re-established and suitably strengthened for the Project.

DILG will coordinate and implement capacity-building and community management training programs and, through NGOs, initiate community and LGU participation. In addition, DILG, through its own and NGOs resources and assisted by consultants, will carry out socioeconomic surveys and community participation activities for the subprojects. Decisions relating to site selection, subprojects design, and appropriate technology will be made at LGU level with the full participation of the beneficiary communities.

The responsibilities of BWSAs and LGUs will be as follows:

(i) At the community level, BWSAs already established (otherwise the barangay council), assisted by NGOs, will participate in the mobilization of communities and preparation of

subproject proposals; and BWSAs, established as a precondition for award of contracts, will assist in construction and be fully in charge of O & M of the facilities;

(ii) The mayor, as chief executive of LGU (municipal level), will be responsible for managing the Project activities at the municipal government level in coordination with DEO and the local DOH office. The project activities at this level will be the selection and formulation of subproject proposals, implementation of subprojects and training.

(iii) At the provincial LGU level, the Governor of the province will have overall responsibility for a provincial board, which will appraise, through the provincial planning and development office and approve subproject proposals prepared at the municipal government level.

For cost recovery, the Government will ensure that BWSAs will provide for a part of the capital costs and all O & M costs (including depreciation) related to the WSS facilities constructed and/or rehabilitated under the Project as follows:

(a) for capital costs, BWSAs will provide 10 percent of the capital costs of the water supply facilities in kind; and

(b) for O & M costs, BWSAs will provide the full costs of both routine O & M costs and replacement of assets.

The provincial government will fund WATSAN sector project on the basis of observed financial arrangements.

(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 supports entailing manpower and vehicle allocation.

Further, 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.

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

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.

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 was previously undertaken by a task force under the Provincial Engineering Office (PEO) and DILG (BWP – institutional building, UNDP – WATSAN and CIDA – capability building). 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 designing, construction and provide O&M assistance. Although a new office for this sector cannot be created due to budgetary constraints, the task force was upgraded to " Waterworks Division" in line with the policy to enhance implementing capacity.

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. Thus, cost sharing among concerned parties (LGUs, central government agencies and barangay people) has been made within realistic arrangement/ current capacity.

Following are other financial arrangements and issues based on discussions with Provincial Treasurer, Budget and Accountant Offices.

a) There is a priority list of water supply projects for the municipalities for a period of 8 years, but no budget allocation was made in advance to reflect in the AIP. There is a Local 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) In 1977, ₱7.2 million were acquired by the Provincial Government from DBP for the procurement of heavy equipment.

c) The PEO-Waterworks 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.

Funding Source	Implementing Agency
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.

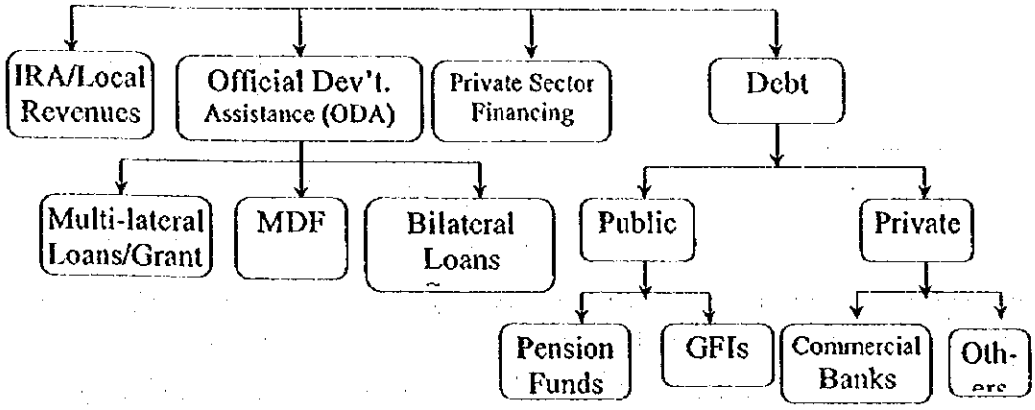
For any central government grants that are provided for the development of Level I water supply systems and sanitation facilities to the limited classes of municipalities, the LGUs and beneficiaries concerned shall share the capital cost required. No subsidies from the central government will be provided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

(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) and the Development Bank of the Philippines (DBP). For the LGU to enter into a loan, the respective legislative council (PA for the Province, Sangguniang Panlunsod; 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 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 a World Bank-assisted project, the Local Government Unit-Urban Water and Sanitation Project (LGUUWSP), 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 watersupply 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:

- Municipalities/ cities, irrespective of income class, which have not formed a water district; and
- 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, the local water district 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:

