PROVINCIAL WATER SUPPLY, SEWERAGE AND SANITATION SECTOR PLAN (PW4SP)

BOHOL

Volume I

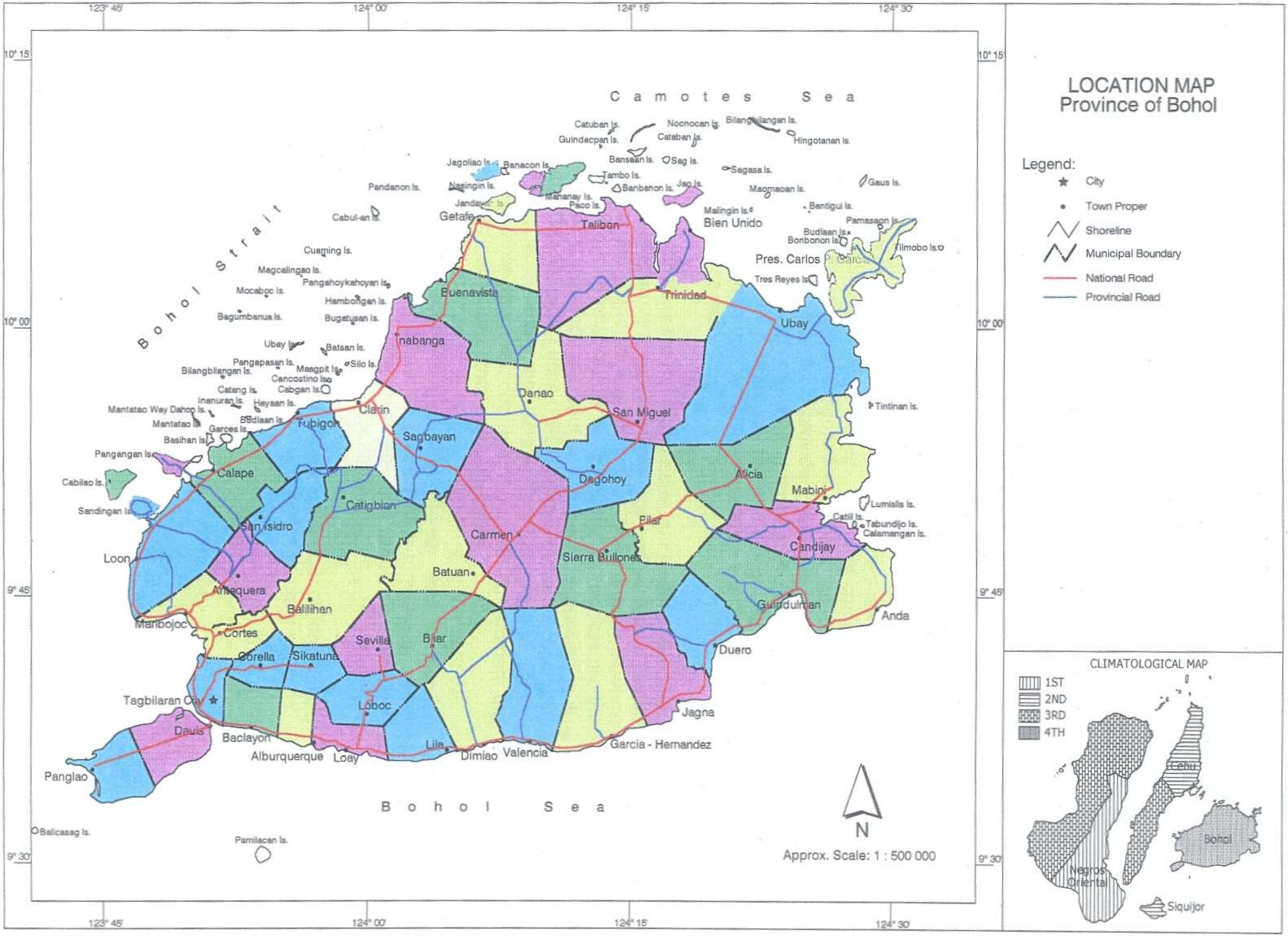
Main Report

December 2003

German Technical Cooperation

Department of the Interior and Local Government
Water Supply and Sanitation Program Management Office

In collaboration with the
Provincial Government of Bohol


LOCATION MAP
Province of Bohol
Legend:
City
Town Proper
Shoreline
Municipal Boundary
National Road
Provincial Road
CLIMATOLOGICAL MAP
1ST
2ND
3RD
4TH
Cebu
Bohol
Negros Oriental
Siquijor
Camotes Sea
Bohol Strait
Bohol Sea
Approx. Scale: 1 : 500 000
N
123° 45'
124° 00'
124° 15'
124° 30'
10° 15'
10° 00'
9° 45'
9° 30'
Catuban Is.
Nocnocan Is.
Bilangbilangan Is.
Guindacpan Is.
Cataban Is.
Hingotanan Is.
Jagoliao Is.
Banacon Is.
Bansaan Is.
Sag Is.
Sagasa Is.
Tambo Is.
Pandanon Is.
Nasingin Is.
Banbanon Is.
Jag Is.
Maomaoan Is.
Gaus Is.
Mananay Is.
Paco Is.
Jandayan Is.
Malingin Is.
Bantigui Is.
Cabul-an Is.
Getafe
Talibon
Bien Unido
Pamasagan Is.
Budlaan Is.
Bonbonon Is.
Tilmobo Is.
Pres. Carlos
Tres Reyes Is.
Cuaming Is.
Magcalingao Is.
Pangahoykahoyan Is.
Mocaboc Is.
Hambongan Is.
Buenavista
Trinidad
Ubay
Bagumbanua Is.
Bugatusan Is.
Ubay Is.
Batsan Is.
Pangapasan Is.
Silo Is.
Maagpit Is.
Bilangbilangan Is.
Cancostino Iso
Catang Is.
Cabgan Is.
Danao
Tintinan Is.
Inanuran Is.
Hayasan Is.
Mantatao Way Dahop Is.
Clarin
San Miguel
Bdlaan Is.
Mantatao Is.
Garces Is.
Tubigon
Sagbayan
Basihan Is.
Pangangan Is.
Calape
Dagohoy
Alicia
Cabilao Is.
Mabini
Catigbian
Lumislis Is.
Sandingan Is.
Catil Is.
Tabundijo Is.
Calamangan Is.
San Isidro
Pilar
Carmen
Candijay
Loon
Sierra Bullones
Batuan
Antequera
Guindulman
Anda
Balilihan
Maribojoc
Cortes
Sevilla
Bilar
Duero
Corella
Sikatuna
Tagbilaran City
Loboc
Jagna
Davis
Baclayon
Lila
Garcia - Hernandez
Alburquerque
Loay
Dimiao
Valencia
Panglao
Balicasag Is.
Pamilacan Is.

Republic of the Philippines
PROVINCE OF BOHOL
City of Tagbilaran

OFFICE OF THE GOVERNOR

MESSAGE

My sincere and heartfelt congratulations to the people behind the intelligent generation of this management tool, the "Provincial Water Supply, Sewerage and Sanitation Sector Plan" or "PW4SP CY 2004-2013".

Among the most prevalent issues that seriously affect our people are the present environmental conditions in our localities. The most crucial of which are the concerns on water supply, sewerage and sanitation. Under the Local Government Code (RA 7160), provinces are mandated to provide these basic needs and services. Problems relative to these factors apparently bring much environmental hazards that inevitably recoil to the people. And it is not just the community's health that is affected by such problems, but everyone's quality of life in particular and the development and progress of our economy in general.

In order to address the menacing issue, our National Government thru DILG has devised means to improve the water, sewerage and sanitation sectors. As an outcome of its endeavor, the preparation of Provincial Water Supply Sewerage and Sanitation Sector Plan for each Province has been initiated to promote the involvement of local staff in the entire development course. In such responsibility, it is the Provincial Planning and Development Office (PPDO) that is made the focal point where input and support are expected from the Central Government and other sector agencies. Technical assistance was extended by the German Government thru the GTZ Water Program in coordination with other sector agencies.

It is therefore hoped that in this 10-year Plan, component LGUs and all stakeholders will use the same as guide in the formulation and implementation of projects relating to water supply sewerage and sanitation. Through this, we can help strengthen our economic and social foundation.

Together, let us secure for ourselves and for our children a better place to live in with clean and adequate water supply and better sanitary services. PW4SP... for a better life!

November 21, 2003; Tagbilaran City.

ENRICO B. AUMENTADO
Governor

PROVINCIAL WATER SUPPLY, SEWERAGE AND SANITATION SECTOR PLAN FOR BOHOL

VOLUME I MAIN REPORT

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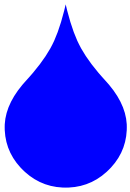
LIST OF ABBREVIATIONS

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

FIES	-	Family Income and Expenditure Survey
FW4SP	-	First Water Supply, Sewerage and Sanitation Sector Project
GAD	-	Gender and Development
GFI	-	Government Financial Institution
GO	-	Government Office
GOP	-	Government of the Philippines
GOJ	-	Government of Japan
GTZ	-	German Agency for Technical Cooperation
HH	-	Household
IBRD	-	International Bank for Reconstruction and Development
ICC	-	Investment Coordination Committee
IEC	-	Information, Education and Communication
IRA	-	Internal Revenue Allotment
IRR	-	Implementing Rules and Regulations
ITN	-	International Training Network
JICA	-	Japan International Cooperation Agency
JBIC	-	Japan Bank for International Cooperation (formerly OECF)
KfW		Kreditanstalt für Wiederaufbau
LBP	-	Land Bank of the Philippines
LGC	-	Local Government Code
LGEF	-	Local Government Empowerment Fund
LGU	-	Local Government Unit
LGUUWSP	-	Local Government Unit-Urban Water Sanitation Project
LWUA	-	Local Water Utilities Administration
MDC	-	Municipal Development Council
MDF	-	Municipal Development Fund
MEO	-	Municipal Engineer's Office
MHO	-	Municipal Health Office
MLGOO	-	Municipal Local Government Operations Officer
MOA	-	Memorandum of Agreement
MOOE	-	Maintenance Operating and Overhead Expenses
M/P	-	Master Plan
MPDO	-	Municipal Planning and Development Office
MS	-	Monitoring Specialist
MSL	-	Municipal Sector Liaison
MSLT	-	Municipal Sector Liaison Team
MTPDP	-	Medium-Term Philippine Development Plan
MWSS	-	Metropolitan Waterworks and Sewerage System
MWSTF	-	Municipal Water and Sanitation Task Force
NAMRIA	-	National Mapping and Resource Information Authority
NCRFW	-	National Commission on the Role of Filipino Women
NDCC	-	National Disaster Coordinating Council
NEDA	-	National Economic and Development Authority
NGOs	-	Non-Governmental Organizations
NIA	-	National Irrigation Administration
NMP	-	National Master Plan
NMYC	-	National Manpower Youth Council
NSCB	-	National Statistical Coordination Board
NSDW	-	National Standard for Drinking Water
NSO	-	National Statistics Office
NSMP	-	National Sector Master Plan
NWRB	-	National Water Resources Board
O&M	-	Operation and Maintenance

ODA	-	Overseas Development Assistance
OECF	-	Overseas Economic Cooperation Fund
PA	-	Provincial Administrator
PAF	-	Poverty Alleviation Fund
PAIASO	-	Provincial Accounting and Internal Audit Service Office
PBO	-	Provincial Budget Office
PD	-	Presidential Decree
PDC	-	Provincial Development Council
PEO	-	Provincial Engineer's Office
PHO	-	Provincial Health Office
PIO	-	Public Information Office
PIS	-	Public Investment Staff
PGSO	-	Provincial General Services Office
PLGOO	-	Provincial Local Government Operations Officer
PMC	-	Project Monitoring Committee
PMO	-	Project Management Office
PMU	-	Provincial Monitoring Unit
PNB	-	Philippine National Bank
POPCOM	-	Population Commission
PoW	-	Program of Work
PPAC	-	Philippine Plan of Action for Children
PPDC	-	Provincial Planning and Development Coordinator
PPDO	-	Provincial Planning and Development Office
PSPT	-	Provincial Sector Planning Team
PST	-	Provincial Sector Team
PTA	-	Parent Teacher Association
PTO	-	Provincial Treasury Office
PW4SP	-	Provincial Water Supply, Sewerage and Sanitation Sector Plan
PWSC	-	Provincial Water Supply and Sanitation Coordinator
PWSO	-	Provincial Water and Sanitation Office
RA	-	Republic Act
RDC	-	Regional Development Council
RDCC	-	Regional Disaster Coordinating Council
RHO	-	Regional Health Office
RHUs	-	Rural Health Units
RPMC	-	Regional Project Monitoring Committee
RSI	-	Rural Sanitary Inspector
RWSA	-	Rural Waterworks and Sanitation Association
SB	-	Sanggunian Bayan
SP	-	Sanggunian Panlalawigan
SRA	-	Social Reform Agenda
SSI	-	Supervising Sanitary Inspector
SWL	-	Static Water Level
TA	-	Technical Assistance
TESDA	-	Technical Education and Skills Development Authority
TCP	-	Teacher-Child-Parent
UNDP	-	United Nations Development Programme
UNICEF	-	United Nations International Children's Emergency Fund
VIP	-	Ventilated Improved Pit Latrine
WASAMS	-	Water and Sanitation Monitoring System
WATSAN	-	Water and Sanitation
WC	-	WATSAN Center
WD	-	Water District

WHO	-	World Health Organization
WID	-	Women in Development
WSSE	-	Water Supply and Sanitation Engineer
WSS-PMO	-	Water Supply and Sanitation-Programme Management Office
WW	-	Waterworks



EXECUTIVE SUMMARY

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I. Introduction

Background and Objectives

The Government of the Philippines (GOP) has been implementing water supply and sanitation sector projects over the years aimed at addressing sectoral concerns. In dealing with these concerns, the national policy framework for water resources provides the focal point in the formulation of strategies and targets for the implementation of sector projects. Towards the ultimate goal for sustainable development and integrated management in the sector, the national framework is cognizant of the policy of devolution and community-based approaches.

It is on this context that the Provincial Water Supply, Sewerage and Sanitation Sector Plan (PW4SP) for the Province of Bohol was prepared by the Provincial Sector Planning Team with technical assistance from the Federal Government of Germany through GTZ Water Program. The PW4SP is a framework plan that will serve as the basis for the future implementation work in the sector.

The PW4SP covers a Long-Term Development Plan (2011-2015) and a Medium-Term Investment Plan (2004-2010) to achieve the provincial targets of water supply, sewerage and sanitation sector. The plan includes arrangements and logistics for implementation and measures to strengthen operational frameworks and institutional capabilities including community development and gender responsiveness. As an initial step towards capability building, the Study was designed with the end view of strengthening the LGU's capability in sector plan preparation through conduct of series of workshop and hands-on training.

Planning Approach for Future Sector Development

The formulation of the PW4SP is based on the objectives, policies and strategies as spelled out in the national plans as well as the major legislations and regulations relevant to the sector. In setting the provincial sector targets, it is guided by the three national plans: the *Medium-Term Philippine Development Plan (MTPDP): 2001-2004*, the *Philippine National Development Plan (PNDP): 1999-2025* and the *Water Supply, Sewerage and Sanitation Master Plan of the Philippines 1988-2000*. These plans seek to redress the imbalances between rural and urban areas. Meanwhile, the MTPDP revised the targets for water supply services based on updated conditions in 2000. Parallel to this are the current sector policies and strategies: 1) an integrated water resources strategy watershed management); 2) promotion of self-reliance and local community management of services; 3) an integrated approach to water, sanitation and hygiene education; 4) cost sharing arrangement; 5) cost recovery of capital and O&M costs; and 6) private sector participation.

The PW4SP will help ensure that sector investments are optimized considering fund constraints and water source availability constraints as well as planning capacity. It is envisioned that this Plan will be regularly updated as its implementation proceeds. Furthermore, future detailed studies and plans for project implementation shall be conducted in line with the PW4SP.

The Plan was prepared applying computer-aided planning approach. A data management system was established as a tool to come up with the outputs corresponding to the objectives of the provincial plan and at the same time reflect the planning approach. It will provide a map of relative needs in the Province that will allow for adjustment and updating when further information becomes available. Also, different scenarios may be worked out by the planners using the program by changing the key parameters based on planning assumptions and conditions.

Report Composition

The report consists of two (2) volumes: I – Main Report and II – Appendices and Annexes. Volume I presents the result of the whole study comprising of 11 chapters, while Volume II includes detailed calculations and data/information materials.

II. Provincial Profile

The Province of Bohol is considered as the tenth largest island in the Philippines. Aside from the mainland, it has other 61 smaller offshore islands and islets. It is one of the 4 Provinces consisting the Central Visayas or Region VII. The Province is composed of 47 municipalities and the city of Tagbilaran, with a total of 951 barangays, of which 107 are urban and 844 are rural. The Province is classified as first class. At the municipal level, 3 municipalities belong to 6^{th} class, 36 to 5^{th} class and the remaining has higher classification. Population of the Province was 923,863 in 2000 with an annual growth rate of 2.92% between 1995 to 2000.

Physical Features

Bohol belongs to Type 4 climate under the Coronas classification, which is characterized by a rainfall that is evenly distributed throughout the year. The terrain of Bohol is variable from nearly flat at the plains to low rolling, moderate to very steep and sloping with 5-to 50-meter high cliffs in the Sierra Bullones limestone formation. The more rugged topography is in Southern Bohol, although the Ubay volcanic rocks and Boctol serpentinite in the north and the northeast are moderate. The Maribojoc limestone, which is well known for its Chocolate Hills and Valley topography is found in the Batuan to Carmen municipalities. The highest elevation is Mt. Mayana at 827m.

There are about 81 river basins in Bohol including those located in small islands. The drainage area ranges from as low as 0.1sqkm to 9sqkm in Cabilao Island to 618sqkm in Loboc. The forest cover constitutes about 25.44% of the total land area of the Province mostly located in the southeastern mountain ranges, about 2% higher than area designated as forestland (23.5%). The existing land use pattern must be enhanced by rehabilitation of critical watersheds such as the Alejawan or Duero Watershed, Loboc Watershed and

Wahig-Inabanga Watershed Forest Reserve. The remaining forest cover must be conserved to primarily serve as watershed rather than as source of timber and fuel. An efficiently managed watershed collects and regulates flow of water, controls soil erosion, and minimizes water pollution.

Socio-economic Aspects

Employment was predominantly agriculture-led. The average annual family income in 2000 was ₱77,291, while the expenditure was at ₱66,907 or a net saving of ₱ 10,384. Percentages of families of lower income levels in the Province were greater than the average in the region. Based on the established poverty threshold level in Region VII for 2000, about 59% of the total number of families in Bohol lived within and below the poverty threshold level.

The road network adequately links the major urban and rural centers of Bohol. Electricity is available in all municipalities and in most island barangays. Several municipalities can now be access through the telephone lines with national and international direct dialing capabilities. Mobile phone service providers have recently gained entry in the Province.

Providing a significant role in the development of its manpower base in Bohol are the 1,156 schools (both public and privately owned) in all levels of education. There are also 5 skills training centers operated by TESDA that offer formal and informal training programs. A large part of the population had attained elementary or high school education

A declining provincial population growth rate had been experienced for census periods (1970-1995). From an average annual growth rate of 2.13% during the period 1970 to 1975, it decreased to a low of 0.89% (1990-1995) and but increased to 2.92% (1995-2000). The 2003 urban-rural population was estimated to provide the planning base for this provincial plan. Rural population accounts for 66% of the provincial total, while 34% is urban.

An indicator of health problems related to water supply and sanitation is the incidence of water-related diseases. The reported cases in the Province were diarrhea, typhoid, hepatitis A, intestinal parasitism, skin disease and amoebiases. Water-related diseases in the ten leading causes of morbidity include diarrhea (rank 2nd) skin diseases (rank 7th) and intestinal parasitism (rank 10th). Diarrhea also ranked 10th as the leading causes of mortality. Diarrhea (rank 2nd) is also among the ten leading causes of infant mortality.

Environmental problems related to wastewater discharge and unsanitary solid waste disposals are occurring in parts of the province. Major pollution sources in urban areas are domestic wastewater and dumped garbage. Only 14% of the total households in the Province relied on the municipal refuse collection services.

III. Existing Facilities and Service Coverage

The service coverage of each sub-sector is estimated as percentages of served population/ households/utilities against the total number. In water supply, safe classification of Level

I facilities is introduced and further categorized into public or private. Aside from household toilets, school toilets and public toilets are included in the sanitation components in view of public hygiene improvement. Preliminary discussions on solid waste management are also considered.

Water Supply

The province has 90 service providers for Level III systems operating under different types of ownership (authority or association). There are only two (2) Water Districts covering two (2) municipalities; and eleven (11) municipalities managed by LGUs. The Bohol Water Utilities is the largest system covering 14 urban barangays in the city of Tagbilaran with a served population of approximately 49,000. Common issues encountered are rationing due to insufficient water pressure caused by limited water source, inadequate capacity of distribution pipes due to inappropriate planning and designing, and insufficient water quality monitoring.

There are 96 operating bodies providing Level II systems in 26 municipalities in the province. The majority of the waterworks are utilizing spring sources (69 systems), while the remaining systems are using deep well. Most of systems utilizing deep wells practice scheduled water supply due to insufficient water source/insufficient capacity of the facilities. Such problems are mainly caused by order-less expansion or tapping of individual connections without due considerations, resulted in insufficient water flow/ reduction of water pressure. Most of the springs are free flowing and operate on a 24-hour basis. It is also common that water quality examination is not adequately conducted. Local tradesmen, and the rest, by the MEO/CEO and by barangay officials, often do repair works.

Level I facilities are common in rural barangays. Of the 14,429 Level I facilities, 50% percent are covered/improved and open dug wells, 24% are shallow wells and 10% are deep wells. According to the PSPT, only 10% of the shallow wells and covered/improved and open dug wells were observed to be safe. All deep wells and developed springs are regarded as safe water sources. Most of these unsafe sources are located in nearby potential pollution sources, hence, for new construction of shallow wells, proper site selection and appropriate construction method shall be applied together with periodic water quality monitoring. Percentage shares between public and private operational Level I facilities for rural water supplies are 42% and 58%, respectively. Share of developed springs in public facilities is 24%.

About 732,220 or 59% of the present population (1,240,000 comprising 34% in urban area and 66% in rural area) are adequately served. Under area classification, 60% of urban population and 59% of rural population have access to safe water sources/facilities. Of the served population, 59% or 432,400 persons are served by Level III systems. About 35% or 253,000 persons depend on Level I facilities, while the rest rely on Level II systems.

Sanitation

The service coverage of sanitary toilets in the province is 79% or 180,355 of the total households, which is below the current national average coverage of 88%. These toilets consist of 7% flush type, 64% pour-flush type and 8% VIP/sanitary pit latrine. In municipalities that have high water supply service coverage (Corella, Duero, San Isidro, Valencia, Baclayon, Mabini, Loon and Tagbilaran City), high sanitation coverage occurs and adversely, in low water supply coverage (Pres. C.P. Garcia, Getafe, Bien Unido and Trinidad), low sanitation coverage occurs. Service coverage in urban area is 83% while, in rural area, the coverage is 77%. Although high percentage of sanitary toilets is disclosed in urban areas, problems arise from the unsatisfactory disposal of the effluent from the septic tanks or the direct discharge of wastewater to the local drains. Sullage management is unheard of. In urban areas, there are no sewerage systems.

The province has a total of 6,086 toilets installed at 1,207 schools. Only 80% of the students is adequately served by sanitary toilets (82% also for public school students). The present average ratio of 44 students per sanitary toilet is over the service level standard of 40 students per sanitary facility. Some of these facilities are not being used due to lack of water supply, destroyed plumbing fixtures and water tank seepage. Proper operation and maintenance are not usually done. There are 338 public toilets bowls found in public markets, bus/jeepney terminals, ports and parks or plazas. Almost all public utilities (98%) are served with sanitary toilets. However, the manner of usage and maintenance are improper rendering the facilities unsanitary. At present, no specific arrangements are made for the operation and maintenance, as well as the collection of fees to cover such cost.

IV. Existing Sector Arrangements and Institutional Capacity

Institutional Framework

The Local Government Code (1991) has essentially re-defined the roles, relationships, and linkages of central, provincial, municipal and barangay institutions in the provision of basic social services, including water and sanitation. The new direction mandates the LGUs to play a larger role in planning and implementing water supply and sanitation projects. However, this has raised serious institutional capacity and resource reallocation issues.

At the national government level, there are two line agencies (DILG and DOH) and two government-owned and controlled corporations (MWSS, for Metro Manila franchise areas and LWUA, for outside Metro Manila franchise areas), which are responsible for sector project implementation. Even at the national government level, there are various transitions that are in process in the sector. The other government agencies concerned with macro planning, natural resources allocation decisions and environmental protection and management are the DENR for watershed protection and the National Water Resource Board (NWRB), which is now under DENR that regulates the franchising of water rights.

At the provincial level, the offices involved in WATSAN activities are the Provincial Planning and Development Office (PPDO), the Provincial Engineering Office (PEO), the Provincial Health Office (PHO) and other offices concerned. At the municipal/city level, planning offices, engineering offices and health offices of municipalities/cities are also involved. The DILG, a national agency, also has its field office working in the sector. Water Districts (WD), RWSAs, BWSAs, water cooperatives and other community-based organizations have been organized to deal with the actual delivery of services. Some LGUs implement and operate municipal or provincial water and sanitation systems. Water Supply and Sanitation Program Management Office (WSS-PMO/DILG at the national level), ad hoc inter-agency committees, and task forces have been organized to address coordination issues.

LGUs are able to implement WATSAN projects using internally generated funds. Barangays generally request for Level I/II systems while municipalities desire Level III facilities. The major foreign funded WATSAN projects, which the province participated in was the USAID-assisted BWP (Level I & II) in the 1980s and the AUSAID-funded Central Visayas Water Supply Project (CVWSP) and UNDF-Swedish Trust Fund in the 1990s. LGUs have limited resources and just starting to improve their implementing capabilities when it comes to WATSAN projects. For future projects, the Province will still need the assistance of national government line-agencies and NGOs. There are only few BWSAs still functioning, but most of the water cooperatives, RWSAs and community-based organizations are still functional. Most of these BWSAs are poor in the O&M of facilities and will need to be strengthened through a joint effort of the Province and the DILG. WDs with a higher level of management expertise supply water to the urban areas. There are also numerous LGU-managed water systems in the Province.

Monitoring activities in the province are done on a project basis and are limited to specific projects (projects assisted by national and/or external agencies). Moreover, monitoring is done only in terms of physical performance against financial requirements. There is wide dissatisfaction among implementers themselves with the existing monitoring system. Poor monitoring leads to the problem of reliability of information coming from the field. There is a need to establish a system similar to project-based monitoring which will have a direct link to performance. In addition, it should be conducted periodically in order to develop a more reliable database for the sector.

The current major institutional issues are: managing the transition process and establishing the LGU's leadership for the sector. Major resource realignments and capacity building initiatives are needed. At the local level, the LGU's capability to handle sector projects needs to be developed to enable them to address their expanded role sufficiently. This will require substantial input and support.

Community Participation and Gender Aspects

Planning or implementing community development processes for the WATSAN sector projects in the Province of Bohol was limited to the BWP, CVWSP and UNDF-Swedish Trust Fund. The manner of community organizing was patterned after these past sector projects. As such, there is an apparent lack of a permanent structure and of the identified

major responsible players on community organizing for the sector in the LGU, which creates a serious gap to the critical linkage and support of sector projects, from the provincial to the municipal and as far down as the barangay levels. Also, training programs updated the knowledge and skills of LGU and community-based organizations on this important activity, but these are project-based and not part of the regular activities of the LGU.

Gender-responsive community-based approach in the sector, as a whole, has still to be fully integrated in the mainstream of projects planned and implemented for the province and its municipalities and barangays.

V. Past Financial Performance in Water Supply and Sanitation

Since the devolution of the water supply and sanitation project to the LGUs in 1991, the LGUs have been dependent on the Internal Revenue Allotment (IRA) for their financial requirements. For the period 1999-2003, the IRA of the Province represented about 89% of the total income.

Actual expenditures for the same period were 91% of the total revenue. These expenditures are further broken down into personnel (57%), capital outlay (2%), and operation and maintenance expenses (29%).

Funds for the capital outlay are mainly derived from 20% Development Fund (DF) of the IRA. During the period 1999-2003, the 20% DFs of the Province were sufficient to cover the actual expenditures.

The Provincial Government has not given priority to WATSAN sector. Actual expenditure for the WATSAN sector in 1999 was 3.7% of the 20% DF, but decreased to 0.4% in 2003.

The sector projects in previous years were funded by CVWSP-AUSAID and UNDF-Swedish Trust Fund and were undertaken by PPDO, PEO, and PHO. The PEO-Waterworks implements the provincial government funded projects under the General Fund. For sector project implementation, funding sources were provincial government, CDF (Congressmen) and the municipal government, while the implementing agencies were the PEO, DPWH-District Office and the Municipal Government, respectively.

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

The O&M costs for Level I and II water supply systems are the responsibility of the users. It is mandatory for the community to organize themselves into an association, cooperative or community-based organization, which handles collection of water charges as well as O&M of the facility. However, most of the RWSAs, BWSAs and some of the CBOs reportedly face difficulty to manage the systems, since beneficiaries do not recognize the cost requirements. For Level III systems, the O&M costs are basically covered by the user's fees. LWUA's policy is to make WDs financially viable, self-sufficient and be able to repay their loans obtained to improve water supply services.

The percentage of water fee to median monthly household income is about 2.75% for Level III service. Thus, the current water rates are within affordable range.

VI. Water Source Development

The study on water source development covers the entire Province. It gives an emphasis on groundwater availability rather than surface water considering its economic advantages and current practices in potable water use.

The Province of Bohol is largely characterized by a karst topography. A karstic terrain is basically made up of limestone from a former coral reef. The portion of Bohol where the so-called Chocolate Hills are found is said to be at the late (advanced) stage of karst development. The oldest rock formations in the province are either igneous or metamorphic rocks (Cretaceous). Tertiary rock formations include Ubay Volcanics, Talibon Diorite, Jagna Andesite, Ilihan Plug, Kabulao Conglomerate, Wahig Limestone, Carmen Formation, Sierra Bullones Limestone and Maribojoc Limestone.

The Ubay volcanics (Early-Late Paleocene) are agglomerates, volcanic flows of andesitic and basaltic composition, and intrusives of gabbro and diabase. Massive formations are encountered in the municipalities of Ubay, Mabini, Pres. C.P. Garcia, Buenavista, Getafe, Trinidad, Danao, San Miguel, Inabanga, Talibon, Dagohoy and Carmen.

The Talibon diorite (Late Paleocene) is characterized by the occurrence of copper and gold mineralization locally encountered along contacts with volcanic rocks. These formations are mostly found in Talibon and scattered in Getafe, Trinidad, Danao and Dagohoy. On the other hand the Jagna Andesite (Middle Miocene), which is porphyritic can be found in Jagna, Anda and Candijay.

A dominant rock on the eastern portion of the Province is the Carmen Formation (Middle Miocene). It is composed of different members: the uppermost Sevilla Marl, Tubigon Conglomerate, Carmen Sandstone and Shale and low dipping and interbedded tuffaceouse Ilihan Shale at the Base. Unconformably overlying the Carmen Formation is the Sierra Bullones Limestone (Late Miocene). These are massive to marly limestone containing small orbitoid fossils; correlative to the Barili Formation of Cebu. This formation is mostly found on the south-southeastern portion of the Province.

The dominant rock on the western portion of the province is the Maribojoc Limestone (Plio-Pleistocene). This is a clastic to coralline limestone, very poorly to clearly bedded to massive, marly in many occurrences.

Quaternary alluvial deposits of mud, silt, sand and gravel can be found along the northwest and northeast coast of the province.

Several faults have been identified in the southwestern, southeastern, and central portions of the island. In the southeastern part (municipalities of Anda, Guindulman and Duero) thrust faulting and strike slip faults (right lateral) are observed. Within the vicinity of Mt. Malibalibad (eastern part of Bohol), thrust faulting also can be observed. Block faulting with a probable extensional origin can be observed in the municipalities of Danao (central Bohol); Balilihan, Cortes, Loboc (southwestern) and the western portion of Bohol (near Cabulao island).

For planning purposes in the development of groundwater sources, the provincial area is divided into solo shallow well, deep well and difficult areas. Deep well area cover more than 70% of Bohol while difficult area and solo shallow well area comprise the remaining area. Potential areas for saline water intrusion are the coastal portions of Tagbilaran City and the municipalities of Panglao and Dauis.

From the inventory of water sources, the Province has 1,145 developed springs currently serving the province. A total of 21 untapped springs for future development is reported in 9 municipalities. However, only 8 have discharges greater than 2 lps.

Referring to the existing well inventory, the depth of potential aquifers occurs between 10 to 90 meters in recent deposits, Carmen Formation and Maribojoc Limestone. The development of deep wells is more advantageous than shallow wells considering the safe quality and invariable yield of deeper aquifers.

Water supply projects using surface water source are planned due to limited groundwater availability in certain portions of the Province. These projects include the clustering of municipalities and tapping the Loboc River (South), Wahig-Inabanga (North) and Alihauan River (East). These projects are included in the proposed Bohol Inter-Municipality Water Connection Plan (BIMWCP), which seeks to lay a water pipeline parallel to the circumferential road of the Province.

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

For the furtherance to design the concrete specifications of the planned wells, recommendations are made to conduct detailed groundwater investigations entailing the construction of test wells and the preparation of groundwater database, prior to the detailed design or in the pre-construction stage.

Untapped springs shall also be surveyed to confirm the development possibility in the detailed groundwater investigation. This will include items on the following: 1) location and type of spring source; 2) fluctuation of discharge rate through the year; 3) distance

from spring source and proposed served area; and 4) relative elevation between the two points.

Towards an Integrated Water Resources Management

The delineation of the different watersheds that comprise the Province is seen as the first major step towards formulating an Integrated Water Resources Management. With each watershed as the basic block in this approach, the micro-management of each watershed will play a crucial role in this integrated management scheme for the whole Province. This will enable the implementation of a water balance study paving the way for a proper accounting of water in each drainage basin. It is hoped that this approach will contribute to the sustainability of water supply projects.

VII. Future Requirements in Water Supply and Sanitation Improvement

Physical Targets and Service Coverage

Phased requirements for the sector development in the Province are assessed to meet the provincial targets established as percentages of beneficiaries or utilities to be served by sub-sector. Targets of service coverage for water supply in Phase I development were established in consideration of securing the existing service coverage and viable investment using available IRA both in urban and rural water supply as shown in Table 7.1.

Table 7.1 Present Service Coverage and Sector Targets

Sub-Sector	*Area/Type*	*Base Year Service Coverage*	*Provincial Sector Targets*	
			Phase I	*Phase II*
Water Supply	***Urban Area***	***60***	***89***	***95***
	Rural Area	***59***	***90***	***93***
Sanitation	***Urban HH Toilet***	***83***	***94***	***98***
	Rural HH Toilet	***77***	***94***	***98***
	School Toilet	***82***	***90***	***95***
	Public Toilet	***98***	***100***	***100***
Sewerage	***Urban Area***	***0***	***Not applicable***	***50***
Solid Waste	***Urban Area***	***42***	***90***	***Not applicable***

Sanitation sector target is applied in order to attain sufficiency and balanced distribution of the facilities in urban and rural area as embodied in the PNDP. Sewerage target is set for only part of urban centers in the long-term development, while solid waste management considered the medium-term household requirements. Logistic support is considered as a minimum requirement of LGUs for the implementation of PW4SP. The types and number of well drilling/rehabilitation equipment and supporting vehicle for Level I facilities are identified as reference information. Also, minimum requirements for setting up a provincial laboratory to support drinking water quality surveillance and monitoring activities are described.

Required Facilities to Meet Target Services

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

In sanitation sector, pour flush and/or flush type household toilets are planned, while VIP type household toilet and sanitary pit latrine are considered in rural area as an intermediate measure. Sewerage program is planned in Phase II for limited urban area. The study on solid waste considered only the number of required trucks for the year 2010. Additional service coverage of the sector by phase is shown in Table 7.2.

Table 7.2 Additional Service Coverage by Phase

Sub-Sector	*Area/Type*	*Unit*	*Additional Service Coverage*	
			Phase I	*Phase II*
Water Supply	*Urban Area*	*Persons*	*204,400*	*156,504*
	Rural Area	*Persons*	*423,141*	*215,090*
Sanitation	*Urban HH Toilet*	*No. of Households*	*24,855*	*56,317*
	Rural HH Toilet	*No. of Households*	*58,307*	*110,024*
	School Toilet	*No. of Students*	*67,944*	*69,916*
	Public Toilet	*No. of Utilities*	*91*	*144*
Sewerage	*Urban Area*	*Persons*	*Not applicable*	*228,746*
Solid Waste	*Urban Area*	*No. of Households*	*55,040*	*Not applicable*

The necessary water supply facilities for Phase I include 56 deep wells/springs for 37,516 house connections in urban area, and 21 Level II systems with spring sources and 5,078 Level I facilities for rural area. For Phase II, 54 deep wells/springs for additional 39,130 connections and 3,540 Level I wells/springs are required for urban and rural water supplies, respectively. It is assumed that 50% of Level I facilities will be implemented by the LGUs. Rehabilitation requirements are assumed to be 10% of the total number of deep wells to be constructed under PW4SP. With regard to strengthening water quality examination, one (1) set of water quality test instruments/equipment will be necessary to be housed in a laboratory to be constructed in Tagbilaran City.

For urban water supply, one Level III system is, in principle, considered for urban area of every municipality. In the municipalities with existing Level III system/s, the expansion of the existing system/s was first considered. In case there are no Level III systems, a new

system was recommended. Existing plan/s on the development of waterworks/WD are also taken into account to determine respective systems of the municipalities.

Currently, 3 out of the total 47 municipalities have no Level III system in their urban/rural areas.

Merging of municipal systems (physical arrangement) in long-term is considered. Integrated management systems shall also be sought. Conditions to be studied include: water source availability, willingness by concerned municipalities and technical study on cost recovery/economic construction.

Integration of other small Level III systems for operation and management shall be sought, although these systems are currently managed individually.

Moreover, Phase I sanitation will require 24,855 household toilets, 90 public school toilets and 91 public toilets for urban area. In rural area, 58,307 household toilets and 231 public school toilets are necessary. Solid waste disposal will need 45 refuse collection trucks. For Phase II, urban area will require 56,317 household toilets, 101 public school toilets and 144 public toilets. In rural area a total of 110,024 household toilets and 1,135 public school toilets are necessary. It is assumed that half of the requirements of school toilets may be converted to classroom toilets from standard toilet building depending on technical conditions and adjustment with DepEd.

VIII. Sector Management for Medium-Term Development Plan

Sectoral and Institutional Framework

To effectively manage the development of the WATSAN sector, the provincial and municipal governments will have to make some adjustments in their current policies and structures. One basic institutional need at the local level is the absence of a common goal and strategy for the sector. The Province has to come up with its logframe (logical framework), which sets the goals, purpose, targets and activities for the sector. Target setting in terms of the proportion or percentage of people and resources who are stakeholders and key players must be identified. The goal of the sector is to provide safe, reliable and accessible drinking water for the marginalized sector of society, the poor, the women and the children, within a demand-responsive and gender-responsive approach. Through the logframe, the Province can formulate its operating and regulatory policies and financing system to fulfill the goals and targets that it has set for itself.

In line with the proposed adjustments, the Province shall adopt the following policies and strategies for the development of the sector:

- Facilities management with emphasis on sustainability through community commitment and increased responsibility;

- Project selection and prioritization based on: i) beneficiaries' commitment and willingness to pay; ii) current water, sanitation and health conditions; and iii) potential for growth;

- Appropriate service level based on Province's goals and purposes, community needs and community commitment;

- Technology appropriate to local conditions and resources integrating wastewater collection and treatment and drainage;

- An integrated approach in the provision of potable water supply, sanitation, and hygiene education;

- Equitable provisions of water supply and sanitation services for rural and urban areas, and for poor and non-poor areas through cost recovery and cost sharing (cross-subsidy policies);

- Private sector participation policies and incentives to be encouraged by the LGU but establishing the regulatory framework for private sector participation;

- Seeking potential sources of local (IRA and other internally generated funds) and external funds (loans and grants) to finance the capital requirements of the sector;

- Broader concerns for environmental protection and management in sector development including water pollution control, conservation and proper utilization of water and land resources;

- Provision of water supply and sanitation services under emergency conditions

- Provision of gender-responsive policies in the different aspects of the sector project: technical, economic, financial, institutional and community participation including equal participation of women and men in the beneficiary community.

Also to be given priority by the LGU are the following:

- Measures to set up, in coordination with appropriate national and local agencies, a coordinated regulatory framework considering, among others, the following: policies on water allocation and water rights (resolution of priorities and conflicts); registration/ accreditation of water service providers; and water quality surveillance.

- Measures to avail of national and external funds, including MDF, in addition to local taxes and allocation from the IRA 20% Development Fund as a primary source of funds.

In the medium-term, a full-time Provincial Water Supply and Sanitation (WATSAN) Sector Team (PST) to provide a focal point in the Province shall be set up for coordination, monitoring and institution-building. The LGU should ensure that adequate logistics and incentives are provided. This may be replicated at the municipal and barangay level of the LGU. In the long term, the PST may be formed as a Provincial Water and Sanitation Office (PWSO) under the office of the Chief Executive of the LGU. The WSS-PMO of DILG shall, however, continue to provide technical and managerial assistance in the formative years of the PST/PWSO.

Community-based Organizations

The LGU shall promote the participation of NGOs, people's organizations (POs), and community-based organizations (CBOs) to catalyze the involvement of women, youth, people's organizations (POs) and other segments of the community in project decision-making and management. The LGU shall develop a community-based implementation strategy and delivery mechanism to ensure the sustainability of sector projects and shall assess the community participation activities and related institutional arrangements of past community projects and recommend workable community participation approaches in the sector.

Human Resource Development and Training

Human resource development and training aims to improve individual competence, organizational effectiveness and efficiency, and espouse national development and ensures the availability of qualified manpower. Training shall be designed and implemented for implementers, planners from national level to regional to LGUs and down to the community level and shall be based on needs. Participants will be selected based on the their tasks and responsibilities. The PST/PWSO shall establish and maintain a reference library and information/documentation center and shall include training materials and equipment to service needs of the municipalities. The DILG-LGU shall provide inputs to these training activities. The LGU ensure that training programs take place and are effective. Training may include: source development principally for deep wells, shallow wells, spring development and surface water intake structures, operation and maintenance, plumbing and pipe-laying and basic hydraulics, bookkeeping and management and special courses for water and sanitation caretakers.

Health and Hygiene Education

The LGUs shall establish an on-going hygiene education program through appropriate methods and channels, which shall include short-term programs, such as, information campaigns and long-term value formation interventions, possibly through the formal school system. Three approaches are recommended: community-based, school-based approach and media-based. The community development specialist at the PST/PWSO shall be given the responsibility for the health and hygiene education function. At the barangay level, its implementation will involve the close coordination among the midwives, the barangay health workers and the Committee on Health of the barangay council. Materials for these efforts have been previously developed and can be found with the various PHOs and RHUs. UNICEF has provided strong support in the preparation of these materials.

Gender and Development

The water supply and sanitation sector shall promote the full participation of men and women in all the phases of the project development cycle and in setting up the WATSAN institutional arrangements in the Province. A gender-responsive approach should consider the following: training of the LGU officials and employees from the regional, provincial,

municipal and barangay levels on gender and development; conscious integration of gender concerns in all aspects of project development; equal representation and distribution of responsibilities to the men and women of the beneficiary community, particularly in sharing work, making decisions, cooperation and control of activities. To provide the LGU insight on how to conceptualize gender-responsive approaches in the Province, it shall conduct a provincial survey to review the role of women in the context of the design of the community participation structure of the project.

IX. Cost Estimates for Future Sector Development

The public investment cost includes direct cost for construction/rehabilitation of required facilities, procurement of vehicle/equipment, construction/upgrading of laboratory, sector management, physical and price contingencies, and value-added tax. The recurrent cost is incurred for operation and maintenance of facilities. Unit construction cost per person/household/ facility was first prepared under contract-out basis in 2003 price level. Investment cost required by phase for the Province is summarized in Table 9.1.

Table 9.1 Public Investment Cost Required by Phase

Unit:1,000 Pesos

Item	*Component*	*Phase I*	*Phase II*
Construction/ Rehabilitation	***Water Supply***		
	Urban Area	*1,017,232*	*759,128*
	Rural Area	*650,961*	*415,910*
	Sanitation		
	Household Toilet[1]	*0*	*0*
	School Toilet	*121,659*	*468,444*
	Public Toilet	*43,064*	*69,663*
	Disinfection of Well	*90*	*0*
	Urban Sewerage	*N/A*	*1,303,852*
	Sub-Total	***5,169,392***	***3,016,997***
Procurement of Vehicle/ Equipment/Maintenance Tools	*Well Drilling Rig & Service Truck*	*32,314*	*0*
	Support Vehicle	*719.8*	*0*
	Well Rehabilitation Equipment	*341.6*	*0*
	Maintenance Tools	*12.2*	*0*
	Water Quality Testing Kits	*18.67*	*0*
	Sub-Total	***33,406.27***	***0***
Water quality Laboratory		*2,000*	*0*
Sector Management	*Engineering Studies*	*672,021*	*392,210*
	Community Development and Training	*121,453*	*166,657*
	Sub-Total	***793,474***	***558,867***
Total Direct Cost		***5,996,272***	***3,575,864***
Contingencies	*Physical Contingency*	*599,627*	*357,586*
	Price Contingency	*1,499,068*	*N/A*
	Value-Added Tax (VAT)	*599,627*	*N/A*
Total Investment Cost		***8,694,594***	***9,910,140***
Total Investment Cost (excluding Price Contingency)		***7,195,526***	***9,910,140***

1/ Previous Government practice was the distribution of toilet bowls (pour-flush only), however it shall be excluded from NG-assisted projects due to the current practice of NEDA.

The investment cost for Phase I is estimated at about ₱ 8.69 billion (in 2003 price level). A total of ₱ 5.2 billion is required as the construction/rehabilitation cost (including cost for disinfection of well) in Phase I, of which urban water supply and rural water supply

share 56% and 35%, respectively. While, the remaining 9% are required for urban and rural sanitation. With reference to urban water supply, some cost required would be managed by newly created WD/s, which is out of public investment to be undertaken by LGUs.

Required equipment and vehicle for construction/rehabilitation of Level I facilities and solid waste management are roughly estimated: 1 set/unit each of well drilling equipment and service truck with crane; 1 set/unit each of well rehabilitation equipment and support vehicle; and 45 units of refuse collection truck. The total procurement cost is estimated at approximately ₱33.5 million.

Likewise, annual recurrent cost in 2003 price level is estimated at ₱87.0 to ₱130 million/year in 2010.

X. Financial Arrangements for Medium-Term Development Plan

Financial arrangements to attain medium-term (Phase I) targets were sought focusing on available Internal Revenue Allotment (IRA). The financial shortfall was first identified for this sector and recommendations were made to seek comprehensive logistics in terms of acquisition of various funds, augmentation of current practices in Government assistance to this sector and effective investments and cost recovery.

The projection of IRA to the relevant sector for Phase I period was made covering different administrative levels. Referring to the experience in other provinces, provincial allocation to the relevant sector is assumed to be about 4%. This means that approximately 20% of "20% Development Fund" from national IRA are counted on sector projects. The same percentage is applied for the allocation of municipal IRA to the sector. The fund available for this sector for medium-term implementation period from 2004 to 2010 was calculated as a sum of municipal and provincial allotments.

The combined provincial and municipal IRA to the sector was estimated at ₱731.71million. In the overall IRA allocation to the sub-sectors, urban water supply has the largest allotment of 56%, followed by rural water supply (35%). While, the share of rural sanitation is 5%, which is higher than that of urban sanitation of about 4%.

The shortfall in funding on the current price level was figured out comparing with available fund for the relevant sector (IRA) in the province over the Phase I requirements. IRA can fund only 89% of the requirements as a provincial average. Hence, the Province will have a shortfall of ₱300 million in funding. It will become ₱810 million in consideration of price escalation with annual rate of 5.5% and VAT. In the municipal achievement percentage in finance, Alicia, Dimiao, Lila, San Isidro, Sevilla and Sikatuna (100%) are the highest among municipalities. Majority is in the range between 60% and 99% to the respective requirements, while the provincial average is 89%.

Under the above situation, different levels of funding availability are discussed with reference to service coverage. Alternative countermeasures are also discussed in view of: i) acquisition of external funds: ii) augmentation of sector finance under current arrangements (IRA and others); iii) introduction of private sector participation to mitigate

public investment needs; and iv) effective and economical investments. It is common to all sub-sectors that the service coverage in the year 2005 would not sustain even the present levels in the provision of only projected IRA. Using computer-based programs, these scenarios may be modified by policy makers according to the updated information and policy on available fund and sector targets.

In the investment need ranking of municipalities covering four sub-sectors, the top ranking municipalities are Bien Unido, Carmen, Dagohoy, Dauis, Getafe, Guindulman. Loay, Pilar, Pres. Carlos Garcia, San Miguel and Talibon, which indicate that they are given priority for investments in all sub-sectors. Baclayon, Danao, Loay and Valencia are the least priority in terms of investment ranking.

Project financing arrangement was studied in line with the Municipal Development Fund Office (MDFO) – Policy Governing Board (PGB) approved NG-LGU cost sharing arrangement. Financing the cost sharing among the Province, municipality and barangay shall then be clarified based on the estimated cost requirements through MOA.

The new policy of the national government grants for devolved activities shall be applied to all new ODA-assisted projects that are currently being packaged in support of the LGUs. With this, the NG-LGU sharing is based on income classification of the province, municipality, city and level and type of service to be implemented, shown below:

New Cost-Sharing Arrangement between NG and LGUs

PGB-approved Cost Sharing (% share)

Level and Type of Service	Income Class (Municipalities/ Provinces)								
	1st/ 2nd			3rd/ 4th			5th/ 6th		
	NG[1]	LGU[2]		NG[1]	LGU[2]		NG[1]	LGU[2]	
		Equity[1]	Loan[1]		Equity[1]	Loan[1]		Equity[1]	Loan[1]
Level I/II WS	30	20	50	40	15	45	50	10	40
Level III WS	0	0	0	20	10	70	50	10	40
Sanitation	20	20	60	40	15	45	50	10	40

PGB-approved Cost Sharing (% share)

Level and Type of Service	Income Class (Cities)								
	1st/ 2nd			3rd/ 4th			5th/ 6th		
	NG[1]	LGU[2]		NG[1]	LGU[2]		NG[1]	LGU[2]	
		Equity[1]	Loan[1]		Equity[1]	Loan[1]		Equity[1]	Loan[1]
Level I/II WS	0	20	80	0	20	80	30	20	50
Level III WS	0	0	0	0	0	0	0	0	0
Sanitation	0	20	80	0	20	80	20	20	60

The overall project cost for the implementation period 2004-2010 was estimated at ₱2.5 billion in 2003 price levels.

[1]NG – National Government grant for the respective level and type of service and respective income class of the LGU.
Equity – refers to the minimum cash equity contribution to be put up by the LGU.
Loan – refers to the portion of the project cost that the LGU must finance either through loan from MDFO or other Government Financing Institutions (GFIs), e.g., Land Bank, DBP, etc.

[2] If the LGU can raise the equity portion more than the minimum required amount, then the portion of the project cost it needs to raise through loan would be lower. Loan terms of MDFO: Interest Rate - currently at 14% per annum fixed until maturity of the sub-loan; Repayment Period - payable in 15 years inclusive of a 3-year grace period.

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

For Case 1, GOP shall share 50% of the overall project cost in combination of the foreign assisted loan and government counter part fund. The remaining 50% shall be shared by the LGUs (47%) and beneficiaries (3%). Under this case, the IRA to be used by the LGUs will increase to ₱1.2 billion from ₱76 million (2003 price levels), considering price contingency and VAT. As a result of cost comparison between the estimated project cost to be shared by the LGUs (₱1.2 billion) and available IRA of LGUs (₱2.4 billion). The required cost is covered by the available IRA.

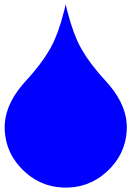
For Case 2, the utilization of the MDF is considered in case the LGUs would fail to furnish IRA for the cost to be shared. The foreign loan may be availed of at the maximum financing limit of 70% of the overall project cost.

NG can possibly finance up to ₱1.767 billion or 70% of the total project cost as a portion of the loan. Out of NG finance through the loan, ₱1.019 billion or 40.4% of the total project cost shall be granted to the LGUs, aside from 9.3% NG counterpart fund. The remaining ₱748 million or 29.6% of the total project cost shall be financed through MDF to improve financial capacity of the LGU. Under this case, the IRA to be used by the LGU will be ₱448 million inclusive of price contingency and VAT, which is 19% of available IRA allocated for the sector.

Cost recovery and cost sharing shall be promoted to attain the planned target based on the principle that adequate water, sewerage and sanitation facilities should be paid for. For Level I water supply systems, LGUs and beneficiaries are required to share the capital cost. For Level II water supply systems, full cost recovery is required for all capital and recurrent cost (₱71.60/HH/month in 2010, less than 1% of monthly income). For Level III water supply systems, a full recovery of capital and O&M cost is required (₱54.10/HH/month in 2010, less than 2% of monthly income). Based on the experience that water fee must not exceed about 5% of income (average monthly water consumption of 15 m^3), the monthly water rate seems to be more than the affordable levels.

For sanitation, the provision of sanitary toilet facilities for public markets and schools is both under the LGUs. For schools, this will be in coordination with the parent-teacher association. The recurrent cost for the public market toilets shall be collected from the market users, vendors and other users. The individual household will manage the household toilet.

CHAPTER I



INTRODUCTION

CHAPTER 1 INTRODUCTION

1.1 Sector Development in the Philippines

The Government of the Philippines (GOP) has been implementing water supply and sanitation sector projects over the years aimed at addressing the sectoral concerns. In dealing with these concerns, the national policy framework for water resources provides the focal point in the formulation of strategies and targets for the implementation of sector projects. Towards the ultimate goal for sustainable development and management in the sector, the national framework is cognizant of the policy of devolution and community-based approaches. Thus, development in the sector covers both physical and institutional framework.

Although much has been achieved by the GOP over the last two decades, the water supply and sanitation services are still inadequate to meet the health and environmental requirements of the country. About 79% (60.3 M) of the population nationwide had access to potable water supply in 2000 (68% in 1995). In urban areas outside Metro Manila, 88% (18.3 M) had access to safe water supply services (61% in 1995), while in the rural areas, 85% (35.8 M) was covered by these services (70% in 1995). However, from the studies of previous PW4SP, it was found out that about 20-30% of the existing water sources in the rural areas fall in the category of underserved or unserved in terms of safe or unsafe sources, damaged and non-functioning sources. Hence, of the rural population, it was estimated that only about 60-68% was served adequately by safe sources. This implies that around 72% of the total population (excluding Metro Manila) has access to adequate and safe water supply services.

Household sanitary toilets were available to 88% (55.4 M) of the total population (excluding Metro Manila) in 2000. Communal toilet facilities are generally found only at schools, public markets and sometimes in bus terminals, ports and town parks. For sewerage, only portions of the cities of Metro Manila, Baguio, Zamboanga and Vigan have sewerage systems (Zamboanga and Vigan have no sewage treatment plant). A mere 4.1% of the total population in the country was covered by sewerage facilities.

The policies and strategies on the sector are generally guided by the *Medium-Term Philippine Development Plan (MTPDP): 2001-2004* and the *Philippine National Development Plan (PNDP): 1999-2025*. Activities in the sector have been directly guided by the *Water Supply, Sewerage and Sanitation Master Plan of the Philippines 1988-2000* since its issuance in 1988. The National Sector Master Plan (NSMP) sets ambitious targets to reach large segments of the population and to redress the imbalances between rural and urban areas. Meanwhile, the MTPDP revised the targets for water supply services based on updated conditions in 2000.

Development in the sector had previously been directed to a high degree by central government agencies. However, the GOP has been instituting devolution and full decentralization of responsibilities for implementation of infrastructure projects to Local

Government Units (LGUs), in line with the Local Government Code of 1991. Major initiatives towards this direction in the sector are the current projects being implemented such as the World Bank funded Local Government Unit-Urban Water Supply and Sanitation Project, the ADB-funded Rural Water Supply and Sanitation Project and the JBIC-funded Rural Water Supply and Sanitation Project Phase V. These projects aim at building/enhancing local level capacity in planning, implementation and management of water and sanitation services.

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

1.2 Provincial Sector Planning

1.2.1 Objectives of Sector Planning

The main objectives of the provincial sector plan are:

(1) To formulate a Long-Term Provincial Development Plan for the water supply, sewerage and sanitation sector up to the 2015 through technical assistance to the provincial staff;

(2) To propose a Medium-Term Sector investment plan covering the years 2004-2010 to form the basis for implementing foreign and locally funded projects;

(3) To recommend physical and financial arrangements and logistics for implementation; and

(4) To provide measures to strengthen operational framework and institutional capabilities including community development and gender responsiveness.

1.2.2 Scope of Sector Planning

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

(1) Collection and Review of Previous Studies and Existing Data, and Establishment of Data Base: Inventories on Existing Conditions and Facilities

1) Natural conditions and geographical features

2) Socio-economic conditions to include population and health status

3) Environmental conditions

4) Existing facilities and service coverage

- Water Supply
- Sanitation and Sewerage

5) Existing sector arrangements and institutional capacity

- Sector institution
- Current community development, gender and training approaches
- Existing sector monitoring systems

6) Past financial performance in the sector development

(2) Long-Term Development Plan

1) Projection and assumption of planning framework: projection of population and relevant frame values, and targets of the sector plan

2) Service coverage by target year

- Water Supply
- Sanitation and Sewerage

3) Water source development

4) Service expansion plan

5) Estimation of project cost

6) Investment program

(3) Medium-Term Investment Plan (2004 – 2010)

1) Facilities and equipment, and rehabilitation required to meet target services

2) Identification of priority projects

3) Sector management plan

- Institutional arrangements
- Community development, gender and training
- Procurement, construction and operation and maintenance
- Sector coordination

4) Estimation of project cost

5) Financial arrangements

- Sources of fund
- Additional funding requirements
- Investment needs ranking of municipalities
- Implementation arrangements
- Cost recovery

1.2.3 Financing of Sector Plan

In 1987, the Philippine Water Supply, Sewerage and Sanitation Master Plan (NMP) was formulated as an offshoot of the declaration of the International Drinking Water Supply and Sanitation Decade – 1980 to 1990. One of the major projects identified in the NMP is the First Water Supply, Sewerage and Sanitation Sector Project (FW4SP), a World Bank (WB) assisted rural water supply project that was proposed for implementation from 1990 to 1995.

Prior to implementation of the FW4SP, the funding agency (WB) made it a condition on the part of the GOP to require the participating provinces to formulate their respective Provincial Water Supply, Sewerage and Sanitation Sector Plans (PW4SP) to ensure a more successful and effective project implementation. The PW4SP should have as its planning basis the newly formulated NMP. Further to this, the WB also made it a pre-requisite for loan effectiveness, the completion of the 8 PW4SP from 1989 to 1990.

The responsibility of assisting the FW4SP participating provinces was delegated to the DILG (then DLG) on the strength of the agency's delineated institutional role and function as provided under the National Economic and Development Authority (NEDA) Board Resolution No. 5 that was passed in 1987. The DILG subsequently negotiated with NEDA in order to obtain funding support for the formulation of PW4SP for the FW4SP provinces. This proposal was later expanded to cover similar assistance to provinces outside of FW4SP and was correspondingly endorsed by NEDA.

In contrast with the previous approach in which the central government agencies were tasked to carry out development for the sector, the preparation of provincial sector plans is the responsibility of the Local Government Units (LGUs). This is in line with the Local Government Code (LGC) of 1991 to effect a substantial decentralization of responsibility in the project planning and implementation. The thrust of the Government is to promote the involvement of local staff in the entire development process. The Provincial Planning and Development Office (PPDO) is designated as the focal point for this responsibility.

To date, there are 58 Provincial Sector Plans prepared and completed which were funded out of local funds and foreign grants. These are the following:

1) Pilot PW4SP assisted by Danish Government through WB and DPWH (early 1989) – Cavite and La Union

2) DANIDA through DILG (mid-1989) – Camarines Sur, Camarines Norte, Albay, Sorsogon, Tarlac and Nueva Ecija

3) DPWH Special Funds and DILG (1990-1991) – Bataan, Bulacan, Batangas, Pampanga, Laguna and Ifugao[1]

4) UNICEF and NEDA-CAR (1989-1991) – Mt. Province and Ifugao

5) UNDP Grant Funds (1992-1993) – Quezon, Palawan, Romblon, Marinduque, Catanduanes and Masbate

6) UNDP administered Danish Trust Fund (1992-1993) – Benguet, Kalinga-Apayao, Isabela, Quirino, Aurora, Pangasinan, Cagayan

7) JICA Technical Cooperation (mid 1994-early 1996) – Zambales, Rizal, Mindoro Oriental, Mindoro Occidental, Ilocos Norte, Ilocos Sur, Nueva Vizcaya, Batanes, Abra

8) JICA Technical Cooperation (mid 1998-early 2000) – Agusan del Norte, Agusan del Sur, Davao del Norte, Davao del Sur, Davao Oriental, Surigao del Norte, Bukidnon, Misamis

9) Oriental, Sarangani, South Cotabato, Biliran, Eastern Samar, leyte, Nortern Samar, Samar, Southern Leyte, aklan, Antique, Capiz, Iloilo and Negros Occidental

Some of these Plans were used as basis for the implementation of water supply and sanitation projects such as the FW4SP (WB-funded), RW3SP (ADB-funded), PAF 2 for 5th and 6th class municipalities (local funds) and RWSSP Phase V (JBIC-funded). In addition, preparations are underway to commence the RWSPVM (KfW-funded).

