Australian Government
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Republic of the Philippines
PROVINCE OF BOHOL

BOHOL INTEGRATED WATER SUPPLY SYSTEM MASTER PLAN

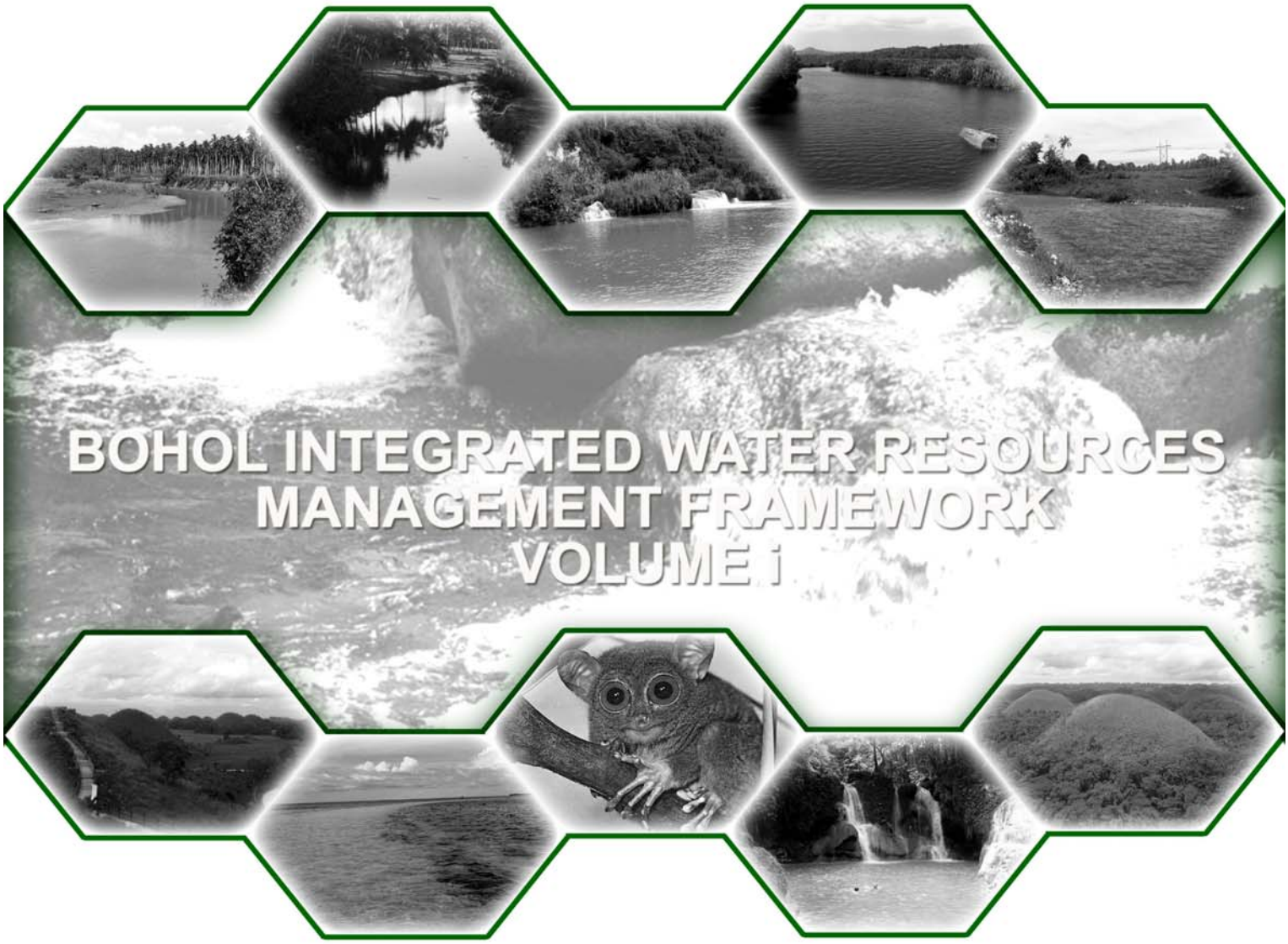
(BHL - 01)

Bohol Integrated Water Resources Management Framework Final Report

VOLUME I

coffey international development pty. ltd.

WOODFIELDS CONSULTANTS, INC.
PLANNERS, ARCHITECTS, ENGINEERS, CONSTRUCTION MANAGERS AND ENVIRONMENT SPECIALISTS



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ACRONYMS AND ABBREVIATIONS

ADP	Annual Development Plan
ANAK BAYONG	Asosayon sa Nagkahiusang Kababayen-an sa Bayong
ARCDP2	Agrarian Reform Community Development Project Phase 2
ARISP	Agrarian Reform Infrastructure Support Project
ASP	Active Server Page
AusAID	Australian Agency for International Development
BAMP	Bohol Agricultural Master Plan
BANGON	Bohol Alliance of Non-Government Organizations
BANWAS	Bantig Women's Association
BAWIGS	Bohol Association of Women in Government Service
BAWIGS-MPC	Bohol Association of Women in Government Service – Multi Purpose Cooperative
BBC	Bantay Banay Councils
BCW	Bohol Council for Women
BEMO	Bohol Environment Management Office
BFAR	Bureau of Fisheries and Aquatic Resources
BFD	Bureau of Forest Development
BHL-01	Bohol Integrated Water Supply System Master Plan
BHL-01	Bohol Integrated Water Supply System Master Plan
BIAD	Bohol Integrated Area Development
BIADNET	Bohol Integrated Area Development Network for Economic Transformation
BIADP	Bohol Integrated Area Development Plan
BIARSP	Belgian Integrated Agrarian Reform Support Program
BIPC	Bohol Investment Promotion Center
BIW2SMP	Bohol Integrated Water Supply System Master Plan
BIWRMB	Bohol Integrated Water Resources Management Board
BIWRMT	Bohol Integrated Water Resources Management Team
BIWSS	Bohol Integrated Water Supply System
BMA	Buayahan Mothers Association
BMP	Best Management Practice
BNS-BORDA	Basic Needs Sources – Bremen Overseas Research and Development Association
BNW	Bohol Network of Watersheds
BOCAP	Bohol Community Assistance Program, Inc.
BOHECO	Bohol Electric Cooperative
BOWAC	Bohol Watershed Advisory Council
BPO	Business Process Outsourcing
BPRMO	Bohol Poverty Reduction Management Office
BSWM	Bureau of Soils and Water Management
BUSWACC	Bol-anon United Sectors Working for the Advancement of Community Concerns, Inc.
BWSAs	Barangay Water Supply and Sanitation Associations
BWUI	Bohol Water Utilities Inc.
CARP	Comprehensive Agrarian Reform Program
CASEC	Community Awareness & Services for Ecological Concerns
CATCHWISE	Consortium on Anti-Trafficking of Children and Women in Sexual Exploitation

CD	Capacity Development
CDA	Cooperative Development Authority
CIDA	Canadian International Development Agency
CIDSS	Comprehensive Integrated Delivery of Social Services
CLB	Children's Legal Bureau
CPC	Certificate of Public Convenience
CPCN	Certificate of Public Convenience and Necessity
CPDC	City Planning and Development Coordinator
CPDO	City Planning and Development Office
CWA	Carahan Women's Association
DA	Department of Agriculture
DA-CENVIARC	Department of Agriculture-Central Visayas Integrated Agricultural Research Center
DAR	Department of Agrarian Reform
DBM	Department of Budget and Management
DBMS	Database Management System
DENR	Department of Environment and Natural Resources
DENR- PENRO	Department of Environment and Natural Resources- Provincial Environment and Natural Resources Office
DepEd	Department of Education
DEWATS	Decentralized Waste Water Treatment System
DILG	Department of Interior and Local Government
DILG -GTZ	Department of Interior and Local Government -German Technical Cooperation
DILP	DOLE under its Integrated Livelihood Program
DNS	Domain Name Server
DOF	Department of Finance
DOH	Department of Health
DOJ	Department of Justice
DOLE	Department of Labor and Employment
DPWH	Department of Public Works and Highways
DSWD	Department of Social Welfare and Development
ECP	Environmental Center of the Philippines
EG	Economic Growth
EHS	Environmental Health Service
EMB	Environmental Management Bureau
EO	Executive Order
ESSC	Environmental Science for Social Change
FAO	Food and Agriculture Organization
FMB	Forest Management Bureau
FOCAS	Focal Community Assistance Scheme
FTCI	Feed the Children, Inc. Philippines
GAA	General Appropriations Act
GAD	Gender and Development
GIS	Geographic Information System
GISP	Government Information Systems Plan
GOCCs	Government-owned and Controlled Corporations
GOV	Good Governance
GPL	General Public License

GTZ	German Technical Cooperation
GWP	Global Water Partnership
HMTL	Hypertext Markup Language
HNU	Holy Name University
HRMDO	Human Resource Management and Development Office
ICRAF	International Center for Research and Agro-Forestry
ICT	Information and Communication Technology
IEC	Information, Education and Communication
IIS	Internet Information Services
IRR	Implementing Rules and Regulations
ISP	Internet Service Provider
ISSP	Information System Strategic Plan
IT	Information Technology
ITECC	Information Technology and Electronic Commerce Council
IWM	Integrated Water Management
IWRM	Integrated Water Resources Management
JICA	Japan International Cooperation Agency
KALAHI	Kapitbisig Laban sa Kahirapan
KALAHI-CIDSS:KKB	Kapitbisig Laban sa Kahirapan – Comprehensive and Integrated Delivery of Social Services: Kapangyarihan at Kaunlaran sa Barangay
KAS	Knowledge, Awareness, Skills
KRAs	Key Result Areas
LADP	Local Area Development Partnership
LAN	Local Area Network
LANTAWA	Lantay Women's Association
LGDP	Local Governance Development Program
LGU-GAD	Local Government Unit- Gender and Development
LGUs	Local Government Units
LTT	Long-Term Training
M&E	Monitoring and Evaluation
MGDs	Millennium Development Goals
MIS	Management Information System
MPDC	Municipal Planning and Development Coordinator
MRF	Materials Recovery Facility
MSDO	Municipal Social Development Office
MSWDO	Municipal Social Welfare And Development Office/r
MTDP	Medium-Term Development Plan
MTPDP	Medium-Term Philippine Development Plan
NAGKALO	Nagkahiusang Kababayen-an sa Loon
NAKASA	Nagkahiusang Kababayen-an sa Sawang
NAMRIA	National Mapping and Resource Information Authority
NCRFW	National Commission on the Role of Filipino Women
NEDA	National Economic and Development Authority
NEPC	National Environmental Protection Council
NGA	National Government Agencies
NGOs	Non-Government Organizations
NHRC	National Hydraulics Research center
NIA	National Irrigation Administration

NIHI	Nagkahiusang Inahan sa Hinlayagan Ilayan
NPCC	National Pollution Control Commission
NRM	Natural Resource Management
NRW	Non-Revenue-Water
NSO	National Statistics Office
NWRB	National Water Resources Board
NWRC	National Water Resources Council
ODA	Official Development Assistance
OPA	Office of the Provincial Agriculture
OPV	Office of the Provincial Veterinarian
PACAP	Philippine-Australia Community Program
PAGASA	Philippine Atmospheric, Geophysical and Astronomical Services Administration
PAGKAINA-Bohol	Pagkahiusa sa mga Kapunongan sa Inahang Nagpakabana sa Bohol (Federation of Concerned Mother's Organizations)
PAHRDF	Philippines-Australia Human Resource Development Facility
PAKANA	Pansul Kababyen-ang Nagpakabana
PAMB	Projected Area Management Board
PATSARRD	Philippine-Australia Technical Support for Agrarian Reform and Rural Development
PD	Presidential Decree
PEF	Peace and Equity Foundation
PENRO	Provincial Environment and Natural Resources Office
PEO	Provincial Engineering Office
PfA	Platform for Action
PFPR	Program Framework on Poverty Reduction
PGIF	Philippine Government Inter-Operability Framework
PGSO	Provincial General Services Office
PHO	Provincial Health office
PIA	Philippine Information Agency
PIACAT	Provincial Inter-Agency Council Against Trafficking
PNP	Philippine National Police
PNSDW 1993	Philippine National Standards for Drinking Water 1993
POPCOM	Commission of Population
POs	People's Organizations
PPA's	Programs/Projects and Activities
PPDO	Provincial Planning and Development Office
PPFP	Provincial Physical Framework Plan
PPGD	Philippine Plan for Gender-Responsive Development
PROCESS	Participatory Research, Organization of Communities, and Education Towards Struggle for Self Reliance
PROCESS-Bohol	Participatory Research, Organization of Communities and Education Towards Struggle for Self-Reliance, Inc.
PW4SP	Provincial Water Supply, Sanitation and Sewerage Sector Plan
PWMFB	Province-Wide Watershed Management Framework for the Province of Bohol
RA	Republic Act
RC	Resource Capital
RDC	Regional Development Council
RIARC	Regional Integrated Agricultural Research Center
RWSAs	Rural Water Supply and Sanitation Associations

SAVIMA	San Vicente Mangrove Association
SD	Sustainable Development
SEC	Services for Ecological Concerns
SIDA	Swedish International Development Agency
SIMEWA	San Isidro Municipal Employees Women's Association
SP	Sangguniang Panglungsod
SQL	Standard Query Language
SRTM	Shuttle Radar Topographic Mission
SSpS	Sisters Servants of the Holy Spirit
STC	Short Term Courses
SUCs	State Universities and Colleges
SWCF	Soil and Water Conservation Foundation
SWECO	Swedish Consultancy
TESDA	Technical Education and Skills Development Authority
TMDLs	Total Maximum Discharge Loads
TWG	Technical Working Group
TWG-WMP	Technical Working Group- Watershed Management and Protection
TWG-WQQM	Technical Working Group-Water Quality & Quantity Management
TWG-WSS	Technical Working Group-Water Supply and Sanitation
UBCDFI	University of Bohol Community Development Foundation, Inc.
UBFCLC	Family Care Lying-In Clinic of the University of Bohol
UN-ASPA	United nations-American Society of Public Administrators
UN-CEDAW	United Nations Convention on the Elimination of All Forms of Discrimination Against Women
UNFPA	United Nations Fund for Population Activities
UNICEF	United Nations Children's Fund
UNIFEM	United Nations Development Fund for Women
URL	Uniform Resource Locator
USAID	United State Agency for International Development
USC-WRC	University of San Carlos- Water Resource Center
VAW	Violence Against Women
VAWC	Violence Against Women and their Children
VMM	Vision-Mission-Mandate
WATSAN	Water and Sanitation
WB	World Bank
WCED	World Commission on Environment and Development
WCI	Woodfields Consultants, Inc.
WDC	Women's Development Center, Inc.
WEP	Women Empowerment Project
WIDA	Wood Industry Development Authority
WINGS	Women Interacting for New Growth and Services
WODB	Women Organization of Danao Bohol
WOPD	Women's Organization for Progress and Development, Inc.
WPA	Water Permit Application
WSSD	World Summit on Sustainable Development
WSSPMP	Water, Sanitation and Solid Waste Management Program
WSSP-PMO	Water Supply and Sanitation-Program Management Office
WWW	World Wide Web

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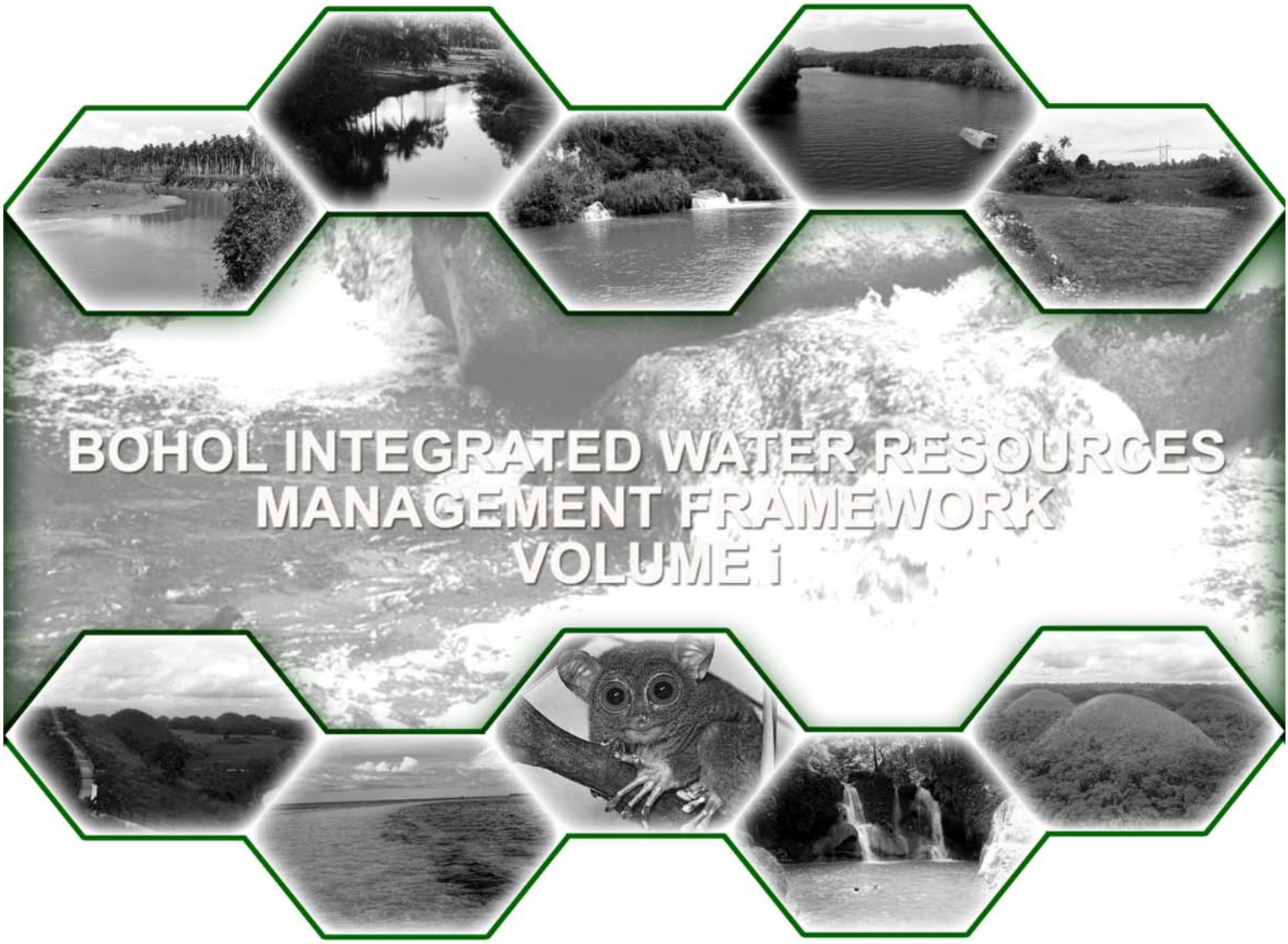

CHAPTER 1
INTRODUCTION

CHAPTER 1 – INTRODUCTION

1.1 BACKGROUND

The Provincial Government of Bohol is very keen in pursuing its mission to continuously achieve advancement in the social, economic, political, and cultural sectors as means to combat poverty in the province. As a proof of its continuous efforts to fight poverty, Bohol has attained great improvement after being listed as one of the 20 poorest provinces in the country in 2000, it is now in the list of the Ten Provinces with Largest Reduction in Poverty Incidence from 2000 to 2003[1]. As of 2003, Bohol is in rank 52, a big leap from rank 17th in 2000. For this reason, Bohol was declared as national winner[2] in search for a highly performing provincial government in 2006.

The Bohol Program Framework on Poverty Reduction (PFPR) was prepared by the Provincial Planning and Development Office (PPDO), and was subsequently approved by the Provincial Development Council on 19 June 2003 to ensure a cohesive response to the poverty situation. The Program Framework serves as the common basis for formulating poverty-focused policies, plans, programs and projects in the province. The same PFPR was used as the over-riding parameter in the re-institution of a local area development mechanism: the Bohol Integrated Area Development (BIAD). In addition, poverty reduction became the focus of both the 2004 Annual Development Plan (ADP) and the 2004-2009 Medium-Term Development Plan (MTDP).

The province through the PFPR has identified improved water supply and sanitation service delivery as an important condition to reduce incidence of poverty in the province. This is one of the targets that are clearly stated in the MTDP 2004: provision of adequate and safe water supply to 95% of the population in urban areas and 93% by year in rural areas from the present service coverage of 60% and 59%, respectively.

Existing situation showed that only about 59% have access to safe and potable water while the remaining 41% rely on unsafe water sources[3]. The rapid assessment conducted under this master plan also showed that in most LGU water systems, the levels of service, i.e., hours of water service operation (less than 24 hours, in most cases), and the existing purification system (maintaining a residual chlorine of 0.2 to 0.5mgl at the farthest point) are not at par with other reliable water supply systems in the country. This situation will further worsen due to increasing water demand because of population growth, rapid urbanization and the projected commercial and industrial development in the province.

The provision of safe and adequate water in each household is a factor in social development because it will improve health, hygiene and sanitation condition. It will reduce the incidence of water-borne diseases such as diarrhea and will save time and human energy for fetching water from a far source. The availability of safe, adequate and reliable water supply is also a very important factor in economic development particularly in commercial, industrial and tourism aspects.

In Bohol, however, not all parts have abundant source of groundwater which may be developed for potable water supply purposes. The northern and northeastern part have scarcity of groundwater due to its geological formation being volcanic in nature while in other parts of Bohol, particularly in the municipalities of Panglao and Dauis, and the city of Tagbilaran, saline intrusion has remarkably advanced inland and further abstraction would hasten upconing of the seawater into the groundwater table. An LGU with scarce water resource which may want to get water supply from other LGUs also encounters problems

[1] http://www.nscb.gov.ph/headlines/statspeak
[2] http:www.bohol.gov.ph/news/news
[3] based on Provincial Water Supply, Sewerage and Sanitation Sector Plan (PW4SP)

because of the inherent characteristic of protecting one's resource than sharing it. Hence, the need to identify and develop a strategy that would result in water sufficiency (in terms of quantity and quality) and sustainability for the whole province while protecting the deteriorating groundwater resource.

The Bohol Integrated Water Supply Master Plan (BHL-01) is formulated based on the results of past studies, and consultations between the provincial government and various stakeholders like the BIADNET wanting to see a stable and sustainable water supply system that will provide adequate and affordable potable water supply to industries, businesses and more importantly to Boholano households.

BHL-01 was conceived through the official development assistance by way of the Local Governance Development Program (LGDP) of the Australian Agency for International Development (AusAID), under the management of Coffey International Development in association with the Canadian Urban Institute. Coffey International Development then commissioned Woodfields Consultants, Inc. (WCI) to undertake the study under a sub-contract agreement. The project was formally started on May 29, 2007**.**

The recommended master plan will adopt a participatory approach, involving local governments and communities using an inter-municipality water connection as the method of integration. Using the Integrated Water Resources Management (IWRM) approach, the Master Plan will address water governance in a broad societal context and provide an approach to building compromises between competing demands for water among the sectors and stakeholders at all levels.

The formulation of the master plan itself is, already part of the IWRM process and some of the key players/stakeholders are composed of the provincial government, the LGUs, the Boholano people, the funding agency and the Consultants collaborating for a common goal of developing a viable water supply system for the whole province.

The master plan will ensure that the welfare of women and children is considered in decision making for water related services.

1.2 GOALS, PURPOSE AND OBJECTIVES

1.2.1 Goal of the Project. The overarching goal of the Project is to protect Bohol's water resources while providing for the needs of the economy, community and environment

1.2.2 Purpose of the Project. The primary purpose of the Project is to ***develop an Integrated Water Supply System Master Plan*** that guides the development of Bohol's water resources for safe domestic, commercial and industrial use thus improving health of the community, increasing opportunities for local economic development and protecting the depleted groundwater systems. The Plan will specify how the System will be implemented so that it is inclusive, sustainable, economically viable and achievable in the medium to long term;

1.2.3 Objectives of the Project. The specific objectives are thus enumerated:

- Gain a common understanding amongst key stakeholders of the current situation with regard to water supply and purification systems for Bohol by reviewing current water resources, plans, programs and impacts;
- Develop an integrated plan, including descriptions of the required technical infrastructure, for the supply of purified water for domestic, commercial and industrial use, based on analysis of existing water resources, projected demand and community needs;

- Review the policy and legislative framework to protect and sustain water supplies and make recommendations on water resources regulation;
- Develop a framework for watershed management that includes the protection and enhancement of environmental systems, water resources and community interests;
- Develop viable investment and management strategies and plans to fund, build and operate the integrated infrastructure to achieve reliable and safe water supplies to customers;
- Create a capacity building framework for the development of the local water industry to support the management, implementation and operation of the integrated supply system; and,
- Promote private sector investment to encourage local economic development in the region based on anticipated improvements.

1.3 BRIEF DESCRIPTION OF THE STUDY AREA

The entire Bohol Province is an island province, comprised by 47 municipalities and 1 city. It is bounded to the northwest by the island province of Cebu; to the northeast by the Province of Leyte and to the south by the mainland Mindanao. The Camotes Sea lies between the provinces Bohol and Cebu while Mindanao sea separates Bohol from the mainland Mindanao. The City of Tagbilaran, the island province's capital, is about 700 km south of Manila. **Figure 1-1** is the location map of Bohol Province.

Tagbilaran City is accessible through air transportation at through the Centennial Airport in Manila and the domestic airport in Tagbilaran.

The general topography of the mainland varies from nearly flat (plain areas) to moderately rugged terrains, notably in the southern part. While the volcanic areas possess semi-rugged topography, the large part of the island is defined by the occurrence of numerous karsts and sinkholes within the limestone formation. The drainage features of the province is generally controlled by the occurrence of 81 river basins of which, 11 are major ones.

The province occupies a total land area of 4,117 km^2 (411,726 hectares) with nearly 310,455 hectares considered as alienable & disposal (74%) and about 101,271 hectares as timberland/forest area (25%). Nearly half of the total land area of the province is covered by grassland, 11% by woodland, nearly 5% by wetland (i.e. mangrove, nipa, etc.), and the rest, is utilized for agriculture.

The entire Province of Bohol falls under the 4^{th} type of Corona's classification, it receives rainfall rather evenly throughout the year (**Figure 1-2**). The climate is affected by southwest-originating monsoons, and is relatively dry from March to May. The wet season is from June to December with mean monthly rainfall averaging about 112mm to 182mm. The wettest months are October and November.

With an annual population growth rate of 2.92% per annum from 1995-2000, the Province of Bohol was ranked 17^{th} in the country with a registered population of 1,137,268 (2000). Total number of household was 209,588 with an average of 5.43 persons per household based on 2000 NSO Census of Population and Housing. The degree of population density is directly indicated by the challenges posed not only on demands for water but on the challenges on sanitation and sewerage in the province. The population density in the province is about 276 persons per sq km.

Bohol's population has increased tremendously (fivefold) since 1903 (6,315 persons/annum) in the late 1990's with a dramatic surge of 36,000 people annually. The Provincial Planning Development Office (PPDO) estimated a ratio of 66%/34% for rural to urban population.

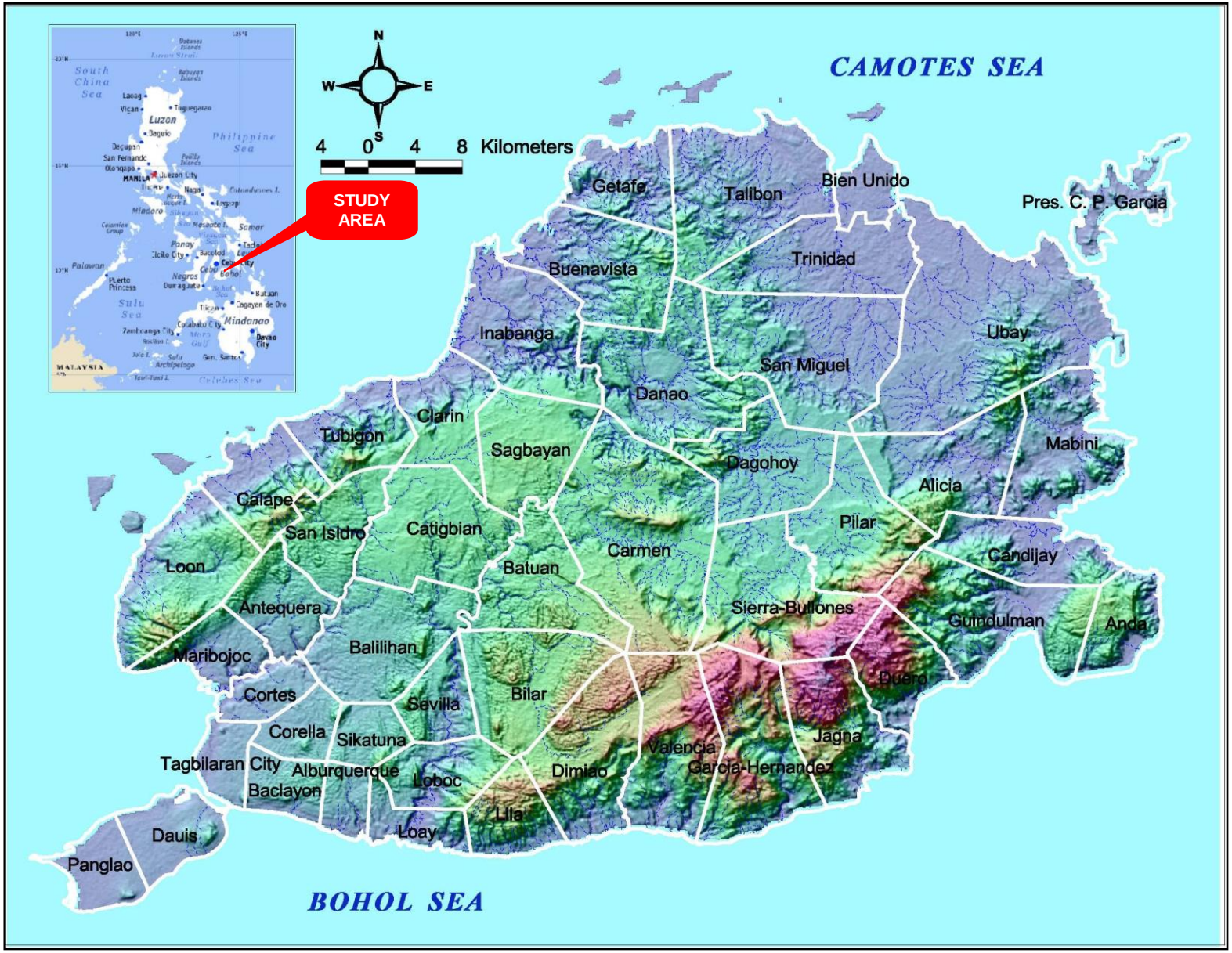

Figure 1-1 Location Map

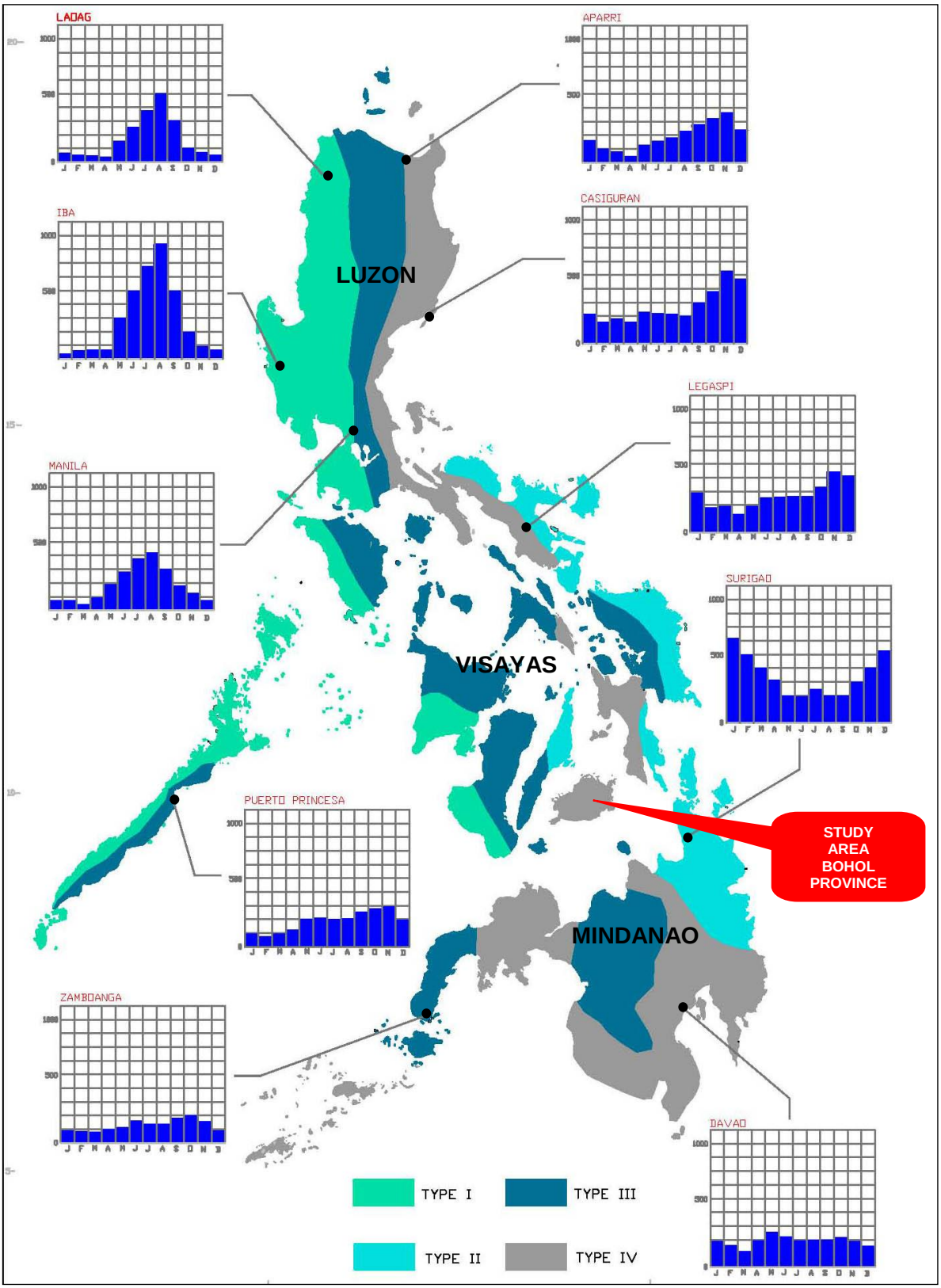

Figure 1-2 Climatological Map

Higher education is concentrated in the Tagbilaran City because of the presence of majority of the college schools and universities.

Agriculture occupies the biggest sector of the province in terms of land utilization. Nearly 50% of the land in Bohol is devoted to agricultural use. To further boost of the present commercial activities e.g. limestone products, rice, salted fish and handicrafts, the province had identified the establishment of Special Economic Zone/Industrial Estates through its landmark legislation – the Bohol Investment Code. The main manufacturing industries in Bohol are engaged in the manufacturing of native products e.g. mats, baskets and furniture under its small-scale activity program around the main island.

Endowed with the bounties of nature, the tourism industry in Bohol is seen as the engine for economic growth of the province. With its abundant marine life, white coral sand beaches, dive sites, chocolate hills of astonishing signature attraction and the presence of Tarsier (one of the smallest living primates), Bohol Island is a marvel of good nature environment.

The basic infrastructure in the island is highlighted by a road network (circumferential) that connects the municipalities in the entire main island in order to promote agricultural, eco-cultural tourism and agro-industrial development. The combined installed capability of the power sources in Bohol is composed of the following: 17.5 MW from Diesel Power; 1.2MW from Loboc Hydroelectric; 5.0MW from Hanopol Hydroelectric; and 100MVA from the Leyte-Bohol Interconnection Project. There is also an on-going construction of a hydroelectric power plant in Brgy. Ewon, in the Municipality of Sevilla, that will give additional power supply of about 2.5 MW.

Main communication facilities in the province are primarily serviced by three (3) telephone (landline) companies and three (3) cellular phone companies. Parallel to the demands of Information Age, six (6) Internet Service Providers (ISP's) in about 40 internet cafes are available for internet access services. In terms of print and broadcast and media, there are five (5) radio stations (AM and FM), (5) cable stations, and four (4) newspapers in circulation in the entire province. For postal and courier services, there are 10 messengerial/courier firms and 49 post offices delivering services into and outside the province.

The health profile in Bohol is determined from the top 10 leading causes of morbidity among the population. In year 2001 – 2006, leading causes of illness were diarrhea/acute gastroenteritis and respiratory diseases. Deaths in the entire province account for more than 50% by the elderly of over 65 years old. Of the reported water-borne diseases, diarrhea topped the leading causes. Present health facilities in Bohol is being attended by 44 hospitals and 336 barangay health stations.

Drainage system in the urban areas (Tagbilaran City, Dauis and Panglao) is challenged by the absence of sewerage system and facilities. Open canals are usually used to drain all effluents directly to the rivers and creeks.

Sources of pollution in the urban areas are primarily traced on domestic waste water and dump garbage – with only 14% of the total households relying on the municipal refuse collection services.

1.4 EXISTING WATER SUPPLY AND SANITATION SITUATION

1.4.1 Existing Water Supply Situation

About 59% of the total population of Bohol have access to safe water sources which are either provided by Level I, II or III facilities while the remaining 41% rely on unsafe water sources (PW4SP Study, 2003)[4]. In addition, proper water treatment and purification is not regularly practiced in most of the municipalities. Inadequate safe water sources and water treatment are the possible causes of water-borne diseases such as diarrhea and acute gastro-enteritis. Incidence of water-borne diseases in the province was prevalent for the past six years (2001-2006) with diarrhea/gastroenteritis being one of the top ranking causes of morbidity.

In a rapid assessment conducted by the Consultant through field surveys and interviews in July and August 2007, about 523 barangays of the 1109 barangays in Bohol, have Level III water systems that are being managed by the LGUs, Water Districts or Water Cooperatives. The estimated population served by these Level III facilities is about 413,000 comprising of more or less 75,000 households. These figures represent roughly 32% of the 1,293,400 projected population of Bohol in 2007.

The existing sources are comprised of wells (shallow/deep/dug) and springs. There are no reliable records of production from the sources in most municipalities. Water production quantity measurement should be undertaken to have an estimate of the groundwater abstraction. There are two municipal water systems utilizing surface water sources, namely Dagohoy (Mas-ing Creek) and Ubay (Calanggaman Catchment area) but both are experiencing water quality problems due to inadequate treatment process. The municipalities in the southwestern part of the province like Garcia Hernandez, Valencia and Lila have abundant spring sources while municipalities in the north such as Getafe, Buenavista, Trinidad and San Miguel have very scarce water resource.

The waterworks system managed by LGU operates as an economic enterprise usually under the office of the Municipal Planning and Development Coordinator the Municipal Office. The Municipal Health Office is in-charge of the treatment of the water system's sources and facilities. Bill collections from water usage are undertaken by the Municipal Treasurers Office or remitted to the said office.

There average consumption varies from 60 lpcd in rural municipalities to 200 lpcd in the highly urbanized city of Tagbilaran. The water rates vary from a low of PhP15.00 for the first 10 cum to a high of PhP70 for the first 3 cum.

Most of the municipalities do not have records of non-revenue water, however information gathered from few municipalities who have available records showed that NRW varies from a low of about 5% (Antequera) to a high 48% (Tubigon). The municipal waterworks offices should keep and maintain a record of water production and consumption to have an estimate of NRW. Municipal waterworks systems with high NRW should improve individual system and implement measures to reduce NRW in order to maximize supply and reduce cost of operation.

Based on the result survey, the waterworks personnel need institutional training (administrative, financial and technical) to improve the capacity to manage and operate the systems.

The summary of data gathered for the 47 municipalities and 1 city in Bohol is tabulated in **Table 1-1.**

[4] Provincial Water Supply, Sewerage and Sanitation Sector Plan, a study conducted by the German Agency for Technical Cooperation-Department of the Interior and Local Government in collaboration with the Provincial Government of Bohol.

Table 1-1 Summary of Information Gathered from LGU Waterworks System

	Municipality/City	2000 POP (NSO)	No. of HH	Average No. of Persons Per Household	Existing Number of Service Connections	Estimated No. of Persons Presently Served by LGU Water System	Average Domestic Consumption per HSC (cum/mo)	Average per Capita Consumption (lpcd)	Minimum Domestic Water Rates (PhP)
1	Alburquerque	8,715	1,670	5.22	1218	6,356	16	102	40
2	Alicia	21,605	4,065	5.31	310	1,648	10	63	50
3	Anda	17,863	3,072	5.81	1353	7,861	1/	1/	25
4	Antequera	13,758	2,801	4.91	1620	7,957	16	109	37
5	Baclayon	14,996	2,978	5.04	2006	10,101	17	115	7
6	Balilihan	16,837	3,101	5.43	2034	11,044	17.5	107	8
7	Batuan	11,835	2,287	5.17	300	1,552	15	97	25
8	Bien Unido	22,176	3,984	5.57	552	3,073	10	60	100
9	Bilar	16,628	2,967	5.60	1,228	6,882	15	103	25
10	Buenavista	25,960	4,550	5.71	325	1,854	10	60	70
11	Calape	27,921	5,588	5.00	2880	14,390	15	100	90
12	Candijay	30,389	5,420	5.61	1,474	8,264			
13	Carmen	40,713	7,379	5.52	630	3,476	15	90	45
14	Catigbian	21,461	4,094	5.24	925	4,849	13	85	10
15	Clarin	18,040	3,575	5.05	1,138	5,743	13	83	9.8
16	Corella	6,048	1,263	4.79	999	4,784	10	70	25
17	Cortes	12,702	2,547	4.99	1,019	5,082	10	67	45
18	Dagohoy	16,845	3,095	5.44	548	2,983	12	73	80
19	Danao	17,265	2,958	5.84	800	4,669	20	114	90
20	Dauis	26,415	2,669	9.90	3,373	33,382	18.32	62	14/cum
21	Dimiao [1/]	14,151	2,708	5.23	469	2,451			
22	Duero	16,485	3,245	5.08	1,736	8,819	13	80	30
23	Garcia Hernandez	21,428	3,989	5.37	1,500	8,058	26	144	15
24	Getafe	26,826	4,694	5.71	88	503			275
25	Guindulman (GUINBUWASCO)	29,166	5,573	5.23	1,726	9,033	22.5	143	90
26	Inabanga	40,714	7,867	5.18	1,574	8,146	14	88	35
27	Jagna	30,643	5,957	5.14	1500	7,716	10	65	25
28	Lila	10,322	1,723	5.99	762	4,565	10	56	40
29	Loay	14,433	2,615	5.52	1500	8,279	10	60	10
30	Loboc	15,734	2,738	5.75	891	5,120	24	137	40
31	Loon	45,215	7,915	5.71	3639	20,788	24	144	60
32	Mabini	27,250	5,047	5.40	643	3,472	12	75	15
33	Maribojoc	16,786	2,630	6.38	2482	15,841	14	73	55
34	Panglao	21,337	3,890	5.49	3,350	18,375	12	73	22.5
35	Pilar	25,095	4,489	5.59	1684	9,414	16	96	
	Picowasco				866		16	96	60
	Piwas				818		15	88	20
36	Pres. Carlos P. Garcia	20,744	4,062	5.11	2/				
37	Sagbayan	18,346	3,688	4.97	2044	10,168	10	67	45
38	San Isidro	9,106	1,848	4.93	115	567	10	68	60
39	San Miguel	20,828	3,738	5.57	3/				
40	Sevilla	10,281	1,840	5.59	800	4,470	10	60	20
41	Sierra Bullones	25,499	4,473	5.70	1306	7,445	10	58	30
42	Sikatuna	6,602	1,177	5.61	1085	6,086	10	67	12.5
43	Tagbilaran	77,700	15,585	4.99	15,126	75,412			
	Bohol Water, Inc.				11,040		30	180	65.00
	Tagbilaran City Water System				4,086		25	150.45	56.00
44	Talibon	54,147	9,712	5.58	1,487	8,290	18	105	150
45	Trinidad (Trinidad Multidevelopment Coop.)	25,683	4,707	5.46	232	1,266	13	80	150
46	Tubigon	40,385	7,714	5.24	1,733	9,073	18	115	120
47	Ubay (UWASCO)	59,827	11,511	5.20	1,735	9,017	22	142	70
48	Valencia	24,363	4,392	5.55	720	3,994	15	91	50
					74,659	412,318			

1/ Average consumption cannot be determined because 75% of meters installed are defective.
2/ No existing Level III water system
3/ Awaiting for source which may come from Pilar or from Bayongan Dam (NIA)

1.4.2 Existing Sanitation Situation

Based also on the results of the PW4SP study, the overall percentage of households having approved types of toilet facilities in the whole province of Bohol is 79% as of 2003. Twenty one percent (21%) of the households comprise the underserved or with unapproved toilet facilities) and unserved or those without toilet facilities. The absence of a safe water supply and approved toilet facilities in a household increases the risk of incidence of water-borne diseases such as diarrhea.

To help improve this situation, the GTZ, in collaboration with the local government units and NGOs, is currently implementing a program for sustainable sanitation in Bohol that included the introduction of Ecosan through Urine Diversion Dehydration Toilets (UDDT) as alternative to the conventional sanitation system. The UDDTs are recommended for waterless communities as this method eliminates use of water for flushing. Three pilot projects were already implemented in Panglao, Talibon and Sagbayan.

There are no centralized sewerage to take care of the disposal of the sanitary wastes from septic tanks and other liquid wastes from industries and other sources in the province. Untreated sewage, domestic wastewater and industrial wastes therefore flows into the drainage system, canals or bodies of water or percolates into the ground. This practice is detrimental to the environment because it pollutes the bodies of water such as creeks, rivers and coastal waters, contaminates the groundwater aquifer, and poses risks to public health. Wastewater seeping underground might infiltrate pipelines with leaks when system pressures are low and may cause dirty water to reach the taps.

At present, the provincial government is implementing the Decentralized Waste Water Treatment System (DEWATS) with the technical assistance from the German Agency for Technical Cooperation (GTZ). The project started in early 2007 and is scheduled for completion within the year. It has an estimated cost of about Php2 million funded by the provincial government. When completed, this facility will treat effluent from the septic tanks of the Provincial West Capitol Compound. The compound has about 600-700 occupants including those working at the commercial building within the compound. The Basic Needs Services-Bremen Overseas Research and Development Association (BNS-BORDA) provided the technical design and supervision of the facility

The details of the existing water supply and sanitation situation are fully discussed in Chapter 2, Volume II, Water Supply Master Plan, of this report.

1.5 BOHOL INTEGRATED AREA DEVELOPMENT NETWORK FOR ECONOMIC TRANSFORMATION (BIADNET)

The clustering of municipalities into BIAD started way back in the 1980's when a team of experts from the Japan International Cooperation Agency (JICA) undertook a Master Plan Study of Bohol Integrated Area Development Project. The bases for the cluster were practical considerations such as geographic proximity to each other, shared natural and agricultural resource base, and local economy and industry among others.

With the initiation of LGDP, the BIAD was re-instituted as the core for the LADP that would fast track the required institutional structure for the local partnership. Hence, in a two-tiered workshop conducted in November and December of 2006, a Strategy Mapping and Priority-Setting Workshop created the impetus for the identification of common development agenda. One of those identified was the perennial problem on water supply.

It was recognized that through an inter-LGU mechanism such as the BIAD, every municipality stand to benefit from the LGDP Project. Further, it was posited that the BIAD clustering will generate the following advantages:

- economies of scale from pooling of resources;
- more effective environmental management;
- stronger lobbying power (i.e. ODA and NGA support);
- inter-LGU exchange and cooperation (i.e. personnel, institutional development, etc.);
- enhance planning systems (e.g. urban development, transportation);
- enhance revenue and investment generation;
- sound policy reform as a result of LGU collaboration; and,
- collaborative tourism development efforts.

Table 1-2 BIAD Composite Municipalities

BIAD I	BIAD II	BIAD III	BIAD IV	BIAD V
Alburquerque	Buenavista	Alicia	Anda	Batuan
Antequera	Calape	Bien Unido	Candijay	Bilar
Baclayon	Catigbian	Mabini	Dimiao	Carmen
Balilihan	Clarin	Pres. Garcia	Duero	Dagohoy
Corella	Getafe	San Miguel	Garcia Hernandez	Danao
Cortes	Inabanga	Talibon	Guindulman	Pilar
Dauis	Loon	Trinidad	Jagna	Sagbayan
Lila	San Isidro	Ubay	Valencia	Sierra Bullones
Loay	Tubigon			
Loboc				
Maribojoc				
Panglao				
Sevilla				
Sikatuna				
Tagbilaran				

1.5.1 Objective of the BIAD System

BIAD is aimed to fulfill the structural and operational imperatives of the LADP, and serves as the litmus test in the identification of priority, high impact projects for the Province of Bohol.

1.5.2 Municipalities in the BIAD System

The same BIAD cluster that was initially identified in the 1980's remains to this day, as illustrated in **Figure 1-3**.

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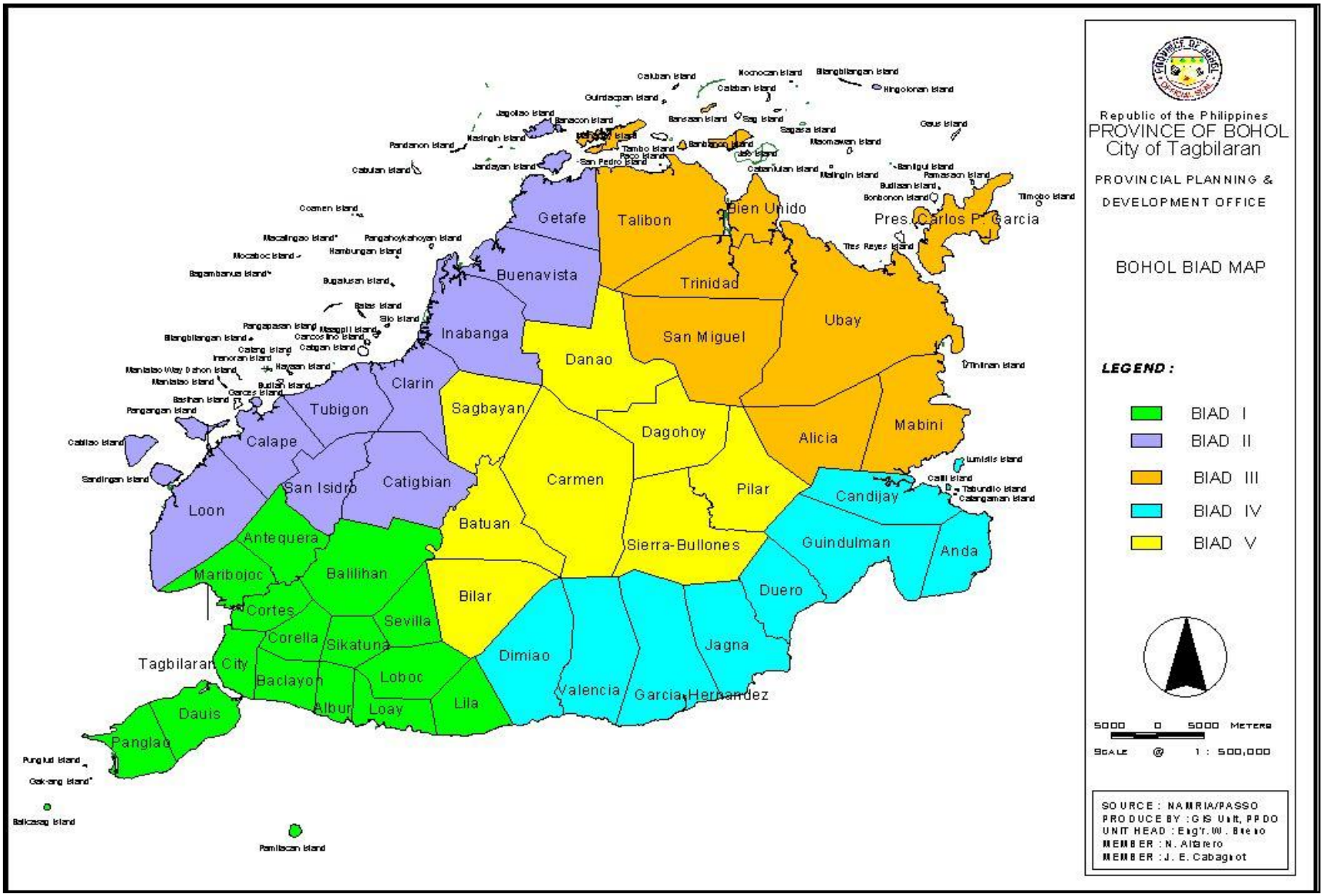
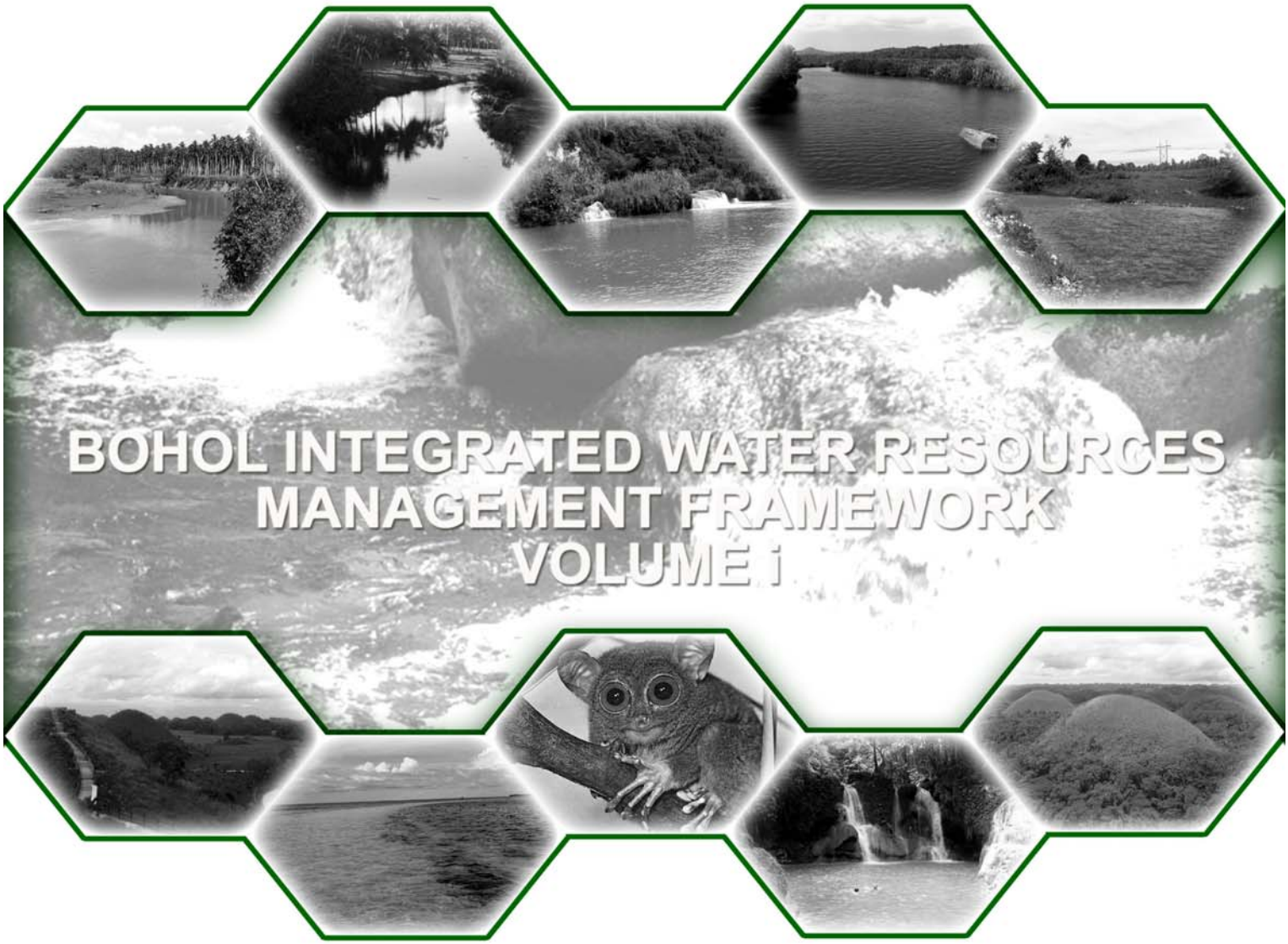


Figure 1-3 BIAD Municipalities



CHAPTER 2
FUTURE WATER DEMAND REQUIREMENTS FOR PROVINCE-WIDE WATER SUSTAINABILITY IN BOHOL

CHAPTER 2 – FUTURE WATER DEMAND REQUIREMENTS AND POTENTIAL WATER SOURCES

2.1 POPULATION AND WATER DEMAND PROJECTIONS

Several factors were considered in projecting the water demand requirements for Bohol. These factors consist of: a) the service coverage and population to be served with respect to the provincial sector target; b) water users that need to be served, and b) the unit demand requirement for each user.

The service area is the whole province of Bohol comprising of 47 municipalities and one city. The facilities such as pipelines, treatment facilities and storage reservoirs were defined based on the needs of the projected population that will be served.

Previous studies for water supply improvement projects in Bohol presented population projections which have varying results. The projected population adopted for this study was taken from the NSO projections for year 2005 through 2035. According to the NSO, the projections were results of three demographic processes, namely, fertility, mortality and migration. The projected population and growth rates are shown in **Table 2-1** and illustrated in **Figure 2-1**.

Table 2-1 Projected Population and Annual Growth Rates 2005-2035

Year	Projected Population[1/]	Projected Annual Growth rate
2000	1,137,268 [2/]	
2005	1,249,200	1.90
2010	1,362,900	1.76
2015	1,480,700	1.67
2020	1,597,100	1.53
2025	1,707,600	1.35
2030	1,811,100	1.18
2035	1,908,200	1.05

[1/] Source: NSO 2000 Census-Based Population Projections
[2/] Actual Population Figure for Year 2000, based on NSO Census of Population and Housing

Although there is a declining growth rates trend from 2005 to 2035, still an average of 22,000 persons is being added yearly to the population of Bohol.

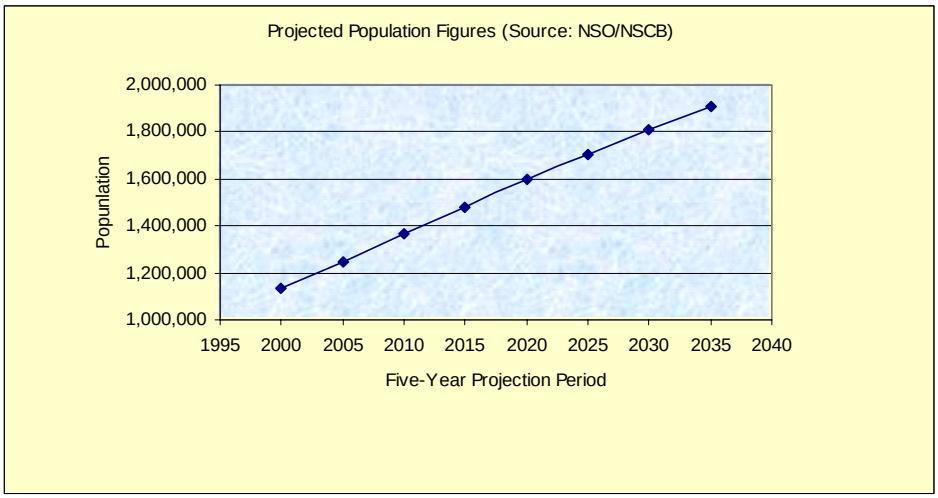


Figure 2-1 Projected Population Figures (2005-2035)

The population of Bohol is classified into rural and urban population. Based on the percent share, as determined by the NSO and modified by the Provincial Sector Planning Team (PSPT) to meet actual conditions in the areas (Chapter 8, PW4SP), the existing rural to urban population ratio is about 66% to 34%. The guidelines in the classification of urban and rural barangays followed the provisions in the NEDA Resolution No. 12, as shown in **Appendix II.2-A, Volume III-Databook.**

The provincial sector target as contained in the MTDP 2004-2009, and the results of the latest survey conducted in July to August 2007 (**Table 2-2** and **Table 2-3**, respectively) were the basis for projecting the service coverage. The existing coverage shown in **Table 2-2** includes all existing service provided by Levels 1, 2 and 3 facilities.

Table 2-2 Provincial Sector Target

Population Classification	Existing Coverage (%) (Based on PW4SP Study, 2003)	Target Coverage (%)
Urban	60	95
Rural	59	93

Table 2-3 Service Area Coverage By Level III Systems (served LGUs, Water Districts and Cooperatives)

Total Number of Barangays for 47 Municipalities and 1City	1,109
Number of Barangays with Level III Systems Managed by LGUs, Water Districts and Cooperatives)	523
Reported No. of Service Connections (as of August 2007)	74,659
Estimated Number of Served Population	412,318
Projected Provincial Population (Year 2007)	1,293,400
% Service Coverage (August 2007)	32%

Other important factors in determining the service coverage are geographical considerations such as distance from the proposed source. A more detailed investigation should be conducted during feasibility study stage to determine the economy of connecting a cluster of households remote from the proposed system.

Table 2-4 shows the target served population defining those that may be served under this master plan (Level III to be served by bulk supply and present sources) and those to be served by other sources. **Figure 2-2** shows the projected service coverage of this master plan vis-à-vis the projected provincial population for years 2010 through 2035.

Table 2-4 Target Service Coverage (2010-2035)

Year	Population Class	Projected Population	Target Service Coverage		Source of Supply			
					Bulk Supply and Current Level III Sources		Other Sources	
			(%)	Population	(%)	Population	(%)	Population
2010	Urban	457,005	65	297,053	62	285,477	3	11,576
	Rural	905,895	60	543,537	26	234,013	34	309,524
	Total	1,362,900	62	840,590	38	519,490	24	321,100
2015	Urban	506,151	89	450,474	79	399,015	10	51,459
	Rural	974,549	90	877,094	48	465,623	42	411,471
	Total	1,480,700	90	1,327,568	58	864,638	31	462,930
2020	Urban	556,416	95	528,595	84	470,114	11	58,481
	Rural	1,040,684	93	967,836	53	546,898	40	420,938
	Total	1,597,100	94	1,496,431	64	1,017,012	30	479,419
2025	Urban	606,192	95	575,882	90	547,478	5	28,404
	Rural	1,101,408	93	1,024,310	53	578,821	40	445,489

Year	Population Class	Projected Population	Target Service Coverage		Source of Supply			
					Bulk Supply and Current Level III Sources		Other Sources	
			(%)	Population	(%)	Population	(%)	Population
	Total	1,707,600	94	1,600,192	66	1,126,300	28	473,892
2030	Urban	654,979	95	622,230	95	619,792	0	2,438
	Rural	1,156,121	93	1,075,193	53	607,577	40	467,616
	Total	1,811,100	94	1,697,423	68	1,227,369	26	470,054
2035	Urban	702,871	95	667,727	95	665,131	0	2,596
	Rural	1,205,329	93	1,120,956	53	633,428	40	487,528
	Total	1,908,200	94	1,788,683	68	1,298,559	26	490,124

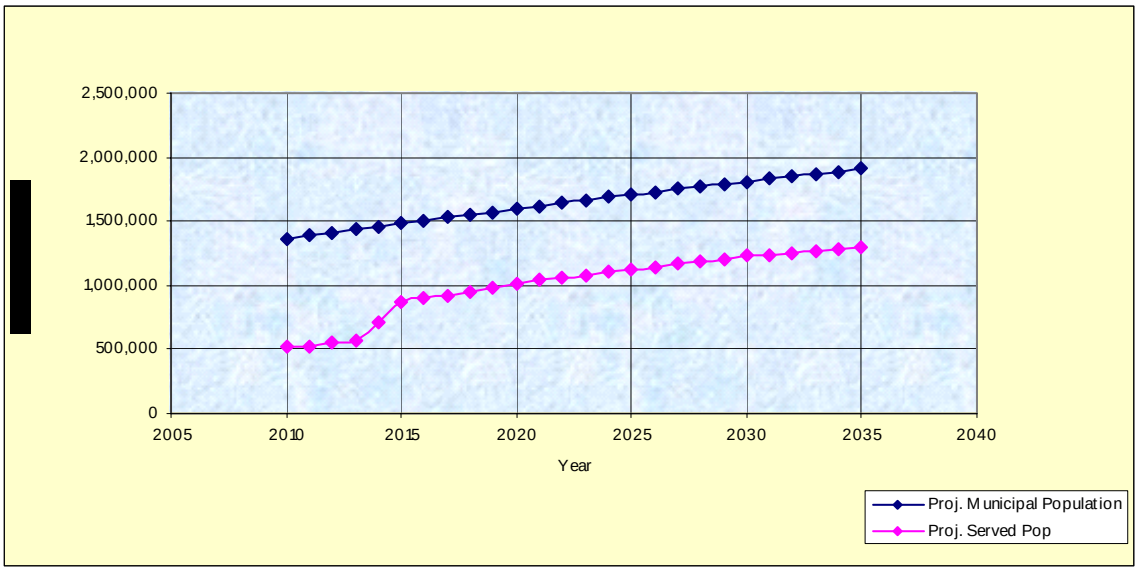


Figure 2-2 Projected Service Coverage

The graph shows a very minimal increase in served population in 2010 to 2012. This period represent construction stage. In 2013, a sudden increase is observed to denote start of operation of the new system. It is projected that there will be an increase in the population that will connect to the new system.

Demand by User Category

Total water demand in this study includes domestic demand, commercial/industrial demand, institutional demand, tourism demand and demand for special economic zones plus an allowance for losses and unaccounted-for-water. Results of actual field survey were used as basis for projecting water demand. In case, where there are no available record or data from the municipality, the provisions in the LWUA Methodology Manual were used as basis for projections.

Domestic Water Demand

The domestic demand was projected using data gathered from field survey. Reference was also made to the LWUA Methodology Manual and NEDA Guidelines regarding the levels of service and the corresponding minimum demand allocation. The unit per capita consumption varies from 110 lpcd to 200 lpcd during the master planning period.

Commercial/Industrial Demand

Water for commercial/industrial demand was allotted for every municipality. About nine percent (9%) of the total demand represent the commercial demand. The commercial/industrial unit consumption varies from 1.20 cumd to to 2.4 cumd per connection depending on the urbanization the expected industries in the area. Seven municipalities, namely, Clarin, Inabanga, Buenavista, Getafe, Talibon, Trinidad, and Ubay are identified as the northeastern corridor and are expected to have light industrial activities such as light manufacturing and ecotourism and agri-tourism businesses in the future.

For proposed industrial sites, a consumption of 86 cumd/ha is allotted (based on LWUA Methodology Manual). According to provincial plans, the Panglao Island Tourism Estate (created under Executive Order No. 14, s1996) which is approximately 120 hectares will include construction of hotels, beach resort, a marina, golf course with a clubhouse, sports center, an entertainment and shopping district, a handicraft village, botanical garden, a retirement village, picnic grove and medical center. It is also the site of the proposed Panglao International Airport. Other proposed industrial sites are Loon, Calape and Tubigon. Carmen is also allotted higher industrial consumption due to the existing palm oil mill in the are. The area to be vacated by the existing domestic airport in Tagbilaran City is also assumed as a prospective industrial area.

Institutional Demand

The institutional demand is the demand allotted for institutions such as public school buildings, churches, public administration buildings, and hospitals. The unit institutional demand varies from 3.2 cumd to 6.0 cumd per connection during the planning period.

Tourism Demand

Tourism demand was given attention in the projection because Bohol is one of the most famous tourist destinations in the country. Tourism is considered as an economic driver in Bohol, hence the need to provide reliable water supply to tourism facilities in order to encourage more tourist to come to Bohol. Based on data from Bohol Tourism Office, about 1,373,689, 1,753,214, and 2,504,590 tourist are expected to visit Bohol in years 2015, 2020,and 2025, respectively. In 2025 onwards, it is projected that an average of 20,000 tourists per day will visit Bohol during peak season. The unit water demand consumption is about 300 liters per tourist per day. In comparison, a country club or a luxury camper provides about 400 liters of water per person per day.

Non-Revenue Water

The Non-Revenue-Water (NRW) is included as part of the projections to take care of the leaks, pilferages, use of unmetered fire hydrants, technical losses, unmetered services/fixed rate and other authorized unmetered uses such as for flushing and disinfection of pipelines and reservoirs. The NRW is computed as a percentage of the average daily production. An allowance of 20% for Non-Revenue-Water (NRW)/Unaccounted-for-Water/Unbilled Water from year 2015 onwards was provided in the demand projection.

Considering all demands of the above user categories, the total demand including NRW, also referred to as the average-day-demand is about 253,762 cumd or 92.62 million cubic meters per year (mcm). **Table 2-5** is a summary of projects per user category for years 2010 to 2035 while **Figure 2-3** is the water demand curve.

Table 2-5 Summary of Projected Demand Per User Category

Demand Category	Demand (cumd)					
	2010	2015	2020	2025	2030	2035
Domestic	59,985	94,789	112,526	131,073	143,411	152,195
Commercial/Industrial	4,007	6,000	13,158	15,480	16,543	17,273
Institutional	2,996	3,272	3,965	5,490	5,790	6,024
Tourism	1,954	3,387	3,675	5,249	5,249	5,249
Industrial Estate	-	11,985	21,420	21,420	21,420	22,270
Total	68,942	119,433	154,744	178,712	192,413	203,011
Non-Revenue Water	37,122	29,858	38,686	44,678	48,103	50,753
Average Daily Demand (Total Water Demand)	106,064	149,291	193,430	223,390	240,516	253,764
Maximum Day Demand	134,499	188,924	244,840	281,637	303,223	319,906
Yearly Average Day Demand (mcm/yr)	38.71	54.49	70.60	81.54	87.79	92.62

Figure 2-3 shows a consistently increasing trend in water demand. The capacity of the current sources which is roughly estimated at 45,408 cumd cannot sustain the projected demand. By year 2010, the projected demand Average Daily Demand is 106,064 cumd against an estimated available supply of 45,408 cumd, hence the need to identify potential sources for future requirements.

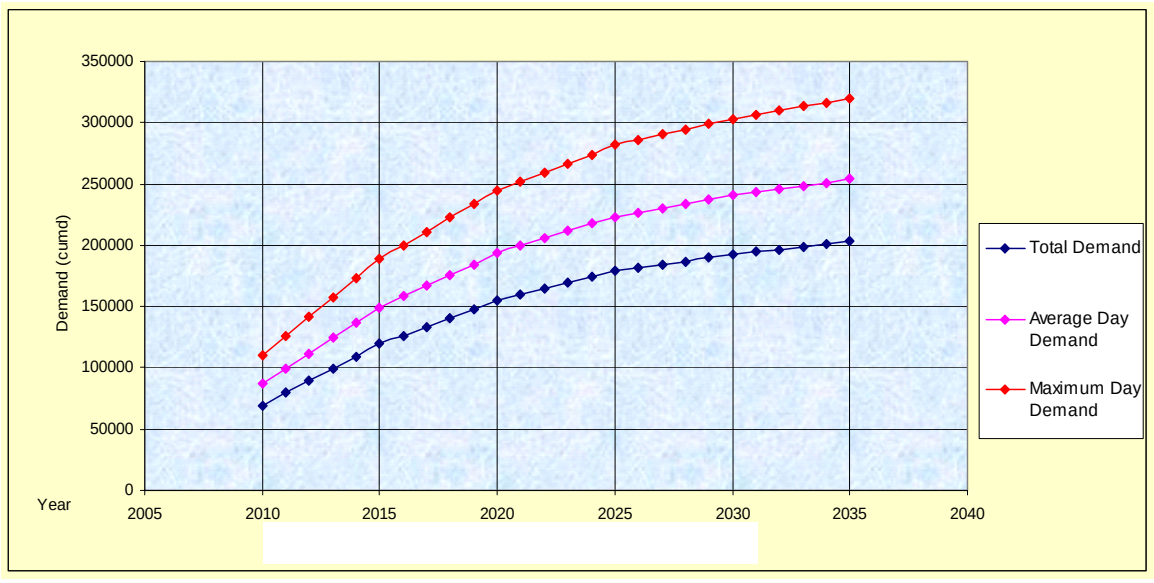


Figure 2-3 Water Demand Curve

Population and Water Demand Projections are discussed in Details in Chapter 3 of Volume II.

2.2 POTENTIAL WATER SOURCES

As mentioned above, the current sources comprised of groundwater through wells and springs are not sufficient to supply the future requirements of the system. In some LGUs, even the present demand can not be sustained by the present sources.

The availability and dependability of the water resources in Bohol may be exploited from existing physiographic features of the province e.g. topography, geology, drainage (river) systems and hydrometeorology.

Geologically, Bohol Province possesses one of the longest chains of limestone belt in the Philippines. The large deposit of limestone formations is generally formed from the continuous recession of the sea in the past. It is generally karstic, coralline and Cavernous with varied porosity and permeability. Except for few identified faults in the eastern and central parts of the mainland, no other geologic structures of significant importance have been identified so far in the study area.

The main geotechnical features of the province are generally translated from the existing slopes, topography, vegetation and physical characteristics of the soil cover of every river system. Where the area is dominated with limestone deposit, the general valley system is relatively stable from mass slumping and large-scale landslide and erosion. However, due to its intrinsic characteristics whereby solution channels and caverns are present, the river system does not fit for large impoundment of water. For the other sedimentary rocks that occupy the higher elevations, with few vegetation and/or green covers, minor erosion and soil slumping often accounts for small-scale soil mantle transportation of every river system.

2.2.1 Groundwater Situation

Groundwater utilization of the province is concentrated within the urban districts of Tagbilaran City and its immediate municipalities. Under present exploitation of groundwater in the area, the south-western coastal part of Tagbilaran and the island of Panglao are experiencing withdrawal of salty water from existing wells as a result of an apparent contamination and/or intrusion of saline water from the sea. The intrusion was initially caused by the continuous lowering of the water levels in wells as a result of uncontrolled pumpage until it intersected the saline body to form upcone structures that led to saline contamination.

At any rate though, the groundwater availability in Bohol is directly reflected from the prevailing hydrogeologic environments of the region, North-western and North-eastern.

- **Alluvium**
  The unconsolidated admixtures of sand, gravel, silt and clay of the Alluvium prevailed at considerable depth to form the shallow aquifer for exploitation via hand-pump tubewells.

- **Limestone Formation**
  The limestone formation near the coastal area appears the major aquifer system in the mainland of hydrogeological significance.

- **Central Limestone Formation**
  Occurs as cappings to the older limestone deposit in the central highlands of Mainland Bohol, it is generally porous and indicates the presence of numerous sinkholes and solution channels. These solution cavities have been developed to form transmission reservoirs for the occurrence of springs in the area.

- **Saline Intruded Area**
  Saline intrusion in the Tagbilaran City was already pointed out in the Tagbilaran Water Supply Master Plan study conducted by Sinclair Knights and DCCD in year 1993. The same findings were presented in a more recent study entitled Underground Water Quality in Tagbilaran City, undertaken by the Australian Youth Ambassadors in 2006. The study also revealed that the groundwater quality in some areas in Tagbilaran City has degraded due to fecal contamination and some wells have already reached their maximum yield.

The provincial government of Bohol is very resolute in declaring its intentions to protect its depleting groundwater source. In Pilar and Bilar there are high yielding springs, however, its capacity may not be sufficient for the projected long term usage because of other water users that already have rights to the springs.