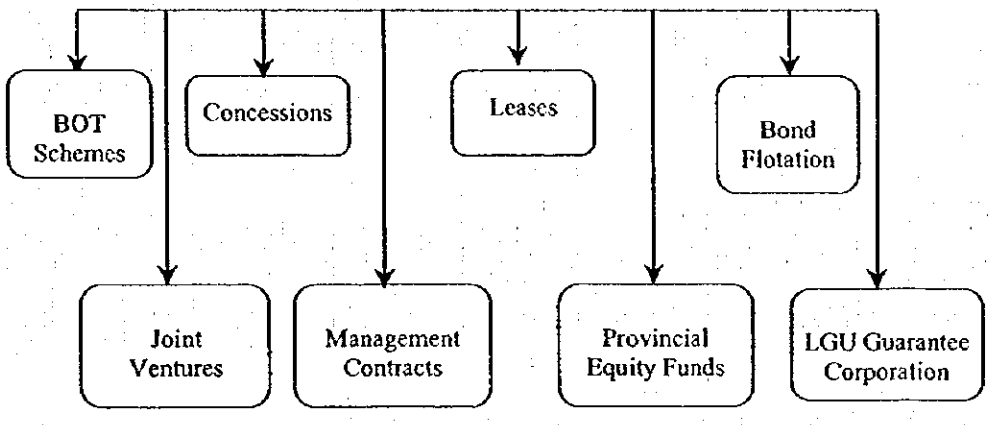
1) World Bank funds shall be channeled thru the Development Bank of the Philippines (DBP) which shall relend them as sub-project loans to the LGUs.
2) The DBP sub-project loan shall include cost of feasibility study, technical design and construction of the water supply facility.
3) Basic terms of the 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 service area coverage may warrant liability 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 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

Based on the Accomplishment Report, 1995-1998, Southern Leyte's water supply services are provided by means of 2,080 units of shallow wells, 444 deep wells, 280 springs and 34 rain

water collectors. About 16,804 households and 196 barangays get their water from Level II water supply systems with 1,583 communal faucets and 1,078 house connections. Under Level III water supply systems, there are 116 barangays covered by the systems serving a total of 14,083 households.

Past Financial Performance of WDs and RWSAs/BWSAs:

Currently, the priority in budget allocation is given to physical construction work, not to supporting activities to sustain the sector projects. In case of RW3SP (ADB-assisted), 10 % required cost is shouldered by LGUs, while users will provide labor assistance.

There are fourteen (14) WWs in the province with Maasin WWs having the largest number of metered connections, which is more than 1,800 connections. There were also unmetered connections paying flat water rates per month. There are no available data for the financial performance of the WWs and it is not therefore clear whether or not they are self-sufficient in their operations (refer to Table 6.4.1). Likewise, there are no information on the loan status of WWs, which relate to their experience and ability to access external sources of financing for either repair or expansion of their existing watersupply systems (refer to Table 6.4.2).

Table 6.4.1 Financial Indicators of Provincial/Municipal Waterworks in the Province (as of June 1998)

Waterworks	Description						
	No. of Metered Connections	No. of Flat Rate Connections	Average Monthly Rate	Average Consumption per HH	Average Expenditures	Average Revenue	Collection Efficiency
	Nos.	Nos.	Pesos/cu.m.	Cu.m./mo.	Pesos/mo.	Pesos/mo.	Percent (%)
Bontoc WWS	315	2		18.75			
Mahayahay WS	40			16.50			
PAWASA	150			0.08			
Brgy. San Vicente	32	6		8.68			
Hinunangan	467			10.40			
Manlico		87					
Maasin	1,811			20.04			
San Roque WWS	243			45.00			
Malitbog		167		33.05			
San Vicente WWS	303			20.00			
Padre Burgos	439	10		43.96			
Pintuyan WWS	881						
San Francisco WW	318						
Tomas Oppus		35					
Total	4,999	140					

Source: Water Districts

Table 6.4.2 Loan Status of Provincial/Municipal Waterworks

(as of June 1998)

Waterworks	Description			
	Total Loan Availed (1,000 Pesos)	Remaining Payment Period Months	Average Monthly Amortization	Current Arrears
n.a.	n.a.	n.a.	n.a.	n.a.

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, while operation and maintenance was the responsibility of the association. 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 are 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 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 ₱10.00 to as much as ₱50.00 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.

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 key informant survey, the respondents indicated that the barangay councils are willing to participate in the construction of sector projects as well as in the operation and maintenance of WATSAN facilities. It was likewise indicated that all the barangay councils

are willing to participate in sector projects by initiating the formation of a water and sanitation association.

Referring to the group interview results for Level I and II water supply conducted in this study, majority of respondents are willing to participate in the water supply projects in the future and to contribute free labor during construction. Hence, for Levels I and II water supply, due to insufficient household income, there is a need for LGUs to provide some sort of subsidy.

With respect to the construction cost of private toilet, it seems that the cost is relatively expensive as compared with the family income. The estimated cost of flush type toilet facility is about 6.73 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 results of the key informant survey for Level I service, common problems that were encountered range from defective pumps to lack of funds for maintenance work. This can be attributed to the fact that almost all of the beneficiaries do not pay for their water supply. The Barangay Treasurer of Otikon (Libagon) was responsible for collecting the fees from a number of residents.

It is noted that barangay councils provide direct assistance in the operation and maintenance of the water systems. They coordinate with the local government units (PHO/MHO) in extending technical and functional assistance to the BWSA. Further, the barangay councils are also willing to pay for the training of community members/volunteers on the various operational activities that pertain to sustaining and maintaining WATSAN facilities.

Based on the group interview results (Level I services), there was no BWSA in their barangays but the respondents signified their intent to contribute cash and labor, collect water fees and do repair and maintenance work for water supply facilities.

At present, majority of the respondents has not been paying their water fee and of those who pay water fee, the amount is about P50.00 a month. Thus, with only a few users paying water fee, the amount of water fees collected are not sufficient to cover the cost of O & M of facilities.