Recently, the Federal Government of Germany, through GTZ Water program agreed to provide technical assistance in the preparation of Provincial Sector Plans in Region VII covering the provinces of Bohol, Cebu, Negros Oriental and Siquijor. The PW4SP for Bohol will be the basis to execute sector development from the proceeds of the sector loan by foreign donors, LGUs budget including internal revenue allotment from National Government and private sector investment.

1.3 The Provincial Plan for the Province of Bohol

1.3.1 Preparation of the Plan

The PW4SP for Bohol was prepared by the Provincial Sector Planning Team (PSPT), which was organized by the Provincial Government. The members consist of the

[1] Due to long delays the PW4SP was later revised and completed under DPWH funding.

Provincial Planning and Development Coordinator (PPDC), the planning and development officers from PPDO, and the staff members from Provincial Engineers Office (PEO), Provincial Health Office (PHO), Bohol Environment Management Office (BEMO), Provincial General Services Office (PGSO), and Provincial Local Government Operations Office (PLGOO-DILG). The preparation of the plan was assisted by the Department of the Interior and Local Government (DILG), the District Engineering Office of the Department of Public Works and Highways (DPWH), the Department of Health (DOH), the Local Water Utilities Administration (LWUA) through its water districts, the Regional Office VII of the National Economic and Development Authority (NEDA), and other national line agencies active in the sector. The PSPT was also assisted by the GTZ Study Team through technical grant assistance from the Federal Government of Germany.

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

The report consists of two (2) volumes: I - Main Report, and II – Appendices and Annexes

1.3.2 Outline of the Report

The PW4SP is a framework plan that will serve as the basis for the future implementation work in the sector. It will be carried out either as large-scale projects funded by international agencies or as a small size project carried out from local funds. The PW4SP is a sector development plan for the entire Province and does not include detailed planning of individual projects. The individual projects will commonly cover selected sub-sector/s for limited areas and detailed planning/design work has to be conducted for the respective projects before the start of construction work. The PW4SP comprises 11 chapters (List of data/information collected is shown in Annex I).

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

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

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

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

Chapters 8, 9 and 10 develop the long-term Development Plan and the medium-term Investment Plan both for physical and sector management requirements. Emphasis is placed on the sector management for the medium-term development plan covering institutional arrangements and operational framework, community development, gender and training and project implementation needs. Required costs for physical and institutional elements are also presented according to the implementation arrangements.

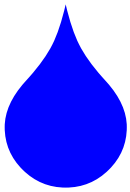
Chapter 11 presents the financial arrangements based on identified sources of funds. The financial shortfall is shown to meet provincial targets established for the Medium-Term Investment Plan. The manner of national budget allocation (IRA) to municipalities by sub-sector is illustrated and trial calculation is made for the target year considering the new cost sharing policy between the central government, the LGUs and the beneficiaries.

Investment need ranking of municipalities as a factor of financial allotment is also considered based on evaluation of sector components. The financial viability study of Level I water supply and sanitation projects is highlighted with reference to ODA assisted projects for eligible municipalities. Lastly, cost recovery by the beneficiaries and the LGUs is discussed.

1.4 Acknowledgment

The Provincial Sector Planning Team (PSPT) which was responsible in the preparation of the PW4SP, acknowledges the valuable contributions of the staff of the Department of Interior and Local Government (DILG) particularly the Water Supply and Sanitation Program Management Office (WSSPMO), and other national, regional, provincial, municipal, city, and barangay institutions who provided assistance in the preparation of this sector plan. These institutions had shared essential data and planning principles. The Federal Government of Germany through GTZ-Water Program has generously provided technical assistance to the PSPT throughout the course of the planning work. The list of individuals/offices who directly participated in the preparation of the plan is reflected in Annex I.

CHAPTER II



PLANNING APPROACH FOR FUTURE SECTOR DEVELOPMENT

CHAPTER II PLANNING APPROACH FOR FUTURE SECTOR DEVELOPMENT

2.1 General

The formulation of the PW4SP is based on the objectives, policies and strategies as spelled out in the national plans as well as the major legislations and regulations relevant to the sector. The planning framework is also presented with reference to key measurable targets. The guiding principles in the preparation of the plan are described applying computer-aided planning approach.

2.2 Planning Framework

The provincial sector planning shall adopt the national strategic framework of the GOP in pursuing sustainable development and management of the water resources. From the MTPDP: 2001-2004, the framework of water resource planning is based on the principle that: i) water is a limited resource that must be conserved and managed efficiently; and ii) water has an economic value in all its competing uses and shall be treated as an economic good, thus, capacity and willingness-to-pay must be taken into consideration in pricing water. To support this, the following must be pursued:

1) Strengthening government and non-government institutions to enhance their capabilities in the provision of water supply, sewerage and sanitation services.

2) Appropriate policy and legal reforms, particularly in resource exploitation, allocation, prioritization, optimization, protection and conservation of water resources must be established.

3) Decentralized operations within the context of the policy of devolution and community-based approaches in water and sanitation services must be implemented.

4) Private sector participation with the end view of promoting market-based incentives to rationalize water utilization must be initiated and encouraged.

5) Coordinated basic water data collection system for efficient and effective flow of information including the integration of water supply and sanitation data must be institutionalized.

6) Gender concerns must be integrated in project development and management activities. Specifically, women's participation must be encouraged.

In line with these, the GOP has manifested its commitment to the development of safe and dependable water supply and sanitation facilities. Investment programs are geared towards accelerating sector development through equitable mobilization of resources between urban and rural areas and institutional reforms at all government levels.

Based on the MTPDP targets for the year 2004, the population served with potable water shall be increased up to 90.5% (74.9 M). This corresponds to 90% (14.4 M) of the Metro Manila population, 89.6% (20.2 M) in other urban areas, and 90.4% (40 M) in the rural areas. Sewerage facilities in Metro Manila and other highly urbanized areas will be constructed. About 84% of the population nationwide will be served by sanitation facilities.

The MTPDP targets and 1988 NSMP goals, the current conditions and the planning framework of this provincial sector plan, the national targets as shown in Table 2.2.1 will be used as the basis for setting the provincial targets, except for sanitation sub-sector in the long-term development.

Table 2.2.1 National Sector Coverage Targets (in percent)

Sub-Sector	Existing Coverage (2000)	Year 2004 [1]	Year 2010 [2]
Urban Water Supply [3]	88	89	95
Rural Water Supply	85	90	93
Sanitation[3]	88	94	93[4]

Notes:
[1/] Based on the MTPDP targets for 2004.
[2/] Based on the long-term targets set in the NSMP.
[3/] Excluding Metro Manila and outlaying areas covered by MWSS franchise.
[4/] The NSMP was prepared in 1988, hence the lower target for 2010 as vis-a-viz 2004 target. Target of 93% was for long-term development (2000) and is adopted in this plan as the long-term target (2010).

2.3 Sector Objectives

The objectives of the sector are:

(1) To provide safe and adequate water supply and sanitation to meet basic needs;

(2) To pursue proper O & M of facilities for sustainable water supply and sanitation facilities;

(3) To undertake phased implementation of sewerage facilities; and

(4) To develop the capabilities of LGUs to implement water supply, sewerage and sanitation programs with the national government providing assistance in the areas of community participation, sub-sector planning, program management, regulation of development, selection of technologies, financial management, construction supervision, monitoring and reporting.

2.4 Current Sector Strategies

(1) *An integrated water resources strategy* has been adopted in areas combining irrigation, power, flood control, and domestic and industrial water supply towards a sustainable development. Small and medium-scale water resources projects through

the active participation of the people are encouraged. *Watershed management* to include afforestation/reforestation, water conservation and erosion and sediment control are deemed critical.

(2) One clear policy shift has been towards the *promotion of self-reliance* and *local community management* of services. Since the seventies, formation of local water districts in provincial urban areas has been aggressively pursued. During the eighties, this shift was further induced with the establishment of community-run BWSAs and RWSAs to provide services in smaller rural and peri-urban areas. Recently, more comprehensive *demand-driven* participatory approach and *gender sensitive* participation initiatives are given impetus to ensure success and sustainability of the sector's projects especially in rather small rural and urban fringe areas.

(3) An *integrated approach to water, sanitation and hygiene education* has been prescribed in order to achieve full health benefits of improved services. The GOP promotes intensified health education and information programs to improve hygiene practices at the household level.

(4) *Cost sharing arrangement* is enforced. In line with devolving the central government's functions and responsibilities, particularly those that have social and/or environmental objectives, projects/activities are implemented through a cost sharing arrangement between the central government agency and LGUs. As for the sector, national (central) government's (NG's) grant is to be extended only to Level I systems for eligible municipalities, and its share is within a range of 0 to 50% of the total capital cost. The remaining are managed by LGUs, communities, or BWSAs/RWSAs. No subsidies from the central government are to be provided for Levels II and III systems. For public toilets in public markets, the share of the NG is within 50 to 70%.

(5) *Cost recovery of capital and O & M costs* of all water supply service levels by beneficiaries is to be encouraged. This is a distinct switch from subsidies, which characterized previous strategies. Current priorities also stress the need to promote the collection of such costs, especially in Levels I and II.

(6) *Private sector participation* is encouraged to bring into the sector business principles and practices and private capital to accelerate social and economic development; to improve sector efficiencies; and to ease the burden on the GOP's budget and foreign borrowing. Public-private partnership is to be pursued through any of these mechanisms: build-operate-transfer, concession arrangements, privatization of WDs, LGU-private sector MOA, LGU-WDs collaboration and others.

2.5 Major Legislation and Regulations Affecting the Sector

(1) The *Local Government Code of 1991* (RA 7160) provides for a more responsive and accountable local government structure. Local government units now exercise more authority and responsibilities and provide resources to accelerate the provision of

basic services and facilities, including water supply, sanitation and sewerage. The *Implementing Rules and Regulations (IRR)* to effect the devolution of water and sanitation responsibilities and resources was also approved. The IRR integrates the common definition of terms for water supply and sanitation and defines the roles and functions of central government agencies and LGUs for the sector (see details in Annex II).

(2) The *Water Code of the Philippines of 1976* (PD 1067) consolidates legislation relating to the ownership, development, utilization, exploitation and conservation of water resources. The Code established the basic principles and framework on the appropriation, control and conservation of water resources to achieve their optimum economic efficiency and rational development. In addition, PD 424 declares that the National Water Resources Board (NWRB) shall be responsible for coordinating and integrating all activities related to water resources. PD 1067 also pertains to the grant of water right privileges (water permits) to appropriate and use water. Water permit applications are reviewed and granted by the NWRB.

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

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

(5) The *Philippine Environmental Policy of 1978* (PD 1151) requires all public and private entities to undertake an environmental impact assessment of all projects, which significantly affect the quality of the environment. The *Philippine Environmental Code of 1978* (PD 1152) established standards for air and water quality, and guidelines for land use management, natural resource management and conservation, utilization of surface and groundwater, and waste management.

(6) The *Sanitation Code of 1975* (PD 856) was promulgated to deal with water supply, excreta disposal, sewerage and drainage issues. The Sanitation Code and the *National Building Code (1977)* require that new buildings be connected to a water-borne sewerage system. Where such systems do not exist, sewage must be disposed of onto Imhoff tanks or septic tanks with a subsurface absorption field. In addition, the facilities are required to conform to the *1959 National Plumbing Code.*

(7) The *1981 Rules and Regulations for Domestic Wastewater Disposal* require all subdivisions and condominiums, etc. to have adequate sewage collection, conveyance,

treatment and disposal facilities. A permit must be obtained prior to commissioning a new system.

2.6 Planning Principles and Data Management

2.6.1 Planning Principles

The PW4SP shall be prepared to ensure that the sector investments are optimized under the fund constraints and water source availability as well as planning capability. Furthermore, the plan shall ensure its sustainability at the provincial level. The plan will be progressively adjusted and refined at different detailed implementation stages. Specifically, the following are the guiding planning principles:

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

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

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

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

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

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

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

2.6.2 Data Management

The data management system was established to come up with the basic outputs corresponding to the objectives of the provincial plan and at the same time reflect the planning approach mentioned above. It will provide a map of relative needs in the province allowing for adjustment and updating when further information becomes available. Monitoring and evaluation are to be done using the tool, thereby serving as baseline information for the improvement of planning and implementation. Different scenarios maybe worked out by the planners using the program applying variable parameters.

The need for a full and continuous involvement of local officials is indispensable to establish a reliable database.

(1) Computer-based system

The data management system is designed to perform simple and direct interfaces in data processing. Since the planning level are the municipalities that are limited in number, and involves data collection from the administrative units, EXCEL was selected in order to facilitate data storage, retrieval, updating and processing.

The data storage system was arranged to parallel the structure of questionnaires and contain the same system of logical categories as shown in Figure 2.6.1. A series of EXCEL routines was established to allow summaries and consolidation of data into the forms required for analysis and presentation. Details together with User's Guide for computer-aided planning are included in 2.6.2 Data Management of Appendix II.

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

(2) Key Parameters

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

17) Scoring factors for municipal investment ranking

18) Annual distribution of investment cost (medium-term development)

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

(3) Data Processing

Collected data are entered into the forms constructed in EXCEL database. The data are consolidated into the final forms by applying mini-programs prepared for this planning. Linked outputs in tables and graphics are prepared in EXCEL spreadsheets for final analysis and presentation. Key parameters are entered in a key parameter table linked to the output tables (refer to 2.6.2 Data Management in Appendix II).

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

CHAPTER III

PROVINCIAL PROFILE

CHAPTER III PROVINCIAL PROFILE

3.1 General

The Province of Bohol, an oval-shaped island that lies northwest of Cebu and northeast of Leyte, is considered as the tenth largest island in the Philippines. The Province has other 61 smaller offshore islands and islets. It is one of the 4 Provinces consisting the Central Visayas or Region VII. It is bounded Camotes Sea on the north, Bohol Sea on the south, Canagao Channel on the east, and Cebu Strait on the west as shown in the Location Map.

The Province has a total land area of 3,980.12sqkm[1] consisting of the mainland, the bigger islands of Panglao and C. P. Garcia, and the other smaller islands and islets. This represents 1.32% of the total land area of the country. The mainland has a total coastline of 413km. The Province is classified as first class and has a total of 1,109 barangays, of which 224 are urban and 885 are rural. The provincial total population was 1,137,268 in 2000. There are 2 water districts and 88 LGU/association/private-managed Level III water supply systems that are operating in the Province. Table 3.1.1 presents the breakdown per municipality of land area, population and density, as well as administrative composition.

3.2 Natural Conditions and Geographical Features

3.2.1 Meteorology

Bohol belongs to Type 4 climate under the Coronas classification, which is characterized by a rainfall that is evenly distributed throughout the year as reflected in the Location Map. Based on the records on climatological normals of Tagbilaran City weather station, the Province has an average of 161 rainy days a year. Average rainfall for the period 1961-1995 was registered at 1,331.2mm.

3.2.2 Land Use

Of the total land area of the Province, about 76.5% is categorized as alienable and disposable, and the remaining 23.5% is timber or forestland. Hydro-ecological conditions, slope, land use, erosion and agro-climatic zones are the major factors that affect the lowland resource management structure of the Province.

The forest cover constitutes about 25.44% of the total land area of the Province mostly located in the southeastern mountain ranges. This is about 2.0% higher than the area designated as forestland, an indicators of proper forest management practice. The existing land use pattern as presented in Table 3.2.1 must be enhanced by rehabilitation of critical watersheds such as the Alejawan or Duero Watershed, Loboc Watershed and Wahig-Inabanga Watershed Forest Reserve. The remaining forest cover must be conserved to primarily serve as watershed rather than as source of timber. An efficiently managed watershed collects and regulates flow of water, controls soil erosion, and minimizes water pollution. Conversion of the remaining forestland to other uses will restrict its function as

[1] The Bohol Island area of 3,980.12 sqkm will be utilized in this Report which was determined from 1:50,000 topographic maps of NAMRIA digitized by SWECO. However, the Provincial Government is currently using total land area of 4,117.26 sq. km. provided by DENR and corresponding municipal areas as basis for allocation of Internal Revenue Allotment (IRA). The difference of 137.14 sq. km. could be attributed to submerge sandbars seen in Bohol Island Satellite Image which are not present in other maps and are not considered due to absence of physical land mass.

a watershed. Correspondingly, a significant increase in agricultural area will result in a high demand of water use.

Table 3.1.1 Outline of Municipalities

Municipality/City	Class	Land Area (km^2) [1]	2000 Population		Number of Barangay		
			Number	Density (person/km^2)	Urban	Rural	Total
Alburquerque	6th	28.93	8,715	301	3	8	11
Alicia	5th	102.85	21,605	210	2	13	15
Anda	5th	47.04	17,863	380	2	14	16
Antequera	5th	60.63	13,758	227	2	19	21
Baclayon	5th	41.13	14,996	365	3	14	17
Balilihan	5th	104.09	16,837	162	4	27	31
Batuan	5th	108.14	11,835	109	3	12	15
Bien Unido	5th	32.64	22,176	679	11	4	15
Bilar	5th	101.30	16,628	164	3	16	19
Buenavista	5th	86.73	25,960	299	3	32	35
Calape	4th	71.57	27,921	390	7	26	33
Candijay	5th	89.00	30,389	341	6	15	21
Carmen	4th	178.12	40,713	229	4	25	29
Catigbian	5th	93.71	21,461	229	2	20	22
Clarin	5th	58.58	18,040	308	4	20	24
Corella	6th	27.85	6,048	217	1	7	8
Cortes	5th	35.86	12,702	354	2	12	14
Dagohoy	5th	95.42	16,845	177	1	14	15
Danao	5th	122.41	17,265	141	1	16	17
Dauis	5th	51.47	26,415	513	4	8	12
Dimiao	5th	116.88	14,151	121	2	33	35
Duero	5th	65.02	16,485	254	3	18	21
Garcia Hernandez	5th	123.82	21,428	173	4	26	30
Getafe	5th	75.68	26,826	354	11	13	24
Guindulman	5th	109.19	29,166	267	3	16	19
Inabanga	4th	114.96	40,714	354	13	37	50
Jagna	4th	93.56	30,643	328	8	25	33
Lila	5th	48.11	10,322	215	2	16	18
Loay	5th	30.28	14,433	477	6	18	24
Loboc	5th	52.48	15,734	300	4	24	28
Loon	4th	120.78	45,215	374	13	54	67
Mabini	5th	97.47	27,250	280	5	17	22
Maribojoc	5th	50.40	16,786	333	7	15	22
Panglao	5th	40.09	21,337	532	5	5	10
Pilar	5th	104.36	25,095	240	2	19	21
Pres. Carlos P. Garcia	5th	50.31	20,744	412	6	17	23
Sagbayan	5th	87.53	18,346	210	1	23	24
San Isidro	5th	47.89	9,106	190	1	11	12
San Miguel	5th	116.61	20,828	179	1	17	18
Sevilla	5th	29.18	10,281	352	2	11	13
Sierra Bullones	5th	104.68	25,499	244	4	18	22
Sikatuna	6th	25.93	6,602	255	1	9	10
Tagbilaran City (Capital)	1st	29.20	77,700	2,661	15		15
Talibon	3rd	150.66	54,147	359	14	11	25
Trinidad	5th	90.37	25,683	284	1	19	20
Tubigon	4th	72.22	40,385	559	14	20	34
Ubay	3rd	265.59	59,827	225	6	38	44
Valencia	5th	129.40	24,363	188	2	33	35
Provincial Total	1st	3,980.12	1,137,268	286	224	885	1,109

Table 3.2.1 Current Land Use

Land Use	Area (km^2)	Percentage over Total Land Area
Forest Land	1,012.71	25.44
Grassland	864.68	21.74
Built-up	96.78	2.43
Agricultural	1,848.74	46.45
Fishponds, Mangrove, Inland Water Area	143.00	3.59
Openlands	14.21	0.36
Provincial Total	3,980.12	100.00

3.2.3 Topography and Drainage

The terrain of Bohol is variable from nearly flat at the plains to low rolling, moderate to very steep and sloping with 5-to 50-meter high cliffs in the Sierra Bullones limestone formation. The more rugged topography is in Southern Bohol, although the Ubay volcanic rocks and Boctol serpentinite in the north and the northeast are moderate. The limestone terrain is mostly karstic or sinkhole and hill topography. The Maribojoc limestone, which is well known for its Chocolate Hills and Valley topography is found in the Batuan to Carmen municipalities. The highest elevation is Mt. Mayana at 827m.

There are about 81 river basins in Bohol including those located in small islands. The drainage area ranges from as low as 0.1sqkm to 9sqkm in Cabilao Island to 618sqkm in Loboc (Table 3.2.2 and refer to Figure 7.8.1 for the river basins and river network).

Table 3.2.2 Drainage Areas & Flow Rates of Principal Rivers

Principal River	Drainage Area (km^2)	Flow Rate (m^3/sec)			Water District (using river water)
		Peak	Maximum	Minimum	
Pamacsalan	71	99.00	69.80	0.050	none
Wahig-Inabanga	590	572.39	-	-	-do-
Cantimoc	74	-	221.03	0.003	-do-
Hibayog	41	-	86.05	0	-do-
Hinlayagan	41	-	91.75	0.022	-do-
Gabayan	28	-	95.8	0.100	-do-
Manaba	93	-	233.25	0.100	-do-
Abatan	140	-	205.48	0.120	-do-
Antequera	54	-	372.8	0.088	-do-
Bilar	92	159.77	72.02	0.010	-do-
Loboc	618	571.00	441.80	3.900	-do-

Sources: Philippine Water Resources Summary Data, NWRB; Streamflow Data, BRS-DPWH
Notes: Peak - Peak discharge of Daily Maximum Discharge
Maximum - Maximum Daily Discharge of Weighted Daily Discharge
Minimum - Minimum Daily Discharge of Weighted Daily Discharge

3.3 Socio-economic Conditions

3.3.1 Economic Activities and Household Income

From the labor force survey conducted in 1999 by NSO in Bohol, the potential labor force increased to 691 thousand of which 66.4% were in the labor force. Employment rate, at

the end of 1999, increased to 90.5% from 85.35% in 1998. However, an increase in under-employment was noted, from 5% in 1998 to 11.7% in 1999. Employment was predominantly agriculture-led.

The NSO Family Income and Expenditures Survey (FIES) in 2000 showed that the average annual family income of the Province was ₱77,291, while the expenditure was at ₱66,907 or a net saving of ₱ 10,384. Distribution of families by income class in the region and in the Province is shown in Figure 3.3.1 and Appendix III. Percentages of families of lower income levels in the Province were greater than the average in the region. Based on the established poverty threshold level in Region VII for 2000, about 59% of the total number of families in Bohol lived within and below the poverty threshold level.

As to the number of workers by major industry group, agriculture, services, fishery and trade had the dominant share followed by manufacturing as shown in Figure 3.3.2 (see Table 3.3.2, Appendix III for details).

3.3.2 Poverty Situation

Based on the most recent calculations using the same FIES, the National Statistical Coordination Board placed the poverty incidence in Bohol at 47.3% of total households. This figure places Bohol among the top 20 provinces with high poverty incidence. To ensure a cohesive response to the poverty situation, the Bohol program Framework on Poverty Reduction was prepared by the PPDO and was subsequently approved by the Provincial Development Council on 19 June 2003. The Program Framework serves as the common basis for formulating poverty-focused policies, plans, programs and projects in the province. In addition, poverty reduction became the focus of both the 2004 Annual Development Plan (ADP) and the 2004-2008 Medium-Term Development Plan (MTDP).

The province seeks to reduce poverty incidence from 47.3% to 30% by 2012. In line with this goal, all municipalities were ranked according to levels of deprivation. Two out of the four indicators used were related to water supply and sanitation: percentage of the population with doubtful or non-potable water sources, and percentage of households with unsanitary toilets.

The ranking of municipalities in Bohol based on the poverty-related indicators has been made available to all sectors, including donors, to serve as basis for their programming in line with the policy to broaden the geographic spread of poverty reduction interventions in the province. The indicators were also used to rank the barangays in 17 municipalities where a project will be implemented to strengthen local governance for poverty reduction and sustainable development (refer to 3.3.2, Annex III for the ranking of municipalities and barangays

3.3.3 Basic Infrastructure

The road network of the Province adequately links the major urban and rural centers of Bohol. As of 1999, Bohol has a total of 5,386.89km of road. Of the total, 65% are barangay roads and about 12% are cemented or asphalted. Buses and jeepneys are providing overland transportation to different destinations. In Tagbilaran City, tricycles are the major means of transportation and lately, taxi service is made available.

Figure 3.3.1 Distribution of Families by Income Class

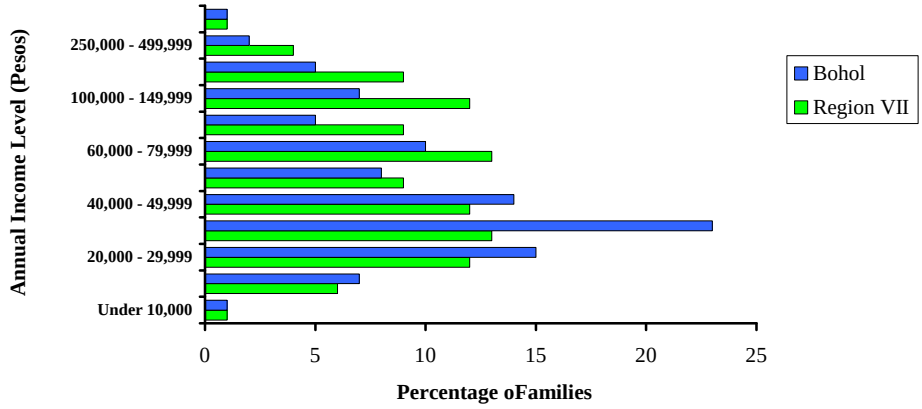


Figure 3.3.2 Employment Distribution by Major Industry

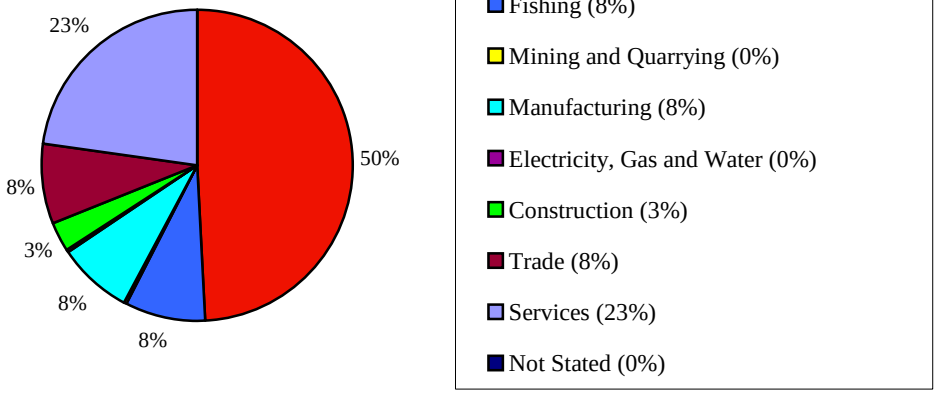
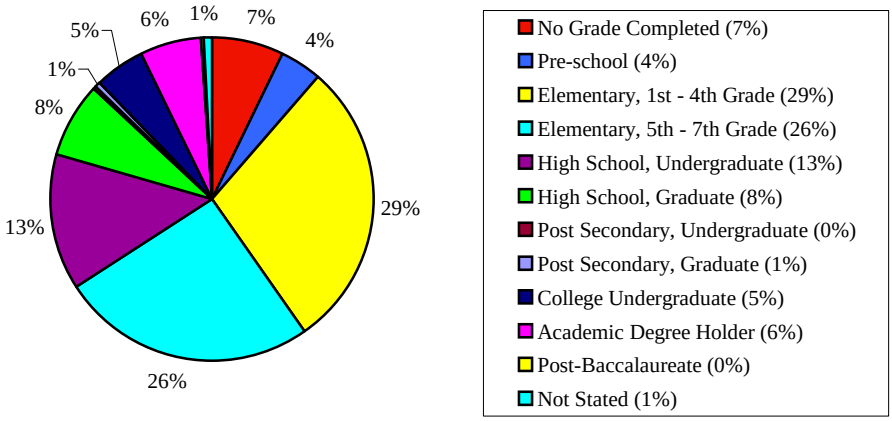


Figure 3.3.3 Population Distribution by Highest Attainment of Education



The National Power Corporation supplies the power requirements through its 4 power plants with a total generating capacity of 27 megawatts. The Province's peak demand reached 30 megawatts in 1999. To date, almost all of the barangays in Bohol are energized. Electricity is available in all municipalities and in most island barangays. With the expected additional power from the geothermal plant in Leyte, the projected increase in industrial and commercial demand for electricity of the province will hopefully be met.

Several municipalities can now be access through the telephone lines provided by ISLACOM, PLDT and CRUZTELCO. Payphones are also available in Tagbilaran City provided by PLDT with national and international direct dialing capabilities. Cellular or mobile phone service providers have recently gained entry in the province. Other communication facilities of the Province include 5 radio stations, all privately owned. A cable station is presently operating in the city. Table 3.3.1 presents a provincial outline of public services and Table 3.3.2 reflects the number of public facilities and services by municipality (see Table 3.3.1, Annex for details).

3.3.4 Education

Providing a significant role in the development of its manpower base are the 1,156 schools (both public and privately owned) in Bohol. There are also 5 skills training centers operated by TESDA that offer formal and informal training programs. Most of the colleges and universities are located in Tagbilaran City. Likewise, Bohol has an agricultural school located in Bilar. A large part of the population had attained elementary or high school education as reflected in Figure 3.3.3 (refer to Table 3.3.3, Appendix III).

Table 3.3.1 Provincial Outline on Public Services

Items	Unit	Value	Items	Unit	Value
(1) **Roads**			(8) **Tourism facilities**	Number	273
a) Total Length	Km	5,384	(Hotel resort, lodges, recreational		
b) Barangay roads	Percent	64.63	facilities, etc.)		
(2) **Electricity service coverage**			(9) **Schools**		
a) Municipality	Percent	100	a) Elementary level	Number	933
b) Barangay	Percent	97	b) Secondary level	Number	139
c) Household	Percent	76	c) Tertiary level/Tech. & Voc. School	Number	31
(3) **Telecommunication Services**			(10) **Health Facilities**		
a) Availability in municipality	Percent		a) Hospital/clinics	Number	33
b) Telegraph station	Number	14	b) Main health centers, rural health	Number	336
c) Telephone station	Number	60	units, barangay health center, etc		
(4) **Post Office**	Number	53	(11) **Labor**		
			a) Labor force participation ratio	Percent	66.40
(5) **Transportation services**	Mode	Jeep, Bus,	b) Employment rate	Percent	90.5
	(ex. Bus,	Tricycle, &			
	jeep, taxi,.)	motorcycle	(12) **Average family income**		
			a) Monthly income	Pesos/Month	77,261
(6) **Banking Facilities**	Number		b) Monthly expenditure	Pesos/Month	66,907
a) Private bank	(by private	19			
b) Public bank	and public)	2			
(7) **Industrial/business/**					
commercial establishment	Number	149			

Table 3.3.2 Public Facilities and Services by Municipality

Municipality/City	High School			Technical School	College	Hospital	Public Market	Bank and Financing Institutions
	Public	Private	Total					
	nos.	nos.	nos.	nos.	nos.	nos.	nos.	nos.
Alburquerque	1		1				1	
Alicia	2		2				2	1
Anda	3	1	4				1	
Antequera	1	1	2			1	1	1
Baclayon	1	1	2				1	1
Balilihan	2	1	3				2	
Batuan	1	1	2		1		1	
Bien Unido	2	1	3				2	
Bilar	1		1		1		1	
Buenavista	3		3			1	1	
Calape	1		1		2	2	1	1
Candijay	3	1	4		1	1	4	
Carmen	3	1	4			1	1	1
Catigbian	2	2	4			1	1	1
Clarin	1		1	1	1	1	2	
Corella	1		1				2	
Cortes	1	1	2				1	1
Dagohoy	1		1				2	
Danao	2		2			1	1	
Dauis	2		2				1	
Dimiao	2	1	3				1	
Duero	2	1	3			1	1	
Garcia Hernandez	2	1	3			1	1	
Getafe	2	1	3				1	1
Guindulman	3	1	4			2	1	1
Inabanga	3	3	6			1	1	1
Jagna	3	3	6	1	1	2	1	1
Lila	1	1	2				2	
Loay	1	1	2				1	1
Loboc	2	1	3				1	
Loon	3	3	6			1	1	2
Mabini	2	1	3				2	
Maribojoc	2	1	3			1	1	1
Panglao	1	1	2				1	1
Pilar	1	1	2				3	1
Pres. Carlos P. Garcia	1	1	2			1	1	
Sagbayan	1	2	3				1	1
San Isidro	1		1				1	
San Miguel	3		3			1	2	
Sevilla	1		1				1	
Sierra Bullones	1	1	2				2	1
Sikatuna	1		1				1	
Tagbilaran City (Capital)	4	6	10	8	6	8	3	21
Talibon	3	1	4	1		1	1	2
Trinidad	4	1	5		1		1	
Tubigon	2	2	4	1	2	1	1	1
Ubay	5	1	6	1	2	1	1	1
Valencia	1		1			2	1	
Provincial Total	92	47	139	13	18	33	65	44

3.4 Population

3.4.1 Previous Population Development

Except for the last censal period of 1995 to 2000, a declining provincial population growth rate had been experienced for census periods (1970-1995). From an average annual growth rate of 2.13% during the period 1970 to 1975, it decreased to a low of 0.89% (1990-1995) and again increased to 2.92% (1995-2000). A summary of the average annual growth rates of the Province is as follows:

Year	Population	Ave. Annual Growth Rate (%)	Period
1975	613,534	2.13	1970 - 1975
1980	657,465	1.20	1975 - 1980
1990	782,502	1.64	1980 - 1990
1995	820,947	0.89	1990 – 1995
2000	1,137,268	2.92	1995 - 2000

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

The 2003 population was estimated to provide the planning base for this Master Plan (see Section 8.3.1 Population Projection). Figure 3.4.1 and Table 3.4.1 show how the past population development by municipality behaved from 1975 to 2000.

3.4.2 Classification of Urban and Rural Areas

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

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

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

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

   1) Street pattern, i.e., network of streets either at parallel or in right angle orientation;

   2) At least six establishments (commercial, manufacturing, recreational and/or personal services); and

   3) At least three of the following:

      a) a town hall, church or chapel with religious services at least once a month;

      b) a public plaza, park or cemetery;

      c) a market place or building where trading activities are carried on at least once a week; and

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

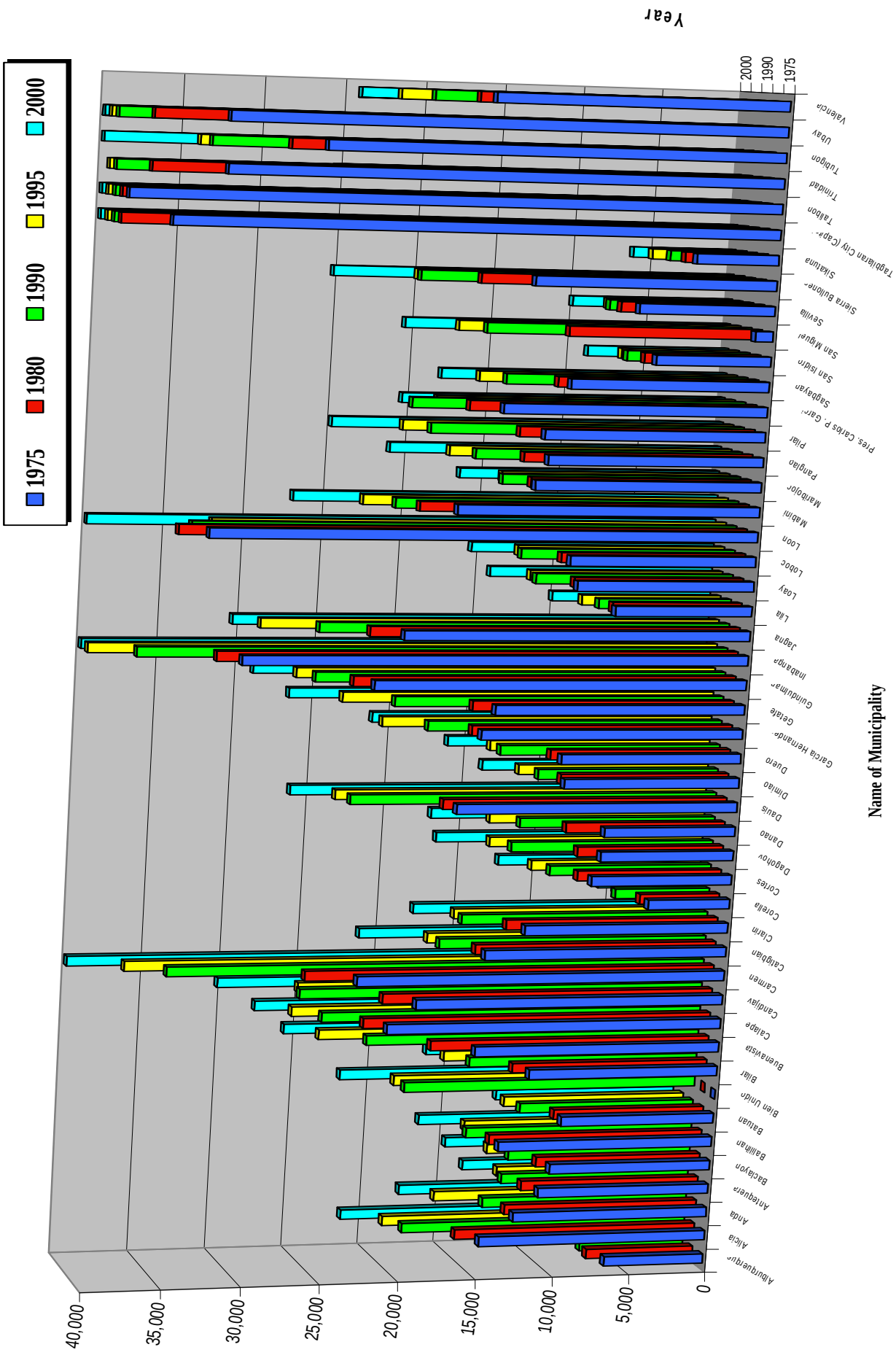


Figure 3.4.1 Previous Population Development of the Province

Table 3.4.1 Previous Population Development by Municipality

Municipality/City	Previous Population				
	1975	1980	1990	1995	2000
Alburquerque	6,505	7,062	6,881	7,709	8,715
Alicia	14,770	15,766	18,653	19,402	21,605
Anda	12,658	12,625	13,497	16,108	17,863
Antequera	11,130	11,641	12,348	12,072	13,758
Baclayon	10,490	10,776	11,986	12,808	14,996
Balilihan	13,912	13,925	14,850	14,400	16,837
Batuan	9,940	9,833	11,438	11,898	11,835
Bien Unido			19,047	19,185	22,176
Bilar	12,226	12,715	14,926	16,029	16,628
Buenavista	15,802	18,088	21,665	24,215	25,960
Calape	21,499	22,488	24,608	26,051	27,921
Candijay	19,750	21,342	26,102	25,729	30,389
Carmen	23,580	26,359	34,573	36,797	40,713
Catigbian	15,570	15,620	17,362	17,596	21,461
Clarin	13,105	13,721	16,021	15,961	18,040
Corella	5,286	5,197	6,150	5,526	6,048
Cortes	9,056	9,350	10,527	11,133	12,702
Dagohoy	8,578	9,451	13,121	13,943	16,845
Danao	8,447	10,298	12,671	14,042	17,265
Dauis	17,955	18,260	23,601	24,041	26,415
Dimiao	11,225	10,845	11,697	12,372	14,151
Duero	11,522	11,619	14,242	14,299	16,485
Garcia Hernandez	16,701	16,715	18,956	21,323	21,428
Getafe	15,903	16,769	21,135	23,927	26,826
Guindulman	23,563	24,376	26,225	26,945	29,166
Inabanga	31,820	32,918	37,400	40,015	40,714
Jagna	21,895	23,494	26,163	29,354	30,643
Lila	8,728	8,278	8,556	9,014	10,322
Loay	11,256	10,842	12,677	12,450	14,433
Loboc	11,799	11,778	13,716	13,335	15,734
Loon	34,225	35,643	34,400	32,716	45,215
Mabini	19,071	20,876	21,854	23,370	27,250
Maribojoc	14,333	14,008	15,214	14,664	16,786
Panglao	13,624	14,547	17,004	18,095	21,337
Pilar	13,928	14,902	19,930	21,141	25,095
Pres. Carlos P. Garcia	16,597	18,142	21,173	19,096	20,744
Sagbayan	12,500	12,703	15,364	16,488	18,346
San Isidro	7,281	7,369	7,840	7,548	9,106
San Miguel	11,117	12,220	16,775	17,979	20,828
Sevilla	8,551	9,073	9,165	8,671	10,281
Sierra Bullones	15,132	17,904	21,101	20,787	25,499
Sikatuna	5,169	5,244	5,525	6,030	6,602
Tagbilaran City (Capital)	37,335	42,683	56,363	66,683	77,700
Talibon	41,270	46,110	41,873	44,854	54,147
Trinidad	13,867	15,501	19,945	20,893	25,683
Tubigon	28,275	29,993	34,302	34,578	40,385
Ubay	34,195	38,289	48,902	50,745	59,827
Valencia	18,229	18,655	20,879	22,423	24,363
Provincial Total	759,370	806,013	948,403	994,440	1,137,268

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

All areas not falling under the urban classification are defined as rural area. Distribution of the classified areas is shown in Figure 3.4.1, Appendix III. Considering the 1995 NSO classification of urban and rural barangay, there are 224 urban barangays and 885 rural barangays for a total of 1,109 barangays in 2003.

3.4.3 Present Population Distribution

From the 2000 NSO census, the 2003 urban-rural population was estimated for the Province. Rural population accounts for 66% of the provincial total, while 34% is urban as reflected in Figure 3.4.2. Table 3.4.2 presents the breakdown of the number of urban and rural barangays by municipality and its corresponding present population distribution.

There are 228,661 households with 151,963 residing in rural areas and 76,698 households in urban areas. The average provincial household size is 5.43 persons/household. Table 3.4.3 presents a breakdown per municipality on the number of households and household sizes by urban and rural area.

3.5 Health Status

3.5.1 Morbidity, Mortality and Infant Mortality

In 2002, the number one cause of morbidity in Bohol was pneumonias, followed by diarrhea a water-related disease. Influenza and bronchiolitis ranked 3rd and 4th, respectively. Regarding mortality, the number one cause was pneumonias, followed by heart diseases. CVD and malignant neoplasms ranked third and fourth, respectively. Pneumonias, diarrhea and diseases of the heart were the 3 leading causes of infant mortality in the Province (see Table 3.5.1, Annex III).

The general health status of the populace of the Province in 2002 was relatively lower compared with the national condition. The incidence of diseases was higher in Bohol than the country as a whole. Table 3.5.1 presents a comparative statistics on the ten leading causes of morbidity, mortality and infant mortality of the Province as well as of the Philippines.

Water-related diseases in the ten leading causes of morbidity include diarrhea (rank 2nd)skin diseases (rank 7th) and intestinal parasitism (rank 10th). Diarrhea also ranked 10th as the leading causes of mortality. Diarrhea (rank 2nd) is also among the ten leading causes of infant mortality.

Table 3.4.2 Outline of Urban and Rural Areas in the Province

Municipality/City	Land Area (km^2)	Number of Barangay			Population (2003)		
		Urban	Rural	Total	Urban	Rural	Total
Alburquerque	28.93	3	8	11	3,557	5,753	9,310
Alicia	102.85	2	13	15	2,267	20,889	23,156
Anda	47.04	2	14	16	2,860	17,567	20,427
Antequera	60.63	2	19	21	2,647	12,014	14,661
Baclayon	41.13	3	14	17	4,595	12,090	16,685
Balilihan	104.09	4	27	31	2,848	15,334	18,182
Batuan	108.14	3	12	15	3,170	9,371	12,541
Bien Unido	32.64	11	4	15	18,508	4,740	23,248
Bilar	101.30	3	16	19	3,713	14,387	18,100
Buenavista	86.73	3	32	35	3,902	25,219	29,121
Calape	71.57	7	26	33	8,220	21,406	29,626
Candijay	89.00	6	15	21	13,034	19,957	32,991
Carmen	178.12	4	25	29	9,966	34,021	43,987
Catigbian	93.71	2	20	22	3,436	20,302	23,738
Clarin	58.58	4	20	24	4,462	14,679	19,141
Corella	27.85	1	7	8	853	5,460	6,313
Cortes	35.86	2	12	14	3,381	10,506	13,887
Dagohoy	95.42	1	14	15	2,778	16,201	18,979
Danao	122.41	1	16	17	3,515	16,508	20,023
Dauis	51.47	4	8	12	12,407	15,436	27,843
Dimiao	116.88	2	33	35	1,409	14,082	15,491
Duero	65.02	3	18	21	3,845	13,817	17,662
Garcia Hernandez	123.82	4	26	30	5,551	17,625	23,176
Getafe	75.68	11	13	24	14,288	16,884	31,172
Guindulman	109.19	3	16	19	5,609	25,039	30,648
Inabanga	114.96	13	37	50	11,731	31,795	43,526
Jagna	93.56	8	25	33	11,622	21,399	33,021
Lila	48.11	2	16	18	2,149	8,914	11,063
Loay	30.28	6	18	24	5,331	10,186	15,517
Loboc	52.48	4	24	28	2,962	14,110	17,072
Loon	120.78	13	54	67	14,028	29,267	43,295
Mabini	97.47	5	17	22	8,088	21,557	29,645
Maribojoc	50.40	7	15	22	8,837	9,091	17,928
Panglao	40.09	5	5	10	14,540	9,235	23,775
Pilar	104.36	2	19	21	4,086	23,924	28,010
Pres. Carlos P. Garcia	50.31	6	17	23	7,557	14,012	21,569
Sagbayan	87.53	1	23	24	3,869	16,087	19,956
San Isidro	47.89	1	11	12		9,997	9,997
San Miguel	116.61	1	17	18	2,369	20,719	23,088
Sevilla	29.18	2	11	13	1,596	9,588	11,184
Sierra Bullones	104.68	4	18	22	9,759	18,484	28,243
Sikatuna	25.93	1	9	10	1,001	6,097	7,098
Tagbilaran City (Capital)	29.20	15		15	94,151		94,151
Talibon	150.66	14	11	25	32,366	24,558	56,924
Trinidad	90.37	1	19	20	3,274	25,706	28,980
Tubigon	72.22	14	20	34	21,521	22,107	43,628
Ubay	265.59	6	38	44	13,873	51,973	65,846
Valencia	129.40	2	33	35	2,350	23,855	26,205
Provincial Total	3,980.12	224	885	1,109	417,881	821,948	1,239,829

Table 3.4.3 Household Numbers and Household Size

Municipality/City	Number of Households (2000)			Number of Households (2003)			2000 Household Size (person/household)		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Alburquerque	590	1,080	1,670	631	1,153	1,784	5.64	4.99	5.22
Alicia	382	3,683	4,065	409	3,949	4,358	5.54	5.29	5.31
Anda	475	2,597	3,072	543	2,967	3,510	5.27	5.92	5.81
Antequera	473	2,328	2,801	504	2,482	2,986	5.25	4.84	4.91
Baclayon	821	2,157	2,978	914	2,399	3,313	5.03	5.04	5.04
Balilihan	494	2,607	3,101	533	2,814	3,347	5.34	5.45	5.43
Batuan	551	1,736	2,287	584	1,841	2,425	5.43	5.09	5.17
Bien Unido	3,176	808	3,984	3,329	846	4,175	5.56	5.60	5.57
Bilar	631	2,336	2,967	686	2,542	3,228	5.41	5.66	5.60
Buenavista	606	3,944	4,550	680	4,424	5,104	5.74	5.70	5.71
Calape	1,513	4,075	5,588	1,605	4,324	5,929	5.12	4.95	5.00
Candijay	2,086	3,333	5,419	2,263	3,615	5,878	5.76	5.52	5.61
Carmen	1,692	5,687	7,379	1,829	6,141	7,970	5.45	5.54	5.52
Catigbian	579	3,515	4,094	640	3,889	4,529	5.37	5.22	5.24
Clarin	820	2,755	3,575	870	2,924	3,794	5.13	5.02	5.05
Corella	155	1,108	1,263	162	1,157	1,319	5.27	4.72	4.79
Cortes	631	1,916	2,547	690	2,093	2,783	4.90	5.02	4.99
Dagohoy	462	2,633	3,095	520	2,967	3,487	5.34	5.46	5.44
Danao	512	2,446	2,958	594	2,836	3,430	5.92	5.82	5.84
Dauis	1,038	1,631	2,669	1,094	1,719	2,813	11.34	8.98	9.90
Dimiao	253	2,455	2,708	277	2,687	2,964	5.09	5.24	5.23
Duero	705	2,540	3,245	755	2,720	3,475	5.09	5.08	5.08
Garcia Hernandez	982	3,007	3,989	1,061	3,252	4,313	5.23	5.42	5.37
Getafe	2,230	2,464	4,694	2,593	2,862	5,455	5.51	5.90	5.71
Guindulman	1,002	4,571	5,573	1,052	4,806	5,858	5.33	5.21	5.23
Inabanga	2,112	5,755	7,867	2,256	6,150	8,406	5.20	5.17	5.18
Jagna	2,067	3,890	5,957	2,226	4,196	6,422	5.22	5.10	5.14
Lila	337	1,386	1,723	361	1,486	1,847	5.95	6.00	5.99
Loay	842	1,773	2,615	905	1,907	2,812	5.89	5.34	5.52
Loboc	498	2,240	2,738	541	2,429	2,970	5.48	5.81	5.75
Loon	2,592	5,323	7,915	2,483	5,099	7,582	5.65	5.74	5.71
Mabini	1,408	3,639	5,047	1,532	3,955	5,487	5.28	5.45	5.40
Maribojoc	987	1,643	2,630	1,055	1,755	2,810	8.38	5.18	6.38
Panglao	2,380	1,510	3,890	2,653	1,682	4,335	5.48	5.49	5.49
Pilar	650	3,840	4,490	726	4,287	5,013	5.63	5.58	5.59
Pres. Carlos P. Garcia	1,343	2,719	4,062	1,397	2,825	4,222	5.41	4.96	5.11
Sagbayan	717	2,971	3,688	780	3,230	4,010	4.96	4.98	4.97
San Isidro		1,848	1,848		2,028	2,028		4.93	4.93
San Miguel	347	3,391	3,738	385	3,760	4,145	6.16	5.51	5.57
Sevilla	260	1,580	1,840	283	1,718	2,001	5.64	5.58	5.59
Sierra Bullones	1,600	2,873	4,473	1,771	3,181	4,952	5.51	5.81	5.70
Sikatuna	187	990	1,177	201	1,064	1,265	4.98	5.73	5.61
Tagbilaran City (Capital)	15,585		15,585	18,868		18,868	4.99		4.99
Talibon	5,454	4,258	9,712	5,739	4,473	10,212	5.64	5.49	5.58
Trinidad	529	4,178	4,707	597	4,717	5,314	5.48	5.45	5.46
Tubigon	3,758	3,956	7,714	4,061	4,276	8,337	5.30	5.17	5.24
Ubay	2,382	9,130	11,512	2,622	10,053	12,675	5.29	5.17	5.20
Valencia	407	3,985	4,392	438	4,283	4,721	5.37	5.57	5.55
Provincial Total	69,301	140,290	209,591	76,698	151,963	228,661	5.46	5.41	5.43

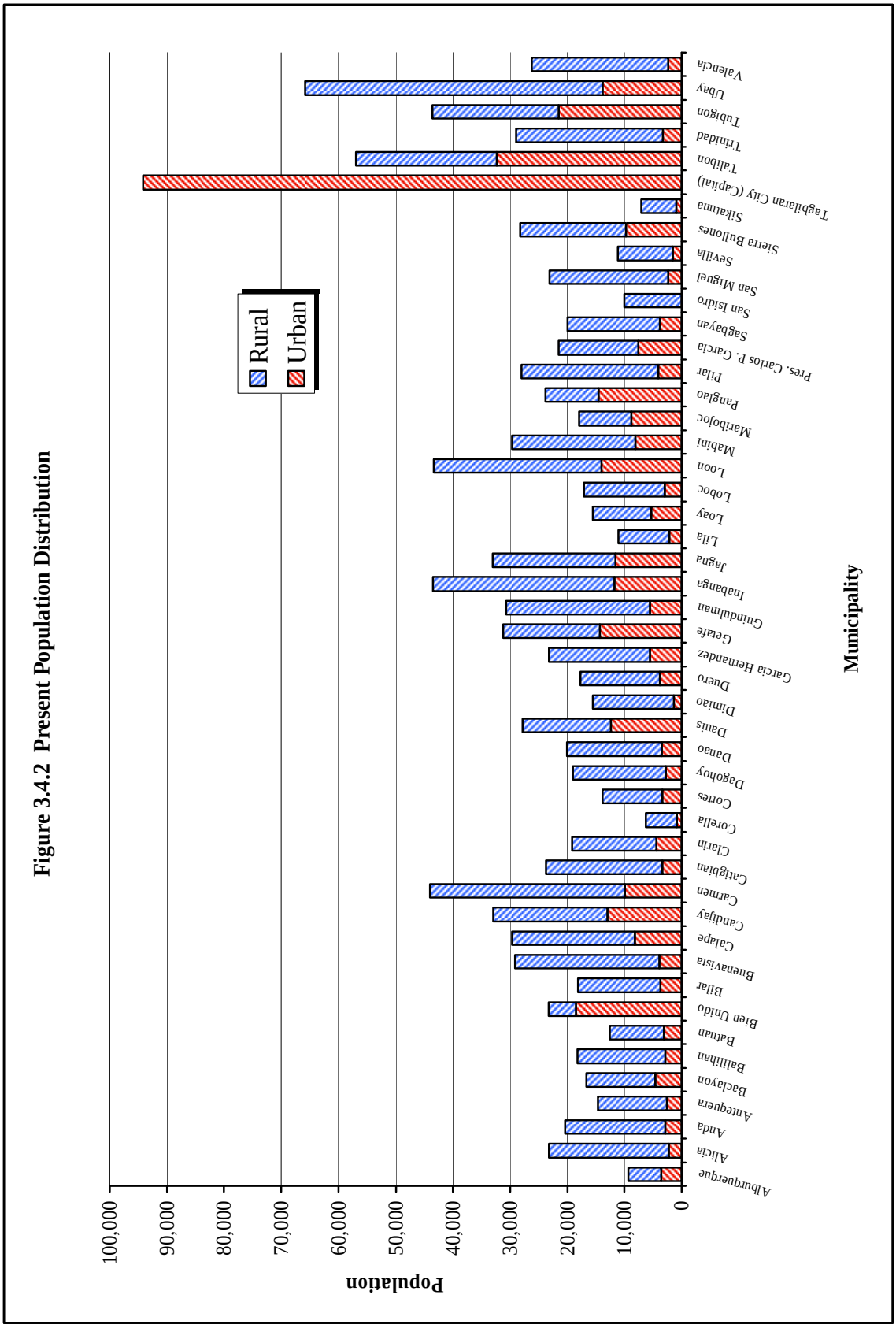


Figure 3.4.2 Present Population Distribution

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

Rate: 1/100,000 population

	Causes	Bohol		Philippines		
		Number	Rate	Number	Rate	Ranking
Morbidity	1. Pneumonias	32,148	2,593.00	652,585	837.4	3
	2. Diarhea	21,294	1,717.50	845,526	1,085.0	1
	3. Influenza	15,075	1,215.90	499,887	641.5	4
	4. Bronchitis/Bronchiolitis	14,057	1,133.80	694,836	891.7	2
	5. Hypertension	10,244	826.20	318,521	408.7	5
	6. Skin Diseases	2,813	226.90	-	-	-
	7. TB Respiratory	1,044	84.20	110,841	142.2	6
	8. Diseases of the Heart	896	72.30	47,040	60.4	7
	9. Chickenpox	691	55.80	24,359	31.3	10
	10. Intestinal Parasites	572	46.10	-	-	-
Mortality	1. Pneumonias	1,026	82.80	33,709	46.1	3
	2. Diseases of the Heart	976	78.70	55,830	76.3	1
	3. CVD	647	52.20	41,380	56.6	2
	4. Malignant Neoplasms	443	35.80	32,090	43.9	4
	5. Hypertension	366	29.50	-	-	-
	6. TB Respiratory	299	24.20	28,041	38.3	6
	7. Kidney Dis.	212	17.10	7,453	10.2	10
	8. Liver Dis.	174	14.10	-	-	-
	9. Septicemia	169	13.60	-	-	-
	10. Diarrhea	56	4.50	-	-	-
Infant Mortality	1. Pneumonias	37	3.00	4,630	16.4	2
	2. Diarrhea	11	0.90	1,483	5.3	5
	3. Diseases of the Heart	3	0.30			
	4. Encephalitis	1	0.10			

1/ Data on morbidity is for 2001, mortality and infant mortality for 1998 taken from FHSIS-DOH.
Rate for infant mortality is per 1,000 live births.

3.5.2 Water Related Diseases

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

Water-related diseases reported in the Province in 2002 were diarrhea, typhoid, hepatitis A, intestinal parasitism, skin disease and amoebiases. Table 3.5.2 presents the reported cases and deaths of notifiable water-related diseases in the Province.

Table 3.5.2 Reported Cases and Deaths of Notifiable Water Related Diseases

Rate: 1/100,000

Diseases	Morbidity		Mortality		Infant Mortality	
	Number	Rate	Number	Rate	Number	Rate
Water-borne						
1. Diarrhea	21,294	1,717.47	56	4.49	11	0.85
2. Typhoid and Paratyphoid		27.29				
3. Hepatitis A		20.00				
4. Amoebiases		2.8				
Water-washed						
1. Skin Diseases		226.85				
2. Intestinal Parasites		46.10				

3.5.3 Health Facilities and Practitioners

Present facilities serving the health care of the populace are 44 hospitals and 336 barangay health stations. The ratio of the population to these facilities is relatively lower as compared to the national average figures. On the other hand, in terms of the number of medical practitioners, the Province has more practitioners per population than the national (see Table 3.5.1, Appendix III for details).

3.6 Environmental Conditions

3.6.1 General

Environmental issues and problems directly affecting the sector and/or how the sector affects these environmental concerns are dealt with in this sub-section. Specifically, the problems of water pollution and solid waste disposal spawned by rapid population growth and increasing industrial and economic activities are discussed. These problems put a strain on the island's water resources and hinder their optimum utilization.

3.6.2 Water Pollution

There are no existing sewerage systems in the Province. Most of the drainage facilities in all municipalities are open canals or ditches. The rivers and streams function as the drainage system. These rivers receive the domestic wastewater and stormwater collected by the segmented drainage facilities in urban centers or poblacions.

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

Domestic and agricultural activities are identified as potential pollution sources in the Province if no control measures are in place. The rivers must be protected and conserved for their intended or beneficial use. However, as of now, not all the rivers in the Province have been classified as to their usage by the DENR (refer to general information in Table 3.6.1 DENR Water Quality Criteria/Water Usage and Classification, Appendix III).

3.6.3 Solid Waste Disposal

Of the 48 municipalities/city, 44 have municipal refuse collection and disposal services as of 2003. These municipalities/city have a total of 78 units of open dump truck or closed type trucks. Tagbilaran City has 8 closed type trucks. In the Province, 14% of the households is served, while 86% is unserved. Table 3.6.1 reflects the manner of solid waste collection and disposal, and service coverage by municipality in 2003.