For short term to medium term improvement plans, groundwater may be sustainable and cheaper to develop in areas where groundwater abounds. However a more in-depth study, i.e. groundwater modeling should be undertaken to assess actual groundwater situation. The study may require longer time because of the magnitude of the data to be gathered and analyzed. The groundwater modeling should be undertaken by an expert. The study may require the following:

- Hydrometeorological study to include study on rainfall, evaporation, streamflow, recharge capacity
- Geological Study to include rock formation and stratification to determine water bearing formations
- Aquifer Geometry to include geologically coded grid level maps from zero elevation and every 25 meter amasl up to the highest known elevation and projected every 25m below sea level to elevation of 200m.
- Mapping-out of salt water intrusion to determine its extent and level
- Wells distribution (location), levels, discharges, quality including saline intrusion
- Determination of optimal pumping pattern i.e., the location of all pumping wells in the system, the magnitude and duration of pumping necessary to satisfy demands
- Identification of computer-aided groundwater model to be used in the study

Water rights to the existing groundwater sources should also be scrutinized to be able to determine the water balance that may be available for utilization. In Bohol, the National Irrigation Administration (NIA) is the agency deputized to accept, investigate and process applications for water permits for approval of the National Water Resources Board (NWRB). **Appendix I.2-A, Volume III-Databook**, shows the list of groundwater source permittees for Bohol approved by NWRB as of December 2006.

2.2.2 River Basins

Mainland Bohol is considered as the tenth largest island of the Philippine archipelago and is geographically located in the Central Visayas Region. There are several rivers, creeks and waterways that traverse the entire Bohol Province. In the Water Resources Study (Chapter 4, Volume II), about twenty river systems (**Figure 2-4**) were analyzed and evaluated for water availability and suitability as potential source of water in the future. After evaluation, seven (7) major river basins in the main island were considered as potential sources water supply. These are:

1) Loboc River
2) Abatan River
3) Wahig-Inabanga River
4) Carood River
5) Manaba River
6) Alejawan River
7) Ipil River

Thirteen (13) rainfall recording stations are installed in the entire Bohol, and one of them is a synoptic station located at the Tagbilaran Airport. From the generated isohyetal map for a 30-year record since 1975 to 2005, the rainfall amount in the basin varies from 1,000 mm to slightly over 3,500 mm. The lowest accumulations occur in the coastal area whereas the highest amount occurs in the mountains that bound the basin on south-east in the vicinity of Bilar.

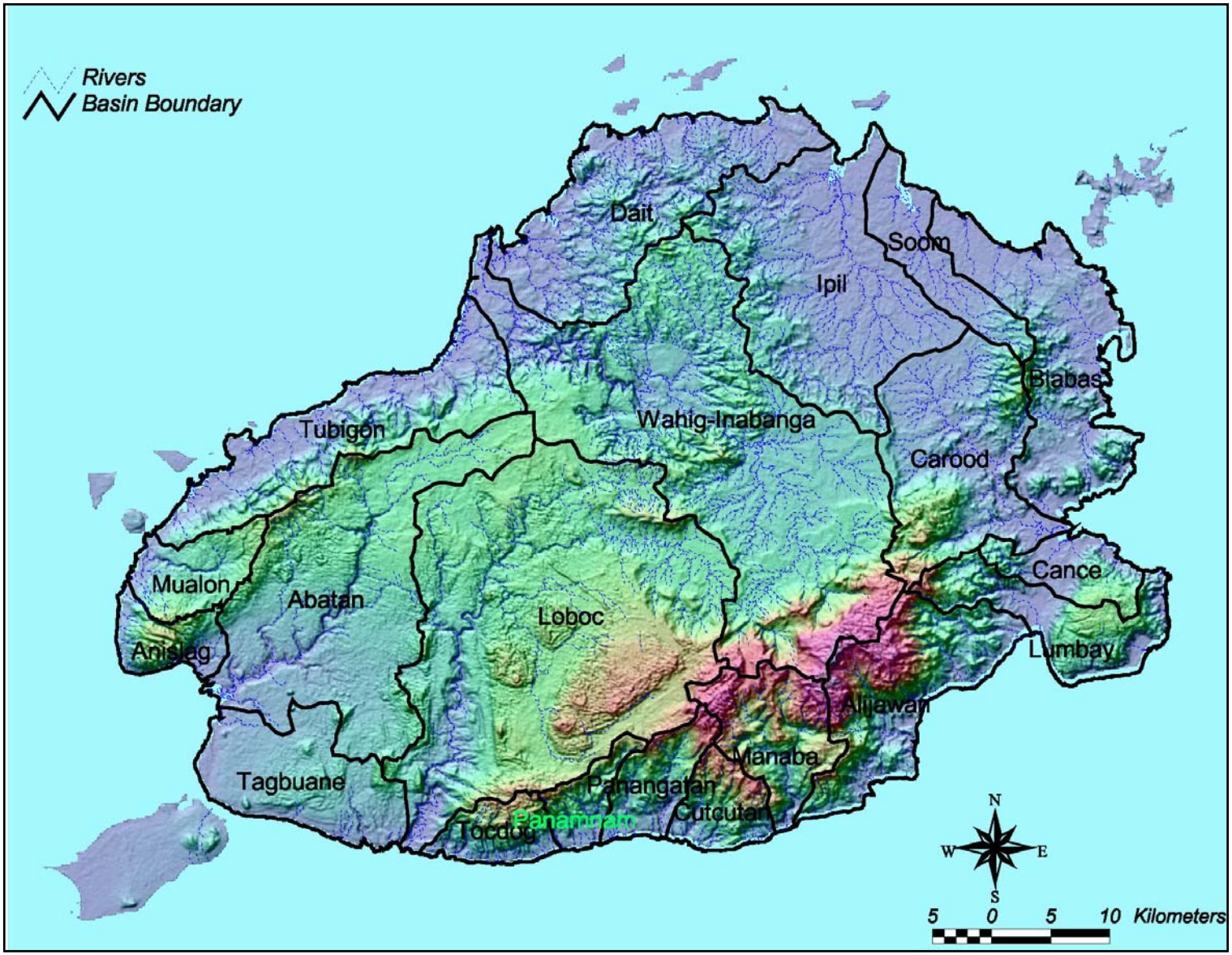


Figure 2-4 River Basins

From the available data of the five (5) gauging stations in the province, the water availability for water supply, irrigation diversion and hydropower requirements, the streamflow duration curve analysis was used for each river system. In relation thereof, a rainfall-runoff analysis was likewise, considered in order to determine the flow regime of each river system. Except for Abatan River, the rest of the gauging stations of the four river systems are often times affected by tidal backwater. With this scenario, the rainfall-runoff relationship for Abatan River catchment is concluded to be used as the basis in the estimation of flow regime for the other river basins in the mainland.

The evaluation of the basin water availability was initiated by using the 1:50,000 topographic NAMRIA-maps by JICA for NIA-GIS Project. The maps were used to delineate the boundaries of the various river basins in the island. Using the Hydro Model (ArcView extension), flow accumulation, ridges and valleys are determined and consequently, basin boundaries are delineated. From the evaluated average basin rainfall and rainfall-runoff coefficient, the availability of water for each basin was estimated. The residual runoff of about 35% of the mean rainfall, is converted into mean discharge. Using the characteristics of the Abatan flow duration curve, the estimated dependable flow for each basin is about 14.02% of the mean discharge. The net dependable flow is computed by reducing the dependable flow by 10% to account for riparian release for environmental consideration. The total picture on the basin availability of water may be represented by a hypsometric curve to serve as a tool guide in planning of water sources for water supply, hydropower potential and irrigation site. Hypsometric curves for the six (6) river basins namely; Abatan, Loboc, Manaba, Ipil, Carood and Inabanga were presented.

The main consideration in the estimation of the water balance analysis (**Figure 2-5**) was generally focused on the water resource development such as water supply and irrigation component of the Province of Bohol. Likewise, the riparian releases for environmental consideration, which is about 10% of the dependable flow is included in the computation of the water demand analysis. By equating water available from the selected river basin with water demand, surplus or deficits on water availability can be estimated. The water balance analysis showed that there is abundant water for development in Bohol that may be utilized for domestic water supply purposes.

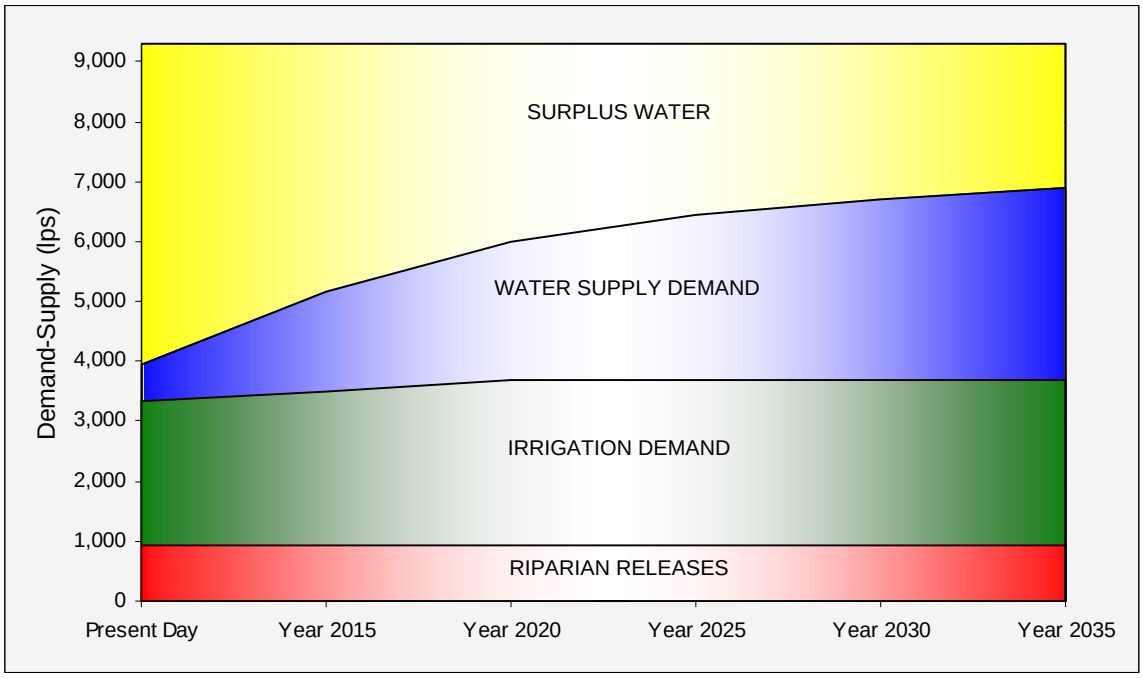


Figure 2-5 Water Balance

Below is the table showing water availability of the seven major river basins identified above.

Table 2-6 Water Availability

No.	Subbasin	Area, km^2	Mean Rainfall, mm	Residual Runoff, mm	mean Q, m^3/s	dep Q, m^3/s	env Q, m^3/s	net Q, m^3/s
1	Manaba	99.70	2,979	1,043	3.30	0.49	0.05	0.44
2	Loboc	659.68	2,488	871	18.22	2.72	0.27	2.45
3	Abatan	368.33	2,220	777	9.08	1.35	0.14	1.22
4	Ipil	299.58	2,364	827	7.86	1.17	0.12	1.06
5	Carood	214.85	2,511	879	5.99	0.89	0.09	0.80
6	*Alijawan	166.57	1,907	668	3.53	0.53	0.05	0.47
7	Wahig-Inabanga	620.32	2,101	736	14.47	2.16	0.22	1.94

* System of coastal rivers all flowing out to the sea, net Q is cumulative of all flows from the rivers in the system

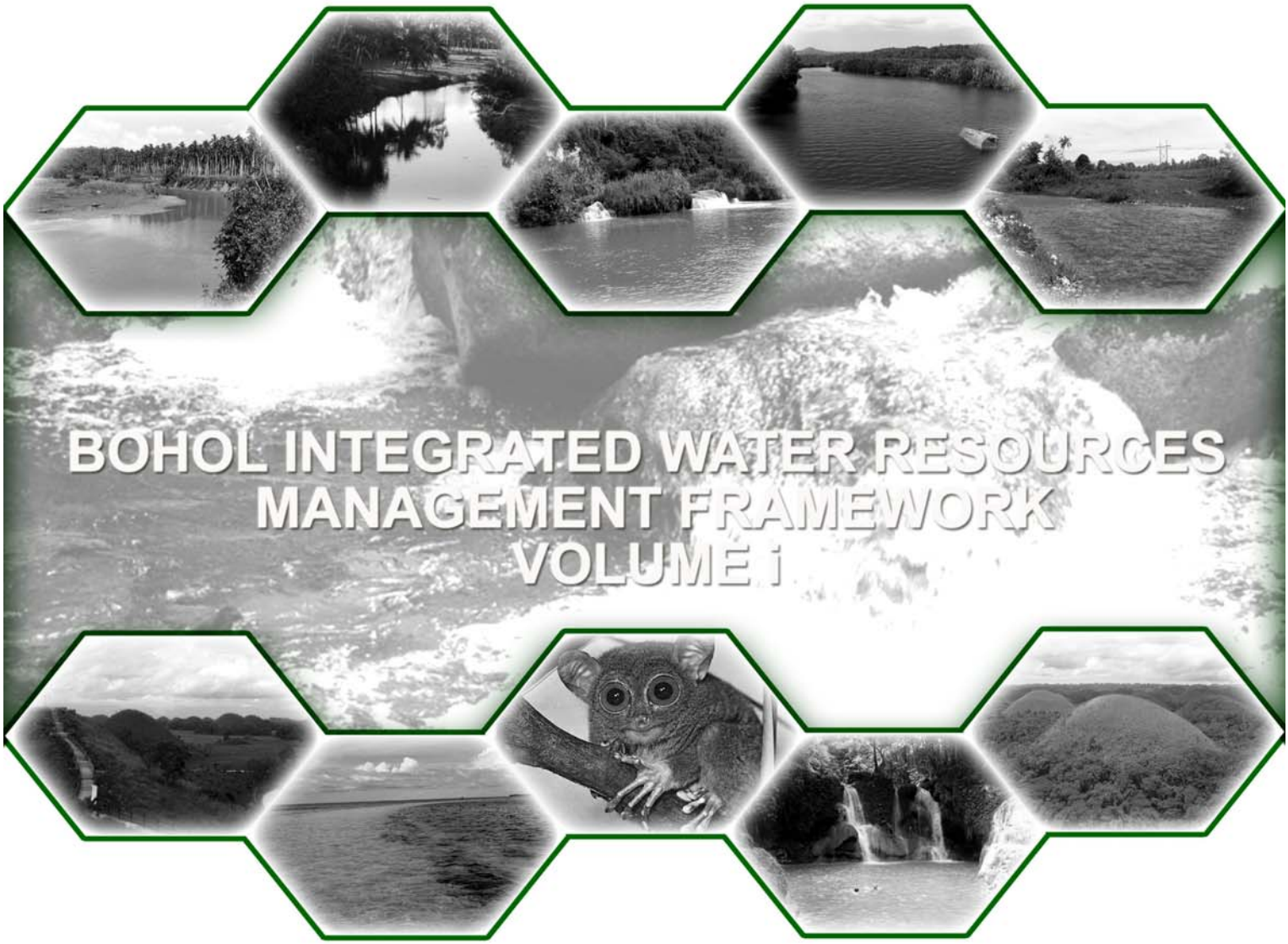
From the water availability results, it can be seen that the projected demands can be meet, however, it is understood that the net Q reflected above is measured at point in the river where all tributaries were already accounted for and near the mouth of the river. The next step therefore is to locate a possible intake point where available Q for diversion (net of riparian releases and other uses) is the largest and where there is no tidal effect. The possible intake point should be geologically stable, near the cluster of municipalities that may be served and will require less pumping energy for transmission.

More detailed studies, however, should be undertaken to validate results of the water availability analysis for each river. These may include:

- A more detailed hydrological study to be able to determine the maximum and minimum yield that may be abstracted from each river. This study shall be the basis of determining the design capacity of the river and proposed structures. The hydrological study shall include physiographic and climatic characteristics of the river basin; watershed characteristics, climate and rainfall data and the evapotranspiration; streamflow measurements to include long term river discharge series, water balance and occurrence of draught; dependable flow analysis including high flow river measurements; and maximum flood level.

- Water quality tests to determine most suitable treatment type. The water quality presented in Chapter 4, Volume 2 of this report was the result of a one-time sampling and therefore may not be conclusive. More tests should be conducted to reflect changes in the water quality, if any, at different times of the year.

- Water rights to the existing surface water sources should also be scrutinized to be able to determine the water balance that may be available for utilization. In Bohol, the National Irrigation Administration (NIA) is the agency deputized to accept, investigate and process applications for water permits for approval of the National Water Resources Board (NWRB). **Appendix I.2-B, Volume III-Databook** shows the list of surface water source permittees for Bohol approved by NWRB as of December 2006.



CHAPTER 3
RECOMMENDED STRATEGY FOR PROVINCE-WIDE WATER SUSTAINABILITY IN BOHOL

CHAPTER 3 – RECOMMENDED STRATEGY FOR PROVINCE-WIDE WATER SUSTAINABILITY IN BOHOL

3.1 BACKGROUND

The entire water sector suffers from extreme uncoordinated, fragmented, inadequate water management planning, institutional restrictions and lack of financial resources for development and improvement purposes. The problems and deficiencies pertaining to the existing water systems in Bohol that were discussed in the previous chapters included the following: a) inadequate water supply coupled with insufficient funds for development of new sources; b) scarcity of groundwater resource due to geological formation, particularly in the identified "north-eastern corridors" municipalities; c) deteriorating groundwater quality in some coastal municipality due to saline intrusion brought about by over abstraction, and contamination that is fecal in origin[1] that is further aggravated by the absence of a sewerage facilities; d) inadequate water purification systems, and utilization of unsafe water sources which are the possible causes of water borne diseases like diarrhea; e) inadequate institutional capacity of some water systems in the operation and maintenance of the systems thereby affecting quality of the service; etc.

There is a seemingly unbalanced distribution of water resources in the province. In the southeastern part most municipalities (Jagna, Lila, Valencia and Garcia-Hernandez) and municipalities located in the so-called headwaters (Pilar and Sierra Bullones) have abundant groundwater resource while adjacent municipalities (San Miguel, Dagohoy and Carmen) have very scarce water resource. For this reason, there is a need to develop a strategy that would result in the water sustainability in the whole province of Bohol. In line with the goals and objective of the project, the strategy/plan would be towards the development of Bohol's water resources for safe domestic, commercial and industrial use in order to improve the health of the community, while increasing opportunities for local economic development and protecting the depleting groundwater systems.

3.2 THE RECOMMENDED STRATEGY

- The recommended strategy for water sustainability for the whole province of Bohol will involve the development of an implementable Water Supply Master Plan (Volume 2). The master planning will include identification of the potential water source for a cluster of municipalities, preliminary design schemes, preparation of costs of facilities and structures and the resulting water tariffs that will basically sustain the operation and maintenance of the proposed system.

- Since the river basins that are expected to provide the required water supply for this master plan are also the sources for water for irrigation purposes, recreation, aquaculture, etc., an Integrated Water Resource Management (IWRM) methodology is very appropriate to adopt. The IWRM methodology will ensure that all different uses of water resources are considered altogether.

  Another point to consider in adopting the IWRM methodology is due to the fact that the river basins encompass municipalities, hence institutional policies pertaining to water use management and planning through IWRM may be instituted to avoid conflicts between LGUs.

  The environment for an IWRM approach is already in-place in Bohol. Various seminars and workshop were already conducted to orient the stakeholders about the IWRM. The Bohol Integrated Water Resources Board (BIWRMB) was already created in August 2007

[1] Based on Underground Water Study of Tagbilaran City, 2006, Australian Youth Ambassador

through an Executive Order. The BIWRMB will be assisted by a secretariat and various technical working groups on the following areas: Watershed Management Protection, Water Quality and Sanitation, Water Quantity and Quality Monitoring. The details of these milestones are presented in Chapter 4, Policy Interventions and Institutional Aspect.

- Effective watershed management, planning that will ensure protection should also be part of the strategy for continuous availability of water in watershed for groundwater and surface water sources (Chapter 5) will also be part of the strategy. The framework identified watershed planning areas, and monitoring plans and programs.

- The strategy would also involve capacitating the local water industry in order to effectively manage, maintain and operate the new system. A well managed system would not only satisfy the demands of the consumers. It will also result in maximum utilization of supply sources thus savings in terms of monetary resources. Water conservation measures may be successfully implemented through a knowledgeable and capacitated waterworks personnel. Chapter 6 presents a capacity development framework for the province of Bohol.

- The welfare of women and children should always be given attention in development projects such as this master plan. As an IWRM principle, " Women play a central part in the provision, management and safeguarding of water", hence the need to involve in decision making in matter pertaining to water issues such as the IWRM. In Bohol, there are about ten (10) active women's organization and six (6) organizations with gender component in their program. The present situation of GAD in Bohol and the strategies for mainstreaming GAD into the Master Plan are presented in Chapter 7.

- The strategy would also involve putting in-place a GIS-based management information system accessible to all stakeholders, particularly the LGU. Since the Master Plan would cover the whole province, an information system would be very useful in gathering information, updating situation and keeping track records. This will facilitate coordination and communications between water managers and the LGU officials, as well. Details of the GIS-based management information system are discussed in Chapter 8.

- A marketing strategy to promote private sector investment and local commercial and industrial development based on having improved access to safe and reliable water supplies is also part of plan to attain water sustainability for Bohol . The Marketing Plan that includes promotion of water conservation measures is discussed in detail in Chapter 9.

- The recommended monitoring and evaluation system (Chapter 10) for this Master Plan will adopt a strategy mp and balance score card. The strategy map will be used as tool for translating the vision into action.

3.3 THE WATER SUPPLY MASTER PLAN

3.3.1 Potential Water Sources

The potential water sources that can suffice the projected demand are the current groundwater and surface water sources. In 2035, the projected average-day demand for the projected service area in the whole province of Bohol is about 253,762 cumd. With an estimated capacity of the groundwater sources of about 45,408 cumd, an additional of 208,354 cumd will be sourced from surface water sources. These will come from the six (6) river basins having highest net Q that may be considered as potential water sources, namely, Abatan, Loboc, Manaba, Carood, ipil and Inabanga. The potential water sources are presented in **Table 3-1**.

Table 3-1 Selected River Basins

River Basin	Area (km^2)	Dependable Q (m^3/s)	Net Q (m^3/s)
Abatan	368.33	1.35	1.22
Loboc	659.68	2.72	2.45
Manaba	99.70	0.49	0.44
Carood	214.85	0.89	0.80
Ipil	299.58	1.17	1.06
Wahig-Inabanga	620.32	2.16	1.94
Total		8.78	7.91

Among the selected sources, Ipil River demonstrated high values for turbidity, chemical oxygen demand, total suspended solids and iron which means that a more extensive treatment may be required to make it fit for human consumption.

The proposed intake points within the identified river basins were selected based on the following criteria:

1) accessibility possibly with right-of-way and support facilities such as power and communication lines;
2) transmission lines should run along existing roadway either barangay, provincial or national to eliminate right-of-way acquisition costs and resettlement costs for settlements that may be affected;
3) mode or degree of difficulty of transporting water to cluster of municipalities that may be served. A gravity system is preferred over a pumping system, or if possible should require minimum energy for pumping; and
4) geological stability of the area

3.3.2 Clustering of Municipalities

Based on the available flow that may be diverted for domestic supply, projected demands for years 2025 and 2035, the 47 municipalities and the city of Tagbilaran were grouped under each river basin. The major considerations in the clustering are the proximity of municipalities with respect to the river basin, hydraulic consideration and geomorphology of the area.

Table 3-2 shows water demand by cluster and the corresponding supply that will come from the proposed and existing sources.

Table 3-2 Projected Water Demand By Cluster

River Cluster	Municipalities	Projected Maximum Day Demand at Year 2035 (cumd)	Estimated Supply Quantity from Existing Sources (cumd)	Supply from River Basin (cumd)
Abatan	Antequera, Catigbian, San Isidro,Sagbayan, Balilihan, Sikatuna Corella	17,918	3,733	14,185
Loboc 1	Loboc,Loay, Lila, Dimiao, Valencia, Alburquerque, Baclayon, Tagbilaran, Dauis, Panglao,	105,361	22,359	83.002
Loboc2	Sevilla,Bilar,Batuan, Carmen, Dagohoy, Sierra Bullones, Pilar	28,459	2,833	25,626

River Cluster	Municipalities	Projected Maximum Day Demand at Year 2035 (cumd)	Estimated Supply Quantity from Existing Sources (cumd)	Supply from River Basin (cumd)
Manaba	Garcia-Hernandez, Jagna, Duero, Guindulman, Anda, Candijay	29,806	5,211	24,595
Carood	Mabini, Alicia, San Miguel, Danao, Ubay, Pres. C. P. Garcia	33,757	2,166	31,591
Ipil	Bien Unido, Trinidad, Talibon, Getafe, Buenavista	39,121	1,329	37,792
Wahig-Inabanga	Inabanga, Maribojoc, Loon, Calape Clarin, Tubigon	52,112	7,777	57,706

3.3.3 Development of Schemes

The development of schemes were simulated and analyzed based on two basic considerations: (a) maximum utilization of pump head to provide required flow at minimum pressure of 14 meters at the offtakes and (b) provision of booster pump and sump at each municipality to supply required flow at a minimum pressure of 14 meters at the offtake.

The first scheme considers the use of bigger diameter pipes in order to provide the required pressures at the offtakes while the second scheme considers the use of smaller diameter pipes but uses booster pumps to provide adequate pressures at the offtakes. These basic considerations (schemes) have their own advantages and disadvantages depending on the topography, and relative distances and elevations of offtakes with reservoir.

Each scheme included source development, pumping system, treatment system, reservoir and sumps, transmission lines for the purpose of delivering required bulk water supply at the offtake of each municipality at a pressure of not less than 14 meters.

The net present worth costs of the schemes at a discount rate of 12% were compared with respect to the investment costs, maintenance and pumping costs at October 2007 price levels. The least cost schemes together with non-economic considerations were selected and recommended for the proposed integrated water supply system.

3.3.4 Recommended Plan

The Recommended Plan presents the development program of the selected 7 bulk water supply system clusters up to year 2035. The proposed integrated water supply system is envisioned to provide a total average daily production 208,354 cumd benefiting about 1,077,000 population in the Province of Bohol. It is assumed that the construction will start in 2010 and completed in 2012. The initial operation of the bulk water supply system will start in 2013. The cost of the development program includes the construction, feasibility study, detailed engineering design, and construction supervision. The major water facilities and components are (a) source facility, (b) water treatment plant, (c) storage facilties, (d) transmission lines, (e) pumps stations, (f) power source development, ((g) Land Acquisition and Right-of-Way, and (h) stored materials and equipment.

The proposed Abatan River Cluster will provide an average daily production of 10,179 cumd benefiting about 70,200 population. It will cover 7 municipalities of Antequera, Balilihan, Catigbian, Corella, Sagbayan, San Isidro and Sikatuna. The proposed intake structure will be located in Antequera while the treatment plant will be located in Balilihan. The total project cost is PhP778,997,000, consisting PhP772,742,000 for Phase 1 and PhP6,255,000 for Phase 2.

The proposed Loboc 1 River Cluster will provide an average daily production of 61,309 cumd benefiting about 237,400 population. It has the highest number of population served covering the largest number of city/municipalities. It will cover 11 city/municipalities of Alburquerque, Baclayon, Cortes, Dauis, Dimiao, Lila, Loay, Loboc, Panglao, Tagbilaran City, and Valencia. The proposed intake and treatment plant will be located in Loboc. A total of 77 km long raw and clean water transmission lines with diameters ranging from 250 to 1000mm diameter pipes will be installed. The total project cost is PhP2,751,826,025.00, consisting PhP2,724,099,603 for Phase 1 and PhP27,726,422.00 for Phase 2.

The proposed Loboc 2 River Cluster will provide an average daily production of 19,612 cumd benefiting about 124,000 population. The proposed Loboc 2 River Cluster will cover 7 municipalities, namely: Batuan, Bilar, Carmen, Dagohoy, Pilar, Sevilla and Sierra Bullones. The proposed intake structure will be common for both Loboc 1 and Loboc 2 Clusters since they will be tapping the same river and location. The proposed water treatment plant will be located in Balilihan. The raw and clean water transmission lines will have a total length of 65km with diameters ranging from 150 to 600mm. The total project cost is PhP1,257,646,000 consisting PhP1,238,579,000 for Phase 1 and PhP19,067,000 for Phase 2.

The proposed Manaba River Cluster will provide an average daily production of 18,418 cumd benefiting about 114,400 population. The proposed Manaba River Cluster will cover 6 municipalities, namely: Anda, Candijay, Duero, Garcia-Hernandez, Guindulman and Jagna. The proposed intake structure and the water treatment plant will be located in Garcia-Hernandez. The raw and clean water transmission lines will have a total length of 53.5km long with diameters ranging from 250 to 500mm. The total project cost is PhP1,074,845,000 consisting PhP1,068,238,000 for Phase 1 and PhP6,607,000 for Phase 2.

The proposed Carood River Cluster will provide an average daily production of 24,534 cumd benefiting about 147,500 population. The proposed Carood River Cluster will cover 6 municipalities, namely: Alicia, Danao, Mabini, Pres. Carlos P. Garcia, San Miguel and Ubay.

The proposed intake structure and treatment plant will be located in Alicia. The transmission line has a total length of 74.5km long with diameters ranging from 200 to 700mm. The total project cost is PhP1,412,862,000 consisting PhP1,404,519,000 for Phase 1 and PhP8,344,000 for Phase 2.

The proposed Ipil River Cluster will provide an average daily production of 29,968 cumd benefiting about 177,700 population. The proposed Carood River Cluster will cover 5 municipalities, namely: Bien Unido, Buenavista, Getafe, Talibon and Trinidad. The proposed intake structure and water treatment plant will be located in Trinidad. The total project cost is PhP1,247,201,000, consisting PhP1,240,547,000 for Phase 1 and PhP6,654,000 for Phase 2.

The proposed Wahig-Inabanga River Cluster will provide an average daily production of 44,335 cumd benefiting about 207,400 population. The proposed Wahig-Inabanga Cluster will cover 6 municipalities, namely: Inabanga, Maribojoc, Loon, Calape, Clarin and Tubigon. The proposed intake structure and treatment plant will be located in Inabanga. The transmission line has a total length of 60.2 km long with diameters ranging from 200 to 700mm. The total project cost is PhP2,251,727,834 consisting PhP2,237,896,494 for Phase 1 and PhP13,831,340 for Phase 2.

The total project cost estimates of the Bohol Integrated Water Supply System Master Plan is PhP10,600.50 million, consisting of PhP10,512 million for Phase 1 and PhP88.50 million for Phase 2.

The recommended master plan must be periodically updated. Master plan updating should be undertaken at least once every 5 years, or sooner if significant changes occur, Updating is necessary to assess the effectiveness of the current plan, benefits gained, the actual costs, the problems and constraints encountered; and to provide overall review, refinement and direction for the future.

The overall development plan is presented in Figure 6-13, Chapter 6 of Volume II.

3.3.5 Water Tariffs

The financial feasibility analysis for the seven (7) river clusters was undertaken considering the a) technical and cost estimates of the river clusters including intake structures, water treatment plants, transmission pipes, pumps, reservoirs, power structures, and land and right-of-way acquisitions; b) estimated annual water sales, based on estimated average-day-demand per municipality/city; c) annual operations and maintenance (O&M) expenses including salaries, energy, chemicals and maintenance; d) depreciation based on 30 years as the economic useful life of civil works and transmission pipes, and 13 years for pumps and equipment; and five-year amortization period for feasibility and detailed engineering cost.

Three feasibility scenarios were undertaken which are at 15% Financial Internal Rate of Return (FIRR), 12% FIRR and at 0%FIRR.

Table 3-3 Highlights of Results of Financial Analysis

River Cluster Area	LGUs Served	Estimated Project Cost in Million Pesos at 2007 Prices	Pesos at 2007 Prices per Cubic Meter					
			FIRR=15%	FIRR=12%				FIRR=0%
				Base Case	+30% Sales	-20% Cost	+30% Sales & -20% Cost	
Integrated Water Supply System								
Abatan	Antequera, Balilihan, Catigbian, Corella, Sagbayan, San Isidro and Sikatuna	772.74	90.39	71.46	54.97	59.23	45.56	19.48
Loboc1	Alburquerque, Baclayon, Cortes, Dauis, Dimiao, Lila, Loay, Loboc, Panglao, Tagbilaran City and Valencia	2,724.10	50.48	40.33	31.03	33.65	25.90	12.31
Loboc2	Batuan, Bilar, Carmen, Dagohoy, Pilar, Sevilla and Sierra Bullones.	1,238.58	74.62	60.10	46.19	50.36	38.74	19.63
Manaba	Anda, Candijay, Duero, Garcia Hernandez/ Manaba, Guindulman and Jagna.	1,068.24	69.22	54.40	41.85	44.92	34.56	14.14
Carood	Alicia, Danao, Mabini, San Miguel, Pres. Carlos P. Garcia and Ubay	1,404.52	62.84	49.42	38.02	40.65	31.27	12.36
Ipil	Bien Unido, Buenavista, Getafe, Talibon and Trinidad	1,240.55	48.90	38.19	29.38	31.35	24.11	9.22
Wahig-Inabanga	Calape, Clarin, Inabanga, Loon, Maribojoc and Tubigon	2,063.27	58.23	44.99	34.61	36.99	28.45	10.87

3.3.6 Expected Benefits from the Recommended Strategy

- Piped water systems in the households will help improve health and sanitation. There will be reduction in mortality and morbidity caused by water-borne diseases such as diarrhea and gastroenteritis.
- It will save time and human energy expended for fetching water from a far source. Saving human energy may also help in absorption of nutrition in the body.
- The project will boost eco-tourism and other livelihood activities that are dependent on water. Provision of sufficient, safe and reliable drinking water supply for every citizen is a major thrust of the Philippine government. The improvement of the water

supply system of Bohol is in line with this thrust and is consistent with the development plans of the provincial and municipal governments.

- Availability of water in a locality increases land valuation, thereby increasing also the government's tax base.

3.3.7 Other Necessary Requirements Prior to Project Implementation

If the project will be implemented, these will fall on under **Category B,** as these are are located in Environmentally Critical Areas (ECA). Projects classified as Category B are required to have an Environmental Compliance Certificate (ECC) from the DENR-EMB Regional Office concerned, in this case EMB Region VII, prior to implementation.

Bohol hosts endemic and protected species of flora and fauna, aesthetic tourist spots, mangrove forests, a man-made forest and several protected watershed areas, thereby qualifying it as an ECA per Section 1.0 (b), Article II of DAO 96-37.

Among the proposed sources of domestic water supply system to be developed are rivers within the three major watersheds that have been declared as protected areas under the NIPAS Law. These are: (a) Loboc River within the Loboc Watershed which was declared a NIPAS area under PP 450, (b) Manaba River within the Duero Watershed which was declared a NIPAS under PP 881), and (c) Ipil and Inabanga Rivers within the Wahig-Inabanga Watershed which was declared a NIPAS under PP No. 468 as amended by PP No. 223. This includes the areas inside the Rajah Sikatuna National Park (PP 127).

Category B projects are categorized further as B-1, B-2 and B-3 depending on whether or not the project is new and on the type of operation. The documentary requirements for ECC application for each project category are shown in following table:

Table 3-4 Documentary Requirements for Category B Projects

CATEGORY		APPLIED TO	DOCUMENTS REQUIRED FOR ECC/CNC APPLICATION
B: Non-Environmentally Critical But located in an ECA	**B-1**:New	Single Project	IEE or IEE Checklist (if available)
	B-2: Existing and to be expanded (including undertakings that have stopped operations for more than 5 years and plan to re-start, with or without expansion)	Single Project	EPRMP (based on a checklist if available)
		Co-located Project	PEPRMP
	B-3: Operating without ECC		

Source: Table 3-1 of the Procedural Manual of DAO 2003-30

From **Table 3-4**, it appears that the project would fall under Category B-1, being a new project for which an IEE or IEE checklist would be sufficient for ECC application. However, based on Table 2-1 of DAO 2003-30, under *Item C (6)-Water Supply Systems*, submission of an EIS is required for projects that involve the construction of more than six (6) production wells and other systems. Furthermore, Level III distribution systems are considered as Category B projects, for which IEE checklist or IEE report would be required depending on the assessment of the EMB Regional Office.

As the bulk water supply project involves the construction of seven (7) complete water supply systems, it is probable that the EMB Regional Office would require the submission of an EIS. If such is the case, there would be a need to carry out a comprehensive environmental impact assessment.

To confirm the level of environmental study that would be required by the EMB Regional Office, a scoping meeting with the EMB may be initiated by the proponent during the feasibility study stage.

3.3.8 Summary of Recommendations for Future Studies

As indicated in DAO 2003-30, IEE Report for water supply source and for the pipe laying works should be prepared and submitted as the basic requirement for application for environmental clearance, however, considering the size and characteristics of the impact areas, there is a possibility that the EMB Region VII would require a more detailed environmental assessment of an EIA level. To confirm the level of study and baseline surveys that should be undertaken, scoping meetings should be held with the EMB Region VII as early as the feasibility study stage.

Among others, the following aspects are recommended for inclusion in the environmental study:

- Comprehensive analysis of the quality of water from each water supply source being considered for development. All constituents of concern as specified in the PNSDW should be analyzed to ensure that the threshold values are not exceeded. In the event that any parameter is not met, recommendations for remedial measures or appropriate treatment of the water prior to distribution should be incorporated in the study.
- Confirm the right-of-way clearance based on the final site of facilities and alignment of water pipeline. Determine the areas affected by right-of-way claims, if any, for information and appropriate action of the proponent.
- Inventory or survey of wildlife habitat areas to ensure that such areas will not be affected by construction activities

3.3.9 Options for Priority Development Areas

In addition to the recommended river clusters, the following options were prepared for priority development areas in Bohol upon the request of the Provincial Governor.

3.3.9.1 Abatan-Loboc River Option

Metro Tagbilaran (composed of Tagbilaran City, Dauis, Panglao and Cortes) and the Panglao Island Tourism Estate (PITE) are identified as the top priority areas that need water supply improvement. Tagbilaran City is the center of education, tourism, commerce and industry in the province. PITE, on the other hand, is the center of tourism and is the site of the proposed international airport to be built in the province.

The development of Abatan River will also be given priority because among the river basins, it is the closest to the two priority areas. Abatan can give a maximum flow of 532 L/s sufficient for the demand of Metro Tagbiaran and PITE until year 2017. By year 2018 to 2035, Loboc River will augment supply coming from Abatan River and the the service area will also be expanded to include the municipalities of Loboc, Loay, Alburquerque and Baclayon.

Based on the hypsometric curve taken from the water resources study, about 563 lps may be diverted from Abatan River for potable water supply. This flow is adequate for the demand of the four municipalities and one city until year 2017.

By year 2018, Loboc River may be tapped to augment supply. Four other adjacent municipalities may be served, namely, Loboc, Loay, Alburqueque, and Baclayon will be added to the service area.

The combined Abatan-Loboc River Option, shown in **Figure 3-1,** will have an average daily production of 56,325 cumd and will serve about 203,800 persons. The development of Abatan River has an estimated project cost of Php 1,164,221,091.00 during Phase 1 and Php 898,342,348 for Phase for the development of Loboc River.

3.3.9.2 Loboc River Option

The above cluster of top priority composed of Metro Tagbilaran (Tagbilaran City, Dauis, Panglao and Cortes) and the Panglao Island Tourism Estate (PITE) including the adjacent municipalities of Loboc, Loay, Alburqueque, and Baclayon may also be served through another option utilizing the Loboc River as source.

Similarly with the Abatan-Loboc River Option, Loboc River Option will have an average daily production of 56,325 cumd and will serve about 203,800 persons. The development of Loboc River has an estimated project cost of Php 2,161,380,000 and replacement of pumps by 2025 amounting to PhP25,290,000.

The development plan of Loboc River Option is presented in **Figure 3-2.**

3.3.9.3 Ipil River Option

The next priority areas would be the municipalities of comprising the Northeastern Industrial Corridor. These municipalities where agro-industrial developments are programmed for investments are: Ubay, Trinidad, Bien Unido and Talibon.

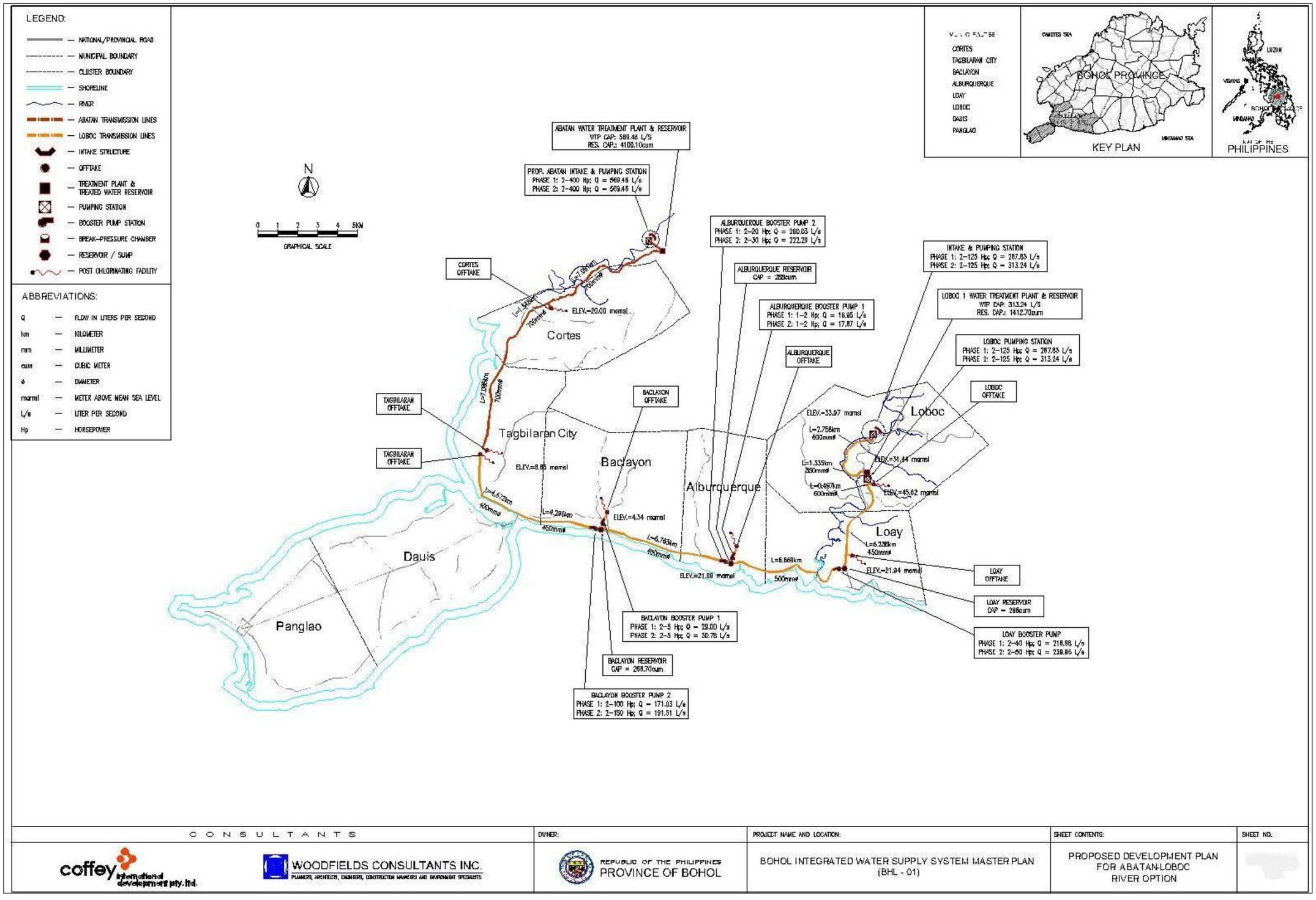
The **Ipil River Option,** shown in **Figure 3-3,** will have an average daily production of 32,409 cumd and will serve about 180,000 population. The option will cost Php 1,107,395,543 and Php 4,400,192 for replacement of pump by year 2025.

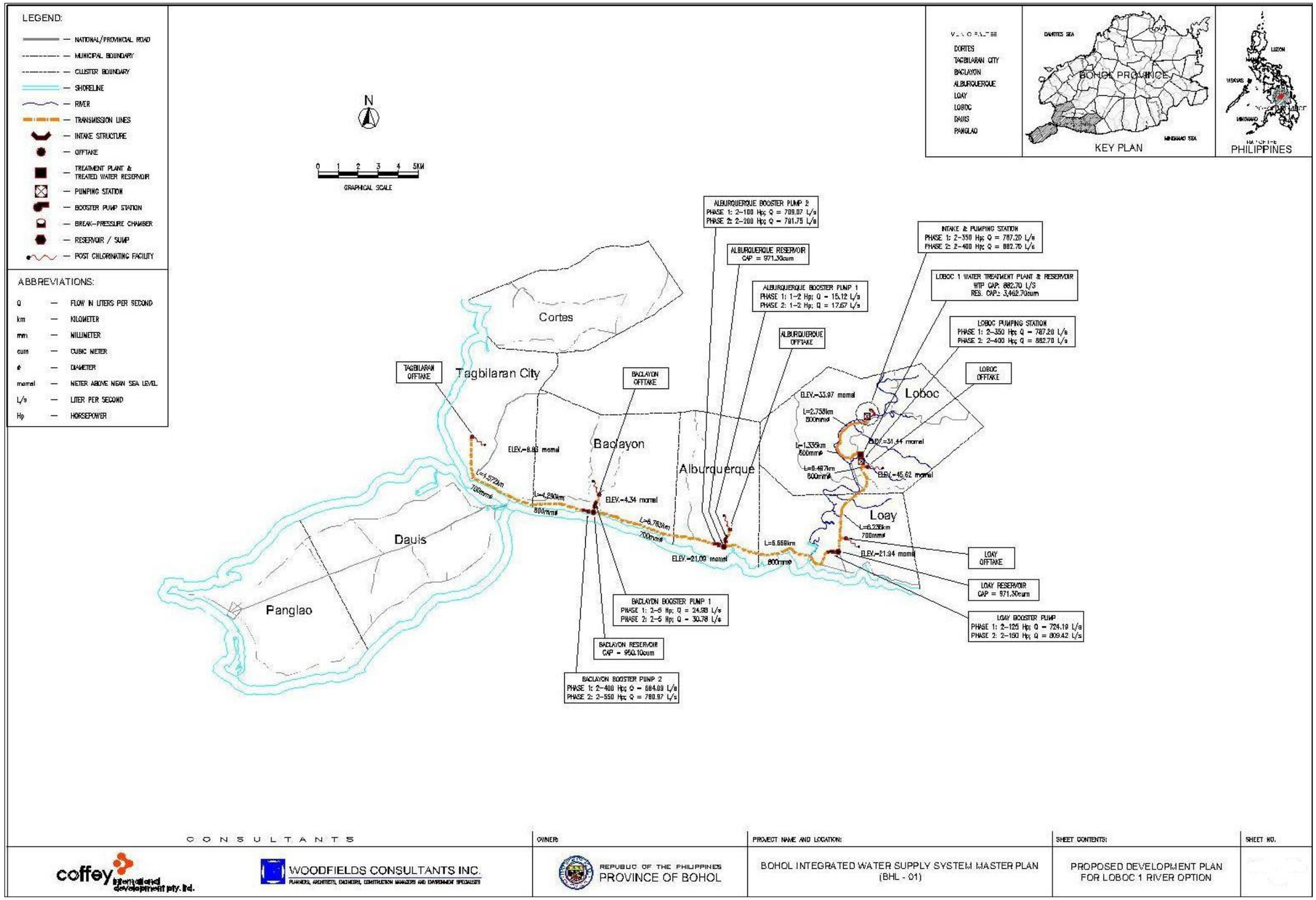
3.3.9.4 Wahig-Inabanga River Option

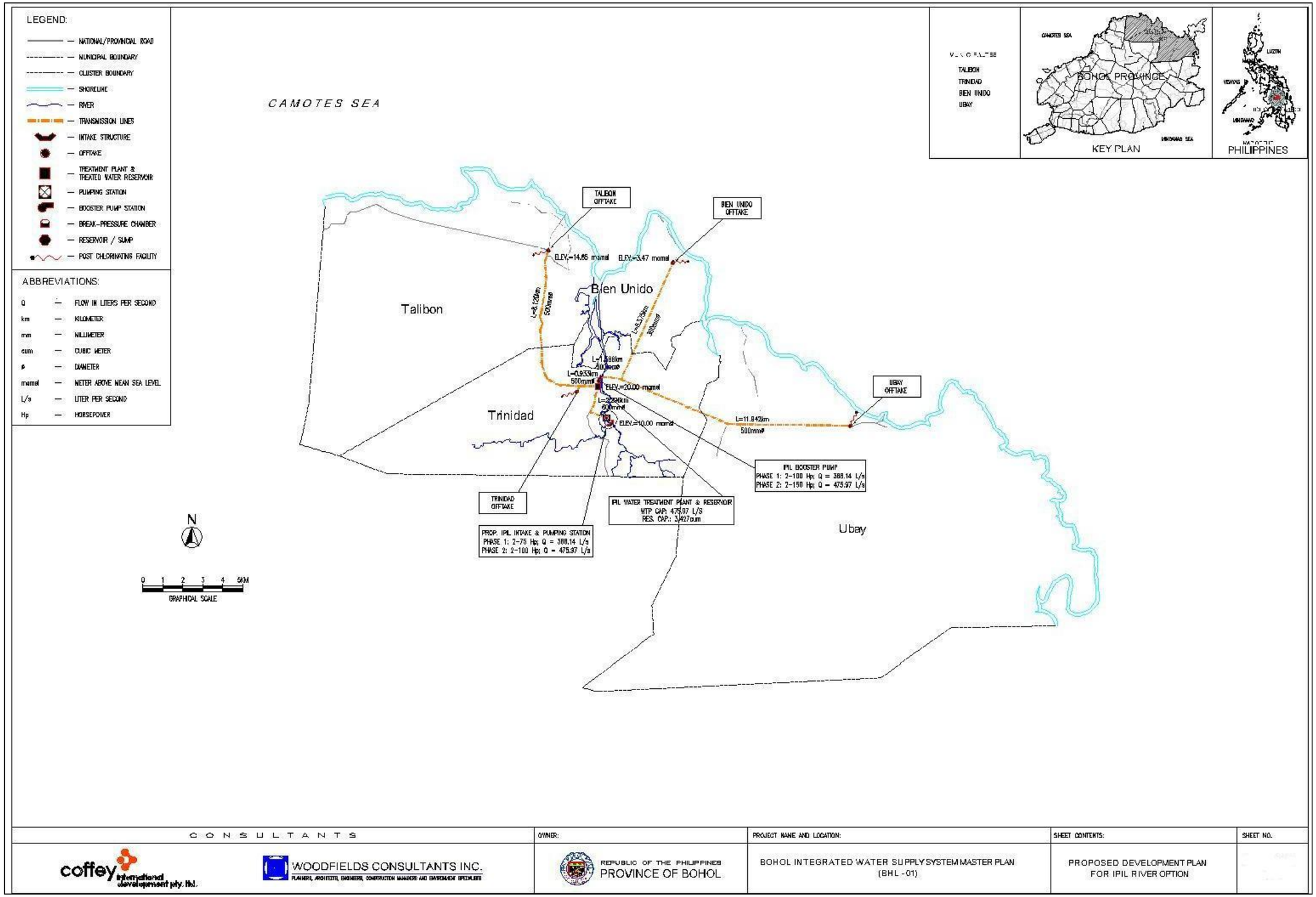
The other municipalities in the northeastern corridors are Getafe, Buenavista, Inabanga and Clarin. The Wahig-Inabanga River is the identified potential source for these municipalities.

The **Wahig-Inabanga River Option** as shown in **Figure 3-4** will have an average daily production of 15,262 cumd and will serve about 97,300 persons. This option will cost Php 715,510,613 and Php 2,865,822 for replacement of pumps by year 2025.

The highlights of the financial analysis showing the derived water tariffs for the above options are presented in **Table 3-5.**


LEGEND:
NATIONAL/PROVINCIAL ROAD
MUNICIPAL BOUNDARY
CLUSTER BOUNDARY
SHORELINE
RIVER
ABATAN TRANSMISSION LINES
LOBOC TRANSMISSION LINES
INTAKE STRUCTURE
OFFTAKE
TREATMENT PLANT & TREATED WATER RESERVOIR
PUMPING STATION
BOOSTER PUMP STATION
BREAK-PRESSURE CHAMBER
RESERVOIR / SUMP
POST CHLORINATING FACILITY
ABBREVIATIONS:
Q — FLOW IN LITERS PER SECOND
km — KILOMETER
mm — MILLIMETER
cum — CUBIC METER
ϕ — DIAMETER
mamsl — METER ABOVE MEAN SEA LEVEL
L/s — LITER PER SECOND
Hp — HORSEPOWER
N
0 1 2 3 4 5KM
GRAPHICAL SCALE
CORTES
TAGBILARAN CITY
BACLAYON
ALBURQUERQUE
LOAY
LOBOC
DAUIS
PANGLAO
BOHOL PROVINCE
KEY PLAN
PHILIPPINES
ABATAN WATER TREATMENT PLANT & RESERVOIR
WTP CAP: 589.48 L/S
RES. CAP.: 4108.10cum
PROP. ABATAN INTAKE & PUMPING STATION
PHASE 1: 2-400 Hp; Q = 569.45 L/s
PHASE 2: 2-400 Hp; Q = 569.45 L/s
CORTES OFFTAKE
ELEV.=20.00 mamsl
Cortes
TAGBILARAN OFFTAKE
Tagbilaran City
ELEV.=8.83 mamsl
TAGBILARAN OFFTAKE
BACLAYON OFFTAKE
Baclayon
ELEV.=4.34 mamsl
Dauis
Panglao
ALBURQUERQUE BOOSTER PUMP 2
PHASE 1: 2-20 Hp; Q = 200.03 L/s
PHASE 2: 2-30 Hp; Q = 222.29 L/s
ALBURQUERQUE RESERVOIR
CAP = 288cum
ALBURQUERQUE BOOSTER PUMP 1
PHASE 1: 1-2 Hp; Q = 16.95 L/s
PHASE 2: 1-2 Hp; Q = 17.87 L/s
ALBURQUERQUE OFFTAKE
Alburquerque
ELEV.=21.08 mamsl
INTAKE & PUMPING STATION
PHASE 1: 2-125 Hp; Q = 287.85 L/s
PHASE 2: 2-125 Hp; Q = 313.24 L/s
LOBOC 1 WATER TREATMENT PLANT & RESERVOIR
WTP CAP: 313.24 L/S
RES. CAP.: 1412.70cum
LOBOC PUMPING STATION
PHASE 1: 2-125 Hp; Q = 287.85 L/s
PHASE 2: 2-125 Hp; Q = 313.24 L/s
LOBOC OFFTAKE
ELEV.=33.97 mamsl
Loboc
ELEV.=31.44 mamsl
ELEV.=45.62 mamsl
Loay
ELEV.=21.84 mamsl
LOAY OFFTAKE
LOAY RESERVOIR
CAP = 288cum
LOAY BOOSTER PUMP
PHASE 1: 2-40 Hp; Q = 218.98 L/s
PHASE 2: 2-50 Hp; Q = 239.86 L/s
BACLAYON BOOSTER PUMP 1
PHASE 1: 2-5 Hp; Q = 28.00 L/s
PHASE 2: 2-5 Hp; Q = 50.76 L/s
BACLAYON RESERVOIR
CAP = 268.70cum
BACLAYON BOOSTER PUMP 2
PHASE 1: 2-100 Hp; Q = 171.03 L/s
PHASE 2: 2-150 Hp; Q = 191.51 L/s
CONSULTANTS
coffey international development pty. ltd.
WOODFIELDS CONSULTANTS INC.
PLANNERS, ARCHITECTS, ENGINEERS, CONSTRUCTION MANAGERS AND ENVIRONMENT SPECIALISTS
OWNER:
REPUBLIC OF THE PHILIPPINES
PROVINCE OF BOHOL
PROJECT NAME AND LOCATION:
BOHOL INTEGRATED WATER SUPPLY SYSTEM MASTER PLAN
(BHL - 01)
SHEET CONTENTS:
PROPOSED DEVELOPMENT PLAN
FOR ABATAN-LOBOC
RIVER OPTION
SHEET NO.


LEGEND:
NATIONAL/PROVINCIAL ROAD
MUNICIPAL BOUNDARY
CLUSTER BOUNDARY
SHORELINE
RIVER
TRANSMISSION LINES
INTAKE STRUCTURE
OFFTAKE
TREATMENT PLANT & TREATED WATER RESERVOIR
PUMPING STATION
BOOSTER PUMP STATION
BREAK-PRESSURE CHAMBER
RESERVOIR / SUMP
POST CHLORINATING FACILITY
ABBREVIATIONS:
Q — FLOW IN LITERS PER SECOND
km — KILOMETER
mm — MILLIMETER
cum — CUBIC METER
ø — DIAMETER
mamsl — METER ABOVE MEAN SEA LEVEL
L/s — LITER PER SECOND
Hp — HORSEPOWER
N
0 1 2 3 4 5KM
GRAPHICAL SCALE
MUNICIPALITIES
CORTES
TAGBILARAN CITY
BACLAYON
ALBURQUERQUE
LOAY
LOBOC
DAUIS
PANGLAO
BOHOL PROVINCE
KEY PLAN
PHILIPPINES
ALBURQUERQUE BOOSTER PUMP 2
PHASE 1: 2-100 Hp; Q = 709.07 L/s
PHASE 2: 2-200 Hp; Q = 781.75 L/s
ALBURQUERQUE RESERVOIR
CAP = 971.30cum
ALBURQUERQUE BOOSTER PUMP 1
PHASE 1: 1-2 Hp; Q = 15.12 L/s
PHASE 2: 1-2 Hp; Q = 17.57 L/s
ALBURQUERQUE OFFTAKE
INTAKE & PUMPING STATION
PHASE 1: 2-350 Hp; Q = 787.20 L/s
PHASE 2: 2-400 Hp; Q = 882.70 L/s
LOBOC 1 WATER TREATMENT PLANT & RESERVOIR
WTP CAP: 882.70 L/S
RES. CAP.: 3,462.70cum
LOBOC PUMPING STATION
PHASE 1: 2-350 Hp; Q = 787.20 L/s
PHASE 2: 2-400 Hp; Q = 882.70 L/s
LOBOC OFFTAKE
TAGBILARAN OFFTAKE
BACLAYON OFFTAKE
Cortes
Tagbilaran City
Baclayon
Alburquerque
Loboc
Loay
Dauis
Panglao
ELEV.=33.97 mamsl
L=2.758km
800mmø
ELEV.=31.44 mamsl
L=1.339km
600mmø
L=8.487km
600mmø
ELEV.=45.62 mamsl
ELEV.=8.85 mamsl
L=4.572km
700mmø
L=4.290km
800mmø
ELEV.=4.34 mamsl
L=6.783km
700mmø
ELEV.=21.09 mamsl
L=6.668km
800mmø
L=6.236km
700mmø
ELEV.=21.94 mamsl
LOAY OFFTAKE
LOAY RESERVOIR
CAP = 971.30cum
LOAY BOOSTER PUMP
PHASE 1: 2-125 Hp; Q = 724.19 L/s
PHASE 2: 2-150 Hp; Q = 809.42 L/s
BACLAYON BOOSTER PUMP 1
PHASE 1: 2-5 Hp; Q = 24.58 L/s
PHASE 2: 2-5 Hp; Q = 30.78 L/s
BACLAYON RESERVOIR
CAP = 950.10cum
BACLAYON BOOSTER PUMP 2
PHASE 1: 2-400 Hp; Q = 684.09 L/s
PHASE 2: 2-550 Hp; Q = 780.97 L/s
CONSULTANTS
coffey international development pty. ltd.
WOODFIELDS CONSULTANTS INC.
PLANNERS, ARCHITECTS, ENGINEERS, CONSTRUCTION MANAGERS AND ENVIRONMENT SPECIALISTS
OWNER:
REPUBLIC OF THE PHILIPPINES
PROVINCE OF BOHOL
PROJECT NAME AND LOCATION:
BOHOL INTEGRATED WATER SUPPLY SYSTEM MASTER PLAN
(BHL - 01)
SHEET CONTENTS:
PROPOSED DEVELOPMENT PLAN
FOR LOBOC 1 RIVER OPTION
SHEET NO.


LEGEND:
NATIONAL/PROVINCIAL ROAD
MUNICIPAL BOUNDARY
CLUSTER BOUNDARY
SHORELINE
RIVER
TRANSMISSION LINES
INTAKE STRUCTURE
OFFTAKE
TREATMENT PLANT & TREATED WATER RESERVOIR
PUMPING STATION
BOOSTER PUMP STATION
BREAK-PRESSURE CHAMBER
RESERVOIR / SUMP
POST CHLORINATING FACILITY
ABBREVIATIONS:
Q — FLOW IN LITERS PER SECOND
km — KILOMETER
mm — MILLIMETER
cum — CUBIC METER
ø — DIAMETER
mamsl — METER ABOVE MEAN SEA LEVEL
L/s — LITER PER SECOND
Hp — HORSEPOWER
MUNICIPALITIES
TALIBON
TRINIDAD
BIEN UNIDO
UBAY
CAMOTES SEA
BOHOL PROVINCE
MINDANAO SEA
KEY PLAN
LUZON
VISAYAS
MINDANAO
PHILIPPINES
CAMOTES SEA
Talibon
Bien Unido
Trinidad
Ubay
TALIBON OFFTAKE
BIEN UNIDO OFFTAKE
UBAY OFFTAKE
TRINIDAD OFFTAKE
ELEV.=14.65 mamsl
ELEV.=3.47 mamsl
ELEV.=20.00 mamsl
ELEV.=10.00 mamsl
L=8.120km 500mmø
L=5.378km 300mmø
L=1.588km 400mmø
L=0.933km 500mmø
L=2.226km 600mmø
L=11.842km 500mmø
IPIL BOOSTER PUMP
PHASE 1: 2-100 Hp; Q = 388.14 L/s
PHASE 2: 2-150 Hp; Q = 475.97 L/s
IPIL WATER TREATMENT PLANT & RESERVOIR
WTP CAP: 475.97 L/S
RES. CAP.: 3,427cum
PROP. IPIL INTAKE & PUMPING STATION
PHASE 1: 2-75 Hp; Q = 388.14 L/s
PHASE 2: 2-100 Hp; Q = 475.97 L/s
N
0 1 2 3 4 5KM
GRAPHICAL SCALE
CONSULTANTS
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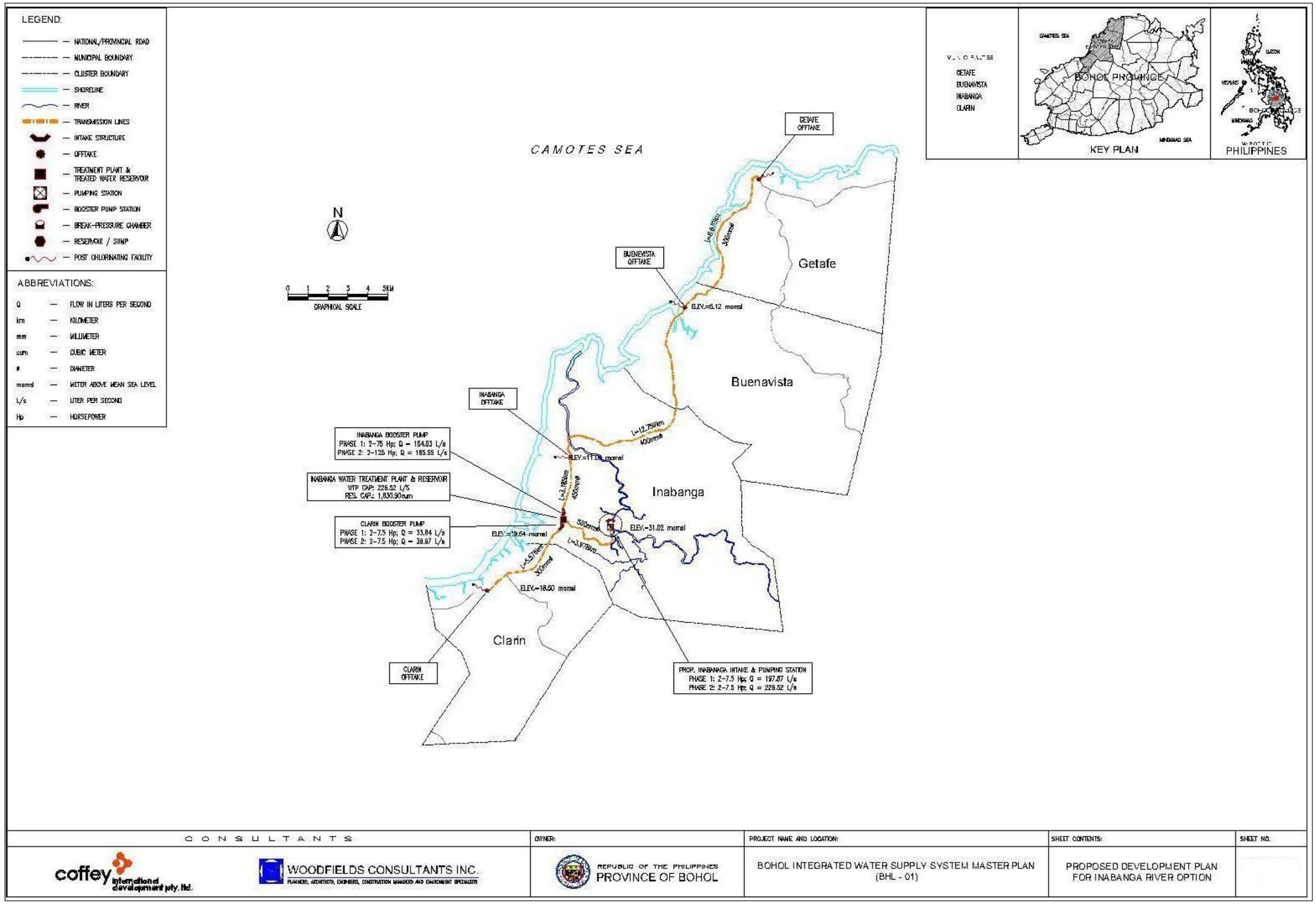
PLANNERS, ARCHITECTS, ENGINEERS, CONSTRUCTION MANAGERS AND ENVIRONMENT SPECIALISTS
OWNER:
REPUBLIC OF THE PHILIPPINES
PROVINCE OF BOHOL
PROJECT NAME AND LOCATION:
BOHOL INTEGRATED WATER SUPPLY SYSTEM MASTER PLAN
(BHL-01)
SHEET CONTENTS:
PROPOSED DEVELOPMENT PLAN
FOR IPIL RIVER OPTION
SHEET NO.


LEGEND:
NATIONAL/PROVINCIAL ROAD
MUNICIPAL BOUNDARY
CLUSTER BOUNDARY
SHORELINE
RIVER
TRANSMISSION LINES
INTAKE STRUCTURE
OFFTAKE
TREATMENT PLANT & TREATED WATER RESERVOIR
PUMPING STATION
BOOSTER PUMP STATION
BREAK-PRESSURE CHAMBER
RESERVOIR / SUMP
POST CHLORINATING FACILITY
ABBREVIATIONS:
Q — FLOW IN LITERS PER SECOND
km — KILOMETER
mm — MILLIMETER
cum — CUBIC METER
ø — DIAMETER
momsl — METER ABOVE MEAN SEA LEVEL
L/s — LITER PER SECOND
Hp — HORSEPOWER
N
0 1 2 3 4 5KM
GRAPHICAL SCALE
CAMOTES SEA
GETAFE OFFTAKE
BUENAVISTA OFFTAKE
ELEV.=6.12 momsl
INABANGA OFFTAKE
INABANGA BOOSTER PUMP
PHASE 1: 2-75 Hp; Q = 164.03 L/s
PHASE 2: 2-125 Hp; Q = 185.55 L/s
INABANGA WATER TREATMENT PLANT & RESERVOIR
WTP CAP: 226.52 L/S
RES. CAP.: 1,830.90cum
CLARIN BOOSTER PUMP
PHASE 1: 2-7.5 Hp; Q = 33.84 L/s
PHASE 2: 2-7.5 Hp; Q = 38.97 L/s
ELEV.=19.64 momsl
ELEV.=18.50 momsl
CLARIN OFFTAKE
ELEV.=31.02 momsl
PROP. INABANGA INTAKE & PUMPING STATION
PHASE 1: 2-7.5 Hp; Q = 197.67 L/s
PHASE 2: 2-7.5 Hp; Q = 226.52 L/s
Getafe
Buenavista
Inabanga
Clarin
GETAFE
BUENAVISTA
INABANGA
CLARIN
CAMOTES SEA
BOHOL PROVINCE
MINDANAO SEA
KEY PLAN
LUZON
VISAYAS
MINDANAO
PHILIPPINES
CONSULTANTS
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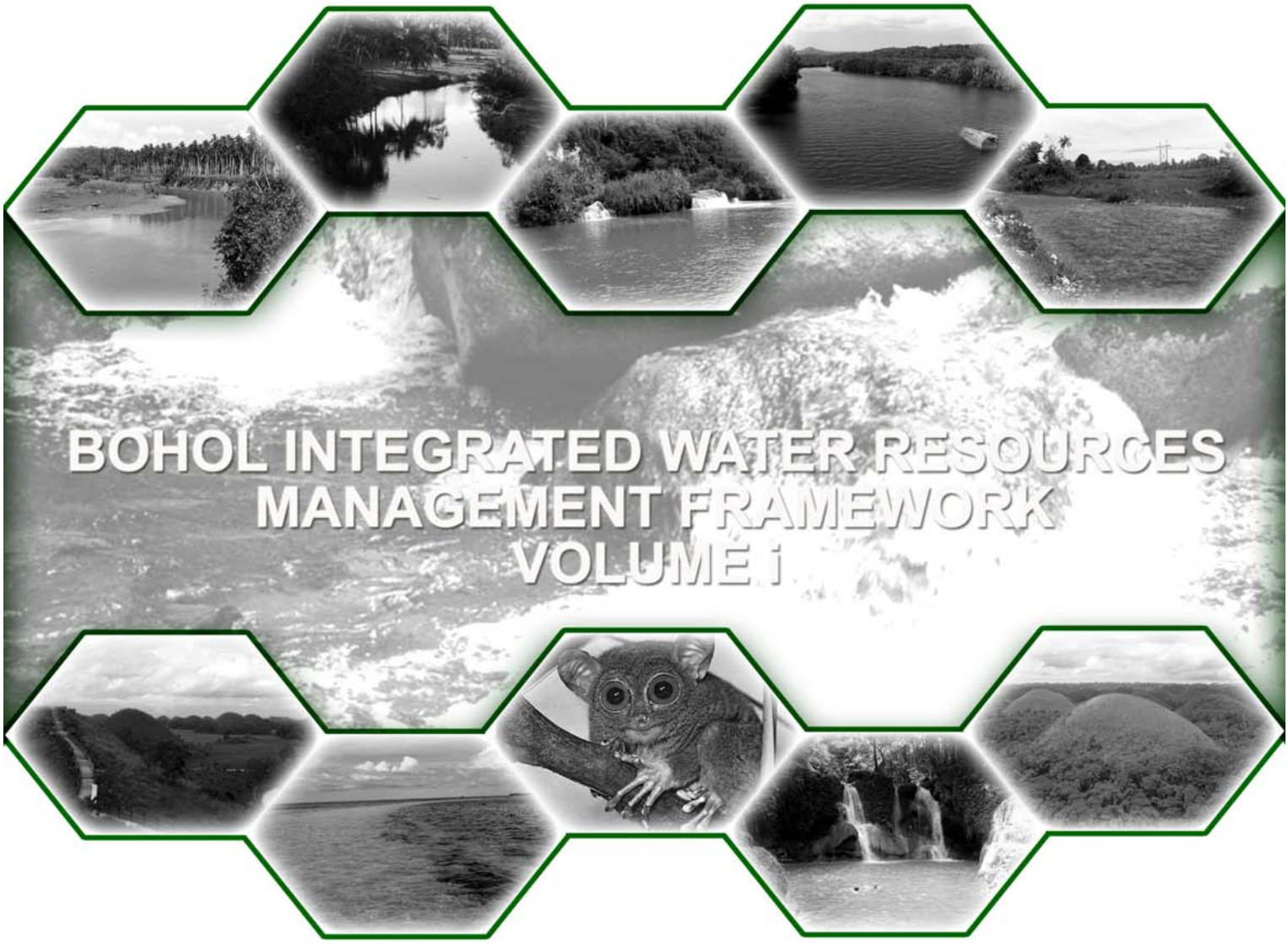
WOODFIELDS CONSULTANTS INC.
PLANNERS, ARCHITECTS, ENGINEERS, CONSTRUCTION MANAGERS AND ENVIRONMENT SPECIALISTS
OWNER:
REPUBLIC OF THE PHILIPPINES
PROVINCE OF BOHOL
PROJECT NAME AND LOCATION:
BOHOL INTEGRATED WATER SUPPLY SYSTEM MASTER PLAN
(BHL - 01)
SHEET CONTENTS:
PROPOSED DEVELOPMENT PLAN
FOR INABANGA RIVER OPTION
SHEET NO.

Table 3-5 Highlights of Results of Financial Analysis for Priority Development Areas

River Cluster Area	LGUs Served	Projected Population to be Served	Estimated Project Cost in Million Pesos at 2007 Prices	Pesos at 2007 Prices per Cubic Meter					
				FIRR=15%	FIRR=12%				FIRR=0%
					Base Case	+30% Sales	-20% Cost	+30% Sales & -20% Cost	
Wahig-Inabanga	Clarin, Inabanga, Buenavista & Getafe	97,351	715.51	51.02	39.91	30.70	32.73	25.18	9.55
Ipil	Talibon, Bien Unido, Trinidad & Ubay	179,790	1,107.40	40.11	31.22	24.02	25.55	19.65	7.23
Abatan-Loboc									
Phase 1 (2010 - 2012)	Cortes, Tagbilaran City, Dauis & Panglao	203,825	1,164.22	26.08	21.14	16.26	17.51	13.47	6.24
Phase 2 (2015 - 2017)	Loboc, Loay, Alburquerque, Baclayon, Tagbilaran City, Dauis & Panglao		898.34	5.23	4.59	3.54	3.84	2.95	2.40
Total Abatan-Loboc			2,062.56	31.31	25.73	19.80	21.35	16.42	8.64
Loboc	Loboc, Loay, Alburquerque, Baclayon, Tagbilaran City, Dauis & Panglao	203,825	2,161.38	43.72	35.07	26.98	29.37	22.59	11.17



CHAPTER 4
POLICY INTERVENTION AND INSTITUTIONAL ASPECT

CHAPTER 4– POLICY INTERVENTION AND INSTITUTIONAL ASPECT

4.1 INTRODUCTION

During the World Summit on Sustainable Development (WSSD) held in Johannesburg in 2002, world leaders including that of the Philippines committed themselves to the UN Millennium Development Goals (MDGs), and agreed to formulate and implement their respective IWRM and water efficiency plans by 2005.

Cognizant of the urgency of taking immediate and collaborative action, the Medium- Term Philippine Development Plan (2004-2010) underscores the need to translate these global commitments to action by adopting and operationalizing the Integrated Water Resources Management (IWRM) Strategy.