Table 6.6.1 presents the affordability of households by service. 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 (%) [4]
Median of Monthly Income [1]	3,471.67		-
Average Level III: Monthly Water Bill [2]	50.00	1.44	5.0 or less
Average Level II: Monthly Water Bill	30.00	0.86	2.0 - 3.0
Mo. Level I Expenditures	10.00	0.29	1.0 or less
Private Toilet Construction Cost – Flush Type Toilet [3]	23,000	6.73	

Notes:

[1] 1994 Family Income and Expenditures Survey, NSO. Average mean income is ₱45,503 annually for Southern Leyte and median income is ₱29,703. In 1999, average mean income is ₱63,820 and ₱41,659 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.

[2] Data from PSPT; It is assumed that 21 cu.m. will be consumed per family.

[3] Current prices estimated in this study

[4] Based on the experiences mainly from LWUA, DPWH and DILG.

Chapter 7

WATER SOURCE DEVELOPMENT

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, DPWH 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 2,598 shallow wells, 414 deep wells and 496 developed springs in the province (functional sources). Majority of the wells is shallow wells. About 48% of these water sources are public facilities. Of the total existing wells, only 189 shallow wells and 123 deep wells are not functional at present. In addition to the above sources, 90 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	905	294	496	1,695
b. Privately owned sources	1,693	120	0	1,813
c. Number of water sources	2,598	414	496	3,508
d. % share of different sources	74%	12%	14%	100%
2. Water sources with problems and non-functional facilities				
a. Water quality problems*	1,559	0	0	1,559
b. Non-functional	189	123	5	317
3. Spring source information				
a. Undeveloped	-	-	0	0
b. Untapped	-	-	90	90

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

The province of Southern Leyte lies on the southern extension of a mountain range and system as major geomorphic features. A range of rugged mountains, reaching a maximum height of 948 masl at Mt. Nacolod, bisects the entire length of Leyte Island - the Leyte Central Highlands Range.

The volcanoes occupy present topographic highs and form rugged ridges with irregular slopes in the eastern-half of the province along a northwest trending belt controlled by a major fault structure which runs parallel to the Philippine Rift Zone. They were extruded during the early to middle Miocene epochs with a violent late phase resulting in the deposition of agglomerates and explosive breccia along the slopes of the ridges. These probably emerged contempo-

raneous with extensive volcanism prevalent throughout the archipelago during the Quaternary. The evolution of Mt. Hugpa is related to this period of volcanism.

Unconformably, overlying the volcanic rocks in western side of the island is corraline limestone with marly facels. It exhibits its topographic prominence in the form of north-northwest trending ridges. Solution channels and extensive caves are common features in western-half of the province. The clastic rocks and limestone are found unconformably overlying the clastic rocks with late Miocene to early Pliocene epochs. The clastic rocks occur along the western slope of the Leyte Central Highlands.

Southern Leyte shares common geologic features and history with Leyte, being found in a common land mass - Leyte Island. On the island of Leyte, four broad lithologic classification have been identified: (1) a schist body, (2) an igneous complex with serpentinized facies of probable Cretaceous to Oligocene age, (3) the sedimentary sequence equivalent to that of Samar Island during early Miocene to Pleistocene epochs and (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.

(1) Miocene and Older Systems

Rock units of Miocene and older have impermeability. They are classified as aquicludes. These rock systems are found at the Leyte Central Highlands in eastern part and in western mountains system of the province.

Volcanic rock units of the Leyte Central Highland 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 clastics that have been greatly folded and intruded by volcanic flows and dikes.