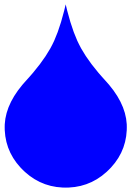
Open dumping is practiced by all LGUs as disposal of solid wastes. The dumped refuse is usually burned or left unattended. Some significant negative effects associated with this unsanitary method are surface and groundwater pollution, air pollution, scattered solid waste, breeding grounds for insects,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

Table 3.6.1 Municipal Solid Waste Collection and Disposal, and Service Coverage, 2003

M

Name of Municipality/City	Number of Households 2003	With Service						Without Service				Percentage of Households Served
		Number of Collection Trucks			Disposal			Manner of Disposal (Number of Household)				
		Open Dump Trucks	Closed Type Trucks	Total Units	Number of Households Served by Open Dump Site	Number of Households Served by Sanitary Landfill	Total Households Served	Dumping (Land and Water)	Burying	Composting	Total Households Unserved	
Alburquerque	1,784	1		1	157		157	157	1,407	63	1,627	9
Alicia	4,358	1		1	250		250	413	3,430	265	4,108	6
Anda	3,510	1		1	314		314	533	2,511	152	3,196	9
Antequera	2,986	2		2	219		219	297	2,220	250	2,767	7
Baclayon	3,313	1		1	360		360	465	2,008	480	2,953	11
Balilihan	3,347	1	1	2	1,062		1,062		246	2,039	2,285	32
Batuan	2,425	1		1	358		358	364	1,147	556	2,067	15
Bien Unido	4,175	1		1	485		485	353	3,177	160	3,690	12
Bilar	3,228	2	1	3	623		623	218	2,301	86	2,605	19
Buenavista	5,104	1		1	211		211	3,552	1,123	218	4,893	4
Calape	5,929		1	1	60		60	933	4,558	378	5,869	1
Candijay	5,878	1	1	2	36		36	230	5,519	93	5,842	1
Carmen	7,970	1	1	2	37		37	981	6,714	238	7,933	
Catigbian	4,529	2		2	579		579	352	3,071	527	3,950	13
Clarin	3,794	2		2	23		23	322	3,334	115	3,771	1
Corella	1,319	1		1	68		68	48	913	290	1,251	5
Cortes	2,783	1		1				1,148	236	1,399	2,783	
Dagohoy	3,487							313	3,045	129	3,487	
Danao	3,430	1		1	38		38	86	2,792	514	3,392	1
Dauis	2,813	1		1	34		34	526	2,161	92	2,779	1
Dimiao	2,964	1		1	570		570		2,334	60	2,394	19
Duero	3,475	1		1	756		756	885	1,558	276	2,719	22
Garcia Hernandez	4,313	1		1	424		424	754	2,580	555	3,889	10
Getafe	5,455	1		1	610		610	4,045	800		4,845	11
Guindulman	5,858	1		1	12		12	440	4,902	504	5,846	
Inabanga	8,406	2		2	2,123		2,123	1,586	3,476	1,221	6,283	25
Jagna	6,422	1	1	2	901		901	577	4,725	219	5,521	14
Lila	1,847	1		1	190		190	325	1,098	234	1,657	10
Loay	2,812	1		1	724		724	200	1,788	100	2,088	26
Loboc	2,970	1	1	2	300		300		282	2,388	2,670	10
Loon	7,582	1		1	99		99	1,281	5,273	929	7,483	1
Mabini	5,487	1		1	53		53	432	4,874	128	5,434	1
Maribojoc	2,810	1	1	2	430		430	128	1,880	372	2,380	15
Panglao	4,335	1	1	2	15		15	664	3,468	188	4,320	
Pilar	5,013							652	3,728	633	5,013	
Pres. Carlos P. Garcia	4,222	1		1	422		422	956	2,631	213	3,800	10
Sagbayan	4,010	1		1	408		408		3,212	390	3,602	10
San Isidro	2,028	1		1	1,498		1,498	163	330	37	530	74
San Miguel	4,145	1		1	37		37	111	3,767	230	4,108	1
Sevilla	2,001	1		1	208		208		617	1,176	1,793	10
Sierra Bullones	4,952	1		1	321		321	275	3,102	1,254	4,631	6
Sikatuna	1,265								382	883	1,265	
Tagbilaran City (Capital)	18,868	9	8	17	10,265		10,265	4,196	3,643	764	8,603	54
Talibon	10,212	3	1	4	1,370		1,370	408	7,931	502	8,841	13
Trinidad	5,314	1		1	400		400	2,479	607	1,828	4,914	8
Tubigon	8,337	1	1	2	4,000		4,000	1,500	2,337	500	4,337	48
Ubay	12,675	1		1	32		32	1,975	10,099	569	12,643	
Valencia	4,721	1		1	1,271		1,271		329	3,121	3,450	27
Provincial Total	228,661	59	19	78	32,353		32,353	35,323	133,666	27,318	196,307	14

CHAPTER IV



EXISTING FACILITIES AND SERVICE COVERAGE

CHAPTER IV EXISTING FACILITIES AND SERVICE COVERAGE

4.1 Water Supply

4.1.1 General

The existing water supply facilities and conditions were evaluated by municipality under the category of urban and rural areas. Facilities were classified into three service levels, of which Level I facilities were further classified for drinking purposes into safe and unsafe.

The percentages of service coverage by different service level were estimated covering urban and rural areas by municipality. The served population is defined as "population served adequately with access to safe water sources/facilities". The rest of the population with unsafe sources/ facilities and without access to water supply facilities was then defined as "underserved population" and "unserved population", respectively. The service coverage was evaluated using estimated population in 2003.

Service profile and operating conditions of existing facilities are summarized by service level to come up with problem areas and need for rehabilitation.

As a provincial total, an estimated 59% of the present population (2003) is considered as adequately served (Table 4.1.7). Under the area classification, 60% of urban population and 59% of rural population have access to safe water sources/facilities, while the rest is underserved or unserved. About 252,851 persons or 35% of the served population depend on Level I facilities, while about 65% are served by Level III and/or Level II systems.

4.1.2 Types of Facilities and Definition of Service Level Standard

(1) Composition of Water Supply System/Facility

The National Sector Master Plan (NSMP) defines service level and system components of the water supply systems as shown in Table 4.1.1. NEDA Board Resolution No. 12 (s. 1995) also provides the approved definition of terms relative to water supply including levels of service (4.1.2, Annex IV). These terms are to be adopted by all government agencies including LGUs.

Table 4.1.1 Composition of Water Supply System/Facility by Service Level

Description	Level I (Point Source Facility)	Level II (Communal Faucet System)	Level III (Individual House Connection)
1. Water Source	Drilled/Driven shallow well Drilled /driven deep well Dug well Spring, Rain collector	Drilled shallow/deep well Spring Infiltration gallery	Drilled deep well Spring Infiltration gallery Surface water intake
2. Water Treatment	Generally none. Disinfection of wells is conducted periodically by local health authorities.	Generally none	Disinfection is provided. Systems with surface water source have water treatment facilities.
3. Distribution	None	Piped system provided with reservoir/s	Piped system with reservoir/s and pumping facilities
4. Delivery and Service Level	At point (within 250m radius)	Communal faucet (within 25m radius)	Individual house connection/household tap
5. Consumption	At least 20 lpcd	At least 60 lpcd	At least 100 lpcd

* lpcd – liters per capita per day

(2) Safe and Unsafe Classification of Water Resources

DOH has classified Level I source facilities as safe (reliable water source) and unsafe sources/facilities based on the National Standard for Drinking Water (NSWD).

Safe Source: Protected deep well, protected shallow well, improved/covered dug well and developed spring

Unsafe Source: Unprotected deep well, unprotected shallow well, open dug well, undeveloped/unprotected spring and rain water collector

Water sources other than the above mentioned, such as untreated surface water of rivers, lakes and ponds are also considered unsafe sources. On the other hand, levels II and III water supply systems are regarded to have safe/reliable sources with provision of adequate treatment.

(3) Service Level Standard

The NSMP and NEDA Resolution No. 12 define "adequate service level" by different water supply system. Improvement in the number of households per water source/facility may be expected for Level I service in the future. On the contrary, the number of households served by a unit of private/public source is sometimes beyond the standard on a current basis.

Level III: 1 household/connection

Level II: 5 (4 to 6) households/communal faucet

Level I: 15 households/point source

1 household/private well

4.1.1 Level III Systems

Level III (individual house connection) systems at municipal level are usually established and operated by the LGUs and waterworks associations. Some LGUs also implement and operate Level III systems commonly at barangay level.

There are 90 service providers for Level III systems in the province under different kinds of ownership as shown in Table 4.1.2 (refer to Table 4.1.1, Appendix IV for details) .

The Bohol Water Utilities is the largest system in the province, covering 14 urban barangays in the city of Tagbilaran with a served population of approximately 49,000. The Bohol Water Utilities covers about 90% of the urban barangays in the capital city. Water source of the Bohol Water Utilities is deep well. The remainder of the population in the capital city is served by Tagbilaran City WWS.

Next to Bohol Water Utilities is the Loon LGU. This water system covers 10 urban and 8 rural barangays in the municipality of Loon with a total served population of 29,165. Water from this system mainly comes from spring and deep well water sources.

In the municipalities of Antequera, Batuan, Danao, Dimiao, G. Hernandez, Lila, Loon, San Isidro, Sevilla, and portions of Sikatuna, and Valencia, the Level III systems are managed by the LGU.

There are only two water districts (WD) in the province, the Talibon Water District and the Clarin Water District (Table 4.1.3). These systems are under the technical and financial assistance of LWUA.

Chlorination is practiced in all Level III systems. According to local officials, Level III systems undergo disinfection once a month.

The different service providers have not been able to come up with a complete detail with regard to production capacity of the spring and deep well sources as well as the daily consumption. It is recommended that a proper monitoring and accounting with regard to the monthly production and consumption of water be institutionalized so as to determine if the consumption exceeds the production or vice versa and sound management strategies can be enforced and implemented.

Table 4.1.2 Details on Existing Level III Systems

Municipality/ City	Service Providers (Operating Body)	Water Consumption			Service Coverage								
		Type of Water Source[1]	Water Consumption (cu.m/day)	Domestic Supply (%)	No. of Brgys. Served			No. of Household Served			No. of Population Served		
					Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Alburquerque	Alburquerque Mun. WWS	SP			2	10	12	196	720	916	980	3,593	4,573
Alicia	Alicia WWS					3	3		413	413		2,043	2,043
	Del Monte WWS	SP				1	1		140	140		300	300
	Katipunan WWS	SP				1	1		69	69		500	500
	La Hacienda WWS	SP	67			1	1		300	300		1,800	1,800
	Napo WWS	SP			1		1	204		204	1,181		1,181
	Progresso WWS	SP			1		1	130		130	650		650
	Putlongcam WWS	SP				1	1		82	82		432	432
	Untaga WWS	SP				1	1		17	17		90	90
	Municipal Total	SP	67		2	8	10	334	1,021	1,355	1,831	5,165	6,996
Anda	Anda WWS	SP			2	3	5	421	321	742	2,218	1,900	4,118
Antequera	Antequera LGU	SP			2	13	15	474	2,028	2,502	2,493	1,798	4,291
Baclayon	Baclayon WWS	DW	946		3	7	10	903	1,877	2,780	4,130	9,460	13,590
Balilihan	Balilihan Mun. WWS	DW			4	9	13	428	480	908	2,140	2,400	4,540
Batuan	Batuan LGU	SP			2		2	328		328	1,738		1,738
Bien Unido	Bien Unido WWS	DW	10		2		2	670		670	3,522		3,522
Bilar	Bilar WWS	SP/DW/Sur			2	9	11	318	883	1,201	3,024	8,287	11,311
Buenavista	Buenavista WWS	DW	48		2	6	8	292	911	1,203	1,583	4,733	6,316
Calape	Calape Waterwork	SP/DW	74	100	4	27	31	989	3,959	4,948	5,968	17,912	23,880
Candijay	Candijay	SP			3	6	9	870	635	1,505	5,011	3,505	8,516
Carmen	Carmen Waterwork	SP/DW	15,305	100		2	2		645	645		3,537	3,537
Catigbian	Catigbian	DW			2	2	4	302	239	541	1,783	3,107	4,890
Clarin	Calrin Water District	SP/DW	594	100	5	12	17	656	472	1,128	3,320	2,380	5,700
Corella	Corella WWS	DW	500	100	1	7	8	162	960	1,122	853	4,800	5,653
Cortes	Cortes WWS	SP/DW	1	96	2	12	14	502	1,035	1,537	2,460	5,196	7,656
Danao	Danao LGU	SP/DW	152	98	1	9	10	297	360	657	3,031	9,154	12,185
Dauis	Dauis WWS	DW	31			8	8		1,148	1,148		10,317	10,317
Dimiao	Dimiao LGU Source-1	SP	424	100	2	8	10	126	153	279	492	1,049	1,541
	Dimiao LGU Source-2	DW	376	100	1		1	95		95	341		341
	Dimiao LGU Source-3	DW	469	100	1		1	95		95	384		384
	Municipal Total	SP/DW	1,268	100	4	8	12	316	153	469	1,217	1,049	2,266
Duero	Angilan	SP			2	3	5	354	273	627	1,759	1,483	3,242
	Bangwalog	SP				6	6		377	377		1,829	1,829
	Tangcobo	SP			2	4	6	351	709	1,060	1,831	4,422	6,253
	Municipal Total	SP			4	13	17	705	1,359	2,064	3,590	7,734	11,324
Garcia Hernandez	G. Hernandez LGU	SP			3	8	11	654	471	1,125	3,924	2,826	6,750
Guindulman	GUINBUWASSCO	DW	894	98	2	6	8	448	1,665	2,113	2,240	8,325	10,565
Inabanga	Inanbanga WW	SP/DW			1	6	7	557	356	913	2,894	1,840	4,734
Jagna	Jagna WWS	SP	3	28	7		7	1,852		1,852	9,260		9,260
Lila	Lila LGU	SP			2	5	7	211	257	468	2,005	2,939	4,944
Loay	Alegria Sur	DW				1	1		80	80		419	419
	Botoc Occidental	DW				1	1		51	51		245	245
	Conception	DW				5	5		251	251		1,421	1,421
	Hinawanan	DW				5	5		221	221		1,279	1,279
	Las Salinas Sur	SP				1	1		80	80		491	491
	Tayong Occidental	SP/DW				1	1		41	41		262	262
	Tayong Oriental	SP				1	1		30	30		171	171
	Tocdog Dacu	SP				1	1		114	114		632	632
	Tocdog Ilaya	SP				1	1		71	71		331	331
	Municipal Total	SP/DW				17	17		939	939		5,251	5,251
Loboc	BARUWASA	SP	16	100		1	1		117	117		662	662
	Cabadiangan	SP				1	1		41	41		275	275
	Calunasan Norte	DW				1	1		69	69		345	345

Municipality/ City	Service Providers (Operating Body)	Water Consumption			Service Coverage								
		Type of Water Source[1]	Water Consumption (cu.m/day)	Domestic Supply (%)	No. of Brgys. Served			No. of Household Served			No. of Population Served		
					Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
	Loboc Mun. WWS	SP	200	100	2	6	8	257	470	727	1,336	2,702	4,038
	Quinoguidan-Bahian WWS	DW	9		2		2	167		167	915		915
	Tatay WATSAN	SP				1	1		30	30		249	249
	Municipal Total	SP/DW	225	96	4	10	14	424	727	1,151	2,251	4,233	6,484
Loon	Loon LGU	SP/DW	2,417	92	10	8	18	1,771	1,387	3,158	12,330	16,835	29,165
Mabini	Mabini WWS	SP/DW			4	12	16	1,092	2,814	3,906	5,953	16,746	22,699
Maribojoc	Maribojoc WWS	SP	1,058	100	7	8	15	557	1,051	1,608	5,629	7,023	12,652
Panglao	Bolod No. 1	SP	102	100		4	4		350	350		1,900	1,900
	Camansilis, Lo-oc	DW			1		1	220		220	1,323		1,323
	Canhilbas Lourdes	DW			3	3	6	1,461	859	2,320	7,931	4,559	12,490
	Municipal Total	SP/DW	102	100	4	7	11	1,681	1,209	2,890	9,254	6,459	15,713
Pilar	PICOWASCO	SP	469	98		8	8		559	559		2,251	2,251
Sagbayan	Sagbayan WW	DW			1	13	14	420	593	1,013	2,083	2,953	5,036
San Isidro	San Isidro LGU	DW	25	9		1	1		90	90		444	444
Sevilla	Sevilla LGU	SP/DW	8		1	8	9	150	862	1,012	831	4,810	5,641
Sierra Bullones	Abachanan WW	SP			1		1	413		413	2,042		2,042
	Anibongan WW	SP	141			1	1		125	125		671	671
	Bugsoc WWS	SP			1		1	117		117	820		820
	Canhayag-Uwanan Spring	SP				1	1		76	76		390	390
	Canta-ub WWS	SP	141			1	1		42	42		240	240
	Danicop WW	SP				1	1		192	192		980	980
	Dusita WW	SP				1	1		45	45		198	198
	Lataban WWS	SP				1	1		96	96		518	518
	Magsaysay WW	SP				1	1		84	84		480	480
	Matin-ao WWS	SP	9		1		1	262		262	1,506		1,506
	San Isidro WWS	SP	9			1	1		253	253		1,428	1,428
	Sierra Bullones WWS	SP	1,099	91	2	5	7	529	437	966	3,104	2,564	5,668
	Sta. Cruz	SP				1	1		77	77		452	452
	Villa Garcia WW	SP			1	1	2		109	109		569	569
	Municipal Total	SP	1,398	72	6	15	21	1,321	1,536	2,857	7,472	8,490	15,962
Sikatuna	Poblacion I	DW	170	100	1		1	187		187	931		931
	Sikatuna LGU	DW				6	6		426	426		2,383	2,383
	Municipal Total		170	100	1	6	7	187	426	613	931	2,383	3,314
Tagbilaran City (Capital)	Bohol Water Utilities	DW			14		14	9,800		9,800	49,000		49,000
	Tagbilaran City WWS	DW	2,231	100	2		2	3,484		3,484	20,896		20,896
	Municipal Total	DW	2,231	100	16		16	13,284		13,284	69,896		69,896
Talibon	Talibon Water District	DW	425	97	2	5	7		722	722		4,123	4,123
Trinidad	Trinidad	SP/DW	90	79	1	1	2	143	29	172	786	160	946
Tubigon	Panadtaran WWS	SP/DW	388			1	1		100	100		500	500
	Panaytayon WW	DW			1		1	170		170	1,100		1,100
	Pinayagan WWS	DW			1		1	197		197	1,787		1,787
	Tubigon WWS	SP/DW	800	100	5	5	10	1,210	445	1,655	6,692	2,461	9,153
	Villanueva-Cahayag WW	DW				2	2		119	119		1,470	1,470
	Municipal Total	SP/DW	1,188	67	7	8	15	1,577	664	2,241	9,579	4,431	14,010
Ubay	Ubay Mun. WWS				3	5	8	485	481	966	2,425	2,405	4,830
	UWASCO				3	5	8	637	859	1,496	3,203	4,320	7,523
	Municipal Total				6	10	16	1,122	1,340	2,462	5,628	6,725	12,353
Valencia	Valencia LGU	SP	519	96	2	33	35	413	1,990	2,403	2,218	11,084	13,302
Provincial Total			30,219	2281	136	366	502	37,027	38,893	75,920	206,056	226,358	432,414

1/ Type of Water Source: *DW* – Deep Well; *Sur* – Surface Water (River); *SP* – Spring; *IG* – Infiltration Gallery

Table 4.1.3 Information on Water District

Water Service Provider	Number of Connections						Production (cu. m/mon)	Accounted for Water (cu. m/mon)
	Domestic	Institutional	Commercial	Industrial	Total	Metered		
Clarin Water District	1,128				1,128	1,128	38,232	17,820
Talibon Water District	722		80	3	805	805	17,940	14,841

4.1.4 Level II Systems

Level II (communal faucet) systems are designed to cater for barangay level water supply with limited service coverage and supply capacity. These systems have been implemented by different agencies (DPWH, LWUA, DILG, LGUs) by encouraging the use of spring sources and are mostly operated by LGUs or RWSAs.

There are a total of 96 operating bodies providing Level II systems in 26 municipalities in the province. Majority of these is utilizing spring sources (69 systems), while the remaining systems are using deep well sources (refer to Table 4.1.2, Appendix IV).

Problem areas, both in managerial and technical aspects, identified on existing Level II systems are discussed hereunder.

(1) Management Practice

Quite a number of deep well sources have been identified for Level II systems. Most of the service providers tapping deep well sources are only able to supply water for a maximum of 12 hours per day. Only two operating bodies are able to supply water for a period of 24 hours. A few are only able to supply water for a maximum of 4 hours per day. On the other hand, most of the springs are free flowing and operate on a 24-hour basis.

Repair works for most of the Level II systems are done by a local trademan. A few are done by the MEO/CEO and by barangay officials.

Most of the service providers do not have people having technical capabilities in maintaining the system. The personnel only consist of administrative staff and collector/s.

(2) Technical Skill for O&M of facilities

Utilization of spring sources normally entails very minimal O&M practice especially in cases where springs are free flowing and delivery of water to the service area is attributed to gravity flow. However, inappropriate care of spring box and pipeline results to various problems, e.g. turbid water, less water flow by clogging at spring box and pipeline, and others. Physical damage may also occur to transmission lines exposed on the ground.

A few Level II systems may practice scheduled water supply due to insufficient water source/insufficient capacity of the facilities. Such problems may be attributed to haphazard expansion or tapping of individual connections without proper planning. This situation usually results in insufficient water flow or a reduction in the water pressure.

Expansion of distribution line and installation of additional public faucets are usually undertaken without appropriate technical study on the capacities of water sources and distribution facilities, resulting in a decrease of supply pressure and quantity.

Although the taste and smell of the water is fairly good, dirty water is occasionally experienced. This may be due to influx of sediments particularly during the rainy season.

Metallic taste in the water is experienced in some parts of Tubigon and San Isidro. This may be attributed to the corrosion of the wells, pipes or the distribution pipes and have to be thoroughly assessed and checked. Replacement of a non-corrosive material such as PVC is recommended.

A number of Level II systems do not have a reservoir that is a part of the definition of a Level II system (4.1.2, Appendix IV). However, such systems, even though without a reservoir, have already been designated as Level II by the local community since for them communal faucets or stand posts constitute a Level II system. It is recommended that a review of the definition be undertaken or a consensus reached in order to properly categorized such systems.

Table 4.1.4 Information on Existing Level II Systems

Municipality/ City	Water Service Provider	Service Coverage								
		No. of Brgys. Served			No. of Household Served			No. of Population Served		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Anda	Anda Mun. Waters		6	6		190	190		1,125	1,125
Antequera	Antequera WWS	1	15	16	15	175	190	79	847	926
Baclayon	San Roque		1	1		15	15		76	76
Balilihan	Balilihan LGU		3	3		75	75		409	409
Batuan	Cabacnitan		1	1		110	110		560	560
	Catigdas		1	1		20	20		100	100
	Garcia		1	1		35	35		178	178
	Poblacion Norte	1		1	175		175	950		950
	Poblacion Vieja		1	1		65	65		331	331
	Quezon		1	1		35	35		178	178
	San Jose	1		1	20		20	109		109
	Municipal Total	2	5	7	195	265	460	1,059	1,347	2,406
Bilar	Bilar LGU	1	5	6	25	125	150	135	708	843
Candijay	Abihilan		1	1		170	170		938	938
	Anoling		1	1		110	110		607	607
	Boyo-an		1	1		170	170		938	938
	Cadapdapan		1	1		30	30		166	166
	Canawa		1	1		100	100		552	552
	Luan		1	1		115	115		635	635
	Lungsoda-an	1		1	85		85	490		490
	Pagahat		1	1		24	24		133	133
	Tambongan		1	1		55	55		300	300
	Tubod		1	1		70	70		386	386
	Municipal Total	1	9	10	85	844	929	490	4,655	5,145
Carmen	ACWSA		1	1		60	60		332	332
	Buenos Aires		1	1		50	50		277	277
	Municipal Total		2	2		110	110		609	609
Catigbian	Bongbong BWSA		1	1		35	35		183	183
	Libertad Sur		1	1		25	25		131	131
	Municipal Total		2	2		60	60		314	314
Clarin	Bontud LGU		1	1		30	30		151	151
	Katipunan Water Assn.		1	1		35	35		176	176
	Mataub Water Assn.		1	1		60	60		301	301
	SISILAMCO (PO)		1	1		75	75		376	376
	Municipal Total		4	4		200	200		1,004	1,004
Danao	Hibale		1	1		30	30		123	123
	Remedios		1	1		20	20		82	82
	Municipal Total		2	2		50	50		205	205
Dauis	Biking		1	1		145	145		1,302	1,302
	Bingag		1	1		55	55		494	494
	Dao		1	1		145	145		1,302	1,302
	San Isidro		1	1		210	210		1,886	1,886
	Tabalong		1	1		15	15		135	135
	Municipal Total		5	5		570	570		5,119	5,119
Duero	Imelda		1	1		35	35		178	178
	Taytay		1	1		40	40		203	203
	Municipal Total		2	2		75	75		381	381
Inabanga	Inabanga LGU	1	9	10	55	385	440	281	2,002	2,283
Getafe	Getafe LGU	3	1	4	75	30	105	179	180	359
Loay	Palo	1		1	69		69	276		276
	Sagnap		1	1		60	60		320	320
	Tambangan		1	1		125	125		625	625
	Tangcasan Sur		1	1		105	105		561	561
	Municipal Total	1	3	4	69	290	359	276	1,506	1,782
Loboc	Agape WWS		1	1		100	100		553	553
	Bonbon Lower		1	1		10	10		58	58
	Cambance WWS		1	1		65	65		378	378
	Candabong WWS		1	1		40	40		232	232
	Candasag WWS		1	1		40	40		232	232
	Oy WWS		1	1		90	90		523	523
	Municipal Total		6	6		345	345		1,976	1,976
Mabini	Abad Santos		1	1		35	35		191	191
	Baybayon	1		1	50		50	264		264
	Minol		1	1		20	20		109	109
	San Jose	1		1	20		20	109		109

Municipality/ City	Water Service Provider	Service Coverage								
		No. of Brgys. Served			No. of Household Served			No. of Population Served		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
	San Rafael		1	1		30	30		164	164
	Tangkigan	1		1	30		30	158		158
	Municipal Total	3	3	6	100	85	185	531	464	995
Sagbayan	Calangahan WW		1	1		50	50		249	249
San Isidro	Abehilan		1	1		25	25		123	123
	Baryong Daan		1	1		30	30		148	148
	Baunos		1	1		20	20		99	99
	Cabanugan		1	1		30	30		148	148
	Caimbang		1	1		60	60		296	296
	Cambansag		1	1		75	75		370	370
	Candungao		1	1		35	35		173	173
	Cansague Norte		1	1		30	30		148	148
	Cansague Sur		1	1		10	10		49	49
	Causwagan Sur		1	1		30	30		148	148
	Masonoy		1	1		40	40		197	197
	Poblacion		1	1		25	25		123	123
	Municipal Total		12	12		410	410		2,022	2,022
San Miguel	Corazon		1	1		54	54		270	270
	Poblacion		1	1		25	25		123	123
	San Jose Water Assn.		1	1		60	60		375	375
	Municipal Total		3	3		139	139		768	768
Sierra Bullones	Anibongan WW		1	1		15	15		87	87
	Cahayag		1	1		20	20		116	116
	Canlangit WW		1	1		60	60		349	349
	Casilay WW		1	1		20	20		116	116
	Danicop WW		1	1		30	30		174	174
	Dusita WW		1	1		30	30		174	174
	La Union WW		1	1		20	20		116	116
	Magsaysay WW		1	1		40	40		232	232
	Man-od		1	1		120	120		697	697
	Municipal Total		9	9		355	355		2,061	2,061
Trinidad	TMDA	1	1	2	60	10	70	329	55	384
Tubigon	Banlasan WWS		2	2		50	50		258	258
	Cawayanan WWS		1	1		85	85		439	439
	Genonocan WWS		1	1		20	20		103	103
	Ilijan Norte WW	1		1	55		55	292		292
	Ilijan Sur WWS		1	1		90	90		465	465
	Libertad		1	1		40	40		200	200
	Macaas WS	1		1	150		150	795		795
	Matabao WWS		1	1		15	15		78	78
	Pandan WW Assn.	1		1	75		75	398		398
	Talenceras WWS		1	1		35	35		181	181
	Tan-awan WW		1	1		45	45		233	233
	Municipal Total	3	9	12	280	380	660	1,485	1,957	3,442
Ubay	Ubay Mun. Water Sys.	3	2	5	105	10	115	525	50	575
Valencia	Valencia LGU		19	19		285	285		1,587	1,587
	Provincial Total	20	139	159	1064	5528	6592	5369	31676	37045

4.1.5 Level I Facilities

Level I facilities (point source) are common in rural barangays. Majority of the point source facilities are publicly owned. These include different types of wells equipped with hand-pumps, developed springs, covered/improved dug well.

Level I facilities are classified in terms of safe and unsafe sources referring to the definition of the DOH and the data from the PPDO as presented in Table 4.1.5 (see details in Appendix IV). Served population/household by safe sources in 2003 is also reflected in the same Table.

Table 4.1.5 Information on Existing Level I Facilities

Name of Municipality/City	Number of Safe Water Sources					Number of Unsafe Water Sources					Served by Safe Source				
											Number of Household			Number of Population	
	Deep Well	Shallow Well	Covered/ Improved Dug Well	Developed Spring	Total	Shallow Well	Covered/ Improved Dug Well	Open Dug Well	Undeveloped Spring	Rain Water Collector	Total	Urban	Rural	Total	Urban	Rural	Total
Alburquerque	26	3		2	31	31	5	2		3	41	120	345	465	677	1,722	2,398
Alicia	6	4	8	58	76	41	65	15	16		137	15	1,125	1,140	83	5,951	6,034
Anda	7			8	15	1		1			2		225	225		1,332	1,332
Antequera	46	3	2	34	85	31	26	24	7		88	14	1,229	1,244	75	5,953	6,028
Baclayon	41		1	5	47	2	8	9	11		30	60	507	567	302	2,554	2,856
Balilihan	32	4	1	45	82	37	11	16			64	133	1,066	1,198	708	5,804	6,512
Batuan	19	4	2	30	55	37	15	60	1		113	69	689	758	373	3,512	3,885
Bien Unido	1		22		23	5	201	234	21		461	285	60	345	1,585	336	1,921
Bilar	7	2	1	43	53	18	18	28	6		70	102	690	793	554	3,905	4,459
Buenavista	33	2	19	15	69	22	172	52	32		278		1,035	1,035		5,900	5,900
Calape	39	18	1	79	137	161	7	53	14		235	180	706	886	922	3,494	4,416
Candijay	39	18	1	79	137	161	7	53	14		235	240	1,816	2,057	1,382	10,019	11,401
Carmen	26	19	18	58	121	176	157	38	5		376	165	1,651	1,816	899	9,141	10,040
Catigbian	17	7	3	23	50	53	33	17	6		109	90	660	750	483	3,445	3,929
Clarin	19	4	3	2	28	42	34	32	9		117	15	405	420	77	2,033	2,110
Corella	30	1	1	1	33	12	5		8		25		112	112		528	528
Cortes	44	1		5	50	13					13	105	646	751	515	3,238	3,752
Dagohoy	26	13	20	2	61	110	175	187	20		492	150	765	915	801	4,177	4,978
Danao	22	5	7	28	62	46	59	4	2		111	75	855	930	444	4,976	5,420
Dauis	34		6		40		55	67	21		143	75		75	851		851
Dimiao	9	4		29	42	36	2	1			39	15	615	630	76	3,223	3,299
Duero	11	28		37	76	249	2		1		252	50	1,066	1,116	255	5,410	5,665
Garcia Hernandez	12	2		14	28	16	3		2		21	45	375	420	235	2,033	2,268
Getafe	13	12	12	3	40	99	101	105	9		314	210	390	600	1,157	2,301	3,458
Guindulman	37	8	1	32	78	79	8	7	3		97	75	1,094	1,169	400	5,705	6,105
Inabanga	89	13	27	26	155	108	252	272	29		661	300	2,026	2,326	1,560	10,469	12,029
Jagna	35	22		28	85	188	7	44	16		255	150	1,124	1,274	783	5,738	6,521
Lila	1			7	8	1			2		3		120	120		720	720
Loay	42	2		14	58	20	3	4	10		37	210	642	852	1,237	3,429	4,666
Loboc	36	5		16	57	44	8	4	8		64	15	841	856	82	4,880	4,963
Loon	33	3		75	111	34	1	16	10		61	285	1,380	1,664	1,610	7,921	9,531
Mabini	11	4	5	19	39	39	49	24	43		155	120	465	585	634	2,534	3,168
Maribojoc	33	2		13	48	17	2	6	4		29	135	399	534	1,131	2,068	3,199
Panglao	25	1	11		37	5	92	202	22		321	105	450	555	575	2,471	3,046
Pilar	19	11	5	44	79	99	42		27		168	30	1,155	1,185	169	6,445	6,614
Pres. Carlos P. Garcia	4	3	32		39	26	270	271	52		619	105	480	585	568	2,381	2,949
Sagbayan	130	15	10	16	171	131	88	49	6		274	360	1,366	1,726	1,786	6,798	8,584
San Isidro	41	2	2	69	114	23	14	7	11		55		1,503	1,503		7,408	7,408
San Miguel	12	16	28	4	60	152	259	109	18		538	105	795	900	647	4,380	5,027
Sevilla	17	8	1	24	50	72	6	13	2		93	60	690	750	338	3,850	4,189
Sierra Bullones	6	4		30	40	35	3	8	2		48	45	555	600	248	3,225	3,473
Sikatuna	13	2	1	4	20	14	5		16		35	14	270	284	70	1,547	1,617
Tagbilaran City (Capital	65	4	1	5	75	35	9	69	7		120	1,126		1,126	5,614		5,614
Talibon	36	10	81	1	128	89	721	280	45		1,135	734	1,186	1,920	4,145	6,506	10,651
Trinidad	18	22	81	2	123	199	735	174	51		1,159	165	1,679	1,844	904	9,156	10,060
Tubigon	111	8	4	17	140	68	37	92	3		200	435	1,597	2,032	2,306	8,263	10,569
Ubay	11	22	61	2	96	200	553	263	33		1,049	180	1,259	1,439	952	6,514	7,466
Valencia	63	3		96	162	36	5	31	1		73	25	1,997	2,021	132	11,112	11,244
Provincial Total	1,447	344	479	1,144	3,414	3,113	4,331	2,942	629		11,015	6,992	40,106	47,098	38,345	214,506	252,851

Of the 14,429 Level I facilities, about 50% are covered/improved and open dug wells, 24% are shallow wells and 10% are deep wells. According to the PSPT, only 10% of the shallow wells and covered/improved dug wells in the province were evaluated to be safe. All deep wells and developed springs are regarded as safe water sources. Of the 14,429 Level I facilities, approximately 75% are regarded as unsafe. Unsafe water sources in the province are shallow wells, covered/improved and open dug wells and undeveloped springs. This should be given much attention since, shallow wells and covered/improved dug wells are supposed to be safe water sources. A proper accounting of these problematic shallow wells and covered/improved dug wells should be done and evaluated in order to assess the nature of the problem.

Percentage shares between operational public and private well facilities is almost 50% for each. Almost 70% of deep and shallow wells are functional and the rest are non-functional. Some of the probable reasons causing the abandonment of the wells are the lack of spare parts, drying up of water source and water quality problems. Major repairs of the wells are brought to the attention of the DPWH-DEO. The status of existing wells is presented in Table 4.1.6.

Table 4.1.6 Operating Status of Existing Wells in the Province

Operating Status	Unit	Public		Private		Total
		Deep Well	Shallow Well	Deep Well	Shallow Well	
Functioning	Number	904	1,486	543	1,971	4,904
	Percent	57	70	75	71	68
Non-functioning	Number	676	644	178	807	2,305
	Percent	43	30	25	29	32
Total Number		1,580	2,130	721	2,778	7,209

4.1.6 Water Supply Service Coverage

According to the definition of DOH in terms of safe and unsafe sources, service coverage was studied under “served”, “underserved” and “unserved” categories.

The base year used for planning purposes is 2003. Population projection used was based on methodologies used by the NSO. The ratio method was used for calculating the population for the year 2003.

Water supply service coverage by service level is estimated for urban and rural areas covering all municipalities under the following conditions and assumptions:

- Service percentage/ population by Level III and Level II systems was estimated based on the questionnaire survey results.
- For municipalities having all the service levels (Levels III, II, I), the system that is being used primarily for drinking purposes is the one taken to account. This is to avoid double counting of population/household served.

Table 4.1.7 presents the profile of the service coverage in terms of served, underserved and unserved. As a provincial total, 59% of the population is adequately served (60% of urban population and 59% of rural population).

The percentage of underserved/unserved population is estimated at 41% (40% of urban population and 41% of rural population) who are depending on unsafe sources/ facilities.

The provincial service coverage is presented in Figure 4.1.1 (see details in Supporting Report).

Both Level III and Level I systems dominate the service coverage in the province.

Although Level III systems provide much of the water in urban barangays, these systems also provide a major contribution of water supply to rural barangays. More than 70% of the total barangays served by Level III systems are rural while only 30% are urban. Therefore, in the province of Bohol, approximately 38% of the rural barangays have access to individual house connections.

With regard to Level II systems, more than 80% of the total household served are rural and the remaining are urban. This is expected since rural barangays are mostly situated in upland-hilly portions where the springs normally occur. In addition, urban barangays normally are geographically far from the source making it difficult to install and lay out long distribution lines.

Taking into account the municipal service coverage, of the 47 municipalities of the province, more than half are above the service coverage of the province which stands at 59%. Municipalities that are way below (<40%) the provincial service coverage are: Anda, Bien Unido, Carmen, Catigbian, Dagohoy, G. Hernandez, Getafe, C.P. Garcia, San Miguel, Pilar, Talibon, Trinidad and Ubay; the lowest being the municipality of Getafe with only 12% (urban 9%, rural 15%) service coverage. The rest of the municipalities below the 59%, have service coverage ranging from 42%-58%.

The lone city of Tagbilaran has a service coverage of 80%.

The municipalities of Corella, San Isidro and Valencia have 100% service coverage at present.

Table 4.1.7 Water Supply Service Coverage by Municipality

M

Name of Municipality/City	Area	Population (2003)	Population Coverage							Percentage of Population Coverage						
			Served by Safe Source				Underserved/Unserved			Served by Safe Source				Underseved/Unserved		
			Level III	Level II	Level I	Total	Unsafe Source	Unserved	Total	Level III	Level II	Level I	Total	Unsafe Source	Unserved	Total
Alburquerque	Urban	3,557	980		677	1,657	1,354	547	1,900	28		19	47	38	15	53
	Rural	5,753	3,593		1,722	5,315	438		438	62		30	92	8		8
	Total	9,310	4,573		2,398	6,971	1,792	547	2,339	49		26	75	19	6	25
Alicia	Urban	2,267	1,831		83	1,914	353		353	81		4	84	16		16
	Rural	20,889	5,165		5,951	11,116	9,773		9,773	25		28	53	47		47
	Total	23,156	6,996		6,034	13,030	10,126		10,126	30		26	56	44		44
Anda	Urban	2,860	2,218			2,218		642	642	78			78		22	22
	Rural	17,567	1,900	1,125	1,332	4,357	178	13,032	13,210	11	6	8	25	1	74	75
	Total	20,427	4,118	1,125	1,332	6,575	178	13,674	13,852	20	6	7	32	1	67	68
Antequera	Urban	2,647	2,493	79	75	2,647				94	3	3	100			
	Rural	12,014	1,798	847	5,953	8,598	3,416		3,416	15	7	50	72	28		28
	Total	14,661	4,291	926	6,028	11,245	3,416		3,416	29	6	41	77	23		23
Baclayon	Urban	4,595	4,130		302	4,432	163		163	90		7	96	4		4
	Rural	12,090	9,460	76	2,554	12,090				78	1	21	100			
	Total	16,685	13,590	76	2,856	16,522	163		163	81	0	17	99	1		1
Balilihan	Urban	2,848	2,140		708	2,848				75		25	100			
	Rural	15,334	2,400	409	5,804	8,613	4,006	2,715	6,721	16	3	38	56	26	18	44
	Total	18,182	4,540	409	6,512	11,461	4,006	2,715	6,721	25	2	36	63	22	15	37
Batuan	Urban	3,170	1,738	1,059	373	3,170				55	33	12	100			
	Rural	9,371		1,347	3,512	4,859	4,512		4,512		14	37	52	48		48
	Total	12,541	1,738	2,406	3,885	8,029	4,512		4,512	14	19	31	64	36		36
Bien Unido	Urban	18,508	3,522		1,585	5,107	13,401		13,401	19		9	28	72		72
	Rural	4,740			336	336	4,404		4,404			7	7	93		93
	Total	23,248	3,522		1,921	5,443	17,805		17,805	15		8	23	77		77
Bilar	Urban	3,713	3,024	135	554	3,713				81	4	15	100			
	Rural	14,387	8,287	708	3,905	12,900	1,487		1,487	58	5	27	90	10		10
	Total	18,100	11,311	843	4,459	16,613	1,487		1,487	62	5	25	92	8		8
Buenavista	Urban	3,902	1,583			1,583	947	1,372	2,319	41			41	24	35	59
	Rural	25,219	4,733		5,900	10,633	14,587		14,587	19		23	42	58		58
	Total	29,121	6,316		5,900	12,216	15,534	1,372	16,906	22		20	42	53	5	58
Calape	Urban	8,220	5,968		922	6,890	1,330		1,330	73		11	84	16		16
	Rural	21,406	17,912		3,494	21,406				84		16	100			
	Total	29,626	23,880		4,416	28,296	1,330		1,330	81		15	96	4		4

Table 4.1.7 Water Supply Service Coverage by Municipality

M

Name of Municipality/City	Area	Population (2003)	Population Coverage							Percentage of Population Coverage						
			Served by Safe Source				Underserved/Unserved			Served by Safe Source				Underseved/Unserved		
			Level III	Level II	Level I	Total	Unsafe Source	Unserved	Total	Level III	Level II	Level I	Total	Unsafe Source	Unserved	Total
Candijay	Urban	13,034	5,011	490	1,382	6,883	6,151		6,151	38	4	11	53	47		47
	Rural	19,957	3,505	4,655	10,019	18,179	1,778		1,778	18	23	50	91	9		9
	Total	32,991	8,516	5,145	11,401	25,062	7,929		7,929	26	16	35	76	24		24
Carmen	Urban	9,966			899	899	7,521	1,546	9,067			9	9	75	16	91
	Rural	34,021	3,537	1,163	9,141	13,841	20,180		20,180	10	3	27	41	59		59
	Total	43,987	3,537	1,163	10,040	14,740	27,701	1,546	29,247	8	3	23	34	63	4	66
Catigbian	Urban	3,436	1,783		483	2,266	725	445	1,170	52		14	66	21	13	34
	Rural	20,302	3,107	314	3,445	6,866	7,830	5,606	13,436	15	2	17	34	39	28	66
	Total	23,738	4,890	314	3,929	9,133	8,555	6,051	14,606	21	1	17	38	36	25	62
Clarin	Urban	4,462	3,320		77	3,397	385	680	1,065	74		2	76	9	15	24
	Rural	14,679	2,380	1,004	2,033	5,417	8,434	828	9,262	16	7	14	37	57	6	63
	Total	19,141	5,700	1,004	2,110	8,814	8,818	1,509	10,327	30	5	11	46	46	8	54
Corella	Urban	853	853			853				100			100			
	Rural	5,460	4,800	132	528	5,460				88	2	10	100			
	Total	6,313	5,653	132	528	6,313				90	2	8	100			
Cortes	Urban	3,381	2,460		515	2,975	368	39	407	73		15	88	11	1	12
	Rural	10,506	5,196		3,238	8,434	602	1,470	2,072	49		31	80	6	14	20
	Total	13,887	7,656		3,752	11,408	970	1,509	2,479	55		27	82	7	11	18
Dagohoy	Urban	2,778			801	801	1,977		1,977			29	29	71		71
	Rural	16,201			4,177	4,177	12,024		12,024			26	26	74		74
	Total	18,979			4,978	4,978	14,001		14,001			26	26	74		74
Danao	Urban	3,515	3,031		444	3,475	40		40	86		13	99	1		1
	Rural	16,508	9,154	205	4,976	14,335	2,173		2,173	55	1	30	87	13		13
	Total	20,023	12,185	205	5,420	17,810	2,213		2,213	61	1	27	89	11		11
Dauis	Urban	12,407			851	851	6,124	5,433	11,557			7	7	49	44	93
	Rural	15,436	10,317	5,119		15,436				67	33		100			
	Total	27,843	10,317	5,119	851	16,287	6,124	5,433	11,557	37	18	3	58	22	20	42
Dimiao	Urban	1,409	1,217	51	76	1,344	65		65	86	4	5	95	5		5
	Rural	14,082	1,049	943	3,223	5,215	2,830	6,038	8,867	7	7	23	37	20	43	63
	Total	15,491	2,266	994	3,299	6,559	2,894	6,038	8,932	15	6	21	42	19	39	58
Duero	Urban	3,845	3,590		255	3,845				93		7	100			
	Rural	13,817	7,734	381	5,410	13,525	292		292	56	3	39	98	2		2
	Total	17,662	11,324	381	5,665	17,370	292		292	64	2	32	98	2		2

Table 4.1.7 Water Supply Service Coverage by Municipality

M

Name of Municipality/City	Area	Population (2003)	Population Coverage							Percentage of Population Coverage						
			Served by Safe Source				Underserved/Unserved			Served by Safe Source				Underseved/Unserved		
			Level III	Level II	Level I	Total	Unsafe Source	Unserved	Total	Level III	Level II	Level I	Total	Unsafe Source	Unserved	Total
Garcia Hernandez	Urban	5,551	3,924		235	4,159	157	1,235	1,392	71		4	75	3	22	25
	Rural	17,625	2,826		2,033	4,859	1,545	11,222	12,767	16		12	28	9	64	72
	Total	23,176	6,750		2,268	9,018	1,702	12,457	14,158	29		10	39	7	54	61
Getafe	Urban	14,288		179	1,157	1,336	10,249	2,703	12,952		1	8	9	72	19	91
	Rural	16,884		180	2,301	2,481	14,403		14,403		1	14	15	85		85
	Total	31,172		359	3,458	3,817	24,652	2,703	27,355		1	11	12	79	9	88
Guindulman	Urban	5,609	2,240		400	2,640	480	2,490	2,969	40		7	47	9	44	53
	Rural	25,039	8,325		5,705	14,030	7,112	3,897	11,009	33		23	56	28	16	44
	Total	30,648	10,565		6,105	16,670	7,591	6,387	13,978	34		20	54	25	21	46
Inabanga	Urban	11,731	2,894	281	1,560	4,735	6,996		6,996	25	2	13	40	60		60
	Rural	31,795	1,840	2,002	10,469	14,311	17,484		17,484	6	6	33	45	55		55
	Total	43,526	4,734	2,283	12,029	19,046	24,480		24,480	11	5	28	44	56		56
Jagna	Urban	11,622	9,260		783	10,043	1,579		1,579	80		7	86	14		14
	Rural	21,399			5,738	5,738	12,087	3,575	15,662			27	27	56	17	73
	Total	33,021	9,260		6,521	15,781	13,666	3,575	17,241	28		20	48	41	11	52
Lila	Urban	2,149	2,005			2,005	89	55	144	93			93	4	3	7
	Rural	8,914	2,939		720	3,659	180	5,075	5,255	33		8	41	2	57	59
	Total	11,063	4,944		720	5,664	269	5,130	5,399	45		7	51	2	46	49
Loay	Urban	5,331		276	1,237	1,513	884	2,935	3,818		5	23	28	17	55	72
	Rural	10,186	5,251	1,506	3,429	10,186				52	15	34	100			
	Total	15,517	5,251	1,782	4,666	11,699	884	2,935	3,818	34	11	30	75	6	19	25
Loboc	Urban	2,962	2,251		82	2,333	575	53	629	76		3	79	19	2	21
	Rural	14,110	4,233	1,976	4,880	11,089	3,021		3,021	30	14	35	79	21		21
	Total	17,072	6,484	1,976	4,963	13,423	3,596	53	3,649	38	12	29	79	21	0	21
Loon	Urban	14,028	12,330		1,610	13,940	88		88	88		11	99	1		1
	Rural	29,267	16,835		7,921	24,756	3,444	1,067	4,511	58		27	85	12	4	15
	Total	43,295	29,165		9,531	38,696	3,532	1,067	4,599	67		22	89	8	2	11
Mabini	Urban	8,088	5,953	531	634	7,118	970		970	74	7	8	88	12		12
	Rural	21,557	16,746	464	2,534	19,744	1,813		1,813	78	2	12	92	8		8
	Total	29,645	22,699	995	3,168	26,862	2,783		2,783	77	3	11	91	9		9
Maribojoc	Urban	8,837	5,629		1,131	6,760	1,006	1,071	2,077	64		13	76	11	12	24
	Rural	9,091	7,023		2,068	9,091				77		23	100			
	Total	17,928	12,652		3,199	15,851	1,006	1,071	2,077	71		18	88	6	6	12

Table 4.1.7 Water Supply Service Coverage by Municipality

M

Name of Municipality/City	Area	Population (2003)	Population Coverage							Percentage of Population Coverage						
			Served by Safe Source				Underserved/Unserved			Served by Safe Source				Underseved/Unserved		
			Level III	Level II	Level I	Total	Unsafe Source	Unserved	Total	Level III	Level II	Level I	Total	Unsafe Source	Unserved	Total
Panglao	Urban	14,540	9,254		575	9,829	4,711		4,711	64		4	68	32		32
	Rural	9,235	6,459		2,471	8,930	306		306	70		27	97	3		3
	Total	23,775	15,713		3,046	18,759	5,016		5,016	66		13	79	21		21
Pilar	Urban	4,086			169	169	1,689	2,228	3,917			4	4	41	55	96
	Rural	23,924	2,251		6,445	8,696	12,388	2,841	15,228	9		27	36	52	12	64
	Total	28,010	2,251		6,614	8,865	14,077	5,069	19,145	8		24	32	50	18	68
Pres. Carlos P. Garcia	Urban	7,557			568	568	6,989		6,989			8	8	92		92
	Rural	14,012			2,381	2,381	11,631		11,631			17	17	83		83
	Total	21,569			2,949	2,949	18,620		18,620			14	14	86		86
Sagbayan	Urban	3,869	2,083		1,786	3,869				54		46	100			
	Rural	16,087	2,953	249	6,798	10,000	6,087		6,087	18	2	42	62	38		38
	Total	19,956	5,036	249	8,584	13,869	6,087		6,087	25	1	43	69	31		31
San Isidro	Urban															
	Rural	9,997	444	2,145	7,408	9,997				4	21	74	100			
	Total	9,997	444	2,145	7,408	9,997				4	21	74	100			
San Miguel	Urban	2,369			647	647	1,722		1,722			27	27	73		73
	Rural	20,719		768	4,380	5,148	15,571		15,571		4	21	25	75		75
	Total	23,088		768	5,027	5,795	17,293		17,293		3	22	25	75		75
Sevilla	Urban	1,596	831		338	1,169	427		427	52		21	73	27		27
	Rural	9,588	4,810		3,850	8,660	928		928	50		40	90	10		10
	Total	11,184	5,641		4,189	9,830	1,354		1,354	50		37	88	12		12
Sierra Bullones	Urban	9,759	7,472		248	7,720		2,039	2,039	77		3	79		21	21
	Rural	18,484	8,490	2,061	3,225	13,776	4,183	525	4,708	46	11	17	75	23	3	25
	Total	28,243	15,962	2,061	3,473	21,496	4,183	2,564	6,748	57	7	12	76	15	9	24
Sikatuna	Urban	1,001	931		70	1,001				93		7	100			
	Rural	6,097	2,383	315	1,547	4,245	1,852		1,852	39	5	25	70	30		30
	Total	7,098	3,314	315	1,617	5,246	1,852		1,852	47	4	23	74	26		26
Tagbilaran City (Capital)	Urban	94,151	69,896		5,614	75,510	8,982	9,659	18,641	74		6	80	10	10	20
	Rural															
	Total	94,151	69,896		5,614	75,510	8,982	9,659	18,641	74		6	80	10	10	20
Talibon	Urban	32,366			4,145	4,145	28,221		28,221			13	13	87		87
	Rural	24,558	4,123		6,506	10,629	13,929		13,929	17		26	43	57		57
	Total	56,924	4,123		10,651	14,774	42,150		42,150	7		19	26	74		74

Table 4.1.7 Water Supply Service Coverage by Municipality

M

Name of Municipality/City	Area	Population (2003)	Population Coverage							Percentage of Population Coverage						
			Served by Safe Source				Underserved/Unserved			Served by Safe Source				Underseved/Unserved		
			Level III	Level II	Level I	Total	Unsafe Source	Unserved	Total	Level III	Level II	Level I	Total	Unsafe Source	Unserved	Total
Trinidad	Urban	3,274	786	329	904	2,019	1,255		1,255	24	10	28	62	38		38
	Rural	25,706	160	55	9,156	9,371	16,335		16,335	1	0	36	36	64		64
	Total	28,980	946	384	10,060	11,390	17,590		17,590	3	1	35	39	61		61
Tubigon	Urban	21,521	9,579	1,750	2,306	13,635	4,214	3,673	7,887	45	8	11	63	20	17	37
	Rural	22,107	4,431	9,413	8,263	22,107				20	43	37	100			
	Total	43,628	14,010	11,163	10,569	35,742	4,214	3,673	7,887	32	26	24	82	10	8	18
Ubay	Urban	13,873	5,628	535	952	7,115	6,758		6,758	41	4	7	51	49		49
	Rural	51,973	6,725	110	6,514	13,349	38,624		38,624	13	0	13	26	74		74
	Total	65,846	12,353	645	7,466	20,464	45,382		45,382	19	1	11	31	69		69
Valencia	Urban	2,350	2,218		132	2,350				94		6	100			
	Rural	23,855	11,084	1,587	11,112	23,783	72		72	46	7	47	100	0		0
	Total	26,205	13,302	1,587	11,244	26,133	72		72	51	6	43	100	0		0
Provincial Total	Urban	417,881	206,056	5,695	38,345	250,096	128,941	38,844	167,785	49	1	9	60	31	9	40
	Rural	821,948	226,358	41,259	214,506	482,123	281,934	57,890	339,825	28	5	26	59	34	7	41
	Total	1,239,829	432,414	46,954	252,851	732,219	410,875	96,734	507,610	35	4	20	59	33	8	41

4.2 Sanitation and Sewerage

4.2.1 General

The national strategy for sanitation and sewerage is demand-oriented. It aims to stimulate sustainable improvements in sanitation service coverage, public health, and environmental pollution abatement. To achieve this goal, the Government has made investment choices based on demand, efficiency and cost-effectiveness.

This sub-sector focuses on household toilets, school toilets and public toilets (public markets, bus/jeepney terminals, ports and parks/playgrounds). The latest municipal data from the PHO on household and public toilets as well as from DepEd on school toilets were gathered. Data on household toilets were compiled by urban and rural area. These facilities were classified into sanitary and unsanitary in terms of structure rather than the surrounding conditions.

The Code on Sanitation of the Philippines provides the minimum standards for services dealing with public health. Specifically, Chapter XVII on Sewage Collection and Disposal, Excreta Disposal and Drainage (Implementing Rules and Regulations, 1995) defines alternatives for on-site sanitation and sewage collection and disposal. At present, the development of sewerage systems, even in the urban centers of the province is not given priority because of the huge investment cost it entails.

In the NEDA Board Resolution No. 12 (series of 1995), definition of approved types of sanitary toilets was outlined (4.1.2, Annex IV). There were 4 approved types of sanitary toilets including the sanitary pit privy where water is not used but provided with cover to minimize the emission of foul odor and also to keep away flies and rodents. These definitions were adopted in this Master Plan.

4.2.2 Types of Facilities and Definition of Service Level Standard

As set forth in the above-mentioned Resolution, the types of household toilet facilities commonly used are categorized into: 1) sanitary toilets - approved types of toilet facilities include water-sealed pour flush or flush-type toilets either with receiving pit or septic tanks/vaults, and ventilated improved pit latrines and sanitary pit privy (dry type) considering its low construction cost especially in rural areas and in areas where water is scarce; and 2) unsanitary facilities - include the types of facilities used for receiving and disposing human waste which do not fall under the category of approved types of toilet facilities such as open pit privy and over-hung latrines (Figure 4.2.1, Appendix IV presents the DOH standard structure of a household toilet that meets minimum requirements of a sanitary facility).

In terms of service level, households are classified into: 1) served households - households with at least one (1) sanitary toilet; 2) underserved households - households with unsanitary toilets; and 3) unserved households - households without toilet. Coverage of adequately served households (with sanitary toilets) was estimated by urban and rural area of municipalities. The remaining households were considered as underserved or unserved. The service coverage was determined using the estimated number of households in 2003.

Service level standard for both elementary and secondary school toilets is translated in terms of: 1) served students - students who are adequately covered by the DepEd standard ratio of one (1) unit per 40 students with access to sanitary toilets (number of sanitary toilet units multiplied by 40); and (2) underserved or unserved students - those with unsanitary and without toilet facilities, and students unserved (based on the standard ratio) even though they have access to sanitary toilets. Service coverage of adequately served students was estimated both for public and private schools by municipality. Figure 4.2.2, Appendix IV shows a standard structure of a school toilet facility adopted by the DILG in its Rural Water Supply and Sanitation Project Phase V.

For public toilets, the service level is classified into: 1) served - utilities that have at least one sanitary toilet, and 2) underserved or unserved - utilities that have unsanitary or without toilet facilities. Service coverage of public utilities was estimated as a percentage of sanitary facilities to the total number of utilities. Figure 4.2.3, Appendix IV shows a standard structure of a public toilet facility adopted by the DILG in its project.

4.2.3 Sanitation Facilities and Service Coverage

(1) Household Toilets

The service coverage of sanitary toilets in the province is 79% of the total number of households. The remaining is underserved or unserved, of which 62% is without toilet facility (4.2.1, Appendix IV and 4.2.3, Sanitation Facilities and Service Coverage, Annex IV).

Municipalities that have higher or equal service coverage from the provincial average of 79% are Dimiao (100%), Tagbilaran City (98%), Candijay, Corella and Jagna (95%), Cortes (94%), Garcia Hernandez and San Miguel (93%), Duero, San Isidro and Valencia (92%), Baclayon and Balilihan (91%), Antequera and Dagohoy (90%), Loay and Sikatuna (89%), Guindulman and Panglao (88%), Alicia (87%), Pilar (87%), Clarin (85%), Sagbayan and Sevilla (83%), Batuan and Sierra Bullones (81%), Dauis and Loon (80%) and Mabini (79%).

On the other hand, the first 6 municipalities that registered the lowest service coverage are Lila (37%), Buenavista (40%), Inabanga (50%) Bien Unido (52%), Pres. C.P. Garcia (56%) and Calape (57%). It was observed that in municipalities that have high water supply service coverage (Corella, Duero, San Isidro, Valencia, Baclayon, Mabini, Loon and Tagbilaran City), high sanitation coverage occurs and correspondingly, in low water supply service coverage (Pres. C.P. Garcia, Getafe, Bien Unido and Trinidad), low sanitation coverage occurs. This can be attributed by the fact that the development of water supply almost always follows the upgrading of the household sanitation facilities because of access to water.

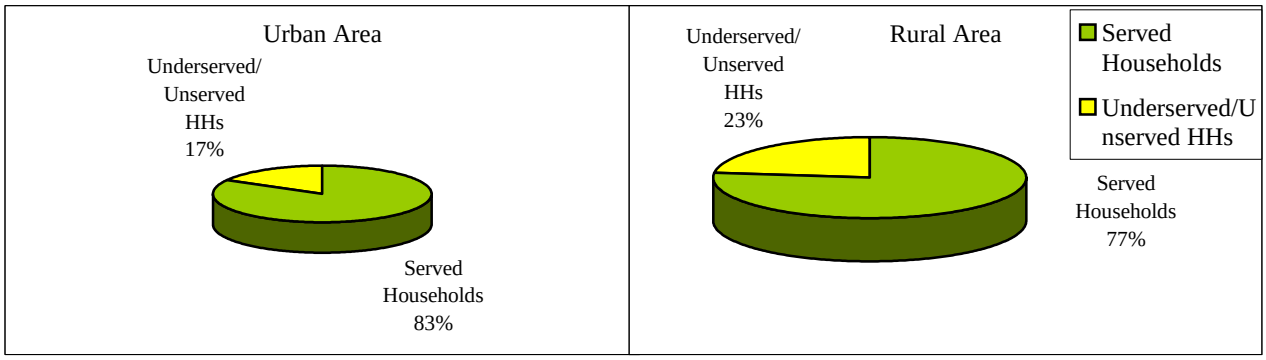
In urban areas, about 83% of the total household is served. A lower served household of 77% exists in rural area. Table 4.2.1 shows the municipal breakdown in the number of urban and rural household toilets by category, and service coverage. Figure 4.2.1 reflects the provincial service coverage of household toilet for urban and rural areas.

Even if high percentages of sanitary toilets are revealed in urban areas, problems arise from the unsatisfactory disposal of the effluent from the septic tanks or the direct discharge of wastewater to the local drains. Generally, there is little concern about the unsatisfactory disposal of wastes once it is outside their dwelling units. Practically, almost all the households dispose their wastes in the manner that poses risks to public health. Sullage management is unheard of.