It is envisioned that the IWRM strategy will enable the Philippines to effectively address the challenges in water resource management, not just from the demand side but also from the supply side, with due consideration for various stakeholders interests and needs.

4.1.1 IWRM Principles

The fundamental principles governing integrated water management laid down during the 1992 Dublin International Conference on Water and Environment are the following:

a. Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment.

b. Water has an economic value in all its competing uses and should be recognized as an economic good.

c. Water development and management should be based on a participatory approach, including users, planners and policymakers at all levels.

d. Women play a central part in the provision, management and safeguarding of water.

4.1.2 IWRM Definitions

a. Global Water Partnership (GWP)

   IWRM is a process which promotes the coordinated development and management of water, land and related resources within hydrological boundaries, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.

b. Medium- Term Philippine Development Plan (MTPDP) 2004-2010

   IWRM is an approach for an integrated and holistic management of water resources, which involves the coordinated development and management of water, land and related resources within the hydrological boundaries, to optimize economic and social welfare without compromising the sustainability of vital ecosystems.

c. Philippine IWRM Plan Framework

   IWRM is a systematic, collaborative and multi-stakeholder process which promotes the coordinated development and management of water, land and related resources within hydro geological boundaries, in order to maximize the resultant economic and social welfare in an equitable manner and without compromising the sustainability of vital ecosystems.

4.1.3 IWRM Methodology

IWRM is a process to improve the planning, conservation, development and management of water, land, forest and aquatic resources. Such an approach intends to maximize economic benefits and social welfare in an equitable manner without compromising the sustainability of vital environment systems.

Implementing an IWRM process is particularly a question of getting the three pillars right:

a. Moving towards an enabling environment of appropriate policies and strategies for sustainable water resources development and management;

b. Putting in place the institutional framework through which the policies and strategies may be implemented; and

c. Setting up the instruments required by these institutions to do their job.

4.2 NATIONAL AGENCIES

There are a number of institutions that are involved in the development and management of water. This review will only explore those institutions that relate to the project.

4.2.1 National Economic and Development Authority

The National Economic and Development Authority (NEDA) was created in 1972 as the government's central planning body. The present form of the NEDA was organized on July 22, 1987 through Executive Order No. 230. It defined the composition of the NEDA Board and the Secretariat and its powers and functions.

The NEDA was reorganized structurally and functionally, to enhance its ability to coordinate the development, planning and policy formulation process, in order to achieve the objectives of sustainable economic growth, coupled with an equitable distribution of income and wealth.

NEDA is an independent cabinet-level agency of the Philippine government responsible for economic development and planning. The powers and functions of the NEDA reside in the NEDA Board. It is the Philippines' premier social and economic development planning and policy coordinating body. The Board is composed of the President as chairman, the Secretary of Socio-Economic Planning and NEDA Director-General as vice-chairman, and the following as members: the Executive Secretary and almost all of the cabinet Secretaries.

The NEDA Secretariat serves as the research and technical support arm of the NEDA Board. It also provides technical staff support and assistance, including the conduct of studies and formulation of policy measures and other recommendations on the various aspects of development planning and policy formulation, and coordination, evaluation and monitoring of plan implementation. It is headed by a Director-General, with the title of Secretary for Socio-Economic Planning and assisted by three deputy directors-general.

NEDA is the highest planning and coordinating agency in the country who lays down the overall policy guidelines for the development of water and related resources. The main control mechanism for NEDA to effectively exercise its coordination functions and impose its policies is its review and approval of the projects for funding. Technical review is exercised by the appropriate staff of NEDA and, through inter-agency committees that is organize from time to time to handle special review functions.

The NEDA after due consultation with the private sector, community organizations and beneficiaries, local government units and appropriate public agencies, shall be responsible for coordinating the formulation of continuing and integrated socio-economic development

plans, policies and programs including the formulation of annual and medium term public investment programs, programming of official development assistance in the form of grants and loans from foreign governments and multilateral agencies and organizations and the monitoring and evaluation of plan implementation.

The plan coordination, policy and technical functions of NEDA are decentralized at the regional level through the Director and staff of the NEDA Regional Offices. These regional offices serve as the secretariat and technical arm of the Regional Development Council (RDC) and extends when necessary, technical assistance to regional and local government offices.

4.2.2 National Water Resources Board

The National Water Resources Board (NWRB), formerly National Water Resources Council (NWRC) was created pursuant to Presidential Decree No. 424 on March 28, 1974 to coordinate and integrate activities related to water resources. It was renamed and reorganized in its current Board pursuant to Executive Order No. 124-A on July 22, 1987. NWRB exercise regulatory and adjudicatory functions relative to water rights and other provisions of the Water Code of the Philippines (PD 1067).

NWRB is the lead regulatory agency for water utilities pursuant to Section 11 par “e” of PD 1206 and the pertinent provisions of Public Service Law otherwise known as Commonwealth Act of 1946 as amended. It continuously strives to further improve the viability, coverage and service levels of water utility operators in the country.

The NWRB is also the institution in the Philippine water sector, conferred with policy-making, regulatory and quasi-judicial functions. It is responsible for ensuring the optimum utilization, development, conservation and protection of the country’s water resources, consistent with the principles of IWRM. The NWRB’s powers, duties and functions are:

a. Formulation and coordination of policies, programs and standards relating to the Philippine water sector;
b. Management and regulation of all water-related activities;
c. Adjudicate and grant water permits and Certificate of Public Convenience; (CPC)/Certificate of Public Convenience and Necessity (CPCN) for the operation and maintenance of water utilities and services; and
d. Impose and collect reasonable fess and charges from water appropriators and public utility operators

Identification and articulation of policy issues is achieved in consultation with concerned water-related agencies through Task Forces and Technical Committees under the auspices of the Board to thresh out specific problems and issues related to water development and management. NWRB recommends to NEDA appropriate action plans to address emerging issues in water as they evolve.

The NWRB Board comprises five (5) cabinet secretaries from Department of Environment and Natural Resources (DENR) as chair, National Economic and Development Authority (NEDA), Department of Justice (DOJ), Department of Finance (DOF) and Department of Health (DOH), academe representative from National Hydraulics Research Center (NHRC) and the NWRB executive director

4.2.3 Department of Environment and Natural Resources

The Department of Environment and Natural Resources (DENR) created pursuant to Executive Order No. 192 on June 10, 1987 as the primary agency responsible for the

sustainable development of the countries natural resources and ecosystems. Its mandate is on the conservation, development and proper use of nation's natural resources as well as the licensing and regulation as provided by law in order to ensure equitable sharing of the benefits derived there from for the welfare of the present and future generations of Filipinos.

The DENR policies and guidelines are guided by the following objectives:

a. Assure availability and sustainability of the nation's natural resources through judicious use and systematic restoration or replacement;
b. Increase the productivity of natural resources to meet the demands of growing population consistent with environmental protection and enhancement;
c. Enhanced the contribution of natural resources towards the achievement of national economic, political and social development and ecological integrity;
d. Promote equitable access to natural resources;
e. Maintain a desirable level of environmental quality; and
f. Conserve specific terrestrial and marine areas for present and future generations.

4.2.4 Environmental Management Bureau

The Environmental Management Bureau (EMB) was created initially as a staff bureau of the Department Environment and Natural Resources on July 10, 1987 by virtue of Executive Order (EO) No.192. The National Environmental Protection Council (NEPC), the National Pollution Control Commission (NPCC), and the Environmental Center of the Philippines (ECP), were abolished and their powers and functions were integrated EMB.

The EMB is currently a line bureau headed by a Director and assisted by the Assistant Director who advises the Secretary of DENR on matters relating to environmental management, conservation and pollution control.

As the primary agency tasked for conservation of natural resources and protection of the environment, its mission is to spearhead the government's effort in protecting the resources of the country from environmental degradation through the development of effective programs and strategies on environmental protection and management.

The powers and functions of EMB are focused on four objectives:

1. Improvement of the quality of the environment (this will encompass air and water quality management, solid wastes and hazardous wastes management);
2. Strengthening and streamlining of the environmental impact assessment system;
3. Generation of relevant technical data and information necessary in the formulation of standards, guidelines, rules and regulations and policies on environmental protection;
4. Creation of environmental public awareness.

4.2.5 Forest Management Bureau

The Forest Management Bureau (FMB) was created pursuant to Section 13 of Executive Order No. 192 dated 10 June 1987.The FMB has integrated and absorbed the powers and functions of the Bureau of Forest Development (BFD) and the Wood Industry Development Authority (WIDA), except the line functions and powers which were transferred to the regional field offices. As such, the FMB performs as a staff bureau and advises the Secretary of DENR on the matters pertaining to forest management, development, and conservation.

The objectives of the FMB as guided by the four-fold policy thrusts of the State are:

1. To promote an efficient and judicious use of forest resources;
2. To ensure a sustainable production capacity of forest resources;
3. To expand the implementation of community-based forest resources management and conservation;
4. To promote ecological balance;
5. To achieve a more equitable sharing benefits derived from the development and utilization of forest resources; and
6. To encourage the development and use of the appropriate forestry technology that will promote harmony between man and his environment.

4.2.6 Department of Health

*The mandate of Department of Health (DOH) are: a)F*ormulation of plans, policies, programs, standards and techniques relative to environmental health and sanitation; b) Provide consultative, training and advisory services to implementing agencies; and c) Conduct studies and research related to environmental health.

The DOH general objectives are to increase the number of population with access to safe water and sanitation facilities and services; and to build the capacity of LGUs/communities and concerned sectors in the management of environmental health hazards and risks. While, other *objectives are* to assure the quality of drinking water through water sampling and analysis and provision of disinfectants; and to promote compliance to drinking water standards.

The water related policies of DOH are embodied in Executive Order N. 119 creating the Environmental Health Service of DOH; Philippine National Standards for Drinking Water; Code on Sanitation of the Philippines (P.D. 856); Executive Order No. 489 Institutionalization of Inter-agency Committee on Environmental Health; Implementing Rules and Regulations (IRR) on Chapter II of P.D. 856; and Supplemental IRR of Chapter II also of P.D. 856

4.2.7 Department of Interior and Local Government

The Department of Interior and Local Government (DILG) was created and reorganized pursuant to the provisions of Memorandum Order No.27 of the Office of the President directing the streamlining of the executive department of government. Administrative Order 269 delegated the power on the general supervision of the President over local governments to DILG. The mandate of DILG is to promote peace and order, ensure public safety and strengthen capability of local government units through active people participation.

The DILG has a Project Management Office for Water Supply and Sanitation whose objective is to enhance the LGUs capability in the organization and development of community institutions such as the Barangay Water Supply and Sanitation Associations (BWSAs) / Rural Water Supply and Sanitation Associations (RWSAs) and also to manage, operate and maintain water supply, sewerage and sanitation facilities.

4.3 RELEVANT POLICIES, LAWS AND REGULATIONS

There are a number of associated policies that are involved in the development and management of water. This review will only explore those policies that relate to the project.

4.3.1 Philippine Constitution

The Philippine Constitution of 1987 stipulates the national policy on water as a natural resource, enshrined in Section 2, Article XII which states that "All lands of the public domain, waters, minerals, coal, petroleum and other mineral oils, all forces of potential energy, fisheries, forests or timber, wildlife, flora and fauna, and other natural resources are owned by the State. With the exception of agricultural lands, all other natural resources shall not be alienated. The exploration, development and utilization of natural resources shall be under the full control and supervision of the State… In cases of water rights for irrigation, water supply, fisheries or industrial uses other than the development of water for power, beneficial use may be the measure and limit of the grant."

The Constitution also mandates the protection and advancement of the right of the Filipino people to a healthful and balanced ecology; provides for the promotion of social justice, guarantees the right of the people and their organization to reasonable participation at all levels of social, political and economic decision making; and encourages administrative decentralization to strengthen the autonomy of Local Government Units and to accelerate the economic and social growth and development.

It is declared policy of the State to ensure the rational use of the country's natural resources under the principles of economic growth and efficiency, food security, social justice and sustainability.

4.3.2 Medium-Term Philippine Development Plan (2004-2010)

The general strategy of the Medium-Term Philippine Development Plan (MTPDP) is the adoption of IWRM to promote devolution of decision making process to the lowest appropriate levels, such as local government and community-based institutions. It also stressed that data collection and database for water resources should be maintained and sustained , including the conduct of water assessment in terms availability and demand.

Specific strategies for water are the provision of potable water for the entire country by 2010, with priority given to waterless barangays, which mean areas with less than 50 per cent water supply coverage; and also ensuring clean water resources for the entire country through full implementation of the Ecological Solid Waste Management Act and Clean Water Act.

The chapter on environment of MTPDP described watershed and ecosystems approach to natural resources management and environmental protection which provide an effective paradigm for sustainable development. The forest ecosystems provide ecological benefits to agricultural production, industries, water for power needs and water for irrigation. It also prevent soil erosion and consequent loss of fertile topsoil and siltation of coastal areas and water bodies. The forest will sustain the supply of surface and groundwater for domestic use in the lowlands.

4.3.3 Water Code of the Philippines

The Water Code of the Philippines of 1976 is the basic water law of the country. The Constitution also provides that all waters belong to the State. The Code is based on rational concepts of integrated and multipurpose management of water resources and sufficiently flexible to adequately meet future developments. Water is vital to national development and it

has become increasingly for government to intervene actively in improving the management of water resources.

The objectives of the Water Code are:

a. To establish the basic principles and framework relating to the appropriation, control and conservation of water resources to achieve the optimum development and rational utilization of these resources;
b. To define the extent of the rights and obligations of water users and owners including the protection and regulation of such rights;
c. To adopt a basic law governing the ownership, appropriation, utilization, exploitation, development, conservation and protection of water resources and rights to land related thereto; and
d. To identify the administrative agencies which will enforce this Code.

The underlying principles of Water Code are:

a. All waters belong to the State.
b. All waters that belong to the State can not be the subject of acquisitive prescription.
c. The State may allow the use or development of waters by administrative concession.
d. The utilization, exploitation, development, conservation and protection of water resources shall be subject to the control and regulation of the government through the National Water Resources Council, hereinafter referred to as the Council (renamed as Board).
e. Preference in the use and development of waters shall consider current usages and be responsive to the changing needs of the country.

Waters is comprehensively defined by the Code. It refers to groundwater, surface water, atmospheric waters, and the waters of the sea within the territorial jurisdiction of the Philippines.

Appropriation of waters is the acquisition of rights over the use of waters or the taking or diverting of waters from a natural source in the manner and for any purpose allowed by law. Water may be appropriated for domestic, municipal, irrigation, power generation, fisheries, livestock raising, industrial, recreational, and other purposes.

Water right is the privilege granted by the government to appropriate and use water and its evidenced by a document known as a *water permit*.

4.3.4 Philippine Clean Water Act

The Philippine Clean Water Act of 2004 provides for a comprehensive water quality management, wherein the State shall pursue a policy of economic growth in a manner consistent with the protection, preservation and revival of the quality of fresh, brackish and marine waters. In attaining this, the framework for sustainable development shall be pursued. Provided, that it shall primarily apply to the abatement and control of pollution from land based sources.

The Clean Water Act provides that the DENR, in coordination with NWRB shall designate certain areas as water quality management areas using appropriate physiographic units such as watershed, river basins or water resources regions. Said management areas shall have similar hydrological, hydrogeological, meteorological or geographic conditions which affect the physicochemical, biological and bacteriological reactions and diffusions of pollutants in

the water bodies, or otherwise share common interest or face similar development programs, prospects, or problems. Said management area shall be governed by a governing board composed of representatives of mayors and governors of member LGUs, and representatives of relevant national government agencies, duly registered nongovernmental organization, water utility sector, and business sector.

4.3.5 Code on Sanitation of the Philippines

The Code on Sanitation of the Philippines of 1975 was promulgated for its ultimate objective on the improvement of the way of the Filipinos by directing public health services towards the protection and promotion of the health of the people.

The Sanitation Code provides that the standards for drinking water and their bacteriological and chemical examinations, together with the evaluation of results, shall conform to the criteria set by Philippine National Standards for Drinking Water 1993 (PNSDW 1993) The treatment of water to render it safe for drinking, and the disinfection of contaminated water sources together with their distribution systems shall be in accordance with procedures prescribed by DOH.

The PNSDW is designed to guide the waterworks officials, developers and operators of water supply systems from government and private entities, health and sanitation authorities and the general public and all other concerned. The new standards cover requirements for the acceptable values of the determined parameters in measuring water quality.

4.3.6 Philippine Environment Code

The Philippine Environment Code of 1997 is a comprehensive program of environmental protection and management, covering air quality, water quality, land use, natural resources, and waste management.

The purpose of water quality management is to prescribe management guidelines aimed to protect and improve the quality of Philippine water resources through: a) classification of Philippine waters, b) establishment of water quality standards; c) protection and improvement of the quality of Philippine water resources, and d) responsibilities for surveillance and mitigation of pollution incidents.

The Environment Code also provides the management policy for forest which state that the national government, through the DENR, shall undertake a system of rational exploitation of forest resources and shall encourage citizen participation therein to keep the country's forest resources at maximum productivity at all times.

4.3.7 Local Government Code

The Local Government Code of 1991 effected a decentralization of broad range of powers and functions from central government to local government units (LGUs) consistent with the policy of developing autonomous and self reliant LGUs. The Code devolved some aspects of governance and delivery of basic services to LGUs such as infrastructure facilities, intended primarily to service the needs of the residents of the municipalities, funded by municipal funds including, but not limited to communal irrigation, small water impounding projects and other impounding projects; artesian wells, spring development, rainwater collection, water supply systems, drainage and sewerage.

The Local Government Code also devolved certain functions, including the enforcement of laws such as the following:

- For the province, pursuant to national policies and subject to supervision, control and review of the DENR, enforcement of forestry laws limited to community-based

forestry projects, pollution control law, and other laws on the protection of the environment.

- The Sangguniang panlalawigan, as the legislative body of the province, shall enact ordinances to protect the environment and impose appropriate penalties for acts which endanger the environments, like illegal logging, slash-and-burn farming, and such other activities which result in pollution, acceleration of eutrophication of rivers and lakes or of ecological imbalance.
- The LGUs concern shall enforce laws and regulations relating to pollution control and protection of the environment;

4.3.8 Bohol Environment Code

The enacted ordinance on the Environment Code for the province of Bohol in 1998 presented a menu of options in the areas of protecting and conserving the provincial environment and natural resources. It sets the guidelines to create a balance between environment and development which will bring progress to the people. The Code encourages the participation of stakeholders in the planning, implementation and assessment of development initiatives.

The Bohol Environment Code was enacted pursuant to the provisions of Republic Act No. 7160, otherwise known as the Local Government Code of 1991, which mandates the Municipal Mayor, City Mayor and Provincial Governor, respectively, to adopt adequate measures to safeguard and conserve land, mineral, marine, forest and other resources. R.A. 7160 also provides for the authorities of the Sanguniang Bayan, Sanguniang Panglunsod and Sanguniang Panlalawigan, respectively, to protect the environment and impose appropriate penalties for acts which endanger the environment.

The objectives of the Environment Code are to promote the principles of ecological sustainable development, and ensure that all reasonable and practicable measures are taken by LGUs to protect, restore and enhance the quality of the environment. The Code is based on the principles of Bohol Covenant for Sustainable Development signed on July 22, 1997 in commemoration of the 143rd Bohol and Dagohoy Day Celebration.

4.4 IWRM PROCESS IN BOHOL

4.4.1 Planning Workshop of DILG-WSSP

The process of IWRM in Bohol started in November 2003, wherein the German Technical Cooperation (GTZ) supports the Department of Interior and Local Government (DILG) Water Supply and Sanitation - Program Management Office (WSSP-PMO) in its Third Phase. One component of the WSS Program aims at enabling the Provincial Planning and Development Office (PPDO) of Bohol, to plan water supply and wastewater disposal projects in accordance with the principles of IWRM.

The identified concerns in the sector are the lack of an integrated approach to address the challenge of IWRM, lack of an agreed vision and deficient coordination and cooperation between the stakeholders. Considering these issues the participants agreed on the common vision: “Safe and adequate water on Bohol Island is available in a sustainable way considering economic, social and ecological aspects.”

The planning workshop in Tagbilaran City held on 11 to 13 November 2003 pointed out that within a general problem analysis, the gaps and the priorities in the context of IWRM were identified and discussed, such as: Provincial Water Supply, Sewerage and Sanitation Sector Plan (PW4SP) should be used as a guide for monitoring, coordination and implementation. Monitoring information is available at all levels. Pilot solution to address selected IWRM

problem is tested. Appropriate action for IWRM is recommended and its implementation is ensured. PPDO is the coordinating body for the management of water related issues.

4.4.2 Organization of BIWRMT

The Bohol Integrated Water Resources Management Team (BIWRMT) was organized through Executive Order No.42 on 19 January 2004 for the implementation of PW4SP as part of the GTZ-DILG-Bohol IWRM Project. The team consist of a Team Leader and some members from PPDO, while other members are representatives of BEMO, PHO, GSO, PEO, OPA, DILG and MPDC of LGUs.

4.4.3 Creation of BOWAC

The Bohol Watershed Advisory Council (BOWAC) was created on 5 June 2005 to serve as the advocacy body and working group for the creation of the Bohol Network of Watersheds. The Council consist of representatives chosen among heads of component LGUs, People's Organization, Government Line Agencies and Environmental Non-Government Organizations operating within the watershed area. This was created on the following premises:

- Forestry Reform Code of the Philippines (PD 705) specifies watershed as natural system that need to be managed carefully.
- DENR Administrative Order No. 99-001, which mandates the adoption of the watershed as a basic planning unit.
- Local Government Code of 1991 (RA 7160), mandates local government units to take charge of their environment and natural resources in general and their watershed in particular.
- DENR and DILG Joint Memorandum Circular 2003-01, co–management by the DENR and interested local government units of some timberlands to conserve community watersheds is now possible.
- Bohol Environment Code of 1998 and Bohol Covenant for Sustainable Development, the right to be informed and to participate in all undertakings pertinent to the sustainable utilization, protection, preservation and conservation of natural resources, the watersheds in particular is now possible.

4.4.4 NWRB-Decentralization Study

The National Water Resources Board (NWRB) commissioned former Secretary Elisea Gozun in 2005, to undertake study on IWRM within Water Resources Region 7, which includes Cebu and Bohol.

As a governing policy, water being a critical factor to the socio-economic development and global competitiveness, there is a need to adopt a more integrated and holistic management of water resources. The strategies are the adoption of IWRM and managing water resources at the lowest appropriate level, through the creation of multi-sectoral Provincial Integrated Water Resources Management Board. The advantages are whole array of resources and use pattern within a basin are taken into account; public participation will be greater and broader; and management decisions will be based on better knowledge of local conditions.

4.4.5 DILG-GTZ Water Program Progress Review

The third phase of the "DILG-GTZ Water Program toward IWRM" aims to contribute to sustainable water resources management and to the development of water supply and sanitation in rural areas of the Philippines.

The areas of cooperation for phase IV include IWRM, wherein Governor Erico Aumentado emphasized the need to form a board for the management of provincial water resources. The Governor made a commitment to set up the Bohol Integrated Water Resources Management Board (BIWRMB) through an Executive Order following the proposal as outlined in the NWRB-decentralization study by former Sec. Elisea Gozun.

The program component assumes that the BIWRMB will be established by September 2006.

During the strategic planning workshop, the agreed key result areas (KRAs) and indicators by March 2009 for IWRM are the following:

KRA 1: Foundation of the BIWRM Board, while the indicators are:
- Three more watershed councils are functioning and/or performing their tasks;
- All water permits are issued only upon favorable endorsement by the BIWRM Board; and
- BIWRM Board is recognized as a best practice (pilot council/board) by the NWRB.

KRA 2: BEMO is fulfilling the role as secretariat for BIWRM Board, while the indicators are:
- All stakeholders act according to the defined roles and responsibilities; and
- Regular meetings of the Executive Committee are institutionalized (3-4 meetings per year)

KRA 3: Bohol Watershed Advisory Council (BOWAC) is institutionalized as Technical Working Group (TWG) for watershed management, while the indicators are:
- All six watershed councils are strengthened; and
- Updated maps of the 3 new watersheds are available.

KRA 4: Improved the capacity for water quality and quantity monitoring of the province, while the indicator is that the decision makers receive annual understandable reports on the status of water quality and quantity.

KRA 5: Raising awareness on IWRM, while the indicator is that a pool of 10 trainers were trained on IWRM advocacy.

4.4.6 Consultation/Workshop on the Draft National IWRM Plan

The consultation/workshop on the draft National IWRM and Efficiency Improvement Plans was conducted last 3 August 2006 at Metro Center, Tagbilaran City led by NWRB. The consultation consists of presentation on situationer of the 12 water resources regions of the country, water potential by river basin and key issues and concerns such as increasing incidence and intensity of water related risks like typhoons, flood, droughts and landslides; fragmented and sectoral approach on water resources management and development; policy evaporation of strategic water related issuances; and low awareness among LGU leaders of the urgency and developmental impacts of effective water resource management and responsive water governance.

The challenges in the water sector in terms sustainability of water quantity and quality necessitate an integrated approach to manage water resources by balancing the supply and demand through IWRM. The basis of IWRM is that different uses of water are interdependent such as domestic, municipal, commercial, industrial, agricultural, fishery, hydropower, recreational, environmental and others. The differences between IWRM strategy and traditional water plan are as follows:

- IWRM is dynamic rather than static, it lays down a framework for a continuing and adaptive process of strategic and coordinated action;
- It involve multiple sectors, for example health, agriculture, energy, tourism, industry, finance and environment;

- Its focus is broader, that looks water in relation to others needed to achieve larger development goals; and
- It has more extensive stakeholder participation.

4.4.7 First Bohol Project Board Meeting

The first meeting of the Project Board for the two packages of assistance for the Philippine-Australia Local Governance Development Program (LGDP) namely: Bohol Integrated Water Supply System Master Plan (BHL-1) and Bohol Agriculture Value Chain Analysis (BHL-2) were convened last 29 May 2007 at Governor's Conference Room.

The key issues and concerns raised related to water during the meeting are:

- The setting up of Bohol Integrated Water Resources Board (BIWRMB), which has been long overdue shall be considered in the policy formulation as part of the study.
- The idea of provincial government of being a bulk supplier does not mean that they are interfering with LGUs, with their chance of lucrative undertaking, although they have not seen any LGU run water supply project earning.
- The study should come-up with a framework for integration to see which will be prioritized out of the seven river basins, considering the planning period alignment with the national plans/programs.
- The water supply system study will be looking into transmission and trunk lines or tapping points and not the distribution.
- The local counterparts should learn from the consultant and they will find time to realize the learning by doing.
- The project is a very important study, because water is one of the resources that had not been integrated.
- Cebu has even included tapping water from Bohol in their Cebu Master Plan.
- There are several economic opportunities in Bohol, if these water resources can be harnessed, like tourism.

4.4.8 Bohol Stakeholders Meeting

The stakeholders meeting of BHL-1 Water Supply Master Plan together with BHL-2 Agriculture Chain Study was conducted on May 30, 2007 at Metro Center, Tagbilaran City. The salient points raised related to water master plan are as follows:

- Water for drinking is actually insufficient, in the northern parts of Bohol, like Inabanga, San Miguel, Dagohoy, because of poor ground water.
- A comprehensive integrated master plan for Bohol's water supply to address the growing needs of the developing province is important.
- The clustering of municipalities, should include nine more municipalities: Getafe, Alburquerque, Baclayon, Dauis, Panglao, Tagbilaran City, Anda, Ubay and Pres. Carlos P. Garcia (an island municipality).
- The three major irrigation systems in Bohol should jive with integrated watershed management plan vis-à-vis water supply system master plan.
- The local NGOs who have watershed management skills should be tapped.
- The development and implementation of some watershed management plan are being pursued by the administration of mini hydro-plants in Hanopol, Balilihan and Sevilla.
- Water utilization and watershed development should go hand-in-hand.

- The pricing of water in relation to water utilization should also be considered to finance water programs such as environmental services.
- Runoff waters in the rivers should be recycled back to the farmlands, but water quality and groundwater seepage should be looked into.
- Potable water in the province is mostly tapped from groundwater and most Boholanos are afflicted with kidney diseases due to limestone content of the water.
- Water supply system in the municipalities of Bohol, are fragmented and uncoordinated and strategies should be looked into to resolve this concern.
- Climate change should be considered especially on the increasing frequency of longer droughts in the past years.
- There's a need for a water treatment plant in every water supply system.
- This study is still the planning process and there will be no infrastructure project implementation at this stage.
- The study has a very short timeframe for about six months, what will happen next is up to the AusAID.
- There's a great need for the understanding of the scope of services of the project, where the goal is clear, water for the environment, community and economy.
- There will be specialist who will address the concerns on IWRM, environment and other issues related to water supply to harmonize watershed management.
- The uses and demand of water will be scrutinized, however, the study is limited only to water supply for domestic and industrial uses, while water costing will be part of the study.
- The project considered the participatory approach where the cooperation of the stakeholder is very important.

4.4.9 Final Consultation Workshop on the Creation of BIWRMB

The final consultation workshop for the creation of Bohol Integrated Water Resources Management Board (BIWRMB) was conducted at Metro Center, Tagbilaran City on July 17, 2007. The participants include key stakeholders consisting of NGAs, LGUs, private sector, consumer, cooperative and irrigator's group, NGOs, academe, religious sector, media, water distributor and watershed organization. This activity was funded by the DILG-GTZ Water and Sanitation Program.

The terminal objective of the workshop is to provide the participants an opportunity to critique and recommend improvements to the proposed Executive Order on the creation of BIWRMB.

During the workshop, the participants were able to draw up issues and concerns related to the management of water resources of Bohol Island, evaluate the draft EO whether it is grounded on the issues and concerns identified, clarify and validate roles and functions of the Board and the Technical Working Groups and affirm or recommend improvements on the provisions of the EO.

4.5 FIRST BOHOL WATER SUMMIT

Through the years, the provincial leadership and stakeholders of the province of Bohol had long recognized the need for more effective management of its water resources. It is evident in the conduct of series of consultations and workshops since 2003, which identified the issues and concerns confronting the water sector, such as inadequate water management planning, fragmentation, institutional restrictions and lack of financial resources.

Water is one of the areas where considerable number of stakeholders in Bohol have converged, from the local government sector, national government agencies, civil society

which includes NGOs and POs, and even the church and the academe to the business and private sectors. The challenge that the province of Bohol is facing requires an effective, efficient and equitable water resources management in an integrated approach that will balance the demands on this valuable and vulnerable natural resources with the available supply. The provincial government has put water as centerpiece of its development efforts evidenced by the number of water studies conducted on how to optimize its water resources. Thus, there's a felt need of an integrated water resources management (IWRM) process, which usually begins with the holding of a water summit in order to build consensus among various stakeholders. As it has been said, the journey of a thousand miles starts with the first step. The main objective is to install the three pillars of enabling environment of policies, institutions to implement that policy and the management instruments to be used in attaining the purpose. The most strategic that the provincial leadership of Bohol is steering, in the management of its water resources is the creation of Bohol Integrated Water Resources Management Board (BIWRMB).

The first Bohol Water Summit with a theme of "Protecting the Water Resources of Bohol" was held at Metro Center, Tagbilaran City last 23 July 2007. This summit was a collaboration between the two international organizations, GTZ Water and Sanitation Program and AusAID LGDP. It was attended by more than 160 participants from various groups of stakeholders. The summit was divided into three parts which comprises the opening proper, statement of purpose, welcome remarks and the presentation of the stakeholder outputs. (See **Appendix I.4-A, Volume III-Databook**)

The second part of the summit was the presentation of the state of Bohol Water Address by Governor Erico B. Aumentado, followed by the signing of Executive Order creating BIWRMB. The signing was witnessed by Australian Ambassador Tony Hely, Counselor Development Cooperation Sam Zappia, GTZ Program Director Juliana Hinterberger and LGDP Program Director David Goodwins as published in national and local newspapers. The third part on said summit was a presentation of the implementation plan for Bohol Integrated Water Supply System Master Plan by Woodfields Consultants, Inc.

4.6 CREATION OF BIWRMB

Executive Order No. 10, series of 2007, creating the Bohol Integrated Water Resources Management Board (BIWRMB) was crafted based on the following premises:

- The water sector suffers from fragmentation, inadequate water management planning, institutional restrictions and lack of financial resources.
- The World Summit on Sustainable Development (WSSD) recognized the importance of Integrated Water Resources Management (IWRM) in the achievement of the United Nations Millennium Development Goals (MDGs), because of the crucial links between improved water resources management, access to safe water supply and sanitation and environmental sustainability.
- The Medium-Term Philippine Development Plan (MTPDP) 2004-2010 spells out the need to adopt a more integrated and holistic management of water resources, because of the increasing demand for water being a critical factor to socio-economic development.
- The overall goal of the MTPDP is to fight poverty by building prosperity for the greatest number of Filipino people, but prosperity cannot be achieved and poverty cannot be reduced or alleviated without the basic provision of safe, reliable and sustainable water supplies.
- One of the strategies of the MTPDP in water resources management is the promotion of the devolution of decision making to the lowest appropriate level.

- The Water Code of the Philippines and other charter of the National Water Resources Board (NWRB) were based on rational concepts of integrated and multi-purpose management of water resources and sufficiently flexible to adequately meet future developments.
- In accordance with the Clean Water Act of 2004 (RA 9275), the management and protection of water quality management areas shall be in a watershed/river basin approach, considering the hydrological/hydrogeological boundaries.
- The National Integrated Water Resources Management Plan Framework which is the product of a multi-sectoral and inter-agency consultation process, calls for the strengthening of local structures and systems to facilitate the adoption and operationalization of IWRM in Local Government Units (LGUs).
- The Local Government Code of 1991 (RA 7160) provides for the concerned local government units to adopt adequate measures to safeguard, conserve and protect the environment.
- The Regional Development Plan long-term vision for Central Visayas is to be a leading growth center in the country, a premier tourist destination and a center of trade and industry, and most especially as the most livable and peaceful community.
- Bohol Province will be able to contribute to the attainment of this long-term vision of the Region if it has a safe and sustainable water supply.
- The major strategies of Bohol clearly point its direction towards local economic development, and to ensure that these strategies can be optimized to bring about higher levels of economic growth, water supply systems are needed to meet domestic, municipal, agricultural, tourism, industrial and other demands.
- Article V of Bohol Environment Code of 1998 (Provincial Ordinance No. 98-01) stresses that water resources in Bohol should be managed to continuously meet the basic requirements of all its residents and for sustained agricultural production, and to secure the availability of adequate supplies of water for the growing industrial, recreational and commercial development activities through water resources pricing, institutionalization of local water pollution control legislation and the establishment of the Bohol Network of Watersheds.

The source of funds to implement this Executive Order shall be appropriated from allocation of the 20% Development Fund based on the approved program of activities. Other sources of funds may come from grants of donor agencies and from the Congressional Development Fund.

The Bohol Environment Management Office (BEMO), acting as the secretariat of BIWRMB and in consultation with the stakeholders and the TWGs, shall prepare the IG of this Executive Order, subject to the approval of the Governor.

4.6.1 BIWRMB Composition and Functions

The newly established Board consists of the following:

a. The Governor as Chairperson
b. Chairperson of the Committee on Environment of the Sangguniang Panlalawigan
c. President of the League of Municipalities of the Philippines, Bohol Chapter
d. One (1) representative from a consumers' group
e. One (1) representative from the private sector, such as business groups, water dealers or vendors

f. One (1) representative from the electric cooperatives group
g. Representative of the National Irrigation Administration (NIA)
h. Representative of the Department of Public Works and Highways (DPWH)
i. Representative from the Department of Environment and Natural Resources-Provincial Environment and Natural Resources Office (DENR-PENRO)
j. Representative from the Protected Area Management Board (PAMB) upon the formation of the federation of PAMBs
k. Representative from private water utilities
l. One (1) representative from water districts
m. One (1) representative from the farmers' or irrigators' groups
n. The Chairperson of the Bohol Watershed Advisory Council (BOWAC) until such time that the Bohol Network of Watersheds (BNW) shall have been created, in which case its chairperson shall be the member of the BIWRMB
o. One (1) representative from the Bohol Alliance of Non Government Organizations (BANGON)
p. One (1) representative from the academe
q. One (1) representative from the religious Sector
r. One (1) representative from the media
s. One (1) representative from the organized women's group
t. One (1) representative from the indigenous people's group

The Board shall perform the following functions:

a. Establish Bohol environment indicators related to water resources complementary or compatible with national indicators that can be used to monitor and report on the attainment of the environmental objectives;
b. Propose and implement policies and action plans related to Integrated Water Resources Management that would contribute to sustainable management and development of water resources, to guarantee adequate supply of safe drinking water and sanitation in rural and urban areas in the Province of Bohol;
c. Advocate for the IWRM localization and operationalization by organizing, administering and strengthening river basin/watershed management organizations;
d. Harmonize the development, management, control, and regulation of land use in the watersheds and protected areas and monitor the implementation of laws and regulations governing the management and development of land, water resources, water supply and sanitation;
e. Accept application and payment of water permit application (WPA), conduct investigation of WPA, monitor compliance of the terms and conditions of water permit, identify non-permittees and submit report to NWRB for appropriate action without prejudice, if applicable, to the right of the PAMB to charge appropriate user's fee;
f. Exercise all the functions necessary, relevant, and incidental to accomplish the purposes and objectives for which the Board is organized consistent with existing national government policies;
g. Mobilize resources to ensure the sustainability of the Board; and
h. Track, monitor and assess progress of planned activities to include results of initiatives, land and water related information within the province of Bohol.

4.6.2 Technical Working Groups (TWG)

The Technical Working Groups strengthened/created shall include representatives of the organized women's group. The TWGs shall assist and provide advice to the Board and conduct regular meetings, which shall be decided among themselves, namely: a) Technical Working Group on Watershed Management and Protection; b) Technical Working Group on Water Supply and Sanitation; and c) Technical Working Group on Water Quantity and Quality

4.6.2.1 TWG on Watershed Management and Protection

The Technical Working Group on Watershed Management and Protection (TWG-WMP) consists of Bohol Watershed Advisory Council (BOWAC) as chair, PENRO, Chairpersons of the different Watershed Councils, BEMO, Provincial Planning and Development Office (PPDO), Office of the Provincial Agriculture (OPA), Department of Interior and Local Government (DILG), Bohol Alliance of Non-Government organizations (BANGON), International Center for Research and Agro-forestry (ICRAF)

The Technical Working Group on Watershed Management and Protection (TWG-WMP) shall serve as a consultative/advisory and technical body for watershed issues and concerns, and shall also serve as catalyst for a collaborative management program. It shall perform the following functions:

a. Design and conduct information, education and communication (IEC) campaigns on sustainable watershed management;
b. Initiate/coordinate in the formation of integrated watershed management councils;
c. Assist in the preparation of integrated watershed management plans;
d. Federate the Protected Area Management Boards (PAMB's);
e. Institute a system for partnership, convergence and pooling of resources;
f. Recommend watershed management indicators to the Board;
g. Assist in the formulation of policies;
h. Convene the Bohol Network of Watersheds;
i. Establish a Monitoring and Evaluation (M&E) systems to check on the attainment of planned activities of the TWG on Watershed Management and Protection; and
j. Integrate, promote and advocate programs to address gender development concerns in watershed management and protection.

4.6.2.2 TWG on Water Supply and Sanitation

The Technical Working Group on Water Supply and Sanitation (TWG-WSS) consists of Bohol Integrated Water Resource Management Team (BIWRMT) as chair, BEMO, PPDO, Provincial Engineering Office (PEO), Provincial General Services Office (PGSO), Provincial Health Office (PHO), DILG, OPA, NIA, President-League of Municipal Planning and Development Coordinators (MPDCs), DPWH, Participatory Research, Organization of Communities, and Education towards Struggle for Self-Reliance (PROCESS) –Bohol, Inc., Holy Name University (HNU)

The TWG-WSS shall continue to perform its functions as stipulated in Executive Order No. 42 (2004). The functions and membership of TWG-WSS may be expanded based on the IG of this Executive Order.

The TWG-WSS shall serve as knowledge base and information center, leading to sustainable water resources development. It shall perform the following functions:

a. Develop the terms of reference, implementation strategies/procedures, training designs, technology demonstration sites and monitoring systems required for the successful implementation of the PW4SP;
b. Formulate the participatory approaches to be applied with LGUs and local communities in the use of the PW4SP as the basis for project identification and development towards integrated water resources development;
c. Promote the policies and strategies, as well as support the targets outlined in the National Master Plan for Water Supply, Sewerage and Sanitation for the sectors;
d. Establish the rational and technical basis for the implementation of more projects on water supply, sewerage and sanitation and other projects within the concept of IWRM;
e. Promote better coordination and inter-agency relations among government agencies towards better sector development from national to local levels;
f. Coordinate the implementation of activities related to the establishment and maintenance of demonstration sites and/or the application, field testing and assessment of pilot technologies to address priority IWRM problems;
g. Establish water and sanitation (WATSAN) information system;
h. Contribute towards the establishment of Monitoring and Evaluation (M&E) system to check on the attainment of planned activities of the TWG on Water Supply and Sanitation;
i. Integrate, promote and advocate gender development concerns in water supply and sanitation;
j. Prepare short-term and long-term plans to address Millennium Development Goals (MDG) on water supply and sanitation;
k. Assist the Board in the processing and investigation of water permit application, monitoring of compliance of the terms and conditions of water permit, including the identification of non-permittees for appropriate action of NWRB in coordination with concerned LGUs; and
l. Conduct information, education and communication campaigns to ensure safe and sustainable supply of drinking water for all the communities in the province.

4.6.2.3 TWG on Water Quantity and Quality Monitoring

The Technical Working Group on Water Quantity and Quality (TWG-WQQM) consists of PHO, BEMO, PPDO, OPA, Office of the Provincial Veterinarian (OPV), PENRO, Bureau of Fisheries and Aquatic Resources (BFAR), Bohol Electric Cooperative (BOHECO) 1 & 2, NIA, DPWH, Bohol Water Utilities Inc. (BWUI), City Government through the City Planning and Development Office (CPDO), League of MPDCs, Representative from the Vice-Mayor's League, HNU, Soil and Water Conservation Foundation (SWCF), PROCESS-Bohol, Inc.

The TWG-WQQM shall be created and perform the functions of Water Resources Committee in charge of water quality monitoring as provided for in Section 33 of the Bohol Environment Code. The functions for water quantity monitoring will be promulgated in the IG of this Executive Order, including the possible expansion of the membership of TWG-WQQM.

The TWG-WQQM shall be responsible for integrating and coordinating water quantity and quality monitoring activities. It shall perform the following functions:

a. Design a province-wide Water Quality/Quantity Monitoring System consistent with national standards and in compliance with the requirements of Clean Water Act. This system shall include the following components:
    - Water Quality/Quantity Monitoring Objectives
    - Scale and Coverage of the Monitoring System
    - Water Quality/Quantity Variables (Parameters) to Monitor
    - Statistical Tools to be Used in Data Analysis
    - Sampling Design to include frequency and locations of sampling station,
b. Design quality assurance and control in sample collection and analysis;
c. Establish a Data Management System for the data collected;
d. Identify appropriate groups to conduct water resources assessment for surface and ground water;
e. Conduct inventory of existing water resources, including other related data;
f. Identify accredited partner institution /agency to test samples from monitoring station;
g. Identify accredited institutions to analyze the results;
h. Regularly consolidate and submit Water Quality and Quantity Monitoring Results to BIWRMB;
i. Design a Risk Management System to address problem areas identified in the Water Quality and Quantity Report for corrective and preventive actions by concerned communities and institutions;
j. Conduct information, education and communication campaigns to promote social and behavioral practices to ensure safe and sustainable supply of drinking water for all the communities in the province;
k. Contribute towards the establishment of Monitoring and Evaluation (M&E) system to check on the attainment of planned activities of the TWG on Water Quantity and Quality Monitoring; and
l. Integrate, promote and advocate gender development concerns in water quantity and quality monitoring.

4.6.3 Secretariat

The roles of the Secretariat are the following:

a. Provide assistance to the Board in carrying out its activities, i.e. meetings, workshops, monitoring and evaluation of projects;
b. Coordinate with the members of the three (3) technical working groups in the performance of their mandated tasks and functions;
c. Facilitate venues, catering, transportation (when needed) for all the activities of the Board and preparation of notices;
d. Take charge on the documentation and proceedings of workshops and meetings;
e. Act as a focal office for all BIWRMB related activities;

f. Take charge in the safekeeping of all BIWRMB records;

g. Establish a Monitoring and Evaluation (M&E) system in the Action Plan of the board;

h. Coordinate in the implementation of the Plans and Programs of the Board; and

i. Integrate, promote and advocate programs to address gender development concerns.

4.7 BIWRMB ROLES AND STRUCTURE

The BIWRMB structure is shown in **Figure 4-1**, while the roles of BIWRMB are as follows:

a. The chairperson shall be the Governor of Bohol.

b. The Vice-chairperson shall come from the private or non-government sector and shall be elected from and among the board members.

c. The members of the Board shall be divided into three Committees namely:

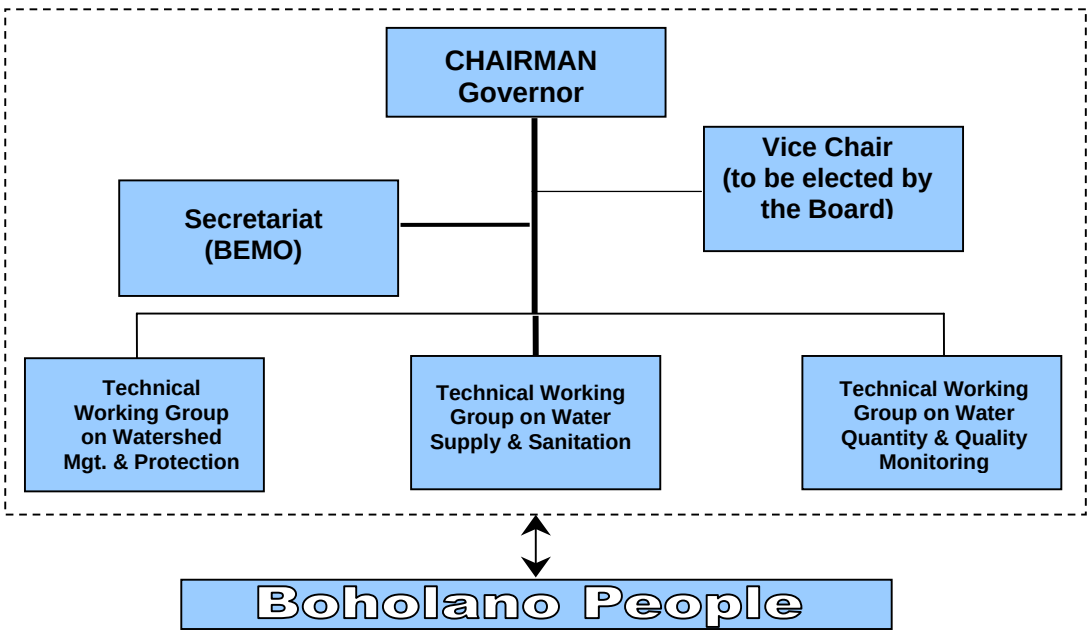
- Committee on Watershed Management and Protection;
- Committee on Water Supply and Sanitation; and
- Committee on Water Quantity and Quality Monitoring.

d. A Board member shall join the appropriate committee according to their organization's related functions and field of interests. Each Committee shall elect a Chair among themselves.

e. In cases when a regular Board Member is absent, the duly designated alternate will attend the meeting.

f. A quorum shall be declared when there are 50 per cent plus one attendees during the meeting or each committee is well represented in the meeting.

g. The regular meeting of the Board shall be on the first Thursday of every quarter, at 1:30 PM unless the members otherwise agree on a date convenient for the majority. It shall be held in a place to be determined by the secretariat.



Reference: BEMO (Bohol Water Summit- 2007)

Figure 4-1 BIWRMB Structure

4.8 SUMMARY, CONCLUSION AND RECOMMENDATION

Executive Order (EO) No. 10 series of 2007, creating the Bohol Integrated Water Resources Board (BIWRMB) was crafted based on the following premises:

In 2002, world leaders assembled in Johannesburg, including that of the Philippines committed themselves to the United Nations Millennium Development Goals (MDGs), and agreed to formulate and implement their respective Integrated Water Resources Management (IWRM) by 2005. Translating these global commitments to action, the Medium-Term Philippine Development Plan (2004-2010) adopted IWRM strategy. It is envisioned that this strategy will enable the Philippines to effectively address the challenges in water resource management.

The Philippine Plan Framework define IWRM as a systematic, collaborative and multi-stakeholder process which promotes the coordinated development and management of water, land and related resources within hydro geological boundaries, in order to maximize the resultant economic and social welfare in an equitable manner and without compromising the sustainability of vital ecosystems.

Review of main national water institutions related to the project include: NEDA as the highest planning and coordinating agency in the country who lays down the overall policy guidelines for the development of water and related resources. The NWRB is the institution in the Philippine water sector, conferred with policy-making, regulatory and quasi-judicial functions. DENR is the primary agency responsible for the sustainable development of the countries natural resources and ecosystems, together with FMB and EMB as staff and line bureau respectively. The DOH general objectives are to increase the number of population with access to safe water and sanitation facilities, while, the DILG has a Project Management Office for Water Supply and Sanitation wherein the objective is to enhance the LGUs capability in the organization and development of community institutions.

On related national policies, laws and regulations, the review considers the Philippine Constitution which states the national policy on water belongs to the state, and also mandates the protection and advancement of the right of the Filipino people to a healthful and balanced ecology. The Water Code of the Philippines is the basic water law of the country, which reiterated that water belongs to the estate and the Code also provides that *water right* is the privilege granted by the government to appropriate and use water. The general strategy of MTPDP on water is the adoption of IWRM to promote devolution of decision making process to the lowest appropriate level, The Clean Water Act provides that the DENR, in coordination with NWRB shall designate certain areas as water quality management areas using appropriate physiographic units such as watershed, river basins or water resources regions. The Sanitation Code provides the standards for drinking water which shall conform to the criteria set by Philippine National Standards for Drinking Water. The Philippine Environment Code is a comprehensive program of environmental protection and management, covering air quality, water quality, land use, natural resources, and waste management. The Local Government Code effected a decentralization of broad range of powers and functions from central government to LGUs consistent with the policy of developing autonomous and self reliant LGUs.

The enacted ordinance on the Environment Code for the province of Bohol presented a menu of options in the areas of protecting and conserving the provincial environment and natural resources. It became also the basis for adopting IWRM in Bohol where the process started in 2003. One component of the DILG-WSS Program aims at enabling the PPDO of Bohol, to plan water supply and wastewater disposal projects in accordance with the principles of IWRM. BIWRMT was organized for the implementation of PW4SP as part of the GTZ-DILG-Bohol IWRM Project. BOWAC was created to serve as the advocacy body and working group for the creation of the Bohol Network of Watersheds. The NWRB undertake

study on IWRM within Water Resources Region 7, which includes Bohol. The DILG-GTZ Water Program aims to contribute to sustainable water resources management and to the development of water supply and sanitation in rural areas of the Philippines. The areas of cooperation include IWRM, wherein Governor Aumentado made a commitment to set up the Bohol Integrated Water Resources Management Board (BIWRMB) through EO. During the first meeting of the Project Board for Bohol Integrated Water Supply System Master Plan (BIW2SMP), with assistance from the Philippine-Australia LGDP, it was again emphasized that the setting up of BIWRMB, which has been long overdue shall be considered in the policy formulation as part of the study.

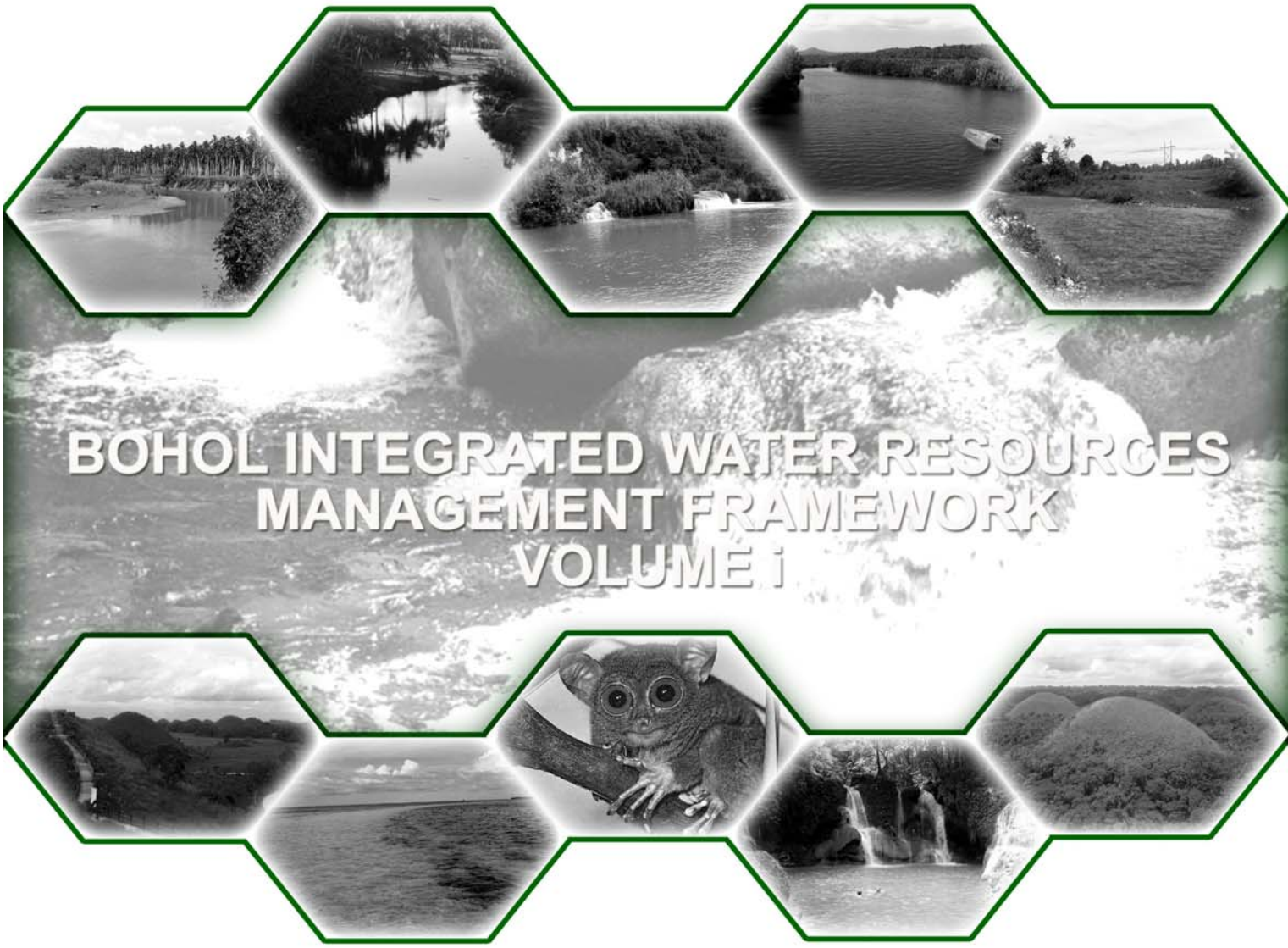
Through the years, the provincial leadership and stakeholders of the province of Bohol had long recognized the need for more effective management of its water resources. Thus, there's a felt need of an IWRM process, which usually begins with the holding of a water summit in order to build consensus among various stakeholders. The first Bohol Water Summit with a theme of "Protecting the Water Resources of Bohol" was held at Metro Center, Tagbilaran City last 23 July 2007. It was attended by more than 160 participants, which lead to the signing of E.O. No. 10, creating the BIWRMB, chaired by the Governor with nineteen members from various stakeholders groups. It has three technical working groups for watershed management and protection; water supply and sanitation; and water quantity and quality monitoring; including BEMO as secretariat which will spearhead in the preparation of implementing guidelines of the said E O.

The basis of IWRM is that different uses of water are interdependent such as domestic, municipal, commercial, industrial, agricultural, fishery, hydropower, recreational, environmental and others. From the foregoing, it shows that implementing an IWRM process is particularly a question of getting the three pillars right: a) Moving towards an enabling environment of appropriate policies and strategies for sustainable water resources development and management; b) Putting in place the institutional framework through which the policies and strategies may be implemented; and c) Setting up the instruments required by these institutions for their appropriate actions. The process is still on-going, but as it has been said, the journey of a thousand miles starts with the first step.

The continuation of the process depends on appropriate policies, so the BIWRMB should pursue to formulate guidelines such as the following:

a. In coordination with the Environment Management Bureau of the Department of Environment and Natural Resources or representative in the province, establish Bohol environment indicators related to water resources;
b. Conduct water resources planning and relevant research studies leading to improved policies in implementing integrated water resources management (IWRM), which include adequate water supply and sanitation for Bohol;
c. Develop information, education and communication (IEC) campaigns for united and strong stakeholder participation in water governance and promotion of responsible stewardship of water and land resources;
d. Develop a watershed management plan in harmony with concerned LGUs and national government policies;
e. Work for the deputization of the provincial government through the Governor, in accordance with the Water Code, wherein the NWRB may deputize any official or agency of the government to perform any of its specific functions or activities;
f. Review and approve program of activities submitted by the three (3) technical working groups;
g. Appropriate funds from allocation of the 20% Development Fund, grants of donor agencies and Congressional Development Fund; and
h. Monitor and evaluate the progress of the planned activities.

Finally, the success of every endeavor relies on the organization and on this case to the BIWRMB with the three TWGs and the secretariat, who should spearhead in the attainment of protecting the water resources of the province for the sake of Boholano people. While, one of the management instruments is the Bohol Integrated Water Supply System Master Plan, which include water management information systems, but it should be updated regularly for sustainability.



CHAPTER 5

A PROVINCE-WIDE WATERSHED MANAGEMENT FRAMEWORK FOR THE PROVINCE OF BOHOL

CHAPTER 5 – A PROVINCE-WIDE WATERSHED MANAGEMENT FRAMEWORK FOR THE PROVINCE OF BOHOL (PWMFB)

5.1 SCOPE AND DEFINITION

The Province-wide watershed management framework for the Province of Bohol provides a coordinating framework for environmental management that focuses public and private sector efforts and resources to address the highest priority concerns within hydrologically - defined geographic areas, taking into consideration both ground and surface water flow, point and nonpoint sources of pollution, air deposition of pollutants, and land and water uses and impacts. This framework will allow the Province of Bohol to operate existing regulatory and nonregulatory programs more efficiently and effectively through a watershed-based approach to protect, enhance and restore the Province's water resources. The Province-wide watershed management framework will enable the Province to realize such efficiencies by: focusing on a set of core programs for initial implementation; expanding to other programs in the future; integrating and coordinating current monitoring and data collection efforts through a Strategic Watershed Monitoring Plan; and establishing a set of goals for environmental and programmatic improvements that can be achieved through implementation of a watershed management approach.

The province-wide watershed management framework also provides a "map" or outline for the public to see where province-wide watershed management activities will be targeted and implemented, so that local, provincial, regional and national efforts may be coordinated, as appropriate. However, the province-wide framework and its implementation schedule do not preclude other watershed management efforts from being initiated or continuing with other resources and leadership. Mandatory regulatory programs will also proceed, as required, until such time as they are coordinated with the province-wide framework, or integrated with other watershed management activities.

5.1.1 The Province-Wide Watershed Management Framework for the Province of Bohol (PWMFB)

Figure 5-1 illustrates the relationship between an overall goal of environmental protection, and existing management programs and activities, on a general concept note. The peak of the pyramid represents the goal, for instance, water resource protection. The next level of the pyramid illustrates how progress toward achieving this goal will be measured through a system of indicators and milestones, including water quality criteria and standards established to protect designated and existing ones. The watershed management approach provides a coordination framework targeting these programs on priority watersheds and watershed issues. The existing programs and their management activities will be used as implementation tools for customized watershed management plans and strategies.

The creation of a province-wide watershed management framework for the province of Bohol starts with the formation of focal persons or entities/groups tasked to integrate and consolidate all existing and proposed watershed management programs province-wide (**Figure 5-2**). Initially these persons or groups may come from Provincial Planning and Development Office (PPDO), the Provincial Environment and Natural Resources Office (PENRO) and Bohol Watershed Advisory Council (BOWAC) as stipulated in Bohol Agricultural Master Plan (BAMP 2006). The entities as presented in the diagram are not at all complete. Suffice to say, these represent the "critical mass" who have initially established plans and programs geared toward protection, management and rehabilitation of the province's entire watersheds. Other persons or groups may join in and participate depending on their relevance and importance in the overall planning and coordination of the province's watershed management framework process.

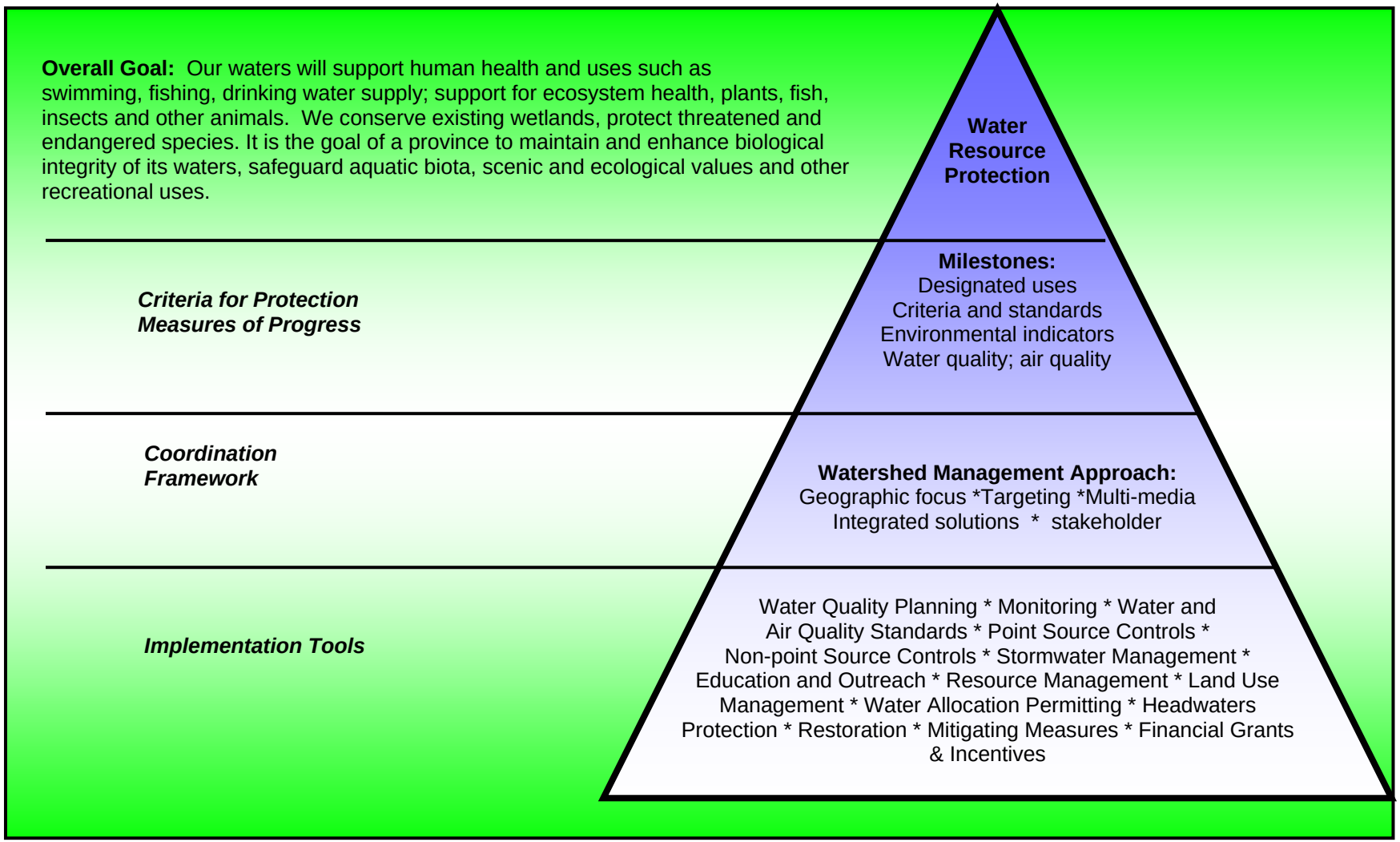


Figure 5-1 Conceptual Management Framework

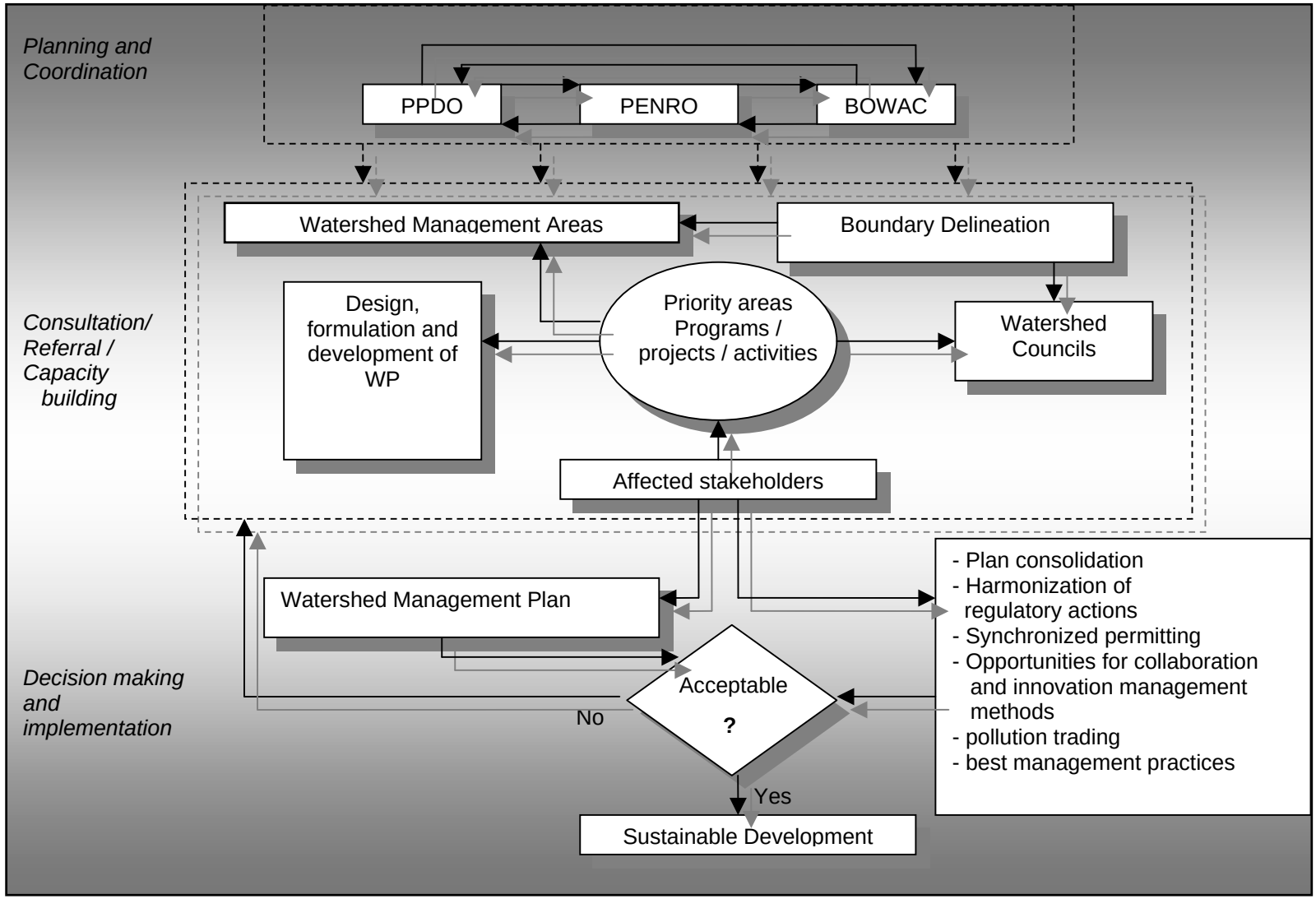


Figure 5-2 The Province-Wide Watershed Management Framework for the Province of Bohol

The next stage of the watershed management framework is the consultation / referral and subsequently the capacity building phase. It is here where all users and beneficiaries of the resources within or adjacent to a given watershed management area or watershed zone are constantly informed and consulted. Also known as participatory, the affected stakeholders are the one setting priorities and programs and targeting subsequent watershed management activities within each watershed zone and among watershed management areas within each zone. As they deliberate and discuss all problems, concerns and issues that would arise as a result of planning for the protection and rehabilitation of the province's watersheds they would essentially be made to understand and acquire the necessary skills and knowledge to plan and decide eventually in the process.

Lastly based on agreement management, measures are identified, constructed and refined to eventually be incorporated in the watershed management plan for adoption and implementation. Otherwise, if found unacceptable, the same are routinely referred back to affected stakeholders for review / changes or modifications until and after they have become feasible and acceptable.

5.1.2 Key Elements of the Province-Wide Watershed Management Framework

The *Province-wide Watershed Management Framework for the Province of Bohol (PWMFB)* provides a framework for implementing watershed management on a province-wide basis. Key elements of this province-wide framework include:

5.1.2.1 Watershed Management Areas and Watershed Management Councils

In order to implement a watershed management framework, the Province of Bohol has been divided into watershed areas and watershed zones, which will be the expanded watershed. councils. **Figure 5-3**, defines the watershed management areas as adopted based on watershed mapping as indicated in Bohol Agricultural Master Plan (BAMP 2006) The boundaries reflect different groupings or aggregates of watersheds into manageable planning areas. Location of each watershed management area is shown in **Table 5-1**.

Table 5-1 Location of Each Watershed Management Area

Watershed Management Area	Location	Area in hectares
1	Loboc	64,914
2	Panampan	2, 437
3	Tagahay	1,375
4	Pangatan	3,114
5	Cocotutan	1,791
6	Manaba	9,896
7	Alijawan-Cansuhay	5,200
8	Guinsularan	2,081
9	Tanguhay	2,379
10	Lumbay	4,727
11	Sagomay	1,645
12	Carood	20,479
13	Cabidita	1,581
14	Kabukas	1,470
15	Ondol	1,302
16	Biabas-Tipolo	3,255
17	Soom	811
18	Ipil	28,252
19	Name of river still to be verified	1,205
20	Name of river still to be verified	750
21	Name of river still to be verified	1,193
22	Name of river still to be verified	3,849
23	Taguinting	1,790
24	Baluarte	3,235

Watershed Management Area	Location	Area in hectares
25	Bago	4,592
26	Wahig-Inabanga	63,855
27	Name of river still to be verified	3,438
28	Name of river still to be verified	1,331
29	Tubigon	1,476
30	Mualong	5,917
31	Abatan	36,626

Source: ESSC National Watershed Database 2003 as lifted from Environmental Science for Social Change, PPDO, March 2005)

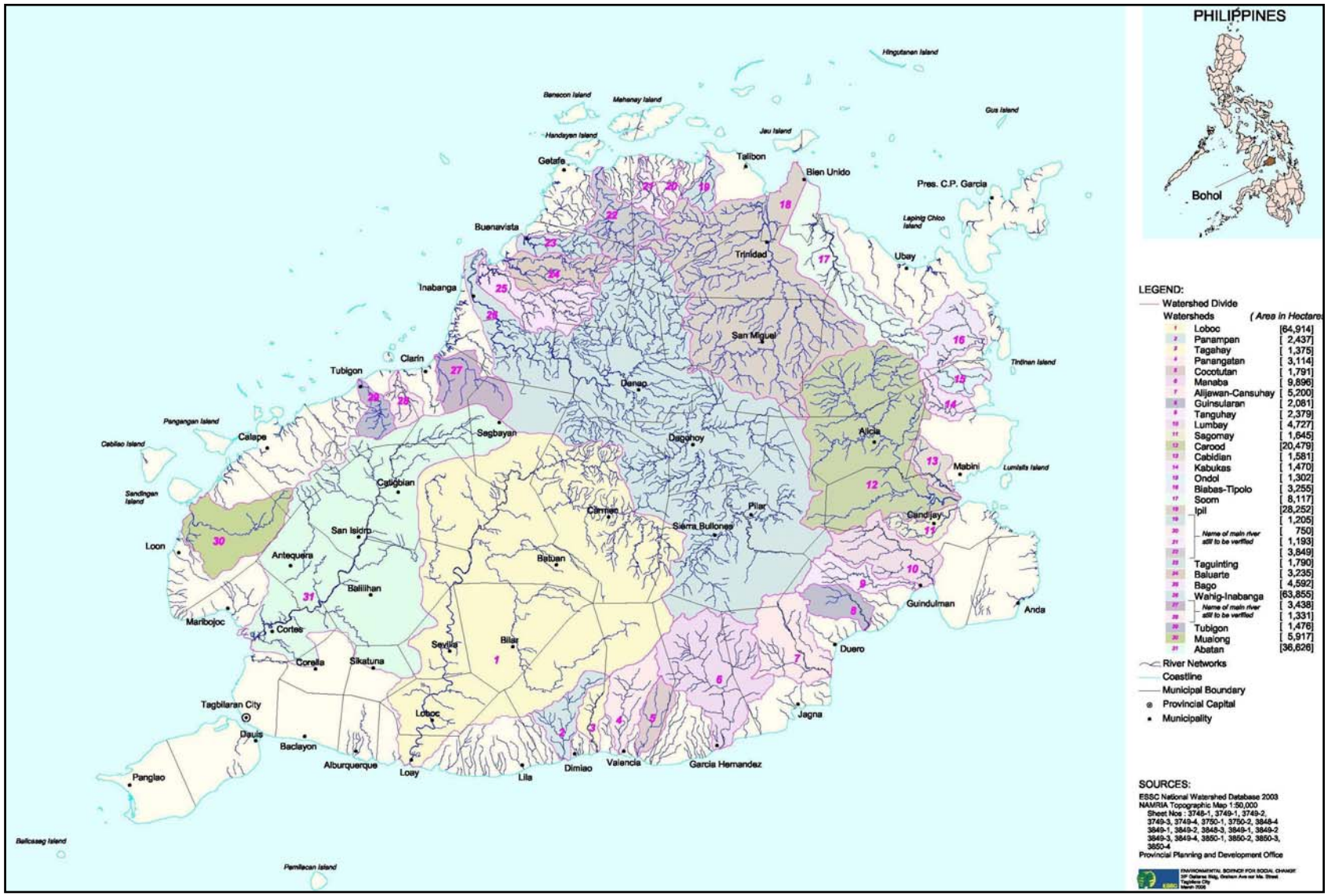
Figure 5-4 reflects indicative aggregates of hydro-geologic boundaries of the different watershed management areas, which are expanded to form watershed zones. The formulation and development of watershed management framework is dynamic in character and would continue to evolve over time. The manner with which municipalities were proposed to be clustered into watershed zones is but temporary. The approach was forwarded simply to illustrate the zoning concept intended to address some vital concerns and issues collectively, such as: vertical/lateral coordination at the regional and local level; budget and other logistics harmony and alignments; synchronization of work schedules; monitoring and evaluation; and other form of similar integrative management activities. It is also intended to stimulate discussions about the matter for consolidation and improvement. At the end of the day, should the affected stakeholders, after careful examination, so decide that a better option following a BIAD model, then appropriate improvement/adjustment will have to be made.

Since BIAD is focused on cluster economic development by municipality, while the watershed zone is defined by natural topographic conditions like river basin, it is more appropriate to adapt the watershed councils by strengthening the existing groups and creation of other prioritized watershed councils. The geographic zone coverage of the expanded watershed council is shown in **Table 5-2**.