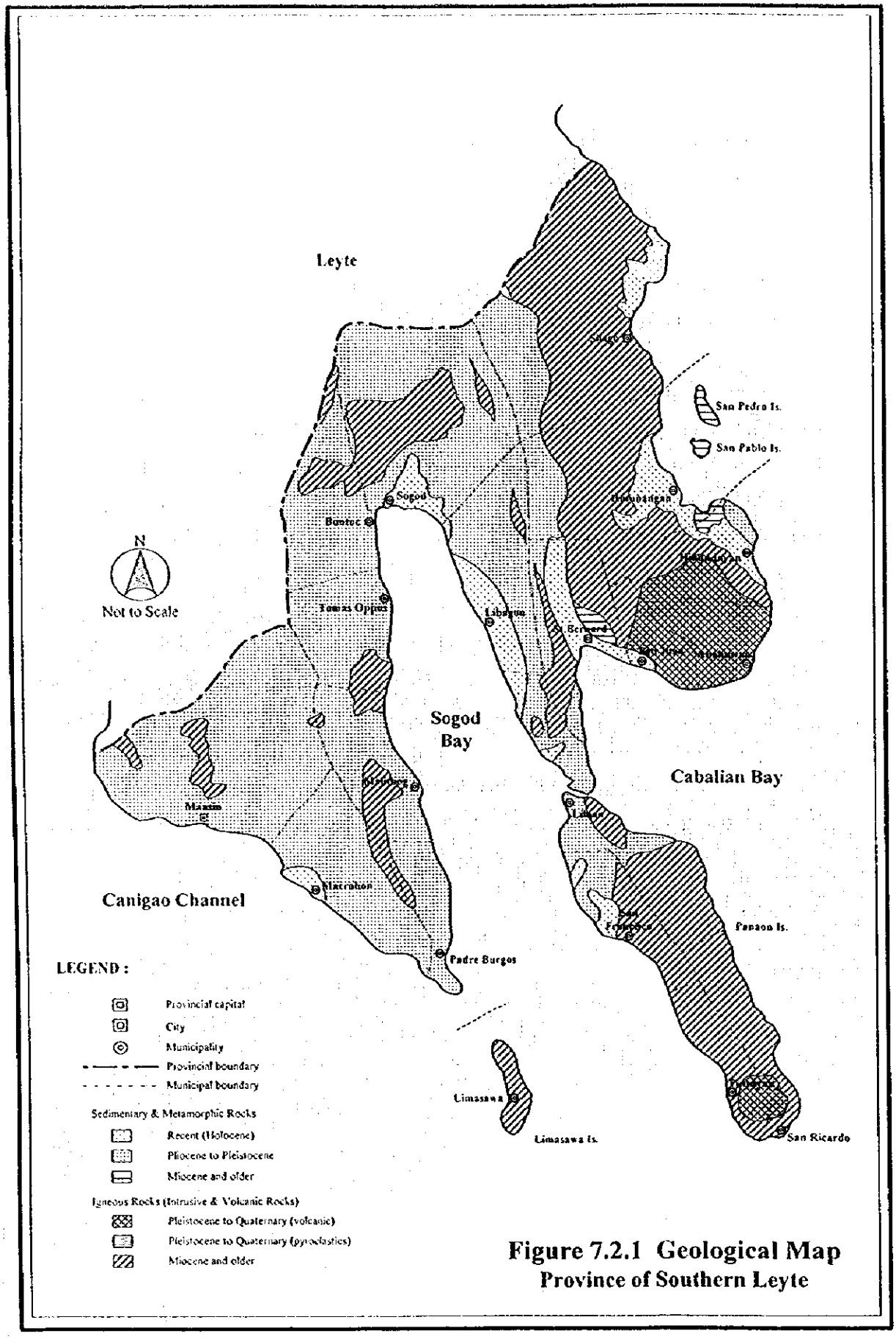


Figure 7.2.1 Geological Map
Province of Southern Leyte

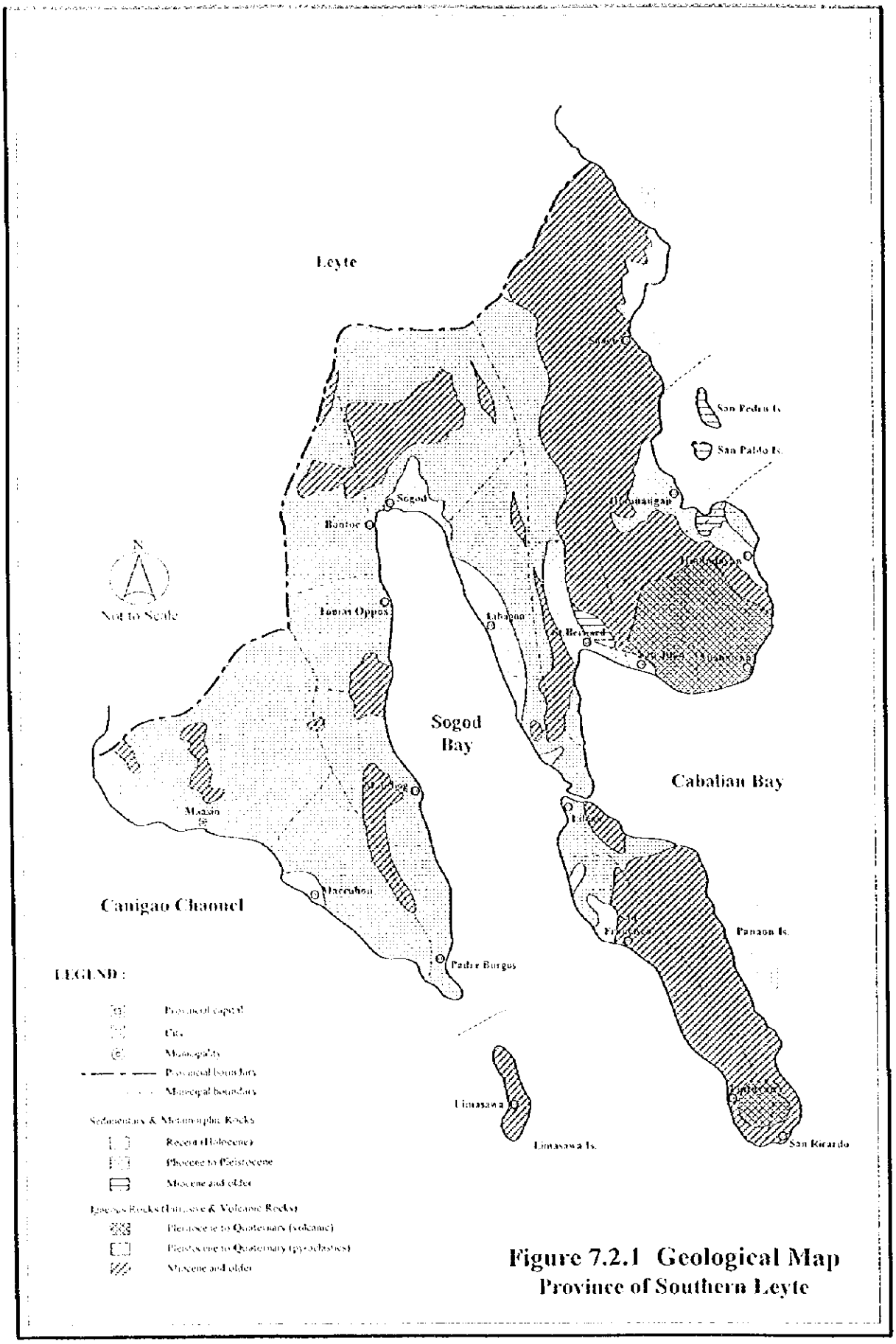


Figure 7.2.1 Geological Map
Province of Southern Leyte

(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 western lowland hills in the province.