Table 4.2.1 Sanitation Facilities and Service Coverage of Household Toilets, Urban and Rural, 2003

Municipality/City	Households, 2003			Household Toilets Facilities and Service Coverage											
				Urban				Rural				Municipal Total			
	Urban	Rural	Total	HHs Served by Sanitary Toilets		Underserved/ Unserved HHs		HHs Served by Sanitary Toilets		Underserved/ Unserved HHs		HHs Served by Sanitary Toilets		Underserved/ Unserved HHs	
				Number	% of HHs	Number	% of HHs	Number	% of HHs	Number	% of HHs	Number	% of HHs	Number	% of HHs
Alburquerque	631	1,153	1,784	248	39	383	61	892	77	261	23	1,140	64	644	36
Alicia	409	3,949	4,358	385	94	24	6	3,398	86	551	14	3,783	87	575	13
Anda	543	2,967	3,510	490	90	53	10	1,712	58	1,255	42	2,202	63	1,308	37
Antequera	504	2,482	2,986	442	88	62	12	2,232	90	250	10	2,674	90	312	10
Baclayon	914	2,399	3,313	882	96	32	4	2,126	89	273	11	3,008	91	305	9
Balilihan	533	2,814	3,347	493	92	40	8	2,561	91	253	9	3,054	91	293	9
Batuan	584	1,841	2,425	531	91	53	9	1,427	78	414	22	1,958	81	467	19
Bien Unido	3,329	846	4,175	1,925	58	1,404	42	226	27	620	73	2,151	52	2,024	48
Bilar	686	2,542	3,228	456	66	230	34	1,702	67	840	33	2,158	67	1,070	33
Buenavista	680	4,424	5,104	299	44	381	56	1,730	39	2,694	61	2,029	40	3,075	60
Calape	1,605	4,324	5,929	940	59	665	41	2,448	57	1,876	43	3,388	57	2,541	43
Candijay	2,263	3,615	5,878	2,122	94	141	6	3,458	96	157	4	5,580	95	298	5
Carmen	1,829	6,141	7,970	808	44	1,021	56	5,439	89	702	11	6,247	78	1,723	22
Catigbian	640	3,889	4,529	585	91	55	9	2,674	69	1,215	31	3,259	72	1,270	28
Clarin	870	2,924	3,794	734	84	136	16	2,504	86	420	14	3,238	85	556	15
Corella	162	1,157	1,319	157	97	5	3	1,096	95	61	5	1,253	95	66	5
Cortes	690	2,093	2,783	662	96	28	4	1,943	93	150	7	2,605	94	178	6
Dagohoy	520	2,967	3,487	495	95	25	5	2,659	90	308	10	3,154	90	333	10
Danao	594	2,836	3,430	563	95	31	5	2,097	74	739	26	2,660	78	770	22
Dauis	1,094	1,719	2,813	699	64	395	36	1,553	90	166	10	2,252	80	561	20
Dimiao	277	2,687	2,964	277	100			2,687	100			2,964	100		
Duero	755	2,720	3,475	719	95	36	5	2,477	91	243	9	3,196	92	279	8
Garcia Hernandez	1,061	3,252	4,313	919	87	142	13	3,109	96	143	4	4,028	93	285	7
Getafe	2,593	2,862	5,455	1,835	71	758	29	2,099	73	763	27	3,934	72	1,521	28
Guindulman	1,052	4,806	5,858	950	90	102	10	4,201	87	605	13	5,151	88	707	12
Inabanga	2,256	6,150	8,406	1,609	71	647	29	2,632	43	3,518	57	4,241	50	4,165	50
Jagna	2,226	4,196	6,422	2,214	99	12	1	3,885	93	311	7	6,099	95	323	5
Lila	361	1,486	1,847	350	97	11	3	325	22	1,161	78	675	37	1,172	63
Loay	905	1,907	2,812	829	92	76	8	1,679	88	228	12	2,508	89	304	11
Loboc	541	2,429	2,970	118	22	423	78	1,569	65	860	35	1,687	57	1,283	43
Loon	2,483	5,099	7,582	2,254	91	229	9	3,846	75	1,253	25	6,100	80	1,482	20
Mabini	1,532	3,955	5,487	1,396	91	136	9	2,961	75	994	25	4,357	79	1,130	21
Maribojoc	1,055	1,755	2,810	717	68	338	32	1,385	79	370	21	2,102	75	708	25
Panglao	2,653	1,682	4,335	2,366	89	287	11	1,459	87	223	13	3,825	88	510	12
Pilar	726	4,287	5,013	608	84	118	16	3,691	86	596	14	4,299	86	714	14
Pres. Carlos P. Garcia	1,397	2,825	4,222	654	47	743	53	1,693	60	1,132	40	2,347	56	1,875	44
Sagbayan	780	3,230	4,010	663	85	117	15	2,683	83	547	17	3,346	83	664	17
San Isidro		2,028	2,028					1,869	92	159	8	1,869	92	159	8
San Miguel	385	3,760	4,145	369	96	16	4	3,479	93	281	7	3,848	93	297	7
Sevilla	283	1,718	2,001	251	89	32	11	1,401	82	317	18	1,652	83	349	17
Sierra Bullones	1,771	3,181	4,952	1,371	77	400	23	2,659	84	522	16	4,030	81	922	19
Sikatuna	201	1,064	1,265	196	98	5	2	927	87	137	13	1,123	89	142	11
Tagbilaran City (Capital)	18,868		18,868	18,475	98	393	2					18,475	98	393	2
Talibon	5,739	4,473	10,212	5,047	88	692	12	2,340	52	2,133	48	7,387	72	2,825	28
Trinidad	597	4,717	5,314	489	82	108	18	2,679	57	2,038	43	3,168	60	2,146	40
Tubigon	4,061	4,276	8,337	2,765	68	1,296	32	3,339	78	937	22	6,104	73	2,233	27
Ubay	2,622	10,053	12,675	1,844	70	778	30	7,847	78	2,206	22	9,691	76	2,984	24
Valencia	438	4,283	4,721	429	98	9	2	3,927	92	356	8	4,356	92	365	8
Provincial Total	76,698	151,963	228,661	63,630	83	13,068	17	116,725	77	35,238	23	180,355	79	48,306	21

Figure 4.2.1 Provincial Service Coverage of Household Toilet Facilities, 2003



Inventory of toilet facilities in elementary and secondary schools for both public and private schools was undertaken. The province has a total of 6,086 toilet units found in 1,207 schools. Sanitary toilets adequately serve 80% of the students. The remaining 20% is underserved or unserved. Meanwhile, sanitary toilets adequately serve 82% of the public school students. Table 4.2.2 provides the number and service coverage of school toilet facilities.

The number of sanitary school toilets is low to meet the service level standard of 40 students per sanitary facility. At present, the average ratio is about 44 students per sanitary toilet, which is double the standard level. A number of school toilets are not being used due to lack of water supply, destroyed plumbing fixtures and water tank seepage. Proper operation and maintenance are not usually done. In some areas, this problem is compounded when access to the sanitary facility is limited to only the teachers.

Dep Ed is currently promoting the practice of having one toilet within the classroom. This practice should be thoroughly reviewed with respect to maintaining sanitary condition, provision of water supply in every toilet/unit, proper design of depository to avoid groundwater pollution, and provision of regular sludge collection and disposal.

There are 338 public toilets found in public markets, bus/jeepney terminals, ports and parks/playgrounds in the province. About 98% of these public toilets are sanitary, while only 2% is considered unsanitary. Table 4.2.3 shows the number and service coverage of public utilities.

Public toilets at markets, bus/jeepney terminals, ports and parks/playgrounds, although culturally acceptable, are improperly used and maintained resulting to unsanitary conditions. In most cases, no specific arrangements are made for the operation and maintenance and for the collection of fees to cover such costs. Although considered as sanitary because of the structure, most of the facilities have unsanitary conditions due to lack of maintenance, inadequate/lack of water supply and destroyed appurtenances because of vandalism.

Table 4.2.2 School Toilet Service Coverage by Municipality

Municipality/City	Number of School		Total No. of Student	Number of Toilets		Service Coverage			
				Sanitary	Unsanitary	Served	%	Unserved	%
Alburquerque	Public	8	1,975	56		1,975	100		
	Private								
	Total	8	1,975	56		1,975	100		
Alicia	Public	17	5,486	119		4,760	87	726	13
	Private								
	Total	17	5,486	119		4,760	87	726	13
Anda	Public	18	3,381	84		3,360	99	21	1
	Private	1	490	3		120	24	370	76
	Total	19	3,871	87		3,480	90	391	10
Antequera	Public	19	2,203	87		2,203	100		
	Private	1	358	5		200	56	158	44
	Total	20	2,561	92		2,403	94	158	6
Baclayon	Public	13	2,465	65		2,465	100		
	Private	1	228	5		200	88	28	12
	Total	14	2,693	70		2,665	99	28	1
Balilihan	Public	19	3,418	116		3,418	100		
	Private	1	290	4		160	55	130	45
	Total	20	3,708	120		3,578	96	130	4
Batuan	Public	16	2,517	77		2,517	100		
	Private	1	368	5		200	54	168	46
	Total	17	2,885	82		2,717	94	168	6
Bien Unido	Public	33	5,495	32		1,280	23	4,215	77
	Private	6	1,210	4		160	13	1,050	87
	Total	39	6,705	36		1,440	21	5,265	79
Bilar	Public	20	3,473	89		3,473	100		
	Private								
	Total	20	3,473	89		3,473	100		
Buenavista	Public	32	4,347	122		4,347	100		
	Private								
	Total	32	4,347	122		4,347	100		
Calape	Public	24	6,187	163		6,187	100		
	Private	1	333	2		80	24	253	76
	Total	25	6,520	165		6,267	96	253	4
Candijay	Public	28	6,077	178		6,077	100		
	Private	1	567	6		240	42	327	58
	Total	29	6,644	184		6,317	95	327	5
Carmen	Public	37	9,280	288		9,280	100		
	Private	1	851	10		400	47	451	53
	Total	38	10,131	298		9,680	96	451	4
Catigbian	Public	24	4,340	112		4,340	100		
	Private	2	633	12		480	76	153	24
	Total	26	4,973	124		4,820	97	153	3
Clarin	Public	18	4,479	40		1,600	36	2,879	64
	Private								
	Total	18	4,479	40		1,600	36	2,879	64
Corella	Public	6	852	19		760	89	92	11
	Private								
	Total	6	852	19		760	89	92	11
Cortes	Public	12	1,743	78		1,743	100		
	Private	2	375	6		240	64	135	36
	Total	14	2,118	84		1,983	94	135	6
Dagohoy	Public	16	4,158	32		1,280	31	2,878	69
	Private								
	Total	16	4,158	32		1,280	31	2,878	69
Danao	Public	116	4,555	114		4,555	100		
	Private								
	Total	116	4,555	114		4,555	100		
Dauis	Public	15	6,021	150		6,000	100	21	0
	Private								
	Total	15	6,021	150		6,000	100	21	0
Dimiao	Public	16	2,439	76		2,439	100		
	Private	1	270	4		160	59	110	41
	Total	17	2,709	80		2,599	96	110	4
Duero	Public	23	3,388	89		3,388	100		
	Private	1	718	5		200	28	518	72
	Total	24	4,106	94		3,588	87	518	13

Municipality/City	Number of School		Total No. of Student	Number of Toilets		Service Coverage			
				Sanitary	Unsanitary	Served	%	Unserved	%
Garcia Hernandez	Public	20	5,386	24		960	18	4,426	82
	Private	1	464	3		120	26	344	74
	Total	21	5,850	27		1,080	18	4,770	82
Getafe	Public	27	5,897	27		1,080	18	4,817	82
	Private	1	487	1		40	8	447	92
	Total	28	6,384	28		1,120	18	5,264	82
Guindulman	Public	22	5,990	194		5,990	100		
	Private	1	366	16		366	100		
	Total	23	6,356	210		6,356	100		
Inabanga	Public	49	9,785	228		9,120	93	665	7
	Private	1	530	6		240	45	290	55
	Total	50	10,315	234		9,360	91	955	9
Jagna	Public	25	5,836	135		5,400	93	436	7
	Private	6	1,947	18		720	37	1,227	63
	Total	31	7,783	153		6,120	79	1,663	21
Lila	Public	10	1,203	54		1,203	100		
	Private	1	204	3		120	59	84	41
	Total	11	1,407	57		1,323	94	84	6
Loay	Public	13	2,063	88		2,063	100		
	Private	1	545	18		545	100		
	Total	14	2,608	106		2,608	100		
Loboc	Public	19	2,989	103		2,989	100		
	Private	1	266	6		240	90	26	10
	Total	20	3,255	109		3,229	99	26	1
Loon	Public	42	6,303	224		6,303	100		
	Private	3	1,413	18		720	51	693	49
	Total	45	7,716	242		7,023	91	693	9
Mabini	Public	23	5,652	135		5,400	96	252	4
	Private	1	535	4		160	30	375	70
	Total	24	6,187	139		5,560	90	627	10
Maribojoc	Public	23	2,835	150		2,835	100		
	Private	1	210	5		200	95	10	5
	Total	24	3,045	155		3,035	100	10	0
Panglao	Public	11	4,628	120		4,628	100		
	Private	1	646	11		440	68	206	32
	Total	12	5,274	131		5,068	96	206	4
Pilar	Public	23	6,325	131	1	5,240	83	1,085	17
	Private	1	295	2		80	27	215	73
	Total	24	6,620	133	1	5,320	80	1,300	20
Pres. Carlos P. Garcia	Public	23	4,816	110		4,400	91	416	9
	Private	1	613	2		80	13	533	87
	Total	24	5,429	112		4,480	83	949	17
Sagbayan	Public	23	4,289	97		3,880	90	409	10
	Private	2	813	10		400	49	413	51
	Total	25	5,102	107		4,280	84	822	16
San Isidro	Public	13	1,788	43		1,720	96	68	4
	Private								
	Total	13	1,788	43		1,720	96	68	4
San Miguel	Public	21	5,840	100		4,000	68	1,840	32
	Private								
	Total	21	5,840	100		4,000	68	1,840	32
Sevilla	Public	14	2,090	39		1,560	75	530	25
	Private								
	Total	14	2,090	39		1,560	75	530	25
Sierra Bullones	Public	25	6,166	107	36	4,280	69	1,886	31
	Private	1	120	2	2	80	67	40	33
	Total	26	6,286	109	38	4,360	69	1,926	31
Sikatuna	Public	6	1,288	64		1,288	100		
	Private								
	Total	6	1,288	64		1,288	100		
Tagbilaran City (Capital)	Public	17	12,922	369		12,922	100		
	Private	4	5,956	147		5,880	99	76	1
	Total	21	18,878	516		18,802	100	76	0
Talibon	Public	32	13,203	106		4,240	32	8,963	68
	Private	5	1,804	21		840	47	964	53
	Total	37	15,007	127		5,080	34	9,927	66
Trinidad	Public	31	7,117	125		5,000	70	2,117	30
	Private	2	550	10		400	73	150	27
	Total	33	7,667	135		5,400	70	2,267	30

Municipality/City	Number of School		Total No. of Student	Number of Toilets		Service Coverage			
				Sanitary	Unsanitary	Served	%	Unserved	%
Tubigon	Public	33	8,050	183		7,320	91	730	9
	Private	2	1,720	34		1,360	79	360	21
	Total	35	9,770	217		8,680	89	1,090	11
Ubay	Public	48	14,679	298		11,920	81	2,759	19
	Private	6	1,748	35		1,400	80	348	20
	Total	54	16,427	333		13,320	81	3,107	19
Valencia	Public	21	3,512	164		3,512	100		
	Private								
	Total	21	3,512	164		3,512	100		
Provincial Total	Public	1,144	238,931	5,604	37	196,700	82	42,231	18
	Private	63	27,923	443	2	17,271	62	10,652	38
	Total	1,207	266,854	6,047	39	213,971	80	52,883	20

Table 4.2.3 Public Toilets Facilities and Service Coverage in 2003

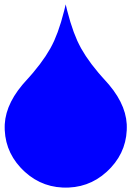
Municipality/ City	Number of Sanitary Toilets				Number of Unsanitary Toilets				Total Number of PU Toilet	Served		Underserved	
	Public Market	Bus/ Jeepney Terminal	Parks/ Playground	Port	Public Market	Bus/ Jeepney Terminal	Park/ Playground	Port		Number of Sanitary Toilets	%	Number of Unsanitary Toilets	%
Alburquerque	4								4	4	100		
Alicia	4								4	4	100		
Anda	2								2	2	100		
Antequera	4		4						8	8	100		
Baclayon	2		2						4	4	100		
Balilihan	9								9	9	100		
Batuan	6								6	6	100		
Bien Unido	8		8						16	16	100		
Bilar	4		2						6	6	100		
Buenavista	2								2	2	100		
Calape	6		2						8	8	100		
Candijay	6								6	6	100		
Carmen	10								10	10	100		
Catigbian	6								6	6	100		
Clarin	4								4	4	100		
Corella	2								2	2	100		
Cortes	4								4	4	100		
Dagohoy	2		4						6	6	100		
Danao	4								4	4	100		
Dauis	1								1	1	100		
Dimiao	2								2	2	100		
Duero	8								8	8	100		
Garcia Hernandez	4								4	4	100		
Getafe	4								4	4	100		
Guindulman	8								8	8	100		
Inabanga	4				4				8	4	50	4	50
Jagna	2	4	4						10	10	100		
Lila	2								2	2	100		
Loay	2								2	2	100		
Loboc	2								2	2	100		
Loon	20		4						24	24	100		
Mabini	6								6	6	100		
Maribojoc	8		2						10	10	100		
Panglao	5								5	5	100		
Pilar	6				2				8	6	75	2	25
Pres. Carlos P. Garcia					2				2			2	100
Sagbayan	8		6						14	14	100		
San Isidro	4								4	4	100		
San Miguel	4								4	4	100		
Sevilla	4								4	4	100		
Sierra Bullones	4								4	4	100		
Sikatuna	3								3	3	100		
Tagbilaran City (Capital)	28	20	2	8					58	58	100		
Talibon	8								8	8	100		

Municipality/ City	Number of Sanitary Toilets				Number of Unsanitary Toilets				Total Number of PU Toilet	Served		Underserved	
	Public Market	Bus/ Jeepney Terminal	Parks/ Playground	Port	Public Market	Bus/ Jeepney Terminal	Park/ Playground	Port		Number of Sanitary Toilets	%	Number of Unsanitary Toilets	%
Trinidad	6		2						8	8	100		
Tubigon	4								4	4	100		
Ubay	2								2	2	100		
Valencia	8								8	8	100		
Provincial Total	256	24	42		8				338	330	98	8	2

4.2.4 Sewerage Facilities

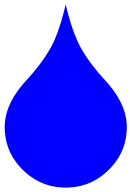
There are no existing sewerage facilities in the province. Most of the wastewater from the dwelling units with acceptable facilities finds its way to open drains and eventually to watercourses. These deficiencies are the major contributing factors to the poor condition of the water environment specifically in urban of the province.

CHAPTER V



EXISTING SECTOR ARRANGEMENT AND INSTITUTIONAL CAPACITY

CHAPTER VI



PAST FINANCIAL PERFORMANCE IN WATER SUPPLY AND SANITATION

CHAPTER VI 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 serves as the basis to formulate for appropriate financial arrangements for the medium term development. The essential study components are: (1) LGUs' past financial performance; (2) past public investment and present plans; (3) LGUs' present financing sources and management participation in the sector, (4) existing practices by the LGUs on cost recovery and (5) affordability by users.

6.2 LGU's Past Financial Performance

The provincial government's past financial performance for the period covering the years 1999 to 2003 was investigated. Actual financial data were obtained for the years 1999 to 2003, while the financial figures in 2003 are only budgetary estimates. The municipalities' past financial performance in the same period (1999 to 2003) are presented in Appendix VI.

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, land area, and equal sharing 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 2% of the total income of the province over the period 1999-2003.

(c) Grants, Aids and Subsidies – There are no grants and subsidies reported by the province. However, there are national projects being contracted by the province that are considered grants.

(d) Other Income – there are no economic enterprises, but receives minimal income from various fees and charges on certain services.

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 Bohol during the period 1999-2003. Local tax revenues, which were 2% 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 89%, which indicates that the province has historically been dependent on IRA with its low tax and non-tax revenue collections.

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 based on NEDA Board Resolution 4 (Annex VI).

Table 6.2.1 Income and Expenditures Between 1999 and 2003

Province	1999	2000	2001	2002	2003
Receipts					
Tax Revenue					
- Real Property Tax	6,970,251	7,200,971	7,000,312	10,545,000	15,225,000
- Business Tax	1,222,000	783,064	696,360	2,050,000	3,100,000
- Others	371,093	366,986	4,909,999	1,050,000	7,055,000
IRA	367,941,164	445,166,260	406,427,984	510,782,811	537,575,048
Other (Non-tax)	30,287	30,960	201,754,027	-	6,118,197
Sub-total	376,534,797	453,548,242	620,788,683	524,427,811	569,073,245
Expenditures	-	-	-	-	-
Personal Services	257,777,539	267,937,272	299,949,485	310,001,516	306,427,719
MOOE	190,039,645	255,574,431	85,523,316	101,059,430	111,106,838
Others	-	-	-	-	-
Sub-total	447,817,185	523,511,704	385,472,802	411,060,946	417,534,557
Net Operating Income	(71,282,387)	(69,963,461)	235,315,881	113,366,865	151,538,688
Add: Borrowings	-	-	-	-	-
Surplus (Income from prior year)	-	-	-	-	-
Less: Capital Outlays	8,237,646	-	12,821,248	-	15,567,500
Net Income	(79,520,033)	(69,963,461)	222,494,633	113,366,865	135,971,188

(2) Uses of Funds in the Province

Actual expenditures of the Provincial Government during the period from 1999 to 2003 show that personnel expenses comprise majority of expenses at 57% to the total revenue, as a result of devolution. Maintenance and operating expenses of the province was 29% of total revenues. In addition, the province has a capital outlay with an average share of 2% to the total revenue.

From 1999 to 2002, the Province had an average of ₱52 million net operating income from operations. For 2003, the Province has likewise projected a net operating income of ₱152 million. After deducting capital outlay and non-office expenditures, the Province projects a net income of ₱136 million (or 27% of the total revenues).

6.2.2 Availability of Funds

As previously noted, the IRA comprises 89% 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 trend of IRA of the Provincial Government and its municipalities between 1999 and budget year 2003. As shown, the average IRA of the Province was 1.5% of the provincial IRA nationwide in the period 1999-2002 and budget year 2003. Likewise, the total amount of IRA allotted to all its municipalities in the years 1999-2003 was 2% in the average. The IRA percentage of each municipality to total provincial IRA is presented in Table 6.2.2.

Based on the past financial performance of the Province, the IRA has been a major source of funds. Firstly, 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.

Based on the income statement of the province, available funds 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 are more than sufficient to cover operating, capital and non-office expenses. Although the province recorded negative net income for the first part of the past five-year period, the latter part showed positive net income, which is sufficient to cover the capital outlays it has incurred for the same period.

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

Table 6.2.3 presents the allotted funds for capital expenditures (20% DF) between 1999 and 2003. The 20% DF of the province were sufficient to cover the actual expenditures for the years 1999 to 2002. For 2003, it is projected that the 20% DF amounting to ₱ 107 million will cover the capital expenditures of the Province, which is projected ₱ 107 million.

Table 6.2.3 Available Funds for Capital Expenditures (20% DF), 1999-2003

Item	1999	2000	2001	2002	2003
Unit: Pesos					
IRA of the Province (a)	367,941,164	425,931,087	406,457,984	516,799,812	537,575,048
20% Development Fund b)	73,588,233	85,186,217	81,285,597	103,359,962	107,515,010
Actual/Projected Capital Expenditures (c)	64,448,709	52,090,913	87,125,498	97,227,789	107,515,010
Surplus/Deficit (d)	9,139,523	33,095,304	(5,839,901)	6,132,173	-

6.3 Past Public Investment and Present Plans

6.3.1 Past and Current Annual Investment Plans

Past investments in the water supply and sanitation sector of the Province were funded through the LGU's 20% DF and IRA, CDF (Congressional Development Fund), DPWH's budget and LWUA's program for the poor (Lingap para sa Mahirap). As shown in Table 6.3.1, a total of PhP390 million investments on water supply and sanitation sector for the period 1999-2003 were made.

The bulk of investments in the sector, around 41% was allocated to Level I systems. Levels II and III accounted for 8% and 33% respectively, and sanitation accounted for 18% of the total sector investments.

(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.

Table 6.3.2 summarizes annual sector investment plan (1999-2003) of the Province by service level. Level I had the largest fund allocation, with an amount of ₱128 million out of the total sector allocation of ₱143 million. Sanitation and sewerage had minimal allocation compared to water supply.

Table 6.3.2 Sector Allocation in the Annual Investment Plan

Item	1999	2000	2001	2002	2003	Total
Unit: '000 Pesos						
Level I Facility						
Foreign Assisted						
National	27,304,000	32,924,000	35,804,000	15,192,000	16,680,000	127,904,000
Local (Provincial)	-	-	-	-	-	-
Level II/III System						-
Foreign Assisted	-	-	-	-	-	-
National	-	-	-	-	-	-
Local	2,500,000	1,000,000	-	-	-	3,500,000
Loan - DBP/LBP	-	-	-	-	-	-
Expansion	-	-	-	-	-	-
Repair/Maintenance	-	9,200,000	-	-	-	9,200,000
Health Centers	-	-	-	-	-	-
Water Quality	-	-	-	-	-	-
						-
Total - Water Supply	29,804,000	33,924,000	35,804,000	15,192,000	16,680,000	140,604,000
Total - Sanitation (Health)	-	2,000,000	-	-	-	2,000,000
Total Sewerage	-	1,027,000	-	-	-	1,027,000
Grand Total	29,804,000	36,951,000	35,804,000	15,192,000	16,680,000	143,631,000

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 6.3.3, allocation to the WATSAN sector from 20% Development Fund, for the period from 1999-2003 ranged

from) 4% to 5.6%. The infrastructure sector had the highest allocation, ranging from 30% to 44% for the same period.

Table 6.3.3 Allocation of the 20% Development Fund, 1999-2003

Unit: Pesos

Year	20% Development Fund	Social Development	Economic Development	Infrastructure	Water Supply/ Sanitation	Others	Sub-Total	% of Water Supply/ Sanitation Allocation
1999	67,145,495.20	2,000,000.00	500,000.00	59,645,495.20	2,500,000.00	2,500,000.00	134,290,990.40	3.7%
2000	53,318,236.40	3,318,236.40	6,500,000.00	38,000,000.00	3,000,000.00	2,500,000.00	106,636,472.80	5.6%
2001	97,048,734.00	1,500,000.00	8,000,000.00	84,500,000.00	-	3,048,734.00	194,097,468.00	
2002	102,156,562.20	13,250,000.00	13,000,000.00	63,406,562.20	1,000,000.00	17,000,000.00	209,813,124.40	1.0%
2003	107,515,009.60	12,150,502.50	14,821,262.49	75,082,681.81	415,143.60	5,045,419.20	215,030,019.20	0.4%

6.3.3 Existing Plans of the LGUs for the Sector

(a) Logistic Support with Required Funding

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

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

(b) Raising Funds and Provision of Subsidies to Support Capital Development in Municipalities

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.

The following annual activities are usually undertaken in the province:

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

- For Levels I and II water supply, LGUs implement the projects based on the available fund. Generally, projects are initiated by the Barangay Council. In case that project needs (finance, technology, etc.) exceed the capacity of Barangay Council, the request is made to municipality followed by action by the province. There are cases when Barangay Councils directly request projects to the Governor's Office.

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

6.4.1 Cost Sharing Arrangements / Counterpart Funding

The Province has implemented recently water supply projects funded by AUSAID-CVWSP.

Cost sharing among concerned parties (LGUs, central government agencies and barangay people) has been made within realistic arrangement/ current capacity (though the level of the practice is far from present GOP policy).

Following are some financial arrangements and issues:

a) There is no priority listing of projects for the municipalities and no budget allocation is made in advance for the AIP. There is a Local Finance Committee to decide on priority of resource allocation for financing of projects, the members of which come from Budget Office, Treasurer's Office, PPDO and Accounting Office. All projects must be supported, however, by barangay resolutions. The PDC also prepares its justification for the prioritization of projects.

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

Funding Source	Implementing Agency/ Unit
Provincial Government	PEO/PPDO
CDF (Congressional Development Fund)	DPWH – District Engineering Office
Municipal Government	MEO/MPDO

A new cost-sharing scheme was authorized in 2003 in accordance with the policy on national government grants. Cost sharing arrangements for Levels I, II and III systems and sanitation are shown as follows:

PGB-approved Cost Sharing (% share)

Level and Type of Service	Income Class (Province/ Municipalities)								
	1st/ 2nd			3rd/ 4th			5th/ 6th		
	NG[1]	LGU[2]		NG[1]	LGU[2]		NG[1]	LGU[2]	
		Equity[1]	Loan[1]		Equity[1]	Loan[1]		Equity[1]	Loan[1]
Level I/II WS	30	20	50	40	15	45	50	10	40
Level III WS	0	0	0	20	10	70	50	10	40
Sanitation	20	20	60	40	15	45	50	10	40

PGB-approved Cost Sharing (% share)

Level and Type of Service	Income Class (Cities)								
	1st/ 2nd			3rd/ 4th			5th/ 6th		
	NG[1]	LGU[2]		NG[1]	LGU[2]		NG[1]	LGU[2]	
		Equity[1]	Loan[1]		Equity[1]	Loan[1]		Equity[1]	Loan[1]
Level I/II WS	0	20	80	0	20	80	30	20	50
Level III WS	0	0	0	0	0	0	0	0	0
Sanitation	0	20	80	0	20	80	20	20	60

Any grant from the national government that is provided for the development of Level I water supply systems and sanitation facilities is based on the income classification of the municipalities. The LGUs and beneficiaries concerned shall share the capital cost required.

6.4.2 ODA Assisted Projects and Grant/Aid

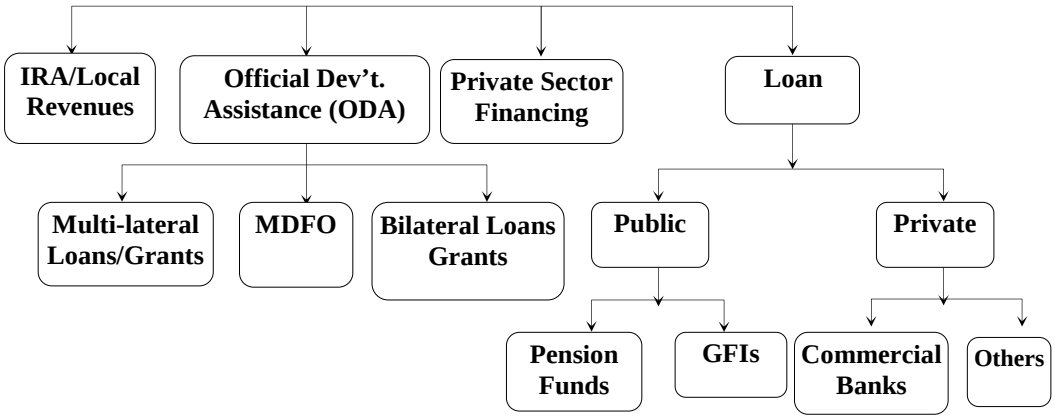
Other external source of funds of the Province is foreign-assisted projects either directly coursed through the Province as in the case of the grants from AUSAID and UNDF/Swedish Trust Fund. Whereas, AUSAID funded construction of Levels I and II water supply systems, UNDF/Swedish Trust Fund provided funding for the Bohol Water Supply, Sanitation and Sewerage Sector Master Plan (BW4SP). Water districts in the Province likewise avail of funding through loans that are directly obtained from LWUA.

LGUs have the following financing options (Figure 6.4.1): IRA, ODA, private sector financing and debt (both public and private sector debts). Below are the major commonly availed or financing options by LGUs.

[1]NG – National Government grant for the respective level and type of service and respective income class of the LGU.
Equity – refers to the minimum cash equity contribution to be put up by the LGU.
Loan – refers to the portion of the project cost that the LGU must finance either through loan from MDFO or other Government Financing Institutions (GFIs), e.g., Land Bank, DBP, etc.

[2] If the LGU can raise the equity portion more than the minimum required amount, then the portion of the project cost it needs to raise through loan would be lower. Loan terms of MDFO: Interest Rate - currently at 14% per annum fixed until maturity of the sub-loan; Repayment Period - payable in 15 years inclusive of a 3-year grace period.

Figure 6.4.1 LGU Financing Options



(1) Municipal Development Fund Office (MDFO)

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

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

The MDF-Policy Governing Board (PGB) formulates its policies. It is composed of representatives from the DPWH, DBM, NEDA and the DILG and chaired by the DOF. The funds administered by the MDF come from loan proceeds from multilateral and bilateral sources, contributions from domestic and foreign institutions, various grants and donations, and repayments by borrowing 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 (Sangguniang Panlalawigan, SP for the Province; Sangguniang Panglunsod, SP for the City; and Sangguniang Bayan, SB for the Municipality) will authorize the Chief Executive Officer (Governor or Mayor, as the case may be). The collateral that the LGU may use in order to avail of loans from the bank could be any of the following: deposit hold out, public land and assignment of IRA.

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

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

Loanable amount may be based on the amount of time deposit of the province in the bank.

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

(3) Foreign Lending Agencies

The external assistance to the Sector in the Province comes from foreign assisted projects. With the LGC 1991, the province can become the direct recipient of foreign grants.

(4) Private Sector Financing Schemes

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

Figure 6.4.2 presents the different modalities for private sector financing that may be tapped by LGUs for financing water supply and sanitation sector projects.

6.4.3 Water Service Providers

The Province of Bohol has 90 (Level III/II) water service providers comprising of RWSAs, LGU-managed systems, cooperatives and two water districts. Other Level II and Level I systems are managed by the barangay LGU, BWSAs or RWSAs.

6.5 Existing Practices by the LGU on Cost Recovery

6.5.1 Capital Cost

In the previous arrangements, the capital cost for Level I systems was free to the community. As for Level II systems, the capital cost was shouldered by the RWSA through loan or grants. Water charges collected by each association cover the cost of operation and maintenance and loan amortization. According to the Loan Department of LWUA, the new loan disbursement to RWSAs has been stopped.

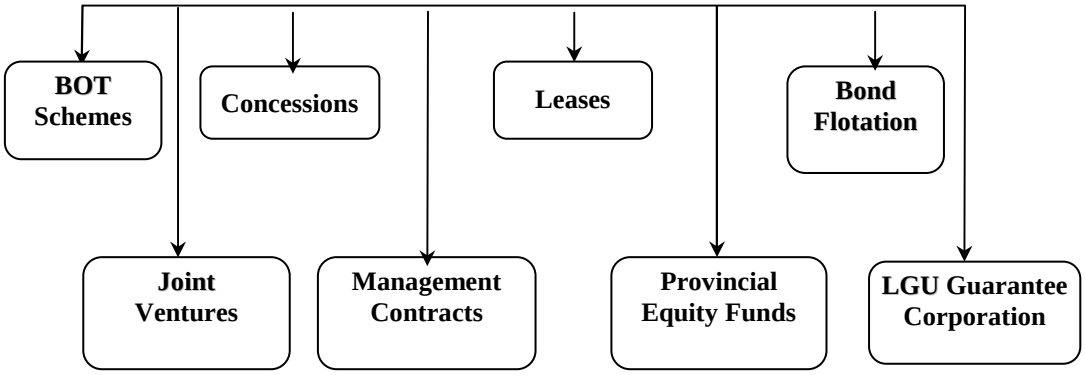
6.5.2 Operation and Maintenance Cost

The operation and maintenance costs for Levels I and II water supply systems are the responsibility of the users upon turnover of the facilities. As such, an organization (or association) to handle the collection of water charges should have been formed beforehand by the implementer.

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

Although the DEO had no budget for operation and maintenance, it extended assistance in the form of materials (such as gaskets or joint pipes) from their supplies, if these items are available. Because of this situation, the emphasis was placed on the need of monthly contributions from the users for the O & M.

Figure 6.4.2 Private Sector Financing



Cost recovery for Level III systems, particularly those covered by Water Districts is managed through different systems. Because of the individual connections, the households covered by the Water Service Providers can be disconnected in case of non-payment by the users.

Average monthly water rates range from ₱1.33 to ₱15.90 per cum while collection efficiencies range from 65% to 100%. (see Table 6.4.1)

6.6 Willingness to Pay

Base information for the analysis on affordability of users by sector service level is limited to the results from the information provided by the LGUs through the questionnaire.

6.6.1 Capital and Operation and Maintenance Cost

From the workshop discussion with the PSPT members and the MPDCs, of all the municipalities of the Province, it was gathered that their experience in implementation of water supply projects is with the CVWSP, and contribution from the community was only in kind, i.e., mostly free labor, and bayanihan. The LGU however, provided cash equity as its counterpart.

6.6.2 Affordability of Users

Affordability of users is based on the average monthly income and average monthly water rates per household. Affordability analysis is limited to Level III water systems since the data available is only for this level. Based on the current water bills, average monthly water bill for Level III water system is within affordable range. Affordable range is based on past experiences of LWUA, DPWH and DILG.

Table 6.6.1 Affordability in Water Supply and Sanitation Services

Income/ Level of Service	Amount (Pesos)	% to Monthly Income	Affordable Range (%) [5/]
Average Monthly Income [1/]	3,870		
Average Level III: Monthly Water Bill [2/]	106.72	2.75	5.0 or less
Average Level II: Monthly Water Bill [3/]			2.0 -3.0
Mo. Level 1 Expenditures [3/]			1.0 or less
Private Toilet Construction Cost – Flush Type Toilet [4/]			

Notes:

[1/] 2000 Family Income and Expenditure Survey.

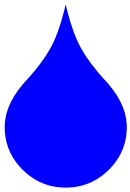
[2/] Data from PSPT: average monthly consumption per household =17.02 cu.m.

[3/] No data available

[4/] Current prices estimated in this study

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

CHAPTER VII



WATER SOURCE DEVELOPMENT

CHAPTER VII 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 expected in the future within the jurisdiction of the Provincial Government. It is also advantageous to utilize groundwater for domestic water supply because of relatively good quality and economical use. Nevertheless, with reference to river basin water resources, surface water potential of rivers in the Province was studied in part to provide information for future use.

A "Groundwater Availability Map" was prepared, which identifies 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.

The major data used in the study were obtained from concerned agencies (NAMRIA, MGB, NWRB, LWUA, DPWH, PPDO, GEOPLAN-DOST) and supplemented by the information gathered from questionnaires of relevant local offices in the field. The field information directly collected by the Study Team was also used to increase the accuracy of the Map. Among the information, the Geological Map published by the MGB, Rapid Assessment of Water Supply Sources, Geographic Atlas of Bohol (unpublished) and interview with DPWH-DEO are essential for the analysis of geological characteristics, and the delineation of shallow, deep and difficult areas.

The Groundwater Availability Map may be used for provincial level master plan and feasibility study. Recommendations have been made regarding the acquisition of more technical information prior to D/D and construction work. These are presented in Appendix VII.

A regular review and updating of the database is possible using the questionnaires prepared for the study. This will allow the LGUs to assess prevailing groundwater condition and implement an effective water source development.

An overview on current groundwater use with the conditions is summarized in Table 7.1.1. There are presently 4,908 shallow wells, 2,406 deep wells and 1,691 springs in the Province. A greater majority of the wells is shallow wells either tapping recent deposits, Maribojoc limestone, Carmen Formation or Ubay volcanics as possible aquifer. Approximately 61% of these water sources are public facilities and the rest are privately owned. Of the 21 untapped springs, only 8 have discharge greater than 2 lps that have been identified by the PSPT as possible source of water for future use.

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	2,130	1,691	1,645	5,466
b. Privately owned sources	2,778	715	46	3,539
c. Number of water sources	4,908	2,406	1,691	9,005
d. % share of different sources	55%	27%	18%	100%
2. Water sources with problems and non-functional facilities				
a. Water quality problems[1]	90%			
b. Non-functional				
3. Spring source information				
a. Undeveloped			0	0
b. Untapped			21	21

1/ Assumed percentage of sources (unsafe category) based on the study on existing water supply facilities in Chapter IV.

7.2 Geology

The Province of Bohol is largely characterized by a karst topography. A karstic terrain is basically made up of limestone from a former coral reef. After the uplift of these limestone formation and/or sea level decline, the contact surface has been exposed to agents of weathering such as rain water. The infiltration of rain water then caused the parts of the limestone to be dissolved creating solution channels which we now know as caves.

The portion of Bohol where the so-called Chocolate Hills are found is said to be at the late (advanced) stage of karst development. Other portions of the province underlain by the same limestone formation but not showing prominent hills are either at the early stage or mid-stage of karst development.

The oldest rock formations in the province are either igneous or metamorphic rocks (Cretaceous). These are the Boctol Serpentinite; Pillow Basalt; Amphibolite Schist, which are highly crushed and brecciated serpentinite, in other places gabbroic serpentinized pyroxene peridotite, pillow basalt and amphibolite schist; and the Alicia Schist, which is highly chloritic, light green to light gray, fine grained to coarsely porphyritic schists exhibiting different lithologic variations. These rocks can be found in the municipalities of Alicia, Ubay, Mabini, Guindulman, Duero and Jagna.

Tertiary rock formations include Ubay Volcanics, Talibon Diorite, Jagna Andesite, Ilihan Plug, Kabulao Conglomerate, Wahig Limestone, Carmen Formation, Sierra Bullones Limestone and Maribojoc Limestone.

The Ubay volcanics (Early-Late Paleocene) are agglomerates, volcanic flows of andesitic and basaltic composition, and intrusives of gabbro and diabase. Massive formations are encountered in the municipalities of Ubay, Mabini, Pres. C.P. Garcia, Buenavista, Getafe, Trinidad, Danao, San Miguel, Inabanga, Talibon, Dagohoy and Carmen.

The Talibon diorite (Late Paleocene) is characterized by the occurrence of copper and gold mineralization locally encountered along contacts with volcanic rocks. These formations are mostly found in Talibon and scattered in Getafe, Trinidad, Danao and Dagohoy. On the other hand the Jagna Andesite (Middle Miocene) which is porphyritic can be found in Jagna, Anda and Candijay.

A dominant rock on the eastern portion of the province is the Carmen Formation (Middle Miocene). It is composed of different members: the uppermost Sevilla Marl, Tubigon Conglomerate, Carmen Sandstone and Shale and low dipping and interbedded tuffaceouse Ilihan Shale at the base.

Unconformably overlying the Carmen Formation is the Sierra Bullones Limestone (Late Miocene). These are massive to marly limestone containing small orbitoid fossils; correlative to the Barili Formation of Cebu. This formation is mostly found on the south-southeastern portion of the province.

The dominant rock on the western portion of the province is the Maribojoc Limestone (Plio-Pleistocene). This is a clastic to coralline limestone, very poorly to clearly bedded to massive, marly in many occurrences.

Quaternary alluvial deposits of mud, silt, sand and gravel can be found along the northwest and northeast coast of the province. Figure 7.2.1, Geological Map shows the distribution of these rock groups.

Several faults have been identified in the southwestern, southeastern, and central portions of the island. In the southeastern part (municipalities of Anda, Guindulman and Duero) thrust faulting and strike slip faults (right lateral) are observed. Within the vicinity of Mt. Malibalibad (eastern part of Bohol), thrust faulting also can be observed. Block faulting with a probable extensional origin can be observed in the municipalities of Danao (central Bohol); Balilihan, Cortes, Loboc (southwestern) and the western portion of Bohol (near Cabulao island).

Vertical joints have been observed in the eastern portion of Bohol (Mabini, Alicia and Ubay) having a NW-SE strike. Other joints in the area have dip directions of NW, SE and SW. In the northwest portion of Bohol (Clarin and Inabanga) vetical joints have a NE-SW strike and joints with a SE dip direction.

Many anticline and syncline can be delineated across the whole province.

The hydrogeological scenario in the island is governed in part by the development of a karst topography. Infiltrating rainwater contributes to the discharge of the springs. Springs developing in a karstic terrain normally occur as a result of a high water table in caves intersecting the ground surface. Although, a fault barrier may also divert some of the groundwater to be discharged as springs. Underground solution channels govern the movement of groundwater from the recharge areas to the discharge areas. Water flow velocities in these conditions are normally high and the behavior of groundwater may sometimes approximate turbulent flows. Due to the limited time of contact between the groundwater and the limestone formation, water flowing through these solution channels hardly undergo through a filtration process. The effect is that groundwater experiences only a very limited self-purification.

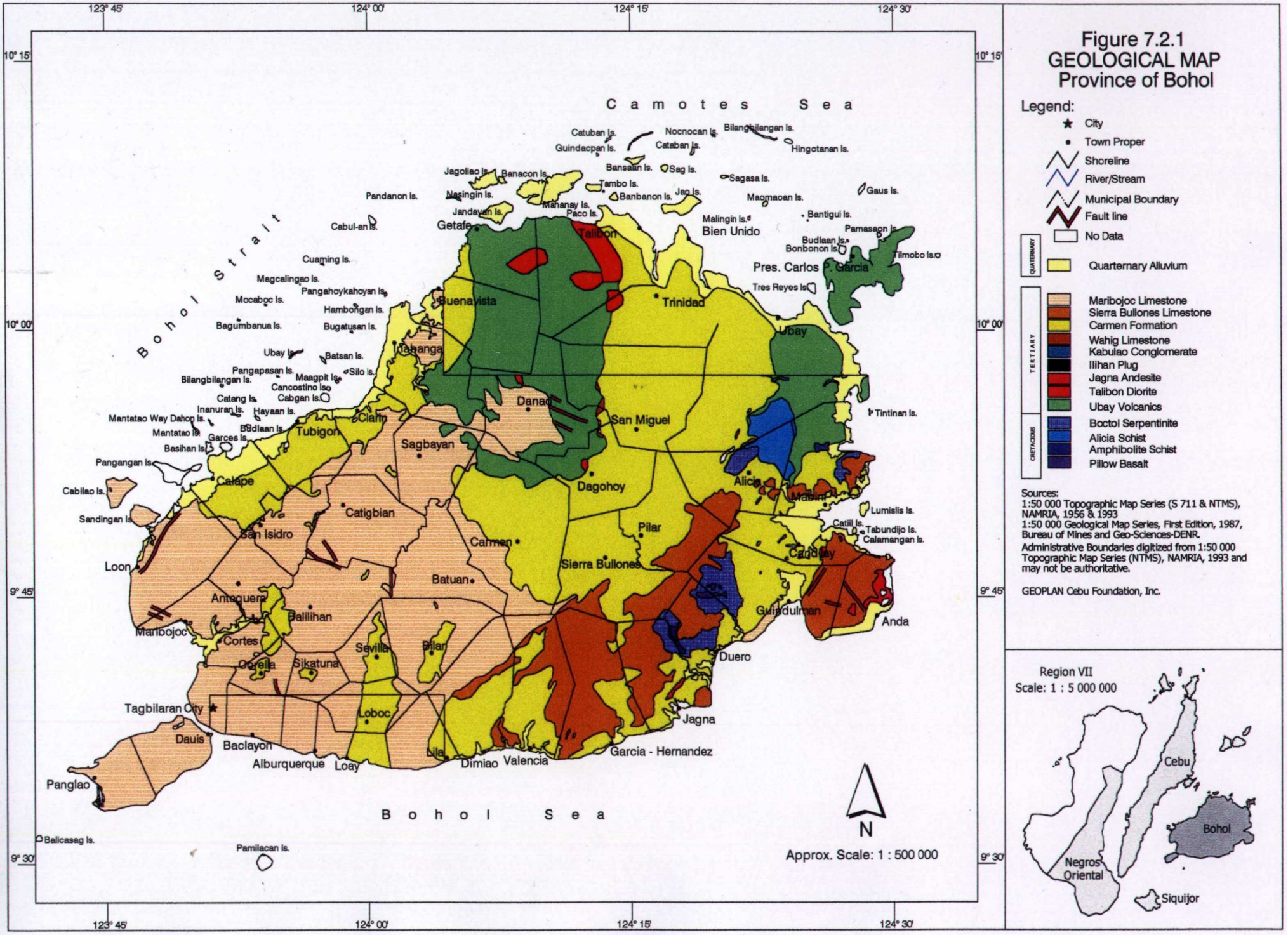


Figure 7.2.1
GEOLOGICAL MAP
Province of Bohol

Legend:

- City
- Town Proper
- Shoreline
- River/Stream
- Municipal Boundary
- Fault line
- No Data

QUATERNARY
- Quarternary Alluvium

TERTIARY
- Maribojoc Limestone
- Sierra Bullones Limestone
- Carmen Formation
- Wahig Limestone
- Kabulao Conglomerate
- Ilihan Plug
- Jagna Andesite
- Talibon Diorite
- Ubay Volcanics

CRETACEOUS
- Boctol Serpentinite
- Alicia Schist
- Amphibolite Schist
- Pillow Basalt

Sources:
1:50 000 Topographic Map Series (S 711 & NTMS), NAMRIA, 1956 & 1993
1:50 000 Geological Map Series, First Edition, 1987, Bureau of Mines and Geo-Sciences-DENR.
Administrative Boundaries digitized from 1:50 000 Topographic Map Series (NTMS), NAMRIA, 1993 and may not be authoritative.

GEOPLAN Cebu Foundation, Inc.

Recharge of groundwater is highly dependent on the infiltration of rainwater. The yield of springs fluctuates with changes in atmospheric conditions. Some springs may be non-existent during dry season. On the other hand, during heavy rainfalls spring water may show high turbidity.

Groundwater also occurs in the unconsolidated sediments near the coastlines of the island. In contrast to the turbulent flows in the solution channels, water flow in sediments are laminar. Water moves between the interstices of the sediments. Since the movement of groundwater is laminar, the passage of water is generally slow which allows a longer contact time between the rock and the fluid. This permits the groundwater to undergo a self-purification as it moves from the recharge areas to the discharge areas.

Impermeable rocks in the island such as the igneous and metamorphic rocks do not allow economic quantities of water to pass through. Water normally occurs in fractures caused by movements due to tectonic activities. Springs are the normal water sources in areas dominated by impermeable rocks.

7.3 Groundwater Sources

7.3.1 Classification of Groundwater Availability

For planning purposes, the island of Bohol is divided into three sub-areas indicating groundwater availability.

(1) Solo Shallow Well Area

Solo shallow well area is defined in this study as the area where only shallow well is available. These areas have aquifers extending not more than 20m in depth below ground surface. Solo shallow well areas are located where unconsolidated sand, silt and gravel occur overlying the Tertiary Deposits. Solo shallow well areas are limited in extent and occur near the coastlines.

(2) Deep Well Area

In deep well areas, the lower aquifers are located more than 20m below the ground surface. The groundwater quality in deep well areas is normally good as the chance of surface pollution coming in contact with the groundwater is low. Passage of water in low permeability rocks such as clay may ultimately cleanse the water with impurities since clay has a high capacity to adsorb certain impurities in its crystal lattice. Allowing the groundwater to be filtered and purified.

Deep well areas in Bohol are mostly underlain by the Maribojoc limestone as well as water bearing portions of the Carmen Formation. Filtration of percolating water through the limestone formation is minimal since groundwater movement is through solution channels. Aquifers related to the Carmen formation may be confined to some extent by the clastic sedimentary members (shale, siltstone and mudstone).

(3) Difficult Area

This area is not suitable for well development. The areas under this category are mostly covered by impermeable igneous and sedimentary rocks. The groundwater availability in these areas is limited to fracture zones. Springs are the common sources of water supply in these areas.

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 the MGB and NWRB. Other information were also taken from the Geographic Atlas of Bohol (not yet published), (GEOPLAN and DOST). The methodology, study procedures and its outputs are discussed in Appendix VII.

(1) Solo Shallow Well Area

There is a limited area in the island where shallow wells are being tapped. These are mostly confined in a limited area near the coast. The aquifer being tapped is an unconfined aquifer consisting of unconsolidated sand, silt and gravel. Shallow wells can be located in coastal portions of municipalities in the northwestern and northeastern portion of the island.

Shallow wells located near the coast are less susceptible to salt-water intrusion compared to deep wells with the same discharge and location.

The risk of shallow wells includes pollution from septic tank. There is however, an existing law wherein no septic tank should be constructed within a radius of 25m. In addition, future wells to be constructed should be located up-gradient from the existing septic tanks to prevent possible contamination of the water pumped from the well.

The static water level (SWL) in shallow well areas is normally less than 13 mbgs.

(2) Deep Well Area

Majority of the island is characterized as deep well areas. These areas are underlain by the Maribojoc limestone and Carmen Formation. Groundwater flow in the limestone areas is limited to solution channels and fractures. The screens of the wells are placed in these fracture zones so as to maximize the capture of the flowing groundwater. Groundwater in these deep wells areas is normally hard. This hardness is attributed to the dissolution of limestone by the infiltrating rainwater, which eventually releases the Calcium ions to the groundwater. On the other hand, aquifers related to the Carmen formation may be confined to some extent by the clastic sedimentary members (shale, siltstone and mudstone). Movement may either be laminar or turbulent (solution channels).

(3) Difficult Area

Most of the difficult areas in the Province occur where there are impermeable igneous and metamorphic rocks such as the Ubay Volcanics, Talibon Diorite, Jagna Andesite and the Cretaceous rock formations (Boctol serpetinite, Alicia schist, amphibolite schist and pillow basalt). Water sources in these areas are normally springs. Groundwater may occur in areas where there is a high density and inter-connectivity of fractures and joints.

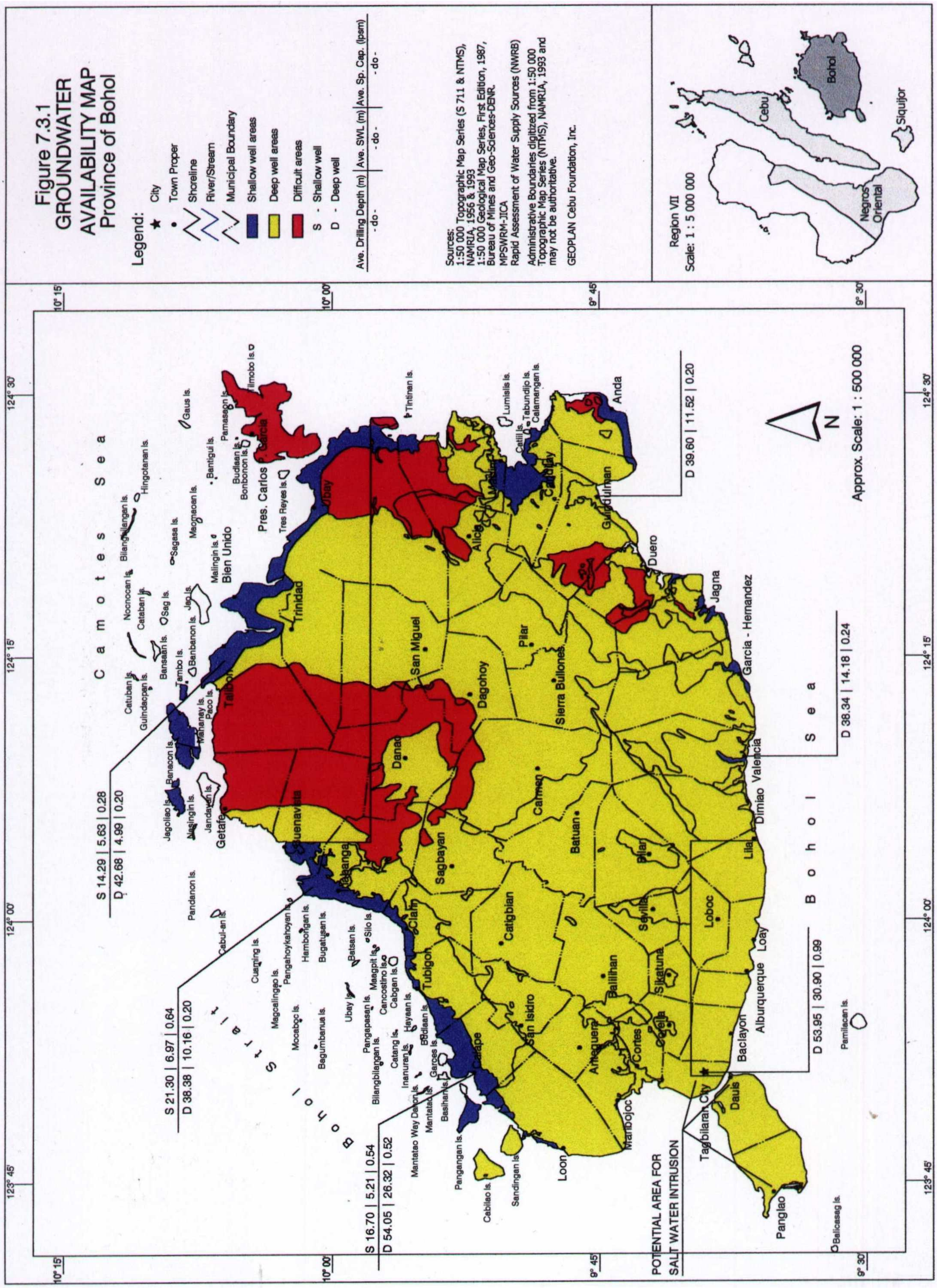


Figure 7.3.1
GROUNDWATER AVAILABILITY MAP
Province of Bohol
Legend:
City
Town Proper
Shoreline
River/Stream
Municipal Boundary
Shallow well areas
Deep well areas
Difficult areas
S - Shallow well
D - Deep well
Ave. Drilling Depth (m) | Ave. SWL (m) | Ave. Sp. Cap. (lpsm)
Region VII
Scale: 1 : 5 000 000
Approx. Scale: 1 : 500 000
Camotes Sea
Bohol Sea
Bohol Strait
POTENTIAL AREA FOR SALT WATER INTRUSION

7.3.3 Groundwater Quality

Groundwater in the limestone dominated portion of the Province is generally hard. This hardness is attributed to the dissolution of limestone by the infiltrating rainwater, which eventually releases the Calcium ions to the groundwater. Even groundwater in the unconsolidated sediments contain a certain amount of hardness since it (groundwater) is being recharged first in the limestone area and some Calcium ions are already being dissolved as the water travels from the limestone mountains to the coastal areas where there are occurrences of these sand, silt and gravel deposits.

7.4 Spring Sources

Spring is a natural outlet of groundwater at the ground surface. Springs developing in a karstic terrain normally occur as a result of a high water table in caves intersecting the ground surface. In other cases springs occur when the water table intersects the ground surface, usually along the contacts of pervious and impervious rock formation and through fractures. Because of the intense fracturing, particularly older formation, and the presence of large solution channels in limestone, secondary permeability is induced to the rocks that favor 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 unutilised and flowing in its natural state.

Based on the inventory of water sources prepared throughout the study, the Province has 1,144 developed springs being utilized for Level I facilities. A greater number of Level III and Level II facilities also rely on springs to supply water to the system. No data is available on the discharge of these developed springs.

7.5 Surface Water Sources

Surface water such as rivers are also considered in this study. The utilization of river water should be considered in areas where groundwater development is limited. These are areas where normally there is a full development of the drainage system. In the northern part of the province, in municipalities such as Danao, Buenavista, Talibon, Getafe, as well as a portion in the eastern part of the Province, a scarcity of groundwater seems to prevail. This is best confirmed by the existence of volcanic rocks in the area.

Nine (9) rivers have met the criteria set by the Study Team as a potential source for water supply to meet the future needs of the Province. These criteria are presented in Appendix VII. These rivers are: 1) Abatan River, 2) Antequera River, 3) Bilar River, 4) Cantimoc River, 5) Hibayog River, 6) Hinlayagan River, 7) Loboc River, 8) Manaba River and 9) Pamacsalan River.

Two more rivers that are cited in the Bohol-Cebu Water Supply Project as possible water sources are the Inabanga River and Wahig River.

No water rights with regard to domestic water supply use have been registered with the NWRB for the aforementioned rivers. Most of the rivers are used for irrigation purposes.

In addition to irrigation, Loboc River is being tapped for industrial as well as for power generation.

All the relevant data with regard to discharge (peak, maximum, minimum), granted rights, etc. are presented in Appendix VII.

Based on the DENR river classification, the rivers classified as Class A waters are: 1) Abatan River (upper reach), 2) Inabanga River (upper reach), 3) Ipil River, 4) Manaba River (upper reach), and 5) Matul-id River. Class A waters are intended (beneficial use) for public water supply (Class II) but will require complete treatment (coagulation, sedimentation, filtration and dis-infection) in order to meet the Philippine National Standards for Drinking Water.

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 rural water supply requirements of the Province.

Shallow wells are a possible source for Level-I service. Considering the existing wells in the Province, the potential aquifers for shallow wells occur between 10 mbgs to 19 mbgs. The existing location of the shallow wells have already been delineated and presented in the Water Supply, Sanitation and Sewerage Sector Master Plan (W4SMP) for Bohol Province (SWECO).

One disadvantage of shallow wells is the lowering of water level during dry season that reduces the discharge rate of the wells or disturbs the hand-pump operation. Another disadvantage is the high susceptibility of shallow aquifers to direct infiltration of surface pollutants. This is probably the case for unconfined portions of recent sediments. Shallow wells tapping solution channels in the limestone formations are equally susceptible to surface pollutants due to the limited purification mechanism in such rock formations. Also, wells drilled in fractures or permeable portions of volcanic rocks are also susceptible to surface pollutants.

In an environment characterized by karstic terrain, it is difficult to delineate the difference between shallow well and deep well because one of the governing factors is the orientation of solution channels.

Within certain portions of the different geologic formations, heterogeneity occurs allowing for certain portions of the aquifer to be confined. Confined aquifers in general have better water quality as pollutants undergo a purification stage in the low permeability zones.

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 (shallow or deep), well depth and static water level. Information regarding the aquifers being utilized is presented in Appendix VII. The groundwater development potential in the Province is shown in Table 7.6.1.