Table 5-2 Expanded Council Geographic Coverage

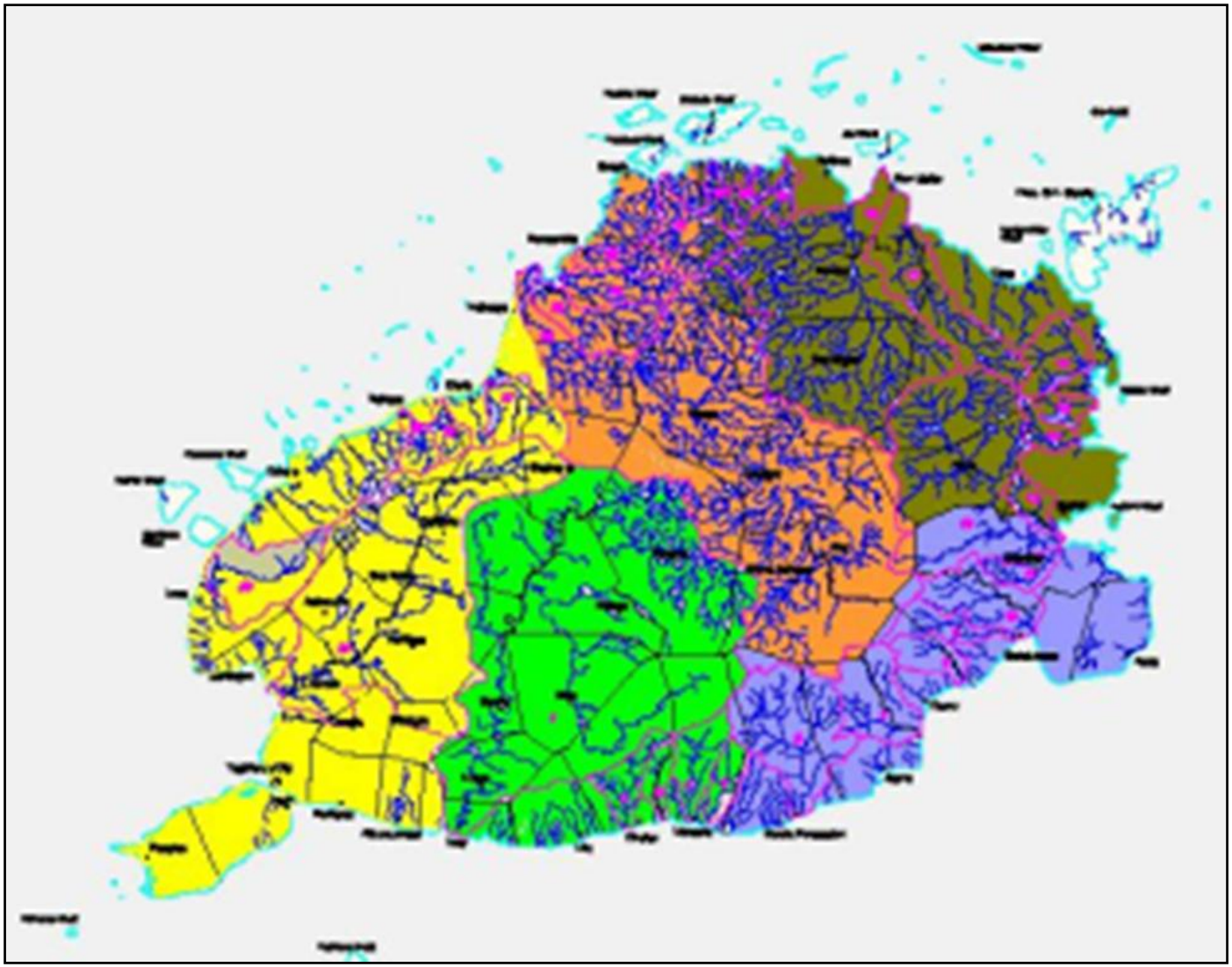
Expanded Watershed Council (number)	Location
1	Panglao; Dauis; Tagbilaran City; Baclayon; Alburquerque; Sikatuna; Corella; Cortes; Balilihan; Antequera; Maribojoc; Loon; Calape; San Isidro; N-NW & S-SW of Catigbian; Tubigon; Clarín; N-NW & S-SW of Sagbayan N-NW & S-SW of Inabanga
2	Loay; Loboc; Sevilla; NE of Balilihan; Bilar; Batuan; N-NE & S-SE of Catigbian; N-NE & S-SE of Sagbayan; Carmen; W of Sierra Bullones; Dimiao; Valencia; Lila
3	N-NE & S-SE of Inabanga; Buenavista; Getafe; Danao; Dagohoy; Pilar; N, E, S of Sierra Bullones; East of San Miguel
4	Garcia-Hernandez; Jagna; Duero; Guindulman; Anda; Candijay;
5	Mabini; Alicia; N, E, S of San Miguel; Trinidad; Talibon; Bien Unido; Ubay; Pres. C. Garcia;

Certain watershed management areas and watershed zones may involve inter-municipal cooperative efforts. These programs may have already developed cooperative agreements and management practices consistent with the principles and elements of the province-wide watershed management framework. Additional refinement of inter-municipal watershed management will be addressed through implementation of the province-wide watershed management framework.



Source: ESSC National Watershed Database 2003 as lifted from Environmental Science for Social Change, PPDO, March 2005

Figure 5-3 The Watershed Management Areas as adopted from Map 5 of Bohol Agricultural Master Plan



Source: Map 5 of BAMP 2006

Figure 5-4 The Proposed Watershed Councils (i.e. Yellow = 1; Green = 2; Orange = 3; Grayish blue = 4; Yellowish brown = 5)

5.1.2.2 The Strategic Watershed Monitoring Program

A strategic watershed monitoring program is necessary and crucial to better serve the needs of the province-wide watershed management framework. Specific features to be considered in the monitoring program, include:

i. a surface water monitoring network, including randomly-located monitoring stations to provide generalized water quality data for province-wide assessments;

ii. a targeted intensive or synoptic component to support watershed initiatives; and,

iii. a design to more fully develop the relationship between ground water quality and surface water quality.

The proposed surface water monitoring network would consist of both fixed and synoptic stations located in all watershed zones. Fixed stations would be located on small streams in the headwaters areas (indicator sites) and near the downstream end of the rivers (integrator sites). Water quality data would be collected at these fixed stations on a regular basis, year after year. The water quality data collected from the upstream, indicator sites would provide an indication of the water quality associated with the land-use, soils, geology and hydrologic characteristics of a small portion of the watershed (the headwaters area), while the water quality data collected at the downstream, integrator sites would represent an integration of all the activities and pollution sources (point and nonpoint) occurring throughout the watershed. The fixed station monitoring network would provide the baseline data for trend analysis, establish relationships between water quality and watershed characteristics and provide a check on water quality in the major rivers with heavy use.

Additional synoptic monitoring stations would be added to more clearly define water quality issues. Synoptic stations are general survey-type stations used for concurrent sampling and would be assigned on a targeted, rotating basis among the watershed management areas. Each synoptic station would consist of an indicator site component and a random site component. The synoptic stations would be sampled during two consecutive years in a longer cycle to establish a broader database to support watershed management activities, including detailed watershed characterization and assessment and water quality modeling. The ground and surface water monitoring program would be coordinated with the synoptic water quality sampling to significantly increase the usefulness of the data collected.

The combination of fixed monitoring network, including both ground water and biological monitoring capabilities, as well as synoptic indicator stations, will significantly expand and enhance the province's water quality database, which is needed for implementation of a province-wide watershed management framework. Monitoring on a watershed basis will also result in more efficient use of data and data collection resources by first collecting baseline information for watershed characterization and assessment, screening for issues of concern, and targeting more intensive data collection efforts for assessing issues, developing remediation strategies and evaluating strategy effectiveness.

Watershed-based monitoring should also result in increased reliability of data, through stakeholder collaboration and oversight of data collection and assessment methodologies, as well as provide opportunities for data and resource sharing; all of which should result in more thorough investigation and analysis of priority issues and solutions.

5.1.2.3 Watershed-Based Permitting

The watershed management areas are grouped into watershed zones to facilitate implementation of watershed-based permitting. PWMFB permitting is necessary to address water quality problems identified through the watershed characterization and assessment steps of the process that are appropriately addressed through discharge treatment requirements. Secondly, permitting via watershed zone or watershed management area-

basis represents an important implementation mechanism for priority watersheds or areas where water pollution issues have been determined to be the principal cause of watershed / water quality impairment. The permits would build on watershed management plans to be developed and would focus on activities that are cost effective and appropriate to the watershed. Agencies or offices would be able to choose management practices that are consistent with their individual needs and would be encouraged to concentrate their efforts on water/river pollution prevention.

Permit limits should be tailored towards reductions in pollutant loads that are achievable through wastewater and stormwater treatment and should be developed in conjunction with other methods for pollutant reductions, including best management practices for stormwater management and nonpoint source pollution control and pollution trading and taking into account any pollutant loadings. Watershed permitting may be implemented through a variety of regulatory and non-regulatory measures that address stormwater management and non-point source pollution control. These measures may include municipal ordinances governing land use, stormwater runoff, or other activities that create non-point source pollution; zoning; and local citizen education efforts.

5.1.2.4 Watershed-Based Stormwater Management Plans

Whether watersheds are dominated by point source or non-point sources of pollution, every watershed management plan should have to include strategies for stromwater management. Stormwater management deals with both water quantity (flooding, runoff and erosion) and quality (non-point source pollutants, sediments, etc.). Traditional stormwater management measures rely on site-specific, pre-development structural controls, such as detention basins and generally, requirements for stormwater runoff are instituted on a site-by-site basis. Watershed management plans should include a stormwater management planning component that would instead establish effective and implementable stormwater management strategies, including best management practices that could prevent and abate flooding and stormwater-related point and non-point sources of pollution. The appropriate level of sophistication and detail of the stormwater management component should be determined based on the current and projected stormwater generation from land uses within the specific watersheds. Plans may range from entirely narrative to heavily dependent on highly sophisticated modeling.

Watershed-based stormwater management plans will contain measures to reduce water quality degradation and increases in existing runoff rates, depths, and velocities caused by land development and redevelopment. Further, a watershed-based stormwater management plan may include measures such as regional / provincial stormwater management facilities, flood control works, stream restoration and erosion control measures, and watershed-wide non-structural programs and best management practices. Remedial measures may also be included to address existing flooding, erosion, water quality, or other stormwater-related problem. Whether developed initially as a stand-alone stormwater management plan, or as a component of a watershed management plan, watershed-based stormwater management measures must address institutional, social and economic issues regarding implementation and effectiveness. Inter-barangay and inter-municipal involvement and coordination is recommended in order to adequately address these issues and the stormwater management needs of the watershed and the watershed zones.

5.1.2.5 The Watershed Management Plans

Watershed management plans should be developed for each of the watershed management areas. The watershed management plan will address all identified priority problems. Plan scope include: wastewater management, water supply and conservation, stormwater management, ground water protection (including well-head and aquifer recharge area protection), and other similar planning areas. The watershed management plan will also be used to coordinate and integrate a broader array of regulatory and non-regulatory tools and

programs in order to effectively implement the watershed management process. Additional regulatory tools and programs may include: land use regulation, stream encroachment, municipal master plans, infrastructure financing, solid waste, hazardous waste, and pollution preventing. In addition, non-regulatory measures implemented through these programs will also be incorporated into the plans, for instance: education and outreach or local ordinances on: stormwater management, non-point source pollution control, septic system maintenance, riparian corridor and open space protection. The watershed management plan would not replace these programs, but would identify where and how such regulatory and non-regulatory mechanisms can be used most effectively to achieve watershed goals.

The watershed management plan will include an implementation scheme that identifies all of the measures that will be implemented to achieve watershed goals and objectives. The implementation scheme will explain the methods and means for implementation of the management strategies identified in the watershed management plan. This component of the plan should also identify parties responsible for implementing protection or restoration measures, milestone dates and deadlines for implementation, sources of funding and other resources, methods and means for tracking compliance with regulatory and non-regulatory measures, available enforcement authorities for ensuring compliance with regulatory requirements, and evaluation of success / effectiveness of implementation measures.

The watershed management plan should also include a methodology for evaluative monitoring, after a specified period of time for plan implementation, to measure the success of plan implementation and to evaluate areas that were not assessed during the previous cycle. The evaluation methodology should be coordinated with the strategic watershed monitoring program, and should be designed to evaluate the effectiveness, individually and collectively, of the selected watershed management strategies in meeting the goals and objectives of the watershed management plan. The environmental criteria and objectives developed in earlier phases of the process should be used to evaluate whether the watershed management plan is effective, if problems and issues were successfully addressed, and if new (or overlooked) issues have arisen that require refinement of the watershed management plan.

5.1.2.6 Geographic Information Systems (GIS)

GIS provides a valuable tool in analyzing data and producing maps for the watershed management framework. However, GIS skills should be developed within other programs to maximize efficient and effective use of GIS staff and technical capabilities. GIS capabilities for mapping, presentation and modeling also need to be developed in order to effectively implement the province-wide watershed management. For instance, water monitoring management uses GIS extensively for public communication, increase public access to environmental data and information, data sharing, so forth and so on.

The transition to a province-wide watershed management framework will be facilitated by the use of GIS for data development, data updates and enhancements, assessment and modeling, and improved data sharing.

5.1.3 Goals for a Province-Wide Watershed Management Framework

By instituting the province-wide watershed management framework, the following goals are expected to be achieved:

Goal 1: Improve Protection of Water Resources For Designated Uses

The province-wide watershed management framework incorporates the water resource protection goal, including the subgoal of improving the protection of water resources for designated human uses (including public health, water supply, fish and shellfish

consumption, and recreation) as well as aquatic life uses. Improved protection of water resources includes pollution prevention and maintenance of high quality water resources, as well as restoration of impaired water resources. The province-wide watershed management framework provides for the improved protection of water resources for designated uses through the coordination and integration of water resources protection programs on a watershed basis, and through the targeting of watershed management activities to priority watershed issues like use impairment.

Goal 2: Improve Public Participation

The province-wide watershed management framework provides a process that will increase public awareness of water-relate issues and be more responsive to citizen concerns. Public input will be incorporated into management decisions involving the allocation of resources and the establishment of watershed management goals and plans for specific watershed management areas. Public input will also be used to identify appropriate measures of success for documenting improvements to the watershed.

Goal 3: Integrate Management Programs

By focusing management efforts from several programs on the same geographic area and coordinating those efforts around a fixed schedule of activities within the watershed management cycle, water resource management programs will function at an unprecedented level of integration. Furthermore, the province-wide framework should help to integrate management efforts across national, regional, provincial, municipal and local/barangay levels of government by providing a common point of reference and creating a common set of management priorities.

Goal 4: Be Proactive Rather Than Reactive

The cyclical, priority-based nature of the watershed management framework reduces the tendency to operate in a reactive or “crisis” mode. A proactive management capability provides the opportunity to target and allocate resources to priority issues and concerns, and to evaluate more prudent, innovative and cost-effective solutions, including formation of partnerships and resource-sharing. On a province-wide level, this process enables the province economic planners to help direct high and low-impact development to appropriate sites within the province; while on a local level, watershed management provides an opportunity for municipalities to plan for long-term growth and water and wastewater needs, while still meeting mutually agreed-upon environmental objectives on a provincial basis.

Goal 5: Improve Working Relationships at All levels of Government

PWMFB anticipates that coordinating management programs and activities around a geographic focus will lead to improved working relationships among different levels of government. The province-wide watershed management framework facilitates cooperation through planned outreach and stakeholder participation in watershed management strategy development and implementation. Also, the watershed management planning and permitting cycles, as well as written watershed management plans, provide common points of reference for all participants. This added element of structure and the corresponding open lines of communication should foster improved working relationships at all levels of government.

Goal 6: Improve Program Efficiency

Implementing a province-wide watershed management framework will streamline the use of resources as roles are clarified and coordinated within and across programs and agencies. Redundancy in program activities should be eliminated. Streamlining should also occur as agency resources are geographically focused on specific watershed management areas and watershed zones.

Goal 7: Increase program Effectiveness

The province-wide watershed management framework focuses public and private sector efforts and resources to address the highest priority concerns within specific geographic areas, thus providing a process and structure for integrating existing programs province-wide and coordinating management activities geographically by watershed management areas and watershed zones, for example: strategic watershed monitoring to support watershed assessment, prioritization and the development of wasteload and load allocations; linking water supply and water quality planning to provide a direct connection between the development, allocation and protection of water resources; as well as improved water resource management solutions, and improved consistency and continuity of management decisions.

Goal 8: Improved Data Management

The coordination of data collection activities on a watershed basis will improve PWMFB's data management capabilities, including the collection, storage, integration, analysis, and assessment of data to support watershed management. The relationships between improved data management and watershed management decisions will be made more explicit through watershed planning process, compelling programs to improve information management system development and coordination.

5.2 IMPLEMENTING A PROVINCE-WIDE WATERSHED MANAGEMENT FRAMEWORK

5.2.1 Adapting a Watershed Management Approach

It is understood in this document that proposing a province-wide watershed management framework is in itself adapt an approach referred to as "watershed management" that integrates existing programs province-wide and coordinates their management activities geographically by watershed zones and watershed management areas. Watershed management is the process of managing all the water resources within the province's entire area of a watershed, rather than on a site-specific basis. A watershed management approach is not a regulatory program rather it is a strategic approach to operating existing regulatory and non-regulatory programs more efficiently and effectively to protect, enhance and restore the province's water resources.

A watershed management approach is based on three key components: (i) *geographical focus,* i.e. nature's boundaries such as lakes, rivers, streams and the surrounding landscape; (ii) *continuous improvement based on sound science* i.e. scientific data, monitoring and other tools and techniques to providing information that supports the process of developing plans and evaluating their effectiveness; (iii) *partnerships/stakeholder involvement* i.e. involvement of all affected interests in designing and implementing goals for the watershed.

A watershed management approach will result in the following benefits: *(i) focus on the resource* i.e. places greater attention on the resource and the achievement of real ecological results, rather than administrative requirements, *(ii) emphasis on priority problems,* i.e. more thorough understanding of threats and conditions in each watershed provides a stronger basis for targeting priority concerns; *(iii) cooperation and collaboration,* i.e. partners gain a sense of common purpose in working out solutions. Stakeholder involvement helps focus on priority issues and needs of each watershed and provides lasting solutions by promoting partnerships, local implementation and stewardship; *(iv) streamlining requirements,* i.e. generates efficiencies in monitoring, permitting, and reporting, saving provincial agencies, industry and taxpayers time and money; and *(v) predictability for the regulated community and the general public,* i.e. helps provide the regulated community and the public with a

better understanding of the water resource management priorities for a given geographical zone and how other activities are related to those priorities.

Watershed management is an on-going process that occurs on both province-wide and watershed levels concurrently. It is a process that focuses activities and resources on particular geographic zones based on province-wide and local priorities. Therefore for practical reasons, the PWMFB cannot initiate watershed management simultaneously in all watersheds across the province at the same time. Instead, PWMFB proposes to implement a watershed management framework as a phased, rotating cycle of activities that will occur on several different levels simultaneously. PWMFB has delineated a set of boundaries for targeting specific types of watershed management activities to the appropriate geographic area and scale. Watershed management activities at both provincial and watershed levels will be sequenced incrementally across the province. His will help to balance program workloads.

However, not all watershed management activities need to be conducted by PWMFB. The sequencing of management activities does not preclude early stakeholder efforts to initiate watershed management activities based on their local needs and resources, and that support this province-wide watershed management framework. PWMFB will provide support and guidance for locally initiated efforts to the maximum extent possible. This Framework Document is the first step in providing such guidance. Targeting of management activities, especially intensive monitoring and modeling efforts, to specific segments of the province crease a more efficient and effective operating framework. For this purpose, the province has been divided into watershed management areas and watershed zones, in order to produce a reasonable timetable for the implementation of watershed management activities at the appropriate levels of concern and management.

5.2.2 The Watershed Management Cycle

PWMFB will begin implementing a province-wide watershed management framework by first working with the stakeholders in each watershed zone to collaboratively develop the priorities and implementation schedules for the watershed management areas within each zone. However, the watershed management framework assumes that a systematic sequence of watershed management activities will occur within each watershed management areas and each watershed zone over a given period of time, and then repeat itself in an iterative process. This cycle of watershed management activities includes the fundamental planning steps of data collection and assessment, problem identification, strategy development, implementation and evaluation (**Figure 5-5**).

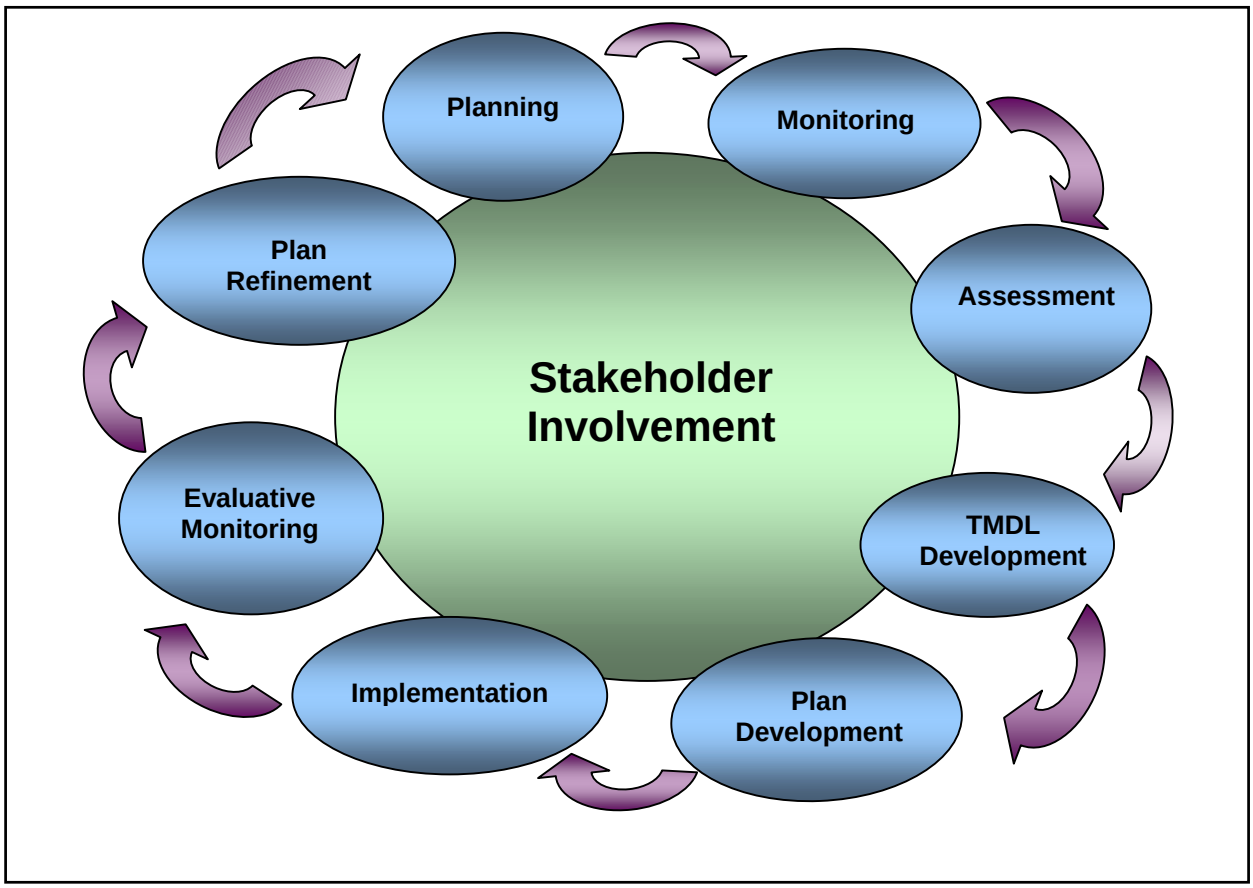


Figure 5-5 The Watershed Management Cycle

However, the cycle of watershed management activities is actually a more detailed set of sequential steps, each containing a set of related management activities that must be coordinated. These steps and activities are outlined as follows:

Sequence of watershed Management Steps and Activities

Step 1: Initial Planning / Stakeholder Involvement

- *Preliminary Watershed Characterization.* Pertinent natural resources will be identified, as well as significant cultural, social and demographic features. These preliminary reports will be used to facilitate watershed-specific dialogues with stakeholders that will serve both to expand the information available to identify problems and issues within each watershed management area, and also to prioritize watershed management issues and target activities within each of the watershed zones.
- *Form a Watershed Partnership.* Every watershed community will be made up of a wide array of diverse and sometimes competing interests. These diverse interests must all be represented in developing a watershed management plan. In order to represent the watershed community, a "watershed partnership should be organized that include representatives of different sectors that should work to identify specific needs and issues, develop goals, objectives and strategies, and develop stewardship program for continued evaluation and refinement of the watershed management plan.

Step 2: Monitoring and Data Collection

- *Technical Work Plan Development.* A technical plan describes the tasks necessary to collect and assess data and information needed to support subsequent watershed management activities. Technical work plans will vary in scope and complexity depending on the distinct needs of each watershed management area; however, required components include: compilation and evaluation of existing data; and development of new baseline data, screening or targeted intensive monitoring, and model development, as appropriate to meet the needs of the watershed management planning process.
- *Screening / Targeted Monitoring.* Where monitoring data is needed, the amount of effort required will depend on the diversity of land uses and land cover characteristics, water resource uses and water quality problems.

Step 3: Watershed Characterization and Assessment

- *Detailed Watershed Characterization and Assessment.* Data and information collected from existing sources and new monitoring will be organized into a detailed watershed characterization and assessment report that: describes specific features and resources within the watershed management area, including natural resources and infrastructure; identifies past and present trends in water quality and other water resource management concerns; demographics and human activities; and assess the current state of the watershed management area. The watershed characterization and assessment report will also identify any additional data needed to establish baseline information necessary to develop a vision and goals for the future of the watershed management area.
- *Modeling and Analysis.* Models may be used to simulate the watershed ecosystem and the impact of human uses on water resources, including adverse impacts on water quality and quantity. The type of complexity of the models used depends on the assumptions made about the system to be modeled and on factors such as hydrology, hydrogeology, hydrodynamics, dispersion air deposition, and number and type of pollutants discharged into the receiving waters.
- *Problem Identification and Prioritization.* Depending on the nature of the problem to be addressed and the authority and resources to implement such measures, priorities are set for better organization, less confusion and high efficiency in the use of resources available.

Step 4: Goal Setting

- *Develop Total Maximum Discharge Loads (TMDLs) and Establish Goals.* TMDL limits should be set to address water quality problem and set basis for regulatory and non-regulatory measures to aid pollution control of impaired waterbodies. TMDL is a “pollution budget” that includes calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards.
- Establish Environmental Objectives and Evaluative Criteria. Many watershed management projects are designed to change the environment in ways that are deemed desirable. But in the process of development, projects may also produce undesirable environmental effects. It is therefore necessary to set environmental objectives and evaluative criteria to determine whether or not the direct and indirect effects of projects to environment are irreversible or not.

Step 5: Management Strategy Development

- *Simulations / Forecasting models.* Modeling predictions to depict different scenarios and project future impacts to the watershed management area.
- *Alternative Analysis.* Examination of management strategy(s) options for addressing priority watershed issues and attaining watershed goals and objectives.
- *Best Management Practice (BMP) options.* Modalities of actions depending on watershed priorities, goals and objectives.
- Cost-benefit Analysis. Determination and identification of the most economical and financially feasible solutions to address problems related managing watershed management areas and watershed zones.

Step 6: Watershed Management Plan Development.

- *Plan Formulation.* A watershed management plan should be developed for each watershed management area to document and formalize the results of all preceding watershed management activities including: watershed characterization and assessment; problem/issue identification and prioritization; environmental criteria and indicators; watershed goals and objectives; implementation options; and selected management strategies and implementation mechanisms.
- *Plan Proposal and Adoption.* The watershed management plan should be used to coordinate, formalized and be submitted for guidance and evaluation/examination by affected stakeholders for subsequent approval and adoption.

Step 7: Watershed Management Plan Implementation

- *Permit Issuance.* Permits should be developed as implementation tools where appropriate to address water quality problems through discharge treatment requirements.
- *Stormwater Management.* Measures such as flood control works, stream restoration, and erosion control, watershed-wide nonstructural programs and best management practices.
- Targeted Site Remediation. Plan selection of the most appropriate remedial or cleanup action for a site or area of concern within a watershed management area or watershed zone.
- Non-regulatory Measures. Prevention through innovative planning and site design techniques, source controls (e.g. proper landscaping and street cleaning methods), and public education on the nature, source and impacts of non-point source pollution.
- *Financing.* Appropriation of funds for projects and activities identified.

Step 8: Evaluation and Refinement

- *Monitoring.* The purpose of monitoring is to determine whether or not watershed practices have had the effects intended.
- *Evaluation.* Evaluation provides a means of measuring accomplishments, and provides useful information as feedback to planners and managers in the redesign of watershed management projects, programs and practices.
- Plan Refinement. These are modifications / adjustments needed to address the changing trend, priorities and issues within the watershed.

- Enforcement. These are actions designed in accordance with watershed management plan, strategies and any related watershed goals.

This outline of watershed management activities provides a step-by-step sequence of implementation activities that will occur on a province-wide basis, by watershed zone, and also for each watershed management area within a watershed zone. The scope and complexity of these activities will vary, depending on the issues, needs and resources of each watershed zone. While PWMFB will provide leadership, oversight, guidance and support for implementing the province-wide watershed management framework, many of these watershed management activities may be initiated and/or implemented locally, using the framework document as guidance.

5.2.3 The Implementation Schedule

The implementation schedule is built on assumptions that watershed management is a dynamic process and watershed management plans will continue to evolve over time. Watersheds transcend political, social, and economic boundaries. The watershed management process should involve all stakeholders, including representatives from all levels of government, public interest groups, business and industry, academic institutions, private landowners, concerned citizens, and others.

The implementation schedule targets watershed zones where preliminary watershed management activities will be initiated on a priority basis. Priority areas will be identified by PWMFB for initial implementation of the watershed management framework, in order to expand upon prior and on-going watershed management-related activities and investment, as well as focus on regional and province-wide environmental concerns. While some initiatives may be on-going before the implementation of the province-wide watershed management framework, they will eventually become integrated into the overall plan and activities of the province-wide framework.

However, the actual sequence of activities within each watershed zone will depend on the ranking of watershed management areas and the prioritization of watershed issues that will be accomplished through the PWMFB's initial outreach to stakeholders within each watershed zone and the development of a preliminary watershed characterization and assessment for each of the watershed management areas in the province.

The PWMFB will initiate the preliminary step of the Province-wide watershed management framework. The preliminary characterization and assessment process will allow the PWMFB to work with the stakeholders to prioritize watershed management activities within each watershed zone and among the watershed management areas of each watershed zone. In this way, the stakeholders in collaboration with PWMFB will be determining the watershed management priorities, and targeting subsequent watershed management activities, within each watershed zone.

Management measures identified in the watershed management plans will be implemented upon adoption of the plans, although some measures may be administered sooner under separate authority (e.g. stormwater management ordinances). Implementation of certain management measures may span several years (e.g. construction of province stormwater facilities) before completion and evaluation.

The implementation schedule should be set based from several scenarios, all of which were developed from a ranking of environmental and programmatic concerns, including: regulatory mandates (e.g. point and non-point source control); priority concerns (e.g. list of impaired waterbodies), resource values (e.g. pristine or threatened waterways or habitat); and public uses of the water resources. Under the proposed implementation schedule, watershed zones exhibiting the most water quality impairment and containing the greatest number of surface discharges would receive priority consideration. While the initial emphasis

may appear to be water quality control of point source discharges, the watershed management process, once underway would address all water resource issues, including water supply, flooding, and nonpoint source pollution (including air deposition of pollutants), that are identified in the watershed management area. This implementation schedule allows resources for watershed management activities to be targeted to where they are most needed.

A watershed ranking methodology is necessary to identify the most serious water resource concerns at the Province, watershed levels. It will guide the allocation of resources to be used in an efficient and effective manner to address priority concerns on a Province-wide basis. The methodology may also be applied on a watershed level to identify environmental issues and target resources for watershed management activities within a subwatershed or watershed management area. In ranking and prioritizing watershed management areas within each watershed zone, this methodology will help PWMFB and stakeholders evaluate indicators and trends and identify issues, concerns and opportunities within and among watersheds. For instance, watersheds that contain water quality-impaired waterbodies due to point source pollution may be subject to more complex planning and permitting requirements (and require more resources) than other watersheds. The ranking methodology will also help identify watersheds that require more intensive study and analysis so that resources can be allocated more efficiently.

5.3 FRAMEWORK FOR ASSESSMENT AND MANAGEMENT OF A TYPICAL WATER SUPPLY PROGRAM / PROJECT IMPACTS WITHIN A PARTICULAR WATERSHED MANAGEMENT AREA.

The objective of assessment and monitoring of a program/project (e.g. water supply program) impacts to a particular watershed management area is to allow identification of key issues and interactions, provides simple tools for exploratory assessment, and guides the use of more demanding tools that ensures progress towards improved water resource management. The outcomes should be relevant to the needs of decision makers and should improve project design and implementation by supporting the identification and design of mitigation or enhancement measures and other management options for sustainable management of a particular watershed management area.

The approach needs to be holistic in scope and able to take account of the needs and concerns of all stakeholders within a watershed management area. It should be flexible and facilitate the use of an appropriate combination of formal and participatory research methods, drawing on primary and secondary sources of empirical information and synthesizing scientific and local knowledge to establish the main processes of change underlying predicted or observed impacts on water supply programs and rural livelihoods, and any sources of conflict. The flexibility should also facilitate an adaptive or learning response to the information generated at each stage of the assessment, within a structured and sequential process that ensures progress towards improved management of water resource and supply.

The outcomes should be relevant to the needs of decision makers and should improve program/project design and implementation by supporting the identification and design of mitigation or enhancement measures and other management options for sustainable management of water resource and supply. The approach must also facilitate the development of local capacity to manage impacts and provide an information base, analytical tools and for a, with the potential to evaluate trade-offs and determine negotiated solutions to conflicts of interest.

A sample framework for an adaptive, participatory and integrated assessment of a proposed project within a specific watershed can be described based on a structured set of indicators (**Table 5-3**). The indicators are by no means exhaustive and can still further be refined in

consultation with affected stakeholders during workshops and focus group discussions. The sources of information and means of verification of these indicators can be gathered through observation by the study team (i.e. a group tasked to assess a program/project within a watershed management area). Peer review of outputs and adoption of both the approach and its outputs will become more important over time.

It should be noted here that by following this framework on an individual watershed management area approach, relevant stakeholders can exploit the strengths of participatory processes including the incorporation of local knowledge and establishment of local "ownership" of measures agreed for implementation. It also established a consensus on the need to include relevant factors in water use planning and management, and on a range of possible mitigation and enhancement measures.

Adequate representation and participation by all stakeholders in the impact assessment (i.e. social, health, livelihood, settlements, environment) including production costs and benefits would ensure comprehensive coverage of all relevant issues and identification of the most pressing areas of conflicts for negotiation / resolution.

Table 5-3 Framework for Assessment and Monitoring Water Supply Programs Within a Particular Watershed Management Area

Structured Assessment	Indicators	Means of Verification
Impact Local and provincial	Wider uptake and adoption potential of approach;	Peer review; Acceptance and use
Water/watershed management program/project	Improved water supply;	Monitoring and evaluation of implementation
Performance (outputs) Identified research needs	Clear specification to fill critical knowledge gaps;	Peer review; Uptake and resource allocation
Management recommendations	Relevant and feasible; Justify costs of impact assessment;	User acceptance and Adoption; Study team and workshop assessments
Impact-assessment results - environment - socio-cultural - health impact - re/settlements - livelihood impacts	Accurate and comprehensive; Management-oriented; Understandable and usable;	Study team and workshop Assessment; Peer review
Performance (key features) Adaptation and learning	Adaptation to resource Constraints; Response to outcomes and Lessons; Reaction to unanticipated Outcomes;	Study team and workshop assessment
Participatory	Commitment/genuine Involvement; Integral use of local Knowledge; Representation of interest Groups; Communication and conflict Reduction;	Study team and workshop Assessment

Structured Assessment	Indicators	Means of Verification
Holistic and integrated	Inter-sectoral and multi-disciplinary analysis and recommendations; Comprehensive spatial and temporal coverage; Diagnosis of complex causal Pathways; Synergistic and innovative Outcomes;	Study team and workshop assessments; Peer review
Composite assessment	cost-effective use of available data; Ability to resolve critical questions and knowledge gaps;	Study team assessment
Outcome-oriented	Relevance, practicality and wide acceptance of results and proposals;	Study team and workshop assessment; Peer review
Implementation (activities) Workshops	Number, conduct and completion to schedule	Study team observation and assessment
Impact assessment	Coverage and analytical tools/methods	Study team observation and assessment
Secondary data collection	data adequacy, coverage, authority, accuracy, level of disaggregation;	Study team observation and assessment
Primary data collection	data adequacy, coverage, authority, accuracy, level of disaggregation, cost effectiveness of collection	Study team observation and assessment

5.4 PROPOSED LAND USE DESIGN CONSIDERATIONS FOR WATERSHED PROTECTION AND MANAGEMENT INTERVENTIONS AND PROGRAMS FOR THE SIX IDENTIFIED RIVER BASINS

Apart from the province-wide framework for watershed management program planning and development discussed above, some specific watershed management interventions and programs are needed to be implemented within the watershed boundaries affecting the six identified river basins that supplies water for the Bohol Integrated Water Supply System. These are the areas that started from the water take-out point up to the uppermost headwaters of each identified river basin. These will ensure the sustainability and quality of the water supply system.

The following options discussed below are just some of the interventions that can be implemented by LGUs, NGAs and NGOs together.

1. Protection Forest cum Biodiversity Conservation

In highly erodible areas or areas adjacent to stream banks (30 m both sides of the drainage), 30 m from the lakes, at elevations greater than 1000 m, slopes exceeding 50%, and in uninhabited areas, protection forests will be established. These areas will be designated as not suitable for timber harvesting and any activity involving extraction of products will be

strictly prohibited. Suitable reforestation species, preferably indigenous trees will be used. Fruit-bearing trees and other trees serving as habitats or food sources for wildlife will be planted in the area.

This land use will promote both the preservation of the indigenous species and increase the wildlife population. Additionally, this could also be an important contribution to the development of land-based ecotourism projects.

The Local Government Units should take an active role in developing the protection forest and biodiversity conservation areas. Likewise, LGU should encourage the involvement of local population in the protection aspect. Aggressive and innovative IEC programs should be instituted to inculcate to the local populace the importance and impacts of these forests to their daily lives and even as possible source of livelihood for them.

A "Bantay Gubat" or Bantay-Kalikasan project could be spearheaded by the LGU and the Provincial / Community DENR office. Incentives for adequate protection of the forest adjacent to the communities could be given in the form of community-assistance projects.

The indicative cost estimate for implementing such option is usually Php 30,000 / ha. At this rate, the total cost of implementing the protection forest cum biodiversity conservation option in each of the river basin identified is shown in the **Table 5-4** below.

Table 5-4 Cost for Implementing Protection Forest Cum Biodiversity Conservation Program Option

Item	River Basin	Length of river (m)	Area (hectares)	Cost @30T/ha
1	Loboc	462,629.00	2,775.77	83,273,220.00
2	Abatan	166,302.00	997.81	29,934,360.00
3	Manaba	82,902.00	497.41	14,922,360.00
4	Wahig-Inabanga	935,807.00	5,614.84	168,445,260.00
5	Ipil	236,030.00	1,416.18	42,485,400.00
6	Carood	158,496.00	950.98	28,529,280.00
		Total	12,253.00	367,589,880.00

2. Production Forest

The dependence of a significant segment of the local population on forest products extraction specifically timber and materials for novelty items justifies the establishment of a forest-base source of these materials. Appropriate selection of a variety of suitable trees exhibiting fast growth rate and slow-growth but durable and dense wood is essential to address the short-term and long-term wood requirements in the area.

The following areas could be converted to production forests: areas with slopes less than 50%, inadequately-stocked second growth forest with no adverse claims, open areas such as grasslands and brushlands with no adverse claims and accepted by the community as public property, and open areas such as grasslands and brushlands with adverse claims can be designated as communal forests. The extensive coconut groves could be developed under agroforestry system to serve also as production forests. These areas could be made more productive through active and conscious intervention efforts of planting commercially valuable tree species.

The implementation of a community-based forest management (CBFM) could drum-up the much needed community support for the program. The scheme could actively incorporate

people's participation in the development and protection of the watershed, which is very limited at this stage. The "sense of ownership" that the stewardship contract would impart will hopefully cause the people to actively develop and protect the area. The program will also be an important component of the alternative livelihood programs.

Table 5-5 shows the result of intersecting the land classification type and landuse maps of the six identified river basins. Except for the A&D, the area estimates for each land classification type-landuse intersect only include those from the take-out point up to the uppermost headwater.

As shown in **Table 5-5**, the forest land classification type where the landcover type is still forested/shrub/banana would be the most probable area where the establishment of a production forest option could be feasible. The indicative cost estimate for implementing the production forest option is Php 45,000 / ha. At this rate the cost for implementing this option is shown in **Table 5-6**.

Table 5-5 Land Classification-Landuse Maps Intersect of the Six Identified River Basins

Item	River	Forest Land		National Park	A&D	Reservation
		Forested/ shrubs/ banana	Mix Coconut, Grassland, Annual crops			
1	Loboc	4,175.50	6,370.00	5,460.16	48,522.13	None
2	Abatan	383.60	1,339.11	None	23,243.84	None
3	Manaba	345.00	17.50	1,416.59	8,010.16	None
4	Wahig-Inabanga	3,751.54	13,492.60	1,758.56	44,958.14	None
5	Ipil	None	4,000.51	None	22,677.62	None
6	Carood	893.76	2,680.00	None	14,328.79	1,080.68

Source: Extracted from the intersect of Land Classification and Landuse maps of DENR

Table 5-6 Cost for Implementing Production Forest Program Option

Item	River	Forested/ shrubs/ banana	Cost @ 45T/ha
1	Loboc	4,175.50	187,897,500.00
2	Abatan	383.60	17,262,000.00
3	Manaba	345.00	15,525,000.00
4	Wahig-Inabanga	3,751.54	168,819,255.00
5	Ipil	None	
6	Carood	893.76	40,219,245.00
		TOTAL	429,723,000.00

3. Agroforestry

The deliberate incorporation of woody perennials with annuals in the same piece of land is an age-old practice of upland communities in Bohol Province. Coconut is a major crop grown widely in the island. There is some semblance of a multistory structure to a tropical rainforest, which is a paramount example of productivity and efficient ecosystem. These coconut plantations could be improved and made more productive. Selection of more suitable crops and high value crops could enhance the productivity and income of the farmers. Moreover, the practice could protect the area from accelerated soil erosion.

As shown in **Table 5-5**, the forest land classification type where the landcover type is still mix coconut, grassland and annual crops would be the most probable area where the establishment of an agroforestry option could be feasible. The indicative cost estimate for implementing the production forest option is Php50,000 / ha. At this rate the cost for implementing this option is shown in **Table 5-7**.

Table 5-7 Cost for Implementing Production Agroforestry Program Option

Item	River	Mix Coconut, Grassland, Annual crops	Cost @ 50T/ha
1	Loboc	6,370.00	318,500,000.00
2	Abatan	1,339.11	66,955,500.00
3	Manaba	17.50	875,000.00
4	Wahig-Inabanga	13,492.60	674,630,000.00
5	Ipil	4,000.51	200,025,450.00
6	Carood	2,680.00	134,000,000.00
		TOTAL	1,394,985,950.00

4. Ecotourism

The island of Bohol is a famous tourist destination. The study has identified numerous potentials for expanding the current destination spots with vast lands with rolling to hilly slopes could well be developed along the true essence of ecotourism. In its real sense, ecotourism projects should promote environmental conservation, maximum economic benefits to the local people, and respect for people's culture. Currently, rich businessmen mainly manage resorts concentrated in Panglao area, which caters mainly to rich clients. The benefits that the local people get from these establishments are in the form of mediocre employment. This current trend creates a wedge that accentuates the social status difference of the rich and the poor. Development of a community-based ecotourism could alleviate if not totally eradicate this problem. Furthermore, the scheme could provide a better alternative source of livelihood for hundreds or even thousands of local people. Expanding the scope to land-based ecotourism instead of concentrating to purely water and shore activities could also diffuse the potential projects to many people or organizations. The community-based scheme will tap the potential of the local people to develop on their own.

The indicative cost estimate for implementing such option is usually Php 1,000,000 / ha. The probable sites where this option would be implemented will still be subject for identification and further study as to its social, environmental and economic impact.

5.4.1 Monitoring and Evaluation Parameters for the Different Land Use Designs for Watershed Management Planning:

Programs/Projects	Objectives/Goals	Outputs/Impacts	Monitoring and Evaluation indicators	Frequency of Monitoring
Protection Forest	Protection and control of illegal logging	Decreased illegal forest activities	Individuals apprehended	quarterly
	Maintenance and development of protection forest	Promote growth of saplings and poles to mature trees	Board feet / cu.m. of logs / lumber confiscated Area patrolled Area planted (including survival and growth of seedlings) by illegal loggers (amicable settlement scheme)	quarterly
	Check uncontrolled and incompatible land uses	Prevention and control of illegal squatting, kaingin making	Area of kaingin Census of residents	quarterly
	Involvement of communities and LGUs in watershed protection	Develop a community spirit of cooperation and unity in protecting Bohol watersheds	Number of participants in “Bantay Gubat” program	annually
	Institutionalization of watershed protection	Increased participation of LGUs, community in protection of Bohol watersheds against destructive agents	Number of provincial, municipal, barangay ordinances passed or enacted	annually
	Enhancement of manpower skills and competence	More capable and able personnel	Trainings conducted	annually

Programs/Projects	Objectives/Goals	Outputs/Impacts	Monitoring and Evaluation indicators	Frequency of Monitoring
	Prevention and control of pests and diseases	Decreased area damaged by pests and diseases	Area detected with pests and diseases	annually
Production Forest	Better socio-economic conditions of watershed residents	Increased income and better living conditions of watershed residents	Percent increase in income	annually
	Increased forest crop production	Maintained / increased productivity of forests	Growth rate of trees Area of planted trees Area of reforested open lands	annually
Agroforestry	Better socio-economic conditions of watershed residents	Sustainable farming practices	Number of farms practicing agroforestry / types of agroforestry interventions	annually
	Increased forest and agricultural crops		Intercropping of perennial crops in coconut plantations	annually
			Number of farms with boundary plantings of trees	annually
Ecotourism	Promote ecotourism activities that are not pollutive of the rivers and their environment	Environment-friendly tourism activities	Siltation rate	monthly
			biodiversity	Every 2 years
			Volume and quality of garbage generated	monthly

5.5 ROLES AND RESPONSIBILITIES

The province-wide watershed management framework is intended to be collaborative process involving all watershed stakeholders at a variety of levels. Active participation and leadership by all stakeholders is imperative in order to successfully implement the province-wide watershed management framework. The watershed community, including residents, barangay or municipal governments, business and industry, environmental groups, and province and national agencies must all play an active role in driving the watershed management process. Watershed-related activities may be conducted by national, regional, provincial, municipal or barangay agencies, as well as by watershed associations, environmental commissions, or other "grass-roots" organizations.

Local government units (Provincial)

- Develop and implement policy and planning framework for IWM in province
- Provide technical assistance to municipalities and cities for watershed management planning and implementation
- Monitor all watershed management activities and results in province
- Establish, maintain and update a management information system and database
- Assist each municipality and city to establish and maintain a municipal database
- Provide financial incentives for watershed management based on results of monitoring

Local government units (municipality and city)

- Develop capability of staff through training and practice;
- Provide overall facilitation and coordination for planning and implementation;
- Develop a watershed management profile with maps for planning;
- Conduct information, education and communication and training activities for local organizations;
- Develop and adopt a multi-year and strategic integrated watershed management (IWM) plan;
- Support IWM plan implementation through appropriate ordinances;
- Incorporate appropriate watershed management best practices in IWM plan;
- Implement IWM plans through yearly operational plans and budget;
- Maintain a municipal watershed management database to facilitate planning and implementation;
- Support participatory watershed resource assessments for each barrage;
- Provide budget and dedicated personnel for planning and implementation;
- Identify and implement alternative or supplemental livelihood for upland communities
- Support law enforcement units as required
- Contract assistance through consultants and NGOs

- Monitor field activities and selected biophysical and socioeconomic indicators
- Implement revenue generation mechanisms through licenses, fees and taxes
- Network and collaborate with local and international funding institutions for IWM implementation
- Develop a local research program on IWM
- Collaborate with province, other municipalities or cities and national agencies to develop multi-municipal IWM plans as required for special management areas
- Share IWM practices with constituents and other LGU learners

Local government units (Barangay)

- Data gathering and profiling
- Collaborative planning, implementation and monitoring
- Formulation of resolutions on community and resource management and enterprise for submission to municipality

Community stakeholders and people's organizations

- Participate in all IWM planning sessions in all levels of local government (barangay/municipality/city/province)
- Participate in stakeholder management organizations
- Volunteer for watershed management implementation activities (i.e., law enforcement, watershed monitoring and management, etc.)
- Provide local and traditional knowledge and experience in resource management
- Initiate IEC activities in the community

Department of Environment and Natural Resources

- Assist with management of resources and areas under the mandate of DENR (e.g. Community-based forest management, water quality, agroforestry, quarrying and protected areas)
- Provide financial assistance in specific projects of DENR mandate
- Provide technical guidance to local government units in watershed management planning and implementation
- Assist in training of LGUs and community stakeholders
- Identify and implement alternative or supplemental livelihood for communities living within/adjacent to watershed areas
- Provide legal assistance to LGUs and community members/stakeholders for environmental law enforcement

Non-governmental organizations

- Provide assistance at the community and barangay level to organize watershed protection councils and other resource management organizations

- Provide technical services to LGUs for implementing community level interventions
- Provide information and education services at the community and municipal level
- Assist with monitoring biophysical and socioeconomic indicators
- Provide a conduit for financial assistance to LGUs for watershed management

Academic institutions

- Assist to analyze information for watershed management profiles
- Assist to design and implement a monitoring program for biophysical, socioeconomic and legal-institutional indicators in IWM for LGUs
- Assist to integrate existing data and information into IWM plans
- Assist in formulating IWM plans and packaging of project proposals
- Provide assistance in designing and maintaining a management information system and database for watershed management
- Assist to design watershed management projects for multi-municipal management areas
- Assist in training of LGUs and communities
- Assist in designing IEC and community development programs and strategies for LGUs, NGOs and POs

Donors (national and international)

- Provide financial assistance to national and local governments for IWM projects
- Provide financial assistance for building sustainability in IWM through technical assistance in program design, policy planning and implementation, training, education, monitoring and other aspects of watershed management programs
- Assist to coordinate multi-sectoral collaboration and policy support for IWM
- Provide international experience in watershed management policy and implementation

5.6 CHALLENGES AND RECOMMENDATIONS

Conducting a watershed management program usually involves changes in the way an office or organization operates. Organizational managers therefore play a key role in developing and implementing the approach. Anticipating and meeting leadership challenges is thus key to the success of the approach. Some of the key challenges that might be encountered are:

- *Determining who leads and what that entails.* Watershed management as a province-wide program is in itself a design without a legislation or mandate for it. Therefore, clear and committed leadership is necessary for partners to participate and cooperate. Hence, the one who would be assigned to lead should be skilled, not only technically but also in communication to motivate, encourage discussion and keep commitments.

- *Dealing with resistance to change.* Many stakeholders maybe anxious about or resistant to change. Some might fear an inappropriate approach adopted from elsewhere might be used or applied. Others might fear that established lines of authority will be challenged. Yet others might see a province-wide management approach as an unmanageable workload. Deal with these problems immediately to minimize their impact.

- *Overcoming constraints to regulatory and program authority.* A key challenge to the leadership is to initiate integration of management activities and decisions while not appearing to exceed regulatory or programmatic authority. There might be some who feel that their authority or "turf" is being challenged. Choosing a leader / facilitator with strong communication and mediation skills for framework development is important to starting out on the right track.

- *Synthesizing regulatory and non-regulatory programs.* The province-wide framework can bring together program elements that historically have fundamentally different approaches to fulfilling their missions, and this may concern some participants. For example, regulators often fear that stakeholder-negotiated management strategies might compromise their ability to satisfy regulatory requirements. Non-regulatory program stakeholders may feel that their constituency will be alienated by their association with regulatory programs. The challenge to province-wide watershed framework leaders is to negotiate objectives that appease all involved. Leaders can draw from examples from other regional or provincial frameworks where flexibility and negotiation were successfully used to fulfill multiple objectives.

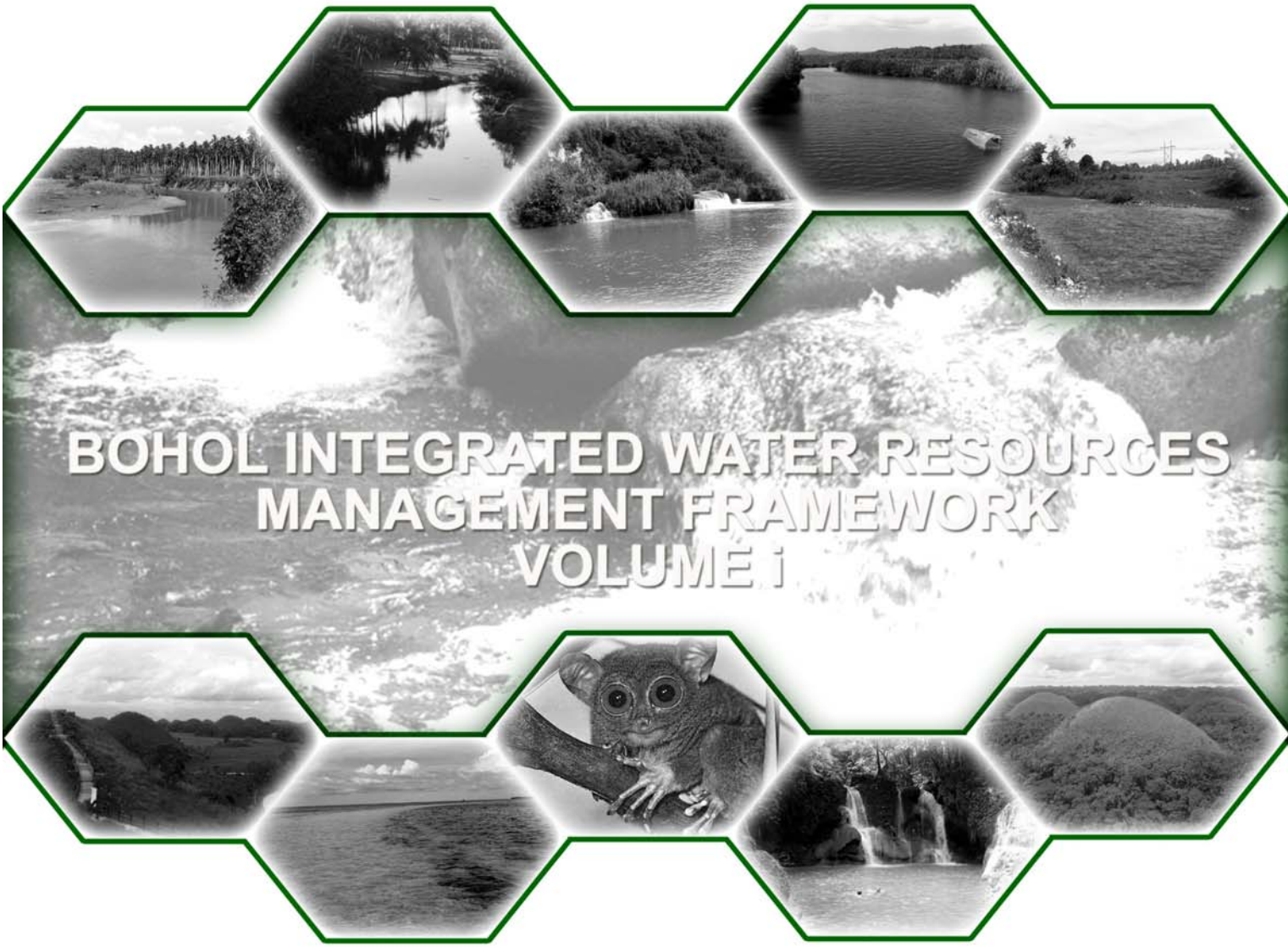
- *Reaching out to potential partners.* Some agencies and organizations outside the "community of partners" might be willing to offer support. Strategic integration of new partners is important to avoid overwhelming or upsetting existing partners. Identify critical areas where integration is needed to achieve objectives, and prepare a unified message that all can use to recruit new partners. Leaders can designate skilled communicators to make initial contact and arrangements with potential new partners.

- *Supporting watershed frameworks despite budgetary constraints.* Some types of assignments -- for example public outreach and coordinating with framework partners -- will inevitably be increased under the province-wide approach. Frequently, hard choices will need to be made to free up resources to support these increases. Streamlining procedures for other activities can help minimize the impacts of budgetary constraints.

- *Streamlining standard operating procedures.* Established planning and operating procedures might need fundamental changes to make it easier or possible to coordinate efforts with partners and ensure compatibility where needed (e.g., data collection and analysis methods). One way to achieve this is to have staff do a self-assessment to identify current areas of work that do not match up well with operating goals and mandates. For example, work associated with a program initiative that is not mandated by law and that is not integral to your mission could be reduced or eliminated. Other procedures may need adjusting to become synchronized with the basin management cycle. In some cases, cross-training among partners may help streamline efforts where more than one entity is involved in the management activity.

- *Changing organizational structure.* If the existing organizational structure(s) form impediments to successful implementation of the watershed management framework, maybe it's time for some reorganization that both satisfies organizational responsibilities and supports the framework. Leaders should consider how their organization matches with the need to participate in framework operational forums, such as province-wide steering committees or basin teams.

- *Developing a transition plan.* Adapting established operations to support the watershed framework cannot happen overnight, but rather must be gradually integrated into each organization. Having a mutually developed organizational plan will encourage buy-in and smooth transition to the new approach. Key components of a transition plan include a strategy for outreach and training in the new approach, a schedule for phasing in new activities, and a budget plan for funding administration of the framework to "keep the ball rolling."



CHAPTER 6
CAPACITY DEVELOPMENT FRAMEWORK

CHAPTER 6 – CAPACITY DEVELOPMENT FRAMEWORK

6.1 INTRODUCTION

The impetus that drives the effort for the establishment of an integrated water supply system for the Province of Bohol is the recognition that economic growth would not proceed as expeditiously as it ought to because of the current water supply challenges. But finding a solution to the water supply problem is only half of the challenge. A far greater, if not equally significant, challenge is to provide a solution that will seriously consider the conservation of its natural environment, which is determined to drive the economic growth.

Millennium Development Goal

Goal 7: **Ensure environmental sustainability**

Target 10: **Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation.**

The Master Plan for the Integrated Water Supply System for the Province is focused on developing, exploiting and managing surface water as the source of the water through the Integrated Water Resource Management approach: a process with credible scientific basis and economic viability worldwide. The introduction of IWRM however poses a challenge to the people of the Province considering the rather complex technology and rigorous demand. Hence, a capacity development program is a considered requirement to ensure contrived success.

6.1.1 Sustainable Development (SD)

In the report of the World Commission on Environment and Development (WCED) entitled "Our Common Future", sustainable development had been described as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". As a concept, it emphasizes the notion of balance: between human needs and the environment's ability to meet these needs; between the needs of the present and future generations; and, between the affluent and the poor. It should be noted that SD does not aim to curtail economic growth, or impede social development; on the contrary, it defines development broadly as "improving the quality of human life within the carrying capacity of supporting eco-systems" (WCS Caring for the Earth). SD views development not merely in terms of economic development, which for years had dominated development agenda in disregard to the source of and avowed goal of economic activities: the environment and humanity, but rather on a holistic perspective of sustaining ecological and social balance.

The Philippines, as a signatory to the Agenda 21 launched during the World Summit on Sustainable Development (WSSD), crafted the Philippine Agenda 21. In the said document, the State "envisions a better quality of life for all through the development of a just, moral, creative, spiritual, economically vibrant, caring, diverse yet cohesive society characterized by appropriate productivity, participatory and democratic processes, and living in harmony within the limits of the carrying capacity of nature and the integrity of creation." In it, the government adhered to several principles notable of which are the following[1]:

- ✓ Primacy of developing full human potential;

[1] Philippine Agenda 21 (PA21)

- ✓ Holistic science and appropriate technology;
- ✓ Nurturing the inherent strengths of local and indigenous knowledge, practices and beliefs while respecting the cultural diversity, moral norms and spiritual essence of Filipino society;
- ✓ Self-determination;
- ✓ National sovereignty;
- ✓ Gender sensitivity;
- ✓ Securing the right of all to a peaceful and secure existence;
- ✓ Ensuring social cohesion and harmony through equitable distribution of resources and providing the various sectors of society with equal access to development opportunities and benefits today and in the future;
- ✓ Ensuring the participation and empowerment of all sectors of society in development decision-making and processes and to operationalize inter-sectoral and multi-sectoral consensus;
- ✓ Viability of institutional structures that are built around the spirit of solidarity, convergence and partnership between and among different stakeholders;
- ✓ Viable, sound and broad-based economic development;
- ✓ Sustainable population which take cognizance of the limited carrying capacity of nature and the interweaving forces of population, culture, resources, environment and development;
- ✓ Recognizing nature as our common heritage and thus respecting the limited carrying capacity and integrity of nature;
- ✓ Bio-geographical Equity and Community-based Resource Management;
- ✓ Global cooperation

In giving flesh and bones to the concept, and ensuring it does not become just a mere wish-list; several operational parameters and strategies are defined: economic; political; cultural; science and technology; ecological; social; and, institutional. Within the context of the Bohol Integrated Water Supply System, the ecological strategy is within the ambit of natural resource management.

6.1.2 Natural Resource Management (NRM)

Conservation of the environment and protecting ecological balance is the onus of natural resource management. Drawing from the experiences drawn since the beginning of the movement towards environmental protection, NRM has evolved from the misunderstood concept of limiting growth to growth with limits. Hence, the operative term for the current times is on “management”: managing for sustainable growth and development.

Nearly all environment-related and ecological endeavors are NRM activities. So wide is its coverage that there are numerous approaches and strategies, depending on the specific environmental concern at stake. For water-related resources, the leading approach accepted and adopted internationally is the integrated water resource management. Notwithstanding, there is a common thread that weaves all these approaches in terms of operational necessities.

6.1.3 Integrated Water Resource Management (IWRM)

The necessity to manage our water resources has given rise to the idea of “Integrated Water Resources Management,” or IWRM. IWRM is a process that promotes the coordinated

development and management of water, land and related resources in river basins in order to maximize the economic benefits and social welfare in a sustainable and equitable manner. It seeks to reconcile the demand for water resources with the limitations of what those water resources can accommodate. A body of water can only withstand so much extraction and pollution by competing user groups with ever-growing needs (such as factories versus agriculture, or upstream communities versus downstream communities).

Today, IWRM is recognized by many countries around the world as a model—the paradigm—for establishing good water governance and putting our water resources on the recovery path. The operative word in IWRM is "integrated." This, in essence, is translated into integrating all possible uses of water, integrating interests of all possible users, and balancing these two interests in a mutually inclusive interdependencies.

The greatest strength of IWRM is the holistic framework that its principles provide:

- ✓ Efficient water use
- ✓ Equitable access
- ✓ Balance between competing uses
- ✓ Use of appropriate environmentally sound technology
- ✓ Collaboration between various government agencies and representatives of all stakeholder groups

6.1.4 Capacity Development for Local Water Industry

IWRM adheres on the belief that ownership at the local level is important for contrived success. It is a proven fact the world over that development programs and projects are only sustainable if owned and operated at an appropriately local level. Experience throughout the world indicates that where local people are not responsible for local services, sustainability of development is not achievable. The passage of the Local Government Code of 1991 empowered local government units (LGU's) to manage local water systems. In this sense, a pre-condition for IWRM had been complied.

Attracting, developing and sustaining local water industry skills and expertise is a challenging requirement even for a prime province as Bohol. For one, investments in water infrastructure is substantial, is usually driven by narrow sectoral interests that do not lead to efficient water use, and thus pose a huge challenge to local governance. Water is not only a social, economic and environmental resource; it is becoming a political instrument. Planning, designing, operating and managing water facilities need to reflect the integration of water with other natural and socio-economic systems. This requires capacity and cooperation among the various stakeholders: government (at the provincial, city/municipal and barangay level), the private sector (business and civil society organizations) and communities.

Moreover, cognizant that an integrated approach to water takes time, and recognizing further that the demands of industrial, agricultural, environmental and household groups need to be reconciled, the management situation can be truly contentious and complex. Further, from a development perspective, experience suggests that access for the poor must be an explicit aim if they are to benefit from reforms.

Be that as it may, local capacity maybe considered as relatively remaining in an embryonic stage at present, particularly in rural areas. Ensuring the proper functioning of government, particularly at local level, and the efficient delivery of services, the abilities and skills of local people need to be developed.

6.2 CAPACITY DEVELOPMENT: CONTEXT, CONTENT, COST

Throughout the document, capacity development is used rather than capacity building although both may have some similarity. Facts abound that the people who constitute the "micro-level" are not without a set of knowledge and skills; a presumption that led to the necessity of "building up" capacities; as if there was none to begin with. It is the contention of this report that "being rural, being poor, or even being illiterate" does not necessarily mean absence of capacities.

Capacity development on the other hand, underscore the need to "develop" capacities where the word develop connotes "deliberate, purposive planned change" from one level of capacity to the next higher or broader or deeper understanding. Essentially, capacity development maybe be described as a transformative process that begins from the results of formal learning and/or reflective insights progressing towards the acquisition of new knowledge and skills to resolve future concerns.

To illustrate, in the realm of human knowledge, any one individual, or even groups of

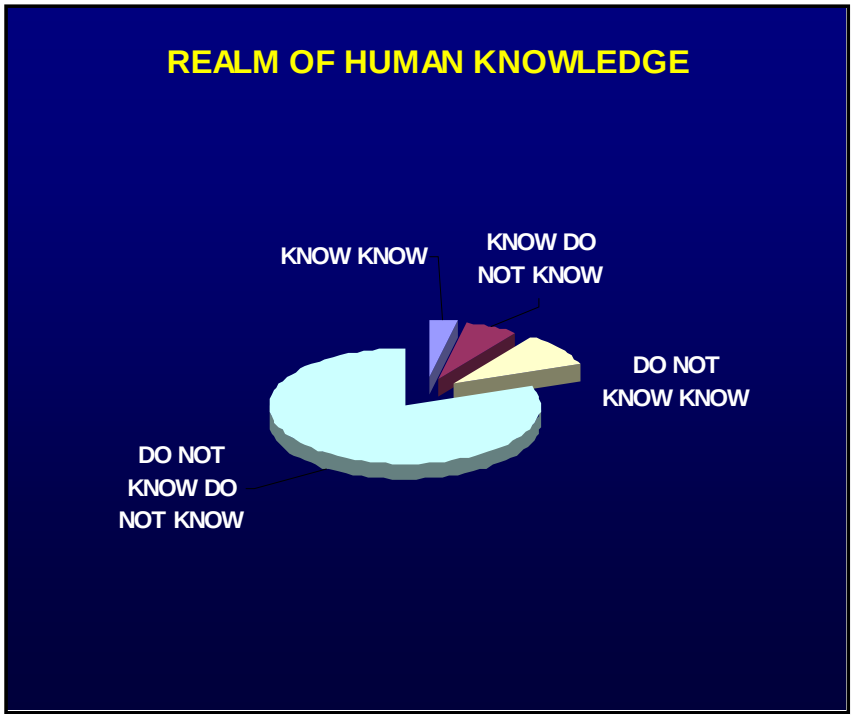


Figure 6-1 Realm of Human Knowledge

individuals have possession of only so much knowledge (We Know that We Know): we are aware of the things we know. Then, there is a higher chunk of knowledge that we are consciously aware to be beyond our current possession (We Know that We Do Not Know) but would probably work hard to possess. And there are knowledge that are stocked up in our knowledge system even if we are unaware of it (We Not Know that We Know), either consciously (which we sometimes discover through events we call dejavu, for instance) or subconsciously (as when we forget it for a long time). But the greatest challenge to all human is that area in the realm which we have totally no awareness of (We Do Not Know that We Do Not Know) knowledge of at present (but which does not negate its existence).

In this realm of knowledge, absence of capacity, in terms of knowledge, awareness and skills (KAS) is impossible. However, a transformation process of scaling up this KAS goes on continuously and allows us to cope and resolve problems, issues and concerns of our daily living.

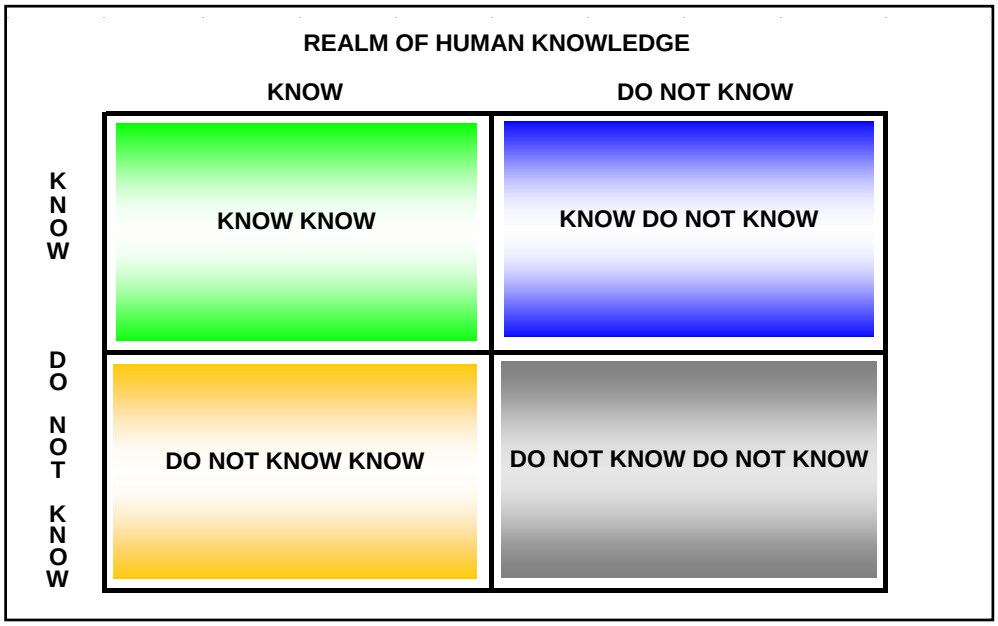


Figure 6-2A Relationship in the Realm of Human Knowledge

To illustrate further, **Figure 6-2A** illustrates the relationship in the Realm of Human Knowledge. The 1st Quadrant (top-left) is the Quadrant of "We Know that We Know", the Area of Present Reality. The 2nd Quadrant (top-right) is the Quadrant of "We Know that We Do Not Know", the Area of Potentials. The 3rd Quadrant (bottom-left) is the Quadrant of "We Do Not Know that We Know", the Area of Discoveries. And the 4th Quadrant (bottom-right) is the Quadrant of "We Do Not Know that We Do Not Know", the Area of Possibilities. The four quadrant represents the areas of growth of human capacity, a sort of capacity development map.

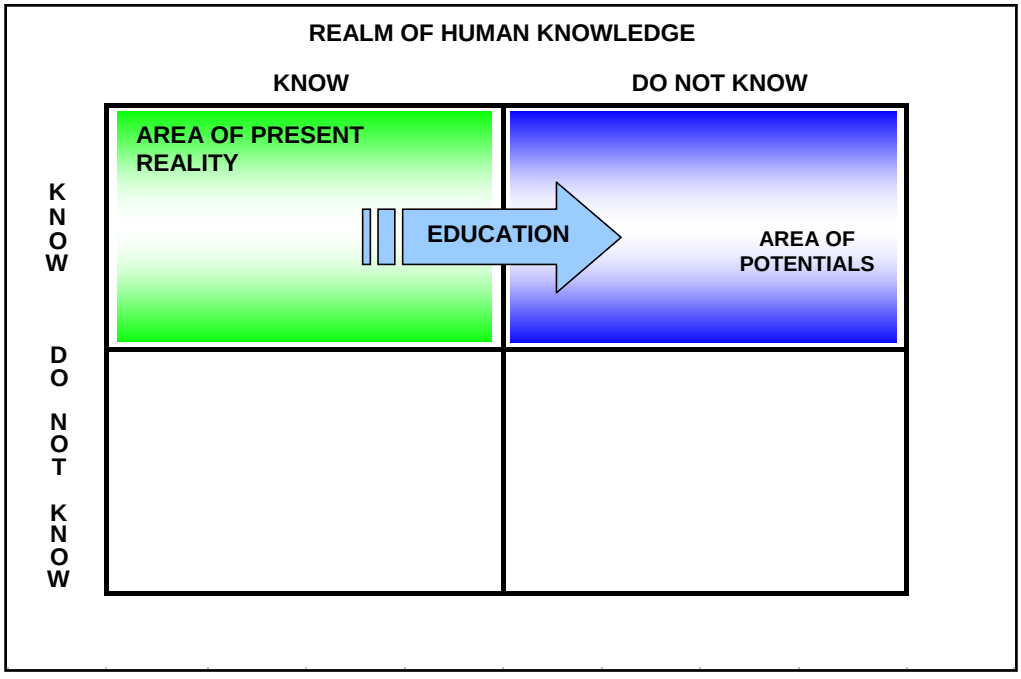


Figure 6-2B Relationship in the Realm of Human Knowledge

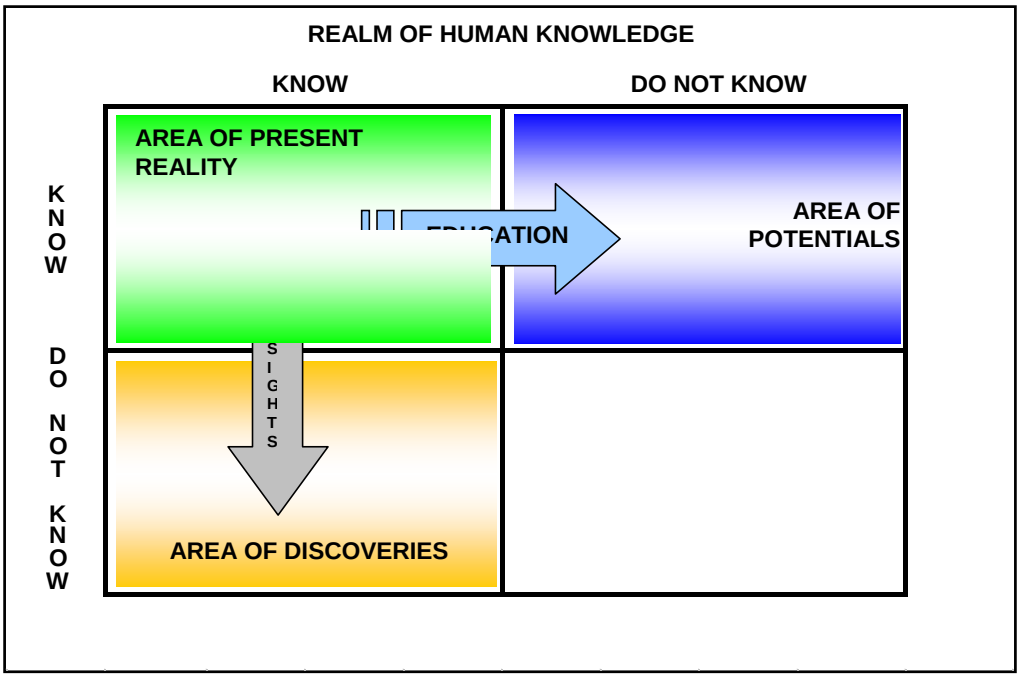


Figure 6-2C Relationship in the Realm of Human Knowledge

Through life, we aspire to "know" those body of knowledge that will capacitate us through formal and informal education because we consider this to be our key to unlocking the area of potential for our life and work. We also reflect on our experiences, and the experiences of others. Depending on the effort we expend, we meditate on our actions, on our thoughts, on our feelings and discover new knowledge that we assimilate and use in our living.