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 facels 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 volcanic is represented by the Leyte Central Highlands: namely Mt. Hugpa. 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 center where both eastern and western mountain areas are connected. Small alluvial plain fringes the Sogod Bay area. The deposit consists of unconsolidated fine sand, silt, clay with minor gravel and rich tuffaceous sediments.

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 overlie 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 limited at present and shown in the Data Report. The groundwater development potential areas in the province for the future are summarized below.

(1) Solo shallow well area

The province has no solo shallow well area. 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, well classification was derived from well depth of 20 m. In this connection, the shallow wells in the province are driven to depths ranging from 3.0m to 19.0m. These wells have static water levels from 0.5 mbgs to 6.0 mbgs and specific capacities from 0.2 lpsm to 6.9 lpsm, respectively.

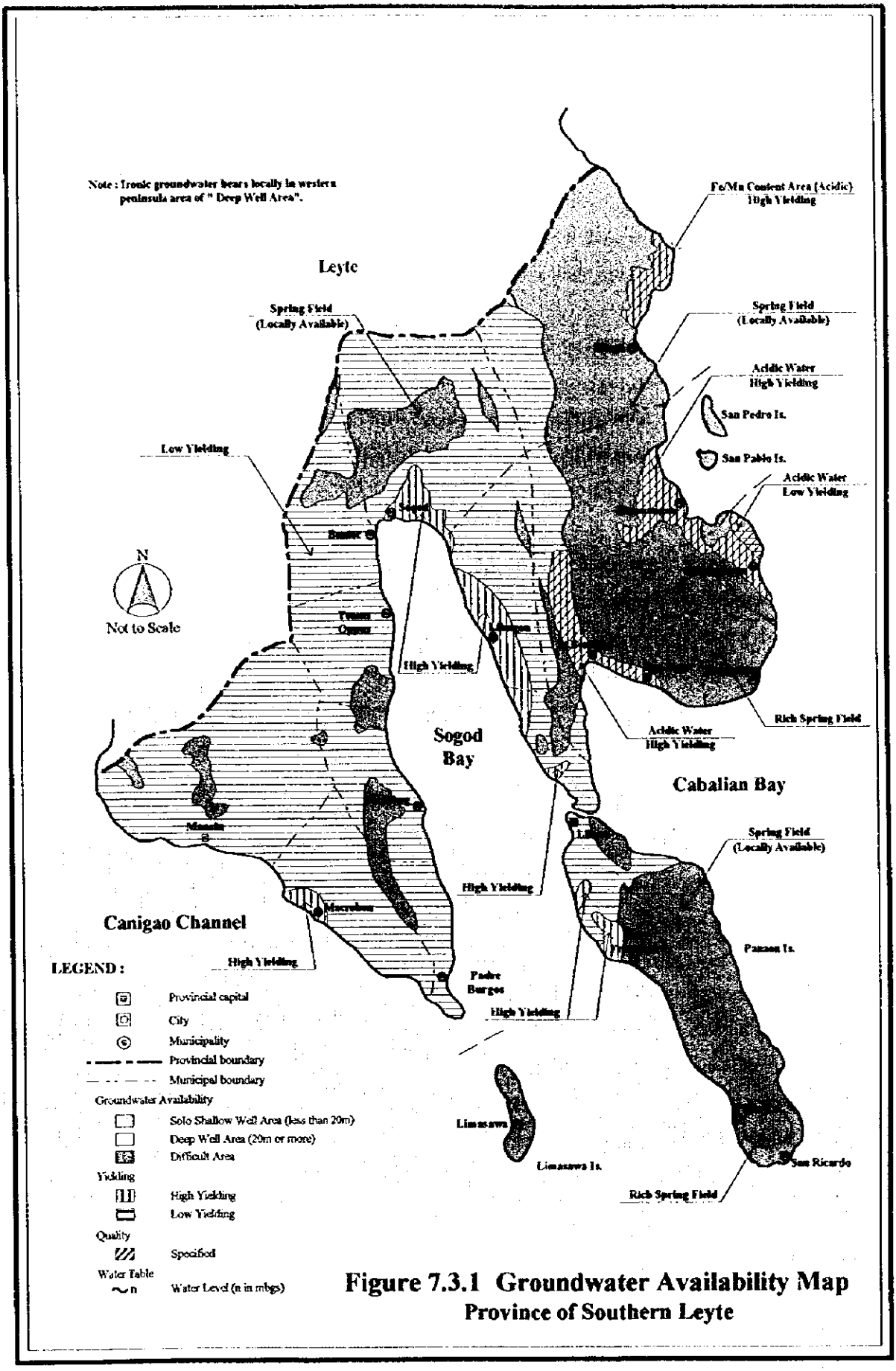


Figure 7.3.1 Groundwater Availability Map
Province of Southern Leyte

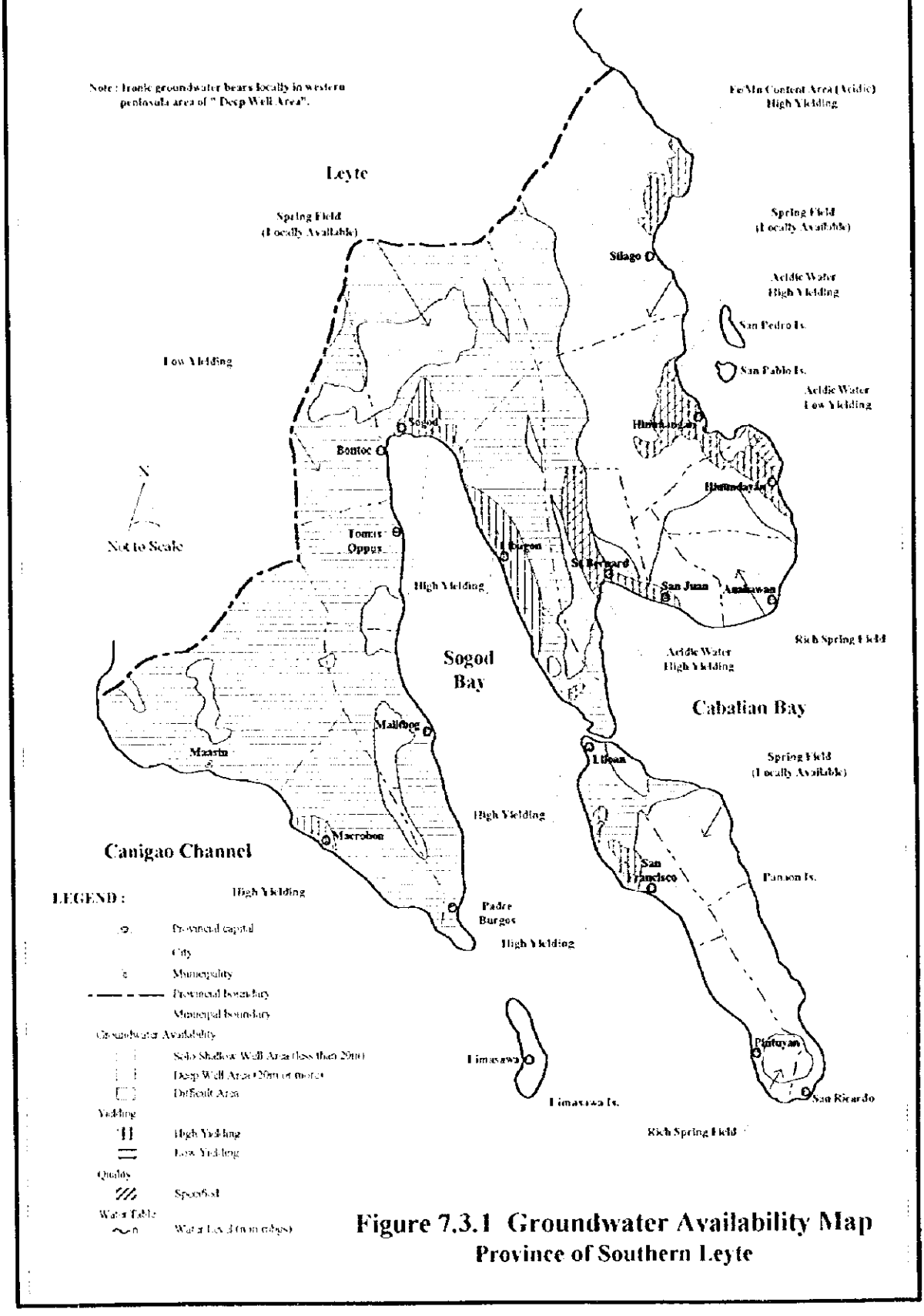


Figure 7.3.1 Groundwater Availability Map
Province of Southern Leyte

(2) Deep well Area

The deep well area covers approximately 60% of the province, widely distributed in western peninsula and western-half of the eastern peninsula of the province. 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 forms a groundwater storage basin for some aquifers. While, the sedimentary formation of Plio-Pleistocene epochs consist of reef limestone, sandstone, conglomerate and pyroclastics in the mostly western mountains part 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 28.3m with an average water level of 3.8 mbgs. The average specific capacity is 2.4 lpsm.