Table 7.6.1 Groundwater Development Potential in the Province

Area	Groundwater Development Potential	Area Feature
Lowland Coastal Area (recent deposits/limestone))	This area is classified both as deep and shallow well areas. The northwestern and northeastern coastlines of the province is characterized as shallow by recent unconsolidated sediments. These deposits are also scattered in the eastern and southeast coastlines. Deep well areas characterize the southern coastline of the island. These are areas dominated by the Maribojoc limestone and Carmen Formation. Productivity of both deep and shallow wells may range from low to high. Salt water intrusion is a primary concern of deep well areas near the coast (excessive pumping of wells). Springs may be present in deep well areas at interface with the sea.	This area bounds the whole province. Recent unconsolidated sediments line the northeast and northwest coastline. Elevation is below 100m.
Lowland Coastal Area (volcanics)	This area is characterized as difficult due to exposures of the Ubay volcanics. These are found in the northern coast of the province as well as in the municipality of C.P. Garcia and Ubay. Groundwater is confined to fractures. Spring development is more appropriate.	The volcanic formation extends landward towards the upland/hilly portions. Elevations range from <100m to 300m. Drainage patterns in these areas are well developed.
Upland, Hilly Area (limestone)	This portion is mostly deep well areas. Underground solution channels govern the movement of groundwater. Recharge is dependent on infiltration of rain water. Springs can be found in areas where there is a high groundwater table. Some springs may be non-existent during the dry season.	This area marks the transition of the highland to the lowlands. Elevations range from 100m to 500m.
Upland, Hilly Area (sandstone/conglomerate)	This portion is mostly deep well areas. The aquifer being tapped is the Carmen formation. Both sandstone and conglomerate are possible aquifers.	This area marks the transition of the highland to the lowlands. Elevations range from 100m to 500m.
Highland Area (cretaceous rocks and limestone formations)	This area is not suitable for well development because of its elevation. Rocks in this portion are either metamorphic rocks or limestone formations	This area can be found on the southeastern part marking the highest elevations in the province. Elevations are greater than 500m.

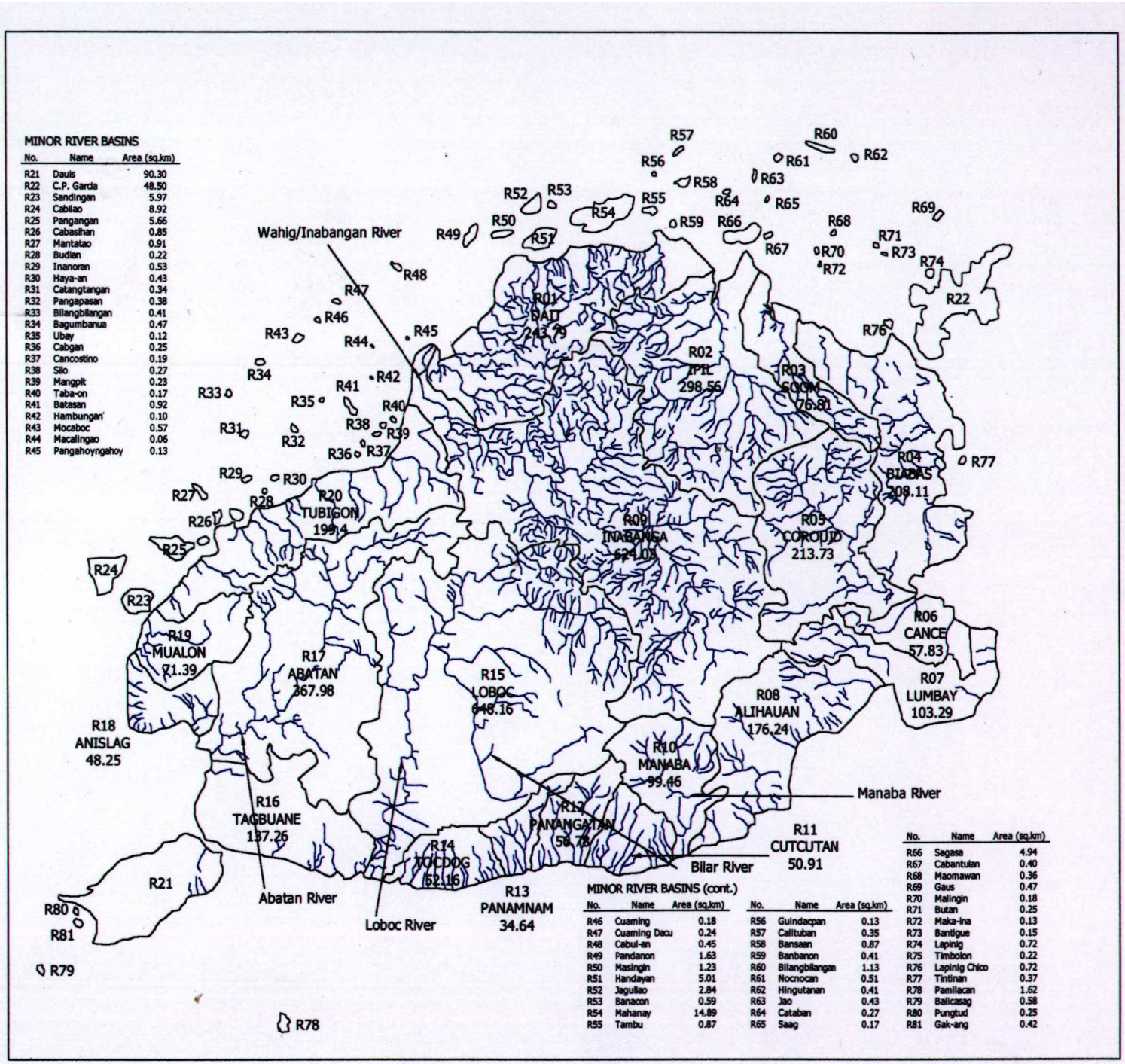


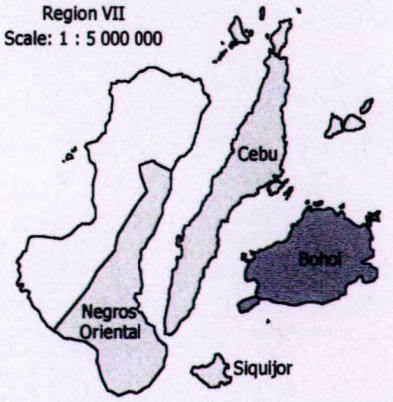
Figure 7.8.1
LOCATION OF RIVER BASINS
Province of Bohol

Legend:

- Principal Basin Boundary
- Minor Basin Boundary
- River
- R15 — Basin Number
- LOBOC — Basin Name
- 648.16 — Basin Area (sq.km.)
- 38492 — Index to NAMRIA's Topographic Map Scale 1:50,000

SOURCE:

Water Supply, Sanitation and Seweratge Sector Master Plan for Bohol Province (SWECO)



Areas where recent unconsolidated sediments occur are possible locations where natural gravel packed wells might be employed. Most of these areas are found near the coast and are very limited in extent (refer to geologic map).

(2) Spring

A total of 21 untapped spring sources in 9 municipalities have been identified by the PSPT. They are presented in Appendix VII. These data were collected and tabulated using the questionnaire sheet-untapped spring information format in Annex VII. Data also include the barangay name, owner, discharge, transmission pipeline length and elevation difference. Of the 21 untapped springs, 8 have discharge greater than 2 lps. The highest discharge estimated is approximately 216 lps in the municipality of Pilar. These untapped springs should be checked and verified since they can be tapped as water source for Level II water supply as well as Level III systems.

(3) Surface water

The major rivers in the Province were selected to evaluate their potential as water supply sources to meet the future needs of the province. The following criteria were adopted for the selection:

- rivers currently utilized for domestic water supply
- rivers which have gauging stations
- rivers with watershed of 40 km^2 or more

As previously mentioned, nine rivers have met the criteria established by the Study Team as follows: 1) Abatan River, 2) Antequera River, 3) Bilar River, 4) Cantimoc River, 5) Hibayog River, 6) Hinlayagan River, 7) Loboc River, 8) Manaba River, 9) Pamacsalan River. The rivers of Inabanga and Wahig are also cited in the Bohol-Cebu Water Supply Project as possible water sources.

A river flow analysis is recommended should there be plans to tap the surface waters of the province for future water supply.

7.7 Water Source Development for Medium Term Development Plan

For the preparation of the medium-term development plan in terms of water source development, standard specifications of wells by municipality were prepared. The parameters, such as proportion of well type, well depth, and specific capacity are shown in Table 7.7.1. These were established using the well information from NWRB (see also Appendix VII) and the hydrogeological assessment shown in Table 7.6.2, Appendix VII).

Groundwater source availability (well and spring) is reflected in Table 7.7.1 that was assumed based on water sources study considering the limited information on geology, topography, water sources inventory, etc. The groundwater source availability indicates the general profile of the different types of groundwater source available in the municipalities. Details on the map should be checked with field conditions. Again, in this study, shallow well areas where delineated based on the occurrence of recent unconsolidated sediments. Existing shallow wells may occur in deep well (limestone areas and volcanic areas) areas since solution channels in limestone and fractures in volcanic rocks are not confined to a certain depth.

Table 7.7.1 Standard Specifications of Wells by Municipality

Municipality/ City	Type	Type Water Source	Proportion (%)	Standard Specification		Remarks
				Depth (m)	Specific Capacity (liter/sec/m)	
Alburquerque	Urban	Shallow Well	75	18	0.2	Fair SW, Rich DW, Few SP
		Deep Well	20	40	0.2	
		Spring	5			
	Rural	Shallow Well	35	18	0.5	
		Deep Well	55	60	0.2	
		Spring	5			
Alicia	Urban	Shallow Well	65	18	0.2	Rich SW, Few DW, Rich SP
		Deep Well	15	60	0.2	
		Spring	20			
	Rural	Shallow Well	35	´18	0.1	
		Deep Well	10	40	0.2	
		Spring	55			
Anda	Urban	Shallow Well	80	18	0.2	Few SW, Few DW, Fair SP
		Deep Well	20	40	0.2	
		Spring				
	Rural	Shallow Well	20	18	0.2	
		Deep Well	30	60	0.1	
		Spring	50			
Antequera	Urban	Shallow Well	60	18	0.3	Fair SW, Fair DW, Fair SP
		Deep Well	40	40	0.2	
		Spring				
	Rural	Shallow Well	30	18	0.2	
		Deep Well	45	60	0.4	
		Spring	25			
Baclayon	Urban	Shallow Well	50	18	0.2	Few SW, Rich DW, Few SP
		Deep Well	50	40	0.2	
		Spring				
	Rural	Shallow Well	5	18	1	
		Deep Well	90	80	1	
		Spring	5			
Balilihan	Urban	Shallow Well	45	18	0.2	Fair SW, Fair DW, Fair SP
		Deep Well	30	40	0.3	
		Spring	25			
	Rural	Shallow Well	30	18	0.4	
		Deep Well	40	60	1	
		Spring	30			
Batuan	Urban	Shallow Well	30	18	0.2	Fair SW, Few DW, Rich SP
		Deep Well	10	60	0.2	
		Spring	60			
	Rural	Shallow Well	15	18	1.5	
		Deep Well	45	40	1	
		Spring	40			
Bien Unido	Urban	Shallow Well	15	18	0.2	Few SW, Few DW, Very Few SP
		Deep Well	5	40	0.2	
		Spring				
	Rural	Shallow Well	15	18	0.2	
		Deep Well	5	40	0.2	
		Spring				
Bilar	Urban	Shallow Well	10	18	0.2	Fair SW, Fair DW, Fair SP
		Deep Well	60	40	0.2	
		Spring	30			
	Rural	Shallow Well	35	18	1	
		Deep Well	20	60	0.3	
		Spring	45			
Buenavista	Urban	Shallow Well				Fair SW, Fair DW, Fair SP
		Deep Well				
		Spring				
	Rural	Shallow Well	35	18	0.2	

Municipality/ City	Type	Type Water Source	Proportion (%)	Standard Specification		Remarks
				Depth (m)	Specific Capacity (liter/sec/m)	
		Deep Well	40	40	1.7	
		Spring	25			
Calape	Urban	Shallow Well	75	18	0.2	Rich SW, Fair DW, Rich SP
		Deep Well	20	40	0.2	
		Spring	5			
	Rural	Shallow Well	30	18	0.6	
		Deep Well	20	60	4	
		Spring	50			
Candijay	Urban	Shallow Well	70	18	0.4	Fair SW, Fair DW, Rich SP
		Deep Well	20	40	0.3	
		Spring	10			
	Rural	Shallow Well	40	18	0.6	
		Deep Well	25	40	2	
		Spring	35			
Carmen	Urban	Shallow Well	55	18	0.5	Rich SW, Fair DW, Rich SP
		Deep Well	35	40	0.2	
		Spring	10			
	Rural	Shallow Well	60	18	0.2	
		Deep Well	10	80	1	
		Spring	30			
Catigbian	Urban	Shallow Well	30	18	0.2	Fair SW, Fair DW, Fair SP
		Deep Well	25	40	0.2	
		Spring	45			
	Rural	Shallow Well	45	18	5	
		Deep Well	25	40	1	
		Spring	30			
Clarin	Urban	Shallow Well	40	18	0.2	Rich SW, Fair DW, Fair SP
		Deep Well	40	40	0.2	
		Spring	10			
	Rural	Shallow Well	65	18	0.8	
		Deep Well	25	40	1	
		Spring	10			
Corella	Urban	Shallow Well	50	18	0.2	Few SW, Fair DW, Few SP
		Deep Well	50	40	0.6	
		Spring				
	Rural	Shallow Well	25	18	1	
		Deep Well	70	60	0.8	
		Spring	5			
Cortes	Urban	Shallow Well	20	18	0.2	Few SW, Fair DW, Few SP
		Deep Well	80	40	0.2	
		Spring				
	Rural	Shallow Well	25	18	1	
		Deep Well	65	80	2	
		Spring	10			
Dagohoy	Urban	Shallow Well	75	18	0.2	Rich SW, Fair DW, Fair SP
		Deep Well	20	60	0.1	
		Spring	5			
	Rural	Shallow Well	60	18	0.2	
		Deep Well	20	40	0.2	
		Spring	20			
Danao	Urban	Shallow Well	80	18	0.2	Fair SW, Fair DW, Rich SP
		Deep Well	15	40	0.2	
		Spring	5			
	Rural	Shallow Well	40	18	0.2	
		Deep Well	20	40	0.2	
		Spring	40			
Dauis	Urban	Shallow Well	10	18	0.2	Few SW, Fair DW, Very Few SP
		Deep Well	90	40	2	
		Spring				
	Rural	Shallow Well	20	18	3	

Municipality/ City	Type	Type Water Source	Proportion (%)	Standard Specification		Remarks
				Depth (m)	Specific Capacity (liter/sec/m)	
		Deep Well	80	60	2	
		Spring				
Dimiao	Urban	Shallow Well	45	18	0.2	Fair SW, Fair DW, Rich SP
		Deep Well	15	40	0.2	
		Spring	40			
	Rural	Shallow Well	50	18	0.2	
		Deep Well	20	40	0.4	
		Spring	30			
Duero	Urban	Shallow Well	90	18	0.2	Rich SW, Few DW, Rich SP
		Deep Well	5	40	0.2	
		Spring	5			
	Rural	Shallow Well	80	18	0.6	
		Deep Well	5	40	0.2	
		Spring	15			
Garcia Hernandez	Urban	Shallow Well	60	18	0.3	Few SW, Few DW, Rich SP
		Deep Well	20	40	0.2	
		Spring	20			
	Rural	Shallow Well	30	18	0.9	
		Deep Well	20	40	0.1	
		Spring	50			
Getafe	Urban	Shallow Well	65	18	0.4	Rich SW, Few DW, Fair SP
		Deep Well	25	40	0.2	
		Spring	10			
	Rural	Shallow Well	80	18	1.5	
		Deep Well	10	40	0.1	
		Spring	10			
Guindulman	Urban	Shallow Well	75	18	0.2	Rich SW, Fair DW, Rich SP
		Deep Well	25	40	0.2	
		Spring				
	Rural	Shallow Well	45	18	2	
		Deep Well	25	40	1	
		Spring	30			
Inabanga	Urban	Shallow Well	60	18	0.2	Rich SW, Rich DW, Rich SP
		Deep Well	35	40	0.2	
		Spring	5			
	Rural	Shallow Well	45	18	0.4	
		Deep Well	40	40	1	
		Spring	15			
Jagna	Urban	Shallow Well	80	18	0.2	Rich SW, Fair DW, Rich SP
		Deep Well	10	40	0.2	
		Spring	10			
	Rural	Shallow Well	70	18	1	
		Deep Well	10	40	0.5	
		Spring	20			
Lila	Urban	Shallow Well	5	18	0.2	Few SW, Few DW, Fair SP
		Deep Well	10	40	0.2	
		Spring	15			
	Rural	Shallow Well	10	18	0.9	
		Deep Well	20	40	0.2	
		Spring	70			
Loay	Urban	Shallow Well	20	18	0.2	Fair SW, Fair DW, Fair SP
		Deep Well	70	40	0.2	
		Spring	10			
	Rural	Shallow Well	20	18	0.1	
		Deep Well	60	60	2	
		Spring	20			
Loboc	Urban	Shallow Well	30	18	0.2	Fair SW, Fair DW, Fair SP
		Deep Well	40	40	0.2	
		Spring	30			
	Rural	Shallow Well	50	18	0.2	

Municipality/ City	Type	Type Water Source	Proportion (%)	Standard Specification		Remarks
				Depth (m)	Specific Capacity (liter/sec/m)	
		Deep Well	30	60	0.5	
		Spring	20			
Loon	Urban	Shallow Well	30	18	0.2	Fair SW, Fair DW, Rich SP
		Deep Well	40	40	0.2	
		Spring	30			
	Rural	Shallow Well	35	18	1	
		Deep Well	25	60	1	
		Spring	40			
Mabini	Urban	Shallow Well	40	18	0.2	Fair SW, Few DW, Fair SP
		Deep Well	10	40	0.2	
		Spring	50			
	Rural	Shallow Well	50	18	0.2	
		Deep Well	10	40	0.2	
		Spring	40			
Maribojoc	Urban	Shallow Well	30	18	0.2	Fair SW, Fair DW, Fair SP
		Deep Well	40	40	0.2	
		Spring	30			
	Rural	Shallow Well	35	18	0.2	
		Deep Well	50	40	2	
		Spring	15			
Panglao	Urban	Shallow Well	30	18	0.7	Few SW, Fair DW, Very Few SP
		Deep Well	65	40	0.2	
		Spring	5			
	Rural	Shallow Well	30	18	0.9	
		Deep Well	60	40	0.8	
		Spring	10			
Pilar	Urban	Shallow Well	70	18	0.2	Rich SW, Few DW, Rich SP
		Deep Well	20	40	0.2	
		Spring	10			
	Rural	Shallow Well	60	18	0.2	
		Deep Well	10	40	0.2	
		Spring	30			
Pres. Carlos P. Garcia	Urban	Shallow Well	40	18	0.2	Few SW, Few DW, Few SP
		Deep Well	10	40	0.2	
		Spring	5			
	Rural	Shallow Well	40	18	0.2	
		Deep Well	10	40	0.2	
		Spring	5			
Sagbayan	Urban	Shallow Well	10	18	0.4	Rich SW, Rich DW, Fair SP
		Deep Well	80	40	0.2	
		Spring	10			
	Rural	Shallow Well	40	18	0.2	
		Deep Well	40	40	0.2	
		Spring	20			
San Isidro	Urban	Shallow Well				Fair SW, Few DW, Rich SP
		Deep Well				
		Spring				
	Rural	Shallow Well	35	18	0.2	
		Deep Well	15	40	0.2	
		Spring	50			
San Miguel	Urban	Shallow Well	85	18	0.2	Rich SW, Few DW, Few SP
		Deep Well	10	40	0.1	
		Spring	5			
	Rural	Shallow Well	75	18	0.2	
		Deep Well	15	60	0.2	
		Spring	10			
Sevilla	Urban	Shallow Well	70	18	0.2	Rich SW, Few DW, Fair SP
		Deep Well	20	60	0.7	
		Spring	10			
	Rural	Shallow Well	60	18	0.7	

Municipality/ City	Type	Type Water Source	Proportion (%)	Standard Specification		Remarks
				Depth (m)	Specific Capacity (liter/sec/m)	
		Deep Well	15	40	0.7	
		Spring	25			
Sierra Bullones	Urban	Shallow Well	30	18	0.2	Fair SW, Few DW, Rich SP
		Deep Well	20	40	0.1	
		Spring	50			
	Rural	Shallow Well	40	18	0.2	
		Deep Well	10	40	0.1	
		Spring	50			
Sikatuna	Urban	Shallow Well	25	18	0.2	Few SW, Few DW, Few SP
		Deep Well	70	40	0.1	
		Spring	5			
	Rural	Shallow Well	40	18	0.2	
		Deep Well	40	60	0.1	
		Spring	20			
Tagbilaran City (Capital)	Urban	Shallow Well	35	18	1	Rich SW, Rich DW, Very Few SP
		Deep Well	60	80	2	
		Spring	5			
	Rural	Shallow Well				
		Deep Well				
		Spring				
Talibon	Urban	Shallow Well	80	18	0.3	Rich SW, Few DW, Few SP
		Deep Well	15	40	0.1	
		Spring	5			
	Rural	Shallow Well	60	18	0.5	
		Deep Well	30	40	1	
		Spring	10			
Trinidad	Urban	Shallow Well	70	18	0.2	Rich SW, Few DW, Few SP
		Deep Well	20	40	0.1	
		Spring	10			
	Rural	Shallow Well	60	18	0.2	
		Deep Well	30	40	0.1	
		Spring	10			
Tubigon	Urban	Shallow Well	10	18	0.2	Rich SW, Rich DW, Rich SP
		Deep Well	80	40	0.2	
		Spring	10			
	Rural	Shallow Well	30	18	1	
		Deep Well	50	40	0.3	
		Spring	20			
Ubay	Urban	Shallow Well	80	18	0.8	Rich SW, Few DW, Few SP
		Deep Well	15	40	0.2	
		Spring	5			
	Rural	Shallow Well	70	18	0.3	
		Deep Well	20	80	0.4	
		Spring	10			
Valencia	Urban	Shallow Well	50	18	0.2	Rich SW, Few DW, Rich SP
		Deep Well	40	40	0.6	
		Spring	10			
	Rural	Shallow Well	20	18	0.2	
		Deep Well	30	40	0.3	
		Spring	50			

The following investigations are required for future water source assessment.

1) Preparation of Groundwater Database

   a) Study Area

      All the 47 municipalities and the city of Tagbilaran

   b) Database Parameters

      Well location, geologic log, well structures/ design, static water level, production (periodic monitoring) and water quality.

2) Preparation of Hydraulic Database

   a) Study Area

      Same as item 1)

   b) Database Parameters

      Rainfall record, river flow measured by auto recorder system (periodic measurements in defined river section are required) and regular river water quality examination (to include pH, trbidity, color, etc.)

7.8 Towards an Integrated Water Resources Management

The different watersheds (drainage basin) of the Province of Bohol have already been identified and delineated in the SWECO study (Figure 7.8.1). Proper management of these water resources is vital in sustaining the supply of water for its various uses.

The micro management of these watersheds plays a crucial role in formulating an integrated water resources management for the Province.

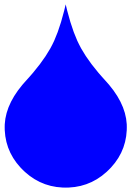
Each drainage basin ideally should have the following information: rainfall record, river flow measured by auto recorder system (periodic measurements in defined river section are required), regular river water quality examination (to include pH, turbidity, color, etc.) and groundwater quality examination, etc.

In addition, various withdrawal programs from the wells and springs as well as river water should be documented and assessed properly. A periodic assessment of the groundwater level should also be performed in order to monitor fluctuations in the groundwater level.

A water balance study could then be performed and the results used for the evaluation of water resources in a particular drainage basin.

A proper accounting of the water in a particular drainage basin allows us to determine the safe yield, which is the amount of naturally occurring groundwater that can be withdrawn from an aquifer on a sustained basis, economically and legally, without impairing the native groundwater quality or creating an undesirable effect such as environmental damage. As such water supply projects will become sustainable.

CHAPTER VIII



FUTURE REQUIREMENTS IN WATER SUPPLY AND SANITATION IMPROVEMENT

CHAPTER VIII FUTURE REQUIREMENTS IN WATER SUPPLY AND SANITATION IMPROVEMENT

8.1 General

Phased investments for provincial sector development, Medium Term Investment (2005-20010) and Long-Term Development (2011-2015), are planned in almost the same manner as adopted in the National Sector Master Plan (NSMP) and the Medium-Term Philippine Development Plan (MTPDP) 2000-2004.

Targets of provincial service coverage for the two phases are established as percentages of beneficiaries or utilities to be served by sub-sector. Service coverage in the base year (2003) and national sector targets indicated in the NSMP and the MTPDP are the bases of the study. Sector targets which are not prescribed in the national plan, such as school and public toilets as well as sewerage are assumed based on the current conditions. In addition, preliminary discussion on solid waste management is included as a vital component of the sanitation sector.

Projection of frame values by municipality is undertaken for respective sub-sectors: future population by urban and rural area, the number of student enrollment to public schools and the number of public utilities. Reference base figures for the study of framework are the 2000 Census of Population and Housing, the statistical data of the Province and the information from relevant agencies. Municipal population by target year and the base year (2003) is estimated using the methodologies by National Statistical Office (NSO). While, the population distribution to urban and rural areas prepared by NSO in 1995 is modified by the PSPT to meet actual conditions in the classification of the areas.

The types of required facilities and their implementation criteria according to service level standards are referred to the NSMP and the NEDA Board Resolution No. 12 (s. 1995). Some planning conditions and assumptions not prescribed in the national plan are conferred to the relevant standards of sector agencies and the Provincial Government. For sewerage requirement, the deficit in sanitation must first be addressed. Partial upgrading of an on-site disposal to a sewerage system (off-site disposal) is envisaged in the final target year.

In estimating future requirements by municipality, additional population or number of students/public utilities to be served by sub-sector is first calculated as a shortfall at target years in comparison between each target and its base year service coverage. In this regard, planned/on-going projects to be completed by respective base years are considered as part of existing services for each target year. Required number of facilities by sector component is then estimated corresponding to the said additional population or number of students/public utilities to be served.

Logistic support is considered as a minimum requirement of LGUs for community development and training, and other relevant activities along with the implementation of PW4SP. The types and number of well drilling/rehabilitation equipment and supporting vehicle for Level I facilities are also suggested as reference information. Also, the minimum requirements for setting up a provincial laboratory to support drinking water quality surveillance and monitoring are described. This will include building,

instrument/equipment and reagent/chemical requirements. The 1993 Philippine National Standards for Drinking Water (PNSDW) requires that initial examinations of water from newly constructed sources should first be undertaken before operation for public use and thereafter periodic examinations of these water supply sources/facilities.

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

8.2 Targets of Provincial Sector Plan

Provincial sector targets for the years 2010 and 2015 are determined as the provincial average of the desirable minimum level for each sub-sector. Table 8.2.1 summarizes the target percentages to be served by sub-sector.

(1) Water Supply

The base year (2003) service coverage was calculated as a total of 2003 figures and expected by planned/on-going projects to be completed by 2004. Table 8.2.2 shows service coverage for the planning purpose (see Appendix VIII for details).

The base year service coverage in the urban area (60%) is lower than the MTPDP sector target of 89% for the year 2000, while rural area (59%) is behind the sector target of 90%.

For Phase I development, targets of service coverage for water supply by urban and rural area were set up considering the following conditions:

i) at least the existing coverage shall be secured to meet population increase; and

ii) viable investment using available IRA to be allocated to water supply sector shall be considered.

For Phase I development, the targets of water supply service coverage for urban area (89%) and for rural area (90%) was adopted as set forth in the MTPDP. An increase of 29% (urban areas) and 31% (rural areas) from the existing coverage was achieved for the medium-term targets.

Phase II targets are planned to increase urban and rural water supply coverage to 95% and 93%, respectively, as envisaged in the NSMP.

(2) Sanitation

1) Household toilets

As with water supply, the base year service coverage is calculated as shown in Table 8.2.3 reflecting any planned or on-going projects scheduled to be completed by 2000 (see Appendix VIII for details).

Table 8.2.1 Provincial Sector Targets

Sub-sector		Existing Service Coverage	Phase I (2005-2010)		Phase II (2011-2015)	
Water Supply		Population Coverage (%)	Population Coverage (%)	Additional Population to be Served	Population Coverage (%)	Additional Population to be Served
Urban Water Supply		60	89	204,440	95	156,504
Rural Water Supply		59	90	423,141	93	215,090
Sanitation		Households Coverage (%)	Households Coverage (%)	Additional Households to be Served	Households Coverage (%)	Additional Households to be Served
Household Toilet						
Urban Household Toilet		83	94	24,855	98	56,317
	Flush	20	25	11,509	50	42,543
	Pour Flush	73	75	12,960	50	13,774
	VIP/Dry	7	0	386	0	0
Rural Household Toilet		77	94	58,307	98	110,024
	Flush	3	10	13,935	10	7,775
	Pour Flush	85	85	37,983	90	102,249
	VIP/Dry	11	5	6,389	0	0
School Toilet		Coverage (%)	Coverage (%)	Additional Public School Students to be Served	Coverage (%)	Additional Public School Students to be Served
		82	90	67,944	95	69,916
Public Toilet		Public Utilities Coverage (%)	Coverage (%)	Additional Public Utilities with Sanitary Toilets	Coverage (%)	Additional Public Utilities with Sanitary Toilets
		98	100	91	100	144
Sewerage		Urban Population Coverage (%)	Not Applicable		Coverage (%)	Population to be Served
		0			50	228,746
Solid Waste		Urban Household Coverage (%)	Coverage (%)	Additional Households to be Served	Not Applicable	
		42	90	55,040		

Table 8.2.2 Estimation of Base Year Service Coverage of Water Supply

Municipality/City	Area	Population (2003)	Population Served by 2003 Facilities				
			Level III	Level II	Level I	Total	Percentage Coverage
Alburquerque	Urban	3,557	980		677	1,657	47
	Rural	5,753	3,593		1,722	5,315	92
	Total	9,310	4,573		2,399	6,972	75
Alicia	Urban	2,267	1,831		83	1,914	84
	Rural	20,889	5,165		5,951	11,116	53
	Total	23,156	6,996		6,034	13,030	56
Anda	Urban	2,860	2,218			2,218	78
	Rural	17,567	1,900	1,125	1,332	4,357	25
	Total	20,427	4,118	1,125	1,332	6,575	32
Antequera	Urban	2,647	2,493	79	75	2,647	100
	Rural	12,014	1,798	847	5,953	8,598	72
	Total	14,661	4,291	926	6,028	11,245	77
Baclayon	Urban	4,595	4,130		302	4,432	96
	Rural	12,090	9,460	76	2,554	12,090	100
	Total	16,685	13,590	76	2,856	16,522	99
Balilihan	Urban	2,848	2,140		708	2,848	100
	Rural	15,334	2,400	409	5,804	8,613	56
	Total	18,182	4,540	409	6,512	11,461	63
Batuan	Urban	3,170	1,738	1,059	373	3,170	100
	Rural	9,371		1,347	3,512	4,859	52
	Total	12,541	1,738	2,406	3,885	8,029	64
Bien Unido	Urban	18,508	3,522		1,585	5,107	28
	Rural	4,740			336	336	7
	Total	23,248	3,522		1,921	5,443	23
Bilar	Urban	3,713	3,024	135	554	3,713	100
	Rural	14,387	8,287	708	3,905	12,900	90
	Total	18,100	11,311	843	4,459	16,613	92
Buenavista	Urban	3,902	1,583			1,583	41
	Rural	25,219	4,733		5,900	10,633	42
	Total	29,121	6,316		5,900	12,216	42
Calape	Urban	8,220	5,968		922	6,890	84
	Rural	21,406	17,912		3,494	21,406	100
	Total	29,626	23,880		4,416	28,296	96
Candijay	Urban	13,034	5,011	490	1,382	6,883	53
	Rural	19,957	3,505	4,655	10,019	18,179	91
	Total	32,991	8,516	5,145	11,401	25,062	76
Carmen	Urban	9,966			899	899	9
	Rural	34,021	3,537	1,163	9,141	13,841	41
	Total	43,987	3,537	1,163	10,040	14,740	34
Catigbian	Urban	3,436	1,783		483	2,266	66
	Rural	20,302	3,107	314	3,445	6,866	34
	Total	23,738	4,890	314	3,928	9,132	38
Clarin	Urban	4,462	3,320		77	3,397	76
	Rural	14,679	2,380	1,004	2,033	5,417	37
	Total	19,141	5,700	1,004	2,110	8,814	46
Corella	Urban	853	853			853	100
	Rural	5,460	4,800	132	528	5,460	100
	Total	6,313	5,653	132	528	6,313	100
Cortes	Urban	3,381	2,460		515	2,975	88
	Rural	10,506	5,196		3,238	8,434	80
	Total	13,887	7,656		3,753	11,409	82

Municipality/City	Area	Population (2003)	Population Served by 2003 Facilities				
			Level III	Level II	Level I	Total	Percentage Coverage
Dagohoy	Urban	2,778			801	801	29
	Rural	16,201			4,177	4,177	26
	Total	18,979			4,978	4,978	26
Danao	Urban	3,515	3,031		444	3,475	99
	Rural	16,508	9,154	205	4,976	14,335	87
	Total	20,023	12,185	205	5,420	17,810	89
Dauis	Urban	12,407			851	851	7
	Rural	15,436	10,317	5,119		15,436	100
	Total	27,843	10,317	5,119	851	16,287	58
Dimiao	Urban	1,409	1,217	51	76	1,344	95
	Rural	14,082	1,049	943	3,223	5,215	37
	Total	15,491	2,266	994	3,299	6,559	42
Duero	Urban	3,845	3,590		255	3,845	100
	Rural	13,817	7,734	381	5,410	13,525	98
	Total	17,662	11,324	381	5,665	17,370	98
Garcia Hernandez	Urban	5,551	3,924		235	4,159	75
	Rural	17,625	2,826		2,033	4,859	28
	Total	23,176	6,750		2,268	9,018	39
Getafe	Urban	14,288		179	1,157	1,336	9
	Rural	16,884		180	2,301	2,481	15
	Total	31,172		359	3,458	3,817	12
Guindulman	Urban	5,609	2,240		400	2,640	47
	Rural	25,039	8,325		5,705	14,030	56
	Total	30,648	10,565		6,105	16,670	54
Inabanga	Urban	11,731	2,894	281	1,560	4,735	40
	Rural	31,795	1,840	2,002	10,469	14,311	45
	Total	43,526	4,734	2,283	12,029	19,046	44
Jagna	Urban	11,622	9,260		783	10,043	86
	Rural	21,399			5,738	5,738	27
	Total	33,021	9,260		6,521	15,781	48
Lila	Urban	2,149	2,005			2,005	93
	Rural	8,914	2,939		720	3,659	41
	Total	11,063	4,944		720	5,664	51
Loay	Urban	5,331		276	1,237	1,513	28
	Rural	10,186	5,251	1,506	3,429	10,186	100
	Total	15,517	5,251	1,782	4,666	11,699	75
Loboc	Urban	2,962	2,251		82	2,333	79
	Rural	14,110	4,233	1,976	4,880	11,089	79
	Total	17,072	6,484	1,976	4,962	13,422	79
Loon	Urban	14,028	12,330		1,610	13,940	99
	Rural	29,267	16,835		7,921	24,756	85
	Total	43,295	29,165		9,531	38,696	89
Mabini	Urban	8,088	5,953	531	634	7,118	88
	Rural	21,557	16,746	464	2,534	19,744	92
	Total	29,645	22,699	995	3,168	26,862	91
Maribojoc	Urban	8,837	5,629		1,131	6,760	76
	Rural	9,091	7,023		2,068	9,091	100
	Total	17,928	12,652		3,199	15,851	88
Panglao	Urban	14,540	9,254		575	9,829	68
	Rural	9,235	6,459		2,471	8,930	97
	Total	23,775	15,713		3,046	18,759	79
Pilar	Urban	4,086			169	169	4
	Rural	23,924	2,251		6,445	8,696	36
	Total	28,010	2,251		6,614	8,865	32

Municipality/City	Area	Population (2003)	Population Served by 2003 Facilities				
			Level III	Level II	Level I	Total	Percentage Coverage
Pres. Carlos P. Garcia	Urban	7,557			568	568	8
	Rural	14,012			2,381	2,381	17
	Total	21,569			2,949	2,949	14
Sagbayan	Urban	3,869	2,083		1,786	3,869	100
	Rural	16,087	2,953	249	6,798	10,000	62
	Total	19,956	5,036	249	8,584	13,869	69
San Isidro	Urban						
	Rural	9,997	444	2,145	7,408	9,997	100
	Total	9,997	444	2,145	7,408	9,997	100
San Miguel	Urban	2,369			647	647	27
	Rural	20,719		768	4,380	5,148	25
	Total	23,088		768	5,027	5,795	25
Sevilla	Urban	1,596	831		338	1,169	73
	Rural	9,588	4,810		3,850	8,660	90
	Total	11,184	5,641		4,188	9,829	88
Sierra Bullones	Urban	9,759	7,472		248	7,720	79
	Rural	18,484	8,490	2,061	3,225	13,776	75
	Total	28,243	15,962	2,061	3,473	21,496	76
Sikatuna	Urban	1,001	931		70	1,001	100
	Rural	6,097	2,383	315	1,547	4,245	70
	Total	7,098	3,314	315	1,617	5,246	74
Tagbilaran City (Capital)	Urban	94,151	69,896		5,614	75,510	80
	Rural						
	Total	94,151	69,896		5,614	75,510	80
Talibon	Urban	32,366			4,145	4,145	13
	Rural	24,558	4,123		6,506	10,629	43
	Total	56,924	4,123		10,651	14,774	26
Trinidad	Urban	3,274	786	329	904	2,019	62
	Rural	25,706	160	55	9,156	9,371	36
	Total	28,980	946	384	10,060	11,390	39
Tubigon	Urban	21,521	9,579	1,750	2,306	13,635	63
	Rural	22,107	4,431	9,413	8,263	22,107	100
	Total	43,628	14,010	11,163	10,569	35,742	82
Ubay	Urban	13,873	5,628	535	952	7,115	51
	Rural	51,973	6,725	110	6,514	13,349	26
	Total	65,846	12,353	645	7,466	20,464	31
Valencia	Urban	2,350	2,218		132	2,350	100
	Rural	23,855	11,084	1,587	11,112	23,783	100
	Total	26,205	13,302	1,587	11,244	26,133	100
Provincial Total	Urban	417,881	206,056	5,695	38,345	250,096	60
	Rural	821,948	226,358	41,259	214,507	482,124	59
	Total	1,239,829	432,414	46,954	252,852	732,220	59

Table 8.2.3 Base Year Service Coverage of Household Toilets

Municipality/ City	Area	2003		Households and Population Using Sanitary Toilets								
				Number of Households				Population	Service Coverage (%)			
		Population	HHs	Flush	Pour Flush	VIP/ Dry	Total		Flush	Pour Flush	VIP/ Dry	Total
Alburquerque	Urban	3,557	631	100	139	9	248	1,388	16	22	1	39
	Rural	5,753	1,153	60	825	7	892	4,430	5	72	1	77
	Total	9,310	1,784	160	964	16	1,140	5,818	9	54	1	64
Alicia	Urban	2,267	409	6	379		385	2,131	1	93		94
	Rural	20,889	3,949	37	3,361		3,398	17,965	1	85		86
	Total	23,156	4,358	43	3,740		3,783	20,096	1	86		87
Anda	Urban	2,860	543	35	455		490	2,574	6	84		90
	Rural	17,567	2,967	15	1,697		1,712	10,189	1	57		58
	Total	20,427	3,510	50	2,152		2,202	12,763	1	61		63
Antequera	Urban	2,647	504	38	74	330	442	2,330	8	15	65	88
	Rural	12,014	2,482	30	226	1,976	2,232	10,813	1	9	80	90
	Total	14,661	2,986	68	300	2,306	2,674	13,143	2	10	77	90
Baclayon	Urban	4,595	914	212	670		882	4,412	23	73		96
	Rural	12,090	2,399	133	1,993		2,126	10,761	6	83		89
	Total	16,685	3,313	345	2,663		3,008	15,173	10	80		91
Balilihan	Urban	2,848	533	105	258	130	493	2,621	20	48	24	92
	Rural	15,334	2,814	50	1,551	960	2,561	13,954	2	55	34	91
	Total	18,182	3,347	155	1,809	1,090	3,054	16,575	5	54	33	91
Batuan	Urban	3,170	584	36	474	21	531	2,885	6	81	4	91
	Rural	9,371	1,841	11	1,000	416	1,427	7,310	1	54	23	78
	Total	12,541	2,425	47	1,474	437	1,958	10,195	2	61	18	81
Bien Unido	Urban	18,508	3,329	20	1,905		1,925	10,735	1	57		58
	Rural	4,740	846		226		226	1,280		27		27
	Total	23,248	4,175	20	2,131		2,151	12,015		51		52
Bilar	Urban	3,713	686	90	110	256	456	2,451	13	16	37	66
	Rural	14,387	2,542	60	88	1,554	1,702	9,640	2	3	61	67
	Total	18,100	3,228	150	198	1,810	2,158	12,091	5	6	56	67
Buenavista	Urban	3,902	680		299		299	1,717		44		44
	Rural	25,219	4,424		1,730		1,730	9,836		39		39
	Total	29,121	5,104		2,029		2,029	11,553		40		40
Calape	Urban	8,220	1,605	98	842		940	4,850	6	52		59
	Rural	21,406	4,324	172	2,276		2,448	12,202	4	53		57
	Total	29,626	5,929	270	3,118		3,388	17,052	5	53		57
Candijay	Urban	13,034	2,263	100	1,959	63	2,122	12,252	4	87	3	94
	Rural	19,957	3,615	24	3,343	91	3,458	19,159	1	92	3	96
	Total	32,991	5,878	124	5,302	154	5,580	31,411	2	90	3	95
Carmen	Urban	9,966	1,829	25	783		808	4,386	1	43		44
	Rural	34,021	6,141		5,439		5,439	30,279		89		89
	Total	43,987	7,970	25	6,222		6,247	34,665		78		78
Catigbian	Urban	3,436	640	15	570		585	3,127	2	89		91
	Rural	20,302	3,889	5	2,669		2,674	14,009		69		69
	Total	23,738	4,529	20	3,239		3,259	17,136		72		72
Clarin	Urban	4,462	870	203	521	10	734	3,749	23	60	1	84
	Rural	14,679	2,924	351	2,031	122	2,504	12,624	12	69	4	86
	Total	19,141	3,794	554	2,552	132	3,238	16,373	15	67	3	85
Corella	Urban	853	162	26	131		157	828	16	81		97
	Rural	5,460	1,157	19	1,063	14	1,096	5,187	2	92	1	95
	Total	6,313	1,319	45	1,194	14	1,253	6,015	3	91	1	95
Cortes	Urban	3,381	690	213	449		662	3,246	31	65		96
	Rural	10,506	2,093	460	1,483		1,943	9,771	22	71		93
	Total	13,887	2,783	673	1,932		2,605	13,017	24	69		94

Municipality/ City	Area	2003		Households and Population Using Sanitary Toilets								
				Number of Households				Population	Service Coverage (%)			
		Population	HHs	Flush	Pour Flush	VIP/ Dry	Total		Flush	Pour Flush	VIP/ Dry	Total
Dagohoy	Urban	2,778	520	5	403	87	495	2,640	1	78	17	95
	Rural	16,201	2,967	27	1,881	751	2,659	14,581	1	63	25	90
	Total	18,979	3,487	32	2,284	838	3,154	17,221	1	66	24	90
Danao	Urban	3,515	594		4	559	563	3,340		1	94	95
	Rural	16,508	2,836		2,097		2,097	12,216		74		74
	Total	20,023	3,430		2,101	559	2,660	15,556		61	16	78
Dauis	Urban	12,407	1,094	116	583		699	7,941	11	53		64
	Rural	15,436	1,719	133	1,420		1,553	13,893	8	83		90
	Total	27,843	2,813	249	2,003		2,252	21,834	9	71		80
Dimiao	Urban	1,409	277	70	207		277	1,409	25	75		100
	Rural	14,082	2,687	180	2,507		2,687	14,082	7	93		100
	Total	15,491	2,964	250	2,714		2,964	15,491	8	92		100
Duero	Urban	3,845	755	112	607		719	3,653	15	80		95
	Rural	13,817	2,720	22	2,455		2,477	12,574	1	90		91
	Total	17,662	3,475	134	3,062		3,196	16,227	4	88		92
Garcia Hernandez	Urban	5,551	1,061	13	902	4	919	4,830	1	85		87
	Rural	17,625	3,252	89	2,868	152	3,109	16,920	3	88	5	96
	Total	23,176	4,313	102	3,770	156	4,028	21,750	2	87	4	93
Getafe	Urban	14,288	2,593		1,835		1,835	10,145		71		71
	Rural	16,884	2,862		2,099		2,099	12,326		73		73
	Total	31,172	5,455		3,934		3,934	22,471		72		72
Guindulman	Urban	5,609	1,052	18	917	15	950	5,049	2	87	1	90
	Rural	25,039	4,806	42	4,077	82	4,201	21,784	1	85	2	87
	Total	30,648	5,858	60	4,994	97	5,151	26,833	1	85	2	88
Inabanga	Urban	11,731	2,256	35	1,574		1,609	8,330	2	70		71
	Rural	31,795	6,150	41	2,591		2,632	13,672	1	42		43
	Total	43,526	8,406	76	4,165		4,241	22,002	1	50		50
Jagna	Urban	11,622	2,226	50	2,164		2,214	11,506	2	97		99
	Rural	21,399	4,196	15	3,870		3,885	19,902		92		93
	Total	33,021	6,422	65	6,034		6,099	31,408	1	94		95
Lila	Urban	2,149	361	235	115		350	2,085	65	32		97
	Rural	8,914	1,486	325			325	1,962	22			22
	Total	11,063	1,847	560	115		675	4,047	30	6		37
Loay	Urban	5,331	905	152	677		829	4,905	17	75		92
	Rural	10,186	1,907	139	1,540		1,679	8,964	7	81		88
	Total	15,517	2,812	291	2,217		2,508	13,869	10	79		89
Loboc	Urban	2,962	541	95	23		118	652	18	4		22
	Rural	14,110	2,429	68	1,501		1,569	9,172	3	62		65
	Total	17,072	2,970	163	1,524		1,687	9,824	5	51		57
Loon	Urban	14,028	2,483	832	1,415	7	2,254	12,766	34	57		91
	Rural	29,267	5,099		3,811	35	3,846	21,951		75	1	75
	Total	43,295	7,582	832	5,226	42	6,100	34,717	11	69	1	80
Mabini	Urban	8,088	1,532		1,396		1,396	7,361		91		91
	Rural	21,557	3,955		2,961		2,961	16,168		75		75
	Total	29,645	5,487		4,357		4,357	23,529		79		79
Maribojoc	Urban	8,837	1,055	338	359	20	717	6,010	32	34	2	68
	Rural	9,091	1,755	370	555	460	1,385	7,182	21	32	26	79
	Total	17,928	2,810	708	914	480	2,102	13,192	25	33	17	75
Panglao	Urban	14,540	2,653	95	322	1,949	2,366	12,941	4	12	73	89
	Rural	9,235	1,682	28	495	936	1,459	8,035	2	29	56	87
	Total	23,775	4,335	123	817	2,885	3,825	20,976	3	19	67	88
Pilar	Urban	4,086	726	50	558		608	3,433	7	77		84
	Rural	23,924	4,287		3,691		3,691	20,575		86		86

Municipality/ City	Area	2003		Households and Population Using Sanitary Toilets								
				Number of Households				Population	Service Coverage (%)			
		Population	HHs	Flush	Pour Flush	VIP/ Dry	Total		Flush	Pour Flush	VIP/ Dry	Total
	Total	28,010	5,013	50	4,249		4,299	24,008	1	85		86
Pres. Carlos P. Garcia	Urban	7,557	1,397		654		654	3,552		47		47
	Rural	14,012	2,825		1,693		1,693	8,408		60		60
	Total	21,569	4,222		2,347		2,347	11,960		56		56
Sagbayan	Urban	3,869	780	33	630		663	3,289	4	81		85
	Rural	16,087	3,230		2,683		2,683	13,353		83		83
	Total	19,956	4,010	33	3,313		3,346	16,642	1	83		83
San Isidro	Urban											
	Rural	9,997	2,028		1,869		1,869	9,198		92		92
	Total	9,997	2,028		1,869		1,869	9,198		92		92
San Miguel	Urban	2,369	385		129	240	369	2,275		34	62	96
	Rural	20,719	3,760		829	2,650	3,479	19,269		22	70	93
	Total	23,088	4,145		958	2,890	3,848	21,544		23	70	93
Sevilla	Urban	1,596	283	26	225		251	1,421	9	80		89
	Rural	9,588	1,718		1,401		1,401	7,863		82		82
	Total	11,184	2,001	26	1,626		1,652	9,284	1	81		83
Sierra Bullones	Urban	9,759	1,771	25	1,181	165	1,371	7,515	1	67	9	77
	Rural	18,484	3,181	27	1,632	1,000	2,659	15,527	1	51	31	84
	Total	28,243	4,952	52	2,813	1,165	4,030	23,042	1	57	24	81
Sikatuna	Urban	1,001	201	35	161		196	981	17	80		98
	Rural	6,097	1,064	14	913		927	5,305	1	86		87
	Total	7,098	1,265	49	1,074		1,123	6,286	4	85		89
Tagbilaran City (Capital)	Urban	94,151	18,868	7,857	10,618		18,475	92,268	42	56		98
	Rural											
	Total	94,151	18,868	7,857	10,618		18,475	92,268	42	56		98
Talibon	Urban	32,366	5,739	950	4,097		5,047	28,483	17	71		88
	Rural	24,558	4,473	622	1,718		2,340	12,771	14	38		52
	Total	56,924	10,212	1,572	5,815		7,387	41,254	15	57		72
Trinidad	Urban	3,274	597		489		489	2,685		82		82
	Rural	25,706	4,717		2,679		2,679	14,653		57		57
	Total	28,980	5,314		3,168		3,168	17,338		60		60
Tubigon	Urban	21,521	4,061	77	2,340	348	2,765	14,635	2	58	9	68
	Rural	22,107	4,276	382	1,583	1,374	3,339	17,244	9	37	32	78
	Total	43,628	8,337	459	3,923	1,722	6,104	31,879	6	47	21	73
Ubay	Urban	13,873	2,622	30	1,438	376	1,844	9,712	1	55	14	70
	Rural	51,973	10,053	5	7,442	400	7,847	40,539		74	4	78
	Total	65,846	12,675	35	8,880	776	9,691	50,251		70	6	76
Valencia	Urban	2,350	438	130	299		429	2,303	30	68		98
	Rural	23,855	4,283	21	3,906		3,927	21,947		91		92
	Total	26,205	4,721	151	4,205		4,356	24,250	3	89		92
Provincial Total	Urban	417,881	76,698	12,701	46,340	4,589	63,630	343,797	17	60	6	83
	Rural	821,948	151,963	3,977	99,768	12,980	116,725	631,445	3	66	9	77
	Total	1,239,829	228,661	16,678	146,108	17,569	180,355	975,242	7	64	8	79

The province has base year service coverage of 79%, which is below the current national average coverage of 88%. Urban and rural areas register levels of 83% and 77%, respectively. Both are also below the national average coverage. By type of sanitary toilet facility, the existing percentage composition is as follows:

Type	Urban (%)	Rural (%)
Flush	20	3
Pour-flush	73	85
VIP latrine	7	11

To attain equitable access to basic services, provincial target of Phase I for both urban and rural household toilets is planned at 94% adopting the MTPDP target. This is pursued to lessen the gap of the coverage between the urban and rural areas and to achieve a balanced distribution of this basic facility. For Phase II, 98% is adopted both for urban and rural household toilets.

The existing composition of the 3 facility types serves as an indicator in the distribution for Phase I, while for Phase II, VIP and sanitary pit privy/latrine (dry-type) is phased-out.

2**)** School Toilets

The base year service coverage of public school students is shown in Table 8.2.4 counting expected coverage of any planned or on-going projects to be completed by 2004 (see Appendix VIII for details).

Base year service coverage is 82% applying the standard number of public school students to be served by one (1) unit of toilet facility. There is a high level of coverage in the Province.

In the absence of national targets for school toilets, the existing level of service coverage is the base in setting up the targets. It is expected that all new construction of school buildings will entail sanitary toilets enabling the coverage to increase on a higher level. For Phase I and II, 90% and 95% are set, respectively.

3) Public Toilets

The base year service coverage considering expected additional coverage by 2004 is shown in Table 8.2.4 (see Appendix VIII for details).

Almost all existing public utilities are served with at least one sanitary toilet giving 98% coverage. This can be attributed by the fact that almost all public utilities are provided with sanitary toilet facilities.

Without national targets as of now, the indicator in setting up provincial targets would be the existing level of coverage. Accordingly, 100% coverage for both Phase I and Phase II are assumed.

(3) Sewerage

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

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

Municipality/City	Public School Toilets			Public Toilets		
	Total Number of Public School Students (2003)	Std. No. of Public School Student that can be Served by Base Year (2003) Sanitary Toilets	Service Coverage (%)	Number of Public Utilities with Toilets in 2003	Number of Public Utility with Sanitary Toilets in Base Year (2003)	Service Coverage (%)
Alburquerque	1,975	1,975	100	4	4	100
Alicia	5,486	4,760	87	4	4	100
Anda	3,381	3,360	99	2	2	100
Antequera	2,203	2,203	100	8	8	100
Baclayon	2,465	2,465	100	4	4	100
Balilihan	3,418	3,418	100	9	9	100
Batuan	2,517	2,517	100	6	6	100
Bien Unido	5,495	1,280	23	16	16	100
Bilar	3,473	3,473	100	6	6	100
Buenavista	4,347	4,347	100	2	2	100
Calape	6,187	6,187	100	8	8	100
Candijay	6,077	6,077	100	6	6	100
Carmen	9,280	9,280	100	10	10	100
Catigbian	4,340	4,340	100	6	6	100
Clarin	4,479	1,600	36	4	4	100
Corella	852	760	89	2	2	100
Cortes	1,743	1,743	100	4	4	100
Dagohoy	4,158	1,280	31	6	6	100
Danao	4,555	4,555	100	4	4	100
Dauis	6,021	6,000	100	1	1	100
Dimiao	2,439	2,439	100	2	2	100
Duero	3,388	3,388	100	8	8	100
Garcia Hernandez	5,386	960	18	4	4	100
Getafe	5,897	1,080	18	4	4	100
Guindulman	5,990	5,990	100	8	8	100
Inabanga	9,785	9,120	93	8	4	50
Jagna	5,836	5,400	93	10	10	100
Lila	1,203	1,203	100	2	2	100
Loay	2,063	2,063	100	2	2	100
Loboc	2,989	2,989	100	2	2	100
Loon	6,303	6,303	100	24	24	100
Mabini	5,652	5,400	96	6	6	100
Maribojoc	2,835	2,835	100	10	10	100
Panglao	4,628	4,628	100	5	5	100
Pilar	6,325	5,240	83	8	6	75
Pres. C.P. Garcia	4,816	4,400	91	2	0	0
Sagbayan	4,289	3,880	90	14	14	100
San Isidro	1,788	1,720	96	4	4	100
San Miguel	5,840	4,000	68	4	4	100
Sevilla	2,090	1,560	75	4	4	100
Sierra Bullones	6,166	4,280	69	4	4	100
Sikatuna	1,288	1,288	100	3	3	100
Tagbilaran City	12,922	12,922	100	58	58	100
Talibon	13,203	4,240	32	8	8	100
Trinidad	7,117	5,000	70	8	8	100
Tubigon	8,050	7,320	91	4	4	100
Ubay	14,679	11,920	81	2	2	100
Valencia	3,512	3,512	100	8	8	100
Provincial Total	238,931	196,700	82	338	330	98

(4) Solid Waste

The municipal level data in 2003 on the number of households served by the municipal refuse collection revealed that the current practice is concentrated mainly to urban areas. The base year service coverage for urban area by municipality is reflected in Table 8.2.5.

About 14% of the total households in the province relied on municipal refuse collection using trucks or 42% urban household coverage. These municipalities have a total of 78 units of collection truck of which only 25% are closed-type.

No national targets have yet been set. However, considering the present level of coverage, a 90% urban household coverage is applied for the medium-term period.

Table 8.2.5 Base Year Service Coverage of Municipal Solid Waste System in 2003

Municipality/City	Total No. of Households	No. of Urban Households	No. of Households Served	Coverage of Households (%)	Coverage of Urban Households (%)
Alburquerque	1,784	631	157	9	25
Alicia	4,358	409	250	6	61
Anda	3,510	543	314	9	58
Antequera	2,986	504	219	7	43
Baclayon	3,313	914	360	11	39
Balilihan	3,347	533	1,062	32	100
Batuan	2,425	584	358	15	61
Bien Unido	4,175	3,329	485	12	15
Bilar	3,228	686	623	19	91
Buenavista	5,104	680	211	4	31
Calape	5,929	1,605	60	1	4
Candijay	5,878	2,263	36	1	2
Carmen	7,970	1,829	37		2
Catigbian	4,529	640	579	13	90
Clarin	3,794	870	23	1	3
Corella	1,319	162	68	5	42
Cortes	2,783	690			
Dagohoy	3,487	520			
Danao	3,430	594	38	1	6
Dauis	2,813	1,094	34	1	3
Dimiao	2,964	277	570	19	100
Duero	3,475	755	756	22	100
Garcia Hernandez	4,313	1,061	424	10	40
Getafe	5,455	2,593	610	11	24
Guindulman	5,858	1,052	12		1
Inabanga	8,406	2,256	2,123	25	94
Jagna	6,422	2,226	901	14	40
Lila	1,847	361	190	10	53
Loay	2,812	905	724	26	80
Loboc	2,970	541	300	10	55
Loon	7,582	2,483	99	1	4
Mabini	5,487	1,532	53	1	3
Maribojoc	2,810	1,055	430	15	41
Panglao	4,335	2,653	15		1
Pilar	5,013	726			
Pres. Carlos P. Garcia	4,222	1,397	422	10	30
Sagbayan	4,010	780	408	10	52
San Isidro	2,028		1,498	74	

Municipality/City	Total No. of Households	No. of Urban Households	No. of Households Served	Coverage of Households (%)	Coverage of Urban Households (%)
San Miguel	4,145	385	37	1	10
Sevilla	2,001	283	208	10	73
Sierra Bullones	4,952	1,771	321	6	18
Sikatuna	1,265	201			
Tagbilaran City (Capital)	18,868	18,868	10,265	54	54
Talibon	10,212	5,739	1,370	13	24
Trinidad	5,314	597	400	8	67
Tubigon	8,337	4,061	4,000	48	98
Ubay	12,675	2,622	32		1
Valencia	4,721	438	1,271	27	100
Provincial Total	228,661	76,698	32,353	14	42

8.3 Projection of Frame Values

8.3.1 Population Projection

Future population for all municipalities by urban and rural areas was projected for the target years of 2010 and 2015 together with the present population in 2003 as a planning base year.

During the course of this study, the official population projection for the study area was not available. Hence, the future provincial population was projected using the 2000 census population as base year. This projection used the Ratio Method that was also used by NSO in its population projection from 1996 to 2010 and using the 1995 census population as base year.

The Ratio Method of estimating the future population of cities and municipalities utilizes the levels and trends in the ratios of the population of cities and municipalities to the population of their province as observed in the previous censuses. Available information used in the study is as follows:

- NSO population census results from 1980 to 2000
- 1995 Census-based Regional and Provincial Population Projection prepared by the NSO
- 1995 Urban and Rural Classification by NSO
- 2002 Philippine Statistical Yearbook by NSCB

Detailed discussion regarding the procedure in the computation of the future population is presented in Appendix VIII.

The rate of changes for the 3 inter-censal periods (1980-1990, 1990-1995, 1995-2000) is presented in Table 8.3.1. In these periods, 16 municipalities have experienced a decline in population. The municipalities of Corella, President C.P. Garcia, Talibon and Sevilla have registered the highest decrease in population. Only the municipality of Loon has experienced a decrease in population during the first two inter-censal periods. On the other hand, the municipalities of Dagohoy, Dauis and Trinidad have registered the highest increase in population. Alburquerque, Bien Unido, Lila, Mabini, Sikatuna and Talibon have registered a continuous increase in population during the three-intercensal periods.

Table 8.3.1.

The trends presented in Table 8.3.1 and the previous population census from 1980 to 2000 was used to compute the initial rate of change and the share of the city/municipalities to that of the province (Table 8.3.2). Only the municipality of Loon had a negative initial rate of change due to a continuous decline in population during the first 3 inter-censal periods. The rest of the municipalities had positive initial rate of change. The city of Tagbilaran and the municipalities of Anda, Danao, and Getafe have resulted in the highest initial rate of change, while the municipalities of Bien Unido, Corella, Guindulman and President C. P. Garcia have resulted in the lowest initial rate of change.

The share of the city and municipalities was computed based on the initial rate of change as presented in Table 8.3.2. Tagbilaran City and the municipalities of Ubay, Talibon, Tubigon and Inabanga have resulted in the highest share among other municipalities while the municipalities of Alburquerque, Corella, Lila, San Isidro, Sevilla and Sikatuna has the lowest share.

The urban and rural population was derived using the reclassification of barangays made by the PSPT. The classification of NSO population census in 1995 served as the basis and the result is presented in Table 8.3.3. Sixty seven percent (67%) or 758,633 of the population are in rural areas, while 33% or 378,632 are in urban areas. Only Tagbilaran City has no rural area/population. The municipalities of Talibon, Tubigon, Bien Unido and Loon have the highest share of urban population, while the municipalities of Ubay, Carmen, Loon and Inabanga have the highest share of rural population.

The ratio of urban and rural by municipalities was applied to compute the share of urban and rural population in the target years of 2010 and 2015 including that of the planning base year of 2003 as presented in Table 8.3.4

8.3.2 School Enrollment Projection

From the 2000 total population of the province, the number of children who would be enrolling in elementary and high school levels for all municipalities is derived.