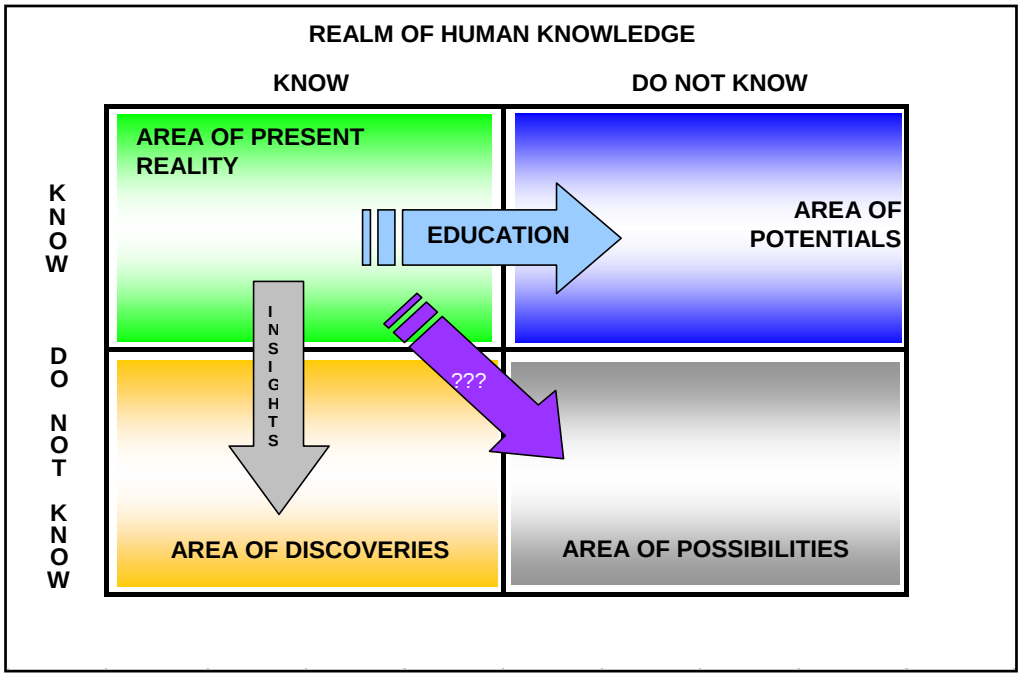


Figure 6-2D Relationship in the Realm of Human Knowledge

But seeking knowledge and capacitating ourselves so we can be more competent, in living and working, we normally focus our attention on the 1st, 2nd and 3rd Quadrant, understandably perhaps those alone takes up so much of our time and efforts. However, "we cannot become what we need to be by remaining what we are"[2], focusing only on the known realm and afraid to venture into the unknown, the unknown where lies the area of possibilities and future realities. Capacity for developing, implementing, managing, maintaining and operating an integrated local water system maybe an unknown area for now: but that is about to change because that is what needs to be changed.

From this conceptual model of learning and acquiring knowledge, skills and ability, we thus define capacity development. And hence, throughout this report, capacity development is used to describe such a learning-change process.

6.2.1 Context

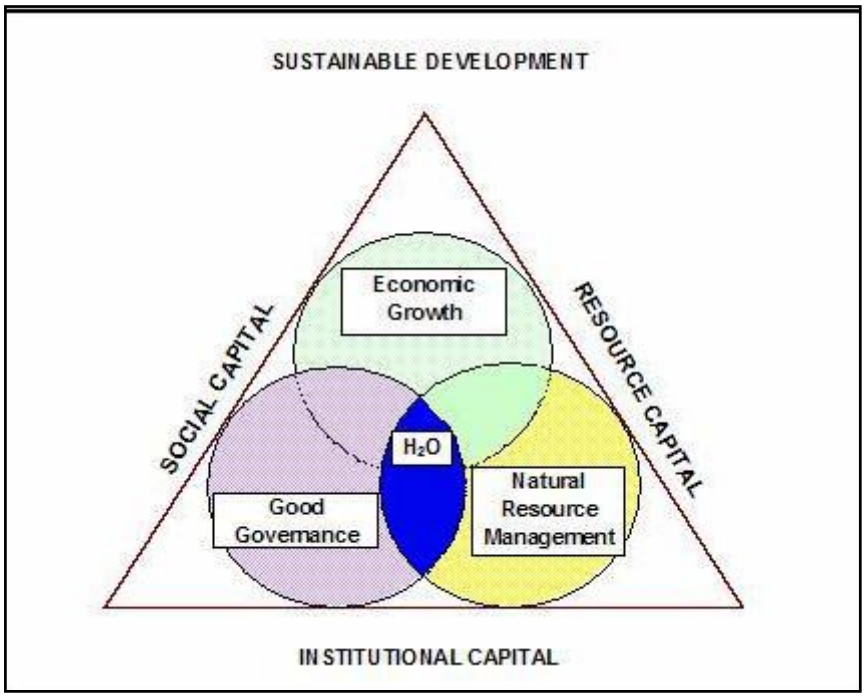


Figure 6-3 Synthesis of the Development Path Taken by the Province of Bohol

We have laboriously described the conceptual model for the learning-knowledge-change process that capacity development must proceed from. We need as well to equally belabor the context for which the change process must operate in. While it may be an interesting venture to seek out and acquire huge body of knowledge, acquiring it for that sake alone is utterly unproductive and wasteful. Knowledge not put into action is simply information stored in a memory bin.

Earlier, we have discussed that the onus of the study is to establish the viability of establishing an integrated water supply system for the province of Bohol. And the chosen approach by which such a water system, considering the parameters of environmental sustainability and economic growth, would be the IWRM. Further, it has been expounded that IWRM as a process that promotes coordinated development and management of natural resources (i.e. water, land and related resources) require the active participation of all stakeholders (government, business, civil society, user-consumer). And cognizant that

[2] "The 17 Indisputable Laws of Teamwork", Dr. J. Maxwell

IWRM as a process is predicated on the concept of Sustainable Development, the context for developing capacity for a local water system is therefore supportive of the twin aim of SD and IWRM.

Hence, the figure above illustrates the synthesis of the development path taken by the province. The synthesis was arrived at after a review and assessment of all the programs, projects and services, plans and policy directions undertaken since the conception of the Bohol Integrated Area Development Plan (BIADP) in the late 1980's.

Digressing awhile, allow us to explain the heuristic diagram. First, the triangular figure denotes a kind of stability (with two legs connected to a horizontal base) and an "arrowed-directed" focus pointing to the top. The circles are the people who are the primary beneficiary of the activities within the circle, which happens to be the three major developmental considerations: economic growth (EG), natural resource management (NRM) and good governance (GOV). The three sides that make up the triangle represent the relationships and assets that "connects" to maintain the stability of the triangle.

By deduction, the intersection of the circles EG and NRM represents the formation of resource capital (RC) which can be man-made (money, technology) and/or natural. The intersection of the circles NRM and GOV represents the formation of institutional capital (the organizational norms, competency and culture, and knowledge-base within the context of SD and IWRM). The intersection of GOV and EG represents the formation of social capital (the social relationship that welds society towards a common development purpose). The convergence of the three intersecting circles, with a label H_2O stands for water: its source, supply, quality and quantity, and cost.

In essence, it can be argued that the seminal capacity to fully implement the IWRM process is already present and a more thorough capacity assessment need only to establish the gap that must be bridged and strengthened. Again, it must be emphasized that capacity development is not merely the building of local skills and abilities. It is a transformative process whereby an individual, an institution, a community, or even society equips itself with abilities to undertake necessary functions, solve problems and set and undertake objectives in a sustainable fashion[3].

6.2.2 Content

As earlier propounded, the primal objective of capacity development is to initiate a continuing process of learning that can be used to perform activities towards the resolution of problems. For the purpose, the stated problem at hand is "*attracting, developing and sustaining local water industry skills and expertise to develop, implement, manage, maintain and operate the integrated system* (Bohol Integrated Water Supply System). Further, capacity development efforts will not be targeting private water service providers and will concentrate instead on the other actors in the playing field: government (provincial, city/municipal, barangay), civil society, and the community. Local water utilities manned and operated by the government is included among the target of the capacity development efforts.

By content analysis, the phrase "attracting, developing and sustaining local water industry skills and expertise" means a procedure for inviting the participation of interested water service providers, experts, technicians and other stakeholders. Further, the phrase "to develop, implement, manage, maintain and operate..." means the expected roles and functions that the invitees will be performing. In essence therefore, the locus of capacity development is on structural areas (engineering, technical, technological) and non-structural areas (governance, organization management & administration, human resource

[3] Capacity Building for water supply and sanitation development at local level: The Threshold Concept.
A paper delivered at the 2nd UNDP Symposium on Water Sector Capacity Building. Delft, Netherlands

development & management, marketing, legislative and legal, fiscal and financial management, investment portfolio management and information management).

From this dichotomy of the type of capacity development, it is possible that a Generic Capacity Development Program[4] could be developed especially for those areas that can be considered as "non-structural support systems" e.g. human resource management, fiscal administration, etc., while Specialized Capacity Development Programs could be developed for those areas considered as "mission-critical" e.g. on structural areas, engineering design; and on non-structural areas, information management.

We mentioned about mission-critical activities and support systems: identification of what falls under which category must be inferred from the vision-mission-mandate (VMM) and development goals of the organization where capacity development will be carried out. Capacitating individuals for its own sake and not in relation to that individuals' organic and functional role to the organization is a disservice to the organization. Building organizational competency, or institutional capacity or societal capability, is the over-arching aim for capacitating individuals. Hence, the VMM should be cascaded down to the level of the individual in an exclusive mutuality of purpose and benefits.

At this juncture, only the general capacity development program areas could be established considering that the specific details of the actual implementation will rely heavily and exclusively on the result of a turn-key activity: determining the critical success factor and the competency that will ensure the attainment of these factors consequent to the clarification of the Key Result Areas, which in turn is linked to the VMM. Noteworthy is the description of what constitute "competency", and the description should somehow be measurable. Use of Key Performance Indicator, with specific output/outcome unit of measure, is a recommended tool. This turn-key activity will open the stage for the initial conceptualization and subsequent development of a capacity development program process.

Gender equality

Gender equality is integral to growth, governance and stability.

Gender equality extends beyond improving female health and education. It includes access to economic resources, participation and leadership in decision making, the human rights of women and efforts to eliminate discrimination against women. Achieving gender equality requires a focus on both men's and women's roles.

Gender equality must continue to be a major consideration to all aspects of strategic capacity development framework.

6.2.3 Cost

Capacity development (CD) programs are usually add-on packages to projects or are after-thought activities appended to project designs. This has led to so much opportunity loss as well as not being maximized to prevent project failures, short-comings or over-runs (in time-lines and resources). Often, only the input cost of CD programs are considered while the output-outcome profits are hard to quantify. Consider this: if a certain activity is done by a person lacking in ability within a certain period of time and that person is paid in a certain amount; and then another person, capacitated to do the same activity and does it in reduced time, then it would perhaps be easier to quantify the profits generated by capacitating individuals, institutions and the community. A good comparative performance indicator system would be useful.

[4] Other examples are: Strategic Management; Governance and Organizational Management

6.3 CAPACITY DEVELOPMENT PROCESS

"Greater understanding is needed of the dynamics and processes of capacity development and greater rigor is needed in the planning, design and implementation of capacity development activities. Most CD is carried out on a project-by-project basis (as discussed above). There is seldom a planning process, which involves a whole area and which address CD and training on a long-term, programmatic basis. Because there is so much uncertainty and confusion relating to the function of CD, it is largely ad hoc and unlikely to be successful in the long-run in most instances."[5]

6.3.1 Identify Stakeholders and Agents

Capacity development, as discussed and elaborated on in section 3.2.2, will focus on those individuals, institutions and communities that will have specific roles in attracting , developing and sustaining local water industry skills and expertise. It will also be the same individuals, institutions and communities who will ensure that the local water industry skills and industry thus attracted, developed and sustained will in turn develop, implement, manage, maintain and operate the integrated system within the context of IWRM and consistent with development vision of the province and each city/munipality as articulated during the Bohol Integrated Area Development (BIAD) Workshop conducted last November and December 2006, and during the Development Agenda-Setting and Planning Workshop last July 2007.

For clarity, stakeholders as used in this report refer to the (1) provincial government of Bohol (PGB), its officials and employees including all its instrumentalities; (2) 1 city and 47 municipal government, its officials and employees including all its instrumentalities (which include the barangay level officials and committees); (3) local waterworks and utilities, its administrators and personnel; (4) local watershed/river basin organizations, its officers and members; (5) irrigators, farmers and plantation owners: (6) indigenous people organization, its officers and members; (7) consumer groups, its officers and members; (8) private business especially in the tourism and eco-tourism and related sector; and (9) civil society organizations.

Agents, as used in this report refer to government officials and staff directly involved in the CD program and process. The PGB, being the prime mover and driver of the integrated water supply system, should also champion the CD initiatives with assistance from all other stakeholders and development partners. Hence, the PGB is both a stakeholder and an agent for the CD program.

6.3.2 Assess Capacity Assets and Needs

Identifying, profiling and understanding the interest of the various stakeholders would provide input on the various level and type of CD programs/projects and interventions that must be provided.

A supply-driven CD program has been proven through experience to be a poor strategy because these programs, which are normally template programs, are usually out-of-touch from the reality at the local level, as well as having due disregard to existing local level experiential knowledge base. Even from the national or sub-national level, CD programs may not "connect" to the specific CD needs and requirements at the sub-regional level. This results into an accumulation of a wealth of data and information that does not contribute to the growth of the local knowledge because these data and information are usually stocked into the work desks or filing cabinets of the participants.

A demand-driven CD program is proven to be the most effective and cost-efficient and provides the participants with a sense of ownership and a commitment for follow-through

[5] Ibid.

action. The essence of learning is the ability to, having acquired the necessary and appropriate data and information, process information into do-able and applicable knowledge.

To ensure that the CD program is indeed demand-driven, initial capacity assessment must be undertaken which aims to determine capacity assets, needs and gaps. In sum, the stakeholders and the agents must know and understand their individual and institutional strengths, weakness, opportunities and threats. Without the ability to assess their own individual and organization's strengths and weaknesses, the stakeholders and the agents cannot be proactive in developing their own capacity and competency.

To illustrate further, consider the diagram below[6].

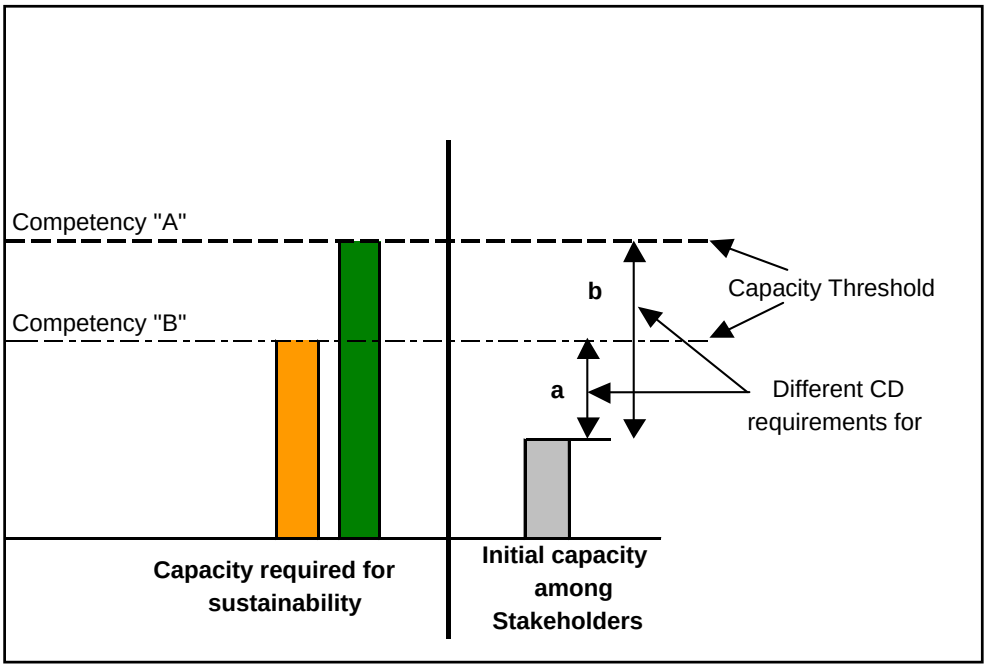


Figure 6-4 The Threshold Concept

In a known competency area, say Competency "A" and Competency "B", the capacity requirement to ensure sustainable performance is represented by the vertical box colored "green" and "orange", respectively. The capacity threshold for Competency "A" and for Competency "B" is the horizontal line passing tangentially on the top of the boxes. On the right-hand side, the result of the initial capacity assessment indicated a certain level of capacity that is way below the threshold requirement. The CD program need therefore is to bring the capacity to the level of the threshold and the CD design should respond to the known need by ensuring that the gaps are minimized or eliminated altogether. The same diagram may be used to track the improvement in capacity.

It should be emphasized that the identification of individual stakeholder's capacity building needs should emerge directly from the stakeholders themselves to ensure that CD and training initiatives are truly demand-driven. Further, it should be noted that every individual, every institution, every community has varying degrees of needs and requirements, as well as varying areas for capacitation.

[6] Adopted freely from the work of Len Abrams in a paper entitled "The Threshold Concept" which he delivered at the 2nd UNDP Symposium on Water Sector Capacity Building.

6.3.3 Implementation

At the moment, there is an existing partnership agreement between the provincial government of Bohol and the Philippine-Australia Human Resource Development Facility (PAHRDF) which may have been facilitated as a complementary and parallel activity of the Local Governance Development Programme of the AusAID. Under the agreement which begun sometime 2004, there are Long-Term Training (LTT) and Short-Term Courses (STC) being availed of by the province, although the beneficiaries included participants from the municipal government and the academe.

The herein capacity development framework is not meant to supplant the existing capacity building program; it aims only to lay down a foundational framework for the capacity development in relation to the integrated water supply system. Moreover, the CD framework discussed in this report should be considered and viewed as an adjunct to the current CD program since CD in areas such as governance, financial management, etc. should be dovetailed and linked to the on-going CD program. The mission-critical training activities may require adoption of the LTT.

6.3.4 Monitoring and Evaluation

Measuring the impact of each training activity ensures continuing improvement in the planning, design and implementation. To ensure that absorption of learnings had taken place, not only are the participants expected to prepare re-entry action plans or re-echo activities, or not only should these plans and activities be implemented and monitored; the competency of each participants (individual, institutions and communities) should be tracked. In this particular instance, the “Threshold Concept” could be used as well.

6.4 FRAMEWORK FOR CAPACITY DEVELOPMENT

Developing organizational capacities, or institutional capital, is the “practice of changing organizations and its people for positive growth. It refers to the nature of changes and/or progression in the policies, processes and systems, practices, structure, teams and units, and more importantly, the management and staff. It is aimed at increasing the level of performance and effectiveness of human organizations through strategically planned interventions.”[7] It improves the capability of organizations and institutions to perform its mandate, act on its mission, attain its vision and deliver on its products and services.

Capacity development does not only concerns the acquisition of KAS but the capability to use this KAS within the requirement of his/her organization and society. As discussed redundantly in this report, capacity development is for individuals, institutions, and society.

[7] Institutional Development Framework, DSWD 2005

In summary therefore, the linkages and "connects" of capacity development is captured in the diagram below.

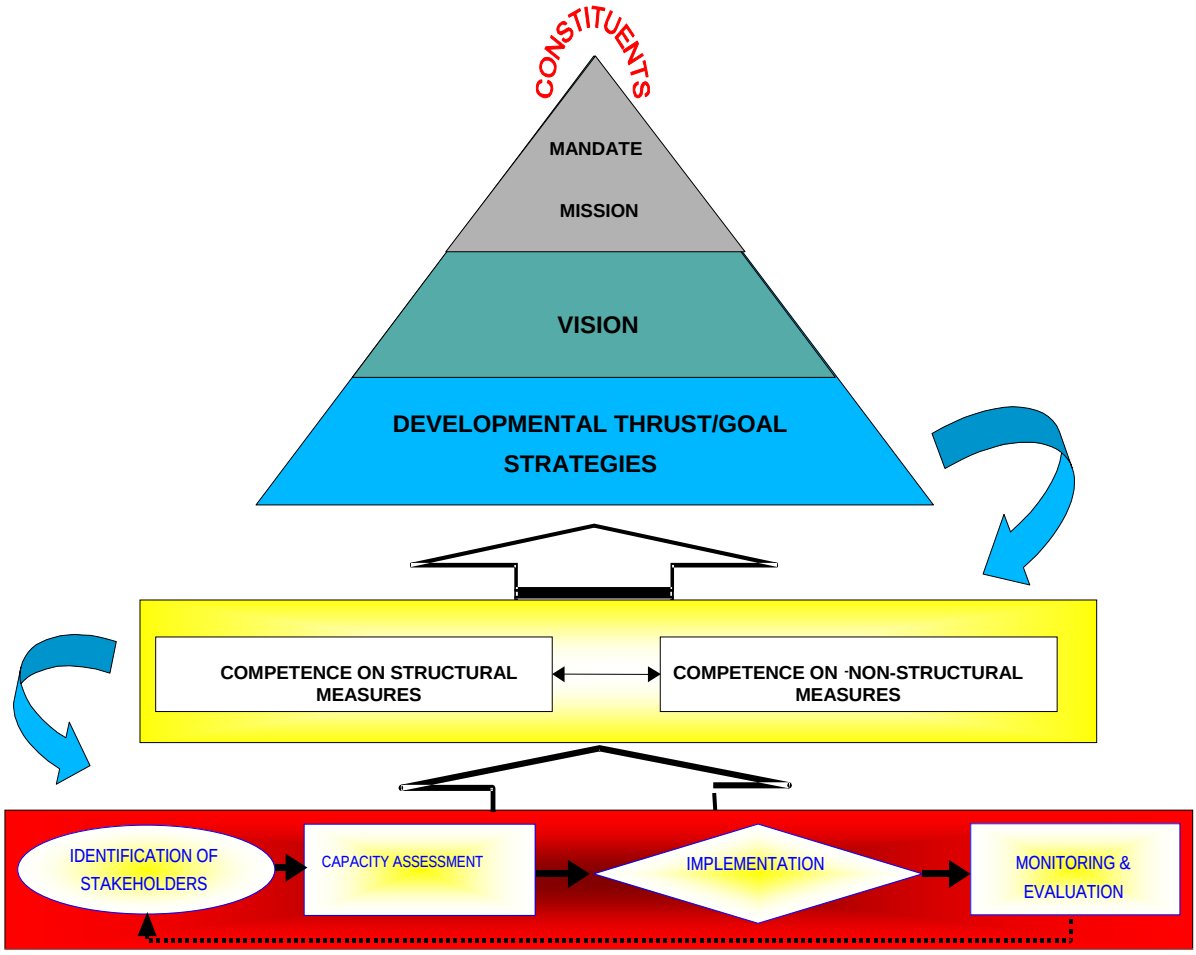


Figure 6-5 Capacity Building Framework

The capacity building framework assumes that effective use and effective management will lead to empowerment. Take note that capacity development must:

- Be focused on the strategic vision and mission of the organization;
- Be responsive to identified needs of the organization;
- Promote gender and social equity,
- Aim to institutionalize learning for performance enhancement;
- Be community-oriented and promote participation;
- Promote continuous organizational learning; and
- Be of a demonstrably high quality.

6.5 MOTIVATION AS FODDER TO SUSTAINABLE CAPACITY DEVELOPMENT

"Capacity does not automatically translate into improved performance and better development results."[8]

It may be folly to think that a highly competent individual will always deliver peak performance and the best results possible; but an incompetent individual will never be expected to deliver quality results. A locomotive, on its own, will not be in motion even if it's the best designed ever unless there is fuel and there is a driver to direct it. Capacity development is one side of the coin in the tranformative process of learning: motivation is on the other side which fuels the drive to transform knowledge into action and to continuously and persistently develop capacities and competencies.
Motivation is the intrinsic initiating force, the persistent behavior to continually improve and develop. It is in an individual, in an organization, and in the societal level at various intensity and direction. It is driven by a belief system, a committed desire to achieve something. Competency with commitment drives economy, performs good governance, and allows the achievement of great works.

Incentives are extrinsic measures designed and established to influence and modify behaviors of individuals, organizations and society. It reinforces motivation and can add more fuel to it. It is normally provided by organizations and by society to individuals and to institutions. A good incentive system is one which does not dilute moral values and does violate social norms and legal systems, but strengthens social capital, and institutional capital.

Most capacity development activities start off with so much flair and energy only to fizzle out in mid-stream, or die out by the end of the program. The participants disperses, each with acquired individual knowledge, improved awareness, and skills (KAS). Without a good incentives system, this individual may cast out and transfer to other institutions, in what we normally term as "brain drain".

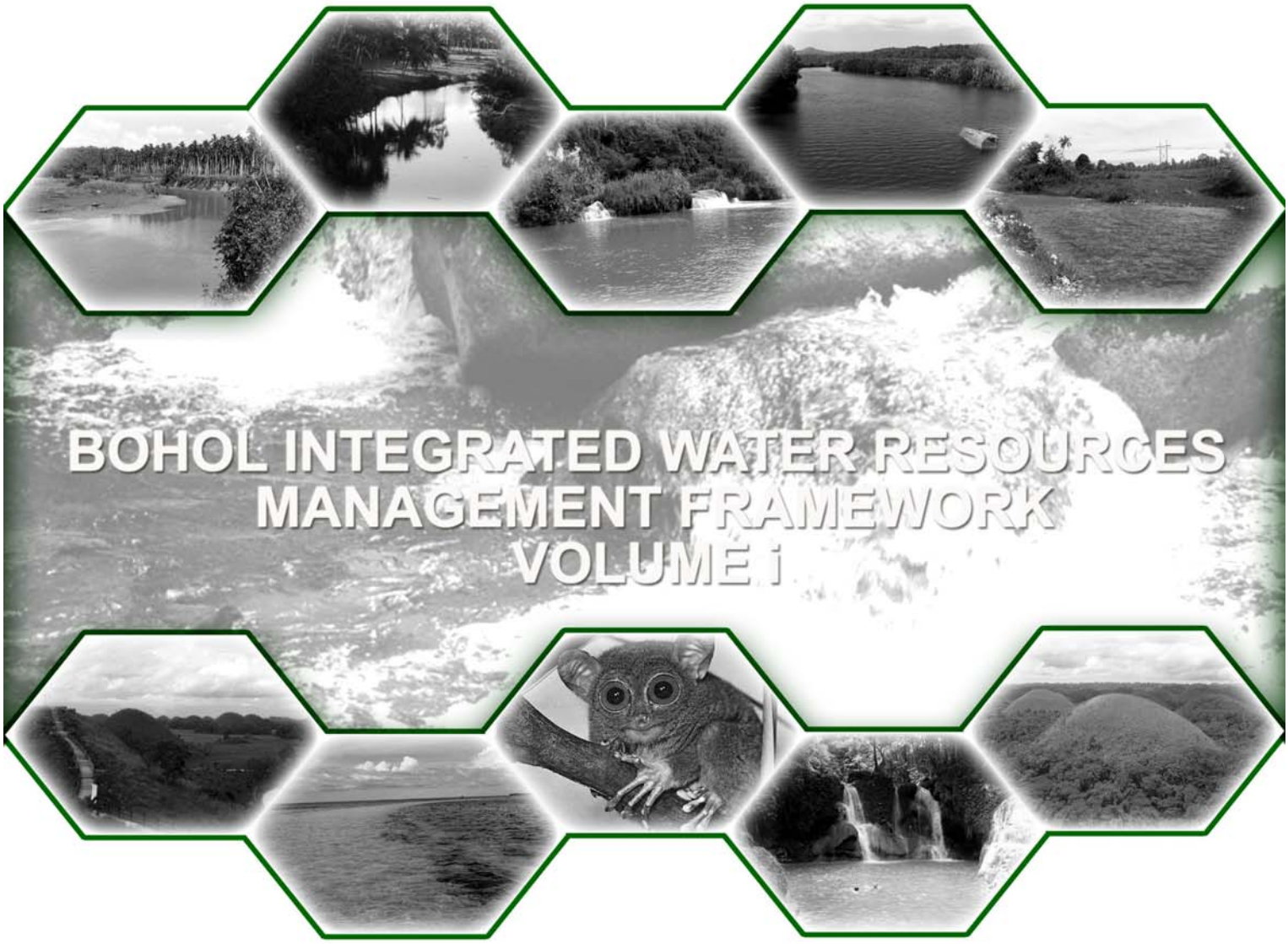
A worthy CD program should hence be designed with modules on motivation, and supported by a good incentives system. In this manner, the continuum of building institutional competence, hence capital, is assured while human capital is fully strengthened.

6.6 CONCLUSION

The concept of a rational framework for capacity development and training set out in this report needs to be widely discussed among a variety of people in order to ensure that it is developed into a useful tool. How to use the concept in practice will need to be developed in detail and then applied in the field. The development of such a methodology should also not be done in isolation from the work of other government instrumentalities, private business, water user groups, and civil society.

With a framework to enable the proper designing and planning of capacity development and training, it is very possible to identify the resources necessary to carry out the work.

[8] Incentive Systems: Incentives, Motivation, and Development Performance. UNDP Bureau for Development Policy-Capacity Development Group. November 2006



CHAPTER 7
MAINSTREAMING GENDER AND DEVELOPMENT

CHAPTER 7 – MAINSTREAMING GENDER AND DEVELOPMENT (GAD)

7.1 GENDER AND DEVELOPMENT ASPECT IMPLEMENTATION

While the Project's goal is to protect Bohol's water resources without compromising the needs of the economy, community and environment, the integration's sustainability will only be complete if the intended women and men users of the water supply will be looked upon as not just a homogenous group but as distinct groups with differing needs and behavior who therefore might require different approaches. Since women and poor men and women are in the lowest end of power spectrum, they often end up without access to scarce supplies. For the past decades, researches and experience have shown that when there is gender balance, where both men and women are involved in consultation processes and in the management and implementation of water related services, there is efficient, effective and equitable management of water resources. This means that before decisions are taken, an analysis of the effects on men and women will already have been made.

Experience have also demonstrated that gender sensitivity and equality perspective need to be integrated into the mainstream for gender practice to become routine in all aspects, not only on a policy or program level, so that it becomes a normal feature of mainstream thinking.

7.1.1 Purpose

The Master Plan wants to ensure that the proposed interventions of the Bohol Integrated Water Supply Master Plan will respond to reduction of gaps on political, social and economic opportunities for women and men, and to the need for a long term structural change for gender sensitivity in water resources management of Bohol.

7.1.2 Objectives

1. To situate GAD initiatives of Bohol stakeholders in water resource management to serve as working context of gender mainstreaming in the Province.
2. To conduct gender analysis of technical interventions proposed by the respective component Specialists of the Master Plan formulation.
3. To identify strategies, factoring in Bohol's GAD initiatives, to ensure gender becomes part of the main consciousness of water resource management stakeholders.

7.1.3 Methodology

In this light, the Plan envisions that it can identify the consequences of its proposed interventions on different groups of women and men as a matter of course. In mainstreaming gender, the Plan will facilitate that gender sensitive practices are ensured to become routine in all aspects of the interventions' implementation and that responsibility of water resources management is lodged not only in the specialists, but also in management and operations.

To achieve its purpose, the Gender and Development Component of the Master Plan undertook data gathering to set the context, to identify the gaps and to identify gender context of the proposed interventions.

An interview tool was developed to serve as guide in culling information. It became clear early on that the LGUs' efforts were focused on the GAD Plan and budgeting while the NGOs, who are more into gender mainstreaming activities, had differing categories of GAD entry points. It became imperative then for the data gathering to be limited to the GAD entry points.

The respondents were of two levels, LGU and civil society consisting of NGOs, POs, Church and academe, which have been or are conducting water resource management initiatives and interventions in Bohol. All 47 municipalities and one city of Bohol Province, with the exception of three LGUs (CPGarcia, Dauis and Lila), due to time constraint, were visited. The Offices visited were of the MPDC, Budget, Social Welfare and Development, and the Sangguniang Bayan/Panlalawigan. Courtesy call was done when the Mayor was in.

7.1.4 Implementation Strategy

The GAD Component will carry out its study by measuring two things: one, the existing structures of GAD in the Province which will provide the context for GAD strategies to be proposed, surfacing insights into success factors, and two, the gender mainstreaming opportunities which the proposed interventions of the Master Plan will offer.

The GAD focal person or counterpart from the Province for BHL -01, Engr. Cecilia Añora who is the Head of the Agricultural Engineering Section of the Provincial Agriculturist Office, expressed willingness to learn. On her own initiative, she immersed herself in reading about gender and GAD, assisted in retrieving information from Offices which were near her office location, and facilitated introduction to concerned officers. Updating of the progress of the GAD component activities between the Specialist and Provincial GAD counterpart was done regularly.

7.1.5 Implementation Activities

The information necessary to illustrate the gender and development context of Bohol Province were gathered in the following manner:

1. A Desk Review which looked into the gender implications of laws, policy and institutional framework pertinent to water resource use on the national, local and international levels.
2. Phase One looked into the various initiatives undertaken by various water stakeholders to situate the gender and development context of Bohol's water resource development. These interventions were in the form of programs and projects, loose coalitions, consortiums, and organizations, on gender related activities, including those initiatives in the protection of Bohol's coastal resources. Secondary data of these interventions, in terms of reports, news articles, publications, success stories and proceedings, formed the bulk of information source. Interviews were also conducted with the stakeholders to supplement the data on hand. **Appendix I.7-A,** (*Volume III-Databook***)** illustrates the data gathering schedule.
3. The Second Phase will be a gender analysis of possible interventions by reason of the Master Plan. It will measure women's empowerment, staffing distribution, preferences by men and women on financing options, community participation mechanism, capacity building mechanisms, if budgeting allows room for women's organizations, if relevant indicators at all M&E levels are sex-disaggregated, and that gender responsive features are embedded in project design mechanisms for compliance of implementing entity.

   The analysis will likewise cover how the proposed interventions will affect:

   a. Political and legal aspects of GAD. Will it address women's political participation so that they are given equal chances at decision making as the men? Will it ensure non-violence against women? Are the women assured of education on legal aspects of the proposed intervention?

   b. Socio-economic aspect of GAD. This will deal with how the policies affect the women workforce, how the interventions can influence public image of women, or how they can affect effective parenting, child care, marital care, and housework. Will the policies allow crisis intervention mechanism?

c. Economic aspect of GAD. Will the proposed intervention develop into a gender-sensitive industry or sector? Will the intervention ensure gender sensitive employment planning? Will the jobs generated provide equal opportunities to both men and women in terms of training and growth?

Once these data have been organized and analyzed vis-à-vis the Working Paper, the GAD component's Mainstreaming Gender Strategies will then be spelled out in a Draft Report.

7.2 WHY GENDER AND DEVELOPMENT MAINSTREAMING

Discussion of development can never be complete if gender issues are not dealt with. There is no intention to marginalize men, only surfacing of the fact that women have not been given as much opportunities as men. This will lead to understanding of how women can be provided avenues to empower themselves and to take active part in the development process.

7.2.1 Issues of Women Affecting Development [1]

Following are major women issues affecting Filipino households which need to be addressed to respond to the current trends of family dynamics.

Marginalization. Development concerns that are primarily associated with women's functions such as maternal and child care, nutrition, are considered less important.

Subordination. Assignation of women to second status vis-à-vis men, at home, work, in public sphere has resulted to women having less access to and control over development resources and benefits, e.g. standards for men are used to measure what is acceptable, father is automatic head of the family.

Discrimination. This refers to any practice, policy or procedure that denies women equal treatment and status simply because they are female.

Multiple Burden. Aside from their fulltime jobs, farm or work, women are still held responsible for seeing to it that there is food on the table, taking care of or seeing to the care of the children and maintaining cleanliness and order in the house.

Gender Stereotyping. A tendency to hold fixed, unquestioned and unexamined beliefs and perceptions about women and men and to assign them roles based on such beliefs.

Violence. These are violence against person perpetrated on women simply because they are women, e.g. sexual harassment, battering, trafficking, psychological, verbal and economic abuse, pornography, rape, incest, sexual assault.

7.2.2 Gender and Integrated Water Resources Management (IWRM)

Integrated Water Resource Management is defined as a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems (GWP, 2000).[2]

[1] Moving Forward with GAD. A Handbook on Gender and Development for the Sanggunian Committee on Women and Family. DILG, NCRFW, WIN and UNCF. pp. 13-15.

[2] The Global Water Partnership is a working partnership among all those involved in water management: government agencies, public institutions, private companies, professional organizations, multilateral development agencies and others committed to the Dublin-Rio principles. Today, this comprehensive partnership actively identifies critical knowledge needs at global, regional and national levels, helps design programs for meeting these needs, and serves as a mechanism for alliance building and information exchange on integrated water resources management. The mission of the Global Water Partnership is to *"support countries in the sustainable management of their water resources."*

Integrated that it is, it includes mainstreaming gender into the development process.

The term “gender mainstreaming” came into widespread use with the adoption of the Beijing Platform for Action (PfA) at the 1995 4th UN International Conference on Women. It represents an attempt by gender advocates to build on the successes of the past and address some of the challenges. It attempts to combine the strengths of the efficiency and empowerment approaches within the context of mainstream development. Mainstreaming gender equality is a commitment to ensure that women’s as well as men’s concerns and experiences are integral to the design, implementation, monitoring and evaluation of *all* legislation, policies and programs so that women and men benefit equally and inequality is not perpetuated. The ultimate goal is to achieve gender equality.[3]

In its Gender and Water Thematic Overview Paper, IRC listed some facts on the plight of poor women in relation to poor men:[4]

- 1.3 billion people are poor and 70 percent of them are women. They constitute a huge, but undervalued, potential to contribute to sustainable development.
- Billion people are consuming unsafe water, and most of them are poor women and children.
- 3.4 million people, mostly children, die annually from water-related diseases. Millions more, primarily women and children, suffer debilitation from water-borne diseases.
- The cost of water and sanitation-related morbidity and mortality is high. Both can be greatly lowered by improved water supply and sanitation and the promotion of better hygiene. Women have prime responsibility for family health.
- In most countries, women work approximately twice the unpaid time men do. Their high contribution to the family's livelihood is not matched by an equal access to water and land.
- Millions of women in the world spend 1-6 hours a day fetching water. As a result they have less time for domestic and productive work, education and rest.
- Women are the world’s principal food producers and providers and are assuming an increasing role in agriculture, and thus, water management.
- Sub-Saharan Africa is home to 50 million out-of-school children, 27 million of them girls. South Asia has 43 million out-of-school children, including 26 million girls. In more than 45 countries, fewer than 1 in 4 girls are enrolled in secondary school. Better education is directly related to better family welfare including hygiene and health.
- The majority of the world’s illiterate adults are women. Literacy is linked to better family welfare and health.

Facts such as these gain support for Gender and Development Mainstreaming in the water sector. The integrated approach to water resources management started in 1992 when the participants to the International Conference on Water and Environment in Dublin, Ireland in 1992 came up with guiding principles on water which they urged the leaders of governments

[3] Abstracted from: Gender Manual: A Practical Guide for Development Policy Makers and Practitioners. Gender Mainstreaming in Integrated Water Resources Management Training of Trainers’ Package.

www.nileiwrm.org/.../B1%20Module%201-Gender%20and%20Integrated%20Water%20Resources%20Management.doc.

[4] IRC International Water and Sanitation Centre facilitates the sharing, promotion and use of knowledge so that governments, professionals and organizations can better support poor men, women and children in developing countries to obtain water and sanitation services they will use and maintain. It does this by improving the information and knowledge base of the sector and by strengthening sector resource centers in the South.

to study and put to action. The principles are:[5]

1. Fresh water is a finite and limited resource, essential to sustain life, development and environment;
2. Water development and management should be based on a participatory approach, involving users, planners, and policy makers at all levels;
3. Women play a central part in the provision, management and safeguarding of water.
4. Water is an economic good.

Other Commitments by Governments and development agencies were inked in support of the use of a gender perspective in all programs and projects, including those related to water and the environment:[6]

- Principle 20 of the *Rio Declaration* (1992) states, "Women have a vital role in environmental management and development. Their full participation is therefore essential to achieve sustainable development." *Agenda 21* (1992) contains a chapter on women and sustainable development (Chapter 24) and a chapter on water management (Chapter 18).
- The *Beijing Platform for Action* (1995) highlighted environmental issues as one critical area of concern - "gender inequalities in the management and safeguarding of natural resources and in the safeguarding of the environment." Three strategic objectives were agreed: (1) To involve women actively in environmental decision making at all levels; (2) To integrate gender concerns and perspectives in policies and programmes for sustainable development; and (3) To strengthen or establish mechanisms to assess the impact of development and environmental policies on women.
- The Johannesburg Plan of Implementation of the 2002 World Summit on Sustainable Development (WSSD), para 25(a), includes agreement by governments to: *"support capacity building for water and sanitation infrastructure and services development, ensuring that such infrastructure and services meet the needs of the poor and are gender-sensitive."*
- In December 2003, the General Assembly proclaimed (resolution 58/217), the period 2005 to 2015 as the International Decade for Action, 'Water for Life', and called for a focus on the implementation of water-related programmes and projects, "whilst striving to ensure women's participation and involvement in water-related development efforts …"
- The Millennium Development Goals, which have the same time frame as the 'Water for Life' Decade, include 2015 targets on gender equality and empowerment of women, as well as on safe water and sanitation.

7.2.3 GAD Mainstreaming Defined

The National Commission on the Role of Filipino Women (NCRFW) defines Gender and Development Mainstreaming as the "main strategy for ensuring that the government pursues gender equality in all aspects of the development process to achieve the vision of a **gender-responsive society where young women and men equally contribute to and benefit from development.** It therefore consists of a set of processes and strategies aimed at recognizing and addressing gender issues in legislation, policies, programs and projects and institutional mechanisms of the government on a sustained basis. Gender concerns will be

[5] Dublin Statement on Water and Sustainable Development. *http://inpim.org/file/Documents/DublinStatmt.pdf*
[6] Gender and IWRM Resource Guide*. http://www.genderandwater.org/redir/content/download/4545/37857/file/Gender_and_IWRM_Resource_Guide_complete_200610.pdf*

institutionalized in the mainstream development processes and agenda and not just in the peripheral programs and projects of the government."[7]

NCRFW lists four possible entry points in gender mainstreaming, namely: people, policy, enabling mechanisms and programs and projects.

7.2.4 Legal Framework

The 1987 Philippine Constitution provides that the State recognize the role of women in nation-building and shall ensure the fundamental equality before the law of women and men (Article II, Section 14). To pursue this, the Philippine government created a body to oversee in making the government gender-responsive, became signatory to international covenants and enacted relevant laws.

It mandated the National Commission on the Role of Filipino Women, created in January 1975 by Presidential Decree No. 633, to review, evaluate and recommend measures, including priorities, to ensure the full integration of women for economic, social and cultural development at national, regional and international levels and to ensure further equality between men and women. For a decade until 1985, NCRFW organized women in the localities and implemented women specific projects. In 1986, it shifted to addressing the unequal gender relations of women and men in the economic, social and political spheres of development. With the Gender and Development (GAD) perspective, the NCRFW thus made it its mission to "*make government work for women's empowerment and gender equality*" in order to achieve its vision of "*women and men equally contributing to and benefiting from development*." [8]

The Philippine Government also signed international covenants like the UN-CEDAW[9] or the United Nations Convention on the Elimination of All Forms of Discrimination Against Women, the 1985 Nairobi Forward-Looking Strategies for the Advancement of Women,[10] and the 1995 Beijing Platform for Action.[11]

The Philippine Legislature enacted laws which identified the responsibilities of public officials to empower the disadvantaged sectors and communities: The Local Government Code of 1991, R.A.7160, and the Women in Development and Nation-Building Act or R.A.7192.

In both Houses of Congress, their respective Committee on Women was created in accordance with their Rules of Procedures. Women sector representation was established with the passage in 1995 of R.A.7941 (Section 5) also known as the Party-List System Act.

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[7] National Commission on the Role of Filipino Women. *http://www.ncrfw.gov.ph*

[8] Ibid. GAD Planning and Budgeting: Adding Value to Governance. GAD Budget Policy Compliance Report 2001-2002

[9] The CEDAW is a human rights treaty for women adopted in 1979 by the UN General Assembly on December 19, 1979. It defines what constitutes discrimination against women and sets up an agenda for national action to end such discrimination. Countries that have ratified or acceded to the Convention are legally bound to put its provisions into practice, submit national reports, at least every four years, on what has been accomplished in compliance of their treaty obligations CEDAW is one of the most highly ratified international human rights conventions, having the support of 185 States parties, thus it can stand as a treaty that has achieved a global consensus and thus reflects the normative standards applicable to women's human rights. *http://www.ncrfw.gov.ph.; http://www.iwraw-ap.org/convention.htm*

[10] These are a set of strategies adopted by the World Conference to review and appraise the achievements of the UN Decade for women: Equality, Development and Peace, held in Nairobi, Kenya, 15-26 July 1985. *http://domino.un.org/UNISPAL.NSF/*

3822b5e39951876a85256b6e0058a478/7b02825848cc2afa85256dcd007534d2!OpenDocument

[11] The 1995 Beijing Platform for Action is a broad-based agenda for promoting and protecting women's human rights worldwide, which establishes the principle of shared power and responsibility between women and men in all arenas. The Platform was adopted by 197 governments at the United Nations Fourth World Conference on Women in Beijing, China. It addresses 12 Critical Areas of Concern: Women and Poverty, Education and Training of Women, Women and Health, Violence Against Women, Women and Armed Conflict, Women and the Economy, Women in Power and Decision-Making, Institutional Mechanisms for the Advancement of Women, Human Rights of Women, Women and the Media, Women and the Environment, The Girl Child. The Beijing Platform for Action. *http://www.genderhealth.org/pubs/Beijing_factsheet.pdf*

With R.A.7160, government serves the people while at the same time providing space for people participation in the development of their locality. Through this Code, women and family issues can be addressed with the creation of the Women and Family Committee within the local government councils of the provincial, municipal and barangay levels.

R.A.7192 provides for the adoption of gender and development approach as a development strategy so that gender concerns can now be integrated into the government's development agenda.

Then, the formulation of the Philippine Plan for Gender Responsive Development, 1995-2025 (or PPGD) which was adopted by EO 273. This is the government's thirty-year blueprint of policies, programs, projects and strategies, wherein women are both major participants and beneficiaries in national development.

The General Appropriations Act in 1995 (GAA) included a provision on gender-responsive projects. Section 27 directed government agencies to set aside an amount from their 1995 appropriations for projects that address gender issues. Referred to as the GAD Budget Policy, this has been retained every year in the GAA.

Similarly, the National Budget Call for fiscal year 1996 (*National Budget Memorandum No. 67*) (and again for 1997) identified women in development/gender and development as a priority concern of the administration towards which government agencies should direct their financial resources.[12]

Moreover, the Philippine government had issued other laws and similar enabling instruments to mainstream Gender and Development. The NCRFW categorized them into seven items: Employment/Economic, Marriage/Family, Political, Health, Education, Criminal and Girl Child. (**Table 7-1**)

Table 7-1 Identified Laws and Enabling Issuances on Gender and Development

Category	Commonwealth Act	Act	Republic Act	Presidential Decree	Executive Order	Proclamation	Department Order	Administrative Order	Department Circular	Memorandum Order	Memorandum Circular	Joint Circular	Resolution	Total
Employment/Economic	1		17	5										
Marriage/Family	1	1	2	1	1	1								
Political	1		4											
Health			9		1			1	1					
Education			5											
Criminal			9					1			1		1	
Girl Child/Child			4			2	1							
General Purpose			8	1	8					1		1		
OFW					1	1								
Rural Women						1								
Total	**3**	**1**	**58**	**7**	**11**	**5**	**1**	**2**	**1**	**1**	**1**	**1**	**1**	**93**

Source: NCRFW. www.ncrfw.gov.ph/insidepages/inforesource/inforesource.htm

[12] International Labor Organization. *http://www.ilo.org/public/english/employment/gems/eeo/law/philip/gaa.htm*

7.2.5 Enabling Mechanisms

NCRFW and NEDA published in 1993 the "Guidelines for Developing and Implementing Gender-Responsive Programs and Projects." NCRFW set into developing a critical mass of gender advocates equipped with necessary skills on gender analysis, planning, project development, implementation, monitoring and evaluation. Then in 2002, the tandem again published "Mainstreaming Gender in Development Planning: Framework and Guidelines" which provided strategies for integrating gender concerns in the different sectoral chapters of the Medium-Term Philippine Development Plan and with the sectoral plans of the different agencies.

In 2004, they produced the Harmonized Gender and Development Guidelines for Project Development, Implementation, Monitoring and Evaluation to provide NEDA, ODA donors, Philippine government agencies, and development practitioners with a common set of analytical concepts and tools to integrate gender concerns into development programs and projects; and to help achieve gender equality in and empower women through projects and programs.[13]

In support to the government's effort in responding to the global call for gender equality in all areas of social and economic development, the Department of Interior and Local Government established a project called GENDER and DEVELOPMENT MAINSTREAMING at the LOCAL LEVEL.[14] Its overall goal is to mainstream and institutionalize Gender and Development at the local level ensuring that it is integrated and incorporated in their planning and budgeting processes, putting into operation the provision of R.A.7192 that recognizes the role of women in nation building and promotes the fundamental equality before the law of women and men.

As oversight agency on GAD Mainstreaming by the Local Government Units (LGUs), it aims to institutionalize the integration of gender perspectives in the overall operations of the LGU and advocate women empowerment and equitable participation in decision-making and development efforts at the local level.

The project involves a series of capability building activities for both the DILG and LGU GAD Focal Points to identify ways of integrating gender concerns in every phase of local planning and budgeting, activities which will provide data for Policy Formulation.

Table 7-2 Indicators of GAD Mainstreaming by LGUs

Objectively Verifiable Indicators	Performance Indicators
Number of LGU with GAD Plan integrated into AIPs/:LDIP and addressing GAD issues in the locality.	Total number of local development policies
Number of local Councils of Women Organized	Number of workshop/training/seminar and general assemblies conducted by regional coordinators for LGUs
Number of LGUs with GAD Focal Point	Number of LGUs that includes 5% GAD Budget in their PPAs
Number of LGUs with GAD Code	Number of monitored DILG Regional GAD trainors action plan implemented
	Number of established LGU-GAD and LCW databank
	Number of Technical Assistance rendered to Regional GAD Trainors in their advocacy on the implementation of the planning and budgeting for LGUs nationwide

Source: Knowledge Management Center Bureau of Local Government Development DILG

[13] Harmonized GAD Guidelines. pp.1-2.
http://www.neda.gov.ph/references/Guidelines/HarmonizedGADGuidelines_13Jan05_Reducedsize.pdf.
[14] Gender and Development Mainstreaming at the Local Level. *http://www.dilg.gov.ph/blgd/gad.htm*

These indicators made the LGUs take serious efforts at coming up with GAD Codes and Plans.

To aid the agency in its Monitoring and Evaluation Reports, DILG came up with objectively verifiable indicators and performance indicators to measure LGUs GAD mainstreaming compliance as shown in **Table 7-2.**

7.3 GENDER AND DEVELOPMENT IN BOHOL

7.3.1 GAD Entry Point: Policy

Policy refers to official statements and pronouncements of support for gender mainstreaming issued by the agency, in the form of memoranda, executive orders or specific guidelines. This is a recognition and acceptance o gender mainstreaming as a critical and legitimate concern.[15]

7.3.1.1 Women and the Provincial Government

The Provincial Government of Bohol has enshrined the protection and promotion of women and their rights in Article III of its Ordinance No. C-001 otherwise known as the Administrative Code of the Province of Bohol, enacted in 1997. In said Article, it recognizes that women shall be partners in all fields of development initiatives and processes.[16] As such, it encourages women to actively participate in public governance and gives due recognition to their efforts in promoting social, cultural, economic and political programs designed to uplift the quality of life of people.[17] The Administrative Code further provides for the implementation of a comprehensive nutrition and safe motherhood and women health program,[18] the establishment of a Women's Desk in the Office of the Provincial Social Welfare and Development to provide assistance to women seeking protection and justice through investigation of and referral to appropriate agencies the complaints by women victims and monitoring the status of cases filed on such complaints.[19]

To enable the implementation of the protection and promotion of women and their rights, the Province of Bohol Province provides in said Ordinance for the creation of a Bohol Provincial Women's Council, functions of which are:[20]

a. Integrate all women's concern from all sectors and recommend for the implementation of programs, projects and activities on participation of women in development;
b. Coordinate with any government agency in the province and with national organizations and desks on women to carry out its assigned mission;
c. Encourage women to actively participate in public governance;
d. Give due recognition to women's efforts in promoting social, cultural, economic and political programs designed to uplift the quality of life of people;
e. Intensively campaign through all medium of information the desired role of women and family in the developmental efforts of government in partnership with women's groups.

[15] NCRFW. *http://www.ncrfw.gov.ph*
[16] Section 185. Article III. Provincial Ordinance No. C-001. Administrative Code of the Province of Bohol.
[17] Ibid. Section 190.
[18] Ibid. Section 187.
[19] Ibid. Section 188.
[20] Ibid. Sections 185 and 186.

This provision of the Ordinance was put into effect[21] five years after; when in July 2002 Executive Order No. 16 was issued creating the Bohol Council for Women (BCW) with the following functions:

a. Institute the gender responsiveness of provincial development plans and coordinate the preparation, assessment and updating of the Provincial Plan for Women;

b. Undertake continuing advocacy to promote women economic, social and political empowerment and provide technical assistance in the setting-up and strengthening of mechanisms on gender mainstreaming; and

c. Ensure that the gains achieved by Filipino women due to Philippine culture and tradition shall be preserved and enhanced in the process of modernization.

Related ordinances on promoting and protecting women's rights and welfare have also been passed in several Municipalities. **Table 7-3** shows the LGUs which have passed such ordinances. These ordinances are of three kinds: establishment of mechanisms for mainstreaming GAD, enforcement of National Laws, and celebration of Women. The ordinances on mechanisms are Health Programs, creation of Focal Points, Women's Desk, Crisis Centers, Birthing Home, Local Council for Women, HIV/AIDS Council and Children's Code; enforcement of Anti-Prostitution, RA 9208 or the Anti-Trafficking in Persons Act, RA 9262 or the Anti-Violence Against Women and Their Children Act of 2004 popularly known as the VAWC Law; and celebration of Women's Day. Those LGUs with enacted GAD Codes, i.e. Tagbilaran City, Municipalities of Batuan, Jagna and Tubigon, have already incorporated these ordinances into their respective GAD Code.

Table 7-3 GAD Enabling Ordinances Enacted by LGUs of Bohol Province by BIAD as of 2007

Political District	BIAD	LGUs	GAD Code	Health Program	Focal Point	Creation of Local Council for Women	Establishment of Birthing Home	Creation of Crisis Centers	HIV/AIDS Council	Enforce 9208	Anti-Prostitution	Enforce RA 9262	Domestic Violence	Children's Code	Women's Desk	Women's Day
		Bohol Province		✓		✓									✓	
I	1	**Antequera**			✓											
I	1	**Corella**			✓					✓	✓					
I	1	**Maribojoc**			✓	✓										
I	1	**Sikatuna**													✓	✓
I	1	**Tagbilaran City**	✓					✓	✓							
I	2	**Loon**						✓								
I	2	**Tubigon**	✓						✓							
II	3	**Talibon**							✓	✓		✓				
III	4	**Duero**	✓													
III	4	**Guindulman**								✓	✓					
III	4	**Jagna**	✓		✓					✓			✓	✓		
III	4	**Valencia**	✓													
III	5	**Batuan**	✓	✓			✓							✓		

Source: Secretaries to the SB/SP, Province of Bohol

7.3.1.2 GAD Code

Five municipalities and the lone city in Bohol have already enacted their GAD Code, namely, Jagna, Batuan, Tubigon, Duero, Valencia and Tagbilaran City. As shown in **Table 7-4** all of them are generally comprehensive in ensuring the protection of women's rights in the economic, political and social aspects. Water or the right to easy access to safe water supply is provided for in all of these existing GAD Codes under Socio-Economic benefits for women. This is the only provision relative to water.

[21] Telephone query with the Provincial Legal Office. Mr. Deil Navea, Legal Assistant. September 28, 2007.

Table 7-4 GAD Codes Contents

COMMON PROVISIONS OF THE GAD CODES City of Tagbilaran and the Municipalities of Tubigon, Batuan, Jagna, Duero, Valencia: Bohol Province
Basic Principles
Title and Purpose
Declaration of Policy
Definition of Terms
Development Concerns
Gender and Development
Political and Public Spheres of Women
Special Sector
Support Mechanism to empower women and promote respect for women rights
Support to Women Survivors
Violence Against Women
Rights of Women
Cultural Identity
Education
Health
Labor and Employment
Of Rural Women
Religion
Socio-Economic Benefits for Women
Women and Child Support
Prohibited Acts
Incorporation of Existing Ordinances
Penal Provision
Provision for Implementation
Budgetary Provision

Source: GAD Codes of the City of Tagbilaran and the Municipalities of Batuan, Jagna, Duero, Tubigon, Valencia

Significant provisions of these Codes are the (1) political and public spheres of women, (2) respect for the rights of women in the socio-economic concerns of development, and (3) enabling mechanism for mainstreaming GAD.

Political and Public Spheres. These LGUs have adopted the following measures in mainstreaming Gender and Development:

- Formation of women organizations in the barangay, municipal and city levels are to be encouraged;
- Creation of women councils at the barangay, municipal and city levels;
- Representation of women in the local special bodies and development councils;
- Sectoral Representation to the Sanggunian;
- Promotion of gender balance at all levels of city local government positions;
- Presence of women in law enforcement positions;
- Conduct of women summits or congress

Women's Rights were also given emphasis by the LGUs. There are seven of such rights provided for:

Right to Cultural Identity. Other than the Eskaya of Taytay, Duero, there are the Muslims whose cultural identity need to be protected. Of the six LGUs, only Batuan has not provided in its Gender Code for any recognition and respect of cultural practices and rights. All of them provided for the establishment of appropriate schools for indigenous people, declaration of cultural communities and integrated development program for the indigenous women.

Right to Education. The top four educational concerns are adult education, special or Sunday classes for women, the promotion of gender-sensitive curricula and monitoring of stereotyped portrayal of roles of women and men in educational materials (**Table 7-5**). Other educational concerns are women friendly alternative technology, access to science by women, projects ensuring food security, gender sensitive education programs and services, gender responsive non-formal education for youth and adults, and elimination of barriers to education. Tagbilaran City has provided for many rights in the education realm; e.g. scholarship fund for the girl child, gender responsive non-formal education for youth and adults, regular gender sensitivity training for teachers and production of gender fair educational materials.

Table 7-5 GAD Code Provisions on the Right to Education by LGU

COMMON PROVISIONS OF THE GAD CODES ON RIGHT TO EDUCATION	Tagbilaran	Tubigon	Batuan	Jagna	Duero	Valencia	TOTAL
Adult Education	✓	✓	✓	✓	✓	✓	**6**
Promotion Of Gender–Sensitive Curricula	✓	✓	✓	✓	✓	✓	**6**
Monitoring Of Educational Materials	✓	✓			✓	✓	**4**
Special Classes or Sunday Classes For Women		✓		✓	✓	✓	**4**
Access To Science By Women			✓	✓			**2**
Access To Women Friendly Alternative Technology			✓	✓			**2**
Land-Based Projects Ensuring Food Security			✓	✓			**2**
Developing Gender –Fair Educational Materials	✓						**1**
Elimination Of Barriers To Education	✓						**1**
Gender-Responsive Non-Formal Education For Youth And Adults	✓						**1**
Regular Gender Sensitivity Training For All Teachers	✓						**1**
Scholarship Fund For Girl Child					✓		**1**

Source: GAD Codes of the City of Tagbilaran and the Municipalities of Batuan, Jagna, Duero, Tubigon, Valencia

Right to Health. Primary health care delivery and its upgrading, reproductive health care delivery, gender sensitive pre-marital counseling program, nutritional rights of pregnant and lactating women. The most common denominators of all six LGUs are the provision for the allocation of a health budget and the delivery and/or upgrading of primary health care.

Table 7-6 GAD Code Provisions on the Right to Health by LGU

COMMON PROVISIONS OF THE GAD CODES ON THE RIGHT TO HEALTH	Tagbilaran	Tubigon	Batuan	Jagna	Duero	Valencia	TOTAL
Budget for women's health	✓	✓	✓	✓	✓	✓	**6**
Delivery and/or upgrading of primary health care	✓	✓	✓	✓	✓	✓	**6**
Nutritional rights of pregnant/lactating women		✓	✓	✓		✓	**4**
Delivery of reproductive health care	✓				✓		**2**
Gender sensitive pre-marital counseling program	✓				✓		**2**
Gender sensitive women/children protection unit	✓						**1**
Support for Women's reproductive choice					✓		**1**

Source: GAD Codes of the City of Tagbilaran and the Municipalities of Batuan, Jagna, Duero, Tubigon, Valencia

Right to Labor and Employment. The six LGUs have ensured against sexual harassment in the workplace through a mandated conduct of orientation on the matter for all government and private offices and through the required setting up of Committee on Decorum and Investigation. The City of Tagbilaran and the Municipalities of Tubigon, Duero and Valencia have provided for a gender sensitive workplace.

The Municipality of Jagna provides for respect for the four standards of the right to work: Right to Employment, Right to freely choose and accept work, Right to just and favorable conditions of work, and Right to Social Security, and the Freedom to association, collective bargaining and concerted actions.

Other rights provided for by the different LGUs, singly or in groups are equal access to job, training and promotion, gender-sensitive workplace, collective negotiation agreement, day care support system in the workplace, maternity and other leaves, recognition of women in the entertainment industry as wage earners to render service as specified in the contract and place of business, social protection to women in the informal sector, police operation in entertainment establishments, tax incentives for business entities, and monitoring system for labor standards.

Table 7-7 GAD CODE Provisions on the Right to Labor and Employment by LGU

COMMON PROVISIONS OF THE GAD CODES ON THE RIGHT TO LABOR AND EMPLOYMENT	Tagbilaran	Tubigon	Batuan	Jagna	Duero	Valencia	TOTAL
Orientation/Policy on sexual harassment	✓	✓	✓	✓	✓	✓	**6**
Setting up of CODI	✓	✓	✓	✓	✓	✓	**6**
Gender sensitive workplace	✓	✓			✓	✓	**4**
Facilities and support systems for women	✓	✓				✓	**3**
Recognition of entertainers as wage earners	✓	✓				✓	**3**
Tax incentives for business entities	✓	✓				✓	**3**
Collected bargaining and concerted actions				✓	✓		**2**
Maternity and other leaves	✓				✓		**2**
Monitoring system for labor standards	✓				✓		**2**
Day care support system in the workplace					✓		**1**
Equal access to Job, Training and Promotion	✓						**1**
Free choice and acceptance of work				✓			**1**
Freedom to Association				✓			**1**
Just and favorable conditions of work				✓			**1**
Setting up of grievance machinery	✓						**1**
Social security				✓			**1**
Wage and benefits for women	✓						**1**

Source: GAD Codes of the City of Tagbilaran and the Municipalities of Batuan, Jagna, Duero, Tubigon, Valencia

Rights of Rural Women. Only the Municipalities of Valencia, Duero and Tubigon have provided for protection of rural women's rights such as (1) Land for women headed landless families which ensures that there is a preference for such women in the equitable distribution of disposable public idle lands, (2) rural women's access to credit/financing on agricultural development program, and (3) their access to science and women-friendly alternative technology education.

Right to Religion. This right ensures the free exercise of religious affiliation. Only LGU Duero provided for this.

Socio-Economic Benefits for Women. All six LGUs have provided for access to safe water, the lone provision in the Codes referring to water. The other rights, not necessarily by all LGUs are: assistance to livelihood, consultative right with contracts for loans and investments of LGU, increase of capital assistance for women, and sufficient budget for basic social services.

7.3.1.3 Enabling Provisions for Mainstreaming GAD

The six LGUs also ensured that the GAD Codes will be implemented by providing for the creation of GAD implementing offices, appointment of GAD officer and the functions for carrying out the ordinance.[22]

Tagbilaran City, however, has gone a step ahead of the others by providing for the creation of a GAD Council to ensure the sustained implementation of the ordinance.[23] It has placed in the Office of the City Mayor the responsibility of appointing a GAD Officer and all other necessary staff.[24] Its GAD Office will act as the Secretariat for the GAD Council and the other half of the two women-empowering Councils it created for mainstreaming GAD in the City, the Integrated Inter-Agency, Multi-Disciplinary and Multi-Sectoral Coordinating Council for the Protection of Women and Children from all forms of abuses.[25]

Table 7-8 Specific Provisions in the GAD Codes prescribing for GAD Office, Officer and Functions

LGU	GAD Office	GAD Officer	Functions
Tagbilaran City	Sections 31 and 34, Article I, Chapter 3, Ordinance No. C-203	Section 34, Article I, Chapter 3, Ordinance No. C-203	Section 31 Article I, Chapter 3, Ordinance No. C-203
Batuan	Section 8, Article F, Chapter III	Section 8, Article F, Chapter III	Section 9, Article F, Chapter III
Valencia	Section 1, Chapter IV, Ordinance No. 06-109	Section 4, Article 1, Chapter II, Ordinance No. 06-109	Section 2, Chapter IV, Ordinance No. 06-109
Jagna	Section 8, Article F, Chapter III, Ordinance No. 6-06-2006	Section 8, Article F, Chapter III, Ordinance No. 6-06-2006	Section 9, Article F, Chapter III, Ordinance No. 6-06-2006
Tubigon	Section 1, Chapter IV, Ordinance No. 2006-03-238	Section 4, Article X, Chapter II, Ordinance No. 2006-03-238	Section 2, Chapter IV Ordinance No. 2006-03-238
Duero	Section 107, Article 1, Chapter 5 Ordinance No. 02-07	Section 108, Article 1, Chapter 5 Ordinance No. 02-07	Section 109, Article 1, Chapter 5 Ordinance No. 02-07

Source: GAD Codes of the City of Tagbilaran and the Municipalities of Batuan, Jagna, Duero, Tubigon, Valencia

Of the six LGUs, the Municipality of Duero has put in place a more complete mechanism necessary to hasten putting into motion GAD mainstreaming. Like the others, it has provided for the creation of a GAD office, the appointment of a GAD Officer and a list of functions of said Office. Unlike the others, though, it has provided for the qualification and salary level of the GAD Officer.[26] Moreover, it provides that the Municipal Social and Development Office (MWSDO) or such other office as provided for in the Code shall act as the Interim GAD Office while the GAD Office is not yet created.[27] It has also provided for the creation of a

[22] Table 8. Specific Provisions in the GAD Codes Prescribing for GAD Office, Officer and Functions.
[23] Section 31. Article 1, Chapter 3. City Ordinance No. C-203. Gender and Development Code of Tagbilaran City.
[24] Ibid. Section 34. Article 1, Chapter 3.
[25] Ibid. Sections 34 and 35.a.
[26] Ibid. Section 108.
[27] Section 110. Article 1. Chapter 5. Municipal Ordinance No.02 Series of 2007. An Ordinance Prescribing a Gender and Development Code of the Municipality of Duero, Province of Bohol by Consolidating/Adopting the Applicable Municipal

committee to formulate the Implementing Rules and Regulations composed of the Municipal Social Welfare and Development Officer (MWSDO) as the Chairperson, while the members consist of the Municipal Local Government Operation Officer, a representative of the local police, any member of the Committee on Women and Family Relation of the Sangguniang Bayan and such others as the Mayor may deem proper.[28] It went on to provide for the periodic convening of a consultative body composed of the representatives of the various government agencies of the municipality, women NGOs and others all throughout the period of formulation of the IRR.[29] The Municipal Mayor is also empowered to constitute a Technical Working Group (TWG) for the effective and efficient realization of the GAD Code.[30]

7.3.1.4 Functions and Responsibilities of the GAD Office

The City of Tagbilaran and the Municipalities of Valencia, Duero and Tubigon see the GAD Office as a coordinative, regulatory and monitoring body on gender related projects and activities in their respective localities, more like a local NCRFW. This overseer characteristic of the Office is in contrast to the implementing nature of the GAD Office in the Municipalities of Jagna and Batuan where the GAD Office will initiate gender and development programs in private and government offices thereat. The non-monitoring functions in Jagna and Batuan are advocacy activities. Interestingly, the Municipality of Jagna stands as the lone LGU which identifies the conduct of a GAD advocacy and sexual harassment orientation seminar to male employees only in private and government offices as a function. **Table 7-9** shows the range of functions of the GAD Office either as implementing office or as a coordinative, regulatory and monitoring body.

Table 7-9 GAD Office Functions by LGU

	Identified Functions of the GAD Office	Tagbilaran	Tubigon	Batuan	Jagna	Duero	Valencia	TOTAL
1	Responsible for Gender Education on National policies			✓	✓			**2**
2	Conduct gender sensitivity and training to schools, commercial establishments and government agencies			✓	✓			**2**
3	Conduct Gender sensitization as a pre-requisite to employment			✓	✓			**2**
4	Conduct training on non-traditional occupation related to science and technology and other livelihood trainings			✓	✓			**2**
5	Conduct of GAD advocacy and sexual harassment orientation seminar to male employees only in private and government offices				✓			**1**
6	Formulate an integrated gender sensitive and environment-friendly plan			✓	✓			**2**
7	Ensure realistic, measurable and tangible implementation of GAD ordinance thru gender sensitive watch, psycho-social support program, legal aid services, advocacy and campaign management, violence in media check, sustainable and gender sensitive proj mgt,		✓	✓	✓	✓	✓	**5**
8	Establish protocols and standards for education and training, psycho-social support program, early childhood care and development program and services, violence in media check		✓			✓	✓	**3**
9	Act as Secretariat of the GAD Council and the Coordinating Council for Protection of Women and Children from all Forms of Abuses	✓						**1**
10	Assist in the establishment of GAD Focal Point mechanism in LGU	✓						**1**
11	Assist the Local Finance Committee and that on Appropriations and Accounts in allocation of the GAD Budget	✓						**1**
12	Gather and disseminate information on current developments and studies on GAD and related issues	✓						**1**

Ordinances, National Laws and Other National/ International Policies and Concepts Relating to Women and/or Incidental to the Concern of Women, Prescribing Penalties Thereof and for Other Purposes.
[28] Ibid. Section 112. Article 3. Chapter 5.
[29] Ibid.
[30] Ibid.

	Identified Functions of the GAD Office	Tagbilaran	Tubigon	Batuan	Jagna	Duero	Valencia	TOTAL
13	Maintain and update a sex-disaggregated data bank	✓						**1**
14	Formulate medium term and annual integrated GAD plans	✓						**1**
15	Ensure that development program planning and implementation are gender-sensitive and responsive	✓						**1**
16	Promote and support holding of women's assemblies and the establishment of consultative mechanisms for continuing dialogue between gov't and women sector	✓						**1**
17	Facilitate the registration and election of women NGO/PO representatives to the GAD Council	✓						**1**
18	Design capacity building activities for GAD Mainstreaming	✓						**1**
19	Produce IEC tools	✓						**1**
20	Monitor and evaluate the implementation of local gender and development policies, programs and activities	✓						**1**

Source: GAD Codes of the City of Tagbilaran and the Municipalities of Batuan, Jagna, Duero, Tubigon, Valencia

7.3.2 GAD Entry Point: Enabling Mechanism

These are measures designed to make the agencies and LGUs regular programs, projects and activities, gender responsive. This holds true for both the clientele and its own staff. Such interventions must address the two purposes of GAD mainstreaming:[31]

1. Building the capacity to address gender issues and women's concerns in all aspects of work.
2. Making development plans, policies, budgets, programs and projects gender-responsive which will lead to women empowerment, gender equity and equality.

7.3.2.1 Legal Bases for GAD Plan

LGUs and Agencies are to draft two kinds of GAD plans: the Gender-Responsive Medium Term Plan and the Annual GAD Plan.[32]

All Departments, including their attached agencies, offices, bureaus, SUCs,[33] GOCCs,[34] LGUs and other instrumentalities shall formulate a Gender and Development (GAD) Plan designed to address gender issues within their concerned sectors or mandate and implement applicable provisions in the Convention on the Elimination of All Forms of Discrimination Against Women, the Beijing Platform for Action, the Millennium Development (2000-2015), the Philippine Plan for Gender-Responsive Development (1995-2025), the Framework Plan for Women, and the Ten-Point Legacy Agenda of the Macapagal-Arroyo administration.[35]

The development of the GAD Plan shall proceed from the conduct of gender analysis, the generation and review of sex-disaggregated data, and consultations with gender advocates and women clientele. Its implementation shall contribute to poverty alleviation, the economic empowerment especially of marginalized women, the protection, promotion and fulfillment of women's human rights, and the practice of gender-responsive governance.[36]

[31] NCRFW. *http://www.ncrfw.gov.ph*
[32] Manual on Gender and Development. Reference at the Bohol Provincial Budget Office. p.35
[33] State Universities and Colleges
[34] Government –owned and Controlled Corporations
[35] RA 8522. General Appropriations Act. Programs/Projects Related to Gender and Development.
[36] Ibid.

Per Joint Memorandum Circular No. 2001-01,[37] the Planning Coordinators of the Province/City/Municipality are responsible for ensuring that the GAD Programs/Projects and Activities (PPAs) are integrated in the local planning process and that the formulation of the GAD Plan shall follow the regular planning and budget calendar/schedule of LGUs, anchored on the existing Comprehensive Land Use Plan/Comprehensive Development Plan/Annual Investment Plan preparation.

The same MC also provides that the LGUs must ensure that GAD PPAs are not only responsive to and supportive of Section 16 on General Welfare and Section 17 on Basic Services and Facilities, and other related provisions of the Local Government Code of 1991, but that they will improve access conditions for women and children.