In the western peninsula area made of volcanic sediments as Plio-Pleistocene series, groundwater development is not yet sufficiently achieved due to sufficient spring sources and limited population. When deep well development becomes necessary in this area, the average depth of the planned deep wells would probably be 80m to 120m with an average water level of 20 mbgs. However, the specific capacity will be good for Level II service.

(3) Difficult area

About 40% of the provincial area are classified as a difficult area to exploit groundwater, in which the Leyte Central Highlands areas belong. These are located in the eastern peninsula and southern islands 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 epochs including sandstone, siltstone and conglomerate, and 3) volcanic and igneous rocks of Oligocene to Miocene epochs. 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

There is water quality problem in both shallow and deep wells in much eastern peninsula area

of the province (details are referred to Table 7.3.2, Data Report). Major water quality problem is acidic groundwater. This area is distributed around the Leyte Central Highlands. The other water quality problem is saline water intrusion in coastal areas. 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, acidic groundwater is serious with a high percentage of affected existing wells (much numbers of shallow and deep wells) in surrounding areas of the Leyte Central Highlands. The problem is extended to most of the areas in the municipalities of Silago, Hinunangan, Hinundayan, San Juan and Saint Bernard.

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 496 developed springs currently serving the province. Such spring sources come out from high mountain areas in the western, the range area in the eastern part and southern island part of the province. Of these springs, 134 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 129 springs exceed discharge rates of 2.0 lps. Other 233 developed springs have no data on discharge rates at present.