School age population is extrapolated from the NSO age group classification of 5-9, 10-14 and 15-19 years old bracket by municipality. The age group for the elementary level is from 6 to 13 years, while that for the high school level is from 14 to 17 years. The percentages of school age population for the target years are based on the existing composition or structure of the 2000 population.

From the school age population, the number of children who would attend either private or public school, by target year is computed using the projected participation rate. The participation rate by target year varies depending on the socio-economic condition of the Province. Generally, an improved economy will result to a higher participation rate. For the province, an increase in the participation rate in both private and public schools is foreseen by year 2015.

The number of public school students by target year is then derived from the projected number of children who will attend school. A participation rate for public school enrollment is established based on the existing participation rate of public school students to the total school age population. Based on the projection, an increase of 24% from the 2003 rate is foreseen in 2010 and another increase of 20% from the 2010 rate in 2015 (see details in Table 8.3.6, Appendix VIII).

Table 8.3.2

Table 8.3.3

Table 8.3.4

Table 8.3.5 shows the projected number of public school students by municipality, by target year. About 294,049 and 352,168 public school students are estimated to enroll for years 2010 and 2015, respectively.

8.3.3 Projection of the Number of Public Utilities

The number of public utilities (limited to public markets and bus/jeepney terminals) by target year is projected in urban areas for all municipalities. The Provincial Physical Framework Plan and the Comprehensive Land Use Plan of each of the municipalities serve as references in the projection. Bus or jeepney terminals are considered in major transport routes of the Province.

Eighty three (83) public utilities are to be constructed by year 2010 and another 144 by year 2015. Refer to Table 8.3.5 for the number of public utilities by municipality by target year (see Appendix VIII for details).

8.3.4 Planning Area and its Projected Population for Sewerage

Urban areas with more than 10,000 population provided by Level III water supply systems in 2015 serve as the planning area. Population in the area is considered as the potential population to be served.

Eighteen (18) municipalities/city with a total urban population of about 228,746 are considered (Table 8.5.4).

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

The number of urban households in 2010 is the potential household for the planning (Table 8.3.5, Appendix VIII).

8.4 Types of Facilities and Implementation Criteria

In principle, the types of facilities and their implementation criteria as prescribed in the NSMP and the NEDA Board Resolution No. 12 (s. 1995) are adopted to this PW4SP.

8.4.1 Water Supply

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

(1) Urban water supply

Prevailing situation of urban water supply in each municipality was first reviewed mainly focusing on existing water sources and magnitude of service coverage. Planned/on-going projects for concerned municipalities were also studied and reflected in the planning, with due attention to merging municipalities into an integrated water supply system. Potential water source for future development was then evaluated based on the study results in Chapter 7, taking into account the possibility to utilize untapped spring sources. Recommendations arising from these studies were also incorporated as overall development strategy.

Table 8.3.5 Projected Public School Enrollment and Number of Public Utilities by Municipality

Municipality/City	Number of Public School Student			Number of Public Utilities		
	2003	2010	2015	2003	2010	2015
Alburquerque	1,975	2,312	2,672	1	2	6
Alicia	5,486	6,730	7,778	2	3	6
Anda	3,381	4,505	5,373	1	2	5
Antequera	2,203	3,035	3,632	2	5	8
Baclayon	2,465	3,051	3,754	2	4	8
Balilihan	3,418	4,060	4,856	2	3	6
Batuan	2,517	3,205	3,938	1	2	5
Bien Unido	5,495	6,200	7,174	3	6	10
Bilar	3,473	4,507	5,511	2	4	7
Buenavista	4,347	6,689	8,814	1	2	6
Calape	6,187	7,524	8,700	2	3	7
Candijay	6,077	7,390	9,070	4	6	10
Carmen	9,280	11,070	13,588	3	6	9
Catigbian	4,340	5,516	6,589	1	3	6
Clarin	4,479	5,305	6,328	2	4	8
Corella	852	1,181	1,458	3	5	8
Cortes	1,743	2,465	3,050	1	2	5
Dagohoy	4,158	5,345	6,356	4	7	10
Danao	4,555	5,481	6,508	1	3	6
Dauis	6,021	7,605	9,075	2	3	7
Dimiao	2,439	3,222	3,852	1	3	6
Duero	3,388	4,240	5,073	1	2	5
Garcia Hernandez	5,386	5,843	6,988	1	2	5
Getafe	5,897	7,863	9,618	3	6	10
Guindulman	5,990	7,539	9,235	1	2	6
Inabanga	9,785	12,442	15,181	1	2	6
Jagna	5,836	8,774	10,138	4	7	11
Lila	1,203	1,676	2,085	2	3	6
Loay	2,063	2,959	3,634	1	3	7
Loboc	2,989	3,193	3,919	1	3	6
Loon	6,303	7,320	9,044	4	8	12
Mabini	5,652	7,125	8,519	2	3	6
Maribojoc	2,835	3,678	4,502	3	7	11
Panglao	4,628	5,214	6,390	1	4	8
Pilar	6,325	7,524	8,486	6	8	11
Pres. Carlos P. Garcia	4,816	5,998	7,188	2	4	8
Sagbayan	4,289	5,019	6,002	2	4	7
San Isidro	1,788	2,343	2,855	1	2	5
San Miguel	5,840	6,568	7,579	3	5	8
Sevilla	2,090	2,687	3,277	1	2	5
Sierra Bullones	6,166	7,625	8,798	2	2	5
Sikatuna	1,288	1,630	1,988	3	6	9
Tagbilaran City (Capital)	12,922	16,053	18,985	7	11	15
Talibon	13,203	13,911	16,662	2	5	9
Trinidad	7,117	7,951	9,166	3	5	8
Tubigon	8,050	10,092	12,071	2	4	8
Ubay	14,679	17,524	20,228	2	5	9
Valencia	3,512	4,860	6,481	2	5	8
Provincial Total	238,931	294,049	352,168	104	198	363

Aforementioned studies were carried out by the following sequence:

- Review of existing water supply systems and water sources;
- Review of planned/on-going projects;
- Establishment of planning conditions covering service level, utilization of existing facilities, water sources, and number of systems; and
- Recommendations for overall development strategy.

1) Review of existing water supply systems and water sources

Only the municipalities of Clarin and Talibon are served by water districts (WDs). Data from Table 4.1.3 shows that the production is greater than the consumption or accounted for water that supposedly goes to the consumers.

In the municipalities of Antequera, Batuan, Danao, Dimiao, G. Hernandez, Lila, Loon, San Isidro, Sevilla, portions of Sikatuna, and Valencia, the Level III systems are managed by the LGU.

The rest of the municipalities are served by waterworks system managed by either a cooperative, association and others.

Tagbilaran City is served by 2 operating bodies namely, 1)the Bohol Water Utilities which is the largest system in the province and 2)Tagbilaran City WWS.

Population served by existing Level III systems range from about 90 persons (Untaga WWS, Alicia) to as many as 49,000 persons (Bohol Water Utilities, Tagbilaran). These systems are utilizing various kinds of water sources such as deep well and spring. The Bilar WWS is the only operating body utilizing surface water for domestic consumption.

Only the municipalities of Jetafe, Pres. C.P. Garcia, Dagohoy and San Miguel have no Level III systems.

There are a total of 96 operating bodies providing Level II systems in 26 municipalities in the province. Majority of these is utilizing spring sources (69 systems), while the remaining systems are using deep well sources (Table 4.1.2, Appendix VIII).

Level I facilities exist in all the 47 municipalities and the City of Tagbilaran.

2) Review of planned projects

At present, the Provincial Government of Bohol is planning to tap surface water as source for various municipalities and the city of Tagbilaran. These municipalities will be clustered according to geographical location, proximity to the source and topographical considerations. Possible sources that can be tapped are as follows:

1) Loboc River

Municipalities identified by the PPDO to be served by water from the Loboc River are: Alburquerque, Baclayon, Corella, Cortes, Dauis, Loay, Loboc, Maribojoc and Panglao. Tagbilaran City will also be included in this cluster.

2) Inabanga River

Municipalities included will be those within or in the vicinity of the catchment area of the Inabanga River Basin.

3) Alihauan River

Municipalities included will be those within or in the vicinity of the catchment area of the Alihuan River Basin. These include, among others Jagna, Duero, Guindulaman.

3) Establishment of planning conditions

a. Service Level

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

b. Utilization of existing facilities

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

c. Water Sources

Possibility/availability to utilize surface water and groundwater (spring and deep well) is evaluated as potential water sources for water supply development.

From the viewpoints of cost effectiveness and easy O&M of water supply system, utilization of spring sources is given due priority in the course of urban water supply planning. Application of deep wells for water source is regarded as the second priority in principle.

Since the Province have numerous surface water sources, its utilization has been envisaged by the Provincial Government to deliver water to the various municipalities as well as in Tagbilaran City. Although, it has to be taken into consideration that a large capital investment and complexity of surface water treatment are required.

d. Number of systems

In principle, 1 Level III system is considered for urban area of every municipality. In the municipalities with existing Level III system/s, the expansion of the system was first considered. In case there are no Level III system/s, a new system was recommended.

Any rural barangay/s being served by an existing urban Level III system are considered to be in operation in the near future.

e. Rehabilitation

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

4) Overall development strategy

Expansion of the existing system/s was planned for those with WD/Level III, while formation of the system is considered for those without systems at present.

Merging of municipal systems (physical arrangement) in the long-term is considered. Integrated management systems shall also be sought. Conditions to be studied include; water source availability, willingness by concerned municipalities and technical study on cost recovery/economic construction.

Some municipalities have high potential for spring development due to the presence of a number of untapped spring sources favorable for urban water supply that were identified during the course of PW4SP preparation. However, a detailed survey to ensure appropriate development of spring sources shall be conducted in the implementation of the projects.

(2) Rural water supply

1) Service Level

Level I systems (deep well/shallow well/developed spring) are generally planned for rural areas where houses are scattered. In the PW4SP, the percentage allocated for public facility is 50%. In both Phase I and II, the percentage allocated for public wells and for public spring development is 95% and 5% respectively. This takes into consideration the existing share between public (42%) and private (58%) Level I facilities.

Level II systems are considered where houses are clustered and suitable untapped spring is available.

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

Application of Level III systems in rural areas may be considered in a case-to-case basis during actual implementation.

2) Utilization of existing facilities

The existing facilities/systems in all service levels are to be utilized throughout the future.

3) Water Source

For Level I facilities, deep well construction is given priority wherever applicable considering safety against possible contamination and stable water supply. Standard specifications of shallow and deep wells are summarized in Table 8.4.1 based on the water source evaluation results presented in Chapter 7.

Spring development is not considered in Level I planning based on the study results of water source development presented in Chapter 7.

For Level II systems, only untapped springs suitable for water supply purposes are considered. Identified untapped springs are shown in Table 7.4.1, Appendix VIII.

Table 8.4.1 Standard Specifications of Level I Wells

Specification	Shallow Well	Deep Well
Construction Method	Open-hole drilling and gravel pack	
Casing Diameter	63 mm	100 mm
Borehole Diameter	100 mm	150 mm
Ranges of Well depth	Standard Depth	
0 – 20m	18	Not Applicable
21 – 50m	Not Applicable	40
51 – 70	Not Applicable	60
71 – 110	Not Applicable	80

4) Number of systems/facilities

The number of Level I wells and spring development is estimated based on the service level standard; while the number of Level II systems coincides with the number of untapped springs having an estimated discharge of 2.0 lps or more.

5) Rehabilitation of existing Level I wells is not considered, since most of the wells constructed by driving method is not suitable for rehabilitation to recover their functions. However, minor repair work for hand-pump and concrete apron is a requisite.

8.4.2 Sanitation

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

(1) Household toilets

Three types of sanitary toilet facilities for individual houses are considered for Phase I; flush, pour-flush and VIP/sanitary pit privy (dry-type). While for Phase II, only flush and pour-flush are planned considering the improvement of living standard.

The type of toilet facilities is dependent on the existing or planned service level of water supply in the community. In urban and rural areas with Level I or II water supply facilities, only pour-flush and/or VIP are considered, while in urban areas with Level III water supply systems, flush type toilets requiring a piped water connection are included. Isolated rural areas where there is dearth of water supply, sanitary pit privy (dry type) is taken into account.

(2) School toilets

Standard service level currently used by DepEd (40 students per unit facility) is employed for both phases.

The standard toilet facility (1 building) with 5 units of toilet bowl to serve for 200 students is adopted for the planning purpose, which is provided with a shallow well as a water source. Since DepEd is currently promoting the "one classroom-one toilet" concept, the PW4SP also adopts this concept on a 50-50 basis, which is 50% of the school toilet requirements will be allocated using the JICA-RESP design and the other 50% will be adopting the new concept.

(3) Public toilets

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

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

8.4.3 Urban Sewerage

The commencement of staged implementation of the sewerage program is planned in Phase II for the limited urban area (50% of urban population served by Level III system for the municipalities with urban population of more than 10,000). It is practical to start the program using fully the existing facilities to allow for lower initial investment cost than starting at once a conventional sewerage system (Figure 8.4.2 Staged Improvement in Sewage Collection Method, Appendix VIII).

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

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

8.4.4 Solid Waste

In terms of facility requirements, this PW4SP only studied the number of refuse collection trucks required for the year 2010. A rated capacity of 5 cu.m truck/vehicle is considered for calculation of required units of truck. Disposal of solid waste shall be studied in detail through investigations, F/S and D/D. Unit solid waste generation for urban area is assumed to be 0.418 kg. per capita per day.

8.5 Service Coverage by Target Year

8.5.1 Water Supply

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

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

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

Future requirements in terms of additional population to be served were then estimated by urban (Level III) and rural (Level I & II) area by municipality as a shortfall to meet the population to be served in each target year. The population served in the base year is

adopted as the population served in target year, when the former population exceeds the population to be served in the target year/s. The manner of calculation is presented by phase.

(1) Phase I Requirements

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

The utilization of untapped springs for Level II systems was given priority during Phase I period for rural water supply. At the time of this plan preparation, 21 untapped springs in 9 municipalities were identified.

(2) Phase II Rquirements

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

Table 8.5.1 presents the service coverage by target year and by level of service as well as the additional population to be served.

Through Phase I development, approximately 627,580 persons in the province will be served by additional water supply services, if which 204,440 persons or 33% of the total will be urban population and 423,140 or 67% will be rural population.

For Phase II period, a total of 371,590 persons, of which 156,500 or 42% in urban area and 215,090 persons or 58% in rural area, will be further benefited by water supply services. This additional service coverage in urban area includes the upgrade of service level for 44,000 persons served by Level I and Level II facilities in 2003.

8.5.2 Sanitation

(1) Household toilets

The service coverage (number of households to be served) by different types of sanitary facility is estimated by urban and rural area by municipality for the years 2010 and 2015.

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

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

Table 8.5.1

Table 8.5.1

Table 8.5.1

Table 8.5.1

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

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

The projected number of served households at the end of the Phase I period is 262,911. Additional households to be served totaled to 83,162, of which 30% is urban households and 70% is rural households. While at the end of Phase II period, the number of served households are 429,082 with additional households to be served at 166,341. Table 8.5.2 provides the number of households to be served by target year for urban and rural areas by municipality.

(2) School toilets

The service coverage or the number of public school students to be served is estimated by municipality for the years 2010 and 2015.

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

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

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

The projected number of served students at the end of Phase I period is 264,644. The additional students to be served are 67,944. While at the end of Phase II period, the projected number of served students is 334,560 with additional students to be served at 69,916. Table 8.5.3 summarizes the number of public school students to be served by target year.

(3) Public toilets

The service coverage of public utilities with sanitary toilet facility by municipality is estimated for the years 2010 and 2015.

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

Table 8.5.2

Table 8.5.2

Table 8.5.2

Table 8.5.2

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

Municipality/City	Phase I Coverage (2010)			Phase II Coverage (2015)		
	Total No. of Public School Student	Std. No. of Public School Students to be Served	Add'l. No. of Public School Student to be Served	Total No. of Public School Student	Std. No. of Public School Students to be Served	Add'l. No. of Public School Student to be Served
Alburquerque	2,312	2,515	540	2,672	2,538	23
Alicia	6,730	6,332	1,572	7,778	7,389	1,057
Anda	4,505	4,412	1,052	5,373	5,104	692
Antequera	3,035	2,912	709	3,632	3,450	538
Baclayon	3,051	3,178	713	3,754	3,566	388
Balilihan	4,060	4,366	948	4,856	4,613	247
Batuan	3,205	3,266	749	3,938	3,741	475
Bien Unido	6,200	2,728	1,448	7,174	6,815	4,087
Bilar	4,507	4,526	1,053	5,511	5,235	709
Buenavista	6,689	5,910	1,563	8,814	8,373	2,463
Calape	7,524	7,945	1,758	8,700	8,265	320
Candijay	7,390	7,803	1,726	9,070	8,617	814
Carmen	11,070	11,866	2,586	13,588	12,909	1,043
Catigbian	5,516	5,629	1,289	6,589	6,260	631
Clarin	5,305	2,839	1,239	6,328	6,012	3,173
Corella	1,181	1,036	276	1,458	1,385	349
Cortes	2,465	2,319	576	3,050	2,898	579
Dagohoy	5,345	2,529	1,249	6,356	6,038	3,509
Danao	5,481	5,835	1,280	6,508	6,183	348
Dauis	7,605	7,777	1,777	9,075	8,621	844
Dimiao	3,222	3,192	753	3,852	3,659	467
Duero	4,240	4,378	990	5,073	4,819	441
Garcia Hernandez	5,843	2,325	1,365	6,988	6,639	4,314
Getafe	7,863	2,917	1,837	9,618	9,137	6,220
Guindulman	7,539	7,751	1,761	9,235	8,773	1,022
Inabanga	12,442	12,026	2,906	15,181	14,422	2,396
Jagna	8,774	7,450	2,050	10,138	9,631	2,181
Lila	1,676	1,595	392	2,085	1,981	386
Loay	2,959	2,754	691	3,634	3,452	698
Loboc	3,193	2,989		3,919	3,723	734
Loon	7,320	8,013	1,710	9,044	8,592	579
Mabini	7,125	7,064	1,664	8,519	8,093	1,029
Maribojoc	3,678	3,694	859	4,502	4,277	583
Panglao	5,214	5,846	1,218	6,390	6,071	225
Pilar	7,524	6,998	1,758	8,486	8,062	1,064
Pres. Carlos P. Garcia	5,998	5,801	1,401	7,188	6,829	1,028
Sagbayan	5,019	5,052	1,172	6,002	5,702	650
San Isidro	2,343	2,267	547	2,855	2,712	445
San Miguel	6,568	5,534	1,534	7,579	7,200	1,666
Sevilla	2,687	2,188	628	3,277	3,113	925
Sierra Bullones	7,625	6,061	1,781	8,798	8,358	2,297
Sikatuna	1,630	1,669	381	1,988	1,889	220
Tagbilaran City (Capital)	16,053	16,672	3,750	18,985	18,036	1,364
Talibon	13,911	7,490	3,250	16,662	15,829	8,339
Trinidad	7,951	6,857	1,857	9,166	8,708	1,851
Tubigon	10,092	9,677	2,357	12,071	11,467	1,790
Ubay	17,524	16,014	4,094	20,228	19,217	3,203
Valencia	4,860	4,647	1,135	6,481	6,157	1,510
Provincial Total	294,049	264,644	67,944	352,168	334,560	69,916

The additional number of public utilities with sanitary toilets needed by municipality is the shortfall of the number of public utilities in target year comparing with either the existing coverage or Phase I coverage (see details in Appendix VIII).

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

The number of served public utilities at the end of Phase I period is 413. The additional public utilities to be served are 91. While at the end of Phase II period, the number of served public utilities is 557 with additional public utilities to be served at 144. Table 8.5.4 summarizes the additional number of public utilities to be served by municipality by target year.

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

Municipality/City	Type	Phase I Coverage (2010)		Phase II Coverage (2015)	
		Add'l. No. of Public Utility with Sanitary Toilets	No. of Public Utility with Sanitary Toilets	Add'l. No. of Public Utility with Sanitary Toilets	No. of Public Utilities with Sanitary Toilets
Alburquerque	Public Market	1	5	1	6
	Bus/Jeepney Terminal			1	1
	Parks/Playground			1	1
	Ports			1	1
	Total	1	5	4	9
Alicia	Public Market	1	5	1	6
	Bus/Jeepney Terminal			1	1
	Parks/Playground			1	1
	Ports				
	Total	1	5	3	8
Anda	Public Market	1	3	1	4
	Bus/Jeepney Terminal			1	1
	Parks/Playground			1	1
	Ports				
	Total	1	3	3	6
Antequera	Public Market	1	5	1	6
	Bus/Jeepney Terminal	1	1	1	2
	Parks/Playground	1	5	1	6
	Ports				
	Total	3	11	3	14
Baclayon	Public Market	1	3	1	4
	Bus/Jeepney Terminal			1	1
	Parks/Playground	1	3	1	4
	Ports			1	1
	Total	2	6	4	10
Balilihan	Public Market		9	1	10
	Bus/Jeepney Terminal	1	1	1	2
	Parks/Playground			1	1
	Ports				
	Total	1	10	3	13
Batuan	Public Market	1	7	1	8
	Bus/Jeepney Terminal			1	1
	Parks/Playground			1	1
	Ports				
	Total	1	7	3	10
Bien Unido	Public Market	1	9	1	10
	Bus/Jeepney Terminal			1	1
	Parks/Playground	1	9	1	10
	Ports	1	1	1	2
	Total	3	19	4	23
Bilar	Public Market	1	5	1	6

Municipality/City	Type	Phase I Coverage (2010)		Phase II Coverage (2015)	
		Add'l. No. of Public Utility with Sanitary Toilets	No. of Public Utility with Sanitary Toilets	Add'l. No. of Public Utility with Sanitary Toilets	No. of Public Utilities with Sanitary Toilets
	Bus/Jeepney Terminal			1	1
	Parks/Playground	1	3	1	4
	Ports				
	Total	2	8	3	11
Buenavista	Public Market	1	3	1	4
	Bus/Jeepney Terminal			1	1
	Parks/Playground			1	1
	Ports			1	1
	Total	1	3	4	7
Calape	Public Market		6	1	7
	Bus/Jeepney Terminal			1	1
	Parks/Playground	1	3	1	4
	Ports			1	1
	Total	1	9	4	13
Candijay	Public Market	1	7	1	8
	Bus/Jeepney Terminal	1	1	1	2
	Parks/Playground			1	1
	Ports			1	1
	Total	2	8	4	12
Carmen	Public Market		10	1	11
	Bus/Jeepney Terminal	1	1	1	2
	Parks/Playground	2	2	1	3
	Ports				
	Total	3	13	3	16
Catigbian	Public Market	1	7	1	8
	Bus/Jeepney Terminal	1	1	1	2
	Parks/Playground			1	1
	Ports				
	Total	2	8	3	11
Clarin	Public Market	1	5	1	6
	Bus/Jeepney Terminal			1	1
	Parks/Playground	1	1	1	2
	Ports			1	1
	Total	2	6	4	10
Corella	Public Market	1	3	1	4
	Bus/Jeepney Terminal			1	1
	Parks/Playground	1	1	1	2
	Ports				
	Total	2	4	3	7
Cortes	Public Market	1	5	1	6
	Bus/Jeepney Terminal			1	1
	Parks/Playground			1	1
	Ports				
	Total	1	5	3	8
Dagohoy	Public Market	1	3	1	4
	Bus/Jeepney Terminal			1	1
	Parks/Playground	2	6	1	7
	Ports				
	Total	3	9	3	12
Danao	Public Market	1	5	1	6
	Bus/Jeepney Terminal	1	1	1	2
	Parks/Playground			1	1
	Ports				
	Total	2	6	3	9
Dauis	Public Market		1	1	2
	Bus/Jeepney Terminal			1	1
	Parks/Playground	1	1	1	2
	Ports			1	1
	Total	1	2	4	6

Municipality/City	Type	Phase I Coverage (2010)		Phase II Coverage (2015)	
		Add'l. No. of Public Utility with Sanitary Toilets	No. of Public Utility with Sanitary Toilets	Add'l. No. of Public Utility with Sanitary Toilets	No. of Public Utilities with Sanitary Toilets
Dimiao	Public Market	1	3	1	4
	Bus/Jeepney Terminal	1	1	1	2
	Parks/Playground			1	1
	Ports				
	Total	2	4	3	7
Duero	Public Market	1	9	1	10
	Bus/Jeepney Terminal			1	1
	Parks/Playground			1	1
	Ports				
	Total	1	9	3	12
Garcia Hernandez	Public Market	1	5	1	6
	Bus/Jeepney Terminal			1	1
	Parks/Playground			1	1
	Ports				
	Total	1	5	3	8
Getafe	Public Market	1	5	1	6
	Bus/Jeepney Terminal			1	1
	Parks/Playground	1	1	1	2
	Ports	1	1	1	2
	Total	3	7	4	11
Guindulman	Public Market	1	9	1	10
	Bus/Jeepney Terminal			1	1
	Parks/Playground			1	1
	Ports			1	1
	Total	1	9	4	13
Inabanga	Public Market	4	8	1	9
	Bus/Jeepney Terminal	1	1	1	2
	Parks/Playground			1	1
	Ports			1	1
	Total	5	9	4	13
Jagna	Public Market		2	1	3
	Bus/Jeepney Terminal	1	5	1	6
	Parks/Playground	1	5	1	6
	Ports	1	1	1	2
	Total	3	13	4	17
Lila	Public Market	1	3	1	4
	Bus/Jeepney Terminal			1	1
	Parks/Playground			1	1
	Ports				
	Total	1	3	3	6
Loay	Public Market	1	3	1	4
	Bus/Jeepney Terminal			1	1
	Parks/Playground			1	1
	Ports	1	1	1	2
	Total	2	4	4	8
Loboc	Public Market	1	3	1	4
	Bus/Jeepney Terminal	1	1	1	2
	Parks/Playground			1	1
	Ports				
	Total	2	4	3	7
Loon	Public Market		20	1	21
	Bus/Jeepney Terminal	1	1	1	2
	Parks/Playground	2	6	1	7
	Ports	1	1	1	2
	Total	4	28	4	32
Mabini	Public Market	1	7	1	8
	Bus/Jeepney Terminal			1	1
	Parks/Playground			1	1
	Ports				

Municipality/City	Type	Phase I Coverage (2010)		Phase II Coverage (2015)	
		Add'l. No. of Public Utility with Sanitary Toilets	No. of Public Utility with Sanitary Toilets	Add'l. No. of Public Utility with Sanitary Toilets	No. of Public Utilities with Sanitary Toilets
	Total	1	7	3	10
Maribojoc	Public Market	1	9	1	10
	Bus/Jeepney Terminal	1	1	1	2
	Parks/Playground	2	4	1	5
	Ports			1	1
	Total	4	14	4	18
Panglao	Public Market	1	6	1	7
	Bus/Jeepney Terminal	1	1	1	2
	Parks/Playground			1	1
	Ports	1	1	1	2
	Total	3	8	4	12
Pilar	Public Market	3	9	1	10
	Bus/Jeepney Terminal			1	1
	Parks/Playground	1	1	1	2
	Ports				
	Total	4	10	3	13
Pres. Carlos P. Garcia	Public Market	3	3	1	4
	Bus/Jeepney Terminal			1	1
	Parks/Playground			1	1
	Ports	1	1	1	2
	Total	4	4	4	8
Sagbayan	Public Market		8	1	9
	Bus/Jeepney Terminal	1	1	1	2
	Parks/Playground	1	7	1	8
	Ports				
	Total	2	16	3	19
San Isidro	Public Market	1	5	1	6
	Bus/Jeepney Terminal			1	1
	Parks/Playground			1	1
	Ports				
	Total	1	5	3	8
San Miguel	Public Market	1	5	1	6
	Bus/Jeepney Terminal			1	1
	Parks/Playground	1	1	1	2
	Ports				
	Total	2	6	3	9
Sevilla	Public Market	1	5	1	6
	Bus/Jeepney Terminal			1	1
	Parks/Playground			1	1
	Ports				
	Total	1	5	3	8
Sierra Bullones	Public Market		4	1	5
	Bus/Jeepney Terminal			1	1
	Parks/Playground			1	1
	Ports				
	Total		4	3	7
Sikatuna	Public Market	1	4	1	5
	Bus/Jeepney Terminal	1	1	1	2
	Parks/Playground	1	1	1	2
	Ports				
	Total	3	6	3	9
Tagbilaran City (Capital)	Public Market	1	29	1	30
	Bus/Jeepney Terminal	1	21	1	22
	Parks/Playground	1	3	1	4
	Ports	1	9	1	10
	Total	4	62	4	66
Talibon	Public Market	1	9	1	10
	Bus/Jeepney Terminal	1	1	1	2
	Parks/Playground			1	1

Municipality/City	Type	Phase I Coverage (2010)		Phase II Coverage (2015)	
		Add'l. No. of Public Utility with Sanitary Toilets	No. of Public Utility with Sanitary Toilets	Add'l. No. of Public Utility with Sanitary Toilets	No. of Public Utilities with Sanitary Toilets
	Ports	1	1	1	2
	Total	3	11	4	15
Trinidad	Public Market	1	7	1	8
	Bus/Jeepney Terminal	1	1	1	2
	Parks/Playground		2	1	3
	Ports				
	Total	2	10	3	13
Tubigon	Public Market		4	1	5
	Bus/Jeepney Terminal	1	1	1	2
	Parks/Playground			1	1
	Ports	1	1	1	2
	Total	2	6	4	10
Ubay	Public Market	1	3	1	4
	Bus/Jeepney Terminal	1	1	1	2
	Parks/Playground			1	1
	Ports	1	1	1	2
	Total	3	5	4	9
Valencia	Public Market	1	9	1	10
	Bus/Jeepney Terminal	1	1	1	2
	Parks/Playground	1	1	1	2
	Ports				
	Total	3	11	3	14
Provincial Total	Public Market	46	302	48	350
	Bus/Jeepney Terminal	21	45	48	93
	Parks/Playground	24	66	48	114
	Ports	11	19	21	40
	Total	91	413	144	557

8.5.3 Urban Sewerage

The service coverage in 2015 (Phase II) is estimated for the municipalities with population of more than 10,000 in urban area provided by Level III water supply. It is assumed that half of the population in the area/s is to be served by the sewerage systems. Table 8.5.5 shows the population to be served in Phase II.

8.5.4 Solid Waste

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

Service coverage in Phase I was assumed at 90% with reference to the present service coverage of 42% in urban area. Additional service coverage in Phase I is calculated as a shortfall of target coverage in Phase I comparing with current service coverage. Table 8.5.6 presents additional service coverage for Phase I in the urban area.

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

Municipality/City	Urban Population in 2015	Level III Water Supply Coverage	Population to be Served
Alburquerque	5,038	4,786	
Alicia	3,209	3,049	
Anda	4,017	3,816	
Antequera	3,749	3,945	
Baclayon	6,475	6,679	
Balilihan	4,027	4,243	
Batuan	4,494	4,726	
Bien Unido	26,268	24,955	13,134
Bilar	5,246	5,531	
Buenavista	5,494	5,219	
Calape	11,650	11,068	5,825
Candijay	18,420	17,499	9,210
Carmen	14,092	13,387	7,046
Catigbian	4,846	4,604	
Clarin	6,323	6,007	
Corella	1,211	1,272	
Cortes	4,774	4,630	
Dagohoy	3,910	3,715	
Danao	4,929	5,189	
Dauis	17,599	16,719	8,800
Dimiao	1,989	2,034	
Duero	5,444	5,730	
Garcia Hernandez	7,848	7,456	
Getafe	20,031	19,029	10,016
Guindulman	7,959	7,561	
Inabanga	16,609	15,779	8,305
Jagna	16,439	15,738	8,220
Lila	3,042	3,059	
Loay	7,542	7,165	
Loboc	4,186	3,977	
Loon	20,146	20,876	10,073
Mabini	11,428	11,079	5,714
Maribojoc	12,514	11,888	6,257
Panglao	20,485	19,461	10,243
Pilar	5,756	5,468	
Pres. C.P. Garcia	10,737	10,200	5,369
Sagbayan	5,467	5,764	
San Isidro			
San Miguel	3,340	3,173	
Sevilla	2,255	2,142	
Sierra Bullones	13,759	13,071	6,880
Sikatuna	1,417	1,492	
Tagbilaran City (Capital)	131,380	124,811	65,690
Talibon	45,922	43,626	22,961
Trinidad	4,605	4,375	
Tubigon	30,432	28,910	15,216
Ubay	19,574	18,595	9,787
Valencia	3,326	3,502	
Provincial Total	589,403	567,000	228,746

Table 8.5.6 Additional No. of Urban HHs to be Served by Municipal Solid Waste System in Phase I

Municipality/City	No. of Urban Households Served in the Base Year	Phase I Coverage (2010)		
		No. of Urban Households	Urban Households Coverage	Add'l. No. of Urban Households to be Served
Alburquerque	157	773	696	539
Alicia	250	501	451	201
Anda	314	662	596	282
Antequera	219	618	557	338
Baclayon	360	1,116	1,005	645
Balilihan	1,062	653	1,062	
Batuan	358	716	645	287
Bien Unido	485	4,083	3,675	3,190
Bilar	623	840	756	133
Buenavista	211	830	747	536
Calape	60	1,968	1,772	1,712
Candijay	36	2,769	2,493	2,457
Carmen	37	2,238	2,015	1,978
Catigbian	579	782	704	125
Clarin	23	1,066	960	937
Corella	68	198	179	111
Cortes		844	760	760
Dagohoy		635	572	572
Danao	38	723	651	613
Dauis	34	1,342	1,208	1,174
Dimiao	570	339	570	
Duero	756	925	833	77
Garcia Hernandez	424	1,299	1,170	746
Getafe	610	3,158	2,843	2,233
Guindulman	12	1,291	1,162	1,150
Inabanga	2,123	2,763	2,487	364
Jagna	901	2,725	2,453	1,552
Lila	190	442	398	208
Loay	724	1,108	998	274
Loboc	300	661	595	295
Loon	99	3,067	2,761	2,662
Mabini	53	1,874	1,687	1,634
Maribojoc	430	1,292	1,163	733
Panglao	15	3,241	2,917	2,902
Pilar		886	798	798
Pres. Carlos P. Garcia	422	1,715	1,544	1,122
Sagbayan	408	954	859	451
San Isidro	1,498		1,498	
San Miguel	37	470	423	386
Sevilla	208	346	312	104
Sierra Bullones	321	2,164	1,948	1,627
Sikatuna		246	222	222
Tagbilaran City (Capital)	10,265	22,917	20,626	10,361
Talibon	1,370	7,038	6,335	4,965
Trinidad	400	729	657	257
Tubigon	4,000	4,970	4,473	473
Ubay	32	3,206	2,886	2,854
Valencia	1,271	536	1,271	
Provincial Total	32,353	93,719	87,393	55,040

8.6 Facilities, Equipment and Rehabilitation to Meet the Target Services

8.6.1 Water Supply

(1) Required facilities

Water supply facilities required by service level were estimated by urban and rural area by municipality based on the additional service coverage by target year and summarized in Table 8.6.1.

Urban water supply:

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

Rural water supply:

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

(2) Rehabilitation

Rehabilitation requirements were estimated as 10% of the total number of deep wells to be constructed under PW4SP. Rehabilitation work will be mainly redevelopment of wells by means of air surging, while minor repair of concrete apron and hand-pump will be undertaken by respective beneficiary organizations.

(3) Equipment

Logistic support:

For rural water supply development, 1 unit each or set of the following equipment was considered necessary for the Provincial Government to conduct various activities of PW4SP implementation:

Transportation	-	service vehicle
Office equipment	-	computer with printer, typewriter, mimeo machine, scanning machine and copier
Field equipment	-	sound system, tape recorder and tools for maintenance

For urban water supply, no hardware was considered.

Well drilling and rehabilitation equipment

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

Table 8.6.1.

During Phase I, a total of 1,424 Level I deep wells shall be newly constructed and 10% of these deep wells shall be rehabilitated annually (see Appendix VIII for details). Presently, the Provincial Government of Bohol does not have any drilling rig.

At least 1 unit/set each of drilling rig (rotary type- applicable for >8" borehole diameter), well rehabilitation equipment, support vehicle for well rehabilitation and service truck for deep well construction shall be mobilized/procured either by the private sector or LGUs (see details in Appendix VIII).

Selection of well drilling machine

An appropriate type of well drilling machine with its specifications shall be selected after comprehensive study on the technical requirements, local capability in O&M of the machine and cost effectiveness.

From the technical viewpoint, geological conditions in the Province allow for the use of either rotary or percussion type drilling machine (no rock drilling is expected). The rotary type machine is quite effective to reduce construction period under soft soil condition. Furthermore, it can have the advantage of preserving drill cuttings with the help of mud circulation. However, special training on mud-circulation, handling manner, etc. is required together with additional equipment and materials. On the other hand, the drilling speed of the percussion type is rather slow, but has advantages in drilling boulder and cobble formations. Further, drill cuttings are mostly crushed making it difficult to characterize the details of the subsurface.

One unit of truck-mounted rotary drilling machine is to be procured in the second year of Phase I development.

(4) Laboratory

Required New Building

To ensure regular examination of the potability of drinking water supplies, a laboratory building will be constructed in Tagbilaran City. The new building will have a floor area of 57m2 to house the examining laboratory, an office space, a storage room and a toilet. Water and power supplies will be provided.

Instrument/Equipment and Other Laboratory Accessory

One (1) set of instruments/equipment will be necessary to undertake water quality monitoring and surveillance activities for the entire Province. The following are the requirements:

	Item	Unit	New Laboratory
1.	Instrument/Equipment		
	Turbidity meter	set	1
	Color meter	set	1
	pH/Residual chlorine checker	set	1
	Incubator	set	1
	Refrigerator	set	1
	Sterilizer	set	1
	Portable water quality testing kit	set	1
	Electric stove	set	1
	Range hood	set	1
2.	Glassware/Chemical	set	1
3.	Accessory		
	Sink	set	1
	Working table	set	1
	Shelf	set	1
	Office desk	set	1
	Chair	set	1

8.6.2 Sanitation

This sub-section presents the physical requirements by target year covering household, school and public toilet facilities. Table 8.6.2 indicates the required sanitation facilities by target year. Rehabilitation of sanitation facilities is considered as part of recurrent cost.

(1) Household toilets

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

(2) School toilets

The future requirements in the number of toilet facilities were estimated based on the standard number of students to be served by a 5-unit standard facility or a toilet in every classroom (50-50 sharing) and the additional students to be served by target (see details in Appendix VIII).

The total required facilities were further broken down into urban and rural areas by applying the percentage share of urban and rural population.

8.6.3 Urban Sewerage and Solid Waste

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

As reference information, the number of refuse collection trucks is estimated for the urban area in Phase I. Forty five (45) additional units of truck are required to meet assumed service coverage as reflected in Table 8.6.3.

Table 8.6.2

Table 8.6.3 Number of Refuse Collection Trucks Required in Phase I

Municipality/City	Add'l. Urban Households to be Served	Estimated Daily Amount of Refuse to be Generated, (Kg)	Number of Collection Truck Required
Alburquerque	539	226	1
Alicia	201	85	1
Anda	282	118	1
Antequera	338	142	1
Baclayon	645	270	1
Balilihan			
Batuan	287	120	1
Bien Unido	3,190	1,334	1
Bilar	133	56	1
Buenavista	536	225	1
Calape	1,712	716	1
Candijay	2,457	1,028	1
Carmen	1,978	827	1
Catigbian	125	53	1
Clarin	937	392	1
Corella	111	47	1
Cortes	760	318	1
Dagohoy	572	240	1
Danao	613	257	1
Dauis	1,174	491	1
Dimiao			
Duero	77	33	1
Garcia Hernandez	746	312	1
Getafe	2,233	934	1
Guindulman	1,150	481	1
Inabanga	364	153	1
Jagna	1,552	649	1
Lila	208	87	1
Loay	274	115	1
Loboc	295	124	1
Loon	2,662	1,113	1
Mabini	1,634	684	1
Maribojoc	733	307	1
Panglao	2,902	1,214	1
Pilar	798	334	1
Pres. Carlos P. Garcia	1,122	469	1
Sagbayan	451	189	1
San Isidro			
San Miguel	386	162	1
Sevilla	104	44	1
Sierra Bullones	1,627	681	1
Sikatuna	222	93	1
Tagbilaran City (Capital)	10,361	4,331	2
Talibon	4,965	2,076	1
Trinidad	257	108	1
Tubigon	473	198	1
Ubay	2,854	1,193	1
Valencia			
Provincial Total	55,040	23,029	45

8.7 Identification of Priority Projects for Medium-Term Development Plan

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

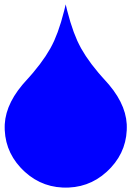
Specific projects shall be selected subject to detailed studies and will not be discussed in the provincial master plan. In addition, pertinent information to identify priority projects is not available both at provincial and municipal level during this PW4SP preparation, except some future expansion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

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

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

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

CHAPTER IX



SECTOR MANAGEMENT FOR MEDIUM-TERM DEVELOPMENT

CHAPTER IX SECTOR MANAGEMENT FOR MEDIUM-TERM PLAN

9.1 Purpose of Policy and Structural Adjustment

This Chapter recommends the initial mechanisms, processes and structures needed to achieve the goals and targets of the sector. Since the sector and institutional arrangements are undergoing transition due to devolution of roles from the national government to the LGU, the recommendations are formulated within a framework that is flexible enough for possible changes in the sector policies of the national government and the LGU. Primarily, devolved functions and roles are guided by the Implementing Rules and Regulations under NEDA Board Resolution No. 4.

The adjustments should be aimed at coordinating the local policies and structures with national institutional and regulatory policies and resource-sharing systems of the water sector, so that the Province and its cities and municipalities would be able to optimize available opportunities in the sector to improve their water services.

Specifically, structural and policy adjustments are aimed at:

(1) Effecting immediate improvements in the physical infrastructure for water, sanitation, and related environmental services; and

(2) Improving absorptive capabilities to (a) plan, manage and institutionalize systems in sector services, (b) nurture constructive partnerships with the private sector, and (c) set in place and maintain the mechanisms for sustainability.

9.2 Sector Management

9.2.1 Development of a Logframe for the Sector at the Regional and Local Level

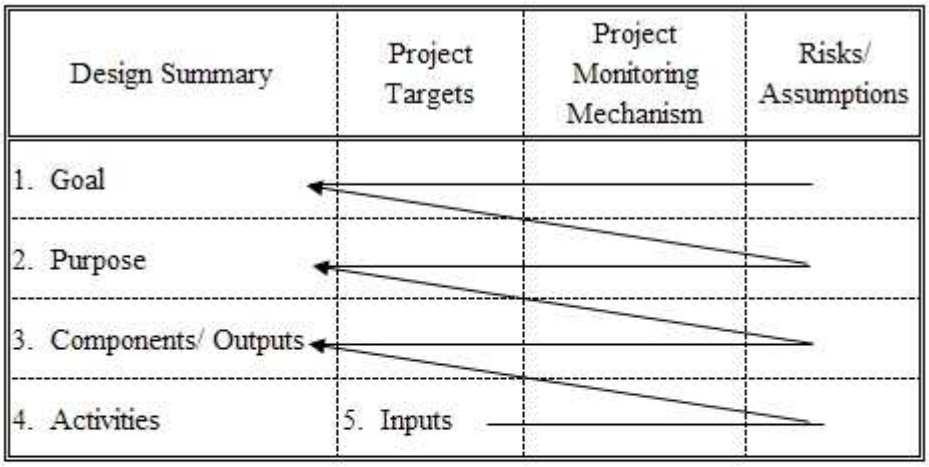
One basic institutional need at the local level is the absence of a common goal and strategy for the sector. Considering that the national government through its planning agency, the NEDA, has included in its approval of new projects a conditionality to produce a logframe (logical framework) of the project to allow for a thorough monitoring and evaluation of projects, the Province has to come up with its logframe, which sets the goals, purpose, targets and activities for the sector. Target setting in terms of the proportion or percentage of people and resources who are stakeholders and key players in making the vision a reality must be identified and harnessed for project implementation. Primary goal of the sector is to provide safe, reliable and accessible drinking water for the least marginalized sector of the society, the poor, the women and the children, within a demand-responsive and gender-responsive approach.

Through the logframe, the Province can formulate its operating and regulatory policies and financing system to fulfill the goals and targets that it has set for itself. (See Fig. 9.1.1)

Initial vision statement or target setting: The Province will adopt a two-phased plan, which will dramatically improve the provision of water supply and sanitation. In the medium-term (2004-2010) plan, the Province seeks to increase water supply coverage in urban areas to 89% and in rural areas to 90%. On the other hand, household toilets will be made available to 94% of both urban and rural population; 90% of the students in public schools will have

adequate sanitary toilet facilities; 100% of public utilities will have sanitary toilets; and 90% of the urban population will be covered by solid waste collection services. For its long-term (2011-2015) plan, the Province will pursue a more vigorous program to increase water supply coverage in urban areas to 95% and in rural areas to 93%. For the sanitation sub-sector, individual household toilets will increase up to 98% in urban areas and 98% in rural areas; public school toilets will rise up to 95%; public utilities will have 100% sanitary toilet coverage; while sewerage service will cover 50% of the urban population.

Fig. 9.1.1 Logical Framework (Logframe) Model



Goal (Sector/ Area) - The ULTIMATE RATIONALE of the Project.
Purpose - WHY the Project is being done.
Components/ Outputs - WHAT the Project will deliver.
Activities - HOW you will do the Project.
Inputs - The SUPPORT necessary to implement activities.

Source: Asian Development Bank, Project Framework

9.2.2 Sector Management Model

Figure 9.2.1 presents a model for sector management and project development. It is envisaged that this PW4SP will be used as a basis for the Annual Sector Plan and/or as input into Loan or Grant Negotiations in the future. The Annual Sector Plan, together with the budgets, will be reviewed by the Governor and passed upon by the legislature as part of the provincial budget approval process.

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

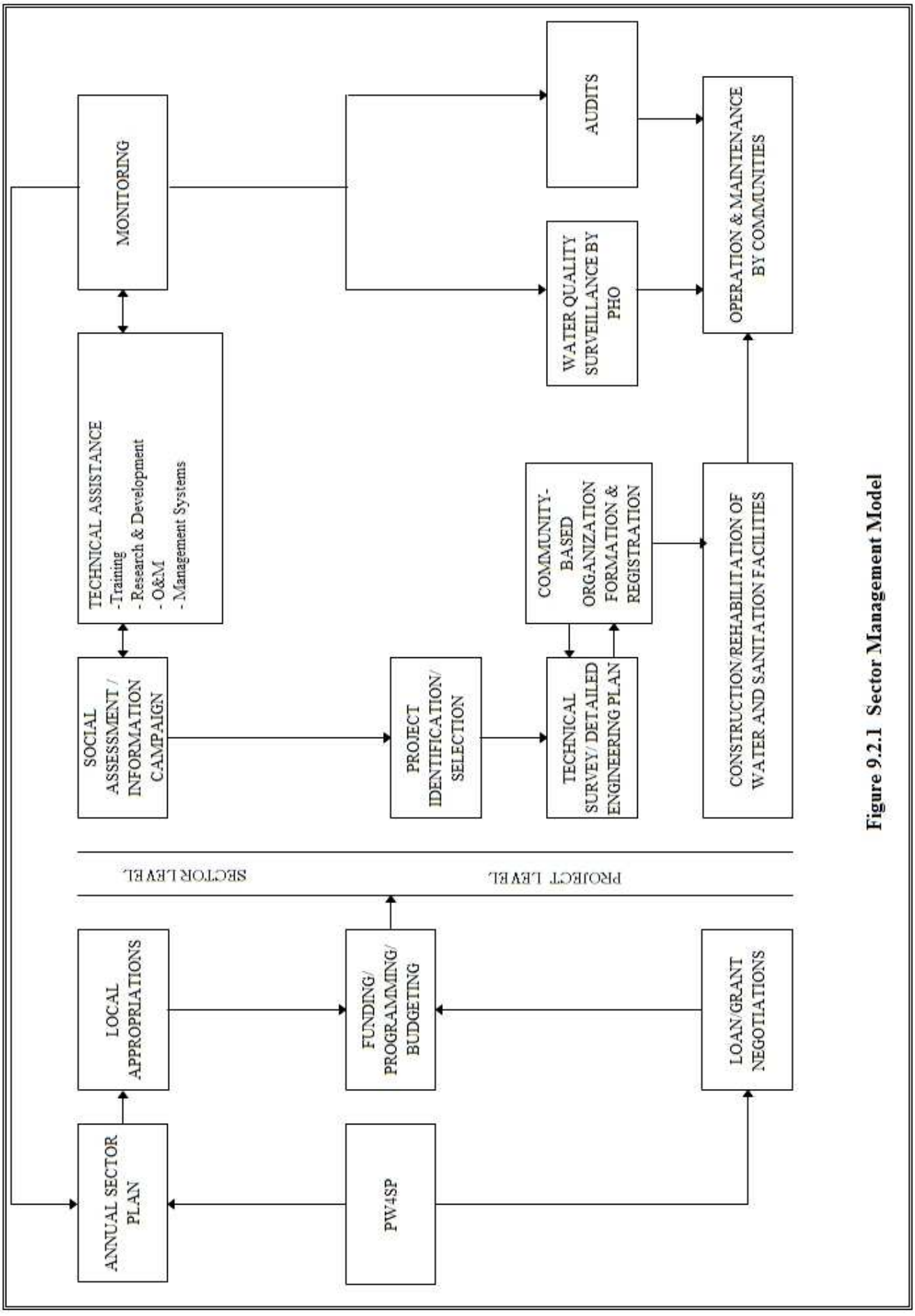


Figure 9.2.1 Sector Management Model

9.2.3 Service Provision Policies and Objectives

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

- Level I facilities serve at most 15 households per source; Level II water supply system serves 5 households per communal faucet; and Level III systems provide individual household connections.
- Water supply provision will be at least 20 lpcd for Level I; 60 lpcd for Level II; and 100 lpcd for Level III.
- At least 90% of the individual households in every barangay has sanitary toilet facilities.
- All schools shall have adequate water supply and at least one sanitary toilet facility for every 40 students.

9.2.4 Operating Policies

The following policy and strategy statements, which should be reviewed and revised particularly in line with devolution process, are recommended to form the initial policy set for adoption and approval by the Provincial Government:

1) Sustainability shall be promoted through community-based organizing, training and information dissemination to increase willingness to organize, willingness to pay and willingness to learn O&M of facility.
2) Criteria for selection and prioritizing projects to the community should take into consider sustainability factors, goals and purposes formulated in the logframe of the Province and shall be based on demonstrated commitment of the beneficiaries to participate in the project, the current needs for water and sanitation and overall health conditions, potentials for growth and costs.
3) Appropriate service level shall be determined based on sustainability parameters, goals and purposes of the Province, the needs of the community based on demographics and demonstrated capacity and willingness to participate in the project by the communities.
4) Technology to be used for the projects shall be appropriate to the local conditions and resources. Upgrading of existing systems and facilities will be promoted based on needs of the community. In urban areas, a range of technologies may be needed integrating wastewater collection and treatment, as well as drainage.
5) All projects developed by the LGU must involve an integrated approach to the provision of potable water supply, sanitation and hygiene education.
6) Cost Recovery and Cost Sharing (Subsidy Policies). The LGU shall enforce a rational and consistent policy on the application of subsidies and loans for water supply and sanitation. The current national policy of cost sharing for water supply, sanitation and sewerage shall be followed (see Chapter 5).

7) Private Sector Participation policies and incentives shall be primarily encouraged, but regulated by the LGU. The LGU should take measures to institutionalize its regulatory functions in order to regulate private water service providers.

8) In terms of financing, capital costs generally used to construct water supply projects shall be financed mainly out of the concerned LGU's own resources, particularly the Internal Revenue Allocations (IRA). The LGU will appropriate up to a certain percentage allowed by law of its annual infrastructure budget to support capital requirements for water supply and sanitation projects. In addition, the LGU shall actively negotiate with other potential sources of local and external funds (loans and grants) to finance the capital requirements of the sector.

9) Concerns for the environmental protection and management including water pollution control, conservation and proper utilization of water and land resources should be part of the LGU's policy formulation and programs.

10) To address Disaster Response and Emergency Coordination, the LGU shall formulate, as part of its contingency plans, a program to address emergency conditions. The program shall include maintenance of portable water purifiers, stocks of chlorine, organization and training of local communities on restoration of water supplies and provision of emergency sanitary facilities. The LGU should coordinate closely and regularly with the local officials of the National Disaster Coordinating Council (NDCC).

11) Policies to be formulated should be gender-responsive. The different aspects of the sector project: technical, economic, financial, institutional and community participation, should provide for equal participation of women and men in the beneficiary community.

9.2.5 Regulatory Policies

In coordination with appropriate national and local agencies, the LGU shall endeavor to set up a coordinated regulatory framework on the following:

1) Water allocation and water rights policies and rate review, which are within the mandate of the National Water Resources Board.

2) Water Service Providers Registration/ Accreditation - The LGU shall adopt a registration and franchising system for water service associations/ providers. Annual reporting requirements will have to be established for monitoring and auditing purposes.

3) Water Quality - The LGU will have to establish a viable mechanism, including water testing and standards enforcement, to ensure that water delivered meet the potability standards set by the National Drinking Water Standards. The DOH currently has the responsibility and the regulatory power to stop the operations of water systems not delivering potable water. The LGU shall establish Water Surveillance Program thru the creation of a Local Drinking Water Quality Monitoring Committee (per Implementing Rules and Regulations of Chapter II, Water Supply, of the Code of Sanitation of the Philippines, P.D.856).

9.2.6 Financing Systems

The LGC presents an opportunity for LGUs to establish the conduit for future local and foreign-assisted projects. Presently, funds reach the LGUs through the government allotment and sub-allotment systems. To support water supply and sanitation activities, housing improvement loans for installing in-house sanitary facilities and level III systems may be studied and instituted by the LGU. Such a mechanism can be organized with the rural banks or existing credit cooperatives in the Province. Seed funding for this revolving fund also needs to be raised. The LGU can also be considered to act as conduit of the national government for financing the capital cost for the sector. The mechanism for this would, however, have to be evaluated comprehensively. The experiences of the RWDC, where the LGU is the focal point for financing the water supply systems at the community level, should be evaluated and lessons learned from that type of financing and institutional arrangement would be most helpful for the sector at this time.

9.3 Institutional Arrangements

In the medium-term, a full-time Provincial (WATSAN) Sector Team (PST) to provide a focal point in the Province shall be set up for coordination, monitoring and institution-building. The LGU should ensure that adequate logistics and incentives are provided. This may be replicated at the municipal and barangay level of the LGU.

In the long term, the PST may be formed as a Provincial Water and Sanitation Office (PWSO) under the office of the Chief Executive of the LGU. For LGU-run water systems, this would be the office of the economic enterprise within the LGU with duties and functions beyond coordination and monitoring. It would become the focal point of WATSAN activities of the Province and coordination and monitoring of all WATSAN activities would emanate from that office. It would also be the regulating arm of the Province for all WATSAN activities within its provincial jurisdiction. This should be replicated at the municipal level. A PMO for water supply and sanitation at the DILG-LGU to provide technical and managerial assistance in the formative years of the PST/PWSO is highly recommended to be set up.

Both the Province and Municipality may set up such a Team (for the medium-term) or Office (for the long-term) in their respective LGUs.

With the devolution of water supply and sanitation to the LGU, the DPWH-DEO may still provide technical services at cost and in competition with other private contractors. Sharing of resources (equipment and staff) with the LGU at cost may be looked into subject to policy decision and guidelines approved at the national level.

The initial professional-level staffing of the PST/PWSO is estimated, as follows:

Provincial Water Supply & Sanitation Coordinator	1
Community Development, Gender & Training Specialist	2
Water Supply & Sanitation Engineer	2
Monitoring and Evaluation Specialist	1
Total Personnel Required	6

The recommended roles for the various staff positions are as follows:

(1) The *Provincial Waterworks & Sanitation Coordinator* shall lead an interdisciplinary Provincial Sector Team, shall be responsible for coordination and supervision of all development planning, implementation, monitoring and evaluation, database development and progress reporting of all activities in the water supply and sanitation sector, shall also liaise with all project implementers and key players in the sector and shall be the key contact person of the DILG for WATSAN concerns.

(2) The *Community Development, Gender and Training Specialist* shall be responsible for implementing community organizing and community participation aspects of the sector with a gender-responsive approach, shall be responsible for developing and implementing community-based programs and activities for the sector in the various barangays and municipalities, including criteria for community and site selection, conducting regular dialogues and disseminating information among local leaders on water supply, sanitation and health and hygiene education program province-wide, shall oversee accreditation of community-based organizations responsible for the water supply and sanitation facilities, and shall annually review past training programs and develop and implement the province's training programs for water supply and sanitation, hygiene and sanitation education, and community organization and development, including any manuals or other training materials used.

(3) The *Water Supply and Sanitation Engineer* shall be responsible for all the technical aspects of the project including feasibility studies, design, construction, operation and maintenance, review of the existing technical and environmental situation relating to WSS facilities, proper construction supervision and monitoring in coordination with the municipal liaison, adequate maintenance of LGU equipment and tools for water and sanitation facilities, including drilling rigs and vehicles supervise major repair or rehabilitation work beyond the capacity of communities to undertake and implement, in coordination with the IPHO, the water quality surveillance system.

(4) The *Monitoring and Evaluation Specialist* shall assist the Coordinator in all monitoring and evaluation activities including development of database and data processing and reporting for baseline, monitoring and evaluation data.

The same can be done at the municipal level, with the Municipal Waterworks and Sanitation Coordinator also acting as Sector Liaison for the municipality to the Province.

At the barangay level, the Barangay Councils will continue to play a major role in fulfilling the community's aspirations for improved water and sanitation services. It will play a key role particularly in the preparatory stages before the organization of the association (or the appointment of the responsible group). By default, many of the previously failed systems have ended up as responsibilities of the barangay councils. Although the Councils will not have any supervisory role over the associations operating the water systems, it is important that they monitor the performance of the associations.

9.4 Project Management Arrangements

Levels I and II

Fig. 9.4.1 shows the Procedural Flow for Levels I and II facilities. The following key requirements may be considered:

1) *Project Selection*. A demand-responsive approach at the community level should be used as primary process for project selection. The initiative of the community should be encouraged. All barangays should be properly and consistently informed about sector opportunities and policies by the Provincial through its municipal LGUs. The barangays should take the first step by assessing their needs, deciding that they want to improve their water and sanitation above all other needs and express this needs to the Municipal LGU's WATSAN Unit. The barangay should also decide on desired service levels, with a full understanding of the cost recovery aspects and other responsibilities.

2) *Organization of associations*. More flexibility is needed in order to tap into local community resources. The basic principle is for the community to agree on what type of organization, association, community-based organization, cooperative, etc. they want to form in preparation for accepting the responsibility for the facilities. Existing community-based groups with an active track record and with leaders and members who are ready, willing and able to take on the O&M functions may be tasked with the responsibility for the facilities. LGUs will assess the readiness of the communities and approve the arrangements and accredit the organization. Failure of community-based organizations to live up to their responsibilities can be grounds for removing their accreditation and giving the responsibility to another accredited group.

3) The organization can decide how to organize itself internally in coordination with the municipal liaison ensuring that roles, responsibilities and accountabilities are adhered.

4) *Technology and Technical Design Standards***.** The former Rural Waterworks Development Corporation (whose functions were absorbed by LWUA) and the DPWH have developed a simplified procedure for conducting the initial data gathering. The format used is recommended for adaptation by the LGUs. These forms can also be revised to suit the specific needs of the LGU.

   For Level II systems, technical standards have been in use by LWUA for RWSAs and by DPWH. As these are considered as national standards, their adoption is recommended.

5) *Bidding of works and procurement of services and materials* should follow provision of PD 1594 and other appropriate government policies and practices. Where possible, major capital procurement shall be sourced within the province.

6) *Construction and Drilling*. "Backyard" drillers and "pakiaw" contractors will be needed for any major rural water supply and sanitation undertaking. Construction inspection shall be done with the municipal sector liaison.

7) *Right of Way Acquisition*. Deed of Donation (or written permits to grant use of land) for proposed facility sites should be executed in favor of the provincial government prior to project approval.

8) *Major rehabilitation work*, beyond the capacity of the associations, shall be referred to the PST/PWSO for action. Clear definition of "major rehabilitation work" is needed. All costs incident to the rehabilitation shall be accounted to the association O&M reserve fund. The PST/PWSO will assist, if needed, the association in securing soft loans, if the reserve funds are inadequate.