7.3.2.2 GAD Budgeting

A GAD budget refers to that portion of the yearly general appropriation of the LGU or agency that is allocated for the implementation of the gender plan for gender and development. The GAA and the Local Budget Memorandum No. 28 dated 15 June 1997 are the legal bases of the GAD Budget. [38]

The cost of implementing the GAD Plan shall be at least five (5%) of the agency's or local government's total budget appropriations. The 5% allocation was specified for by the legislators to guarantee compliance by the agencies when the latter were not able to come up with their GAD budget in the initial year of GAD budget implementation. [39] Utilization of the GAD budget shall be evaluated based on the GAD performance indicators identified by the agency or local government. [40]

7.3.2.3 GAD Budgeting in Bohol

About 85% (**Table 7-10**) of the LGUs in Bohol have formulated Annual GAD Plans.[41] Theoretically, they are considered to have taken to ensuring that the steps to respond to GAD issues and concerns are implemented.[42]

Table 7-10 Inventory of GAD Plans 2007 Collection

Political District	*BIAD*	*Municipality*	*complete plan collected*	*collected plan with incomplete budget*	*collected plan without budget*	*budget only*	*plan not collected*	*existing plan but not available for collection*	*Total*
I	1	Alburquerque	1						1
I	1	Antequera	1						1
I	1	Baclayon	1						1
I	1	Balilihan					1	1	2
I	1	Corella	1						1
I	1	Cortes					1		1
I	1	Dauis	1						1
III	1	Lila	1						1
III	1	Loay	1						1
III	1	Loboc	1						1

[37] A Joint Circular among the Department of the Interior and Local Government, Department of Budget and Management and the National Commission on the Role of Filipino women.
[38] Manual on Gender and Development. Reference at the Bohol Provincial Budget Office. p.37.
[39] Ibid pp. 13, 37.
[40] Ibid.
[41] The Philippine Plan for Gender-Responsive Development (PPGD) 1995-2025, approved and adopted by E.O 273, enjoins the integration of GAD in the Local Planning and Budgeting. Guidelines for such are provided for in the Joint Memorandum Circular No. 2001-01 of the DILG, DBM and NCRFW.
[42] The PPGD, in providing the direction for mainstreaming gender concerns in development, outlines steps to respond to gender issues and concerns that need to be addressed in the long term.

Political District	*BIAD*	*Municipality*	*complete plan collected*	*collected plan with incomplete budget*	*collected plan without budget*	*budget plan plan not collected*	*existing plan but not available for collection*	*Total*
I	1	Maribojoc	1					1
I	1	Panglao	1		1			2
III	1	Sevilla	1	1				2
I	1	Sikatuna	1		1			2
I	1	Tagbilaran City					1	1	2
		sub-total	12	1	2			2	15
II	2	Buenavista					1	1	2
I	2	Calape				1			1
I	2	Catigbian					1		1
II	2	Clarin					1		1
II	2	Getafe					1	1	2
II	2	Inabanga	1						1
I	2	Loon	1						1
II	2	San Isidro	1						1
I	2	Tubigon	1						1
		sub-total	4	-	-	1	4	2	9
III	3	Alicia	1						1
II	3	Bien Unido	1		1				2
III	3	Mabini	1	1					2
II	3	Pres.C.Garcia					1		1
II	3	San Miguel	1						1
II	3	Talibon	1						1
II	3	Trinidad				1			1
II	3	Ubay					1		1
		sub-total	5	1	1	1	2	-	8
III	4	Anda	1						1
III	4	Candijay	1						1
III	4	Dimiao	1						1
III	4	Duero	1		1				2
III	4	Garcia-Hernandez	1						1
III	4	Guindulman	1						1
III	4	Jagna	1						1
III	4	Valencia					1	1	2
		sub-total	7	-	1	-	1	1	8
III	5	Batuan					1		1
III	5	Bilar	1						1
III	5	Carmen	1						1
II	5	Dagohoy	1						1
II	5	Danao					1	1	2
III	5	Pilar				1			1
II	5	Sagbayan	1						1
III	5	Sierra Bullones					1		1
		sub-total	4	-	-	1	3	1	8
		TOTAL	**32**	**2**	**4**	**3**	**13**	**6**	**48**

However, a closer look at the GAD plans reveals that most of the projects for which the 5% of total budget had been allocated for are infrastructure projects, at 30.30%, such as construction of waterworks structures, classrooms, market buildings, or park beautification,

which normally are regular development projects of the municipality. This is followed closely by Health Services and Social Services, at 24.82% and 23.91% respectively (**Table 7-11 and Table 7-12**).

Table 7-11 Summary of Budget Allocation GAD Plans 2007

	INFRA	Health Services	Social Services	Econ. Support	Env'tal Protection	Women Groups	Total
BIAD I	7,865,362.47	3,286,618.20	1,193,378.00	411,492.00	1,614,400.00	1,247,000.00	15,618,250.67
BIAD II	9,606,400.00	6,817,346.00	3,835,052.02	1,221,331.25	2,216,553.40	1,332,637.00	25,029,319.67
BIAD III	310,000.00	1,254,100.00	781,900.00	3,809,800.00	438,900.00	131,600.00	6,726,300.00
BIAD IV	2,350,000.00	7,255,360.00	1,353,600.00	1,420,000.00	880,000.00	400,000.00	13,658,960.00
BIAD V	6,732,069.80	3,397,429.00	14,032,450.00	1,957,000.00	1,295,000.00	220,000.00	7,633,948.80
Total	**26,863,832.27**	**22,010,853.20**	**21,196,380.02**	**8,819,623.25**	**6,444,853.40**	**3,331,237.00**	**88,666,779.14**

Source: GAD Plans 2007

Table 7-12 Summary of Percentage of Budget Allocation GAD Plans 2007 by BIAD

	INFRA	Health Services	Social Services	Econ. Support	Env'tal Protection	Women Groups	Total
BIAD I	**50.36**	**21.04**	**7.64**	**2.63**	**10.34**	**7.98**	**100**
BIAD II	**38.38**	**27.24**	**15.32**	**4.88**	**8.86**	**5.32**	**100**
BIAD III	**4.61**	**18.64**	**11.62**	**56.64**	**6.53**	**1.96**	**100**
BIAD IV	**17.20**	**53.12**	**9.91**	**10.40**	**6.44**	**2.93**	**100**
BIAD V	**24.36**	**12.29**	**50.78**	**7.08**	**4.69**	**0.80**	**100**
	30.30	**24.82**	**23.91**	**9.95**	**7.27**	**3.76**	**100**

Source: GAD Plans 2007

Budget officers claim that funds are so limited and allocating another 5% for GAD puts further stress on the meager resources.[43] Interpretation of GAD has come to mean it will cover anything, as long as women, men, children and the elderly are equally benefited. In effect, the 5% is distributed among the infrastructure and service projects of the municipality benefiting women and the whole population. Activities for women or gender development amount to PhP3,331,237.00 or 3.76% only (**Table 7-11** and **Table 7-12**). **Table 7-14** shows that advocacy on reproductive health, responsible parenthood, women's rights, VAWC and anti-trafficking, has the highest number of Municipalities which identified it as a GAD Concern. Corollary to advocacy is the legal, financial and emotional assistance to abused and battered individuals, identified by six Municipalities as a GAD issue. It can also be gleaned from the Table that economic status improvement has been identified as a GAD concern by 10 municipalities. Women's Month celebration has a frequency of 11 Municipalities while Strengthening of Women's Groups was identified by 7 Municipalities.

Table 7-13 Identified Infrastructure Projects

1	Construction of water source: wells, jetmatic pump, reservoir, irrigation, dam
2	Construction of roads, street lights
3	Construction of agri training center, cultural center, crisis center, day care center
4	Construction of waiting shed, MRF, library, public market
5	Maintenance of public markets, health centers, plazas, schools, municipal cemetery
6	Maintenance of roads, waterworks, abattoir, streetlights, dumpsite
7	Improvement of multi-purpose center, Municipal building, public market, Municipal wharf
8	Development of landfill
9	Socialized housing project
10	Infrastructure Support for Economic Development

Source: GAD Plans 2007

[43] Interviews: Ms. Florlinda P. Amora. Budget Officer IV, Province of Bohol, August 3, 2007; Ms. Beatriz M. Palgan, Sikatuna Budget Officer, August 16, 2007; Ms. Marcelina J. Oguis, Corella Budget Officer, August 16, 2007.

Table 7-14 Improvement of Women Access by Budget Allocation and Number of Municipalities

	Project	Budget	F
1	Advocacy on repro health, responsible parenthood, women's rights, VAWC, anti-trafficking	425,000	19
2	Women's month celebration	279,600	11
3	Economic enhancement - trainings and seminars, cooperatives	380,000	10
4	Strengthening of women organizations - registration, meetings, skills development, operational orgs.	205,000	7
5	Legal/financial/emotional assistance to abused/battered individuals	457,637	6
6	Women program development	494,000	6
7	Provision of medicine and vitamin for pregnant women	1,040,000	2
8	Establishment of crisis intervention center	50,000	1
9	monitoring of VAWC cases	-	1
	Total	**3,331,237**	**63**

Source: GAD Plans 2007

Moreover, the GAD budget allocation exercise sometimes took the place of planning so that the GAD plan is equated with the budget. Per **Table 7-10**, there are three LGUs in Bohol (Pilar, Trinidad and Calape) whose GAD Annual Budget represent the GAD Plan.

Such current practice of GAD Planning and Budgeting misses the purpose of GAD as a development tool where the LGU can capacitate its personnel to address gender issues and women concerns in all aspects of their work.

7.3.3 GAD Entry Point: People and Groups

Stakeholders are the people on whose shoulders fall the task of gender mainstreaming. They may be the sponsor, the change agent, the individual or group who must actually change and the advocate.[44] Following are the different kinds of groups involving women and women empowerment:

7.3.3.1 Women and Other Gender Sensitive Groups

- **Participatory Research, Organization of Communities and Education Towards Struggle for Self-Reliance, Inc.** (**PROCESS-Bohol)**

The Participatory Research, Organization of Communities and Education Towards Struggle for Self-Reliance or PROCESS-Bohol, Inc. is a non- stock, non-profit social development organization, the vision of which is societal transformation in partnership with the men and women stakeholders.[45]

Its mother unit, based in Manila, started its operations in Bohol in the Municipality of Tubigon way back in 1985, facilitating the formation and strengthening of POs from the fisherfolk, women, urban poor and farming sectors. PROCESS-Bohol was officially registered with the SEC in March 2, 1998. Leading the operations is Executive Director Ms. Emilia M. Roslinda while the GAD Officer is Ms. Ma. Jocelyn E. Bucia. PROCESS-Bohol has four major and two support programs: [46]

[44] NCRFW. *http://www.ncrfw.gov.ph*
[45] PROCESS – Bohol, Inc. Brochure, 2007.
[46] Ibid.

Major Programs:

1. Women's Empowerment Program – envisions the empowerment of women in society through initiatives aimed at raising awareness and critical attitude towards women as a distinct sector in equal partnership with the men
2. Fishery Development Program – geared towards the development of viable and gender-sensitive fisherfolk organizations who actively participate in local governance to pursue their legitimate and collective interests and aspirations without prejudice to protection, conservation, development and the utilization of the marine and coastal resources.
3. Community-Based Resource Management Program - facilitates intensive awareness campaign on environmental issues and concerns with the major stakeholders of development, provides continuous education and assists POs adopt effective and efficient integrated approaches in watershed management and implement environment friendly livelihood programs for economic self-sufficiency.
4. Resource Tenure Improvement Program – aims to establish strong and viable POs through critical consciousness-raising, self-reliant economic endeavors, advocacy and alliance-building with the LGU and other partners in development for tenurial security.

Support Programs:

1. Research and Development Program – develops the capacity of the local folks to deepen their awareness of their situation, analyze, and adopts strategies to counteract perceived problems and threats. This also facilitates mutual sharing of information with stakeholders.
2. Training and Consultancy Program – undertakes, together with the people, participatory and task-oriented educational and skills development programs based on their identified needs to resolve concrete issues and problems.

Its present office is situated at 111-A Espuelas Extension, Tagbilaran City. But she is scheduled to move her Office to her own newly constructed building at Tiptip, Tagbilaran City sometime in September 2007.

PROCESS-Bohol's staff are best at the following skills:

1. gender and reproductive health
2. advocacy and networking
3. integrated watershed management
4. agroforestry
5. community-based coastal resource management
6. community organizing
7. training and consultancy
8. participatory action research

- **PAGKAINA–Bohol**

PROCESS-Bohol organized in 1993 a federation called PAGKAINA–Bohol Federation or the *Pagkahiusa sa mga Kapunongan sa Inahang Nagpakabana sa Bohol* (federation of concerned mothers' organizations) comprising of rural women organizations of Bohol focused on socio-economic activities, environmental protection and conservation concerns. These women associations are accredited with the DOLE under its Integrated Livelihood Program (DILP). The federation membership hail from 17 barangays in 11 municipalities of Bohol. PAGKAINA – Bohol was registered with the DOLE in February 22, 1994. Its incumbent Chairperson is Ms. Remedios Yana.

Table 7-15 PAGKAINA-Bohol Member Organizations

	Name of Organization		Address	Status*	Contact Person
1	CMA	Catarman Mothers Association	Catarman, Dauis, Bohol	Well-developed	Myrna Fulguerinas
2	DMA	Das-ag Mothers Association	Sitio Das-ag, Poblacion, Panglao, Bohol	Well-developed	Claudia Arboleras
3	DMAO	Doljo Mothers Active Organization	Doljo, Panglao, Bohol	Growing	Victoria Guimalan
4	MAMA	Mangool Active Mothers Association	Sitio Mangool, San Isidro, Baclayon, Bohol	Mature	Salome Miculob
5	KIK	Kapunungan sa mga Inahan alang sa Kaugmaran	San Vicente, Baclayon, Bohol	Well-developed	Ma. Remedios Yana
6	BEMWA	Barangay Epo Men and Women Association	Eastern Poblacion - EPO, Alburquerque, Bohol	Growing	Magdalena Manding
7	KNI	Kapunungan sa Nagpakabanang Inahan	Tagbuane, Alburquerque, Bohol	Well-developed	Erlinda Anipa
8	BMO	Banban Mothers Association	Banban, Lila, Bohol	Emerging	Jovencia Hamo
9	NIC	Nagpakabanang Inahan sa Casingan	Casingan, Dimiao, Bohol	Well-developed	Lourdes Enobio
10	LIPAYA	Libertad Parents and Youth Association	Libertad, Garcia-Hernandez	Emerging	Luciana Pagulong
11	WUMA	West Ulbujan Mothers Association	West Ulbujan, Garcia-Hernandez,Bohol	Growing	Florencia Parcon
12	EUWA	East Ulbujan Mothers Association	East Ulbujan, Garcia-Hernandez, Bohol	Well-developed	Josefina Saldivar
13	BMA	Buayahan Mothers Association	Sitio Buayahan, Guinsularan, Duero, Bohol	Mature	Norma Ochavo
14	BWA	Bacong Women's Association	Bacong, Anda, Bohol	Growing	Ofelia Guide
15	NIHI	Nagkahiusang Inahan sa Hinlayagan Ilaya	Hinlayagan Ilaya, Trinidad, Bohol	Growing	Andresa Atup
16	KAINAN	Kapunungan sa mga Inahang Nagpakabana	San Roque, Talibon, Bohol	Well-developed	Ermelita Auxtero
17	KINK	Kapunungan sa mga Inahan nga Nagpakabana sa Kabataan	San Isidro, Talibon, Bohol	Growing	Maria Tura

** Based on criteria set for PO development stages.*
Source: PROCESS – BOHOL

- **Bohol Community Assistance Program, Inc. (BOCAP)**

BOCAP is a non-stock, non-profit NGO based in Guindulman, Bohol, working with small farmers, women and youth towards poverty reduction, rural improvement and sustainable development. It was organized in September 15, 1995, incorporated with the Securities and Exchange Commission in January 1997. BOCAP's program components are:

1. Sustainable Agriculture
2. Appropriate Technology
3. Basic Support Services: Health, Water Systems, Day Care Learning Centers
4. Livelihood and Cooperative development
5. Women, Youth and Children Development

Its services in carrying out these program components are:[47]

1. Organizing – formation and consolidation of the rural workers – farmers, women and youth – organizations
2. Capability building – continuing education and training for organizational development, gender sensitivity trainings, PRA and PCPD, of local technician on organic rice culture, farm tools fabrication, livestock production, SALT
3. Environmental Protection – watershed management, nursery, tree planting
4. Livelihood Assistance – marketing, livestock dispersal, semi-cooperatives-consumer store, agrivet.

Incumbent Chairman is Msgr. Feliciano Nalzaro, Jr. while the Program Coordinator is Ms. Bominda Gerasmio – Flores. BOCAP City Office is located at #3 Dampas Road, Mansasa District, Tagbilaran City while its field office is at BOCAP Training Center, Pandayan, Guindulman.

- **Women's Organization for Progress and Development, Inc. (WOPD)**

BOCAP's organized women organizations in the municipalities of Guindulman and Candijay federated into the WOPD or the Women's Organization for Progress and Development, Inc. of Guindulman.[48] This was registered with the DOLE in 2000 and with the SEC in 2004. Seven organizations became ten with two more in the pipeline pending completion of the requirements for membership to the federation. Membership to WOPD is organizational. The incumbent Chairperson is Ms. Fortunata Felisilda - Mision. WOPD holds office at Sawang, Guindulman, Bohol.[49]

WOPD aims to be an active and assertive voluntary organization in which the members are committed to achieve common goals, i.e. progress and development of Guindulman rural population, especially women. [50]

Table 7-16 WOPD Member Organizations

	Name of organization		Address	No. of Members	Contact Person	Focus Groups	Technical Expertise
1	ANAK BAYONG	Asosasyon sa Nagkahiusang Kababayen-an sa Bayong	Bayong, Guindulman, Bohol	24	Carlita Lusica	women	livelihood activities
2	BANWAS	Bantig Women's Association	Bantig, Mayuga, Guindulman, Bohol	21	Adriana Bersano	women, farmers, TSKI, Cooperative, poverty reduction	
3	LANTAWA	Lantay Women's Association	Lantay, Lombog, Guindulman, Bohol	33	Anecita Gulay	women, policy makers, politicians, bureaucracy, youth farmers, religious groups, PTCA, dajong	mgt of water system, integrated waste mgt, organic farming, project mgt
4	NAKABALON	Nagkahiusang Kababayen-an sa Longon	Longon, Mayuga, Guindulman, Bohol	20	Proferia Dagupo	women	mgt of water system, integrated waste mgt, organic farming, gender (legal process)

[47] BOCAP Brochure, 2007.
[48] Interview with Ms. Melba Laga, BOCAP Vice-Chairperson, at the SB Office of Guindulman, August 13, 2007.
[49] Interview with Ms. Fortunata Mision at the SB Office of Guindulman. August 13, 2007.
[50] WOPD Brochure, 2007.

	Name of organization		Address	No. of Members	Contact Person	Focus Groups	Technical Expertise
5	PAKANA	Pansul Kababayen-ang Nagpakabana	Pansul, Cabantian, Guindulman, Bohol	29	Marcelina Romero	women, lawmakers, govt agencies, youth, farmers, fishers, PTCA, Community Assn Dajong, chapel pastoral council, water system association	water mgt, recycling of wastes, organic farming, fund sourcing for livelihood activities
6	INA	Ilaya Nanay's Association	Poblacion, Crossing, Candijay, Bohol	20	Adelaida Tadena	women, govt, youth, farmers, fisherfolks	water sanitation, envt, agriculture, gender, sustainable devt, IWRM, livelihood activities
7	NAKASA	Nagkahiusang Kababayen-an sa Sawang	Sawang, Guindulman, Bohol	33	Corazon Bernales	women, govt, fisherfolks	envt, gender, sustainable devt, livelihood
8	CWA	Carahan Women Association	Carahan, Lombog,Guindulman, Bohol	33	Nerie Peligro	CTP (farmers), barangay devt council	mgt of water system, integrated waste mgt, forest resource mgt, organic farming, root crops production, lending project, proj mgt
9	EWWA	Esperanza West Women's Association	Esperanza west, Bayong, Guindulman, Bohol	25		women, politicians, govt offices, youth, farmers,, PTCA, dajong, subasta, chapel, BADA, gala	water assoc mgt, waste recycling, watershed mgt, diversified farming, laws protecting women, organic fertilizer making, paramedical training
10	BUKANAMA	Bunhayag Kababayen-ang Nagkahiusa ug Matinud-anon	Bunhayag, Canhaway, Guindulman, Bohol	32		women, lawmakers, politicians, govt offices, youth, farmers, religious groups, BAPA, catechists, waterworks, PTCA, dajong	water mgt, integrated soil mgt, watershed mgt, organic farming

Source: WOPD, Guindulman, Bohol

- **Women's Development Center, Inc. (WDC)**

The Women's Development Center, Inc. is a non-stock, non-profit NGO registered with the SEC, founded in 1989 in Tagbilaran City. Its vision is a just and humane society where men and women are equal partners in shaping the destiny of the nation. It holds office at 45-B Burgos St. Tagbilaran City. WDC's objectives are[51]:

1. To ensure full integration of women in the developmental efforts especially in emphasizing women's role in economic, social, political and socio-cultural development;

[51] Women's Development Center, Inc. Brochure, 2007

2. To respond to the specific needs of women from all sectors in coordination with other institutions, community and volunteer groups concerned with the empowerment of women and children and the Filipino people as a whole;
3. To disseminate information, promote and conduct activities that educate and equip Boholano women with knowledge and skills and instill in them consciousness and motivation to achieve socio-cultural transformation;
4. To establish linkages with women's organizations and programs in the local, national and international levels.

WDC had its share of growth pains. It stopped operations in 1995 but started to revitalize its organization in 2001, which it was able pull off. It is currently managed by Ms. Ester Espino as Executive Director.[52]

- **Women Interacting for New Growth and Services (WINGS)**

One of the most involved groups in GAD in Bohol is the WINGS of the Holy Spirit School. Holding Office at the Holy Spirit Alumni Center, it has two Directors: namely, Atty. Myrna T. Pagsuberon and Sr. Jovita Cendaña, SSpS while its Program Coordinator is Ms. Kenny Datuin-Ancog. Influenced by St. Scholastica and Miriam Colleges, WINGS has gone into Gender and Development activities. The school itself practices and teaches Gender sensitivity to its student populace. Newly-hired Instructors are provided Gender Sensitivity Training before they can embark on any teaching assignment.[53]

SSpS WINGS for Justice, Peace and Integrity of Creation envisions communities of women, men and society free from all gender-based bondages as loved by the Abba, sent by Jesus, empowered by the Spirit, aware of their personal value and dignity and enjoying equitable relations living life to the full in a human society and healthy environment. Thus, it serves as the resource center and social development arm of the Sisters Servants of the Holy Spirit (SSpS), Trinity Province. It was established in March 8, 1997 with the mandate to mainstream gender and development concerns into all SSpS Mission areas. WINGS Services are:[54]

1. Consciousness-Raising Education and Training – designing and facilitating modules on gender sensitivity and various gender issues for different participants coming from different sectors. It can refer and assist in contacting resource persons on gender and related issues.
2. Capability-Building Training and Consultancy – designing and facilitating capability-building training seminars on organizational development and gender-responsive planning. It helps women's organizations and NGOs integrate gender concerns in their plans, programs and projects.
3. Peer Advocacy – conducting of special and intensive trainings for selected high school students to be Advocates among their Peers.
4. Gender-Education Training - assisting schools and teachers review and revise curricula and syllabi to integrate gender concerns and issues both in content and teaching strategies and methodologies.
5. Reading and Resource Center – shares through arrangement various print and audio visual materials on women and children issues.
6. Counseling – options are provided to women and girls for decision making.
7. Referrals – on various service providers are provided women who have less access to professional services.

[52] Interview with Ms. Ester Espino at WDC Office. August 21,2007.
[53] Interview with Sis. Jovita Cendaña, SSpS and Ms. Kenny Datuin-Ancog, WINGS Office. August 21, 2007.
[54] SSpS WINGS Brochure. 2007.

- **Family Care Lying-In Clinic of the University of Bohol (UBFCLC)**

The Family Care Lying-In Clinic of the University of Bohol has been serving as a GAD avenue in the University. This lying-in clinic started as a training center for family planning of the John Hopkins Institute for the University's Nursing Department, evolving into a gender responsive entity, networking with other GAD initiatives in the province. Its Executive Director is Ms. Nuevea T. Montes, the past Vice-Mayor of Tagbilaran City, and the Officer-in-Charge is Ms. Sylvia C. Doron, a midwife by profession. This clinic is situated at the ground floor of the Alumni Building of the University of Bohol along Ma. Clara St., beside the Vicente D. Tirol Learning Center. [55]

- **Women Organization of Danao Bohol (WODB)**

Danao has 17 women associations at the barangay which federated into the Women Organization of Danao Bohol or WODB. These associations used to be of the Balikatan but were not sustained. However, through the efforts of Ms. Natividad Gonzaga, mother to the incumbent Mayor, and of a KALAHI organizer in Danao, the organization was revived. The Chairperson is Ms. Carmencita Busalanan, an elementary schoolteacher, who is the President of the Poblacion Women's Association.[56]

- **Bohol Association of Women in Government Service (BAWIGS) – Multi-Purpose Cooperative**

BAWIGS Chairperson of 2006, Ms. Ronilita Bunado, related that in 1997, a group of women at the Provincial Capitol decided to organize themselves into an Association to improve the quality of life of the membership. They registered with the DOLE. Shortly after, they established the BAWIGS Multi-Purpose Cooperative, a primary non-agriculture multi-purpose cooperative.[57] Since the two organizations have the same set of officers and members, the respective Boards approved for the merger of the Association and the Cooperative into one entity.[58] This was affirmed and approved by the General Assembly in its March 2006 meeting.[59]

In addition to those objectives set forth in its Articles of Cooperation and in R.A. 6938, BAWIGS-MPC has the following objectives:[60]

1. To uphold the moral and spiritual values of the bonafide members of the cooperative;
2. To respond to the protection of women's rights and equality before the law and to support the fight against exploitation of women;
3. To initiate livelihood projects that may allow women to cope with the present economic conditions;
4. To call attention to the health needs of the members;
5. To call for total elimination of graft and corruption, immorality and disregard of human rights;
6. To disseminate available information that will benefit the members of the Cooperative;
7. To promote the rights and welfare of the members.

[55] Interview with Ms. Sylvia C. Doron at FCC, August 22, 2007.
[56] Interview with Ms. Carmencita Busalanan. Danao. August 15, 2007.
[57] Preamble. BAWIGS-MPC By-Laws, pending CDA approval of amendments.
[58] Telephone Interview with Ms. Ronilita Bunado. BAWIGS Chairperson 2006. September 27, 2007
[59] Chairperson's Report 2006. BAWIGS – MPC.
[60] BAWIGS – MPC By-Laws. op.cit. Section 1, Article II. Objectives ad Purposes.

Membership is open to all women who are of legal age, with capacity to contract, or are heads of the families, are employees of Provincial and National Offices within the political boundaries of the Province of Bohol, including the City of Tagbilaran, and are residing therein.[61]

In consonance with the role of women in nation-building, BAWIGS-MPC has adopted the insignia of women hand-in-hand as a symbol of love and unity.[62] Headquarters of the organization is prescribed in the By-Laws to be within the Provincial Capitol Compound of the Provincial Government of Bohol.[63]

- **San Isidro Municipal Employees Women's Association (SIMEWA)**

San Isidro has also a similar group, the SIMEWA or the San Isidro Municipal Employees Women's Association. It provides assistance during the Women's Day celebration and additional income through goat dispersal and credit. Goat dispersal allows the beneficiary to own the goat after 2nd kidding. The group's credit program is doing well. [64]

7.3.3.2 Other Organizations with Gender Components in Their Programs

- **Feed the Children, Inc. Philippines (FTCI)**

Feed the Children (FTC) is a non-stock, non-profit charitable organization holding headquarters in Oklahoma City, USA. FTC Philippines was formally registered in the country in 1989. Children and their family are the primary focus of FTC, distributed into three programs: Integrated Child, Family Development Program, Biodiversity Resource Management for Sustainable Development and Community Banking – Micro-Finance Program.

Implementation of these programs adhere to four components, namely: Feeding a child, advocating for child's rights, development of the family, and promotion of women and gender development. FTC holds office at #5 Katipunan Street, Mansasa District, Tagbilaran City.[65] The national headquarters used to hold office at the Bohol Office but recently moved to Cebu. Current National Director is Ms. Esperanza Abellana while its Area Manager for the Visayas is Ms. Maria Socorro E. Burbos.[66]

- **University of Bohol Community Development Foundation, Inc. (UBCDFI)**

An academe-based NGO but totally autonomous of its mother unit,[67] the University of Bohol Community Development Foundation, Inc. was organized in December 12, 1999 and registered with the SEC in April 12, 2000. It envisions a self-reliant community where individuals enjoy improved quality of life in a peaceful, pro-active and God-fearing society. It will work towards this vision by empowering people in the development of holistic and sustainable community programs, namely:[68]

1. Environmental Protection & Rehabilitation Program
2. Community Organizing and Extension Program
3. Research and Publication
4. Water and Sanitation
5. Livelihood Program

[61] BAWIGS – MPC By-Laws. op.cit. Section 1. Membership, Article III and Section 2 Territorial Jurisdiction, Article I
[62] Ibid. Section 4, Article 1
[63] Ibid. Section 3.
[64] Interview with Ms. Liliosa S. Bahulay. San Isidro. August 16. 2007.
[65] Feed The Children Inc. Philippines. *http:// feedthechildrenphils.org*
[66] Interview with Ms. Maria Socorro E. Burbos at FCC Bohol Office, August 21, 2007.
[67] Short interviews with Dr. Gloria T. Casabal at UBCDFI, July 14 and August 25, 2007.
[68] UBCDFI Project Proposal to the PEF entitled BUGWAC (Buenavista Uplifting Groups for Watershed Access) dated august 15, 2005, unpaged.

- **Community Awareness & Services for Ecological Concerns (CASEC)**

Originally called Candijay Service Center, CASEC was born in January 23, 1989. The name became restrictive in terms of program implementation, so it was formally incorporated as a non-stock, non-profit non-government organization in September 12, 1991 under its present name. Its objectives are:[69]

1. To provide information on the importance of Nature in people's lives through various forms of education such as ecological trainings, seminars, fora, production of reading materials and alternative music with environmental messages.
2. To promote love of nature among children through the establishment of children's ecology learning centers in organized communities.
3. To document important issues about the ecology found in this fragile island of Bohol and the Philippines.
4. To strengthen the people's organizations and implement ecologically sound projects that can help improve the socio-economic status of their members.
5. To provide information about ecology to other concerned groups within the country.

At the helm of CASEC operations is Ms. Ann Piquero – Dy who is the incumbent Vice-Mayor of Candijay.

7.3.3.3 Alliances of Government and Non-Government Organizations

- **CATCHWISE – VAWC - PIACAT**

The Consortium on Anti-Trafficking of Children and Women in Sexual Exploitation and Violence Against Women and their Children (CATCHWISE) – Bohol was launched in October 1, 2004[70] as a result of a seminar-training on R.A. 9208 (*An Act To Institute Policies To Eliminate Trafficking in Persons Especially Women and Children, Establishing the Necessary Institutional Mechanisms for the Protection and Support of Trafficked Persons, Providing Penalties for its Violations, and for Other Purposes.)* The group consists of GOs, LGUs, NGOs, POs and other sectors to facilitate implementation of this law.[71] In the November 11, 2005 meeting of the membership, it was decided to change the name to BOHOL CATCHWISE-VAWC upon merging of these two concerns.[72] Then in its meeting dated April 21, 2006, the name was changed to CATCHWISE-VAWC-PIACAT.[73] PIACAT is the acronym for Provincial Inter-Agency Council Against Trafficking. The change in name was done again to consolidate efforts of the group with the inter-agency body in addressing VAWC requirement of UNFPA.[74]

The five major functions and committee membership of the Coalition are:[75]

1. **Monitoring.** The Committee members are LGUs, DILG, PIA, DOLE, PNP, OPSWD, SAC Tagbilaran and Talibon. DILG is the team leader with DepEd as Co-Team Leader
2. **Advocacy & IEC.** Committee members are WINGS, PROCESS, CWL, LGUs, PIA, DepEd, DOH, TESDA, PGMA, OPSWD and Prosecutors. Team Leader is OPSWD with PIA as Co-Team Leader

[69] Community Awareness & Services for Ecological Concerns, Inc. *http://www.casec.org.ph*
[70] Minutes of the Meeting. CATCHWISE -Bohol General Membership Meeting. Governor's Mansion, Tagbilaran City. November 9, 2004.
[71] BOHOL CATCHWISE/VAWC Proposed CODE OF ETHICS.
[72] Minutes of the Meeting. BOHOL CATCHWISE – VAWC Meeting. Metro Center Hotel CPG Ave., Tagbilaran City. November 11, 2005.
[73] Minutes of the Meeting. CATCHWISE-VAWC Meeting. JJ's Seafood Village. April 21, 2006.
[74] Per inquiry with Ms. Constancia Tuñacao, OPSWDO. August 30, 2007.
[75] Ibid.

3. **Coordination/Protocol Among Agencies.** Committee Members are CLB (Children's Legal Bureau), DSWD, DILG, BCIC, TESDA. Team Leader is CLB and Co-Team Leader is the PNP
4. **Policy Development.** Committee members are WINGS, CLB, LGUs, SP. Team Leader is WINGS with the SP as Co-Team Leader.
5. **Reporting**

- **Bohol Alliance of Non-Government Organizations (BANGON)**

The Bohol Alliance of Non-Government Organizations or BANGON was born when a group of social development organizations in Bohol decided to band together to be able to work closely so that their efforts are coordinated to meet the demands of sustained development for the marginalized sectors in Bohol. It was registered with the SEC on April 30, 1991. Its objectives are:[76]

1. To consolidate efforts among NGOs to address the problem of poverty in the province;
2. To strengthen coordination among NGOs in project development, implementation, management and financing;
3. To promote a harmonious relationship among NGO members to better facilitate sharing of expertise, resources, experiences and other forms of support;
4. to promote awareness at the local, provincial, regional and national levels of the programs and services of the NGOS operating in the province;
5. to encourage functional coordinative mechanism with the local governments for purposes of effective implementation of common programs and projects
6. To have more access to funds for development projects in the province.

Membership of BANGON consists of NGOs based in Bohol or in Cebu City with projects/offices in Bohol.

Table 7-17 BANGON Member Organizations

Name of Organization			Address	Contact Person
1	BOCAP	Bohol Community Assistance Program, Inc.	Pandayan, Canhaway, Guindulman, Bohol	Mr. Roque Flores, Jr.
2	BIDEF	Bohol Integrated Development Foundation, Inc.	#39 Hontanosas cor. Butalid Sts. Tagbilaran City	Mr. Enrique G. Auxilio
3	BIRD	Bohol Institute for Rural Development, Inc.	Door 2 F. Gonzales Residence, Poblacion, Trinidad, Bohol	Mr. Leo Petarco
4	CASEC	Community Awareness & Services for Ecological Concerns, Inc.	#6 Upper San Jose St. Tagbilaran City	Ms. Ann Piquero-Dy
5	ELAC	Environmental Legal Assistance Center	2nd Floor DORES Building, Miguel Parras St. Tagbilaran City	Atty. Raul Barbarona
6	FCBFI	FCB Foundation, Inc.	#10 Mendoza St. Tagbilaran City	Engr. Panfilo M. Asares
7	FTCPI	Feed The Children Philippines, Inc.	#5 Katipunan St. Mansasa District, Tagbilaran City	Ms. Esperanza E. Abellana
8	PROCESS	Participatory Research, Organization of Communities and Education Towards Struggle for Self-Reliance	111-A Espuelas Ext., Tagbilaran City	Ms. Emilia M. Roslinda

[76] BANGON Brochure 2007.

Name of Organization			Address	Contact Person
9	PFTAC	People's Fair Trade Assistance Center, Inc.	227 CPG East Avenue, Bool District, Tagbilaran City	Engr. Vicente T. Loquellano
10		Project Seahorse Foundation	222 First St., Happy Valley Subdivision, Guadalupe, Cebu City	Mr. Amado P. Blanco
11	SAC	Social Action Center	G/F Bishop's Residence JA Clarin cor. V. Inting Sts. Tagbilaran City	Rev. Fr. Efren Bongay
12	SWCF	Soil & Water Conservation Foundation, Inc.	169 - G Maria Cristina Ext. Capitol Site, Cebu City	Mr. William Granert
13	UCPB	United Coconut Planters Bank Foundation, Inc.	CPG Avenue, Tagbilaran City	Mr. Zosimo Monteros
14	VICTO	Visayas Cooperative Development Center, Inc.	Pandan St, Manga District, Tagbilaran City	Ms. Mila A. Baisac
15	WVDF	World Vision Development Foundation, Inc.	111-A Espuelas Ext., Tagbilaran City	Ms. Jasmin Villahermosa
16	UBCDFI	University of Bohol Community Development Foundation, Inc.	UBFCLC-Alumni Bldg C.Putong St. Tagbilaran City	Dr. Gloria T. Casabal, MD MPH

Source: BANGON brochure, 2007.

- **Bol-anon United Sectors Working for the Advancement of Community Concerns, Inc. (BUSWACC)**

BUSWACC, the access center of the Peace and Equity Foundation (PEF) in Bohol, was created to address poverty issues through coordinated efforts and resources of its membership comprising of NGOs, POs, Cooperatives, Academe, and Government Agencies in Bohol It was registered with the SEC on August 8, 2006. This partnership center envisions itself to be a sustainable resources institution committed to improve the living condition of the poor in priority areas of Bohol. Its 15 priority municipalities are Ubay, Trinidad, Bien Unido and CP Garcia for cluster 1; San Miguel, Danao, Catigbian and Carmen for Cluster 2; Alicia, Pilar and Mabini for Cluster 3; Talibon, Buenavista, Getafe, Inabanga for Cluster 4.

All PEF and BUSWACC assisted water projects and loan projects are members of BUSWACC. [77]

Table 7-18 List of BUSWACC Members, August 2007

Name of Organization			Address	Contact Person
1	AWO	Alumar Women's Organization	Alumar, Getafe, Bohol	Anecita Petalcorin
2		Brgy Butan Water Project	Carlos P. Garcia, Bohol	Glecerio Abapo
3		Brgy Gaus Water Project	Carlos P. Garcia, Bohol	Barangay Captain
4		Brgy Tilmudo Water Project	Carlos P. Garcia, Bohol	Amado Abanggan
5	COFA	Campao Occidental Fishermen's Association	Campao, Getafe, Bohol	Christopher T. Auza
6	CBRPP	Corte-Baud Rehabilitation Project for Progress	Corte-Baud, Getafe, Bohol	Brigido Aparicio
7	ESNMPC	El Progresso Samahang Nayon Multi-purpose Cooperative	El Progresso, Carmen,Bohol	Virgilio Candole
8	ISFA	Ilaya sustainable Farmer's Association	Ilaya, Inabanga, Bohol	Eriberto Torston
9	KMPC	Kagawasan Multipurpose Cooperative	Kagawasan, San Miguel, Bohol	Herminio C. Sombrio
10	KASAMAKA	Kapunongan Alang sa Malambuong Katawhan	Capayas, San Miguel, Bohol	Cresencio saligumba

[77] Presentation Document on BUSWACC. Undated.

	Name of Organization		Address	Contact Person
11	KKKIA	Kapunongan Katilingabanon Kalambuan sa Ilaud Asso.	Ilaud, Pilar, Bohol	Aniano Café
12	LETMULCO	Lundag eskaya Tribe Multipurpose Cooperative	Lundag, Pilar, Bohol	Antonio Abcede
13	LUFA	Lusong United Farmers' Association	Lusong, Buenavista, Bohol	Domingo Melancolico
14	MWA	Minol women's Association	Minol, Mabini, Bohol	Jesselita Espinosa
15	NIHI	Nagkahiusang Inahan sa Hinlayagan Ilaya	Hinlayagan Ilaya, Trinidad, Bohol	Andresa Atup
16	NAMANUGA	Nagkahiusang Mag-uuma sa Nueva Granda	Nueva Granada, Buenavista, Bohol	Pablo Suello
17	NAMAO	Nagkahiusang Mag-uuma sa Overland	Overland, Buenavista,Bohol	Silvestre Estorgio
18	NPK	Nagkahiusang Pundok alang sa Kalikupan	Tungod, Inabanga, Bohol	Tito Centinales
19	PMC	Panaghiusang Mag-uuma sa Cabangahan	Cabangahan, San Miguel, Bohol	Bernardo A. Macabenta
20	PROCESS-Bohol	Participatory Research, Organization of Communities and Education Towards Struggle for Self-Reliance	Katarungan, Ubay, Bohol	Mario Limocon
21	PFTAC	People's Fair Trade Assistance Center	Villafuerte, Carmen, Bohol	Vicente Loquellano
22	RMC	Rizal Multipurpose Cooperative	Rizal, Pilar, Bohol	Celestino Jamil
23	SPRMA	San Pedro Resource Management Association	San Pedro, Talibon, Bohol	Saturnino Tagsip
24	STMC	Santa Teresita Multi-purpose Cooperative	Cagongcagong, Alicia, Bohol	Jonie Luna
25	UDAMCO	Ubay Dairy Multipurpose Cooperative	Brgys Cambunga, Villa Teresita, Gov.Boyles, Tipolo, Ubay, Bohol	Esteban Bernales
26	VASNI	Villa Anunciado Samahang Nayon	Villa Anunciado, Danao, Bohol	Rafaela Bautista

Source: BUSWACC Directory of Contacts: Approved Water Projects. August 2007

7.3.3.4 Women Associations and Other Organizations in the Barangay

The Department of Labor has in its registry names of women associations per municipality. The Rural Workers Directory (updated December 2006) however provides a list of all the associations and does not segregate them by concerns. Women groups can only be identified by the words Women*, Kababayen-an*, *Inahan,* Mothers and other similar terms. There are a total of 1,056 Rural workers Associations and 158 Women's Associations.

The Cooperative Development Authority neither identifies its registered cooperatives by concern. Per the CD specialists the membership information is not sex-disaggregated in the CDA records.[78]

[78] Per inquiry with CD Specialists Gemma Resquir and Nisa Cagulada at CDA Office, Provincial Capitol August 14, 2007.

Table 7-19 Distribution of Rural Workers Association

	2006	Rural Workers Assoc	Identified Women's Assoc			Rural Workers Assoc	Identified Women's Assoc			Rural Workers Assoc	Identified Women's Assoc
	District I				District II				District III		
1	Alburquerque	21	3		Bien Unido	32	6		Alicia	5	2
2	Antequera	48	10		Buenavista	25	3		Anda	19	3
3	Baclayon	12	2		Clarin	9	2		Batuan	14	1
4	Balilihan	28	4		Dagohoy	26	3		Bilar	32	3
5	Calape	25	3		Danao	21	3		Candijay	24	2
6	Catigbian	22	6		Getafe	26	4		Carmen	13	4
7	Corella	13	2		Inabanga	28	4		Dimiao	7	1
8	Cortes	17	2		Pres. C. Garcia	17	3		Duero	34	1
9	Dauis	23	4		Sagbayan	9	2		G-Hernandez	32	4
10	Loon	47	5		San Isidro	16	7		Guindulman	31	11
11	Maribojoc	19	4		San Miguel	31	3		Jagna	6	2
12	Panglao	18	3		Talibon	31	3		Lila	6	2
13	Sikatuna	20	4		Trinidad	40	5		Loay	9	1
14	Tagbilaran City	23			Ubay	50	2		Loboc	9	
15	Tubigon	28	3						Mabini	41	5
16									Pilar	9	1
17									Sevilla	21	5
18									Sierra Bullones	11	3
19									Valencia	8	2
	Total	**364**	**55**			**361**	**50**			**331**	**53**
									Grand Total	**1056**	**158**

Source: RWA Provincial Directory as of December 2006, DOLE Bohol

7.3.4 GAD Entry Point: Locally Initiated Programs

Civil organizations in Bohol have availed of gender equality or women empowerment as entry points for their programs and projects, mindful of the call for mainstreaming gender in the development cycle. These organization's initiatives are hereunder categorized into those engaged in water systems, those engaged in watershed management, those engaged in governance, those engaged in economic enterprise, and those engaged in advocacy for protection of women's sexual rights.

- **GAD in Water Systems**

Women organizations in Baclayon (MAMA) and in Duero (BMA) are managers of their water system projects for levels II and III. MAMA in Sitio Mangool, San Isidro, Baclayon is a group of mothers who started with participation in feeding projects of CARE Philippines, Inc. and evolved into cooperative and water system management under the tutelage and support of PROCESS-Bohol. The mothers were granted fund by PEF for the construction of their ferrocement water tank. Now, everyone in the sitio has access to clean water. MAMA collects payment for water provision, from which they allocate payment for maintenance of the tank. To date, the consumer store fund and the water system fund have remained distinct and separate from each other, water fee collection is up to date, and policies are in place. MAMA has contributed much to the community with the benefits brought about by the water system

and the convenience of a consumer store in the area, all of which served to encourage the men to participate in gender activities.[79]

When the water transmission pipes of the water system of Sitio Buayahan, Barangay Guinsularan of Duero were destroyed, **BMA** decided to respond to the problem. With the project fund, and in coordination with the Barangay Council and the Municipal Engineering Office, they rehabilitated the reservoir and the pipes. The waterworks is managed by these women. The endeavor was not smooth sailing though. It took them months to convince the uncooperative officials to support their project. Things moved faster when the Kagawad assigned to their Purok took notice and assisted them. [80]

NIHI of Hinlayagan Ilaya have also been able to avail of water project fund from PEF. The water system has four tap stands placed in the School, Church, Barangay and Purok. Only three members of the organization could avail of the water by reason of their proximity to the stands. With NIHI, the husbands or other male members of the household become automatic members so as to continue participation in the absence of the woman members. All members have undergone gender sensitivity training from PROCESS-Bohol and they have become conscious of translating this into their activities but it is more 'lakbit-lakbit' (sporadic) than a sustained one.[81]

Of the members of BUSWACC, the first to finish their water system project is the women's group from Minol, Mabini, the Minol Women's Association.[82]

Another women's association who contributed much to the water needs of their community is the **Busao Women's Organization** in Barangay Busao, Maribojoc. Their linkage with the Nagkahiusang Kababayen-an sa Loon (NAGKALO) for their livelihood endeavors led them to information on possible venue to source funds. Thus, this women organization became the conduit to accessing fund to the amount of PhP300,000 from Gabriela in 2005 to improve their existing water system in the barangay.[83] The water system which is serving more or less 150 households from the barangay and some household of the adjacent barangay of Sto. Rosario of Antequera, is currently managed by the Busao Barangay Council. Women continue to participate in the water system management through the Committee on Women and Health which is tasked to monitor the state of sanitation of the waterworks and through the BHWs who are tasked with chlorinating the system at least once a month.[84]

WOPD has a water project in the offing with the Women for Water, Water for Women, a foreign women organization. The project will be construction of water tanks in four barangays, namely: Lungon of Bayugan; Carahan and Lantay in Lombog and Pansul in Cabantian. Originally intended for the day care water needs, it evolved into responding to the whole community's water needs.[85]

- **Watershed Management**

The Loboc-River Basin Area-Focused Approach Program or Loboc-AFA, funded by AusAid through PACAP, aimed to improve the quality of life of the residents inside the Loboc River while rehabilitating, protecting and conserving the natural resources of the watershed. It covered the municipalities of Carmen, Bilar, Batuan and Sagbayan. [86] Members of BANGON participated in this program.

[79] Gathered from a focus group discussion with the officers of MAMA during a PCNC evaluators visit. Mangool, San Isidro, Baclayon. August 24, 2007.
[80] Ms. Ma. Jocelyn E. Bucia, GAD Officer PROCESS-Bohol. Interview. June 23, 2007.
[81] Ms. Andresa Atup, Chairpeson of NIHI, Trinidad. Short Interview . August 17, 2007.
[82] Per Mr. Lare Tumulak, Executive Director, BUSWAC. August 30, 2007.
[83] Ms. Sinforiana Putol, past Chairperson of the Busao Women's Organization. Interview. Busao, Maribojoc. August 11, 2007.
[84] Barangay Captain Marcelino Dapiton, Busao, Maribojoc. Interview. August 13, 2007.
[85] Mision. op.cit.
[86] Loboc AFA poster.

One of these is the **Feed the Children** which implemented it in three barangays of Sagbayan: Barangays Calangahan, Sta. Catalina and Kabasacan. In the course of the project cycle, Gender and Development issues were reported to be limited to ratio of participation of both male and female beneficiaries of the project. The direct benefits range from level II water system beneficiaries to seeds distribution to livestock dispersal and women micro-enterprise. In all three areas, the women outnumber the men in the frequency of meeting attendance. This is significant in the sense that it is during these meetings that decision-making on matters pertaining to project implementation approaches and strategies are usually made.[87]

UBCDFI likewise implemented watershed management programs under PACAP in Barangays Villa Aurora and Subayon of Bilar. The projects showed that in terms of access and control of resources, benefits and opportunities by both men and women, the women have significantly participated to a high degree since they are the ones at the helm of management, be it organizational or financial. Men and women had equal access to training on agricultural technology, leadership formation and organizational management.[88]

BOCAP's various sustainable agriculture projects in the municipalities of Guindulman and Candijay have facilitated the establishment of cooperatives (consumers, credit, marketing), six multi-purpose centers, three children's learning centers, three health centers, two drinking water systems, an eatery (women - managed), a diversion canal for irrigation, a mini-impounding dam, three blacksmith shops, and the Training Center for the NGO. Its formation of rural women's organizations puts focus on issues and concerns towards gender equality and empowerment. When its seven women associations formed into WOPD, it embarked on a Women Strengthening and Livelihood Enhancement Project for a year to ensure that the women federation could manage on its own independent of BOCAP. [89]

BOCAP is currently implementing a PACAP assisted project called "Poverty Reduction Through Organic Farming Systems in Alicia and Dagohoy." It ensures equal participation of men and women in the decision-making process. Moreover, Gender Sensitivity Orientations are conducted among the organizational staff and among the farmers.[90]

- **Enterprise Development**

PROCESS – Bohol envisions that the **PAGKAINA Federation** and its member POs can become successful entrepreneurs through their enterprise-related activities. All the 17 member POs had implemented 20 kinds of group-managed income generating projects, generating thereby 65 jobs for storekeepers, hand tractor operators, bakers, masons and carpenters. 85% of these employees are women. Such endeavors had generated additional income for the micro-lending and savings mobilization of the POS. The knowledge and skills the members gained from various training workshops provided them can be outlined into three categories:[91]

1. Production which dealt with production of quality products and quality control
2. Financial Management which honed the skills on generation of financial plans for both organizational and enterprise levels, and strengthening of their bookkeeping system
3. Marketing Strategies which taught them the relevance of making a flowchart illustrating steps from production to marketing, the packaging of products, how pricing of products and promotion influence sales.

[87] Feed the Children, Inc. CASIAD, SCANREM, KANREMP Terminal Reports. September 1, 2001 to March 31, 2006.
[88] UBCDFI Terminal Reports. Subayon Livelihood and Natural Resource Management Project and Villa Aurora Permaculture Project. October 2003-January 2006.
[89] A 5-page letter size Primer on BOCAP provided by the NGO. August 29, 2007.
[90] Ibid.
[91] PROCESS-Bohol. Women's Empowerment Program Terminal Report. July 2003 to June 2006 Executive Summary pp. 9-11.

The **San Vicente Mangrove Association (SAVIMA),** a PROCESS-Bohol assisted CBFMA holder in San Vicente, Maribojoc contributes to coastal resource management by protecting the mangroves within their concession. The officers, except for the auditor, are all women. On their huge organizational chart in the restaurant is a box assigned to GENDER with a Chairperson and members. It is their way of ensuring that they will be reminded to be gender-responsive in their undertakings. They engage in community-based tourism which they call Community Life Tour. The enterprise consists of a restaurant at the entrance of a bamboo boardwalk through the mangrove area towards a breathtaking view of the sea at Tin-tinan Island. Local and foreign tourists alike pay an entrance fee which entitles one to a guide-assisted educational walk through the mangrove. Halfway through the walk, one can also learn from the gleaners of "imbao" shells, who are mostly women. SAVIMA officers have many plans up on their sleeves to improve the enterprise in terms of amenities, quality control and promotion.[92]

On the other hand, another women's group in Agahay, Maribojoc called **Nagkahiusang Kababayen-an sa Agahay (NKA)**, engages in catering for the Abatan River Tour. Organizationally, it is weak, caused in most part by the recent misunderstanding on election process between the old and new officers. Decisions are so quite difficult to come by since a quorum cannot be reached. It has neither an institutionalized set of financial policies. In the catering service, seventy percent go to capitalization for the catering and thirty percent go to the workers' fee. Out of the latter is deducted thirty percent for the organization's share. The catering business is the women's supplemental source of income, not only because it is new and dependent on the frequency of the river tour patrons, but because these women have been engaged in making nipa roofing materials, farming and gleaning for shells for their main sources of livelihood. This women's group has also been the recipient of a 50,000 grant from DOLE which was used to purchase baking implements and initial ingredients. Unfortunately, the baking skills have not been learned adequately to produce quality baked goods. The endeavor stopped, the implements are shelved and the flour had gone to waste.[93]

The **Busao Women's Organization of Maribojoc** went inactive when the women members became busier looking for income other than those opportunities offered by their organization.[94] Under the new leadership, the plans are still to be formulated. Their sewing machine, courtesy of a woman Board Member is still around for anyone to use or learn from. The members do attend provincial activities in celebration of the Women's Month, usually to perform a dance.[95]

The **women's group of San Isidro, Candijay** is also engaged in entrepreneurial endeavor like decoration-making, which however could not sustain the passage of time. They underwent training in cooking because they wanted to learn new recipes to offer during fiestas. They attend provincial activities of the Women's Month celebration to perform a dance number, uniform expense included as part of the GAD budget. Their meetings are focused on their Sinking Fund, a forced savings mechanism which will allow each contributor to receive a certain agreed amount according to schedule, usually each month. Such amount will be contributed to by the member within the duration agreed upon by the members.[96]

WOPD women, particularly ANAK BAYONG, PAKANA, BANWAS and LANTAWA, participated in the construction of their multipurpose building by assisting in bringing the lumber to the site, leveling of the earth for the flooring base, separation of sand from gravel, and preparation of the snacks. According to WOPD's Chairperson, the livelihood projects in micro-lending: rice retailing, palay trading, consumer store, fish retailing and hog dispersal

[92] Discussion with the SAVIMA together with the PCNC Evaluators. San Vicente, Maribojoc. August 24, 2007.
[93] Ms. Amoritte Arayan, NKA Secretary. Interview. Discussion with the Agahay Barangay Council. August 11, 2007.
[94] Putol, op. cit.
[95] Ms. Rosario Dapiton, incumbent Chairperson of Busao Women's Organization. Interview. Busao, Maribojoc. August 11, 2007.
[96] Ms. Judy P. Macarayad, Barangay Committee on Women Chairperson, and the San Isidro Barangay Council. Discussion. San Isidro Candijay. August 13, 2007.

have contributed to the increase in income, doubly so at the end of the year when profits are divided.[97]

The **women's federation in Danao (WODB)** is also an entrepreneurial group, engaged in several small enterprises under their economic development window, managed by their women members. They have a beauty parlor, catering service, dress shop, traditional massage clinic, buy and sale of farm products, and rental service for gowns, kitchen ware, and "trapal." They used to render on the 3rd Sunday of the month voluntary clean-up of the whole barangay under their solid waste management program. But when they saw that the community was not doing its share, they shifted their energy into reminding the community through the pulpit and through the children who were tasked to remind their entire family. Their money is deposited at the nearest bank, the Rural Bank of Sagbayan.[98]

Like their sisters in the private sector, the women of Bohol who are in government service have also rallied together to improve their quality of life. The **BAWIGS-MPC** has been providing its members with a loan window to meet their emergency and other credit needs.[99] Organizationally, BAWIGS-MPC is efficient since (1) it has increased its membership to 300 women regular employees,[100] and (2) it has a strongly involved Board of Directors as can be gleaned from the majority's attendance to meetings where each Director is merited with more than 10 attendance.[101] At their program level, it has accumulated sufficient financial resources as tangible proof of its entrepreneurial success. There is an 18% increase in the Cooperative's asset from PhP2,615,240.00 in 2005 to PhP3,096,730.00 in 2006. Its Capital Build-Up from the members' equity amounts to PhP1,588,377.00 With an efficient collection, ranging from 25% to 65%, it has a Revenue Income of PhP602,110.00 and a Net Income of PhP454,192.00. [102]

- **Governance Participation**

WOPD is one of the accredited POs in the Municipality of Guindulman. It sits as Vice-Chairperson of the Guindulman Local Council of Women. It maintains continuous links with the Vice-Mayor by always inviting her to their activities.

The WOPD members have been strong in lobbying for a share of the GAD budget at the barangay level. **PAKANA** was able to get PhP5,000 for financial assistance in the construction of their Multi-purpose Center, **CWA** got PhP1,500 for livelihood capitalization while **NAKASA** was able to lobby successfully for PhP3,000 due for release for the construction of their rice retailing store building.

Lobbying for their GAD budget took time. They sat in several council sessions to push their agenda. When the Barangay Councils deny them share of the GAD Plan, the women use the Local Government Code to cite their right to it. [103] A PROCESS – Bohol women group (**Buayahan Mothers Association or BMA**) likewise pushed for their right to be provided financial assistance by the Barangay Council.[104]

The Women Empowerment Project (WEP) of PROCESS-Bohol was instrumental in getting the members of PAGKAINA-Bohol actively involved in Local Special Bodies as members of the different sectoral committees and successfully lobbied for the gender sensitive legislations: formation and adoption of seven Bantay Banay Councils (BBC) through

[97] Mision. Op.cit.
[98] Busalanan. op.cit.
[99] Telephone query with incumbent Chairperson Ms. Florencia L. Uy. BAWIGS-MPC September 28, 2007
[100] Ibid.
[101] Chairperson's Report 2006. BAWIGS-MPC.
[102] Ibid.
[103] Mision. op.cit.
[104] Bucia. Op.cit.

legislation in the five WEP municipal sites, establishment of crisis intervention (therapeutic) centers and allocation of budget for gender related activities.[105]

The efforts of PROCESS-Bohol were also instrumental in the passage of ordinance on anti-VAWC in Trinidad and anti-trafficking law in Talibon, both laws with budget allocations.[106] Another group, CATCHWISE-VAWC, which will be discussed in the sub-topics following, was also instrumental in this.

Sixty-five percent of the 17 POs of PAGAKAINA-Bohol are active members in Local Special Bodies and development councils in their respective Municipalities: Municipal Development Councils, Health Board and Municipal Tourism Council. Their active participation include issue deliberation, attendance to meetings and attendance in SB sessions where they were able to access financial support for their endeavors.[107]

- **Advocacy on VAWC and Anti-Trafficking**

In terms of accomplishments, from its inception to the present, **CATCHWISE-VAWC-PIACAT** was able to conduct series of advocacy fora for anti-violence against women through its member organizations and offices. The committee on Policy Development was able to draft through a writeshop a provincial ordinance entitled "An Ordinance Implementing and Enforcing the Provisions of RA 9208, otherwise known as the 'Anti-Trafficking in Persons Act of 2003."[108] As of April 21, 2006, this ordinance, authored by Board Member Godofreda Tirol who is the past Chairperson of the Coalition, was still of 1st reading (at the Sangguniang Panlalawigan) since there is a plan to incorporate anti-violence against women and sex-trafficking into the Women's Code. They will form part of one provision in said Code.[109] To date, there is still no Women's Code of the province. The LGU of Talibon, through the efforts of Ms. Virginia Item, an SB member, was able to approve two ordinances on this gender issue. [110]

- **Bantay Banay of PROCESS-Bohol** [111]

In response to high incidence of domestic violence cases, PROCESS set out to pilot the Bantay Banay Councils or Community Watch in seven barangays. The BBC is a multisectoral group of POs, NGOs, LGUs, MSWDO, PNP, DILG, academe and other sectors in the community who will watch out for all forms of domestic violence in the community. Massive information drive in school, purok, barangay and municipal levels were conducted on gender-related laws like anti-violence against women and their children, anti-rape, anti-trafficking and child abuse. This has caused the community to be gradually becoming vigilant of any abuse or violence in their areas.

Bantay Banay is supported by the local government units and concerned line agencies. This may have much bearing on the quick response to reported cases and building of referral system.

PROCESS has identified concrete gender mainstreaming impacts out of the series of gender sensitivity and reproductive health related trainings they have conducted:

1. Construction or establishment of crisis intervention centers. These are found in Eastern Poblacion and Tagbuane, Alburquerque, in Guinsularan, Duero, in Bacong, Anda and soon in Hinlayagan Ilaya, Trinidad.

[105] PROCESS-Bohol. op.cit.4
[106] Ibid.
[107] Ibid. p.12
[108] Draft Copy. Provincial Ordinance No. _____ An Ordinance Implementing and Enforcing the Provisions of RA 9208, Otherwise Known as the "Anti-Trafficking in Persons Act or 2003.. Prepared at Inotosan Resort, Danao City, Cebu. March 29, 2005.
[109] CATCHWISE-VAWC Meeting.April 21, 2006. op.cit.
[110] Ibid.
[111] PROCESS. Women's Empowerment Program Terminal Report op.cit.p.7.

2. Victim – students of San Roque High School sought assistance through Bantay Banay members.
3. Majority of the 40 cases referred and counseled by the BBC were filed in court with support from the lead agencies,

- **UBFCLC and HIV/AIDS advocacy**

UBFCLC expanded into advocacy in year 2000, in partnership with the Philippine HIV/AIDS Support Program, disseminating information on HIV/AIDS. Upon the project's termination, the information dissemination was sustained in the school. Then, it implemented SAFE HARBOR project, an adolescent reproductive health education for young men and women so they can avoid health risks. It ran for two years – 2002 to 2004. Now, UBFCLC has gone back to being mainly a Family Planning Services Lying-in Clinic, but has retained its relevant role as a Resource Center for Reproductive Health.[112]

7.3.5 GAD Entry Point: ODA Programs

Gender and Development is part of the various implementing components in all foreign funded programs, in compliance with the Official Development Assistance (ODA)[113] provisions of Republic Act 7192 or the Women in Development and Nation Building Act. It provides that a substantial portion of official development assistance funds shall be set aside and utilized by the agencies concerned to support programs and activities for women.[114] Responsibility for this is placed on the NEDA with the assistance of the NCRFW.[115]

To assist in the monitoring of compliance to such requirement, the Official Development Assistance – Gender and Development (ODA-GAD) Network was formed, upon the initiative of the Canadian International Development Agency (CIDA) when it convened in January 2002 a meeting of donors to establish the usefulness of such a network. In that meeting, attended by four bilateral agencies (USAID, JICA, SIDA, CIDA) and four multilateral agencies (WB, UNICEF, UNIFEM, UNFPA), it agreed to establish the network and to invite other donors. This is an informal group of GAD focal persons from 17 member organizations: bilateral and multilateral development agencies, international NGOs and the Philippine government formed to serve as a venue for exchanging information, experiences and best practices on gender and development, and for exploring possible collaboration and enhancing complementation of ODA programs. Its focus are on RA 7192 compliance re provisions on ODA funds; support for gender equality programming and mainstreaming efforts of members; thematic discussion (on issues such as gender and local governance, judicial reform, Mindanao programming, violence against women (VAW), reproductive health, economic empowerment, environment, among others); emerging gender equality issues; and influencing major development agenda/events.[116]

It issued a statement during the Philippine Development Forum (PDF)[117] in March 30-31, 2006 at Tagaytay City proposing that:[118]

1. The NCRFW be made a regular participant of the PDF

[112] Ms. Sylvia C. Doron. Interview. UBFCLC. August 22, 2007.
[113] OECD Glossary of Statistical Terms. ODA is defined as : Flows of official financing administered with the promotion of the economic development and welfare of developing countries as the main objective, and which are concessional in character with a grant element of at least 25 percent (using a fixed 10 percent rate of discount). By convention, ODA flows comprise contributions of donor government agencies, at all levels, to developing countries ("bilateral ODA") and to multilateral institutions. ODA receipts comprise disbursements by bilateral donors and multilateral institutions. *http://stats.oecd.org/glossary/detail.asp?ID=6043*
[114] Section 2 (1). Declaration of Policy. RA 7192 Women in Development and Nation Building Act.
[115] Ibid. Section 4. Mandate.
[116] Official Development Assistance – Gender and Development Network (ODA-GAD Network). *http://pdf.downloads/Others/Statement%20%of%20the%20ODA-GAD%20Network.pdf*
[117] The Philippines Development Forum or PDF is the primary mechanism of the Government for facilitating substantive policy dialogue among stakeholders on the country's development agenda. It also serves as a process for developing consensus and generating commitments among different stakeholders toward critical actionable items of the Government's reform agenda. *http://pdf.ph/about.htm*
[118] Philippine Development Forum Tagaytay City 30-31 March 2006. http://pdf.downloads/Others/Statement%20%of%20the%20ODA-GAD%20Network.pdf

2. The ODA-GAD Network be represented in the various working groups of the Philippine Development Forum to ensure mainstreaming of gender equality concerns and issues in PDF discussions;

3. The PDF and all donors support the Philippine government in promoting the application of the Harmonized Gender and Development Guidelines;

4. The Philippine government and the ODA donors report on donor compliance with RA 7192 in succeeding PDF.

However, per Status Report on the Action Plans of 2006 PDF during the 2007 PDF meeting, there was only a printing of Harmonized Guidelines and Training Manuals.[119]

7.3.5.1 ODA - Funded Programs in Bohol

Under the Bohol Poverty Reduction Program for Peace and Development, the Provincial Government channeled its 20 Percent Development Fund as leverage to secure funding from Official Development Assistance (ODA), Non-Government Organizations (NGO) and National Government Agency (NGA). Thus, foreign–funded programs abound in Bohol. Following are the current or just-terminated foreign funded programs in Bohol: [120]

1. Agrarian Reform Community Development Project Phase 2 (ARCDP 2)

This is a World Bank assisted project covering 15 municipalities, with the Department of Agrarian Reform (DAR) as implementing agency. ARDCP 2 spells infrastructure and other projects for Antequera, Balilihan, Catigbian and Tubigon totaling P153 million, for San Isidro, Trinidad, Ubay, Talibon, Danao and Getafe, P123.995 million and for Mabini, Alicia, Guindulman, Pilar and Dimiao, P129.542 million, or a total of **P406.537 million**.

ARCDP2 aims to significantly raise household incomes and the quality of life of the project beneficiaries by improving their productive assets, rural infrastructure and access to key support services through four components – community development and capacity building, agriculture and enterprise development, support to rural finance and rural infrastructure. Capacity building interventions include training, study tours, immersion, field observations and participation in trade fairs, on-the-job trainings, mentoring or coaching and provision of business and technical advisors. [121]

2. Kapitbisig Laban sa Kahirapan-Comprehensive and Integrated Delivery of Social Services: Kapangyarihan at Kaunlaran sa Barangay (KALAHI-CIDSS: KKB)

With the Department of Social Welfare and Development (DSWD) as implementing agency, this World Bank assisted project will fund projects that the barangay residents themselves will identify. All barangays of San Miguel, Trinidad, Ubay, Maribojoc, Carmen and Pilar stand to get P300,000 each in three cycles. The other towns are Danao, Buenavista, Getafe, Talibon, President Garcia and Bien Unido. The total cost is P287.5 million.

KALAHI (or *Kapit-Bisig Laban sa Kahirapan* meaning "linking hands in the fight against poverty") is patterned after the Comprehensive Integrated Delivery of Social Services (CIDSS) program. It provides the primary framework for fighting poverty in the Philippines. In supporting the Government's anti-poverty program, the key objective of the KALAHI-CIDSS project is to assist in strengthening people's participation in barangay (community-level) governance and to develop their capacity to design, implement and manage development

[119] Philippines Development Forum.
http://pdf.downloads/Others/Status%20of%20Action%20Plans%20from%202006%20PDF%20updated%20as%20of%20March%2030.pdf
[120] Aumentado Reports Accomplishments as of 2005. *http://www.bohol.gov.ph/downloads/guv's%20report.pdf*
[121] Guv, Mayors Sign P240-M ARCDP2 Grants
http://www.bohol.gov.ph/news/print.php?newsid=183

activities that reduce poverty. This program started in September 2002 and will close on June 2009. [122]

3. Philippines-Australia Community Assistance Program (PACAP)

The Provincial Government, in cooperation with PACAP is implementing a three-year program called Focal Community Assistance Scheme (FOCAS) aimed to strengthen economic governance, improve security and stability, and improve rural living standards. PACAP has allocated a total of P430 million for the FOCAS for five priority provinces: Bohol, Northern Samar, Surigao del Norte, Agusan Sur and Misamis Occidental. At 20 percent, Bohol's share is **P86 million**. PACAP-FOCAS covers 17 municipalities, namely – Maribojoc, Loon, Tubigon, Clarin, Inabanga, Catigbian, Alburquerque, Loboc, Sevilla, Bilar, Batuan, Sierra Bullones, Anda, Alicia, Dagohoy, Sagbayan and San Isidro.

Meanwhile, Bohol is also technically and financially assisted by the **Philippines Australia Human Resource Development Facility (PAHRDF)**. Its total assistance to date through capability building training in both short- and long-term courses now stands at **P15.981 million**.

4. The Belgian Integrated Agrarian Reform Support Program (BIARSP) III

BIARSP is a bilateral program between the Governments of Belgium and the Philippines to help the agrarian reform agenda. It is the biggest Belgian ODA to the Philippines.[123] Just recently terminated, the projects range from construction or rehabilitation of farm-to-market roads, improvement of main irrigation canal lining, construction of Level II waterworks systems, public latrines, repair of primary and elementary school buildings, construction of barangay health station, rural health unit building and municipal health center. It covers 16 municipalities: Trinidad, San Miguel, Pilar, Dagohoy, Batuan, Catigbian, Calape, Candijay, Carmen, Ubay, Sagbayan, Clarin, Mabini, Tubigon, Loboc and Sierra Bullones.

5. The Agrarian Reform Infrastructure Support Project (ARISP)

One major benefactor of Bohol is the Japan Bank for International Cooperation (JBIC) that gave grants to rehabilitate the 6.5365-km. Catagdaan-San Carlos-San Vicente-Inaghuban Road for P16.65 million in Pilar, and the Level II San Vicente Rural Waterworks System worth P1.22 million benefiting 99 households also in Pilar, or a total of **P17.87 million** implemented through the Department of Agrarian Reform (DAR).

6. Philippines-Australia Technical Support for Agrarian Reform and Rural Development (PATSARRD)

Australia also poured its ODA in Ubay, Mabini, Alicia, Catigbian, Antequera, San Isidro, Balilihan, Pilar, Guindulman, Sierra Bullones, Candijay, Getafe, Carmen, Trinidad, Tubigon and Talibon through the PATSARRD. Together with the financial or expertise put in by other partner local government units, the project cost reached **PhP4,056,616.**

PATSARRD is a tri-partite project of the Philippine National Government (through the Department of Agrarian Reform, the implementing agency), the Food and Agriculture Organization (FAO) of the United Nations (the executing agency), and the Australian Government (through AusAID, the funding institution). The project covers Agrarian Reform Communities (ARCs) in five priority provinces, one of which is Bohol.[124]

It was launched in Bohol on March 21, 2003 to give technical support to the government in

[122] Kalahi-Comprehensive Integrated Delivery of Social Services (Kalahi-CIDSS) *http://lguportal.org/projects.asp?projcode=73*
[123] Belgian Integrated Agrarian Reform Support Programme *http://www.ops.gov.ph/septvisits06/backgrounder-belgium.htm*
[124] United Nations Fund for Population Activities (UNFPA). *http://www.ppdo.bohol.gov.ph/pi.htm*

implementing the Comprehensive Agrarian Reform Program (CARP). Major types of assistance include planning, beneficiaries' economic development, monitoring and evaluation and support services coordination and integration.

7. United Nations Fund for Population Activities (UNFPA) 6th Country Programme [125]

The UNFPA 6th Country Programme of Assistance for the Province of Bohol is a five-year program expected to run from 2005 to 2009 in the pilot municipalities of Carmen, Talibon, and Ubay.

The Provincial Government and Municipal LGUs of the abovementioned municipalities will be the lead project partners, assisted by LIKHAAN (the lead local NGO), the Commission of Population (POPCOM), Department of Health (DOH), Department of Education (DepEd), and the Department of Social Welfare and Development (DSWD). It's three-fold approach, also called the program components, are made up of Reproductive Health, Population, and Development Strategies and Gender.

The underlying assumption is that gender-sensitive reproductive health strategies can be operational in a population and development strategies framework. Proposed strategies will focus on reducing fertility, improving maternal health, promoting adolescent reproductive health, and addressing and preventing STDs including HIV/AIDS, especially for the poor and vulnerable sectors. Each component has specific outcomes and outputs align with the UNDAP framework of results, interpreted as they are needed in the province, and in the three municipalities in particular. The UNFPA has allocated P5 million a year for its implementation, or a total of **P25 million** for the whole program duration.

Except for UNFPA 6th Country Program, all these foreign funded programs do not specifically identify GAD as a program component. However, PACAP required gender and development as a report component as can be gleaned from reports of the NGOs implementing FOCAS.

7.3.5.2 Women in Public Sphere

BAWIGS is an indication that there are many women in the bureaucracy of Bohol. It cannot be said at this point, though, what percentage in the different levels do they occupy, even if the NCRFW Factsheet on Filipino Women state that they make up the majority, per 2004 Civil Service Commission national statistics.

Based on the list in the COMELEC website (http://www.comelec.gov.ph) Bohol has five women Board Members, 13 women Mayors, eight women Vice-Mayors and 80 women Councilors, totaling to 106 elected women officials for the term 2007-2010. They comprise 21% of the elected officials in the entire province. It must be noted that there are five Municipalities – Bien Unido, Calape, Duero, Jagna and Loboc – which do not have women elected officials. Two of these have already passed their GAD Code. The Municipality of Garcia-Hernandez topped the list with the most number of elected women officials (five) followed by Cortes which has four. This figure does not vary much from the national percentage, (20% in 1998, 2001 and 17% in 2004).

At the judiciary, Bohol has one woman judge in its Metropolitan Trial Court Branch 2 based in Tagbilaran City.

[125] Ibid.

7.4 GAPS IN MAINSTREAMING GENDER AND DEVELOPMENT IN BOHOL

Gender and Development (GAD) mainstreaming of water activities in Bohol has to be addressed within the light of other GAD concerns, such as economic enterprise, anti-violence against women and environmental protection, not only because these are the gender issues today that Bohol women organizations have identified as needing sustained attention, but more importantly because the finite characteristic of water necessitates an integrated water resources management (IWRM) approach wherein water must be considered not only as an economic good but also as a social and environmental commodity. Like gender, water cuts across all aspects of life.

In Bohol, GAD has been practiced quite considerably among NGOs and POs. In their water-related projects, the GAD component is part of the project design, and in fact, contributed to the success of the project.

There are ODA funded programs in Bohol, as a result of the Governor's efforts to reduce poverty in the province. Except with the UNFPA 6th Country Program, GAD however is not categorically identified as a component in these programs.

With the LGUs, mainstreaming of GAD appears to be doing well. Five municipalities and the lone city in Bohol have already enacted their GAD Code, namely, Jagna, Batuan, Tubigon, Duero, Valencia and Tagbilaran City. All of them are generally comprehensive in ensuring the protection of women's rights in the economic, political and social aspects. Water or the right to easy access to safe water supply is provided for in all of these existing GAD Codes under Socio-Economic benefits for women. This is the only provision relative to water.

About 85% of the LGUs in Bohol have formulated Annual GAD Plans. Theoretically, they are considered to have taken to ensuring that the steps to respond to GAD issues and concerns are implemented. However, a closer look at the GAD plans reveals that most of the projects for which the 5% of total budget had been allocated for are infrastructure projects such as construction of classrooms, market buildings and waterworks structures, which normally are regular development projects of the municipality. Budget officers claim that funds are so limited and allocating another 5% for GAD puts further stress on the meager resources. Interpretation of GAD has come to mean it will cover anything, as long as women, men, children and the elderly are equally benefited. In effect, the 5% is distributed among infrastructure projects of the municipality benefiting women or the whole population. When a certain amount is appropriated for women, it is for the cost of uniform and travel expense during Women's Day celebration. Little or almost nil budget is allocated for activities for GAD consciousness-raising. Moreover, the GAD budget allocation exercise sometimes took the place of planning so GAD plan is equated with the budget. There are about 6% LGUs in Bohol doing this. Such current practice of GAD Planning and Budgeting misses the purpose of GAD as a development tool where the LGU can capacitate its personnel to address gender issues and women concerns in all aspects of their work.