The high yielding springs are concentrated in the municipalities of Bontoc, Macrohon, Malitbog and Saint Bernard. Most of these springs are not dried up during a drought year or dry season with yields varying from 0.1 lps to 1,025.5 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 Dasay, Lawigan, Buac, Salog, Amparo and Canturing Rivers. The Bonbon River is tributary of the Salog River. There is one gauging station at the Lawigan River in the province. Other 2 gauging stations in the province of Leyte are selected with due consideration of same climate pattern of Southern Leyte, since their specific discharges were applied for major rivers without gauging station in the province.

Surface water use in the province totaled to 2.9 m^3/sec according to the NWRB's water rights registration database as of March 1997. All the water rights were registered for irrigation purpose. The diversions for major flume, which are operated by private associations, are located at Bontoc, in Salog River; at Hinunangan, in Dasay River; at Sogod, in Buac River; and at Saint Bernard, in Lawigan River. Such water rights were registered in the 1980's.

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 "A" limitation of "DENR Fresh Water Quality Criteria". It is noted that mining activities on copper production are prevalent in the Dasay River watershed at the municipalities of Hinundayan. These operations have caused contamination of the surface water by heavy metals such as mercury solution.

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 3.0 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 groundwater 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 20m to 60m in depth.

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 90 untapped spring sources identified by the PSPT ia 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 elevation difference between spring source and served area. Such springs are mainly located in the eastern peninsula of the Leyte Central Highlands area. Other areas have few untapped springs. Of these springs, 81 untapped springs with discharge rates ranging from 0.5 lps to 553.9 lps (actual data base) are generally applicable for Level II water

Table 7.6.1 Groundwater Development Potential in the Province

Area	Groundwater Development Potential	Water Quality	Area Feature
Eastern Peninsula & Panaon and Limasawan Islands Area	The eastern-half of this district is classified as difficult area including Southern Islands; namely Panaon Island, while the western-half of this district is deep well area. The high yielding areas are distributed in coastal alluvial plains. However, the other areas are classified into low-yielding area. As general information, the water tables in this western peninsula area is deeper ranging from 20mbgs to 40mbgs. Springs are very rich (numerous and high yielding) and only potential source in this eastern-half district and southern part of the Panaon Island. There are many Level III water supply systems using spring sources in surrounding area of Mt. Hugpa.	Acidic groundwater and spring water were examined in this district except in the Panaon Island. Saline water intrusion was reported from deep wells in seashore area. Spring water was reported potable. However, the potential value of polluted spring water flow from mining fields was not yet confirmed and examined.	This mountain range occupies the eastern peninsula and Panaon Island. Young volcanic rocks cover the top of southern mountain range and Panaon Island. The volcanoes occupy present topographic highs and form rugged ridges with irregular slopes in eastern-half of the province along a northwest trending belt controlled by a major fault structure which runs parallel to the Philippine Rift Zone. The evolution of Mt. Hugpa is related to this volcanism.
Western Peninsula & Sogod Bay Area	Most area of this district is classified as deep well area. Areas, where the old volcanic rocks are found, are difficult areas. Limasawa Island is classified into difficult area. The high yielding areas are distributed in coastal alluvial plains. However, the other areas are classified into low-yielding area. There are some possibilities to develop fissure groundwater in difficult area locally. Springs are very rich (numerous and high yielding) and useful potential source in this western-half district and southern part of the Limasawa Island. There are many Level III water supply systems using spring sources in the municipalities of Macrohon and Malitbog.	Area where groundwater with high Fe contents is located in mountainside of this deep well area. Spring water is potable.	Smaller mountain system is found on the western peninsula. This district is characterized by relatively mountainous interior regions. Unconformably, overlying the volcanic rocks is corraline limestone with marly faceis. It exhibits its topographic prominence in the form of north-northwest trending ridges. Solution channels and extensive caves are common features in western-half of the province.

supply. Five untapped springs in the municipality of Macrohon have discharge rates of 240.0 lps and 553.9 lps (enough discharge rates for large Level III water supply), while other 76 untapped springs have discharge rates ranging from 0.5 lps to 25.0 lps. Spring development potential in the province is shown in Table 7.6.5, Supporting Report.

(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 Salog River basin are privileged to use larger amount of river 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 and/or tentative specifications of wells by municipality were prepared based on available well information which were gathered in limited municipalities. 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 possibility (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. These groundwater source possibilities indicate 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/Tentative Specification of Wells by Municipality