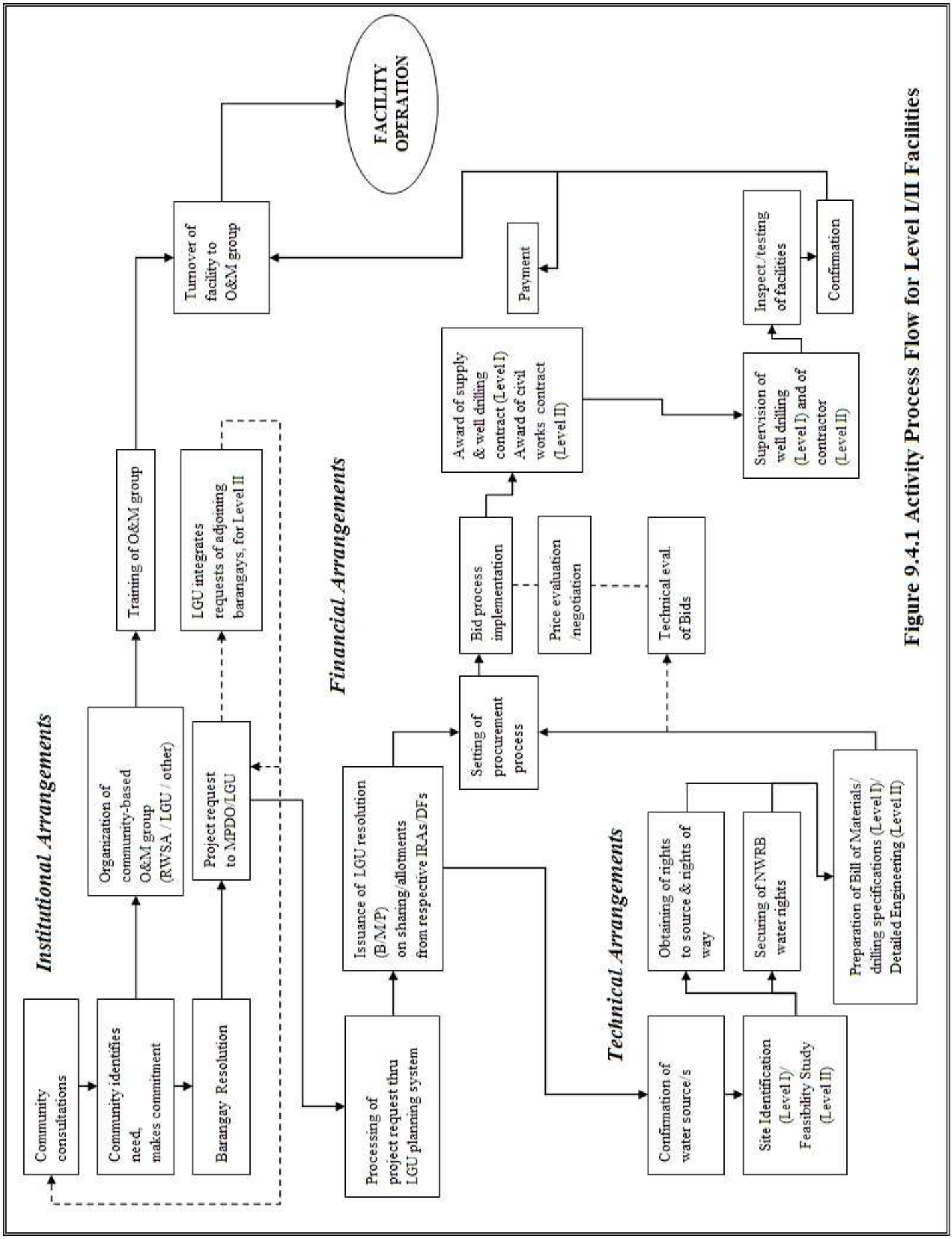


Figure 9.4.1 Activity Process Flow for Level I/II Facilities

9) *Operation & Maintenance* will generally be the responsibility of the community-based organization accredited and approved by the LGU. To support the caretakers, a franchising system for major O&M activities may be instituted by the PST/PWSO (through a private firm, a major water district in the area or any other competent group). Mechanics and plumbers can organize well-equipped "mobile service centers" which visits all the facilities monthly to check-up facilities and provide technical advice on behalf of the LGU.

10) *Spare Parts Support.* With standardization, local hardware stores will find it more profitable to stock up on needed spare parts. The association, and not the LGU, should maintain a ready stock of fast-moving spares.

11) *Rate Setting***.** Fees and rates shall be established and approved by the community prior to construction. The fees shall be sufficient to cover all monthly operation, maintenance and administration costs, as well as to establish a reserve fund.

12) *Fees Collection and Funds Management.* The community-based organization shall collect monthly fees until a set ceiling is reached. When the ceiling is reached, fees may be reduced but never totally eliminated to ensure funds will be readily available in the future. The ceiling and monthly fee can be set during the project planning. When the fund goes below the ceiling due to repairs, fees may be raised for a fixed period until the ceiling is reached (or other fund raising activities could be organized). Guidelines for setting the ceiling as well as the annual external auditing of association funds should be organized by the PWSO, in addition to the internal audit functions of the association. All funds of the association shall be deposited in a bank to be selected by the association and approved by the PST/PWSO.

Level III

Fig. 9.4.2 shows the Procedural Flow for Levels III facilities. The following key requirements may be considered:

1) *Project Selection.* Since most of the Level III systems are initiated by the municipal governments, selection and local initiative are taken through the municipal governments, most of whom have a desire to see service levels improve. The more crucial decision is the type of water service provider and the level of independence (or control) over the utility. All communities, including rural areas may request for Level III services, provided they are willing and able to take on the financial and managerial obligations for higher service levels. The level of service should be approved by the community but within technical advise of the LGU.

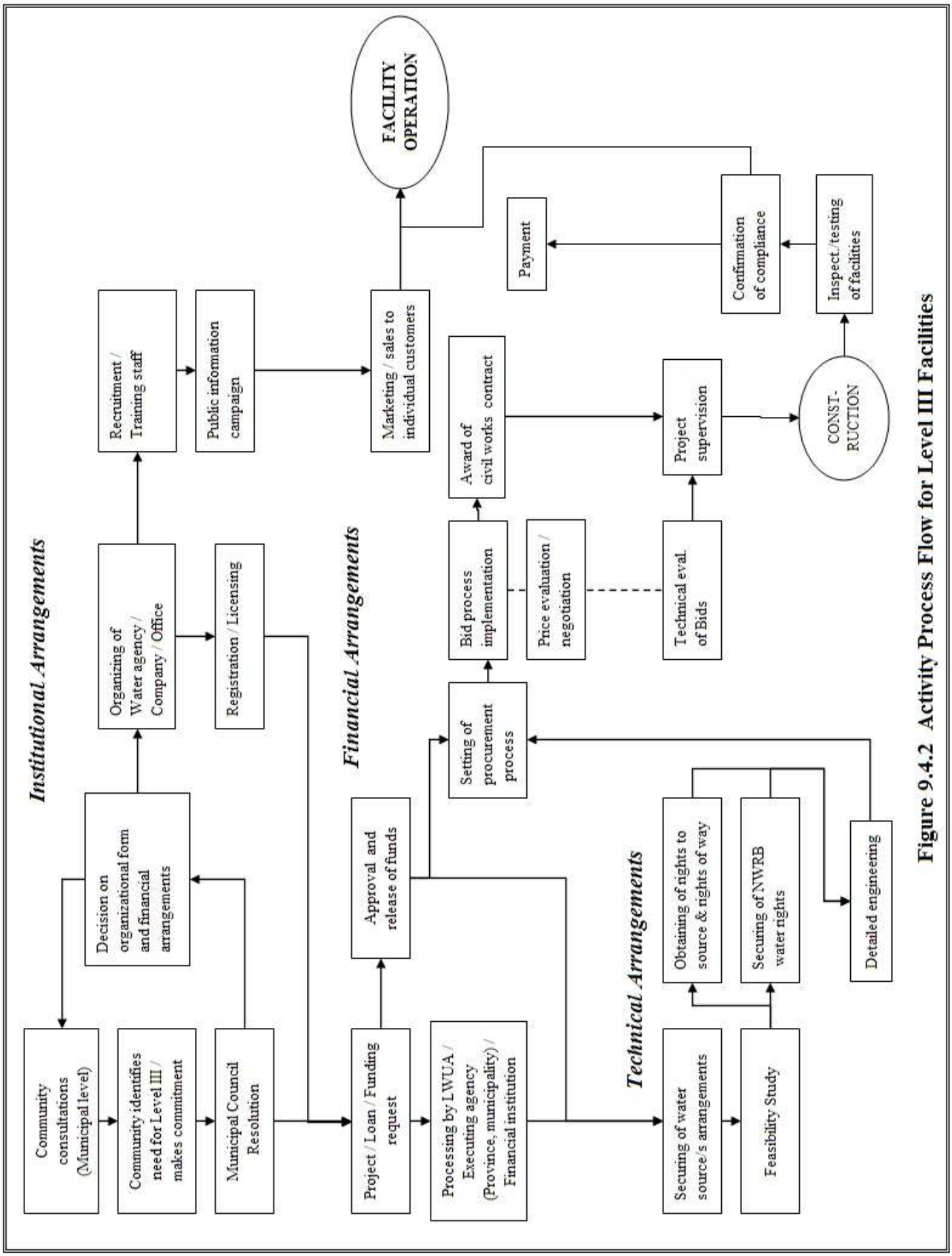


Figure 9.4.2 Activity Process Flow for Level III Facilities

2) *Organization.* There are several viable Level III models, which may be adopted: the Water District Concept; an LGUs-managed system, a cooperative-run system or a privately-owned and managed system. For detailed information on the water district concept, the LGU should contact and coordinate with LWUA. The second option is for the LGU to maintain operational control over the utility. Current experiences, however, point to many difficulties because of government controls and restrictions. The private sector may be a viable option using the BOT mechanism or even as a long- term investment for private entrepreneurs for larger systems. Water rights and the Certificate of Public Convenience (or a Certificate of Conformance - for WDs) will have to be secured by the organization.

3) *Technology and Technical Design Specifications.* Regardless of the institutional model adopted, the technical design standards to be enforced should be uniform. Technical standards used by the water districts and LWUA will be adopted and enforced by the LGU.

4) *Bidding of Works and Procurement* of services and materials should follow provision of PD 1594 and all other applicable national and local legislation on bidding and award of contracts using public funds. LWUA uses standard formats and procedures for this process, which the LGU may study and adopt.

5) *Construction* will be done by a contractor in most cases. Inspection would be undertaken by the water district and LWUA; by the cooperative or the private developer; or by the LGU depending on the institutional arrangement adopted.

6) *Right of Way Acquisition.* The government will have to negotiate for the purchase of land on which facilities will be constructed. Should negotiations fail, the government may exercise the power of eminent domain to secure needed lands.

7) *Operation & Maintenance and Rehabilitation* will be the responsibility of the water service provider. It shall ensure that adequate tools and spare parts are available. It shall employ needed staff and caretakers.

8) *Water Rate Setting.* All rates are subject to public hearings and approval by the appropriate regulatory authority.

9) *The organization* will establish a formal billing and collection system. In addition, business practices systems shall be adopted. The LWUA has established a comprehensive commercial practices system, which may be adopted by the organization.

9.5 Community-Based Organizations

The traditional view of communities as mere beneficiaries and recipients of projects has been undergoing changes and transformation in recent years through the policy reforms and transition in the sector. Communities are now provided avenues for more participation in terms of decision-making and initiation of resolution of issues in critical aspects of the sector's project management and implementation.

This implies the need for the LGU to establish an institutional mechanism at the provincial and municipal levels to enhance trust and confidence of communities on its ability for provision of such basic services as water supply and sanitation. Communities will be

encouraged to collectively take stock of their resources and constraints and agree on a development program appropriate for their needs.

The LGU shall promote the participation of NGOs, people's organizations (POs), and community-based organizations (CBOs) to catalyze the involvement of women, youth, people's organizations (POs) and other segments of the community in project decision-making and management. It will focus on the role of women in the context of the design of institutional arrangements at all levels. Towards increasing community involvement, the LGU shall develop a community-based implementation strategy and delivery mechanism to ensure the sustainability of sector projects. It shall review the roles and responsibilities of central and local government, NGOs, the private sector and communities themselves. It shall assess the community participation activities and related institutional arrangements of past community projects and recommend workable community participation approaches.

9.6 Human Resources Development Training

The main objective for training human resources is to improve individual competence, organizational effectiveness and efficiency, and espouse national development. Training is a function and a responsibility of every leader. It ensures the availability of qualified and able manpower, the shortage of which is considered as one of the major obstacles to improvements in the water supply and sanitation sector.

Training shall be designed and implemented for implementers, planners from national level to regional to LGUs and down to the community level. Needs Assessments will be conducted as the basis for the design of the courses. Participants will be selected based on the their tasks and responsibilities. The PST/PWSO shall establish and maintain a reference library and information/documentation center and shall include training materials and equipment to service needs of the municipalities. The DILG-LGU shall provide inputs to these training activities.

The LGU role is not to run courses but to ensure that training programs take place and are effective. Actual training activities may be organized or contracted out to well-functioning water districts and government-accredited training, technical and vocational schools. Training may cover but should not be limited to the following areas: source development principally for deep wells, shallow wells, spring development and surface water intake structures, operation and maintenance, plumbing and pipe-laying and basic hydraulics, bookkeeping and management and special courses for water and sanitation caretakers.

9.7 Health and Hygiene Education

The LGUs shall establish an on-going hygiene education program through appropriate methods and channels. These shall include immediate short-run programs: information campaigns; as well as, long-term value formation interventions, possibly through the formal school system. Household and individual hygiene practices, such as hand washing, in house water storage, etc., are part of benefit assessment since these are part of improvement in lifestyle and practices. Three approaches are recommended:

- Community-based Approach: Direct house-to-house campaigns can be implemented through the Rural Health Units as part of their current functions. Special presentations can also be done during the regular meetings of community-based socio-civic clubs.

Multi-media presentations may be developed and prepared for information dissemination and campaign.

- School-based Approach: Students are the main targets of this approach, either directly or through their teachers. Special focus activities, such as Water and Sanitation Week or Nutrition Week can be introduced with programs or convocations to make the student aware of the issues and solutions. Posters, flip charts, and other audio-visual materials would be helpful.
- Media-based Approach: This approach utilizes radio and print media to introduce and reinforce health messages. Many NGOs and the Philippines Information Agency (in coordination with the DOH) have developed interesting and attractive materials.

The community development specialist at the PST/PWSO shall be given the responsibility for the health and hygiene education function. The CDS will formulate an action plan; implementation will be done with the municipal liaison staff and other local officials. At the barangay level, its implementation will involve the close coordination among the midwives, the barangay health workers and the Committee on Health of the barangay council. Materials for this efforts have been previously developed and can be found with the various PHOs and RHUs. UNICEF has provided strong support in the preparation of these materials.

A continuous health and hygiene education program will be launched by the LGU. Simple, clear messages and approaches will have to be defined. These messages may include the following: Relationship among health, water supply and sanitation; sector opportunities; services available at the rural health units. For Levels I and II systems, the protection of household storage containers from contamination; hand washing; conservation; pay bills/fees on time; etc. The relevance of these, or other messages will have to be determined by the PST/PWSO.

9.8 Gender and Development

Consistent with the national policy of fundamental equality of men and women before the law, as well as of providing equal opportunities to both genders, the water supply and sanitation sector shall promote the full participation of men and women in all the phases of the project development cycle. Sustainability of the WATSAN facilities shall be achieved through the partnership of men and women, and their total involvement in its management, operation and maintenance. The socio-cultural norms and practices in the Province, however, should be taken into consideration in conceptualizing gender-responsive influences in the WATSAN institutional set-up in the Province. Nevertheless, women should be encouraged to participate in all aspects and phases of the project cycle.

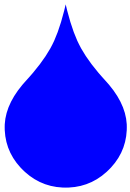
A gender-responsive approach should consider the following:

- The training of the LGU officials and employees from the regional, provincial, municipal and barangay levels on gender and development.
- The conscious integration of gender concerns in all aspects of project development, that is, from project identification, planning, design and implementation, where the unique needs and requirements of both genders are recognized.

- The equal representation and distribution of responsibilities to the men and women of the beneficiary community, particularly in sharing work, making decisions, cooperation and control of activities such as but not limited to institutional and CD structures and processes, the organization and management of the WATSAN facilities, the training of managers, operators and maintenance personnel.

To provide the LGU insight on how to conceptualize gender-responsive approaches in the Province, it shall conduct a provincial survey to review the role of women in the context of the design of the community participation structure of the project. The review shall include: brief overview of women's socio-economic situation and their role in water and sanitation; gender analysis; analysis of relevant NGOs, women's groups and private agencies that will support community and women's activities; assessment of support action for women's participation essential for project sustainability; and proposed steps to enhance women's role and participation in the project.

CHAPTER X



COST ESTIMATE FOR FUTURE SECTOR DEVELOPMENT

CHAPTER X COST ESTIMATES FOR FUTURE SECTOR DEVELOPMENT

10.1 General

The total investment cost requirement for the medium and long-term development periods was estimated based on the future requirements identified in Chapters 8 and 9. The investment costs include direct cost for construction/rehabilitation of required facilities and sector management, as well as physical and price contingencies. Cost requirements for the equipment and vehicle are also discussed as a reference to the LGUs. In addition, recurrent cost is estimated for the operation and maintenance of facilities.

Conditions and assumptions to come up with investment cost were established covering all sub-sector components with reference to the NSMP and current standards of relevant sector agencies such as DILG, DOH, DPWH and LWUA. Of the total investment cost required, only construction cost for sector components by municipality was included in this Chapter. The total investment cost is presented in Chapter 11 as a total requirement of the Province.

With regard to construction cost, unit construction cost per person/household/facility was prepared under contract-out basis for respective sub-sector component facilities in 2003 price level (see Appendix X for details).

Recurrent cost was also included in this Chapter taking into account regular operation, spare parts and equipment replacement for respective sector components.

10.2 Assumptions for Cost Estimates

(1) Unit Construction Cost

Unit construction cost per person (household or facility) of each sector component was estimated based on the current standard unit cost of relevant sector agencies and typical standards developed for previous PW4SP as contract-out basis in 1998 price level. Referred cost data are urban water supply of LWUA, rural water supply of DILG and sanitation of DILG and DOH. Prices of construction material were adjusted from 1998 price level to 2003 price level using the escalation factor 1.22.

Unit construction cost consists of, in general, direct cost (mobilization/demobilization, material and labor), indirect cost (profit and VAT of contractor) and government expense (detailed engineering, institutional development and water quality analysis, if necessary).

Freight cost of construction materials excluding indigenous materials, i.e., sand and gravel, was counted for sanitation and rural water supply in consideration of the distance from Manila. The cost is estimated at fixed percentage (8%) based on the standard practice being adopted by sector agencies.

Table 10.2.1 shows a summary of unit construction cost and their descriptions are given below (see details in Appendix X).

Urban water supply

- Unit cost for three different sizes of Level III system covering served population of 5,000, 10,000 and 15,000.

- Unit cost for Level III system shall be applicable to both systems utilizing spring source and deep well. However, in case of utilization of spring source, it is desirable to conduct surveys prior to implementation, since the location (distance/elevation) of the untapped spring might affect the construction cost.

Rural water supply

- Unit cost for four types of Level I wells (shallow well at 18m in depth and deep wells at 40, 60 and 80m in depth).

- Unit cost for deep well was estimated for open hole with gravel packed well based on the water source study results (see details in Table 7.3.1).

- Unit cost for deep well using anti-corrosive materials (PVC casing and stainless screen, riser pipe and sucker rod) was considered, with an additional of 7% to the unit cost of an ordinary deep well.

- Unit cost for Level I spring development was estimated considering system upgrading to Level II, adopting 63mm diameter of transmission line.

- Unit cost for Level II system to cover 600 served population.

Sanitation

- Household toilet: (Construction cost is not included since it is not considered as a public investment; unit cost is included to serve as a reference for financial study in terms of affordability).

  Unit cost for four types of sanitary toilets (flush, pour-flush, VIP) to cover one served household in urban or rural areas. Cost of flush toilet includes costs for demolition, water closet and water line.

- Public school toilet

  Unit cost for public school toilet was estimated using a combination of toilet facility with 5 toilet bowls and 5 units of classroom toilet to cover 200 served students. The distribution of the two kinds of toilet facility is assumed to be 50% each.

Table 10.2.1 Unit Cost of Facilities by Type and Service Level

M

Sector	Service Level	Unit Construction Cost per Facility (Pesos)	Service Coverage		Unit Cost		Rehabilitation Cost of Level I Deep Well (Pesos/Well)
			Served Population	Served Households	Pesos/ Person	Pesos/ Household	
Urban Water Supply	***New System***						
	For 5,000 population	30,491,000	5,000	N/A	6,100	N/A	
	For 10,000 population	45,361,200	10,000	N/A	4,600	N/A	
	For 15,000 population	69,914,400	15,000	N/A	4,700	N/A	
	Expansion						
	For 5,000 population	28,634,100	5,000	N/A	5,800	N/A	
	For 10,000 population	43,504,400	10,000	N/A	4,400	N/A	
	For 15,000 population	68,057,600	15,000	N/A	4,600	N/A	
Rural Water Supply	**Level II**	1,662,200	600	120	2,780	13,900	
	Level I						
	Deep Well						
	40 meter depth	427,100	N/A	15	N/A	28,480	83,900
	60 meter depth	540,300	N/A	15	N/A	36,020	
	80 meter depth	644,900	N/A	15	N/A	43,000	
	Shallow Well	92,800	N/A	15	N/A	6,190	
	Spring Development	893,200	N/A	15	N/A	59,550	
Sanitation	***Household Toilet***						
	Flush	29,700	N/A	1	N/A	29,700	
	Pour Flush	18,100	N/A	1	N/A	18,100	
	VIP Latrine	8,600	N/A	1	N/A	8,600	
	Public School Toilet	379,000	250	N/A	1,600	N/A	
	Public Toilet	422,200	N/A	N/A	N/A	N/A	
	Urban Sewerage				5,700		
	Disinfection of Level I Wells	85					

- Public toilet

- Unit cost for one facility with 6 toilet bowls.

- Well disinfection

- Unit disinfection cost per well based on DOH standard cost. Unit cost shall be applied to all existing and new wells once a year.

Urban Sewerage

- Unit cost per served population. Preliminary estimates derived from the Philippine National Urban Sewerage and Sanitation Strategy and Feasibility Studies report.

(2) Unit Cost of Equipment

Unit cost of equipment shown in Table 10.2.2 was prepared based on the 1998 standard unit cost and escalated to 2003 prices (see details in Appendix X).

Table 10.2.2 Unit Cost of Equipment and Vehicle

Name of Equipment	**Unit Cost** (Peso 1,000)
Rotary drilling rig and service truck with crane	32,674.0
Well rehabilitation equipment	341.6
Support vehicle (Pick-up with winch)	719.8
Refuse collection truck	2,509.5
Maintenance tools	12.2
Water quality testing kit	18.67

(3) Sector Management Cost

Sector management cost consists of:

- Engineering studies (F/S, D/D and construction supervision) for water supply, public toilet and school toilet facilities.

- Community development and training including health & hygiene education and logistic support.

Cost of engineering studies was estimated based on the fixed percentages to the total construction cost; 9% for F/S and D/D and 4% for construction supervision.

Community development and training with logistic support was also estimated on the same manner; 12% of respective construction costs for rural water supply and sanitation, and 3% of construction cost for urban water supply.

(4) Recurrent cost

Recurrent cost was estimated for water supply and sanitation (school and public toilets) facilities to cover the regular operating cost and the cost for spare parts and equipment replacement based on the following cost assumptions, while household toilet is to be maintained by the owner.

Regular operating cost normally includes salaries of operation staff, electricity, fuel and chemicals. Due to the nature of this cost, it is only applied to urban water supply (Level III system). As a typical unit cost being applied in the preparation of PW4SP, to LWUA data was applied at ₱ 365 /household /year.

Cost for spare parts and equipment replacement was considered by different service level as described below:

Level III system

- Mechanical and electrical equipment has normally a life cycle of 8 to 12 years and is considered in depreciation cost at 10% per annum. Assuming that the equipment cost comprises 10% of construction cost, the annual depreciation will be at 1% of the construction cost.

- Accordingly, the cost of spare parts was assumed to be 10% of the equipment cost or equivalent to 1% of the construction cost.

- As a whole, 2% of the construction cost was applied for the cost of spare parts and equipment replacement.

Level II system

- Operation and maintenance (O&M) cost of Level II system utilizing spring sources includes minor repair of pipeline and communal faucets (1% of the direct cost) and salaries of maintenance staff.

- A unit cost of ₱ 180 /household /year was assumed.

Level I facility

- O&M cost of Level I facility simply includes spare parts of hand-pump and caretaker.

- A unit cost of ₱ 100 /household /year was assumed.

School and public toilets

- O&M cost includes the salaries of maintenance staff, cost of pumping sludge from septic tanks (periodically) and rehabilitation cost (for depreciation).

- For cost estimates, 5% of the construction cost was applied per facility per year.

Management cost

- Management cost of water supply, sewerage and sanitation sector is part of the cost required for public services of LGUs. This mainly consists of salaries of officers and workers and normally included in the annual budget of the LGU. The rest of the management cost, such as equipment for information and dissemination activities was considered as part of the logistic support under the sector management cost. Owing to the nature of this cost item, the management cost pertaining to salaries of officers/workers depends largely on the population size and institutional set-up of each LGU.

- Management cost was not estimated in this PW4SP considering the above mentioned reasons.

10.3 Cost of Required Facilities and Equipment

10.3.1 Cost of Required Facilities

The construction cost of the required facilities as public investment of LGUs is summarized in Table 10.3.1 by sub-sector, by municipality for each target years.

During the medium-term development period, a total of 599.2 million Pesos will be required for construction of the required facilities. Of the requirements, urban water supply and rural water supply will share 22% and 46%, respectively. While, the remaining 32% will be required for urban and rural sanitation. With reference to urban water supply, some cost required would be managed by newly created WD/s, which is out of public investment to be undertaken by LGUs.

10.3.2 Cost of Required Equipment and Vehicle

The procurement cost of the required equipment was estimated as shown in Table 10.3.2 (see details in Appendix X). In this PW4SP, one set/unit of truck-mounted drilling rig, well rehabilitation equipment and support vehicle will be included in the medium-term investment plan (Phase I).

Table 10.3.1 Construction Cost of Required Facility by Municipality

M

Unit: P 1,000

Name of Municipality / City	Phase I (2010) Requirements							Phase I (2015) Requirements							
	Urban Area			Rural Area			Grand Total	Urban Area				Rural Area			Grand Total
	Water Supply	Sanitation	Sub-total	Water Supply	Sanitation	Sub-total		Water Supply	Sanitation	Urban Sewerage	Sub-total	Water Supply	Sanitation	Sub-total	
Alburquerque	10,121	422	10,543	7,671	758	8,429	18,972	11,954	1,689		13,643	893	3,032	3,925	17,568
Alicia	6,444	422	6,866	11,110	2,653	13,763	20,629	621	1,267		1,887	8,569	12,507	21,076	22,963
Anda	8,097	422	8,519	13,972	1,895	15,867	24,386	1,172	1,267		2,438	20,218	8,338	28,556	30,994
Antequera	7,528	1,267	8,795	14,253	1,137	15,390	24,185	893	1,267		2,160	4,901	5,306	10,207	12,367
Baclayon	13,033	844	13,877	25,583	1,137	26,720	40,597	1,752	1,689		3,440	1,786	4,927	6,713	10,154
Balilihan	8,091	422	8,513	14,810	1,516	16,326	24,839	4,106	1,267		5,373	9,948	7,201	17,149	22,522
Batuan	9,025	422	9,447	9,368	1,137	10,505	19,952	8,306	1,267		9,572	7,255	5,306	12,561	22,133
Bien Unido	39,987	3,541	43,528	1,735	379	2,114	45,641	56,787	7,753	74,864	139,404	3,377	2,653	6,030	145,433
Bilar	10,544	844	11,389	9,787	1,516	11,303	22,692	3,996	1,267		5,263	1,786	7,959	9,745	15,008
Buenavista	11,061	422	11,483	20,192	2,653	22,845	34,328	10,028	2,447		12,475	20,814	13,644	34,458	46,933
Calape	23,391	1,180	24,572	17,000	2,274	19,274	43,846	6,189	1,689	33,203	41,080	3,573	11,370	14,943	56,023
Candijay	28,090	1,981	30,071	13,295	1,895	15,190	45,261	26,858	2,447	52,497	81,801	2,680	9,854	12,534	94,335
Carmen	28,321	2,404	30,725	20,004	3,790	23,794	54,519	37,418	1,267	40,162	78,846	20,468	18,950	39,418	118,265
Catigbian	9,750	844	10,594	14,102	2,274	16,376	26,970	6,612	1,267		7,879	16,058	10,233	26,291	34,170
Clarin	12,696	1,223	13,920	11,470	1,895	13,365	27,285	2,888	3,205		6,093	10,974	8,717	19,691	25,784
Corella	2,430	844	3,275	9,039		9,039	12,313		1,267		1,267	893	2,274	3,167	4,434
Cortes	9,599	422	10,021	17,833	758	18,591	28,612	2,987	1,267		4,254	1,786	4,169	5,955	10,209
Dagohoy	8,278	1,267	9,544	10,561	1,895	12,456	22,000	13,676	2,404		16,080	13,880	9,854	23,734	39,814
Danao	9,941	844	10,786	11,476	1,895	13,371	24,156	2,575	1,267		3,842	1,786	9,475	11,261	15,103
Dauis	26,796	1,938	28,734	13,725	1,895	15,620	44,355	48,893	2,447	50,160	101,500		9,096	9,096	110,596
Dimiao	4,002	844	4,846	8,954	1,137	10,091	14,937	737	1,267		2,003	5,541	6,443	11,984	13,988
Duero	10,933	422	11,355	6,990	1,516	8,506	19,862	1,479	1,267		2,746	1,786	7,201	8,987	11,733
Garcia Hernandez	15,770	1,180	16,950	11,368	1,895	13,263	30,213	4,715	3,162		7,877	14,687	9,475	24,162	32,039
Getafe	32,044	2,783	34,826	14,361	1,895	16,256	51,082	55,490	6,995	57,091	119,576	11,958	9,475	21,433	141,009
Guindulman	15,973	1,180	17,153	17,758	2,653	20,411	37,564	14,889	1,689		16,577	12,139	13,644	25,783	42,361
Inabanga	25,309	3,627	28,936	27,889	4,169	32,058	60,994	31,385	2,826	47,339	81,550	25,062	20,087	45,149	126,699
Jagna	25,058	2,783	27,841	12,282	2,653	14,935	42,776	4,541	3,205	46,854	54,600	15,009	11,749	26,758	81,358
Lila	6,113	422	6,535	4,927	758	5,685	12,220		1,267		1,267	5,548	3,032	8,580	9,846
Loay	15,150	844	15,994	13,325	758	14,083	30,077	26,407	1,689		28,096	1,786	4,169	5,955	34,052
Loboc	8,416	844	9,260	12,306		12,306	21,566	1,595	1,267		2,862	2,428	5,685	8,113	10,974
Loon	30,518	2,826	33,344	21,490	2,274	23,764	57,109	9,338	1,689	57,416	68,443	3,573	10,991	14,564	83,007
Mabini	22,974	1,180	24,154	11,110	2,274	13,384	37,538	6,757	1,646	32,570	40,972	2,680	10,991	13,671	54,643
Maribojoc	25,131	2,447	27,578	9,182	758	9,940	37,519	11,171	2,068	35,665	48,904	1,786	4,169	5,955	54,859
Panglao	31,280	2,783	34,062	9,317	758	10,075	44,138	17,968	1,689	58,385	78,042	893	4,548	5,441	83,484
Pilar	11,588	2,068	13,656	13,648	3,032	16,680	30,336	20,126	1,267		21,393	14,359	12,886	27,245	48,638
Pres. Carlos P. Garcia	22,649	2,447	25,096	7,861	1,895	9,756	34,853	28,543	2,447	30,603	61,593	11,117	8,338	19,455	81,048
Sagbayan	10,991	844	11,835	15,137	1,895	17,032	28,868	10,359	1,267		11,625	8,241	8,717	16,958	28,583
San Isidro		422	422	10,352	1,137	11,489	11,911		1,267		1,267	893	5,306	6,199	7,466
San Miguel	7,064	844	7,908	12,992	2,653	15,645	23,553	11,687	1,267		12,954	17,414	12,128	29,542	42,496
Sevilla	4,530	422	4,952	6,098	1,137	7,235	12,187	3,074	1,267		4,341	1,786	4,927	6,713	11,054
Sierra Bullones	27,683	1,137	28,820	9,561	2,274	11,835	40,656	4,791	2,783	39,216	46,789	3,765	10,233	13,998	60,787
Sikatuna	2,848	1,267	4,114	6,211	758	6,969	11,083	406	1,267		1,673	2,818	3,032	5,850	7,522
Tagbilaran City (Capital)	210,570	8,890	219,459				219,459	40,212	4,342	374,433	418,986				418,986
Talibon	73,089	4,678	77,767	17,886	2,653	20,539	98,306	127,590	10,785	130,878	269,253	17,794	12,886	30,680	299,932
Trinidad	9,274	844	10,119	19,837	3,032	22,869	32,988	11,542	1,267		12,809	20,992	14,781	35,773	48,581
Tubigon	48,502	3,118	51,621	23,276	2,274	25,550	77,170	38,663	3,205	86,731	128,599	2,680	10,991	13,671	142,269
Ubay	29,867	2,783	32,650	41,754	6,064	47,818	80,468	27,188	2,826	55,786	85,799	53,955	28,804	82,759	168,559
Valencia	6,682	1,267	7,948	18,100	1,895	19,995	27,943	766	1,267		2,032	3,573	10,612	14,185	16,217
Provincial Total	1,017,232	77,174	1,094,406	650,961	87,549	738,510	1,832,916	759,128	107,942	1,303,852	2,170,922	415,910	430,165	846,075	3,016,998

Table 10.3.2 Cost of Equipment and Vehicle

Unit; Peso 1,000

Name of Equipment	Unit Cost	Q'ty (set)	Amount
Rotary drilling rig and service truck with crane	32,314	1	32,314
Well rehabilitation equipment	341.6	1	341.6
Support vehicle (Pick-up with winch)	719.8	1	719.8
Refuse collection truck	2,509.5	45	112.9
Total Equipment Cost			33,488.3

Aside from the above, one set each of maintenance tools and water quality testing kits shall be provided to all municipalities and cities for O&M of Level I facilities (see Appendix X for details).

10.3.3 Cost for Laboratory

Required cost for a new laboratory building, office equipment and instruments/chemicals was estimated at 2 million Pesos (see details in Appendix X).

10.4 Recurrent Cost

Recurrent cost is estimated in 2003 price level as a provincial total of each sub-sector covering existing facilities and additional facilities to be constructed during the medium-term development as shown in Table 10.4.1.

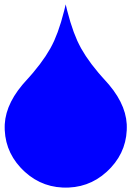
For year 2010, the recurrent cost will increase to 130 million Pesos/year from 87 million Pesos/year in 2003, which is 67% increase from the base year corresponding to the implementation of the medium-term development.

Table 10.4.1 Recurrent Cost

Unit: P 1,000

Sector Component	Item	Base Year Existing Facilities	2004	2005	2006	2007	2008	2009	2010	Total (2004-2010)
Urban Water Supply	Operating Cost	23,806	23,806	26,057	28,308	30,559	32,810	33,935	35,061	141,538
	Spare Parts/Equipment	39,782	39,782	43,544	47,305	51,067	54,829	56,710	58,591	236,527
Rural Water Supply	Spare Parts/Equipment for Level II System	1,275	1,275	1,430	1,586	1,586	1,586	1,586	1,586	7,463
	Spare Parts/Equipment for Level I Facilities	3,814	3,814	5,056	6,297	7,539	8,781	9,402	10,023	31,487
Sanitation	Public School Toilets	13,769	13,769	14,720	15,671	16,623	17,574	18,049	18,525	78,357
	Public Toilets	4,950	4,950	5,223	5,496	5,769	6,042	6,179	6,315	27,480
Total Recurrent Cost		**87,395**	**87,395**	**96,030**	**104,664**	**113,143**	**121,622**	**125,861**	**130,100**	**522,853**

CHAPTER XI



FINANCIAL ARRANGEMENTS FOR MEDIUM-TERM DEVELOPMENT PLAN

CHAPTER XI FINANCING ARRANGEMENTS FOR MEDIUM-TERM DEVELOPMENT PLAN

11.1 General

Financing arrangements to attain medium-term (Phase I) targets are explored taking into account potential funds. However, quantitative study is limited to the use of projected Internal Revenue Allotment (IRA). Hence, this Chapter addresses to identify financing shortfall with reference to available IRA for this sector and to seek comprehensive logistics in terms of sourcing of various funds, augmentation of current practices in the Government assistance to this sector and effective investments and cost recovery.

Available funds (IRA) for the medium-term development period are projected using computer-based programs that allow for future application to include additional funds that are available. Figure 11.1.1 shows the sector budget allocation at different administrative levels to come up with the total funds available in the Province. Figure 11.1.2 illustrates the manner of sector fund allocation to respective municipalities from the national and provincial governments with a detailed study flow availing IRA. Interfaces between provincial government and municipalities/barangays are also presented in the same figure.

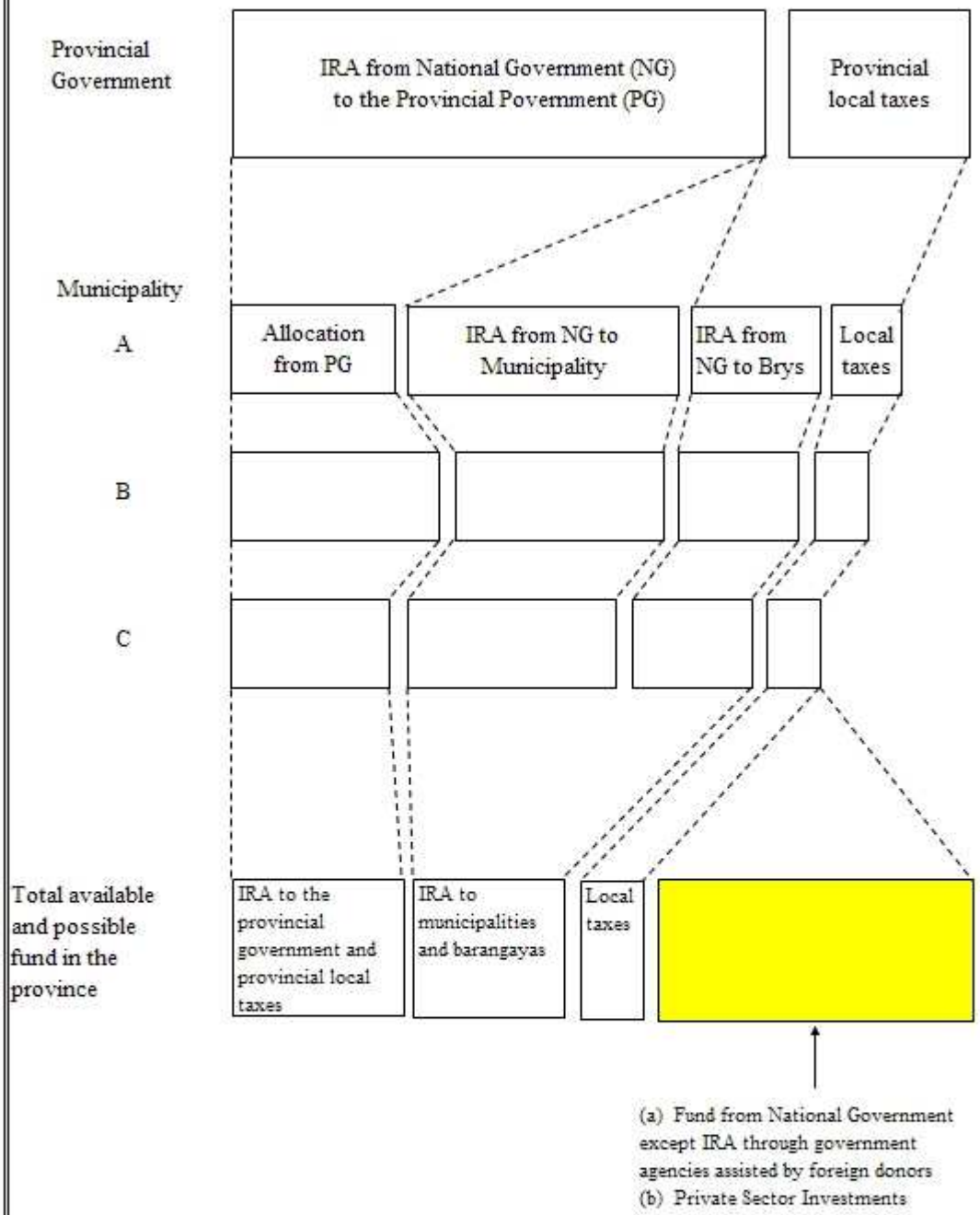
Distribution of IRA down to the municipality level for the planning period is examined based on assumptions and estimates as of 2003.

The Investment Coordination Committee (ICC) of NEDA adopted a policy "to support the financing of devolved activities with social and/or environmental-objectives" based on three considerations, namely: Equity, Externalities and Economies of Scale. Cost-sharing arrangement between the NG and LGUs as revised and approved in January 2003 provides national government subsidy based on income classification of the LGU and the level and type of service. For $1^{st}/2^{nd}$ class provinces and municipalities, Level III water supply facilities will not be provided with NG subsidy while Levels I/II water supply facilities will be provided 30% and sanitation with 20%. For $3^{rd}/4^{th}$ class provinces and municipalities, Level III water supply facilities will be provided with NG subsidy of 20% while Levels I/II water supply facilities and sanitation will be provided 40%. For $5^{th}/6^{th}$ class provinces and municipalities, water supply facilities (all levels) and sanitation will be provided with NG subsidy of 50%.

11.2 Projection of IRA

The projection of IRA to the relevant sector for Phase I period is made covering different administrative levels. Current manner of allocation by the national government is directed to three different governmental levels; province, municipality and barangay. Municipal fund available for this sector is calculated as a sum of municipal and provincial allotments.

Figure 11.1.1 Sector Budget Allocation



Notes: (1) Budget from different sources in the figure above are those shared to water supply and sanitation sector from allotted amount for overall sectors.

(2) Shaded portion above is the potential fund source to be negotiated/arranged to meet target requirements.

FIGURE 11.1.2
GENERAL FLOW OF FINANCIAL ARRANGEMENTS FOR RELEVANT SECTOR DEVELOPMENT

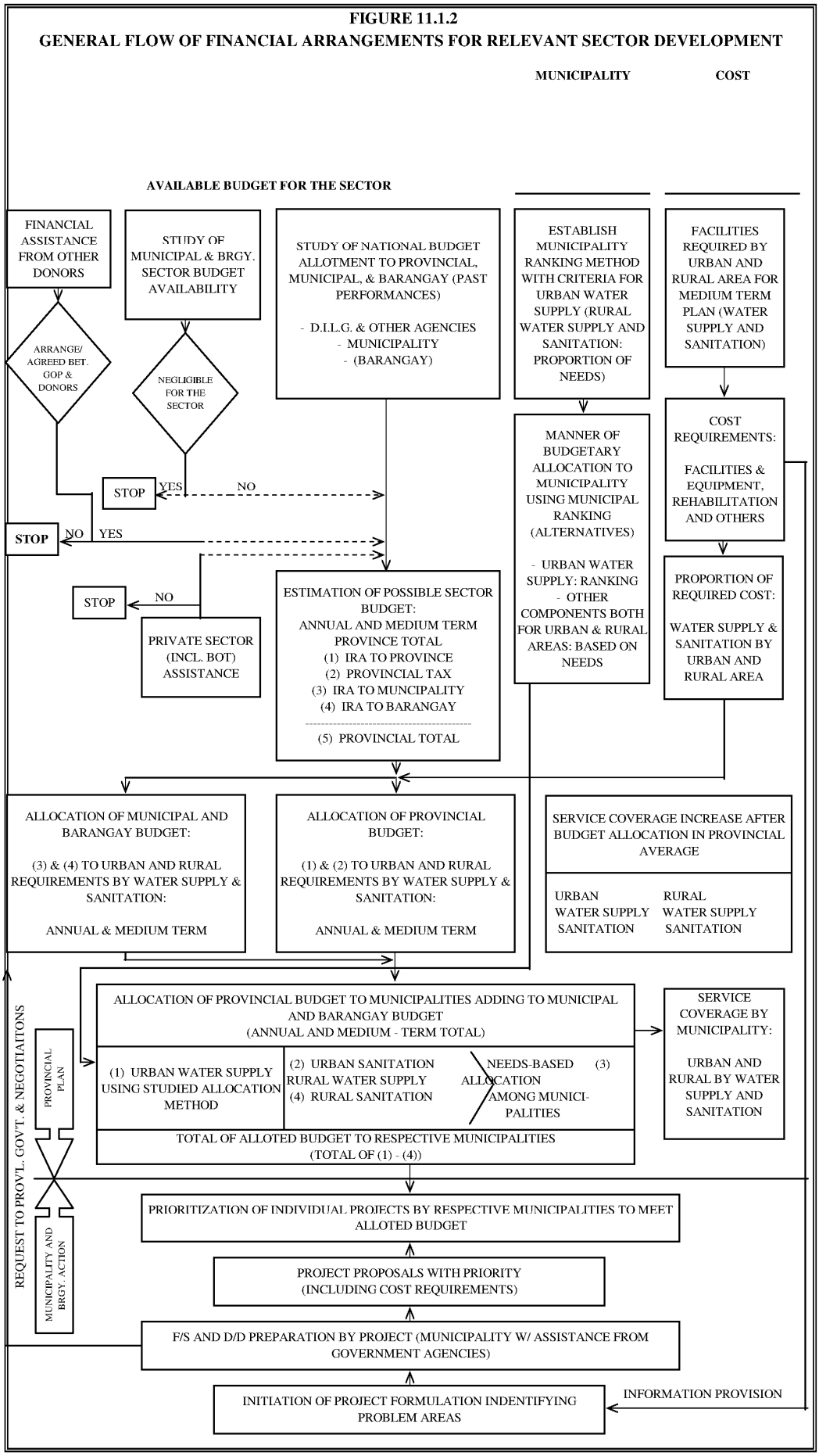


Figure 11.2.1 shows the calculation procedure with assumptions and Tables 11.2.1 and 11.2.2 present the calculation results. The calculation process is further described as follows:

(1) Projection of annual IRA to all LGUs in the Philippines from 2001 to 2005

The IRA projection for the period 2004 to 2005 have been derived as equivalent to 40% of the total revenues of the actual National Internal Revenue Taxes of the 3rd Fiscal Year preceding the current year (e.g. 2001 to 2003). The ratio is based on the Local Government Code (LGC) in 1991. For 2006 to 2010, the projected National Internal Revenue Taxes by DOF served as the basis for projecting the IRA. Projected IRA registered an annual average growth rate of 11% for the period 2004 to 2010.

(2) Distribution of national total IRA to each administrative unit

Based on the LGC, IRA is distributed by administrative level as follows:

Provinces	23%
Cities	23%
Municipalities	34%
Barangays	20%

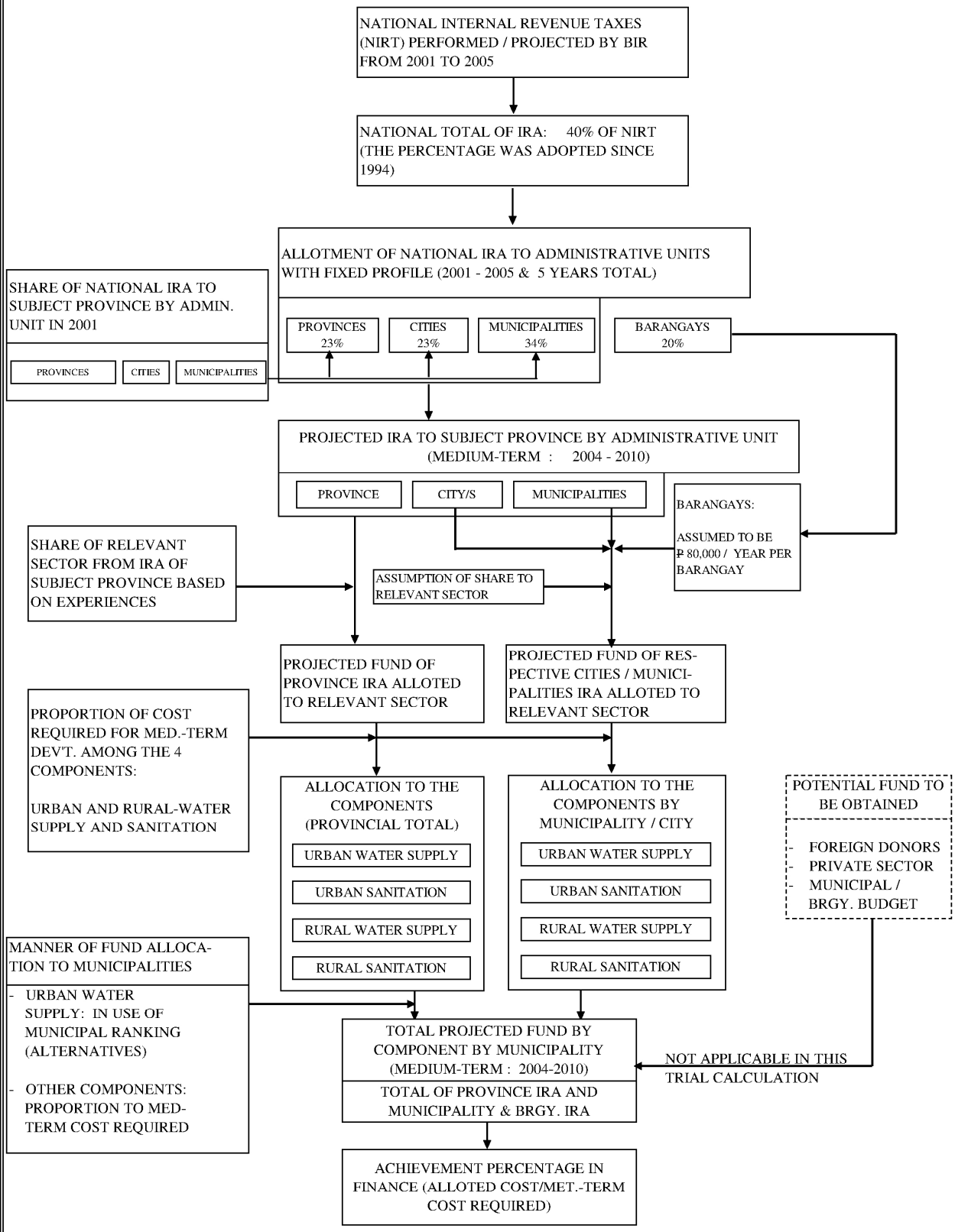
(3) Distribution of national total IRA to the subject province by provincial, municipal and barangay level

With reference to allocation of national IRA by administrative level, provinces and municipalities are based on weighted three (3) factors: population, land area and number of administrative units. In this analysis, however, the distribution percentage experienced in 2003 is employed in projecting IRA for the period 2004-2010 (refer to Table 6.2.2 and Appendix XI). Allotments to barangays are added to the IRAs for municipalities (₱80,000 times the number of barangays).

(4) Projection of available IRA to the relevant sector by administrative unit of the Province

According to the Provincial Annual Report in 2003, less than 2% of the provincial IRA on the average was availed for the water supply and sanitation sector. However, referring to the experience in other provinces, the provincial allocation to the relevant sector is assumed to be about 4%. This means that approximately 20% of "20% Development Fund" from national IRA are allotted on sector projects. In this Plan, the same percentage is applied for the allocation of municipal IRA to the sector.

Figure 11.2.1 TRIAL ALLOCATION OF INTERNAL REVENUE ALLOTMENT (IRA) TO MUNICIPALITIES FOR RELEVANT SECTOR DEVELOPMENT



NOTE: BIR - BUREAU OF INTERNAL REVENUE (DOF)
NIRT (2001-2005) IS THE BASIS OF NATIONAL TOTAL
TOTAL OF IRA (2004-2010)
POTENTIAL FUND: NEEDS OF ADDITIONAL FUND ARE CONSIDERABLE THUS REFERENCE INFORMATION IS SHOWN.

Table 11.2.1 Projected Internal Revenue Allotment for Medium-Term Sector Development

M

Unit: P 1,000

	2004	2005	2006	2007	2008	2009	2010	Total
1 40% of Actual/Projected National Internal Revenue Taxes of the 3rd Fiscal Year preceding the current year	490,423,819	544,370,440	604,251,188	670,718,819	744,497,889	826,392,656	917,295,849	4,797,950,660
2 Internal Revenue Allotment to all LGUs								
(a) province (23%)	112,797,478	125,205,201	138,977,773	154,265,328	171,234,514	190,070,311	210,978,045	1,103,528,652
(b) cities (23%)	112,797,478	125,205,201	138,977,773	154,265,328	171,234,514	190,070,311	210,978,045	1,103,528,652
(c) municipalities (34%)	166,744,099	185,085,949	205,445,404	228,044,398	253,129,282	280,973,503	311,880,589	1,631,303,224
(d) barangays (20%)	98,084,764	108,874,088	120,850,238	134,143,764	148,899,578	165,278,531	183,459,170	959,590,132
(e) total IRA to all LGUs	490,423,819	544,370,440	604,251,188	670,718,819	744,497,889	826,392,656	917,295,849	4,797,950,660
3 Projected IRA to Subject Province by Administrative Unit								
(a) province	1,869,784	2,075,461	2,303,761	2,557,175	2,838,464	3,150,696	3,497,272	18,292,614
(b) municipalities/city including barangays	4,319,166	4,784,515	5,301,052	5,874,408	6,510,834	7,217,267	8,001,407	42,008,649
Alburquerque	48,830	54,105	59,959	66,458	73,672	81,679	90,567	475,270
Alicia	80,944	89,716	99,453	110,261	122,257	135,574	150,355	788,560
Anda	67,922	75,253	83,390	92,422	102,448	113,576	125,929	660,941
Antequera	69,803	77,297	85,615	94,848	105,096	116,472	129,099	678,230
Baclayon	60,123	66,587	73,761	81,726	90,566	100,379	111,271	584,411
Balilihan	76,633	84,790	93,844	103,894	115,050	127,432	141,177	742,821
Batuan	57,384	63,564	70,424	78,038	86,491	95,873	106,287	558,060
Bien Unido	72,702	80,567	89,297	98,988	109,745	121,685	134,938	707,921
Bilar	76,297	84,522	93,652	103,787	115,036	127,523	141,383	742,201
Buenavista	93,070	103,000	114,022	126,257	139,837	154,911	171,643	902,740
Calape	88,084	97,483	107,915	119,496	132,350	146,618	162,455	854,400
Candijay	94,603	104,825	116,171	128,765	142,744	158,261	175,485	920,855
Carmen	130,741	144,867	160,547	177,952	197,272	218,716	242,520	1,272,616
Catigbian	81,206	89,945	99,645	110,412	122,364	135,631	150,356	789,559
Clarin	68,073	75,350	83,427	92,393	102,345	113,391	125,653	660,631
Corella	45,149	50,045	55,479	61,511	68,207	75,640	83,890	439,920
Cortes	55,476	61,455	68,092	75,459	83,636	92,713	102,788	539,617
Dagohoy	68,326	75,710	83,906	93,003	103,102	114,311	126,753	665,111
Danao	80,274	88,954	98,590	109,285	121,157	134,334	148,962	781,555
Dauis	79,942	88,630	98,274	108,978	120,860	134,049	148,689	779,423
Dimiao	73,954	81,781	90,469	100,113	110,817	122,699	135,888	715,723
Duero	71,152	78,794	87,277	96,692	107,144	118,745	131,622	691,426
Garcia Hernandez	84,593	93,634	103,670	114,809	127,174	140,900	156,135	820,915
Getafe	98,038	108,611	120,347	133,374	147,834	163,885	181,701	953,791
Guindulman	121,211	134,377	148,992	165,214	183,220	203,207	225,393	1,181,614
Inabanga	100,517	111,134	122,919	136,000	150,520	166,637	184,527	972,254
Jagna	100,068	110,786	122,682	135,886	150,543	166,813	184,872	971,649
Lila	53,253	58,952	65,278	72,301	80,095	88,747	98,351	516,977
Loay	62,336	68,981	76,358	84,546	93,635	103,724	114,922	604,503
Loboc	66,289	73,334	81,154	89,835	99,470	110,166	122,038	642,285
Loon	125,208	138,391	153,025	169,268	187,298	207,311	229,526	1,210,026
Mabini	89,130	98,741	109,409	121,250	134,394	148,984	165,179	867,089
Maribojoc	65,614	72,638	80,434	89,089	98,695	109,357	121,193	637,020
Panglao	71,695	79,493	88,149	97,758	108,423	120,262	133,403	699,183
Pilar	88,375	97,911	108,497	120,246	133,289	147,766	163,835	859,918
Pres. Carlos P. Garcia	72,817	80,624	89,290	98,910	109,587	121,440	134,596	707,264
Sagbayan	70,699	78,264	86,662	95,984	106,331	117,816	130,565	686,320
San Isidro	53,321	59,081	65,474	72,571	80,448	89,192	98,897	518,985
San Miguel	80,872	89,610	99,309	110,074	122,024	135,288	150,011	787,189
Sevilla	63,007	69,824	77,390	85,788	95,110	105,458	116,944	613,522
Sierra Bullones	99,256	109,981	121,885	135,099	149,766	166,047	184,119	966,154
Sikatuna	46,875	51,944	57,569	63,814	70,746	78,440	86,980	456,368
Tagbilaran City (Capital)	448,395	497,586	552,188	612,797	680,073	754,749	837,639	4,383,427
Talibon	144,828	160,539	177,978	197,335	218,822	242,673	269,147	1,411,321
Trinidad	98,659	109,336	121,187	134,341	148,943	165,150	183,141	960,757
Tubigon	109,239	120,956	133,962	148,399	164,423	182,211	201,955	1,061,144
Ubay	176,462	195,485	216,601	240,040	266,058	294,937	326,993	1,716,576
Valencia	87,721	97,062	107,431	118,941	131,716	145,897	161,638	850,407
(c) Provincial Total	6,188,950	6,859,975	7,604,813	8,431,584	9,349,299	10,367,962	11,498,679	60,301,262

Table 11.2.1 Projected Internal Revenue Allotment for Medium-Term Sector Development

M

Unit: P 1,000

	2004	2005	2006	2007	2008	2009	2010	Total
4 Project fund of IRA to Relevant Sector by Administrative Unit								
(a) province	74,791	83,018	92,150	102,287	113,539	126,028	139,891	731,705
(b) municipalities/city including barangays	170,351	188,706	209,079	231,694	256,797	284,660	315,589	1,656,876
Alburquerque	1,953	2,164	2,398	2,658	2,947	3,267	3,623	19,011
Alicia	3,087	3,421	3,792	4,205	4,662	5,170	5,733	30,070
Anda	2,717	3,010	3,336	3,697	4,098	4,543	5,037	26,438
Antequera	2,792	3,092	3,425	3,794	4,204	4,659	5,164	27,129
Baclayon	2,405	2,663	2,950	3,269	3,623	4,015	4,451	23,376
Balilihan	3,065	3,392	3,754	4,156	4,602	5,097	5,647	29,713
Batuan	2,295	2,543	2,817	3,122	3,460	3,835	4,251	22,322
Bien Unido	2,908	3,223	3,572	3,960	4,390	4,867	5,398	28,317
Bilar	3,052	3,381	3,746	4,151	4,601	5,101	5,655	29,688
Buenavista	3,723	4,120	4,561	5,050	5,593	6,196	6,866	36,110
Calape	3,523	3,899	4,317	4,780	5,294	5,865	6,498	34,176
Candijay	3,784	4,193	4,647	5,151	5,710	6,330	7,019	36,834
Carmen	5,230	5,795	6,422	7,118	7,891	8,749	9,701	50,905
Catigbian	3,248	3,598	3,986	4,416	4,895	5,425	6,014	31,582
Clarin	2,723	3,014	3,337	3,696	4,094	4,536	5,026	26,425
Corella	1,806	2,002	2,219	2,460	2,728	3,026	3,356	17,597
Cortes	2,219	2,458	2,724	3,018	3,345	3,709	4,112	21,585
Dagohoy	2,733	3,028	3,356	3,720	4,124	4,572	5,070	26,604
Danao	3,211	3,558	3,944	4,371	4,846	5,373	5,958	31,262
Dauis	3,198	3,545	3,931	4,359	4,834	5,362	5,948	31,177
Dimiao	2,250	2,488	2,752	3,046	3,371	3,733	4,134	21,773
Duero	2,846	3,152	3,491	3,868	4,286	4,750	5,265	27,657
Garcia Hernandez	3,384	3,745	4,147	4,592	5,087	5,636	6,245	32,837
Getafe	3,922	4,344	4,814	5,335	5,913	6,555	7,268	38,152
Guindulman	4,848	5,375	5,960	6,609	7,329	8,128	9,016	47,265
Inabanga	4,021	4,445	4,917	5,440	6,021	6,665	7,381	38,890
Jagna	4,003	4,431	4,907	5,435	6,022	6,673	7,395	38,866
Lila	1,835	2,031	2,249	2,491	2,760	3,058	3,389	17,812
Loay	2,493	2,759	3,054	3,382	3,745	4,149	4,597	24,180
Loboc	2,652	2,933	3,246	3,593	3,979	4,407	4,882	25,691
Loon	5,008	5,536	6,121	6,771	7,492	8,292	9,181	48,401
Mabini	3,565	3,950	4,376	4,850	5,376	5,959	6,607	34,684
Maribojoc	2,625	2,906	3,217	3,564	3,948	4,374	4,848	25,481
Panglao	2,868	3,180	3,526	3,910	4,337	4,810	5,336	27,967
Pilar	3,535	3,916	4,340	4,810	5,332	5,911	6,553	34,397
Pres. Carlos P. Garcia	2,913	3,225	3,572	3,956	4,383	4,858	5,384	28,291
Sagbayan	2,828	3,131	3,466	3,839	4,253	4,713	5,223	27,453
San Isidro	1,784	1,976	2,190	2,428	2,691	2,984	3,308	17,361
San Miguel	3,235	3,584	3,972	4,403	4,881	5,412	6,000	31,488
Sevilla	1,824	2,022	2,241	2,484	2,754	3,053	3,386	17,764
Sierra Bullones	3,970	4,399	4,875	5,404	5,991	6,642	7,365	38,646
Sikatuna	1,659	1,839	2,038	2,259	2,504	2,777	3,079	16,155
Tagbilaran City (Capital)	17,936	19,903	22,088	24,512	27,203	30,190	33,506	175,337
Talibon	5,793	6,422	7,119	7,893	8,753	9,707	10,766	56,453
Trinidad	3,946	4,373	4,847	5,374	5,958	6,606	7,326	38,430
Tubigon	4,370	4,838	5,358	5,936	6,577	7,288	8,078	42,446
Ubay	7,058	7,819	8,664	9,602	10,642	11,797	13,080	68,663
Valencia	3,509	3,882	4,297	4,758	5,269	5,836	6,466	34,016
(c) Provincial Total	245,142	271,724	301,230	333,981	370,335	410,688	455,480	2,388,580

(5) Available IRA of municipalities by sub-sector

Available municipal fund for the 4 components (urban and rural water supply, and urban and rural sanitation) is estimated as a sum of the respective components in combination of those allocated from the Province and distributed in each municipality. Distribution of sector total fund to sub-components both at the provincial and municipal levels is arranged in proportion to the direct construction cost required for Phase I development.