Women groups abound in the municipalities through the Local Government Code mandated women associations in each barangay, but these groups are most often involved in activities which perpetuate and reinforce the traditional role of women, e.g. beautification projects, cooking and sewing lessons or as entertainers (dance numbers) during celebrations. This rich source of human resource needs intensive gender sensitization to facilitate GAD mainstreaming in the barangays.

Much has already been done in mainstreaming GAD in Bohol. Yet, there are gaps which need to be addressed to strengthen the efforts of both public and private organizations in ensuring equality of men and women in the development process for successful projects.

7.4.1 Consolidation of GAD Activities in the Province, Both Government and of the NGOs, POs and Private Sector

Other than that it is a legal requirement, the LGUs came up with GAD Codes and Plans because they are indicators in the DILG performance evaluation. There is however the absence of a common source of inspiration in planning and implementing activities towards a certain direction. The GAD Codes are based on the issues identified by national and international Gender responsive bodies, not that this is not right, but there is no indication that these provisions were in response to local issues. The budget allocation for GAD were done more for compliance with the law, to facilitate approval of their budget. Like in the GAD Codes, these activities should have been more in response to gender issues identified in the locality.

The NGOs have been focused in carrying out their mandates, mindful of their accountability to the donor agencies requirements. This resulted to limiting their experiences and results within their organization and with the donor agency. Sometimes, it trickles to their network. The rich experiences are not shared fully.

There is a marked absence of a provincial consolidating body of all GAD related activities. The policy have been enshrined in their Administrative Code and executed through a Bohol Women's Council. Much has to be done for the Council to carry out its role.

7.4.2 Critical Understanding by the Municipal GAD Focal Points of the Purpose of GAD in the Development Process

The Municipal Focal Points for GAD is indeed critical in GAD Mainstreaming but these points are generally lacking in Bohol. The Focal Points lead in ensuring gender responsiveness of the activities. They should have a more proactive role so that there is a clear direction of how GAD mainstreaming can be achieved. The active participation of the Budget Officers as the sole formulator of plan is caused by absence of a Focal Point directions or failure of the Focal Point to appreciate the purpose of his/her role.

7.4.3 More Functional Municipal GAD Plans

The Study has shown that GAD Plans did not undergo a more thorough investigation of the gender issues in the locality. Health and education issues are considered by most municipalities in their GAD Plan and allocated with budget, not only because they have been identified by international bodies and adopted by the NCRFW, but also because they are "regular" budget items in the municipalities' books. The GAD Plans must consist of efforts at responding to the issues, not palliative responses but towards a long-term response to address these issues.

An eye must also be on the lookout for the rest of the 95% budget. Even if the law provides for the 5% for the GAD Plan, it does not mean that the rest of the 95% can be discriminating of women's role in municipal or provincial development.

7.4.4 Monitoring and Evaluation of GAD Plans and Activities

The DILG have included GAD Plans and their accomplishments as indicators of performance. But monitoring the gender responsiveness of these activities during the year of implementation is absent. The mechanism to check this is absent.

7.4.5 Systematic Information Dissemination About GAD Activities and Progress

The rich experiences in GAD, both in the LGU and NGO sectors of Bohol, can assist other groups in mainstreaming GAD and in the process ensure success in their programs. There is an absence of a systematic information dissemination mechanism to make his possible.

There is an absence of information on what ODA funded projects, which are mandated to have gender components, have achieved in GAD mainstreaming. They should be made available to the province. Training and the build-up of expertise on GAD among LGUs are often eroded with the change of administration. Information flow again is aborted. RA 7192 mandates sex-disaggregated data collection and inclusion in programs and projects and strategies of the different government agencies and instrumentalities which directly or indirectly affect the participation of women in national development. Again, this rich source of information lacks consolidation for maximum usage in the process of development. The information flow on GAD mainstreaming in Bohol

7.5 STRATEGIES FOR MAINSTREAMING GAD IN BOHOL

A more critical need in Bohol is the presence of an enabling mechanism to facilitate GAD mainstreaming for this Master Plan. The GAD Specialist then proposes four major interventions to address these gaps during the period prior to construction of any facility or year 2010 and the period of implementing the proposed development program, i.e. construction, feasibility study, detailed engineering design, and construction supervision. Major water facilities and components will include (a)source facility, (b) water treatment plant, (c)storage facilities, (d)transmission lines, (e)pumps stations, (f) power source development, ((g)Land Acquisition and Right-of-Way, and (h)stored materials and equipment.

The proposed GAD interventions prior to 2010 are:

1. Institutionalization of Gender-Responsive Water Policies.
2. Creation of a Coordinating Center for GAD Mainstreaming in Bohol.
3. Nurturing GAD Advocates in water activities
4. Development of a creative but efficient information dissemination Plan on GAD.

7.5.1 Institutionalization of Gender-responsive Water Policies

In preparation for the installation of facilities and other engineering components, GAD needs have to be addressed. First, GAD Water Policies will be enshrined in an Executive Order with its implementing guidelines. However, this can be integrated, when applicable, with the Water Management Council Implementing Guidelines. The Policies will cover the following concerns:

a. Gender and Development in Water Resources Management

Water Gender Issues. Scarcity of clean and safe water is a burden which have given rise to health and economic problems, most particularly of women who have the onus on their shoulders. Now that the master plan to establish Bohol's water system is underway, women and water policies have also to be ready to adequately respond to the consequences implementation activities might result to, more so, when there is every probability of increase of women's burden. Affordability of water has to cut across all strata of society, environmental degradation consequently affects women more than men, Food production uses most of the available water and thereby affects women.

Creation of Bohol GAD Water Management Body. The GAD Managing Body will be created to cover coordination of GAD related water activities. It will facilitate, in part, research on gender and development in Bohol. It will develop GAD information dissemination strategies, and water programs/ services which will provide venue for women's access to Education, Cultural Determination, and to their socio-economic benefits. Women can have access to water knowledge and women-friendly water resource management technology., on Water National Policies implications on women, and adult education. Institutions must promote gender-sensitive curricula on water resource management.

Indigenous peoples of Bohol must also be of concern to this Body. Their right to cultural determination can be addressed with documentation of their indigenous water resource management practices.

Socio-economic benefits for women will include Access to safe water and Access to financial assistance windows for water-related endeavors. The PO members of PAGKAINA and WOPD can be tapped to provide input on this

7.5.2 Creation of a Center for GAD Mainstreaming in Bohol

Institutionalization efforts by the NCRFW and DBM of Gender and Development have already made headway in its mainstreaming through the budgetary requirement on LGUs for GAD projects. Though this has resulted to laying out of the plans more for compliance purposes than reflection of the inroad which GAD has achieved with the 5% budgetary allocation, it has made the Chief Executives, MPDCs, and MBOs more conscious of GAD. That DILG has identified GAD Plan and GAD Code as indicators for evaluation has also contributed to mainstreaming GAD among government offices. How this consciousness can be strengthened and can reach other offices and organizations can be addressed by the GAD Center.

In preparation for 2010, each river cluster will have a satellite point for GAD mainstreaming, working with a general purpose and with specific objectives appropriate to the needs of each river cluster. This set-up is different from the existing focal point of each municipality since this is focused on water alone. The satellite point can be an NGO or PO who is very active in the area. The NGOs and POs within the cluster will be tapped to surface the needs of the communities they are serving. Again, the strong collaboration among the government and NGOs/POs will facilitate or hasten the implementation of programs.

a. Enabling Mechanism

Through an Executive Order, a BOHOL GAD Management Board will have to be created to manage GAD mainstreaming activities in the province. It shall manage a Center which shall ensure that GAD and all related activities, including those of national programs, in the province are in consonance with a Gender and Development Plan, properly documented and disseminated, monitored and evaluated, and readily accessible to who may need it to further promote GAD as a way of life. It shall facilitate inclusion of water issues and concerns in the GAD Code of the municipalities, reflective of the over-all GAD policy of the province. .

Preparation for the creation of the Board will be the responsibility of an ad hoc Secretariat, members of which may later form part of the GAD Management Board. The ad hoc Secretariat will be identified from among the GAD advocating NGOs based in Bohol.

b. Board Membership

The Board Chairperson will be the Governor of the Province while the Vice-chairperson is the Chairperson of the Committee on Women. Other officers and members will be GAD advocates from provincial offices, national line agencies, NGOs, POs and other water user groups advocating for water, food, anti-violence against women, entrepreneurship, education and environmental protection. Membership will be distributed among these advocacies.

c. Operations

The Center will be operated by a functional Secretariat, and initially, can be financed from the 5% GAD allocation of the provincial budget. To enable this Board to work efficiently, it will facilitate fiscal autonomy with a separate bank account. Later, the Center may acquire legal personality for capacity to source funds elsewhere.

The GAD of water sector will ensure conduct of constant studies on gender relations in water activities, results of which will have to be reflected in program and project designs of both government and non-government entities. It shall tap all avenues for research projects. It shall facilitate the generation of database on water related projects, accessible to any office

or organization, subject to intra- and inter-office protocol. It shall develop mechanism for sex-disaggregated data to be made available from national agencies like DOLE, CDA, DAR, DA, DENR. Each municipality has a number of cooperatives but the CDA has records of total population of membership only.

7.5.3 Nurturing Gad Advocates In Water Activities

Spokespersons for GAD will contribute to hastening the process of its mainstreaming in the water projects in Bohol. Advocates will turn in more like-minded individuals because of their sphere of influence.

The best advocate, of course, is the Local Chief Executive. But few in reality are. Advocates are identified from existing GAD practitioners, resource persons and personalities in the province who have been supportive of GAD. LGU officials who have undergone training in WIN (Women in Nation Building) are a rich source of advocates. Ears must be keen for Officials who have proposed specific mechanisms for GAD success like the Vice-Mayor of Candijay who wants a separate account for the GAD budget to ensure it is for approved GAD purposes only. Gender–sensitive wives or mothers to Mayors will rake in more hands and hearts than what irregular training courses can do. Heads of offices who have been vocal about their gender and development orientation must also be tapped. Agriculture and Agrarian Offices are ripe with advocates considering that the programs of the national or regional offices have gender components. The NGO leaders in women issues, such as water, anti-violence against women, economic enterprise and environmental protection will contribute much in consciousness-raising. The academe-based advocates can promote research on gender relations in water related projects and among their students. PO leaders can join hands in relating their successes.

7.5.4 More Creative Information Dissemination on GAD

Reliance on single shot orientation or training among LGU GAD planners in ensuring that GAD will be understood and implemented has created a hiatus of knowledge among the team tasked to ensure it is operational. Training did not lead to multiplication of knowledge and skills but became permanently lodged in the Budget Officer who underwent training for GAD budgeting. In some LGUs though, the MSWDO prepares the plan.

Thus, consciousness raising among the LGU personnel and other stakeholders has to be addressed. Information need to be regularly disseminated through more creative means to make them imbibe GAD as a tool for development. Waterworks personnel must undergo gender sensitization activities.

Water projects will have to be substantially documented where male and female participation in implementation is being addressed. The experience of PROCESS Bohol, BOCAP, WOPD, CASEC, UBCDFI and Barangay Busao Waterworks, can serve as learning tools. The nature and degree of participation, the factors affecting it, the resulting events or circumstances of said participation can illustrate a strong message for GAD as a development strategy.

Advocates may avail of opportunities offered by regular events to promote GAD. Baseline of sex-disaggregated data can be compiled by LGUs through their respective offices from the latest NSO report, from Cooperatives in their area, and from existing programs implemented therein.

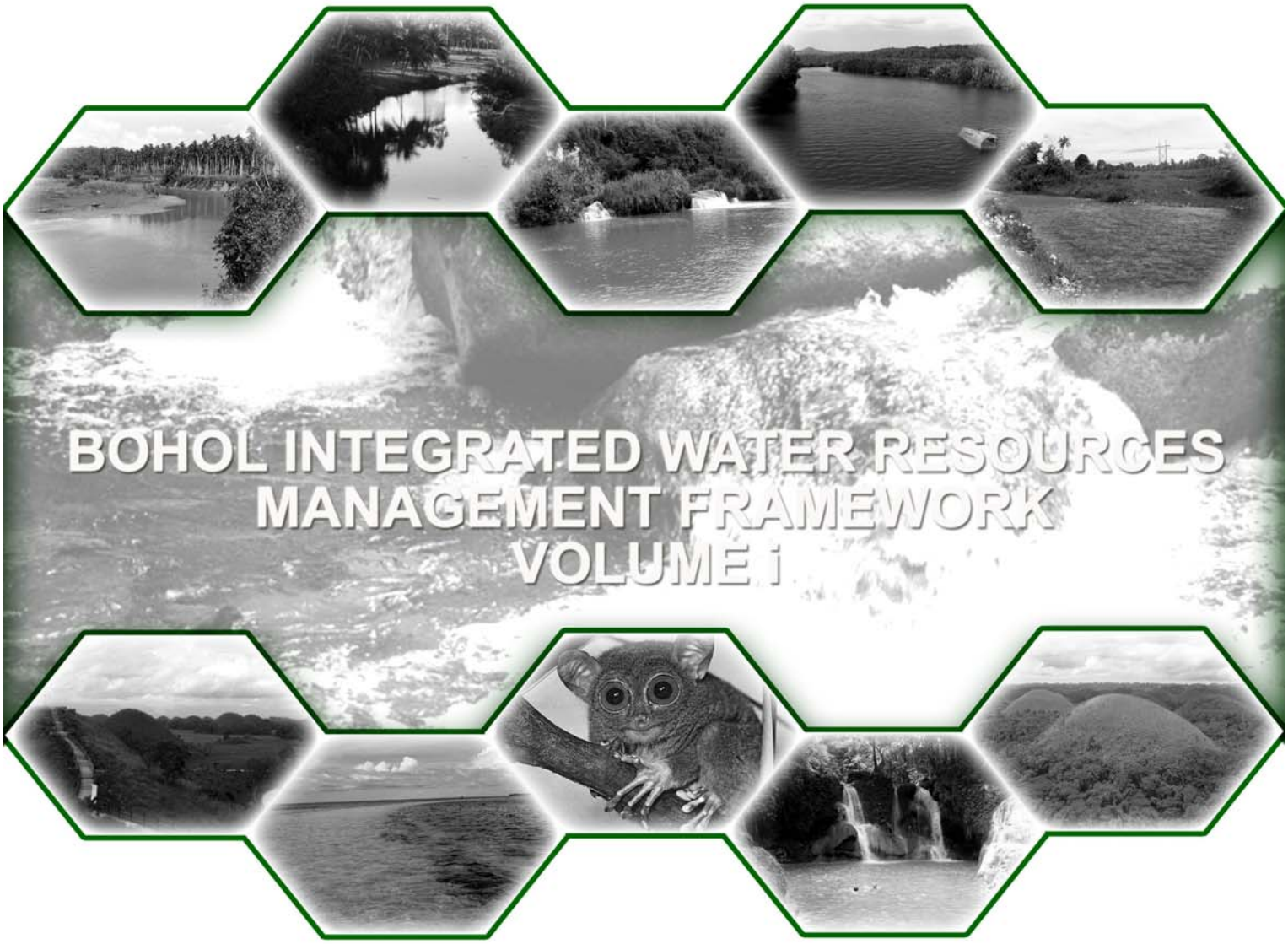
7.5.5 GAD Mainstreaming in the Proposed Master Plan Development Program

In the construction of major water facilities and components per the Master Plan, GAD is a marked presence in Labor and Employment. Gender sensitization is a prerequisite for all personnel, they be administrative or technical. Each one has to learn to live Gender equality and appreciate what sexual harassment entails to ensure a gender sensitive workplace is

created. Both women and men have equal access to job training and promotion, wage and benefits. Moreover, the construction components must have gender sensitive health services (reproductive health - child care minding center and day care center), crisis intervention center and Office for complaints against sexual harassment.

Feasibility studies have to measure women's participation in any of the construction components. The sex-disaggregated data will lead to a more accurate measurement of women's needs and capabilities. Studies have to be conducted on ways and means of identifying where women have greater potential for abuse of their right to participate.

It is further recommended that in all activities to mainstream GAD, it must be noted that in order for mainstreaming to take root, only women and men from the clusters can collectively write the policies. Any outside help is purely for facilitation purposes. Therefore, an outside consultant can only be hired to facilitate the formulation of the policies and similar activities. This is to plant the seed of ownership among the stakeholders and ensure, in the process, vigilance of their implementation.



CHAPTER 8
MANAGEMENT INFORMATION SYSTEM

CHAPTER 8 – MANAGEMENT INFORMATION SYSTEM

8.1 INTRODUCTION

In this age of information technology, any organization intent on positioning itself for competitiveness must reckon with the requirement for an effective system on information and knowledge management. The use of Information and Communication Technology (ICT), and the swiftness by which this technology develops, has challenged every public and private organizations.

But in what context has information management, and the use of ICT, got to do with IWRM or with an integrated water supply system, one may be tempted to ask. Will the use of ICT provide competitive advantage, and in what way will it do so if ever it does? Or will it just be another "expense" item that lavishes the curiosity of techno-phobics and computer geeks? Or perhaps a status-quo symbol for government executives, as well as of government offices and institutions?

In this Chapter, the importance, and the relevance, of the use of ICT for information management will be illustrated and a conceptual design for a water management information system will be offered. Then, a normative spatial-based information system is presented for possible adoption. As the discussion unfolds, there will be a discussion on state policies, mandatory requisites and technology standards set forth by the national government which guides the usage and adoption of ICT in the country. All discussion should be understood within the framework of the requirements of the Integrated Water Resource Management which is the foundational concept for the integrated water supply system.

8.1.1 Background Information

The Integrated Water Supply System Master Plan for the Province of Bohol was developed under the auspices of the Bohol LADP and through the local LGDP Partnership Advisor. It was developed through a series of participatory workshops to identify priority projects which will benefit all municipalities in the Province, build on past initiatives, while contributing to local economic development and poverty alleviation.

The purpose of the technical assistance is to develop an Integrated Water Supply System Master Plan that guides the development of Bohol's water resources for safe domestic, commercial and industrial use in order to improve the health of the community, while increasing opportunities for local economic development and protecting the depleted groundwater systems. The implementation plan is specified so that it is inclusive, sustainable, economically viable and achievable in the medium to long term.

One of the required outputs/deliverables under the scope of services of the technical assistance for the development of Bohol Integrated Water Supply System Master Plan (BHL-01) is a conceptual design of a Water Management Information System (MIS) for Bohol's water resources. This management information system includes the knowledge base of information about Bohol's water resources. This also include, but not limited to, spatial information on the existing and proposed water supply infrastructures, its capacity, water supply and demand data, catchments management programs, environmental flows, and surface water systems.

8.1.1.1 Information System

An information system is a system consisting of the network of all communication channels used within an organization. It is concerned with the collection, storage, manipulation, and dissemination of data and information. In its current computerized form, it includes hardware, software, people, communications systems, and the data itself. The activities involved

include viewing and inputting data, processing of data into information, storage of data and information, and the production of outputs such as management reports.

As a system, it concentrates on the integration of the use of ICT with the aims of the organization in terms of supporting business processes and operations, decision-making, product and/or business development, and adding value to competitive strategies.

Adoption of computer-based information systems, more commonly referred to as management information systems requires the following key activities:

- Systems analysis, which includes information needs assessment, requirements analysis, and requirements specification;
- Systems design, which includes synthesis of alternatives, cost-effectiveness analysis of alternatives, specification of criteria for selecting a preferred alternative, selection of a preferred alternative, top-level design, and detailed design;
- Systems implementation, which includes forms development, specification of data collection and entry procedures, development of editing and quality control procedures, software coding and testing, development of training materials and training, integration of the software components with other system components (e.g., personnel, communications, data transfer and assembly, report preparation and distribution, feedback), and system-level testing;
- Systems operation and support, which includes not only routine operating procedures but also provision for on-going system financing and management, quality control, software maintenance and updating, personnel training, and system maintenance and improvement (including periodic review of system performance and diagnosis and correction of problems).

In an integrated water supply system, operating within the concept of IWRM, substantial amount of data needs to be generated, collected, sorted, stored, analyzed, manipulated, retrieved and reported, a good information management system will a necessity. It can enhance communication through appropriately presented information; improve willingness to pay through effective billing, metering and customer relations management; facilitate early detection of problems both at the supply and demand side; monitors consumption patterns easily; and, monitors performance of water service providers. This will greatly facilitate monitoring of environmental conditions and income patterns both for the government, business and the consumers.

8.1.1.2 Management Information System: Organization, Technology, Infrastructure

There are three interdependent elements in a management information system: organization, technology and infrastructure (see **Figure 8-1**). It is inaccurate, if not an outright mistake, to think of an MIS as the simple adoption of ICT. Although used interchangeably at times, MIS is not ICT, and ICT is not an MIS. A system is always composed of three key features which are normally referred to as “input-process-output”; with an added feedback loop. In essence, it deals with “input process, procedures, and tools”; “process protocols, rules, and tools”; and, “output process, procedures, tools and reports”. Also, a system needs an environment where it will operate; it requires an “operator” to ensure that the system is running as designed, and a medium it can use to facilitate the process. By analogy, if a person (data) needs to be conveyed to a destination, that person will require a vehicle (technology) that will transport him/her via a road/highway (infrastructure).

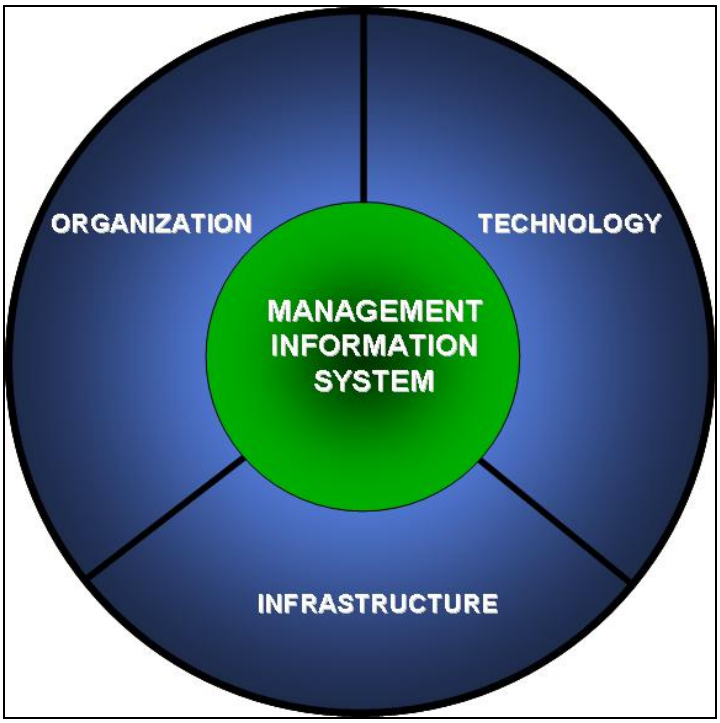


Figure 8-1 MIS Elements

8.1.1.3 Organization

Establishing an MIS requires thorough planning and designing in terms of the information system itself as well as the physical organizational structure that will oversee the operation of the system. Creating the organizational structure requires the consideration for the logical and physical location of the structure. Logical location refers to the position of the structural unit within the total organizational structure of the agency or institution, i.e. MIS Unit under the Project Monitoring Division of a department, or an autonomous department under the office of an executive. Physical location refers to the specific site of the unit or department, for instance, at the ground floor or top floor of the provincial capitol building. The decision on its logical position in the organizational and functional chart may influence to a great extent its physical location placement. The decision on its logical location is in turn influenced by how the organization defines the function of the MIS group, and how it views it role in the over-all business of the agency/institution. For the province of Bohol, the main MIS Unit is subsumed into the office of the Provincial Planning and Development Coordinator.

In addition to defining its logical and physical location, an MIS group's function must be well crafted and established across the agency. In turn, the MIS group must be able to draw up MIS and ICT policies and standards for the agency. Hence, one of the key management decision is: creation of a distinct MIS group whose primary role and function is to align ICT with the business requirements and MIS needs of the agency, and manage these for efficiency and effectiveness. An ad hoc MIS group will never be fully useful, productive and efficient.

8.1.1.4 Technology

One of the challenges of adopting an MIS is the pace by which technology evolve. This is also one of the driving reasons why an "institutionalized" MIS group within an organization is necessary. There must be a professional group within the organization whose primary function is to set up policies and standards: ICT usage, network security, computing platform, network architecture, internet connectivity, hardware, software and ICT training. Not a few organizations, especially in government, suffer from the proliferation of

application software or legacy systems which do not inter-operate or where the file formats are incompatible.

GIS files of the province appear to have compatibility issues with GIS files of the other LGU's as well as the academe. ICT hardware procurement must be based on a systematic MIS design where functionality is the primary reason for procurement or upgrades. Without a policy standard, there is a tendency to chase after "top-of –the-line, state-of-the-art, cutting-edge" technology even if the existing hardware and software still delivers the functionality it was meant to deliver at the same reasonable time-line, and at cost-efficient manner. A lot of executives had complained about ICT being a huge expense item: it is if its procurement is based on desire and not on design. If it is the latter, then the procurement becomes an investment.

8.1.1.5 Infrastructure

It used to be that an MIS is operated on a lone desktop computer and information exchange is done through sharing of temporary storage devices like floppy diskettes. In today's computing environment, sharing of data and information could be done by linking one desktop computer with others in an infrastructure called "network". The distance between these desktops range from a few feet (on the desk of an officemate) to a hundred feet (on the desk of an officemate on another floor of the office building), to even thousand of feet (on the desk of a municipal staff in Talibon), desktop computers could even be linked with another on the other side of the globe!

The type of networks described above is called, respectively: peer to peer; local area network, wide area network, internetworks. This is the infrastructure that must be studied, analyzed, designed and decided upon. There are technical specifications that must be considered within the context of the organizational needs and requirements. This requires a good MIS group to facilitate.

8.1.1.6 Electronic Governance (e-Governance)

By simple definition, e-governance refers to the use of ICT by government to provide information and deliver basic services to its citizen and other publics. The concept is actually a take from the private sector electronic commerce (e-commerce) where information, as well as goods and services, including payment for these goods and services, are done on-line through the use of ICT. It is postulated that e-governance, especially when adopted by local governments can enable them to "re-invent" themselves, and be able to maintain a good deal of the promise of democratic governance.

8.1.2 Purpose of this Report

The main purpose of this report is to present a conceptual design of an MIS for *BIWSS* including the implementation plan, identifying data needs and solutions, and system architecture with sufficient detail to commence the development of an MIS for Bohol Integrated Water Supply System Master Plan.

8.1.3 Organization of the Report

Outlining the topics included in this report, Section 8.2 defines the Philippine e-governance followed by Section 8.3 stating the objectives of the proposed MIS. Section 8.4 enumerates the different requirements of the expected users of the proposed MIS which are the BIWRMB, its three technical working groups and other water stakeholders interested on the information stored in the database. Section 8.5 discusses the concept of GIS-based MIS and how it can be used as a tool for decision support to the proposed BIWSS. It elaborates the use of GIS models and the scope of data required specifically for the BIWSS. Section 8.6 discusses the data requirement of the GIS-based MIS. The result of the workshop on GIS and databases as well as the assessment of existing spatial and tabular databases were reviewed. Other spatial data that were generated by the consultants on the proposed water

system were also discussed. Section 8.7 explains the computer system's architecture. Included in this section is the proposed location of the Data Center and its hardware setup and specification. Section 8.8 discusses the BHL-01 website to be used and to be deployed in the Data Center. This section includes the software and configuration required by the website, the inter-agency data flow, the GIS modules inside the website and how it works and what is capable of, and the content management. Section 8.9 discusses the framework for governance like implementation planning and coordination, staffing, training, and budgetary requirements. The last section, Section 8.10, enumerates the recommendations and immediate concerns.

8.1.4 Other Related Reports

- Proceedings of the workshop on Water Management Information System: Databases & GIS. Pastor P. Garcia, August 30, 2007 (**Appendix I.8-A, Volume III - Databook)**.
- Watershed Boundary Delineation of Seven Major River Basins in Bohol Using SRTM Data Analyzed in GIS. Pastor P. Garcia, September 30, 2007 (**Appendix I.8-B, Volume III - Databook**).
- Map Atlas of Spatial and Tabular Data for Bohol Water Resources. Pastor P. Garcia, September 30, 2007 (**Appendix I.8-C, Volume III - Databook**).

8.2 PHILIPPINE e-GOVERNANCE: DIRECTIONS, POLICIES, STANDARDS

The Philippine government aims to make the country an e-service center in Asia, and be a competitive outsourcing destination. Since the late 1990's, various executive fiats and administrative directives had been issued, in addition to several laws and statutes than aims to promote e-governance. It has even provided fund support to spur investments in the area of ICT, and is currently working on the establishment of a Cabinet-level agency that will focus on ICT business alignment.

8.2.1 Directions

In a 2002 LGU e-Governance Readiness Survey conducted by the National Computer Center, it was indicated that local government units (LGU's) has a long way to go in terms of establishing e-governance. It was the reason for the conceptualization and implementation of the e-LGU Project which led to the increase in the web-presence of LGU's. However, not much had changed for although there was web-presence, there was hardly any "real" local e-governance happening. One of the reasons then cited for the dismal web-presence was the absence of Internet Service Providers (ISP's). A cursory review in the province of Bohol revealed that the presence of ISP's is directly linked to the presence (or absence!) of telecommunication facilities. With the advent of wireless computing, this difficulty may be near to being overcome.

Another drawback cited in the Survey was the inadequacy of financial resources that could be used to make the necessary investment in ICT and MIS. In keeping with the ICT strategic roadmap, not only has the national government provided enabling policy environment, it has also provided a fund source that could be used: the e-Government Fund.

The e-Government Fund was created as an alternative funding source for mission-critical, high-impact, and cross-agency ICT projects:

- Institutionalization of a facility/mechanism that would provide full funding support for mission-critical government ICT projects;
- Ensure successful completion of high-impact ICT projects that would jumpstart the development and implementation of e-Government throughout the country; and,
- Facilitation of professional evaluation, selection and monitoring practices for ICT projects that would result in more effective and / or efficient cross-agency interfaces.

Consistent with established ICT Plans and Frameworks, i.e. MTPDP, GISP & ITECC Strategic Roadmap, and requiring an approved agency Information System Strategic Plan (ISSP), proposed projects must satisfy the following criteria: citizen-centric cross-agency; and, a multiplier effect. The e-Gov Funds are replenished with around Php1.0 billion annually.

8.2.2 Policies

The ICT policies of the national government, which cascades down to the lowest stratum of the LGU's, are the following:

- Republic Act No. 8972 otherwise known as the Philippine e-Commerce Act;
- Republic Act No. 7718 otherwise know as the BOT Law;
- Republic Act No. 8293 otherwise known as the Intellectual Property Rights Code;
- Republic Act No. 9239 otherwise known as the Optical Media Act of 2003;
- Executive Order No. 265 (Government Information Systems Plan);
- Executive Order No. 262 which provides policies, guidelines, rules and regulations for the procurement of goods/supplies;
- NCC Memorandum Circular No. 2002-01 (Guidelines on Creation of the Agency's Official Website and Compliance to e-Commerce Law & Stage 1 of the UN-ASPA Stages of e-Government);
- NCC Memorandum Circular No. 2003-01 (Guidelines on Compliance to the e-Commerce Act & Stage 2 and 3 of the UN-ASPA 5 Stages of e-Government);
- Joint Memorandum Circular No. 2002-01 (Rules and Regulations to Implement Section 78 "Lease-Rental of Computers and Other Information Technology (IT) Equipment under R.A. 9162"); and,
- Memorandum Circular No. 115 (Directing All Departments and Agencies and Instrumentalities to Legalize their Computer Software).

Further, the national government has issued the Philippine Government Inter-Operability Framework (PGIF) which laid down the foundation of key principles, notably:

- When appropriate and available, published Internet and www standards and the government's own standard will be adopted;
- The standards within the Framework should conform with open-systems principles;
- Mandatory standards will be prioritized and strictly enforced, and if proven insufficient then recommended; and,
- These are relatively short-list of policy guides issued.

8.2.3 Standards

Notable among the standards for e-governance is the United Nations-American Society of Public Administrators (UN-ASPA) which is used to qualify the level of ICT adoption by government agencies, offices, and instrumentalities. Below is the description of each Stage:

Table 8-1 The Stages of e-Government

Emerging	:	A government web presence is established through a few independent official sites. Information is limited, basic and static.
Enhanced	:	Content and information is updated with greater regularity.
Interactive	:	Users can download forms, contact officials, and make appointments and requests.

Transactional	:	Users can actually pay for services or conduct financial transactions online.
Seamless	:	Total integration of e-functions and services across administrative and departmental boundaries.

For the province of Bohol, the websites of the province and all its city and municipalities are all static web pages. Most of the LGU's website is hosted by the e-LGU of the NCC and all are in Stage 1. With the current efforts exerted by the provincial government, it may not be too long before its website is elevated to the higher Stage bracket.

8.3 OBJECTIVES OF THE PROPOSED MIS

The main user of the proposed MIS is the newly formed Bohol Integrated Water Resources Management Board (*BIWRMB*) and its three technical working groups. The proposed MIS must be able to accomplish various functions such as data management, data analysis, data visualization/monitoring and as a tool for decision-making. Other MIS users may include stakeholders who maybe interested in knowing the current status on water availability, water quality, status of the proposed water supply system and other water-related parameters from time to time.

The general objectives of the MIS therefore are as follows:

- To provide users with on-going access to the physical status of the proposed water supply system and to the water-related data (water availability, water quality, water use, rivers and other water-related data) of Bohol. The availability of transparent water resources data, information and knowledge will facilitate improved decision making processes and build public trust and confidence in the overall process.
- To allow for the collation, analysis and reporting of data gathered for BIWSS and to be made available through the Web so as to be used in performance indicator and benchmarking assessments.
- Architecturally, it is envisioned that the framework will allow custodians of water information (data contributors) to make their data available for sharing.

8.4 THE MIS USERS' REQUIREMENT

The table below (**Table 8-2**) lists the users' requirements for the MIS as noted during informal discussions with stakeholders and counterparts and during the initial presentation of the report last September 7, 2007 at the conference room of the Bohol Provincial Planning and Development Coordinator's office.

Table 8-2 Possible User Requirements of the MIS

No.	User Requirement/Description
1	Data Visualization
1.1	View pre-developed static fundamental data including pre-developed maps, graphs and tables about water in general that provides overview of the state of water in Bohol.
1.2	View directory of people, projects, stakeholders and organizations involved in the water industry and related to water resources data and information.
1.3	View the current and most useful versions of available water data and information.
1.4	View a directory of reports, whitepapers, research papers, documents etc. including existing water management plans, watershed management plans, laws, ordinances and others.
1.5	View frequently asked questions.

No.	User Requirement/Description
2	Report Generation
2.1	Generate customized and ad hoc reports using different pre-defined templates, data sets, or other information that may be applicable and available.
2.2	Query maps and obtain additional information about an area, using mapping layers of different information, drilling down to more detailed and smaller areas, and panning (etc).
2.3	Print maps
2.4	Generate, print and export graphs of data on a key water related topics.
3	Data and Information Query
3.1	Conduct simple searches and obtain meaningful search results.
3.2	Search & display metadata about: data, information, data sources, people, projects, references, etc.
3.3	Search for data and information by multiple dimensions including by: data sets, information elements, time periods, jurisdictions, locations, organizations, document type, dates, etc.
4	Data Accessibility
4.1	Obtain / export / access to raw data at the lowest level possible, as well as at various levels of aggregation in an efficient and timely manner.
4.2	Determine who the data holders are and how to access the data where data is not immediately accessible or where data can be obtained offline from agencies / catalogues /websites.
4.3	Access and download data on a particular topic and or location for further processing in a number of methods: e.g. for GIS models, GIS software or tools such as Microsoft Word and Excel, spatial, temporal, at different scales and degrees of accuracy etc.
4.4	Provide data that can be used to help reporting, delivery of initiatives and requirements.
5	Analysis and Manipulation
5.1	Conduct interrogations of the data and methodology (used in reports or analysis).
5.2	Compare information over time.
5.3	Compare and review information across locations (e.g. towns).
5.4	Understand the relationships between data sets – e.g. environmental flows versus extractions.

8.5 USE OF GIS FOR WATER SUPPLY SYSTEM

8.5.1 GIS Models as a Tool for Data Analysis

Although data management and visualization are important components of the MIS, the most important function of the GIS-based MIS is for decision-making and management. With the application of GIS models as a tool for data analysis, the *BIWRMB* and the technical working groups will be able to identify, analyze, and quantify the effect of broad management objectives and crosscutting issues such as environmental objectives, any proposed land-use change, new policies, economics, etc. in different scenarios to derive to an informed decision.

GIS models however, require technical assumptions and quantitative information derived through direct observations and mathematical calculations and feed into GIS models. The type of technical assumptions and information necessary to quantify these broad objectives can be described as:

a) *Data* – factual or observed information such as measurements or statistics (e.g. gauged flows in a river, population, salinity of the water sample, etc). The sets of data maybe raw (as taken from measuring devices) or elaborated (or modified slightly as part of quality assessment and quality control measures), or *interpreted* (supplemented to address missing measurements);

b) *Relationships* (or system interactions) – descriptions of how the social, physical, and environmental systems affect or are affected by the status of water supply and water use (e.g., how releases from a reservoir affect water temperature at a point in a river downstream, the irrigated crop acreage in a municipality and the expected market conditions for each crop and the delivery of water), and;

c) *Estimates* – inferred, derived and/or forecasted quantities based on available data, defined relationships, and other assumptions (e.g., population forecasts for the province in the next 15 to 25 years, groundwater flows between sub basins, future available water deliveries, and the cost to implement water conservation best management practices).

In order to better understand the complexity of data, relationships, and estimates required for GIS modeling and scenario building, the different system parameters that characterize and significantly affect the *BIWSS* should be organized according to their potential interactions as shown in **Figure 8-2**. These parameters are explained below:

a) The *water demand parameters* influence the calculation of water demand which is not directly controlled by water management activities (e.g. data on population, population density, land use patterns, economic activity, etc). This represents the *human and environmental water demands* that include both the dynamic consumptive and non-consumptive demands for water that fluctuates based on the climate, economy, and changes in water use efficiency, population growth, and other factors. Consumptive demands include activities that deplete water from the system by evaporation, evapotranspiration, or flows to saline water bodies. Non-consumptive demands include activities that require a specific quantity of water at a particular location and time, but do not deplete water from the system. This includes releasing water for hydropower production, stream flows, or municipal water use that flows to a wastewater treatment facility and is later released to a stream or recharged to groundwater.

b) The *geophysical parameters* represent the hydrology, hydrogeology, geology and climate which form the natural constraints of the water supply system, for example data on precipitation, soil properties, aquifer transmissivity, etc.

c) The *water management objectives parameters* are those developed by policy makers for desired output of the water system while considering the various constraints, competing demands, and numerous resource strategies or *management options* to improve operation of the water supply system and are heavily influenced by the desired water management objectives. This includes actions like water use efficiency, surface or groundwater storage, floodplain management, and ecosystem restoration, desired water quality and desired water reliability at a particular location, time and purpose.

d) The *water infrastructure parameters* are those man-made and natural water storage and conveyance features where the water management decisions are implemented. This includes location, storage and flow capacities, and operating criteria of reservoirs, pipes, wetlands, floodplains, lakes, rivers, and groundwater basins.

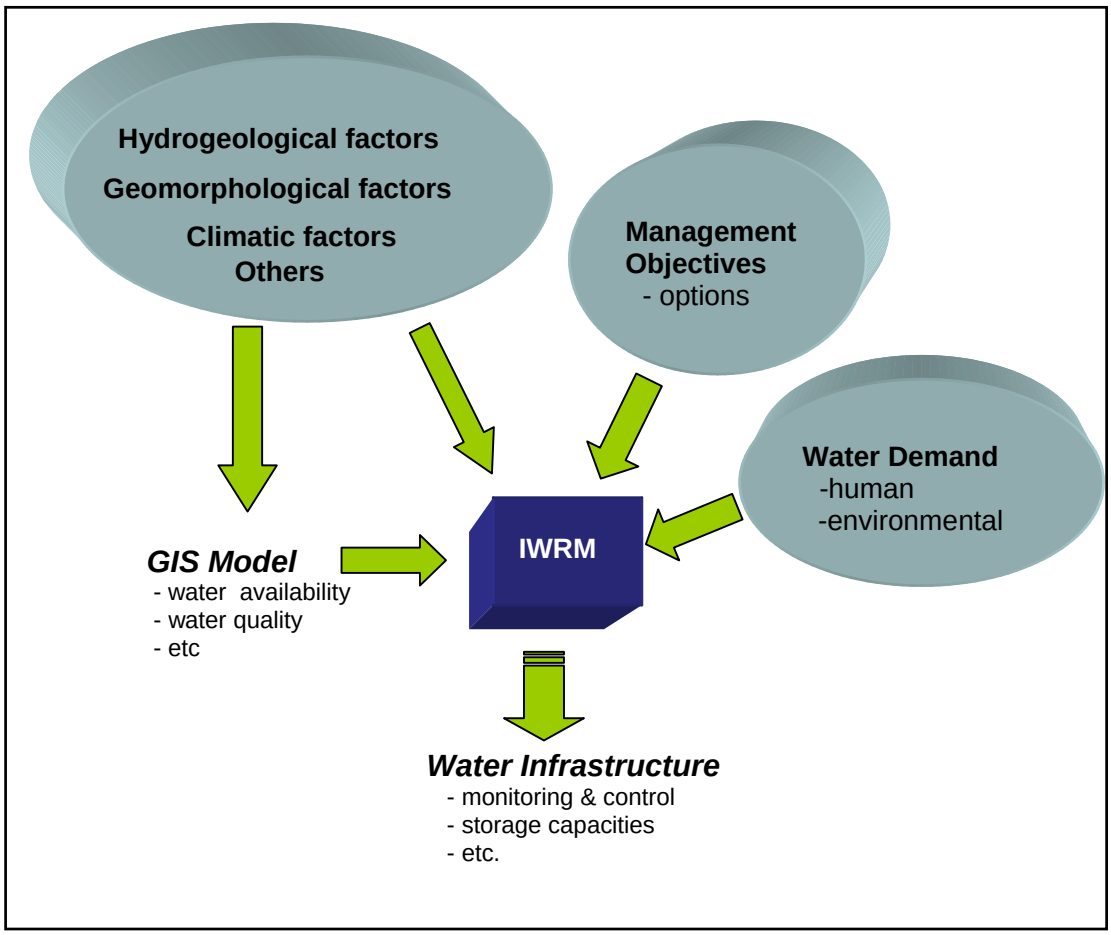


Figure 8-2 GIS Decision Support System's Diagram

8.5.2 GIS Models as a Monitoring Tool

The conceptual design of the GIS-based MIS for Bohol water resources considers two groups or categories of data for inclusion as far as monitoring frequency and urgency is concern.

Figure 8-3 shows a sample template of Loboc watershed showing the water intake point (circle red color), the upstream of the intake point on the Loboc watershed where intensive water monitoring is necessary (inside the yellow boundary) and the conveyance structure (thicker blue color lines). Based in the figure, the grouping of the data for GIS-based MIS can be explained as follows:

The first group of data is the one that will be included in the BIWSS model discussed in Section 8.5.1. These data requires frequent monitoring and closer observation because these directly affect the quantity and quality of water in the proposed integrated water supply system of Bohol. It includes data and mapping requirements starting from the intake point of water and going upstream which include all important water decision parameters inside its catchment's area (e.g. geophysical, hydrological, climate, land use, monitoring stations, etc), to the water treatment facilities, monitoring stations, conveyance facilities down to the bulk-water take-out point.

The second group of data for monitoring includes the take-out points or junctions (circle yellow color) and the conveyance structures or the transmission lines. A regular monitoring for environmental protection, land use planning and other purposes such as other river networks, springs, marine water, and other water-related resources are also needed.

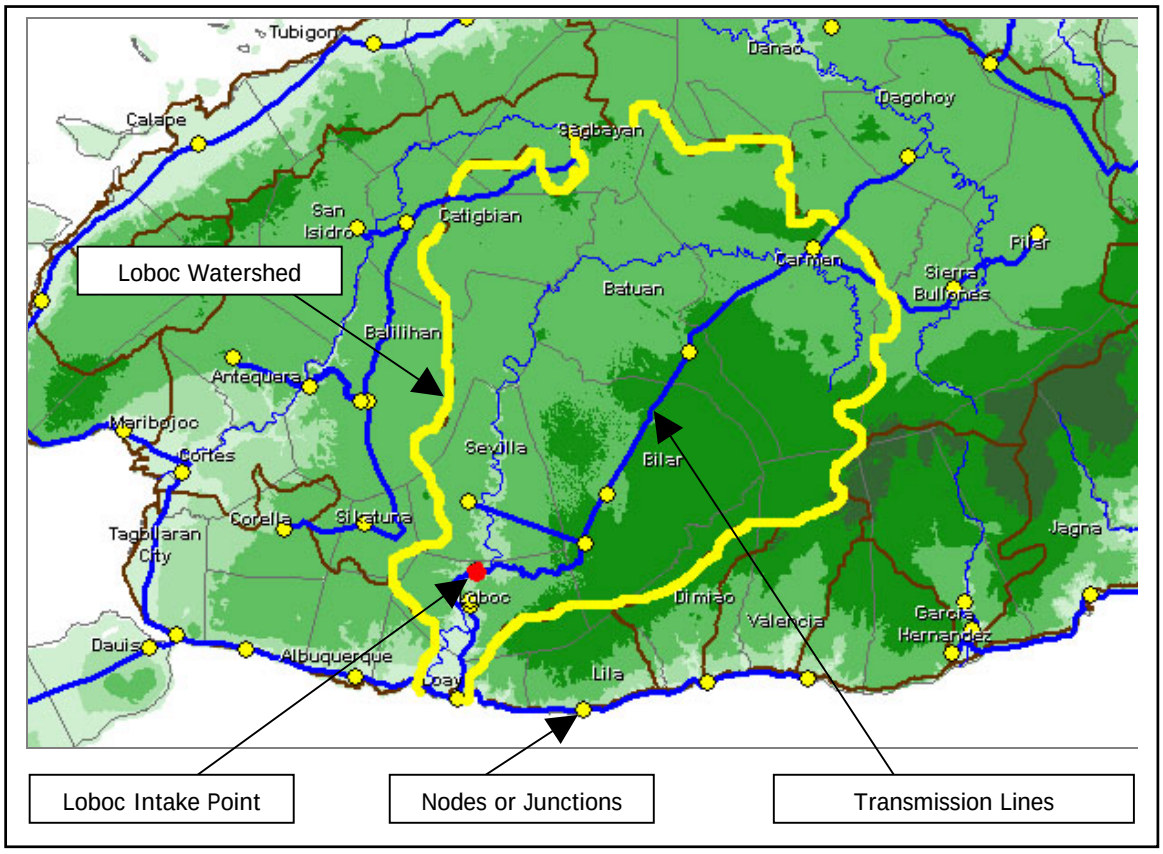


Figure 8-3 Categories of GIS-based Water Supply System

8.6 SPATIAL AND TABULAR DATA BUILT-UP

8.6.1 Workshop on GIS & Databases

A GIS/Database workshop with different stakeholders was conducted on July 30, 2007 at Casa Rey Francis Pension House, Tagbilaran City to assess the data requirement for a GIS-based MIS based on the expectations of the users or stakeholders (**Appendix I.8-A, Volume III-Databook**). From the result of the workshop, a GIS data management and mapping requirements was formulated.

Table 8-3 lists all possible spatial and tabular data needed for the MIS. The list includes the data identified during the workshop and from the input by the technical experts on water resources who are involved in the master planning project.

Table 8-3 List of Spatial and Tabular Data Needed for MIS
(Possible data identified during the workshop)

Data Group	Data Layer	Subtype	Attributes
Water Facility Lines	Main transmission lines		Pipe length, pipe size, pipe material, pipe class
	Raw water pipeline		
	Treated water pipeline		
Water Facility Points	Connection or tapping points		Feature type code, name, survey status
	Reservoirs		
	Pump stations		
	Bulk meters		
Recycled Water Facility Lines	Recycled water mains		Pipe length, pipe size, pipe material, pipe class, as-built drawing, encasement status, owner.
Recycled Water Facility Points	Meters		Feature type code, name, survey status, owner
	Valves		
	Other appurtenances	Air-vacs, Blow-offs, End caps, Cathodic test stations, Reducers	Feature type code, name, survey status
Wasterwater Facility Points	Sludge drying bed		Name, survey status
	Other appurtenances	Cleanouts, Manholes, Overflows, Plugs	Feature type code, name, survey status
Basemap	Cadastral Map	Parcel	Site address, Owner Name, etc.
	Political/ Administrative Boundaries	Municipal boundaries, Barangay boundaries	Name, area
	Roads	National, Provincial, Local	Type, length, date constructed
	Rivers/streams	Primary, Secondary, Tertiary	
	Contours		Elevation
	Lakes		
	Utilities	Hydropower Irrigation dams	
	Transmission lines	Electric, telephone	
	Digital Orthophotos		Elevation
Hydrogeology	Soil moisture		
	Groundwater basins/ Aquifer Types	Confined, Unconfined Isotropic, Anisotropic	
	Wells locations		Longitude, Latitude, depth, diameter, discharge/ capacity/date of installation/ materials used
	Model results		
	Rare plants		
	Sensitive wildlife areas		
	Aquifer Permeability / Hydraulic Conductivity		
	Subsidence		
	Groundwater elevation/depth		
	Aquifer Zones & Depths		
	Connection to surface water bodies		
	Aquifer Homogeneity / Heterogeneity		
	Porosity		
	Stratigraphy		Layer depth
	Storativity		Coefficient

	Aquifer Transmissivity		
	Piezometric Surface/Pore Pressure		
Property/Real Estate	Buildings		
	Easements		
	Historic buildings		
Climate	Net Solar radiation		
	Air Temperature		
	Relative Humidity		
	Wind speed		
	Dew point temperature		
	Cloud cover		
	Evaporative Demand		
	Microclimates	Temporal/spatial Variations	
Surface Hydrology	Precipitation	Intensity, Duration Frequency	
	Stream bank stability and bank grain size distribution		
	Basin soil erosion		
	Basin soil type		
	Upper basin shape, size and topography		
	Soil infiltration		
	Stream reach rating curve		
	Stream channel shape and slope		
	Lower basin ground slope		
	Surface vegetation ET		
	Land use	Vegetation cover, Pavement, Fisheries, Irrigation	
Water quantity/ quality monitoring points	Water quality		
	River gauging stations		

8.6.2 Assessment of Existing Spatial and Tabular Databases

Existing spatial and tabular data were collected from different sources. The existing spatial data used in this project were gathered solely from the GIS unit of the Planning and Development Coordinator's Office of Bohol that has a collection of data from various sources such as NAMRIA, BSWM, DENR, ESSC and GEOPLAN. The SRTM data of Bohol was also downloaded from the Web and analyzed in GIS to delineate the watershed boundaries of the seven major river basins (**Appendix I.8-B, Volume III-Databook**).

All these spatial data were converted into common coordinate and projection system (UTM projection, Zone 51N, Luzon Datum and GCS_WGS84 projection, WGS84 Datum) for ease in analysis and visualization purposes. A map atlas of all spatial data collected is presented in **Appendix I.8-C, Volume III-Databook**. These will form part of the initial thematic maps to the spatial database.

The tabular data were gathered from BEMO, NSO and from the other experts in the project. These data were encoded and saved as Excel files and linked with the spatial data.

8.7 COMPUTER SYSTEM'S ARCHITECTURE

8.7.1 Assessment of Hardware and Databases

A survey/visit to different offices with existing GIS units was conducted to evaluate existing hardware and software. Agencies and organizations that have no GIS units but have potential for future collaboration in the proposed MIS were also visited. Copies of previous reports on the assessment of existing GIS and databases concerning Bohol water were likewise collected and analyzed.

There are two GIS units at the provincial capitol's office. These are the IT unit under the HRMDO and the GIS unit under the PPDO. The third GIS unit is located at the CPDO at the City Hall.

The personnel handling these three GIS units are relatively capable and well-trained in basic GIS/GPS. Their basic hardware (computers, scanners, and plotters) are relatively in good condition although their GPS units are old model and may need to be upgraded.

The GIS software used by the GIS units in Bohol are ARCView Version 3.2, AutoCAD and Manifold version 7.

Tabular data are mostly saved in Excel files but BEMO has software called "Natural Resource Database" developed from MS Access that they use for data archiving environment-related information. The IT unit is presently developing a parcel-based database which can be a source of useful information for BIWSS.

8.7.2 Layout of the Proposed MIS/Data Center

The GIS-based MIS will be integrated into the PPDO-Bohol local area network (LAN) system. There will be two servers needed for the initial setup which just enough for the proposed system to run. A hardware upgrade or even additional server should be made when tremendous data built-up happens or when there is an increase in concurrent client connections in the future. Indication of hardware upgrades can be determined when the performance of each server slows down. One server (named S1 in **Figure 8-4**) is already available in current PPDO's LAN and is capable to handle the database service and therefore will be used in the proposed configuration/setup. The utilization of the existing server is one way of maximizing the government's office equipment and thus, saving money by not buying new one. But as mentioned, the system needs two servers. The second server (S2) with specification described in the figure that costs around Php500,000.00 including the software "Windows 2003 Server" as its operating system, cabling and other paraphernalia should be procured.

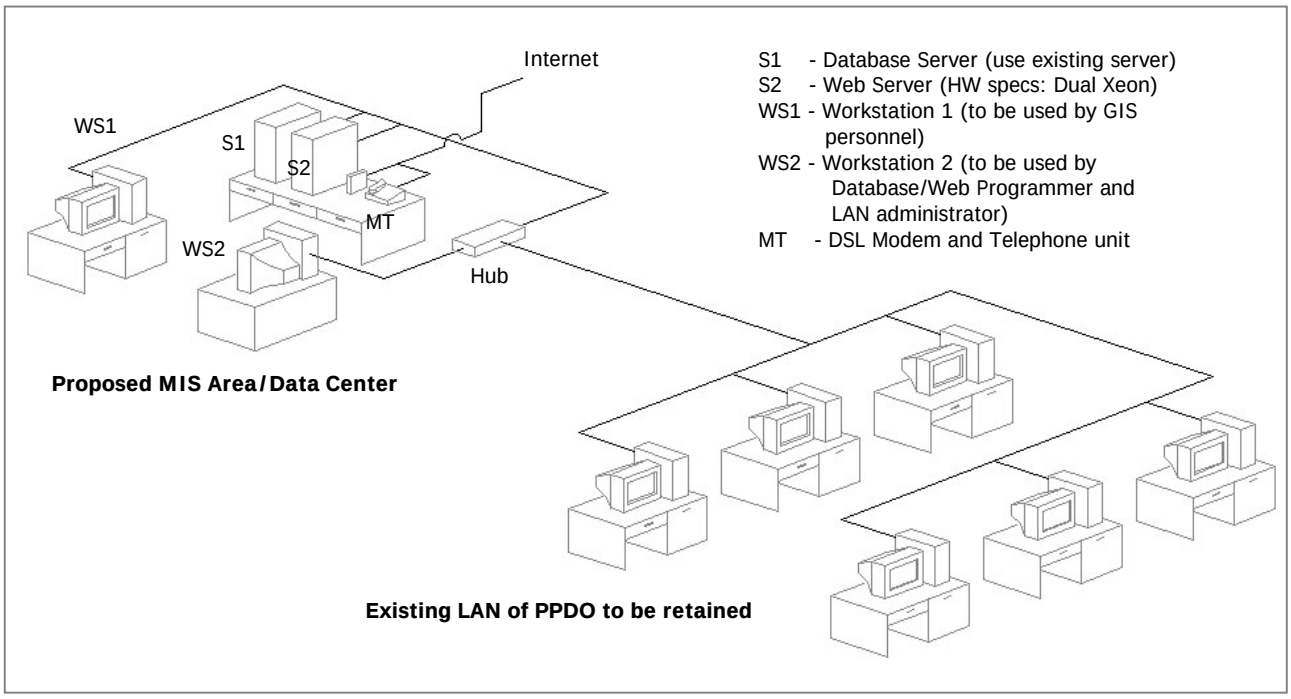


Figure 8-4 Schematic Diagram of MIS Area

8.7.3 Specification of MIS Computer Units

8.7.3.1 Database Server

The database server to be used is the existing server of the PPDO local area network. The hardware specification is “Dual Xeon”. This server also functions as the Domain Name Server (DNS) of the office. The installed operating system is Windows 2000 Server. It is also used by network client as their file storage.

In addition to the existing software of this server, database software named “MySQL version 5.1 Community Server” will be installed. MySQL Products are available under the "dual licensing" model. Under this model, users may choose to use MySQL products under the free software/open source GNU General Public License (commonly known as the "GPL"). MySQL Community Edition is a freely downloadable version in http:// dev.mysql.com / downloads / mysql/5.1.html that is supported by an active community of open-source developers and enthusiasts.

8.7.3.2 Web Server

This server is to be procured with a hardware specification named “Dual Xeon” and may costs around Php500,000.00 including the software “Windows 2003 Server” commonly known as “Win2k3” as its operating system, cabling and other paraphernalia.

The function/service and the software to be installed in this server are as follows:

(1) Internet Information Services (IIS) – this software is already included in Win2K3 CD
(2) MySQL 5.1 Community Server – same detail as described in Section 8.7.3.1
(3) Microsoft .NET Framework 2.0 – a GPL software produced by Microsoft
(4) MyODBC-3.51 – a GPL software driver that connects client to MySQL database
(5) InovaGIS 3.1 – an open source COM+ component produced by Pedro Pereira Goncalves that connects client to read, display and manipulate spatial and tabular data file commonly know as shape file created in Arcview 3.2 GIS software

Email: pedro@inovagis.org

Website: http://www.inovaGIS.org

(6) PHP 5.0.4 – (optional) if the system administrator or the website programmer prefer to use PHP server side scripting

This server will host the website described in Section 8.8. Ideally, a server that hosts website must be running 24 hours a day and 7 days a week (commonly expressed as 24x7). The database server described in Section 8.7.3.1 is not required in a 24x7 uptime.

8.7.3.3 Workstation for System Administrator and Database/Web Programmer

A minimum of Pentium 4 with 256 MB of RAM or its equivalent is required. The operating system should be "Windows XP Professional Edition". The software listed in Section 8.7.3.2 may also install in this workstation but not required. It is the preference of the programmer to do the work and save it in this workstation and upload it to the servers once the finality of the coding was done or work directly in the server by remote access.

The system administrator will handle the following tasks:

- Maintenance of the PPDO's local area network
- Maintenance and updates of the website
- Maintenance and update of the database server
- File storage maintenance and administration

8.7.3.4 Workstation for GIS Development

The same hardware specification stated in Section 8.7.3.3 (Workstation for System Administration and Database/Web Programmer) is required to run a GIS software in this workstation. The GIS software used by the GIS units in PPDO are ARCView Version 3.2, AutoCAD and Manifold version 7 and should be installed in this workstation.

8.7.3.5 Internet Connection

The preferable internet connection speed to be used in this system is 512Mbps DSL connection. The Internet Service Provider (ISP) subscription type or account type should have at least one (1) Static IP Address. Internet subscription type with one (1) Static IP Address or sometimes called "Corporate Subscription" by internet service providers costs around Php3,000.00 to Php5,000.00 per month.

8.8 THE WEBSITE

8.8.1 Engines Used

In order to publish data inside a database server or the spatial and tabular data inside an Arcview3.2 shape files, a web server needs several server-side software components. These server-side components are commonly known as "web server engines" or simply the software installed in the web server. Server-side components used are as follows:

- Microsoft .NET Framework 2.0
- MySQL 5.0 and MyODBC 3.51
- InovaGIS 3.1

8.8.1.1 Microsoft .NET Framework 2.0

BHL-01 website is composed of ASP.NET and ADO.NET programming scripts. These technologies are components of Microsoft's .NET framework compatible in Windows 2000 and 2003 Server, Windows 2000 and Windows XP Professional Edition. It is also free software developed by Microsoft.

ASP.NET is a Microsoft server-side Web technology. It takes an object-oriented programming approach to web page execution. NET is Microsoft's new programming technology which is now gaining acceptance and momentum. It is significantly more stable, and runs much faster than older programming technologies. It also open-up new possibilities for web development graphic streaming on the web.

ADO.NET is the primary relational data access model for Microsoft .NET-based applications. It may be used to access data sources for which there is a specific .NET Provider, or, via a .NET Bridge Provider, for which there is a specific OLE DB Provider, ODBC Driver. ADO.NET is sometimes considered an evolution of ADO technology.

8.8.1.2 MySQL 5.0

All articles, reports and other publications posted by registered user are saved in a database located in the server. The MySQL 5.0 Community Server is the most popular open source database in the world. It is extremely fast and easy to customize, due to its architecture. Extensive reuse of code within the software, along with a minimalist approach to producing features with lots of functionality, gives MySQL unmatched speed, compactness, stability, and ease of deployment. Their unique separation of the core server from the storage engine makes it possible to run with very strict control, or with ultra fast disk access.

A database is a collection of data that is organized so that its contents can easily be accessed, managed and updated. The most prevalent type of database is the relational database, a tabular database in which data is defined so that it can be reorganized and accessed in a number of different ways. The software used to manage and query a database is known as a database management system (DBMS).

8.8.1.3 InovaGIS 3.1

This is also a free COM+ object. InovaGIS is not actually executable software comparing to Arcview 3.2. It only reads and publishes Arcview's shape files (GIS files) by means of Active Server Page (ASP) scripts or a Visual Basic application. The programmer that will consume this software needs to built and construct scripts to be able to produce a user interface program. The software was built by:

Pedro Pereira Goncalves
Email: pedro@inovagis.org
Website: http://www.inovaGIS.org

8.8.2 Designed as Dynamic Website

The website is designed as dynamic website. Users can interact to the pages especially on the GIS modules. They can make different map combination by controlling the visibility of the layers and labels. Maps inside the GIS module can also enlarged or zoomed to area of interest to get the detailed information.

On the other hand, authenticated users or those that have a login account assigned by the system administrator can post information like news, articles, publications and even the attributes of the selected GIS shape files like the population on their barangay. Authenticated

users do not require knowledge about HTML or websites design to update or maintain such portion of the site which they have a grant to change.

8.8.2.1 Inter-Agency Data Flow via website

Taking advantage of the dynamic functionality of this website, various LGUs and other participating agencies can upload and change the current information displayed. The information uploaded by those authenticated users will go directly in the database server for data banking (**Figure 8-5**).

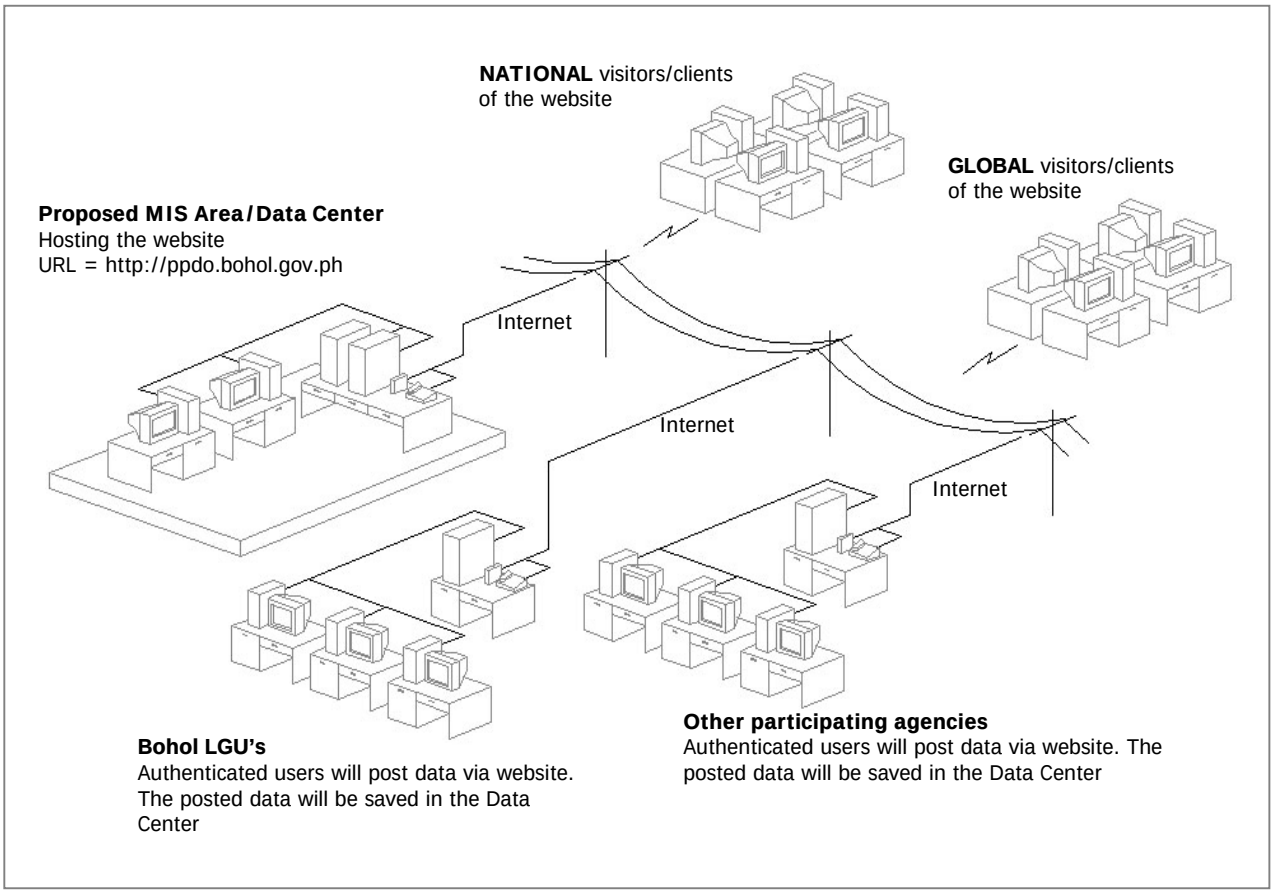


Figure 8-5 Inter-Agency Data Flow via Website

8.8.2.2 Inter-Agency Data Flow via e-mail

In the event wherein the authenticated users cannot use the Content Management System of this website due to some reason, the second option is to email the information to the system administrator. Upon validation of the data received via email, system administrator will do the encoding directly in the database and thus publishing information in the website (see **Figure 8-6**).

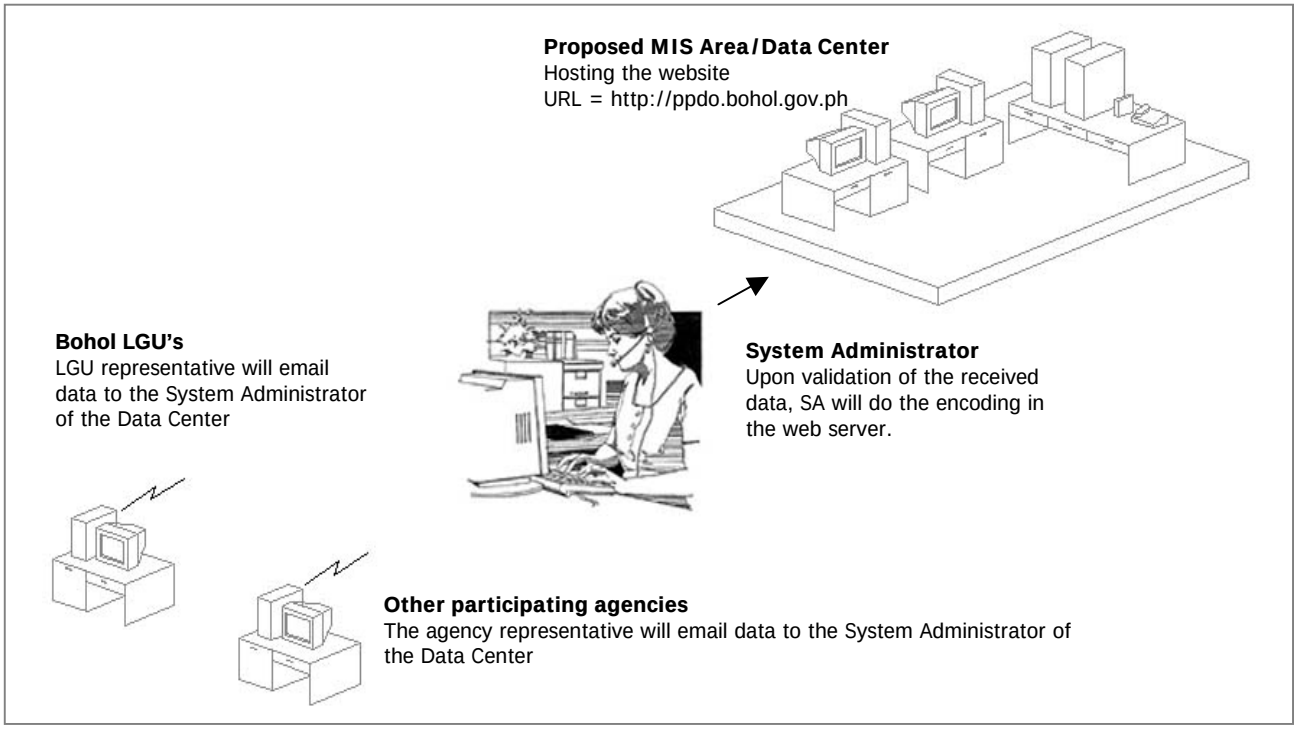


Figure 8-6 Inter-Agency Data Flow via e-mail

8.8.3 Theme and Layout Design

The developed BHL-01 MIS/GIS website theme and layout design is patterned in the existing website design of the PPDO (http://ppdo.bohol.gov.ph). **Figure 8-7** shows the current website theme and layout of the PPDO.

Figure 8-7 Current Theme and Layout of PPDO Website

The BHL-01 website, as of this writing, is currently hosted in WCI server and its URL is http://www.csm-global.com for testing, evaluation and development purposes. Deployment of this website will be done after the proposed Data Center, as described in Section 8.7, is already in place. The default home page is as shown in **Figure 8-8**.

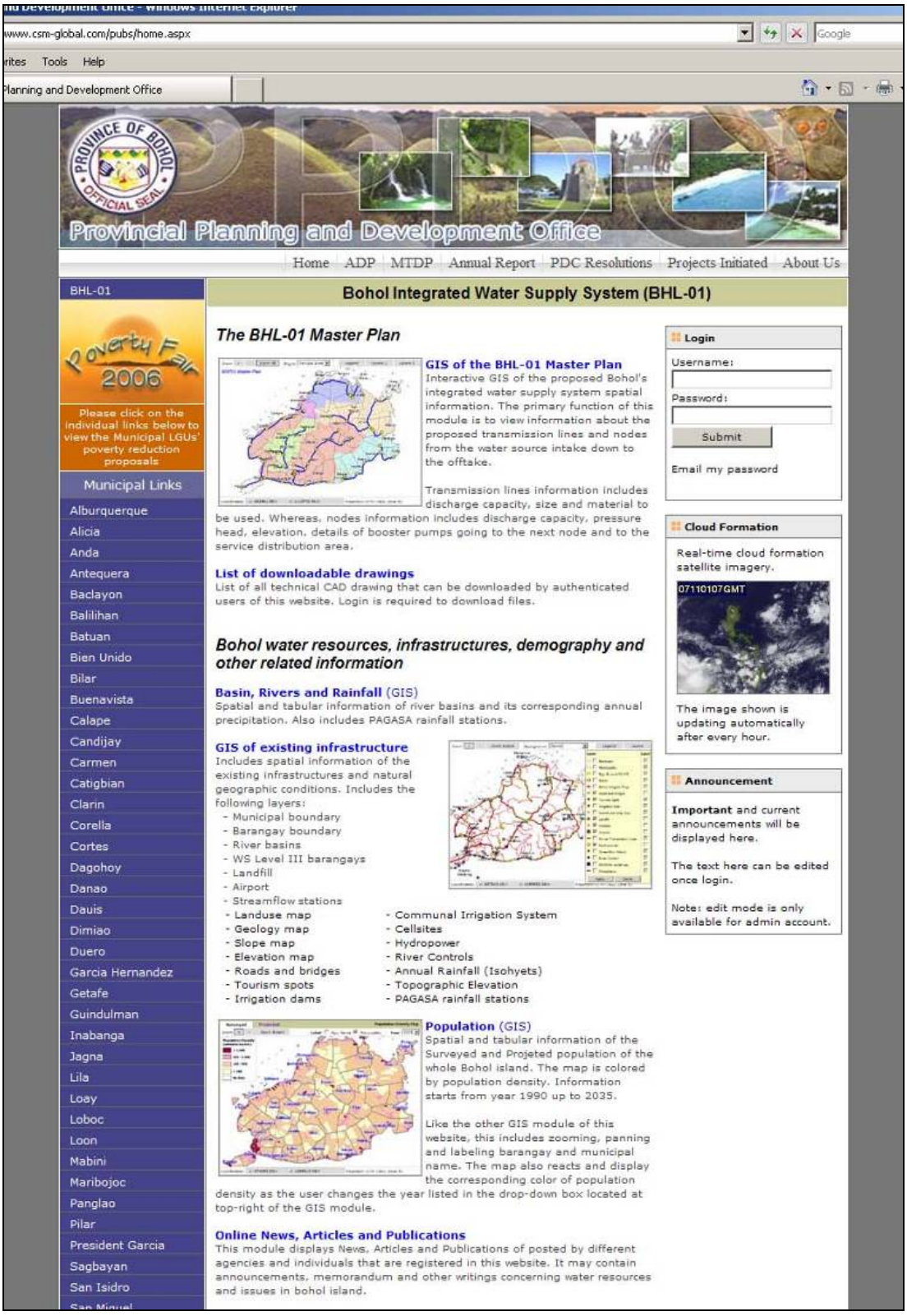


Figure 8-8 Default Home Page of BHL-01 Website

The home page of BHL-01 website contains hyperlinks that will lead browsers to different modules enumerated below:

- GIS of the BHL-01 Master Plan
- List of downloadable drawings
- Basin, Rivers Rainfall (GIS)
- GIS of existing infrastructure
- Population (GIS)
- Online News, Articles and Publications

The home page also consists of "Login" frame (see **Figure 8-9**). This login frame is for those registered users or agencies. The detailed functionality of this login is explained in Section 8.8.6 (Web-based Data Entry).

Figure 8-9 "Login" Frame in Home Page

It also contains a real-time "Cloud Formation" and a short "Announcement" frame located right portion of the page. The "Cloud Formation" frame encloses an image that has a live-link to an image server publishing cloud formation over the entire Philippine archipelago. The image also shows the date and time of its acquisition located in upper-left portion with a date format of YYMMDDHH (see **Figure 8-10**). The image updates after every hour.

Figure 8-10 "Cloud Formation" Frame in the Home Page

The “Announcement” frame encloses a short announcement published by the system administrator. The text of this announcement frame is included in the Content Management System of this website which will be explained in Section 8.8.6.

An additional “BHL-01” hyperlink located in the left navigation menu of the existing PPDO website is added. This hyperlink will lead the browsers to this home page once they are inside the other modules (see **Figure 8-11**).

Figure 8-11 Hyperlink “BHL-01” in the Home Page

8.8.4 The GIS Module for BHL-01 Master Plan

There are four GIS modules in this website, (1) the GIS of the BHL-01 Master Plan, (2) the Basin, Rivers and Rainfall GIS, (3) the GIS of existing infrastructures and (4) the Population GIS. The Master Plan GIS module will be explained in this report because the other three modules are all generally similar with regards to interoperability procedure is concern. The other three modules only differ in set of available layers that can be displayed.