Municipalities with Classification		Type	Proportion (%)	Standard Specification					Availability of Sources
				Depth Range (m)			SWL (m)	Sp. Cap. (lpsm)	
Anahawan	Rural	SW	0	-	<D<	-	-	-	Risky DW and Rich SP
		DW	0	-	<D<	-	-	-	
	Urban	SW	0	-	<D<	-	-	-	
		DW	0	-	<D<	-	-	-	
Bontoc	Rural	SW	0	-	<D<	-	-	-	Poor DW and Few SP
		DW	90	80	<D<	-	-	0.6	
	Urban	SW	0	-	<D<	-	-	-	
		DW	100	2	<D<	48	3.0	0.6	
Hinunangan	Rural	SW	0	-	<D<	-	-	-	Fair DW and Rich SP
		DW	20	60	<D<	80	6.0	0.6	
	Urban	SW	0	-	<D<	-	-	-	
		DW	100	60	<D<	80	3.0	0.9	
Hinundayan	Rural	SW	0	-	<D<	-	-	-	Fair DW and Rich SP
		DW	10	40	<D<	-	-	0.6	
	Urban	SW	0	-	<D<	-	-	-	
		DW	100	40	<D<	-	-	0.9	
Libagon	Rural	SW	0	-	<D<	-	-	-	Good DW and Poor SP
		DW	90	80	<D<	-	-	0.6	
	Urban	SW	0	-	<D<	-	-	-	
		DW	100	40	<D<	-	-	0.9	
Liloa	Rural	SW	0	-	<D<	-	-	-	Fair DW and Few SP
		DW	60	80	<D<	-	-	0.6	
	Urban	SW	0	-	<D<	-	-	-	
		DW	100	40	<D<	-	-	0.9	
Limasawa Island	Rural	SW	0	-	<D<	-	-	-	Risky DW and Rich SP
		DW	0	-	<D<	-	-	-	
	Urban	SW	0	-	<D<	-	-	-	
		DW	0	-	<D<	-	-	-	
Maasin	Rural	SW	0	-	<D<	-	-	-	Poor DW and Rich SP
		DW	90	120	<D<	-	-	0.4	
	Urban	SW	0	-	<D<	-	-	-	
		DW	100	21	<D<	29	3.0	0.6	
Macrohon	Rural	SW	0	-	<D<	-	-	-	Poor DW and Rich SP
		DW	90	80	<D<	-	-	0.6	
	Urban	SW	0	-	<D<	-	-	-	
		DW	100	24	<D<	35	5.1	0.9	
Malitbog	Rural	SW	0	-	<D<	-	-	-	Poor DW and Rich SP
		DW	70	80	<D<	-	-	0.6	
	Urban	SW	0	-	<D<	-	-	-	
		DW	100	21	<D<	28	4.5	0.6	

Table 7.7.1 Standard/Tentative Specification of Wells by Municipality

(cont'd)

Municipalities with Classification		Type	Proportion (%)	Standard Specification: Depth Range (m)			SWL (m)	Sp. Cap. (lpsm)	Availability of Sources
Padre Burgos	Rural	SW	0	-	<D<	-	-	-	Poor DW and Few SP
		DW	90	80	<D<	-	-	0.6	
	Urban	SW	0	-	<D<	-	-	-	
		DW	100	40	<D<	-	-	0.6	
Pintuyan	Rural	SW	0	-	<D<	-	-	-	Risky DW and Rich SP
		DW	0	-	<D<	-	-	-	
	Urban	SW	0	-	<D<	-	-	-	
		DW	0	-	<D<	-	-	-	
Saint Bernard	Rural	SW	0	-	<D<	-	-	-	Fair DW and Rich SP
		DW	40	80	<D<	-	-	0.6	
	Urban	SW	0	-	<D<	-	-	-	
		DW	80	40	<D<	-	-	0.9	
San Francisco	Rural	SW	0	-	<D<	-	-	-	Fair DW and Rich SP
		DW	30	40	<D<	-	-	0.6	
	Urban	SW	0	-	<D<	-	-	-	
		DW	50	40	<D<	-	-	0.9	
San Juan	Rural	SW	0	-	<D<	-	-	-	Poor DW and Rich SP
		DW	0	-	<D<	-	-	-	
	Urban	SW	0	-	<D<	-	-	-	
		DW	50	20	<D<	40	3.0	0.9	
San Ricardo	Rural	SW	0	-	<D<	-	-	-	Risky DW and Rich SP
		DW	0	-	<D<	-	-	-	
	Urban	SW	0	-	<D<	-	-	-	
		DW	0	-	<D<	-	-	-	
Silago	Rural	SW	0	-	<D<	-	-	-	Fair DW and Rich SP
		DW	10	40	<D<	-	-	0.6	
	Urban	SW	0	-	<D<	-	-	-	
		DW	30	40	<D<	-	-	0.9	
Sogod	Rural	SW	0	-	<D<	-	-	-	Good DW and Few SP
		DW	60	120	<D<	-	-	0.6	
	Urban	SW	0	-	<D<	-	-	-	
		DW	100	40	<D<	-	-	0.9	
Tomas Oppus	Rural	SW	0	-	<D<	-	-	-	Poor DW and Few SP
		DW	80	80	<D<	-	-	0.6	
	Urban	SW	0	-	<D<	-	-	-	
		DW	100	24	<D<	40	3.0	0.6	

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 Anahawan, Hinunangan, Hinundayan, Pintuyan, Saint Bernard, San Francisco, San Juan, San Ricardo and Silago. Those municipalities are located in eastern peninsula of the province. Table 7.7.2 summarizes the requirements.

Table 7.7.2 Detailed Groundwater Investigation Required

Municipality	Area	Investigation Activities and Specification
Hinunangan, Hinundayan, Saint Bernard, San Juan & Silago	Rural Area	Groundwater Quality Examination Sample Source; Level-I Deep Wells Parameters of Examination to include: Fe, Mn, pH, Color, Turbidity, Conductivity, etc.
Anahawan, Hinundayan, Pintuyan, San Francisco, San Juan & San Ricardo	Rural Area	Spring Water Quality Examination Sample Source; Developed and Untapped Springs Parameters of Examination to include: Fe, Mn, pH, SO_4, Hg, Cu, Bacteriological, 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^2 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) relative elevation between the two points.