In the distribution of the provincial IRA for urban water supply to respective municipalities, the weighing method with ranking is employed, which is discussed in detail in Section 11.4. For other components, provincial IRA is distributed to municipalities in proportion to their required costs in Phase I (refer to Table 11.2.2).

The projected provincial IRA to the sector during the period of 2004-2010 is estimated at ₱731.71 million, which is equivalent to 1.21% of the combined provincial and municipal IRA. This percentage is computed based on the result of adjustment using IRA for those municipalities, required cost of which is lower than the allotted IRA. With regard to the allocation of IRA to sub-sectors, urban water supply with ₱ 406.08 million (56%) has the largest allotment while urban and rural sanitation both had the least allotment with ₱30.81 million (4%) and ₱34.95 million (5%), respectively. Rural water supply allocation is ₱259.87 million (35%). The proportion of IRA allotment for the sub-sectors differs by municipality and depends on their priority sub-sectors.

In the allocation of municipal/ city IRA, Tagbilaran City has the largest allotment with ₱ 4.4 billion (7%) followed by the municipality of Ubay with ₱1.7 billion (3%).

11.3 Additional Funding Requirements

Annual cost required for the whole Province during the medium-term development is summarized in Table 11.3.1 referring to the study results in Chapter 10. The total cost required covers physical contingency; 10% of the direct cost and price contingency; 7% per year covering the direct cost and physical contingency, and value added tax. The required cost excluding price contingency was also estimated to compare with available IRA on a current price level. Details of implementation arrangements for annual investment are shown in Table 11.3.1, Appendix XI.

Table 11.3.2 presents the additional funding requirements of the Province on the current price level (or shortfall in funding), which are figured out comparing with available fund for the relevant sector (IRA) in the Province over the Phase I requirements. Other funds such as those provided by foreign assistance and local tax portions are kept blank to supplement upon confirmation the additional funds available. Out of ₱2.7 billion required in 2003 price level for Phase I (2004-2010), IRA can fund ₱2.4 billion or 89% of the requirements. This shows that the Province has available funding of ₱300 million through its IRA inclusive of contingencies, price escalation and value added tax.

Table 11.3.1 Financing Requirement by Sector Component for the Province

M

Unit: P 1,000

Sector Components	2004	2005	2006	2007	2008	2009	2010	Total 2004-2010	Total 2011-2015
Direct Cost									
1. Direct Construction Cost									
Urban Water Supply									
Level III System	0	203,446	203,446	203,446	203,446	101,723	101,723	1,017,232	759,128
Rural Water Supply									
Level II System	0	15,934	15,934	0	0	0	0	31,867	0
Level I Facilities	0	123,819	123,819	123,819	123,819	61,909	61,909	619,094	415,910
Urban Sanitation									
Household toilet	0	0	0	0	0	0	0	0	0
Public school toilet	0	6,822	6,822	6,822	6,822	3,411	3,411	34,110	38,279
Public toilet	0	8,613	8,613	8,613	8,613	4,306	4,306	43,064	69,663
Disinfection of Level I Deep Well and Shallow	36	13	13	13	13	13	13	90	0
Rural Sanitation									
Household toilet	0	0	0	0	0	0	0	0	0
Public school toilet	0	17,510	17,510	17,510	17,510	8,755	8,755	87,549	430,165
Disinfection of Level I Deep Well and Shallow	346	130	130	130	130	130	130	864	510
Urban Sewerage	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1,303,852
Sub-total	382	376,286	376,286	360,353	360,353	180,248	180,248	1,833,870	3,017,508
2. Procurement of Vehicle/Equipment/Maintenance tools									
Well drilling rig and service truck with crane	0	32,674	0	0	0	0	0	32,674	0
Support vehicle	0	720	0	0	0	0	0	720	0
Well rehabilitation equipment	0	342	0	0	0	0	0	342	0
Maintenance tools	0	105	105	105	105	52	52	525	0
Water quality testing kit	0	4	4	4	4	2	2	19	0
Sub-total	0	33,844	109	109	109	54	54	34,279	0
3. Water Quality Laboratory	1,999	0	0	0	0	1	2	2,002	0
4. Sector Management Cost									
Engineering Studies									
Feasibility study and detail design	53,076	38,251	73,635	0	0	0	0	164,962	154,229
Construction supervision	0	15,046	15,046	14,408	14,408	7,204	7,204	73,355	68,546
Institutional Development	24,915	20,598	20,598	18,686	18,686	18,686	6,229	128,399	154,229
Sub-total	77,991	73,895	109,279	33,095	33,095	25,890	13,433	366,716	377,004
Total Direct Cost	80,372	484,026	485,674	393,556	393,556	206,194	193,737	2,236,867	3,394,512
Contingencies									
1. Physical Contingency	8,037	48,403	48,567	39,356	39,356	20,619	19,374	223,711	339,451
2. Price Contingency	0	37,270	77,412	97,424	134,547	91,304	106,711	544,668	N.A
3. Value-Added Tax (VAT)	5,546	46,343	46,508	37,487	37,487	18,751	18,751	210,872	N.A
Total Investment Cost	**93,955**	**616,041**	**658,160**	**567,822**	**604,946**	**336,868**	**338,573**	**3,216,118**	**3,733,963**
Total Investment Cost (excluding Price Contingency)	**93,955**	**578,771**	**580,749**	**470,399**	**470,399**	**245,564**	**231,862**	**2,671,698**	**3,733,963**

Note: Institutional development includes:

1. Capacity ehancement programs,
2. Community management program,
3. Health and hygiene educations,
4. Water quality surveillance, and
5. Administrative support.

Table 11.3.2 Additional Fund Requirement for the Medium-Term Plan

Unit: ₱ 1,000

Particulars	2004	2005	2006	2007	2008	2009	2010	Total 2004-2010
Financing Requirement	93,955	578,771	580,749	470,399	470,399	245,564	231,862	2,671,698
Expected available fund National Local (IRA) Others	245,142	271,724	301,230	333,981	370,335	410,688	455,480	2,388,580
Total	245,142	271,724	301,230	333,981	370,335	410,688	455,480	2,388,580
Shortfall in funding	(151,187)	307,047	279,519	136,418	100,064	(165,124)	(223,618)	283,118
(Additional Fund Requirements)	(159,502)	341,751	328,223	168,997	130,779	(227,680)	(325,292)	810,248

Note:
Shortfall in funding: above - current year price level.
below - current year price escalated at 5.5% per year.
Expected available fund is equivalent to 20% of 20% Development Fund.

Municipal achievement percentages in finance (2003 price level) are shown in Table 11.3.3 in the provision of available fund from IRA against Phase I financial requirements. The municipalities with the highest financial coverage at 100% are Alicia, Dimiao, Lila, San Isidro, Sevilla and Sikatuna. The rest of the municipalities are in the ranges between 60% and 99% to the respective requirements, while provincial average is 89%.

11.4 Medium-Term Implementation Arrangements

The financial requirements to meet Phase I target coverage are substantial. However, projected funding available (IRA) by applying past trend revealed that considerable amount of additional fund must be arranged. Under this situation, reference scenarios are discussed with the assumption of different levels of funding availability with reference to service coverage. Alternative countermeasures are also discussed in view of (1) acquisition of external funds, (2) augmentation of sector finance under current arrangements (IRA and others), (3) introduction of private sector participation to mitigate public investment needs, and (4) effective and economical investments.

11.4.1 Reference Scenarios in Different Funding Levels

Achievement levels of service coverage in the target year are examined in assumption of five funding levels. It is regarded that the service coverage is increased in proportion to the investment during Phase I period. The relationships between funding levels and corresponding percentages of service coverage are illustrated in Figure 11.4.1 and Figure 11.4.2 for water supply and sanitation sectors, respectively.

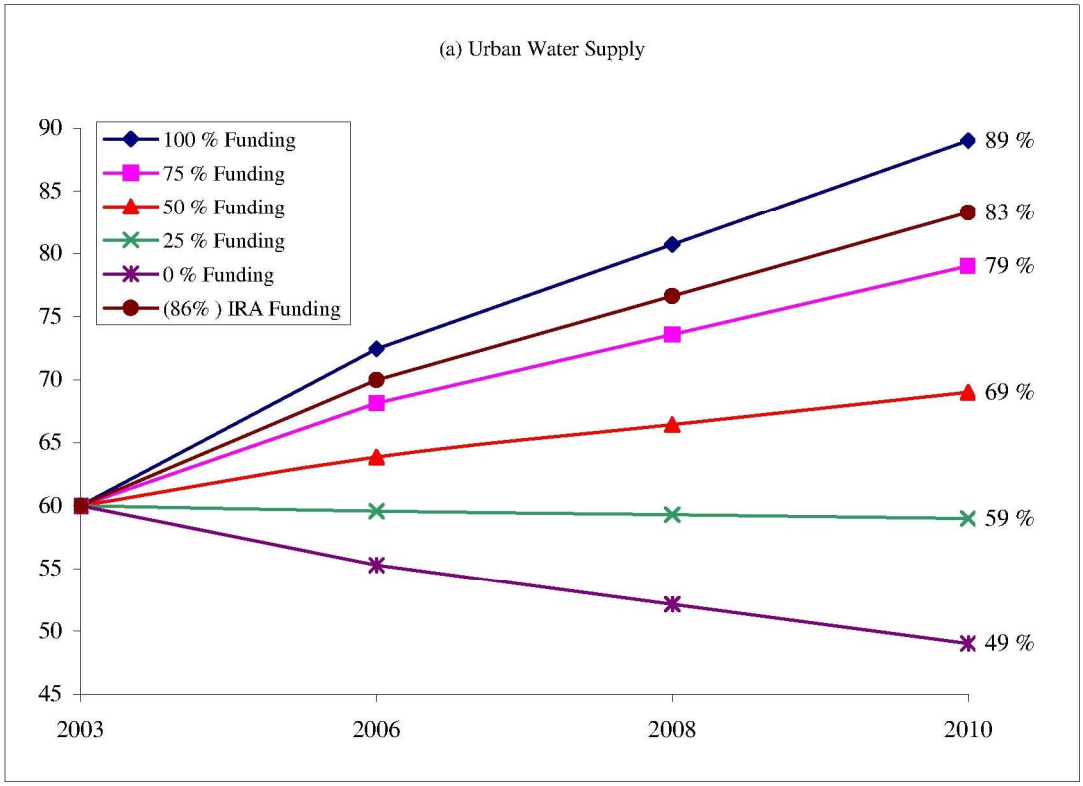
Table 11.3.3 Internal Revenue Allotment for Water Supply and Sanitation Sector by Municipality
(Medium-term Development, 2004 - 2010)

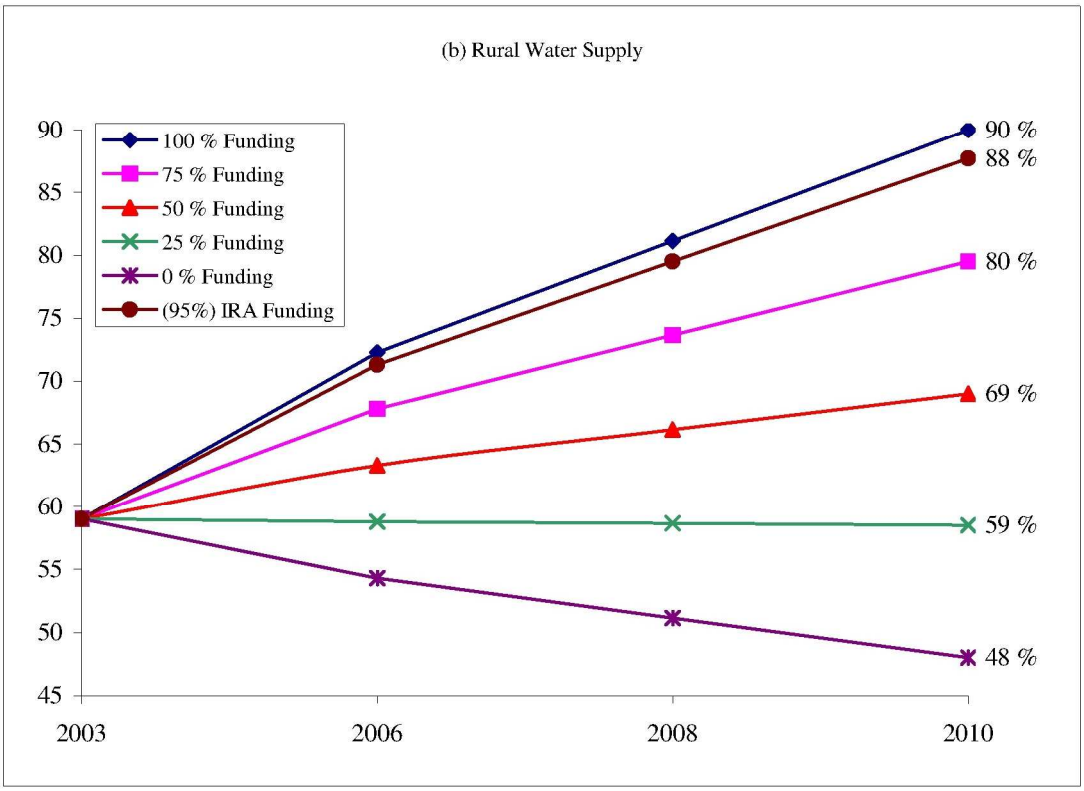
M

Unit: P 1,000

Name of Municipality/City	IRA Allocation to Municipalities												Available Fund of Municipality (a)	Phase I Investment Cost Requirement (b)	Achievement Percentage (%) in Finance (a)/(b)
	Urban Water Supply			Rural Water Supply			Urban Sanitation			Rural Sanitation					
	Allotted from Provincial Government	Allotted Municipality Fund	Total	Allotted from Provincial Government	Allotted Municipality Fund	Total	Allotted from Provincial Government	Allotted Municipality Fund	Total	Allotted from Provincial Government	Allotted Municipality Fund	Total			
Alburquerque	4,395	10,141	14,536	3,844	7,687	11,530	0	423	423		760	760	27,249	27,655	99
Alicia	0	9,393	9,393	0	16,195	16,195	0	615	615		3,867	3,867	30,070	30,070	100
Anda	2,851	8,778	11,629	5,735	15,148	20,883		458	458		2,054	2,054	35,024	35,546	99
Antequera	2,367	8,445	10,812	5,239	15,988	21,227		1,421	1,421		1,275	1,275	34,735	35,253	99
Baclayon	11,214	7,504	18,718	12,242	14,731	26,973	733	486	1,219	1,843	655	2,497	49,408	59,175	83
Balilihan	1,942	9,679	11,621	4,020	17,716	21,736		505	505		1,813	1,813	35,675	36,206	99
Batuan	2,865	10,097	12,962	3,469	10,481	13,950		472	472		1,272	1,272	28,656	29,083	99
Bien Unido	32,622	24,809	57,431	2,722	1,076	3,798	1,809	2,197	4,006	82	235	317	65,552	66,528	99
Bilar	1,349	13,795	15,144	1,554	12,804	14,359		1,105	1,105		1,983	1,983	32,591	33,076	99
Buenavista	4,250	11,635	15,885	8,943	21,240	30,183		444	444		2,791	2,791	49,303	50,038	99
Calape	13,179	18,233	31,412	8,816	13,251	22,067	867	920	1,787	2,297	1,772	4,069	59,335	63,910	93
Candijay	13,179	22,860	36,039	7,337	10,820	18,157	1,187	1,612	2,799	2,145	1,542	3,688	60,682	65,974	92
Carmen	14,232	26,444	40,676	10,015	18,678	28,693	1,355	2,244	3,600	1,795	3,539	5,333	78,302	79,468	99
Catigbian	2,586	11,417	14,003	4,567	16,513	21,080		989	989		2,663	2,663	38,735	39,312	99
Clarin	5,939	12,296	18,235	6,608	11,109	17,717	215	1,185	1,399		1,835	1,835	39,187	39,771	99
Corella	17	3,473	3,490	71	12,917	12,988		1,207	1,207				17,685	17,948	99
Cortes	6,546	7,241	13,787	9,148	13,453	22,601	564	319	883	1,691	572	2,263	39,534	41,706	95
Dagohoy	1,879	10,010	11,889	3,114	12,771	15,885	0	1,532	1,532		2,292	2,292	31,597	32,068	99
Danao	1,413	12,865	14,278	2,019	14,852	16,871		1,093	1,093		2,452	2,452	34,694	35,211	99
Dauis	19,650	18,835	38,485	7,509	9,648	17,156	1,170	1,362	2,532	2,145	1,332	3,477	61,650	64,652	95
Dimiao	0	5,833	5,834	0	13,051	13,051		1,231	1,231		1,657	1,657	21,773	21,773	100
Duero	478	15,224	15,702	391	9,734	10,125		588	588		2,111	2,111	28,526	28,951	99
Garcia Hernandez	5,510	17,140	22,650	5,046	12,355	17,401		1,283	1,283		2,060	2,060	43,393	44,039	99
Getafe	22,090	23,932	46,022	7,762	10,726	18,488	1,507	2,078	3,585	2,145	1,415	3,561	71,655	74,458	96
Guindulman	2,843	20,098	22,941	3,843	22,343	26,187		1,485	1,485		3,338	3,338	53,951	54,754	99
Inabanga	13,179	16,137	29,316	13,163	17,782	30,945	1,844	2,313	4,156	3,053	2,658	5,711	70,129	88,906	79
Jagna	13,179	22,768	35,947	6,932	11,159	18,092	1,507	2,528	4,035	952	2,411	3,362	61,436	62,351	99
Lila		8,911	8,911		7,181	7,181		615	615		1,105	1,105	17,812	17,812	100
Loay	9,579	12,179	21,758	7,349	10,713	18,061	733	679	1,412	1,358	609	1,967	43,198	43,841	99
Loboc	2,061	10,026	12,087	3,221	14,660	17,881	0	1,006	1,006				30,974	31,435	99
Loon	13,179	25,865	39,044	10,608	18,214	28,822	1,524	2,395	3,919	2,297	1,927	4,224	76,009	83,243	91
Mabini	11,769	21,227	32,996	6,465	10,265	16,730	867	1,090	1,957	129	2,101	2,230	53,914	54,717	99
Maribojoc	13,179	17,068	30,247	5,695	6,236	11,931	1,373	1,662	3,034	1,691	515	2,206	47,419	54,688	87
Panglao	13,179	19,820	32,999	5,749	5,904	11,653	1,507	1,763	3,270	1,691	480	2,172	50,094	64,336	78
Pilar	3,503	13,140	16,643	5,669	15,475	21,144	0	2,345	2,345	0	3,438	3,438	43,569	44,218	99
Pres. Carlos P. Garcia	14,144	18,385	32,529	5,168	6,381	11,549	1,373	1,986	3,359	1,081	1,538	2,619	50,056	50,802	99
Sagbayan	5,333	10,452	15,785	8,072	14,395	22,468	602	803	1,405		1,802	1,802	41,460	42,078	99
San Isidro					15,088	15,088		615	615		1,657	1,657	17,361	17,361	100
San Miguel	702	9,443	10,145	1,639	17,369	19,007		1,129	1,129		3,547	3,547	33,828	34,332	99
Sevilla	0	6,603	6,603	0	8,889	8,889		615	615		1,657	1,657	17,764	17,764	100
Sierra Bullones	13,179	26,315	39,494	5,846	9,089	14,935	719	1,081	1,800		2,162	2,162	58,391	59,261	99
Sikatuna		4,151	4,151		9,053	9,053		1,846	1,846		1,105	1,105	16,155	16,155	100
Tagbilaran City (Capital)	13,179	168,235	181,414				3,945	7,103	11,047				192,461	319,889	60
Talibon	63,002	41,972	104,974	9,170	10,271	19,441	2,263	2,686	4,949	2,448	1,523	3,971	133,336	143,294	93
Trinidad	2,516	10,804	13,320	6,432	23,110	29,542		984	984		3,532	3,532	47,378	48,083	99
Tubigon	13,179	26,678	39,857	11,321	12,802	24,123	1,641	1,715	3,356	2,297	1,251	3,547	70,883	112,485	63
Ubay	13,179	25,486	38,665	18,698	35,629	54,326	1,507	2,374	3,881	3,810	5,174	8,984	105,856	117,292	90
Valencia	1,462	8,134	9,596	4,655	22,034	26,688		1,542	1,542		2,307	2,307	40,133	40,730	99
Total	406,081	863,974	1,270,056	259,865	636,986	896,851	30,808	68,129	98,937	34,950	87,787	122,736	2,388,580	2,671,698	89

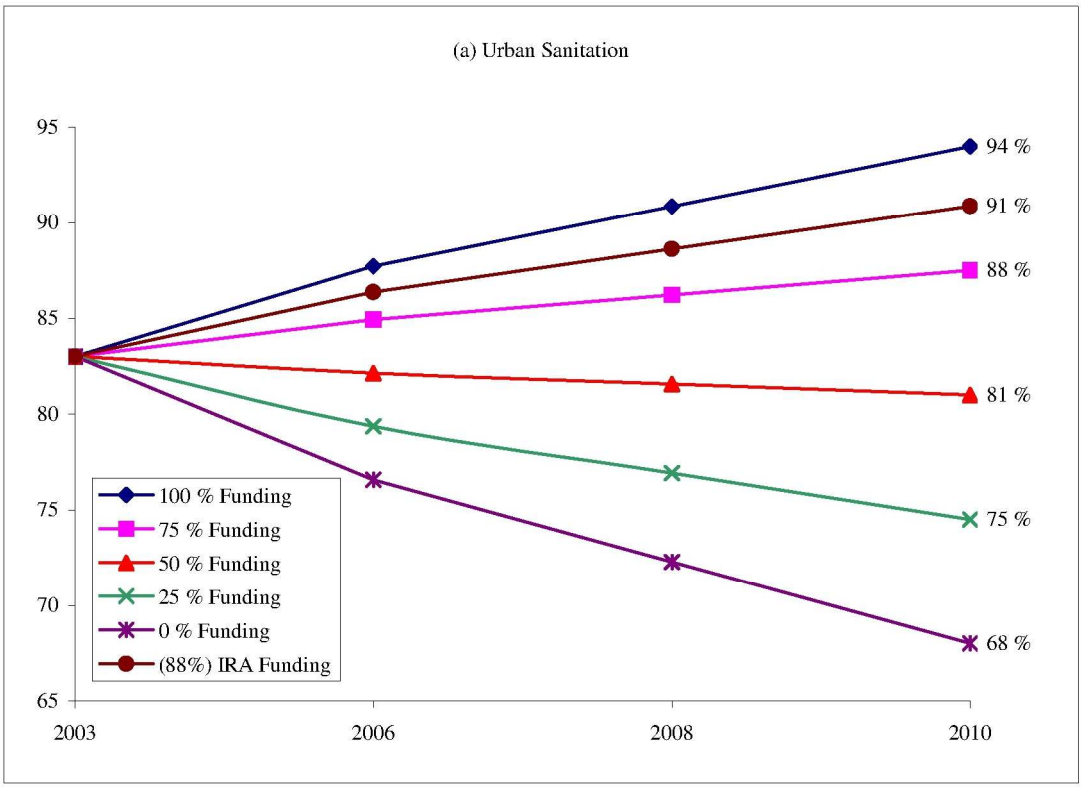
Figure 11.4.1 Relation Between Funding Levels and Percent of Coverage for Water Supply Sector

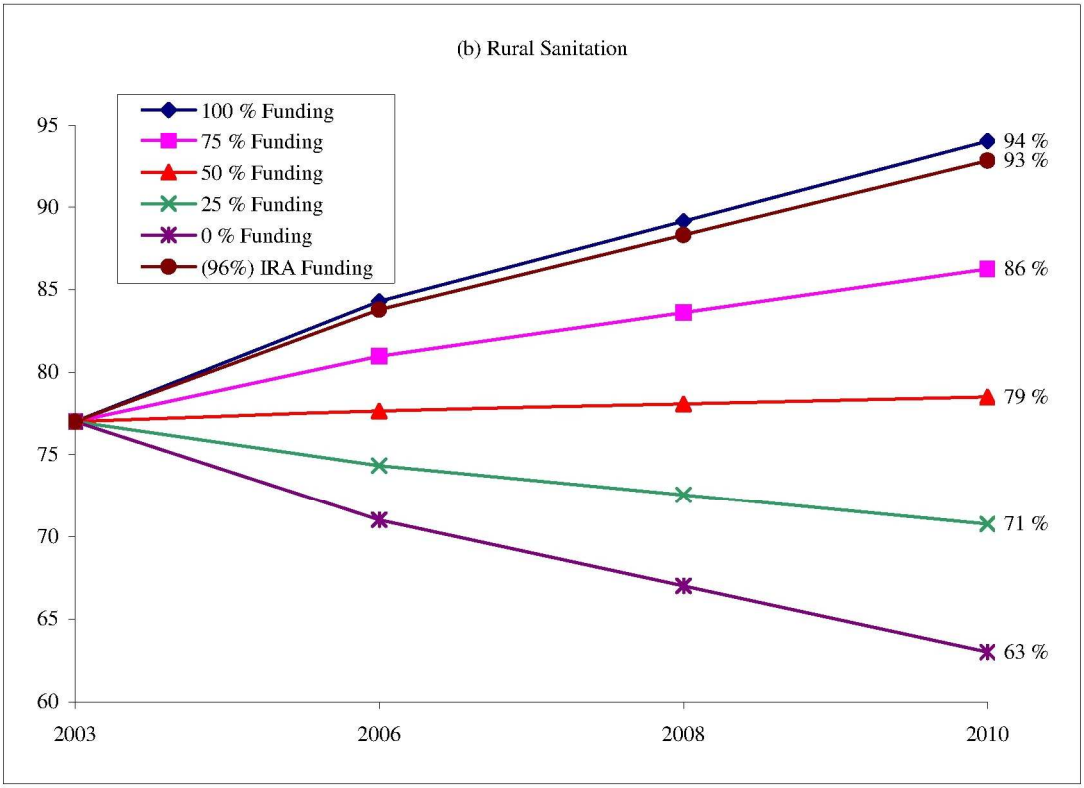




Note: Percentages of the coverage between 2003 and 2010 are simply prorated as the reference

Figure 11.4.2 Relation Between Funding Levels and Percent of Coverage for Sanitation Sector





Note: Percentages of the coverage between 2003 and 2010 are simply prorated as the reference

Three reference scenarios are discussed with respect to different levels of funding. These scenarios are referred to with alternative countermeasures discussed in Section 11.4.2. Using computer-based programs, these scenarios may be modified by policy makers according to updated information and policy on the available fund and sector targets.

(1) The First Reference Scenario

No funding constraints are considered in this scenario to realize Phase I development as planned. This scenario is too optimistic based on the past experience of the province.

(2) The Second Reference Scenario

An intermediate scenario with 50-75 % funding ranges is considered. Urban and rural water supply coverage in the year 2010 is attained between 69-79% and between 69-80%, respectively. For urban and rural sanitation, coverage will reach 81-88% and 79-86%, respectively based on the assumption that required private investments are followed.

(3) The Third Reference Scenario

In the scenario of 25% funding against the total requirements of Phase I, urban and rural water supply coverage in the year 2010 will both be attained at 59%, while urban and rural sanitation coverage will be at 75% and 71%, respectively. All sub-sectors will not be able to keep current service levels.The allocated IRA funding of urban and rural water supply in the year 2010 will be 86% and 95% which will cover 83% and 88% of the population. In order to attain the Phase I development target of 89% and 90% service coverage, it needs an additional IRA funding of 6% and 2%, respectively.

For urban and rural sanitation, 100% funding shall have coverage percentage of 94% for both. However, at IRA funding of 88% and 96%, service coverage will only be at 91% and 93%, respectively for urban and rural sanitation. Thus, to meet the Phase I development targets of 94% of the population, an additional IRA funding of 3% and 1% is required respectively for urban and rural sanitation.

11.4.2 Alternative Countermeasures

This sub-section presents the means of financing the shortfall for the investment program.

(1) Acquisition of external funds

Foreign assistance has played a significant role in the development of the relevant sector in the past. Negotiations with the central government agencies (DILG, LWUA, etc.) are requisites to access the foreign funds. Development of new local financial mechanism is also needed for LGUs under current policy shifts to increase the opportunities of LGUs undertaking foreign-assisted projects.

(2) Augmentation of sector finance under current arrangements

Increase of the IRA to the Relevant Sector

Increase of IRA from the national government to LGUs is at first needed along with current procedure. LGUs shall also arrange the funds with a priority to the relevant sector.

Local Taxes

More allocation of local taxes to the relevant sector shall be arranged although the share of local taxes in the provincial total budget is small.

Utilization of Other Local Funds

The utilization of other funds, the Countryside Development Fund (CDF) in particular, shall be sought for development of the relevant sector.

(3) Introduction of private sector

Privatization of Level III Waterworks System

Privatization of Level III systems helps expedite sector development and sustainability of the system as suggested by NEDA Board Resolution No. 4 (series 1994).

LGU Guarantee Organization

An LGU Guarantee Organization as a public-private corporation managed by private sector in the national level shall be studied to encourage private financing for the development of environmental infrastructure, which is introduced in other developing countries. The organization will guarantee local private loans to LGUs using a longer term financing.

(4) Effective and economical investment

Investment Need Ranking of Municipalities

Investment need ranking of the municipalities is discussed as a guide for implementation of PW4SP and a measure for effective and economical public investment. Referring to this ranking, the Provincial Government will arrange its financial resources more effectively.

The ranking for urban water supply is specifically studied considering three factors, while a sole factor of additional requirements is assumed to coincide with the priority of other sub-sectors. Evaluation of concerned sub-sectors is finally presented in the context of comprehensive improvement of this sector. The result for urban water supply is employed for allocation of the provincial IRA to the municipalities in the concerned sub-sector. The ranking may be availed for the huge investment using the funds to be provided by other donors in the future.

For urban water supply component, the ranking criteria comprise three essential evaluation factors, namely: (a) percentage of underserved and unserved population in the base year; (b) percentage of underserved and unserved population in Phase I; and (c) percentage of population unserved by Level III Systems in the base year. First, these factors are scored by the range of underserved and unserved percentage and totaled by municipality applying the weighing method. Adopted weight to the factors (a), (b) and (c) are 50%, 35% and 15%, respectively. Table 11.4.1 shows the ranking procedures, overall weighted score and investment need ranking of the municipalities.

With reference to the provincial fund allocation, it is assumed that 60% of the fund for urban water supply from the Provincial Government is distributed to the top 11 municipalities, while the remaining 40% are equally distributed to the rest of the municipalities. The result of distribution is shown in Table 11.4.2. The available funds for about half of the municipalities are adequate to meet the Phase I requirements for urban water supply.

To come up with the ranking of the municipalities, scoring method is also employed for other sub-sectors. The score is derived from the range of underserved and unserved percentage in the base year. Investment need ranking of municipalities covering four sub-sectors is shown in Table 11.4.3 (refer to ranking procedures in Table 11.4.1, Appendix XI). The top ranking municipalities are Bien Unido, Carmen, Dagohoy, Dauis, Getafe, Guindulman, Loay, Pilar, Pres. Carlos P. Garcia, San Miguel and Talibon, which indicate that they are given priority for investments in all sub-sectors. The municipalities of Baclayon, Danao, Loon and Valencia are the least priority in terms of investment ranking.

11.5 National Government Assisted Level I Water Supply and Sanitation Project

Of the overall project requirements for the medium-term development, those for water supply and sanitation improvement with possible assistance from the NG were studied by applying the new cost-sharing arrangement. The project components with scope of work and financial viability were studied. The project is a part of medium-term development plan for water supply and sanitation for the different classes of the municipality. The DILG shall be the Executing Agency and the Province, the Implementing Agency.

11.5.1 Project Components

(1) Water Supply and Sanitation Component

All municipalities are eligible for NG assistance in financing Levels I/II water supply and sanitation components. Tagbilaran City is eligible for NG assistance in financing sanitation component but not Level III water supply facilities. Level I facilities for the municipalities consist of 693 deep wells, 1,734 shallow wells and 125 spring development while Level II facilities consist of 21 systems and 420 communal faucets.

Table 11.4.1 Municipal Investment Need Ranking for Urban Water Supply

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Name of Municipality/City	Evaluation Factor			Scoring by the Factor			Overall Weighted Score	Investment Need Ranking
	% of Underserved and Unserved Population in Base Year	% of Underserved and Unserved Population in Phase I	% of Population Unserved by Level III Systems in Base Year	Underserved and Unserved Population in Base Year	Underserved and Unserved Population in Phase I	Population Unserved by Level III Systems in Base Year		
Alburquerque	53	62	72	1.00	1.00	0.80	0.97	12
Alicia	16	31	19	0.40	0.60	0.20	0.44	31
Anda	22	36	22	0.60	0.60	0.40	0.57	22
Antequera		18	6	0.20	0.40	0.20	0.27	37
Baclayon	4	21	10	0.20	0.40	0.20	0.27	37
Balilihan		18	25	0.20	0.40	0.40	0.30	36
Batuan		18	45	0.20	0.40	0.60	0.33	34
Bien Unido	72	78	81	1.00	1.00	1.00	1.00	1
Bilar		18	19	0.20	0.40	0.20	0.27	37
Buenavista	59	67	59	1.00	1.00	0.60	0.94	14
Calape	16	32	27	0.40	0.60	0.40	0.47	29
Candijay	47	57	62	1.00	0.80	0.80	0.90	15
Carmen	91	93	100	1.00	1.00	1.00	1.00	1
Catigbian	34	46	48	0.80	0.80	0.60	0.77	18
Clarin	24	38	26	0.60	0.60	0.40	0.57	22
Corella		18		0.20	0.40	0.20	0.27	37
Cortes	12	28	27	0.40	0.40	0.40	0.40	32
Dagohoy	71	76	100	1.00	1.00	1.00	1.00	1
Danao	1	19	14	0.20	0.40	0.20	0.27	37
Dauis	93	94	100	1.00	1.00	1.00	1.00	1
Dimiao	5	22	14	0.20	0.40	0.20	0.27	37
Duero		18	7	0.20	0.40	0.20	0.27	37
Garcia Hernandez	25	39	29	0.60	0.60	0.40	0.57	22
Getafe	91	92	100	1.00	1.00	1.00	1.00	1
Guindulman	53	62	60	1.00	1.00	1.00	1.00	1
Inabanga	60	67	75	1.00	1.00	0.80	0.97	12
Jagna	14	29	20	0.40	0.40	1.00	0.49	28
Lila	7	24	7	0.20	0.40	0.20	0.27	37
Loay	72	77	100	1.00	1.00	1.00	1.00	1
Loboc	21	36	24	0.60	0.60	0.40	0.57	22
Loon	1	20	12	0.20	0.40	0.20	0.27	37
Mabini	12	28	26	0.40	0.40	0.40	0.40	32
Maribojoc	24	38	36	0.60	0.60	0.40	0.57	22
Panglao	32	45	36	0.80	0.60	0.40	0.67	20
Pilar	96	97	100	1.00	1.00	1.00	1.00	1
Pres. Carlos P. Garcia	92	94	100	1.00	1.00	1.00	1.00	1
Sagbayan		18	46	0.20	0.40	0.60	0.33	34
San Isidro				0.20	0.20	0.20	0.20	48
San Miguel	73	78	100	1.00	1.00	1.00	1.00	1
Sevilla	27	40	48	0.60	0.60	0.60	0.60	21
Sierra Bullones	21	35	23	0.60	0.60	0.40	0.57	22
Sikatuna		18	7	0.20	0.40	0.20	0.27	37
Tagbilaran City (Capital)	20	34	26	0.40	0.60	0.40	0.47	29
Talibon	87	90	100	1.00	1.00	1.00	1.00	1
Trinidad	38	49	76	0.80	0.80	0.80	0.80	17
Tubigon	37	48	55	0.80	0.80	0.60	0.77	18
Ubay	49	58	59	1.00	0.80	0.60	0.87	16
Valencia		18	6	0.20	0.40	0.20	0.27	37
Provincial Total	40	51	51					

Note: 1. Scoring to Underserved and Unserved Percentage. 2. Weight Allocation to Score.

Score	Range of Underserved and Unserved Percentage		
	50	35	15
	Allocated Weight		
1.0	41 < %	61 < %	81 < %
0.8	31 < % < 40	46 < % < 60	61 < % < 80
0.6	21 < % < 30	31 < % < 45	41 < % < 60
0.4	11 < % < 20	16 < % < 30	21 < % < 40
0.2	% < 10	% < 15	% < 20

Table 11.4.2 Distribution of Provincial IRA to Municipalities for Urban Water Supply

M

Unit: P 1,000

Ranking	Name of Municipality/City	Fund Distribution		IRA to Municipalities from National Government (2)	Available Fund Distributed to Municipalities (1) + (2)	Phase I Requirements	Accomplishment Percentage (%)
		Fund Distribution from Provincial Government (1)	Distribution Percentage (%)				
12	Alburquerque	4,395	1.08	10,141	14,536	14,753	99
31	Alicia	0	0.00	9,393	9,393	9,393	100
22	Anda	2,851	0.70	8,778	11,629	11,802	99
37	Antequera	2,367	0.58	8,445	10,812	10,974	99
37	Baclayon	11,214	2.76	7,504	18,718	18,996	99
36	Balilihan	1,942	0.48	9,679	11,621	11,794	99
34	Batuan	2,865	0.71	10,097	12,962	13,155	99
1	Bien Unido	32,622	8.03	24,809	57,431	58,286	99
37	Bilar	1,349	0.33	13,795	15,144	15,370	99
14	Buenavista	4,250	1.05	11,635	15,885	16,122	99
29	Calape	13,179	3.25	18,233	31,412	34,096	92
15	Candijay	13,179	3.25	22,860	36,039	40,944	88
1	Carmen	14,232	3.50	26,444	40,676	41,282	99
18	Catigbian	2,586	0.64	11,417	14,003	14,211	99
22	Clarin	5,939	1.46	12,296	18,235	18,506	99
37	Corella	17	0.00	3,473	3,490	3,542	99
32	Cortes	6,546	1.61	7,241	13,787	13,992	99
1	Dagohoy	1,879	0.46	10,010	11,889	12,066	99
37	Danao	1,413	0.35	12,865	14,278	14,491	99
1	Dauis	19,650	4.84	18,835	38,485	39,058	99
37	Dimiao	0	0.00	5,833	5,834	5,833	100
37	Duero	478	0.12	15,224	15,702	15,936	99
22	Garcia Hernandez	5,510	1.36	17,140	22,650	22,987	99
1	Getafe	22,090	5.44	23,932	46,022	46,707	99
1	Guindulman	2,843	0.70	20,098	22,941	23,283	99
12	Inabanga	13,179	3.25	16,137	29,316	36,891	79
28	Jagna	13,179	3.25	22,768	35,947	36,525	98
37	Lila			8,911	8,911	8,911	100
1	Loay	9,579	2.36	12,179	21,758	22,082	99
22	Loboc	2,061	0.51	10,026	12,087	12,267	99
37	Loon	13,179	3.25	25,865	39,044	44,484	88
32	Mabini	11,769	2.90	21,227	32,996	33,487	99
22	Maribojoc	13,179	3.25	17,068	30,247	36,632	83
20	Panglao	13,179	3.25	19,820	32,999	45,594	72
1	Pilar	3,503	0.86	13,140	16,643	16,891	99
1	Pres. Carlos P. Garcia	14,144	3.48	18,385	32,529	33,014	99
34	Sagbayan	5,333	1.31	10,452	15,785	16,021	99
48	San Isidro						
1	San Miguel	702	0.17	9,443	10,145	10,296	99
21	Sevilla	0	0.00	6,603	6,603	6,603	100
22	Sierra Bullones	13,179	3.25	26,315	39,494	40,352	98
37	Sikatuna			4,151	4,151	4,151	100
29	Tagbilaran City (Capital)	13,179	3.25	168,235	181,414	306,931	59
1	Talibon	63,002	15.51	41,972	104,974	106,537	99
17	Trinidad	2,516	0.62	10,804	13,320	13,518	99
18	Tubigon	13,179	3.25	26,678	39,857	70,698	56
16	Ubay	13,179	3.25	25,486	38,665	43,535	89
37	Valencia	1,462	0.36	8,134	9,596	9,739	99
Total		406,081	100	863,974	1,270,056	1,482,738	86

Table 11.4.3 Municipal Investment Need Ranking

M

Name of Municipality/City	Weighted Score by Sub-sector					Synthetic
	Urban Water Supply	Rural Water Supply	Urban Sanitation	Rural Sanitation	Total Weighted Score	Municipal Investment Need Ranking
Alburquerque	0.24	0.05	0.25	0.05	0.59	16
Alicia	0.11	0.15	0.05	0.05	0.36	35
Anda	0.14	0.25	0.25	0.15	0.79	4
Antequera	0.07	0.05	0.10	0.05	0.27	40
Baclayon	0.07	0.05	0.05	0.05	0.22	43
Balilihan	0.08	0.15	0.05	0.05	0.33	38
Batuan	0.08	0.15	0.05	0.05	0.33	38
Bien Unido	0.25	0.25	0.25	0.25	1.00	1
Bilar	0.07	0.05	0.20	0.10	0.42	27
Buenavista	0.24	0.20	0.25	0.25	0.94	2
Calape	0.12	0.05	0.25	0.15	0.57	19
Candijay	0.23	0.05	0.05	0.05	0.38	33
Carmen	0.25	0.20	0.25	0.05	0.75	6
Catigbian	0.19	0.25	0.05	0.10	0.59	17
Clarin	0.14	0.25	0.10	0.05	0.54	21
Corella	0.07	0.05	0.05	0.05	0.22	43
Cortes	0.10	0.05	0.05	0.05	0.25	41
Dagohoy	0.25	0.25	0.05	0.05	0.60	14
Danao	0.07	0.05	0.05	0.05	0.22	43
Dauis	0.25	0.05	0.20	0.05	0.55	20
Dimiao	0.07	0.25	0.05	0.05	0.42	28
Duero	0.07	0.05	0.05	0.05	0.22	43
Garcia Hernandez	0.14	0.25	0.10	0.05	0.54	21
Getafe	0.25	0.25	0.15	0.05	0.70	7
Guindulman	0.25	0.15	0.25	0.05	0.70	7
Inabanga	0.24	0.20	0.15	0.20	0.79	4
Jagna	0.12	0.25	0.05	0.05	0.47	25
Lila	0.07	0.20	0.05	0.25	0.57	18
Loay	0.25	0.05	0.05	0.05	0.40	30
Loboc	0.14	0.05	0.25	0.1	0.54	21
Loon	0.07	0.05	0.05	0.05	0.22	43
Mabini	0.1	0.05	0.05	0.05	0.25	41
Maribojoc	0.14	0.05	0.2	0.05	0.44	26
Panglao	0.17	0.05	0.1	0.05	0.37	34
Pilar	0.25	0.25	0.1	0.05	0.65	13
Pres. Carlos P. Garcia	0.25	0.25	0.25	0.1	0.85	3
Sagbayan	0.08	0.1	0.1	0.05	0.33	37
San Isidro	0.05	0.05	0.25	0.05	0.4	30
San Miguel	0.25	0.25	0.05	0.05	0.6	14
Sevilla	0.15	0.05	0.1	0.05	0.35	36
Sierra Bullones	0.14	0.05	0.15	0.05	0.39	32
Sikatuna	0.07	0.25	0.05	0.05	0.42	28
Tagbilaran City (Capital)	0.12	0.25	0.05	0.25	0.67	12
Talibon	0.25	0.2	0.1	0.15	0.7	7
Trinidad	0.2	0.25	0.1	0.15	0.7	7
Tubigon	0.19	0.05	0.2	0.05	0.49	24
Ubay	0.22	0.25	0.15	0.05	0.67	11
Valencia	0.07	0.05	0.05	0.05	0.22	43

The sanitation component comprises 102 public toilets and 360 school toilets to the rural communities. Distribution of toilet bowl (pour flush only) is one of the components of sanitation sub-sector in medium-term development plan, however, it shall be excluded from NG-assisted projects due to the current practice of NEDA. With the integration of sanitation in the water supply projects, equal emphasis shall be given to sanitation component to ensure a greater health impact in the rural communities. School toilet will be constructed for public school in the rural areas (50%: toilet facility/classroom and 50%: standard toilet building), while public toilets will be constructed at public markets, bus terminals, etc. in urban areas. Health consciousness among the rural people will also be bolstered with the provision of health education training and IEC materials.

(2) Equipment/Commodity Assistance

The provision of drilling machine and its service truck is included in the medium-term plan so that the LGU can immediately make used of these equipment/vehicle. Also, one unit each of service vehicle and well rehabilitation equipment is considered in Phase I together with maintenance tool and water quality testing kits that are to be procured and provided to each municipality to maintain the facilities.

(3) Consultancy Services

Considering the magnitude and complexity of the project, consulting services and technical assistance may be availed to strengthen the executing and implementing agencies' capabilities in undertaking the project. The services will cover technical and institutional/community development aspects of the project.

During the detailed design stage, the services will cover hydrogeological survey, finalization of well/spring construction sites based on site selection criteria to be developed, and preparation of bidding documents. Guidelines and training program for strengthening the capability of implementing agencies and NGOs will be prepared and carried out. The construction stage will include assistance to LGUs in the supervision of construction works, community organizing and training works.

(4) Institutional Development

The project entails community development with people's active participation to assure the responsibility for O&M of the facilities and strengthening of existing institution/organization and/or formation of new ones. Thus, various activities will be undertaken from national to beneficiary levels. A sufficient cost for the purpose will be taken into account.

11.5.2 Project Requirements

The Province will manifest its willingness to participate in the project covering timely arrangements to meet NEDA requirements. These requirements are (1) RDC Endorsement, (2) ECC clearance and (3) Letter of Commitment. Water right permit from

the National Water Resources Board will be fulfilled after site selection and preparatory works have been undertaken. In addition, a Memorandum of Agreement (MOA) on the cost-sharing and other arrangements required for the project will be exchanged between the Province and concerned municipalities.

11.5.3 Funding Requirements

(1) New cost Sharing Policy

The project financing arrangement was studied in accordance with the Municipal Development Fund Office (MDFO) – Policy Governing Board (PGB) approved NG-LGU cost sharing arrangement. Financing the cost sharing among the Province, municipality and barangay shall then be clarified based on the estimated cost requirements through the MOA.

The new policy of the national government grants for devolved activities shall be applied to all new ODA-assisted projects that are currently being packaged in support of the LGUs. With this, the NG-LGU sharing is based on income classification of the province, municipality, city and level and type of service to be implemented. (Table 11.5.1).

Table 11.5.1 New Cost-Sharing Arrangement between NG and LGUs

PGB-approved Cost Sharing (% share)

Level and Type of Service	Income Class (Municipalities/ Provinces)								
	1st/ 2nd			3rd/ 4th			5th/ 6th		
	NG[1]	LGU[2]		NG[1]	LGU[2]		NG[1]	LGU[2]	
		Equity[1]	Loan[1]		Equity[1]	Loan[1]		Equity[1]	Loan[1]
Level I/II WS	30	20	50	40	15	45	50	10	40
Level III WS	0	0	0	20	10	70	50	10	40
Sanitation	20	20	60	40	15	45	50	10	40

PGB-approved Cost Sharing (% share)

Level and Type of Service	Income Class (Cities)								
	1st/ 2nd			3rd/ 4th			5th/ 6th		
	NG[1]	LGU[2]		NG[1]	LGU[2]		NG[1]	LGU[2]	
		Equity[1]	Loan[1]		Equity[1]	Loan[1]		Equity[1]	Loan[1]
Level I/II WS	0	20	80	0	20	80	30	20	50
Level III WS	0	0	0	0	0	0	0	0	0
Sanitation	0	20	80	0	20	80	20	20	60

[1]NG – National Government grant for the respective level and type of service and respective income class of the LGU.

Equity – refers to the minimum cash equity contribution to be put up by the LGU.
Loan – refers to the portion of the project cost that the LGU must finance either through loan from MDFO or other Government Financing Institutions (GFIs), e.g., Land Bank, DBP, etc.

[2] If the LGU can raise the equity portion more than the minimum required amount, then the portion of the project cost it needs to raise through loan would be lower. Loan terms of MDFO: Interest Rate - currently at 14% per annum fixed until maturity of the sub-loan; Repayment Period - payable in 15 years inclusive of a 3-year grace period.

(2) Financial Viability

1) Conditions and Assumptions for Financial Study

- The cost-sharing between the NG and LGUs ranges from 0%-50% for the NGU and 50%-100% for the LGU, depending on the type of project and the income classification of the LGU, and whether the borrower/ implementer would be the Province, municipality or city.

- The financial sources of the national government are the loan from foreign donor and NG counterpart budget, and LGUs from the budget of the Province and municipalities. The cost-sharing part by the beneficiaries is equity contribution including land, material purchase cost, right of way, labor, etc.

- The O&M cost is managed by the beneficiaries.

2) Project Cost

The cost estimate was made based on 2003 price level in Chapter 10. Then, physical and price contingencies as well as value-added tax were added. The project cost for the concerned municipalities in line with above conditions/assumptions is shown in Table 11.3.1. Total investment cost for the implementation period of 2004 - 2010 was estimated at about ₱3.2 billion (₱2.7 billion in constant 2003 price level) referring to the implementation schedule of the project.

3) Financial Arrangement

The two alternatives for the financial arrangements are studied to prepare required cost to be shared among the concerned parties: i) Utilization of IRA only and ii) Utilization of IRA and MDF.

Case 1: Utilization of IRA fund only

Currently, there is no projection on drastic increase of LGUs' budget in the future. Under such condition, the following are considered.

- Potential fund is the IRA annually allotted from the NG to municipalities and from province to municipalities. The municipal tax is small in the allocation to the sector. The total municipal budget available was projected by sub-sector in Section 11.3.

- Arrangements by the municipalities with the MDF and banks are disregarded considering the current financial capability of the municipalities.

- Medium-term development program (from 2004 to 2010) is applied to increase project fund using available IRA

- Applying the cost-sharing arrangement, the IRA available was estimated for the eligible municipalities/cities utilizing national government grant fund based on the conditions stipulated in Table 11.5.1

The total IRA of the Province available for the eligible municipalities/cities in the subject sector was estimated at ₱18.3 billion as a total of the medium-term development program, consisting of water supply, ₱665.9 million and sanitation, ₱65.8 million. The estimated IRA available is shown below.

Sub-sector	Provincial IRA	Municipal IRA	Total
Rural Water Supply:	259,865,000	635,968,000	895,833,000
Rural Sanitation:	34,950,000	87,625,000	122,575,000
Urban Water Supply	406,081,000	863,463,000	1,269,544,000
Urban Sanitation:	30,808,000	68,047,000	98,856,000
Total:	731,705,000	1,655,103,000	2,388,580,000

The cost comparison was made between the estimated project cost for LGUs eligible for NG grants (2003 price level) and available IRA of LGUs. Table 11.5.2 shows project cost while Table 11.5.3 shows the cost sharing for the project among the NG, LGUs and beneficiaries through community-based organizations. (See Tables 11.5.1 and 11.5.2, Supporting Report.)

The NG shall shoulder 50% of the total investment cost, inclusive of contingencies and VAT, through the utilization of foreign assisted loan of 40.4% or ₱1.018 billion and 9.3% or ₱234 million of the government counterpart fund. The remaining 50% of the overall cost shall be shared by the LGU and the community, respectively, as follows: 47% or ₱1.196 billion and 3% or ₱78 million.

Table 11.5.3 Cost-Sharing for the Project (Case 1): 2003 Price Level

Financial Source	**x** 1,000 **Peso**	**Percentage**		**Remarks**
NG	233,890	9.3	50	NG counterpart
	1,018,696	40.4		Foreign Loan
LGUs	1,196,300	47	50	IRA
	75,715	3		Community equity
Total	2,523,840	100		

The cost comparison was made between the estimated project cost to be shared by the LGUs and available IRA of LGUs in the implementation period. The required cost is covered by 50% of available IRA (₱2.389 billion).

Case 2 Utilization of IRA and MDF

The utilization of the MDF is considered in case the LGU has no sufficient funds to cover the balance of the project cost that the NG will not finance. The foreign loan through the MDF may be availed of at the maximum financing limit of 70% of the total investment cost.

Thus, the NG shall possibly support the LGUs through the MDF in case that manageable IRA will not be able to fill up the cost requirement of the project. Table 11.5.4 shows cost sharing scheme for the project between the NG and the LGUs.

NG is possibly to finance up to ₱1.767 billion or 70% of the total project cost as a portion of the loan. Out of NG finance through the loan, ₱1.019 billion or 40.4% of the total project cost shall be granted to the LGUs, aside from 9.3% NG counterpart fund.

The remaining ₱748 million or 29.6% of the total project cost shall be financed through MDF to improve financial capacity of the LGU.

Table 11.5.4 Cost Sharing for the Project (Case 2): 2003 Price Level

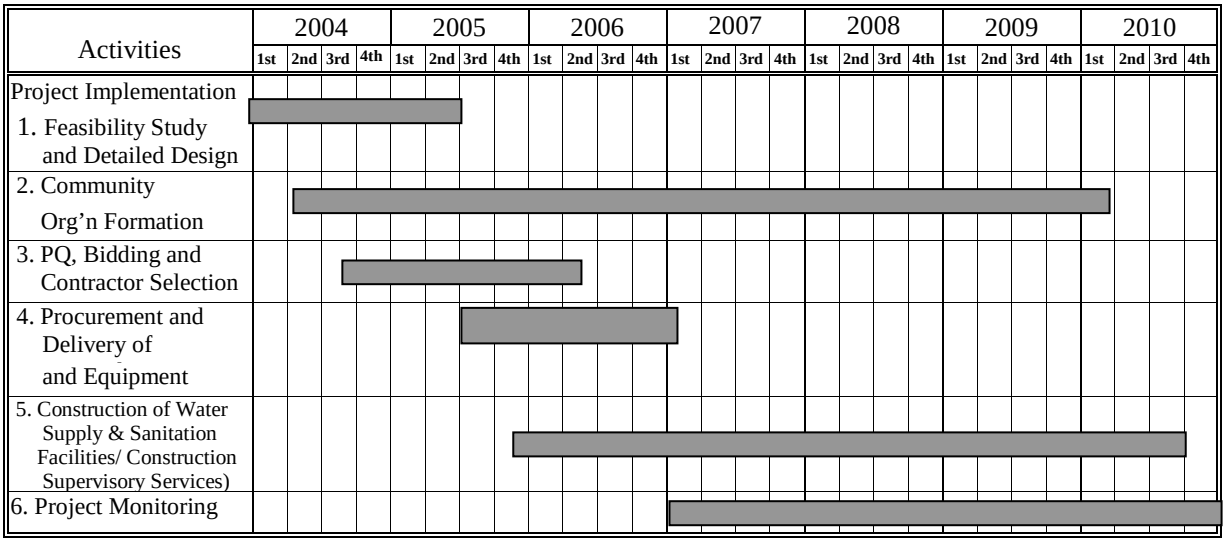
Financial Source	x 1,000 Peso	Percentage			Remarks
NG	233,890	9.3	9.3	50	NG counterpart
	1,018,696	40.4	70		Foreign Loan
	(747,992)	(29.6)			Foreign Loan for MDF
LGUs	447,547	17.7	47	50	IRA
	747,992	29.6			MDF through Foreign Loan
	75,715	3	3		Community Equity
Total	2,523,840	100			

Under this case, the IRA to be used by the LGU will be ₱448 million inclusive of price contingency and VAT, which is 19% of available IRA allocated for the sector.

4) Project Implementation Schedule

The proposed implementation of the project is scheduled for 7 years. Figure 11.5.1 presents the proposed schedule.

Figure 11.5.1 Proposed Project Implementation Schedule



11.6 Cost Recovery

Cost recovery and cost sharing are essential to attain the planned targets. The PW4SP advocates the imposition of tariffs for the recovery of capital and operating cost based on the principle that adequate water, sewerage and sanitation facilities should be paid for.

(1) Level I water supply systems

For Level I systems, cost sharing between the LGUs and beneficiaries is required for the capital costs, even the portion of the beneficiaries is limited according to the current national policy. Currently, the percentage shared by the beneficiaries seems to be 3 to 5% of the total requirements based on experience.

Beneficiaries are also responsible for all recurrent costs. Monthly recurrent cost is estimated at about ₱ 8.30 per household in the base year price level (refer to recurrent cost in Chapter 10). The figure will be increased up to about ₱ 21.85 per household in the year 2010, assuming an annual inflation rate of 5.5%. This monthly fee seems to be affordable to the users considering the current income level (refer to affordability in Chapter 6), but willingness to pay shall be promoted.

Depending on the users' income level, water charges shall be determined and agreed upon among the water users. The estimated water charge for O&M cost is ₱8.30 per household per month, which is less than 1% of the median monthly household income of ₱3,870.50 in 2000. However, the users will have to pay water charge of up to about 1.2% of their monthly income or ₱45.15/household/month to manage not only for repair of hand-pump, but also the rehabilitation and reconstruction of deep well, assuming that the well life is 20 years.

(2) Level II water supply systems

Full cost recovery is required for all capital costs for Level II systems. The number of households to be covered is 9,736 to meet the target (refer to Table 8.5.1; population to be served of 58,417 people and household size of 6 persons). The average capital cost to be paid is estimated at ₱13,900 per household (refer to Chapter 10 and Appendix XI). Applying the capital recovery factor to the capital costs with conditions of 5.5% interest rate and 20 years repayment period, monthly payment amounts to ₱58 per household.

The annual recurrent cost per household is estimated to be ₱130.95 (₱11/household/month) in the base year (refer to Chapter 10). It will reach to ₱13.60 in the year 2010 at an annual inflation rate of 5.5%. Thus, the total amount of repayment and recurrent cost in 2010 is ₱71.60, which is 1.8% of the family income.

(a) Estimated water rate (flat rate; Pesos)	: 71.60
(b) Percentage of (a) to monthly median household income in 2010 [1)]	: 1.8%

Notes:
1) Provincial average monthly median income in 2010 (₱6,600 per household) is derived from 2000 Family Income and Expenditure Survey considering annual inflation rate of 5.5%. The monthly median income in 2000 is ₱3,870.

(3) Level III water supply systems

A full recovery of capital and operation & maintenance cost is required for Level III systems. To test the affordability, a comparative study was made between estimated water rate (based on standard monthly consumption; 15m^3 per household) and projected income in year 2010. Total capital cost of Level III water supply system is ₱1.02 billion for 37,516 households to be served. Assuming an annual inflation rate of 5.5% and 20 years repayment period, the annual capital cost to be paid is ₱1,359 per household. The monthly capital cost to be paid by each household is ₱113.

The monthly recurrent cost per household is estimated to be ₱22.00 (₱264/ year; refer to recurrent cost in Chapter 10 where operating cost is ₱24 million in base year for 90,979 households). Using an annual inflation rate of 5.5%, this recurrent cost is projected to be ₱32.10 per household in the year 2010.

The combined amount of capital repayment and recurrent cost in the year 2010 is ₱54.10/ household/month. The cost shall be recovered as a monthly water charge to be paid by users. The percentage of the water rate against income with more or less 5% is commonly affordable. In this regard, monthly water rate (less than 1% of the household income) seems to be affordable.

(a) Estimated water rate for 15 m^3 (Pesos)	: 54.10
(b) Percentage of (a) to monthly median household income in 2010	: <1%

Notes:
1) Monthly average household income is ₱6,600 in the year of 2010.

(4) Sanitation

The provision of sanitary toilet facilities for public markets and schools is both under the LGUs. For schools, this will be in coordination with the parent-teacher association. The recurrent cost for the public market toilets shall be collected from the market users, vendors and other users.

The individual household will manage the household toilet. However, the facility is costly with reference to the current income level, especially in the rural area (pour-flush toilet; ₱18,100).

To expedite the sanitation sector improvement, the introduction of low-cost technologies and other viable options will be pursued. Also, specific loans that are revolving in character with low interest rates and longer repayment period may be an effective solution. For urban sanitation, the linkage with existing housing loan shall be established to cover construction of sanitary toilets.