The GIS control panel shown in **Figure 8-12** is composed of the following objects:

(1) Zoom buttons
(2) Background dropdown box
(3) Legend button
(4) Layers 1 and Layers 2 button
(5) Coordinates display area
(6) Map display area

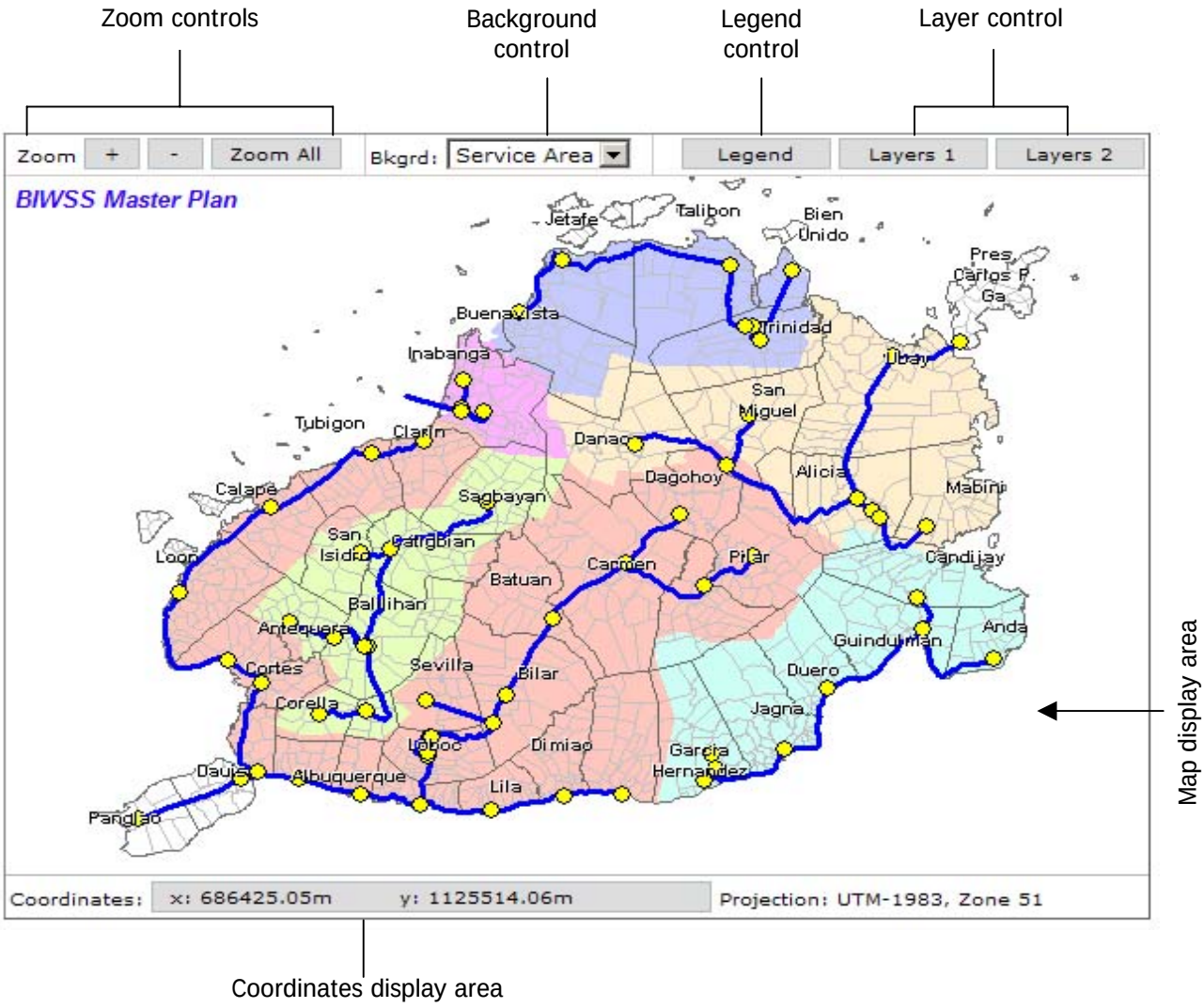


Figure 8-12 GIS Control Panel

8.8.4.1 The "Zoom Buttons"

The "Zoom" group of buttons is composed of Zoom-in (+), Zoom-out (-) and "Zoom All" button. Clicking the "Zoom-in" button will zoom and reload the map. The "Zoom-out" and "Zoom All" buttons functions according to their caption and as explained in clicking the "Zoom-in" button.

8.8.4.2 The "Background Dropdown Box"

The items inside the dropdown box are as shown in **Figure 8-13**. Changing item in the dropdown box will reload the map display area and displays the selected features. This dropdown box also functions as layer control. The sample output is as shown in **Figure 8-14**.

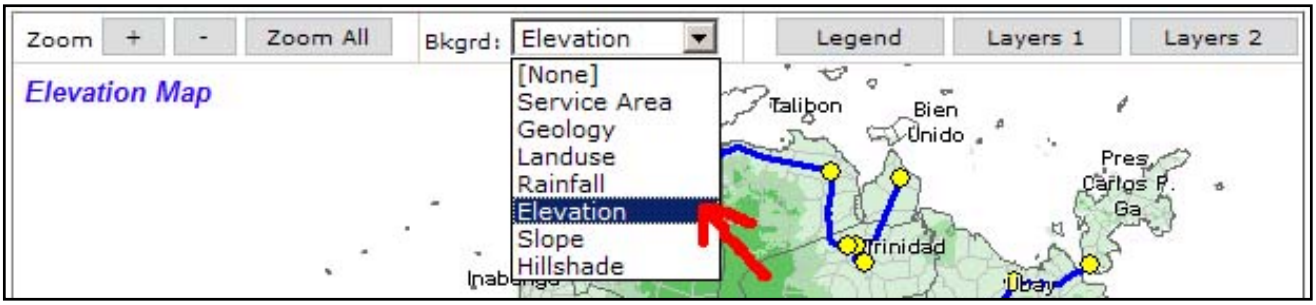


Figure 8-13 "Background" Dropdown Box

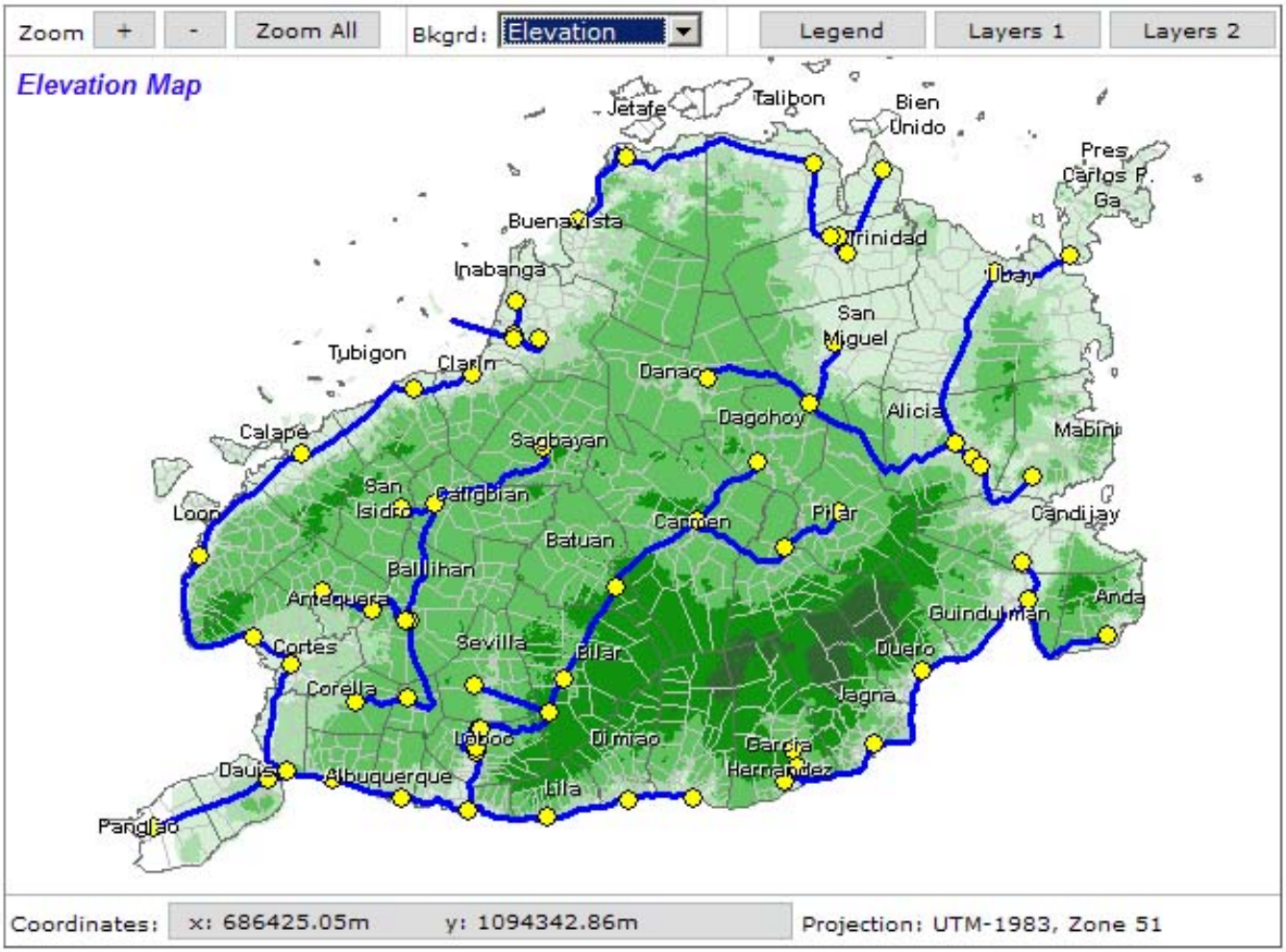


Figure 8-14 Result of Changing Items in Dropdown Box

8.8.4.3 The "Legend Button"

The legend panel is too large to display statically inside the map display area. The "Legend" button is created for displaying and hiding the legend of the map. Clicking the "Legend" button will appear the legend panel and clicking the "Close" button on the legend panel hides itself (see **Figure 8-15**).

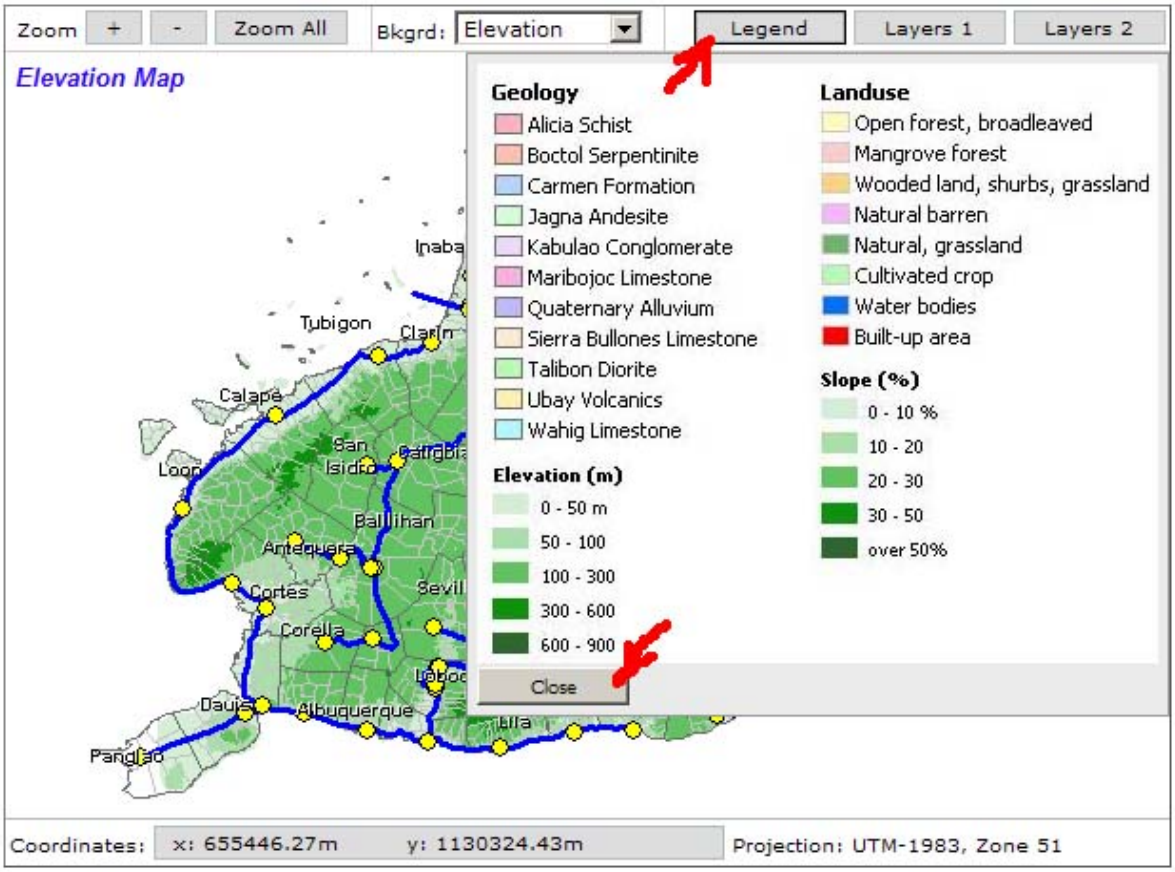


Figure 8-15 Legend Panel

8.8.4.4 The "Layers 1" Button

The function of this button is to control the appearance of the displayed image map. Users can select layer combination by checking the checkbox located left of the layers name. Un-checking the layers checkbox will hide the corresponding layer in the image map. Showing and hiding labels of the corresponding layers can also be controlled by checking and un-checking the label checkbox located right of the layer name under the "Label" column. The parameters of the layers checkboxes and label checkboxes will be executed once the "Apply" button is clicked (see **Figure 8-16**).

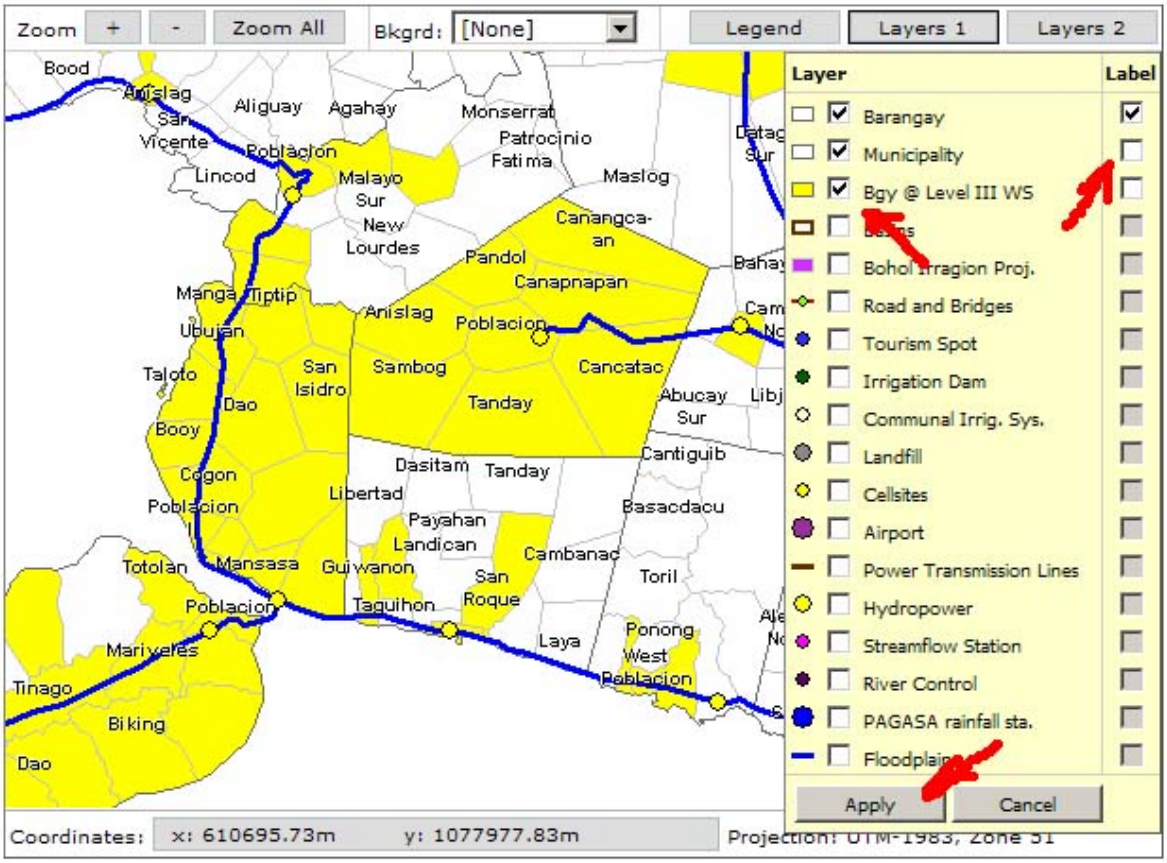


Figure 8-16 Changing the Displayed Layers and Labels Using "Layers 1" Button

8.8.4.5 The "Layers 2" Button

The function of this button is almost similar to that of "Layers 1" button as explained in Section 8.8.4.4. The only difference is that it is focused on the detailed information of the nodes and transmission lines of the Master Plan. It can display the following attributes:

Water Demand – includes projected water demands of each municipality for year 2025 and 2035 as shown in **Figure 8-17**. The information data entry of this attribute is included in the content management or web-based data entry

Transmission Lines – includes "Planned Specs." labels consisting of pipe diameter, length and material to be used. The other attributes that can be displayed by way of labeling is the "Current Status" of the pipes. "Current Status" is an item in the dropdown box under the Label column of "Layers 2" panel (see **Figures 8-18 and 8-19**). Attributes of transmission lines are editable via web-based data entry once logged in.

Nodes – includes "Yr2010 Design", "Yr2020 Design" and "Current Status" items inside the dropdown box used in labeling the Master Plan map. The items "Yr2010 Design" and "Yr2020 Design" in the dropdown box contains information about reservoirs, intake facilities and weir, pumping stations, discharge capacities and horsepower of booster pumps, offtake pumps and elevation (see **Figures 8-20 and 8-21**). The "Current Status" item in the dropdown box contains information about the progress of construction of facilities within each node. Attributes are also included in web-based data entry of this website.

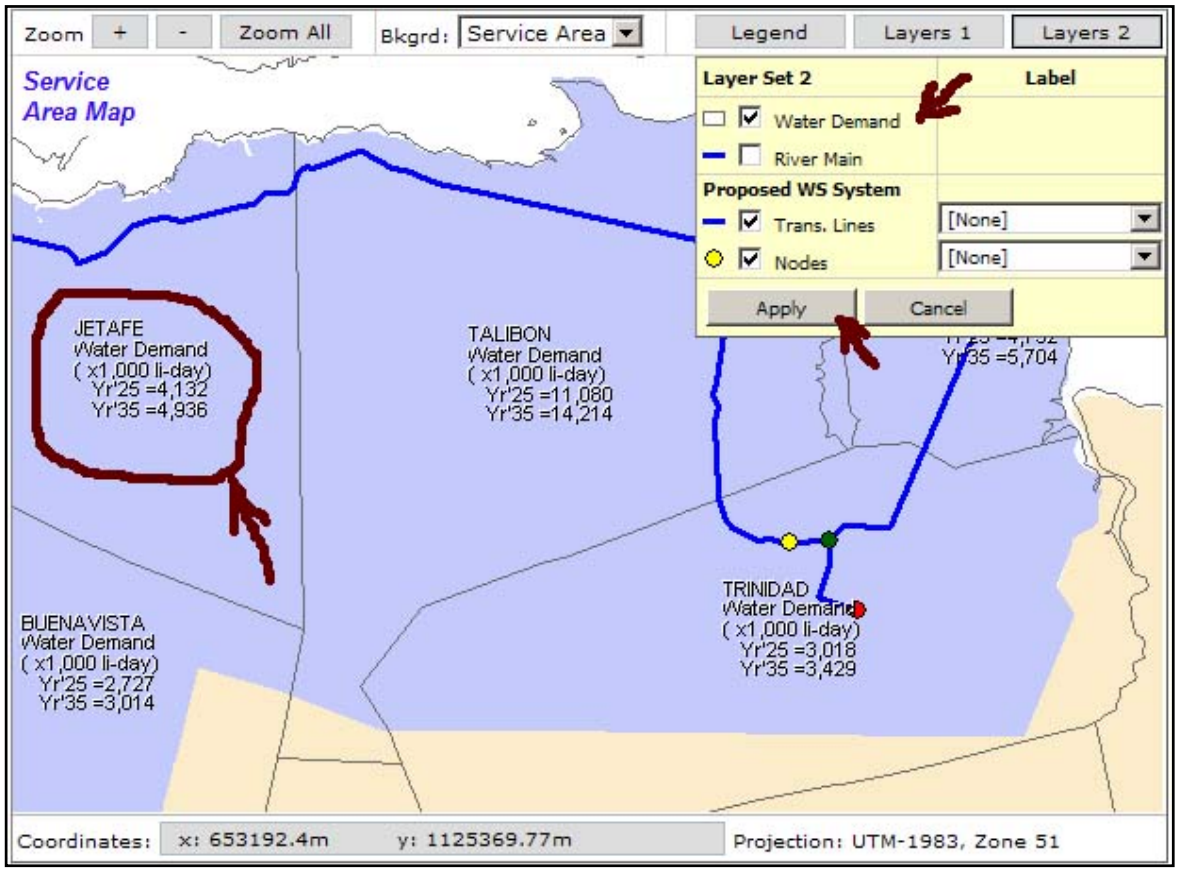


Figure 8-17 Water Demand of Municipalities

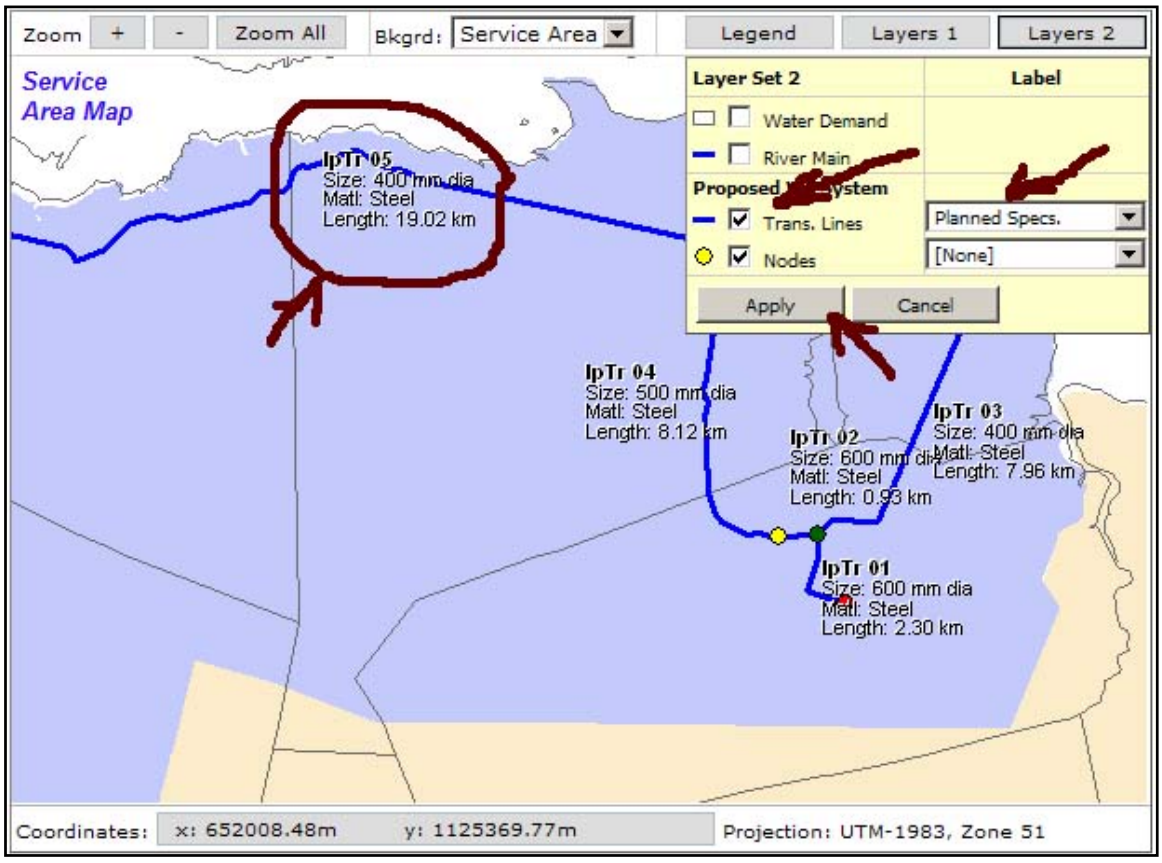


Figure 8-18 Transmission Lines Planned Specification

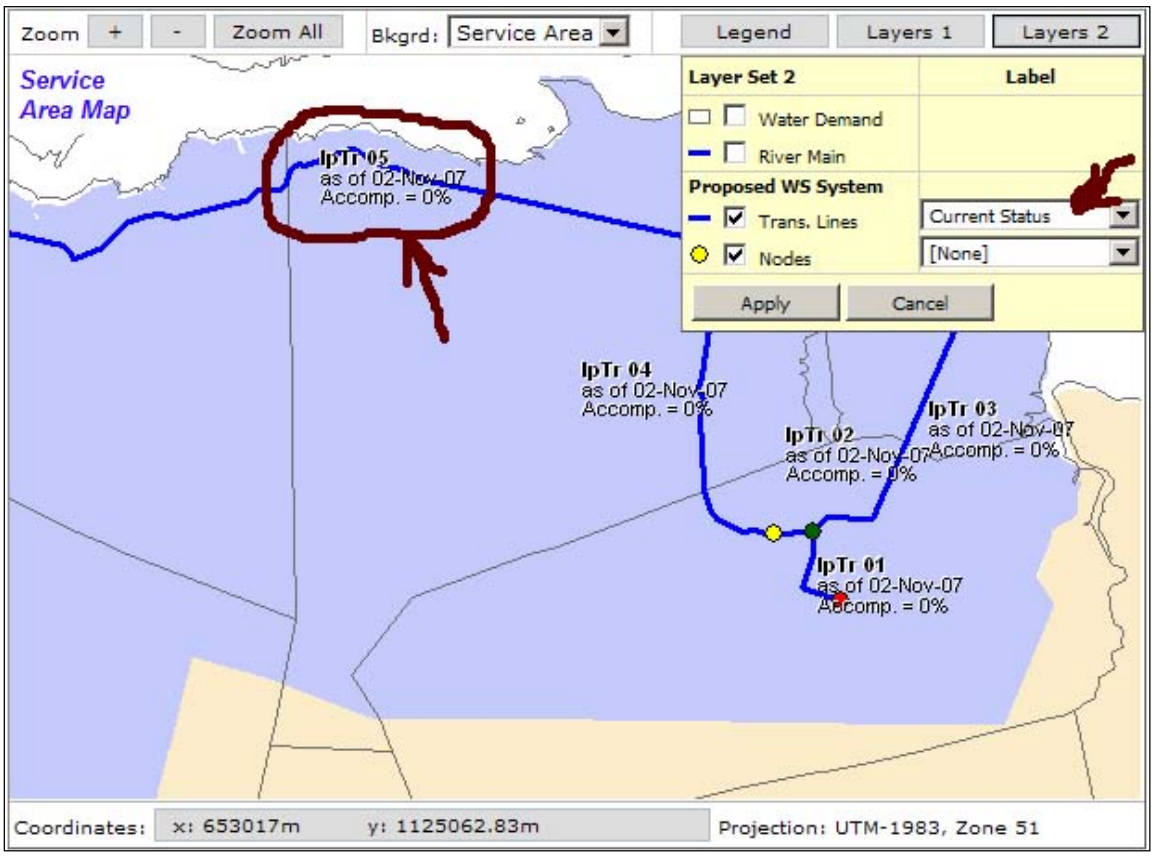


Figure 8-19 Transmission Lines Construction Status and Monitoring

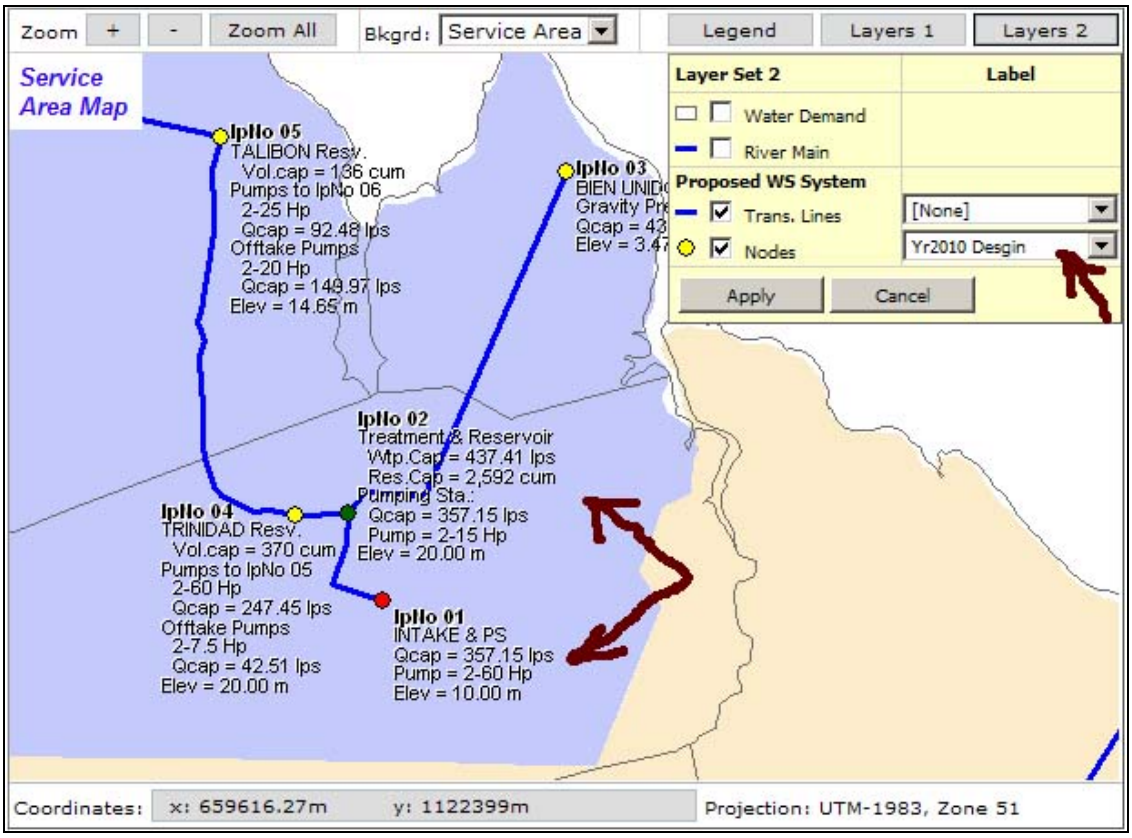


Figure 8-20 Node Facility Information (Design Year 2010)

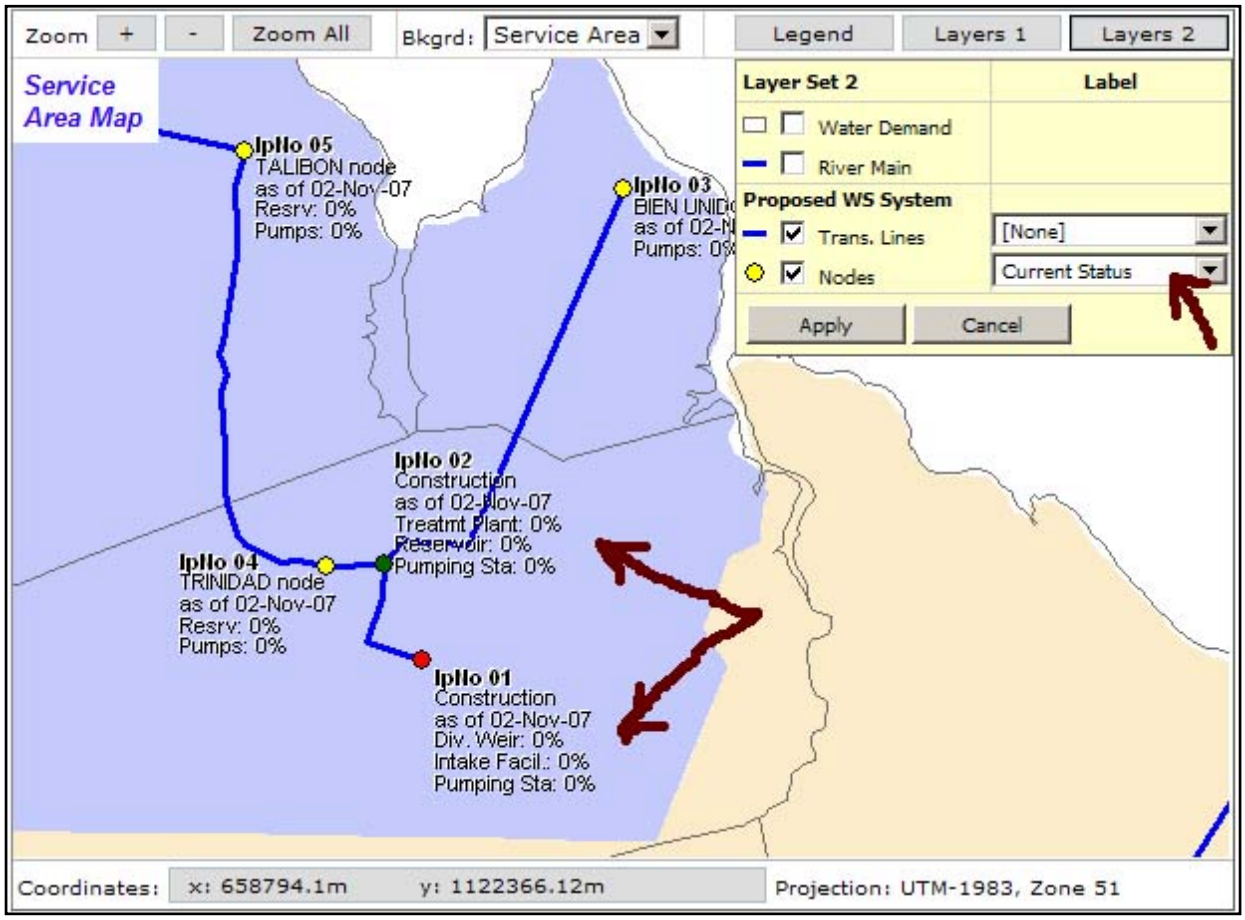


Figure 8-21 Node Facility Construction Status and Monitoring

8.8.4.6 The "Map Display Area"

The Map Display Area is made to function for moving or panning map by dragging the image map. It also reacts as a location pointer by placing the mouse over the map. The coordinates of the mouse pointer is then displayed in the coordinates display area.

8.8.5 Online News, Articles and Publications

List of articles and publication in this module are those information that will post by participating agencies. The compilation of data that displays here is archived in the database server. The user can search within the posted articles by typing a particular keyword or phrase in the search textbox shown in **Figure 8-22**. The items or articles in this module are also included in the content management system of this website.

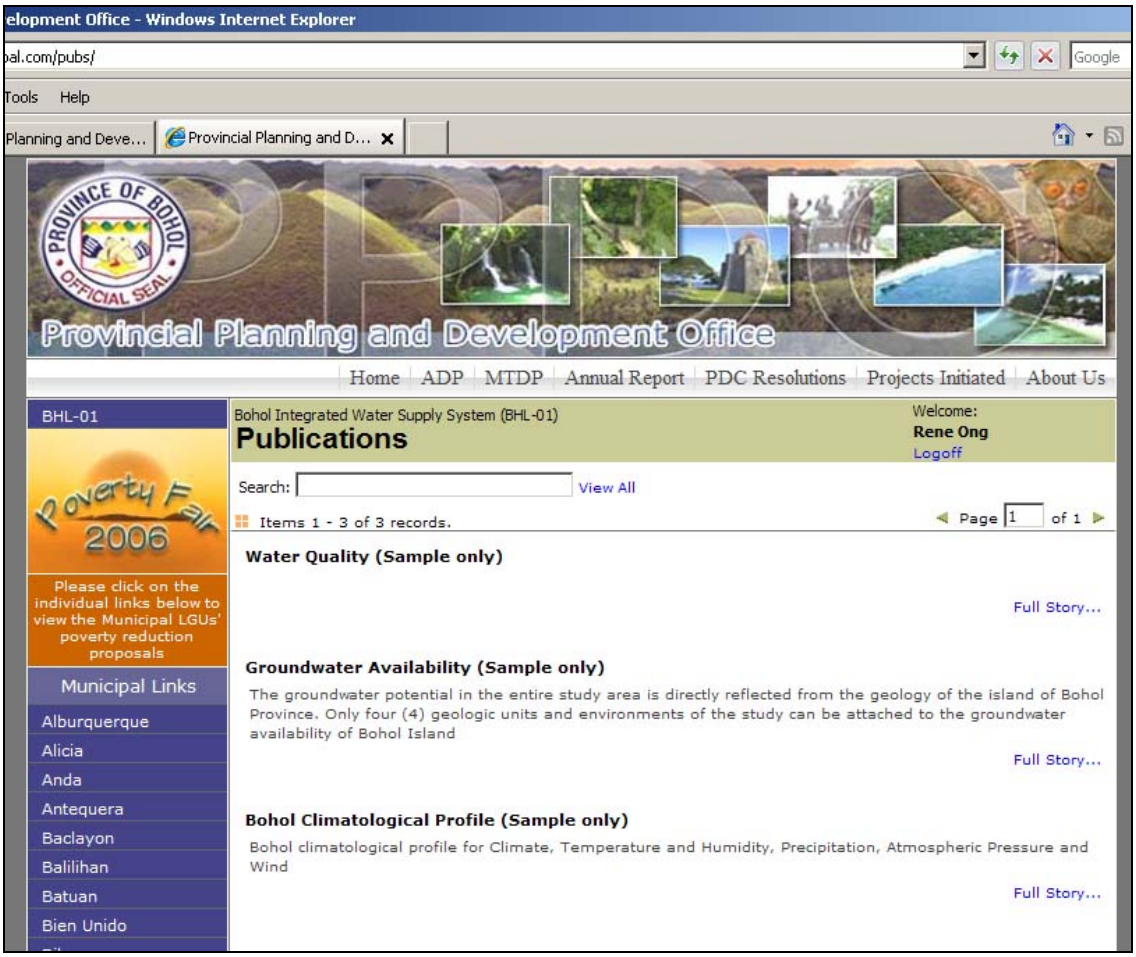


Figure 8-22 Online News and Publications

8.8.6 Web-based Data Entry

Web-based data entry functionality of this website is the passageway of data from authenticated users to the Data Center. The data flow that uses this protocol will automatically affects the website's content. This scenario is called "Content Management System". Registered users must first login before they do some encoding. The login frame can be found in the home page of this website.

Once logged in, the frame for "Administration Menu" will be shown in the home page located left part of the page as shown in **Figure 8-23**. Enclosed in this frame are hyperlinks that will lead the user to different data entry modules.

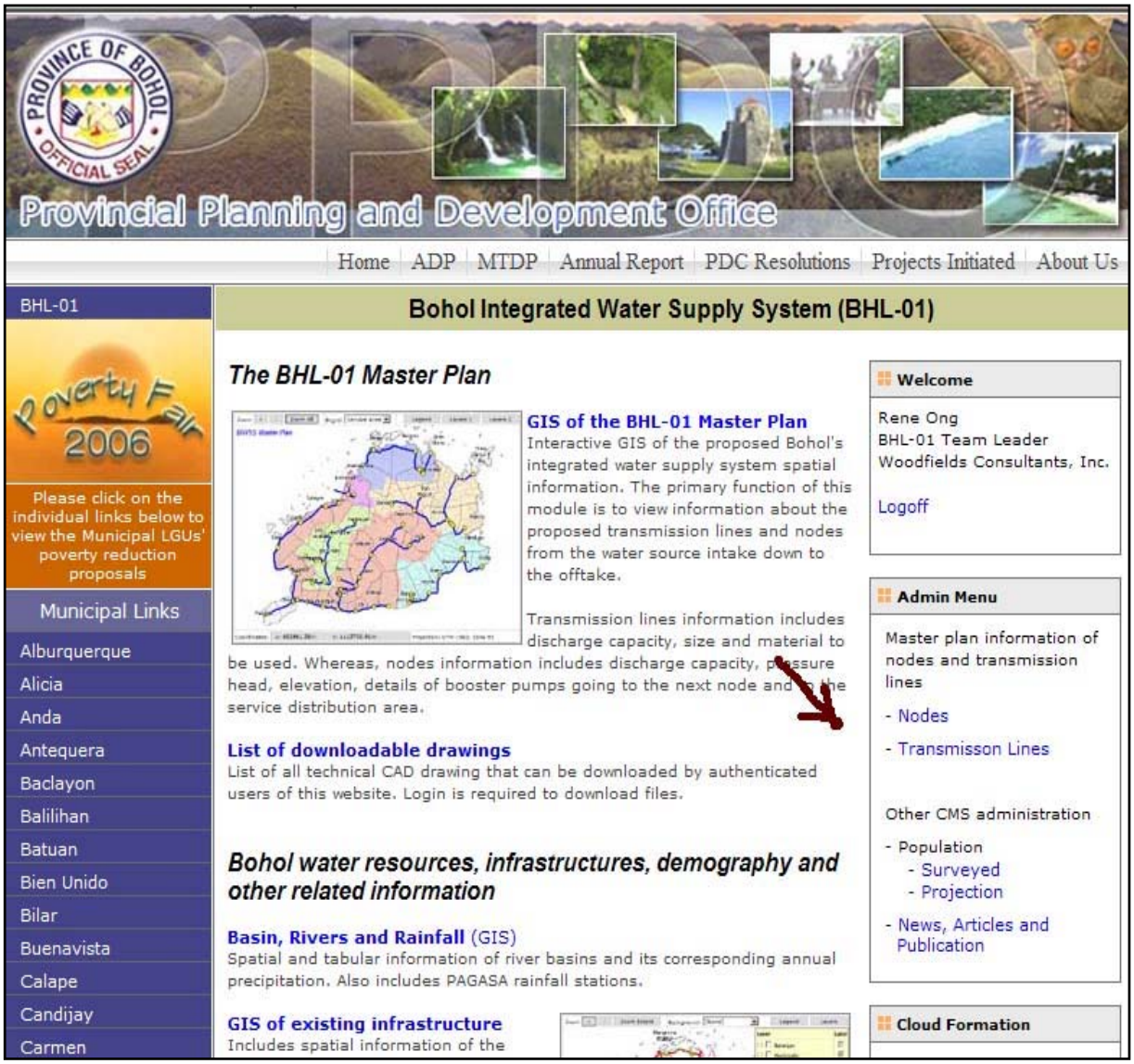


Figure 8-23 Admin Menu Frame

8.8.6.1 The "Nodes" Data Entry

Editing the attributes or values on nodes displayed in the GIS of Master Plan is the function of this data entry module. Clicking the "Nodes" hyperlink will lead the user in the data entry shown in **Figure 8-24**. The sequence of finding a record to edit the value is also shown in the figure. Clicking the "Save" button will commit the transaction to the database server of the Data Center.

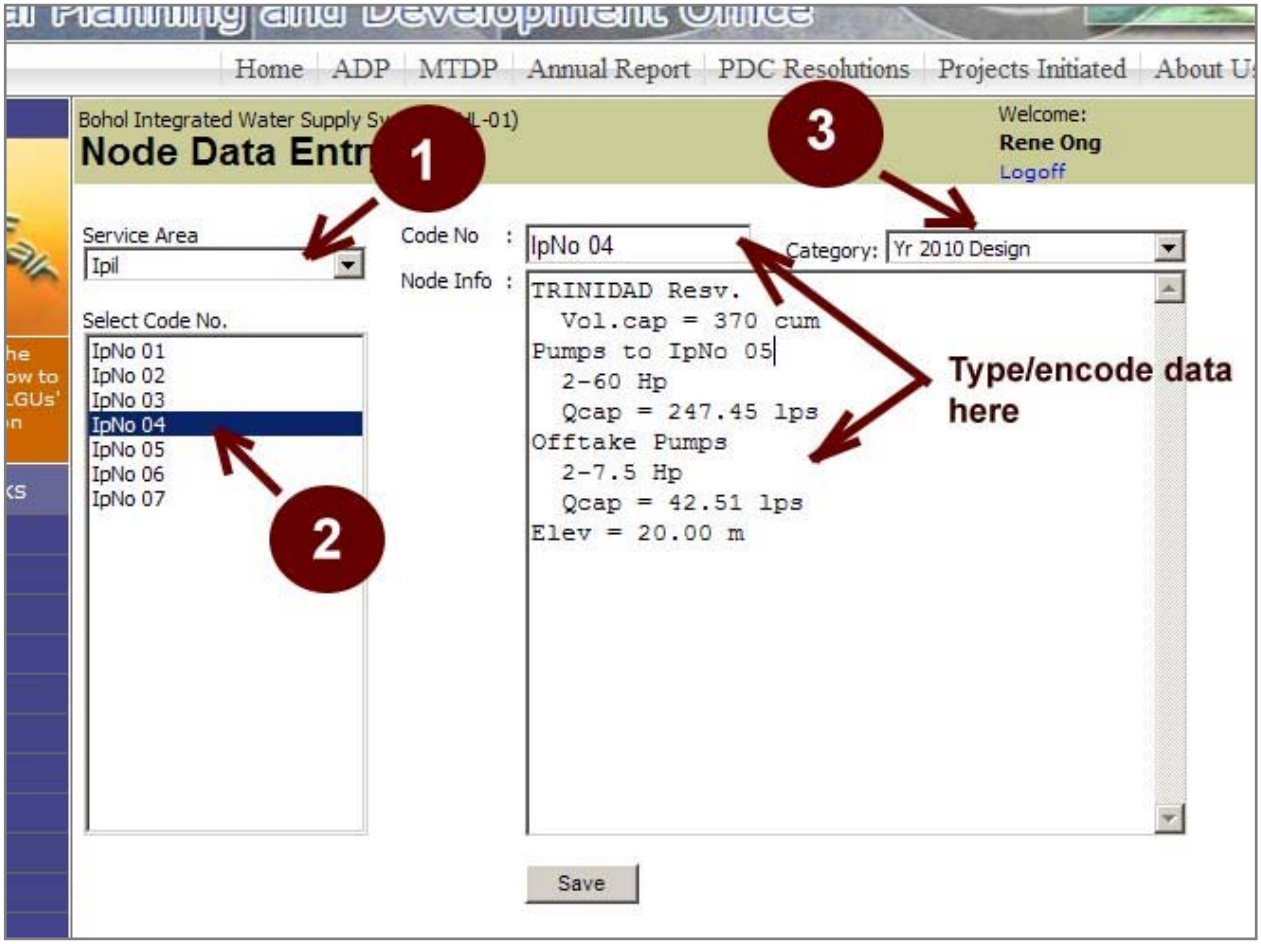


Figure 8-24 "Node" Data Entry

8.8.6.2 The "Transmission Lines" Data Entry

The procedure for editing the attributes of the transmission lines is almost similar to the "Nodes" data entry (see **Figure 8-25**). Activating the data entry module is by clicking the "Transmission Lines" hyperlink enclosed in the "Admin Frame" of the home page.

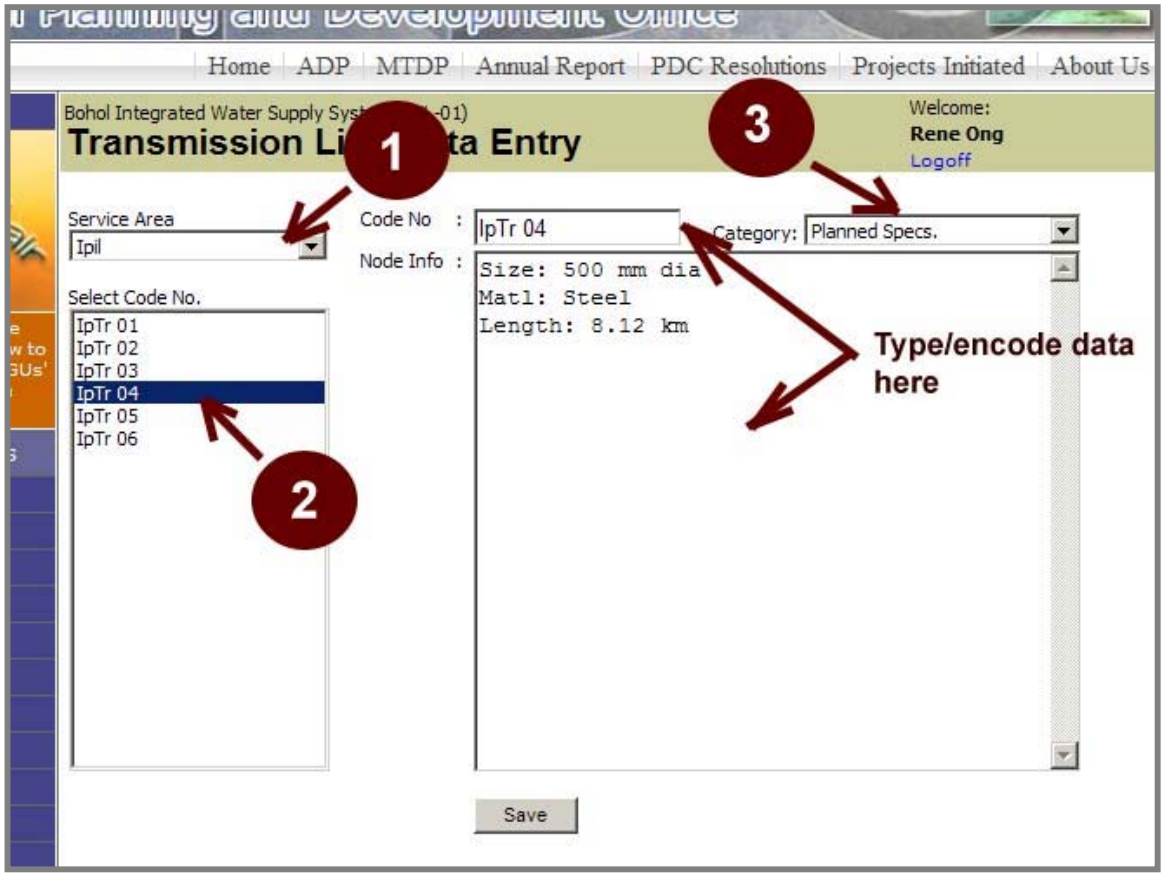


Figure8-25 "Transmission Lines" Data Entry

8.8.6.3 The Barangay Population Data Entry

Data entry for barangay population can be done by first selecting the desired municipality listed in the dropdown box and clicking the year hyperlink as shown in **Figure 8-26**. The page will then display the data entry form for the selected parameters (see **Figure 8-27**). The data entry form also displays the municipality dropdown box for quick jump to other municipalities without exiting from this form.

Encoding type is a little bit complex compared to nodes and transmission lines encoding. The way of encoding is by formatting or arranging the text in the manner described in the form. The format of the text is a comma-separated value. The values between the commas from left to right are:

- Code number of the barangay
- Barangay Name
- Population for the selected year (as displayed above the multi-line textbox

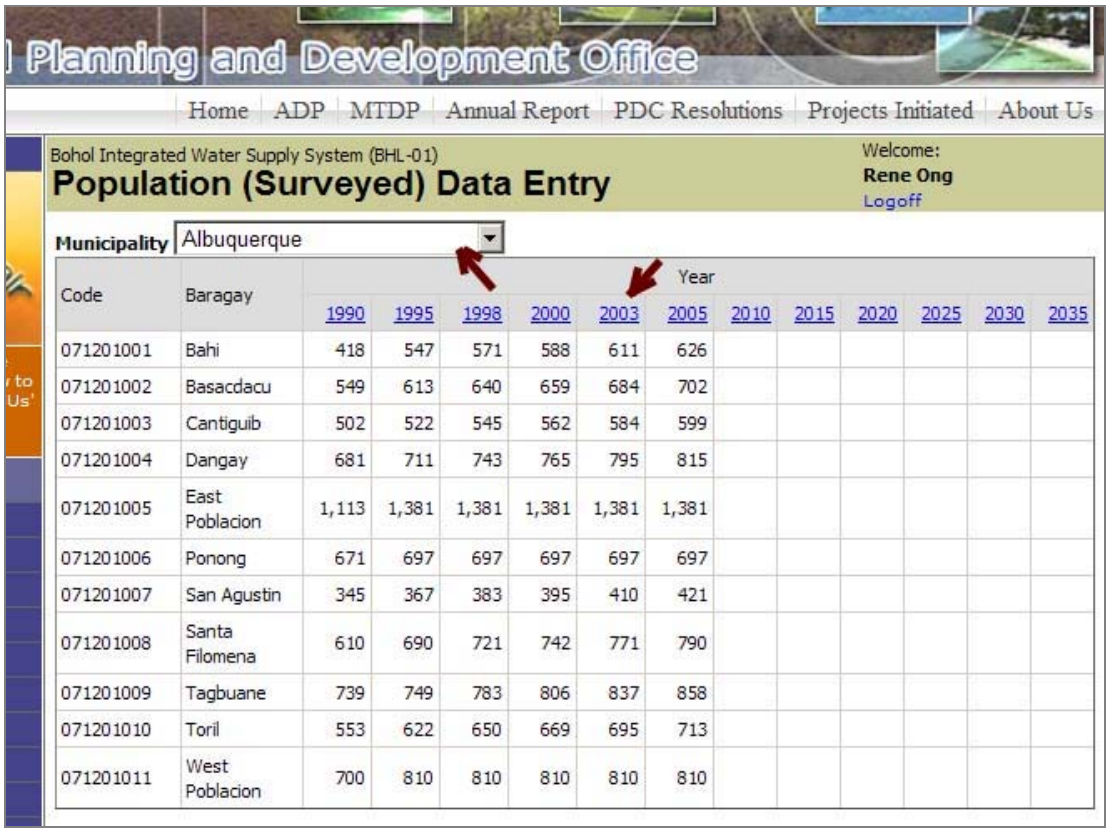


Figure 8-26 Population of Each Barangay in a Municipality

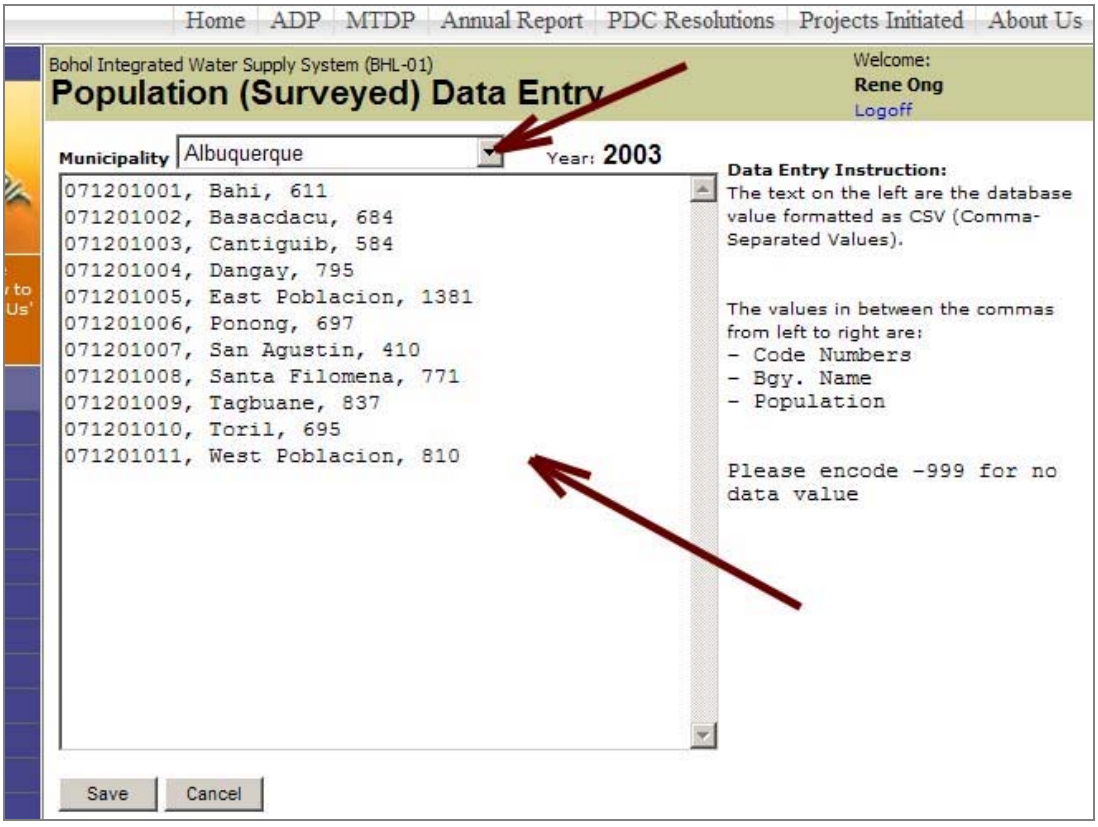


Figure 8-27 Encoding Population Data of Each Barangay in a Municipality

8.8.6.4 News, Articles and Publications Data Entry

Posting news, articles and publications can be done by clicking its hyperlink inside the administration frame of the home page as shown in **Figure 8-28**. The page will then display the list of posted data together with the "Add", "Edit" and "Delete" buttons. Deleting records can be done by first checking the items and clicking the "Delete" button. The "Add" and "Edit" buttons will lead the user to another data entry form shown in **Figure 8-29**.

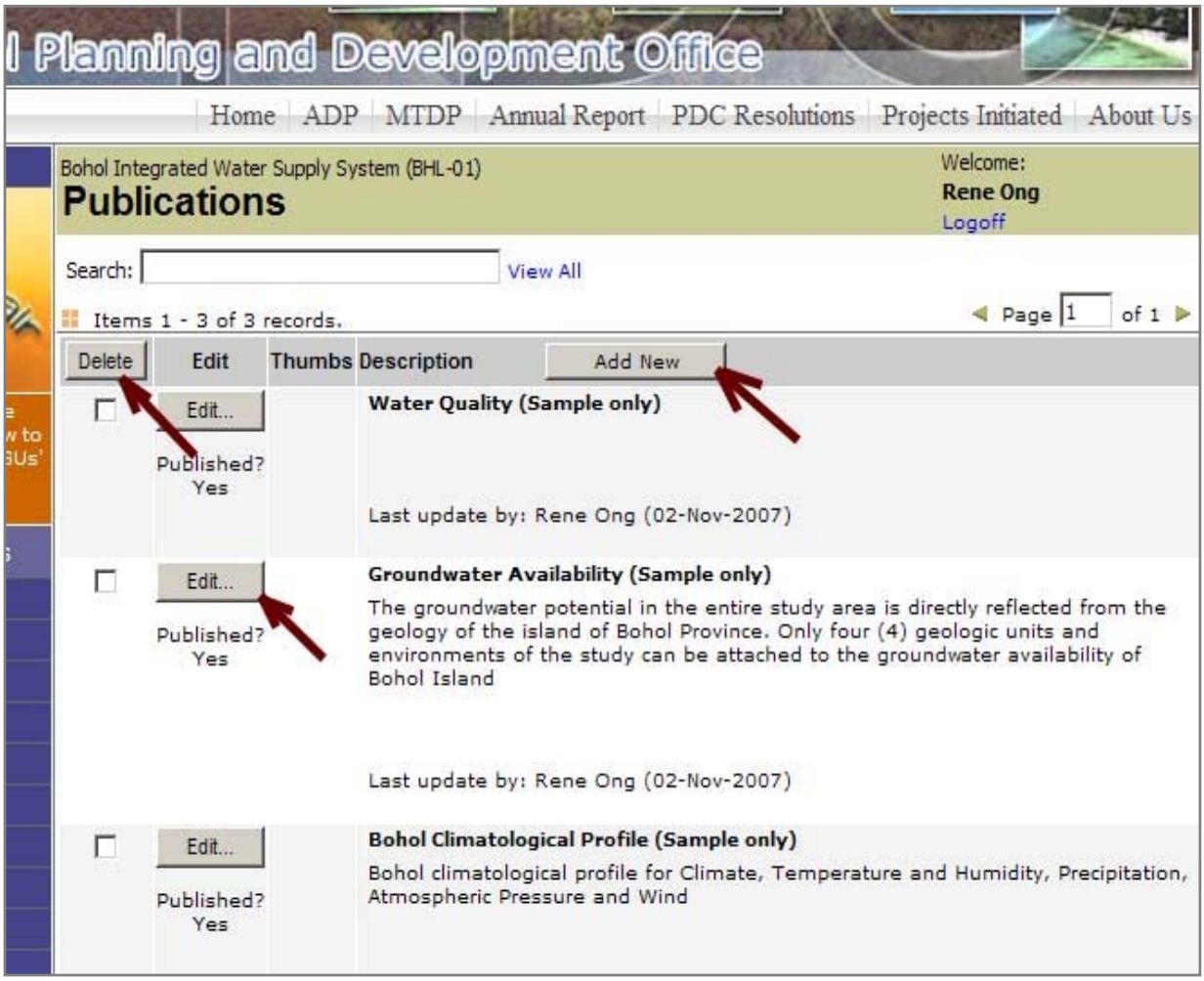


Figure 8-28 List of Posted News and Articles

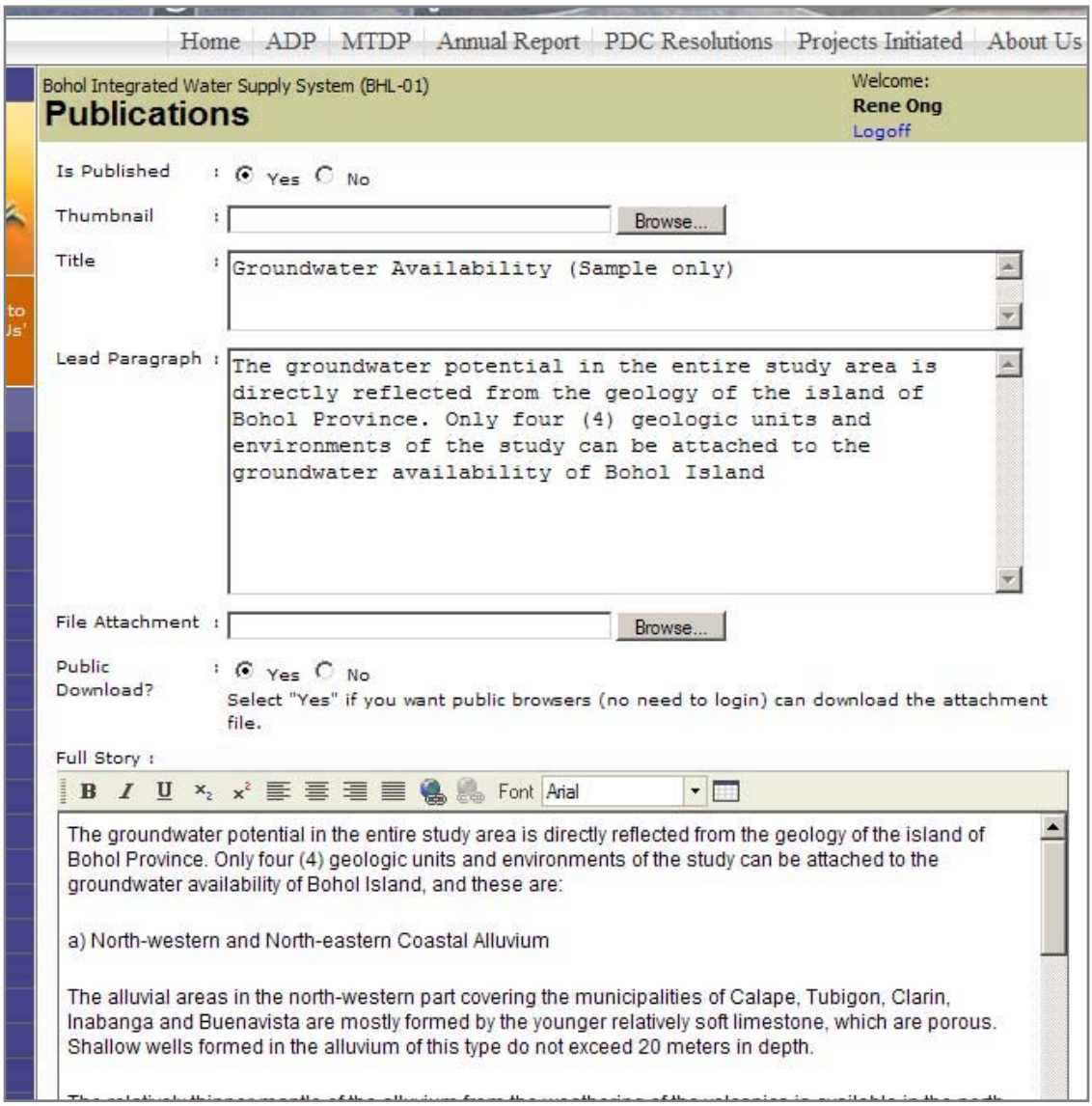


Figure 8-29 Data Entry for the Selected Article

8.9 FRAMEWORKS FOR GOVERNANCE

8.9.1 Implementation Planning and Coordination Framework

The MIS implementation plan is formulated to ensure that all operational and technical issues are identified and addressed in a practical, structured and prioritized manner. It defines the purpose and scope of the GIS-based MIS, the schedule for implementation and the budget. This document also serves as guideline for the *BIWSS*'s data structure and data collection, as well as a conceptual guide for application development.

The set of activities under each function of the GIS-based MIS are as follows:

1) Data management and organization
    - Review and organize all available electronic and hard-copy data
    - Create metadata for all existing GIS / database files
    - Develop data models and new database schema for easy data retrieval

- Organize data storage and file management procedures
- Establish common data repository
- Develop data / document management system
- Implement a version control system

2) Data collection and conversion
   - Ensure all spatial data is in the recommended projection and coordinate system (UTM projection, Zone 51N, Luzon Datum and GCS_WGS84 projection, WGS84 Datum)
   - Develop data conversion tools and procedures
   - Develop data validation tools
   - Validate spatial and tabular data errors

3) GIS Applications (i.e. analysis and modeling)
   - Groundwater and surface water availability modeling
   - Population and demand projections analysis
   - Water flow analysis
   - Site analysis
   - Integrate existing and future software / hardware systems
   - Develop tools / procedures to facilitate required visual outputs
   - Asset data management
   - Hydro infrastructure data management
   - Right-of-way engineering and mapping
   - Natural hazards risk management
   - Landuse change analysis
   - Hydrogeologic data management

4) Data Visualization
   - Automated map production
   - Water distribution system monitoring
   - Water quality monitoring
   - Water quantity/stream gauges monitoring
   - Vegetation mapping
   - Survey data mapping

In order to set the GIS-based MIS into motion, the *BIWRMB*, with the assistance from the three technical working groups, will provide the over-all direction of the GIS-based MIS in terms of planning, implementation and coordinate with other LGUs and National Government Agencies in operationalizing the plan. A GIS User Group, composed of representatives from other stakeholders not included in the TWG, will also be formed to assist in identifying and prioritizing its activities. The data collected will be forwarded to the GIS & Database Management Section for analysis and visualization. The GIS activity planning and coordination framework is shown in **Figure 8-30**.

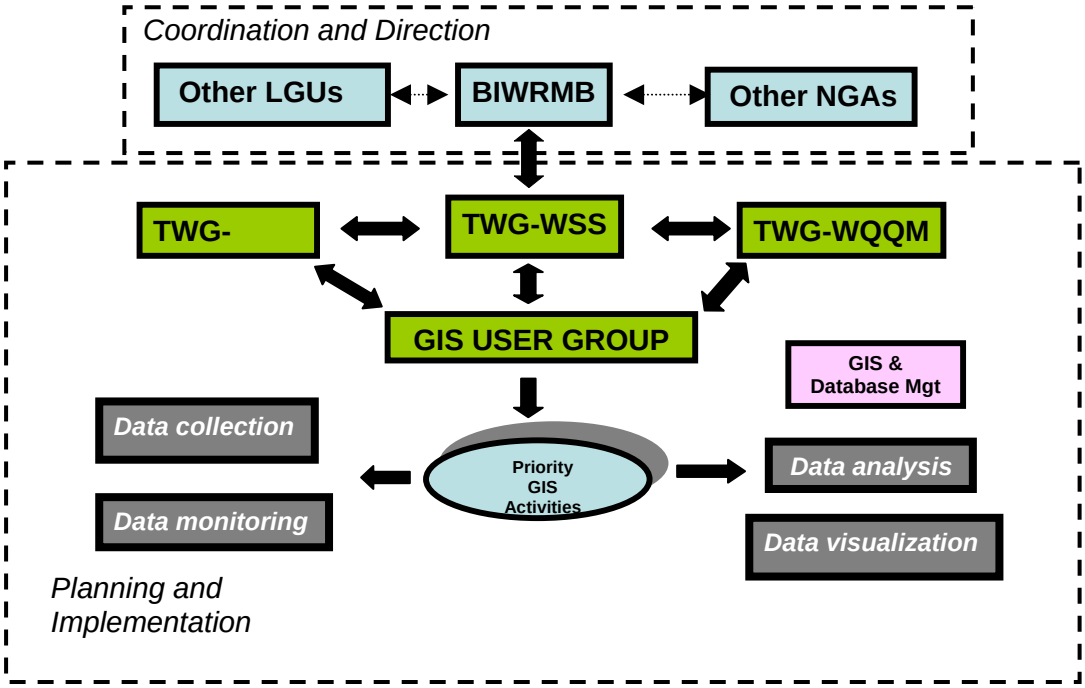


Figure 8-30 GIS Activity Planning and Coordination

8.9.2 Staffing Requirement and Training Needs

A survey of existing staff at the Bohol provincial capitol office with GIS and databases responsibilities (i.e. PPDO, BEMO and IT-unit) was conducted to assess their work responsibilities, volume of work, and trainings attended. This is necessary to formulate a capability building framework for the *BIWSS* master plan.

A GIS & Database Management Section shall be created and to be located at the IT-unit with direct supervision from BEMO being the secretariat of BIWRMB. For personnel needs, there are already people in BEMO, PPDO or IT section who are trained in basic GIS, Database Management and Web Applications and it is just a matter of re-assigning them to this project with a special order from the governor. The number of people and their position needed to run the MIS is shown in the table below.

Table 8-4 Personnel Requirement for the GIS-Based MIS

Item	Position	Quantity	Salary Grade
1	Geographic Information Officer	1	18
2	Database Management Information Officer/ Web Programmer	1	18

Since the existing personnel at BEMO, PPDO or IT section were only trained in basic GIS, there is a need for them to be trained on advance GIS topics, Remote Sensing, Web-GIS and GIS modeling applications.

8.9.3 Budgetary Requirement

The budgetary requirement to implement the GIS-based MIS includes software, hardware, operational cost and the cost of sending the selected personnel for advance GIS application trainings as enumerated above. These costs are shown in table below.

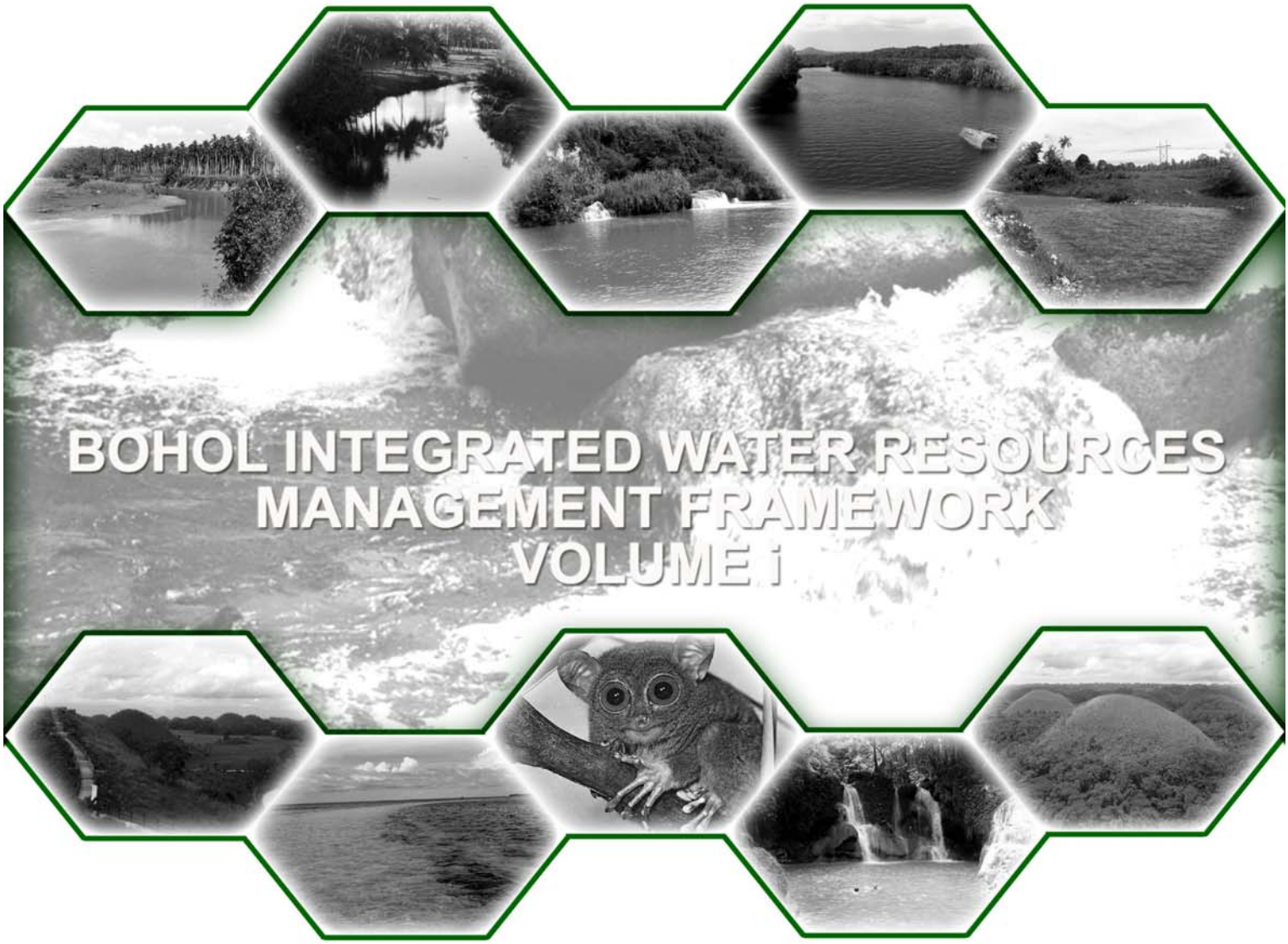
Table 8-5 Budgetary Requirement for the MIS

Type	Item	Investment Cost	Operating Cost
Hardware	Database Server	-	-
	Web Server	P300,000.00	-
	Electrical Power	-	P3,000.00 / mo
	Desktop Computer with OS	P80,000.00	
	Global Positioning System(2 units), GPSMap 76CSx + exterior antennae + ext. cable & connector + vehicle power cable	70,000.00 7,000.00 2,000.00	
	Digital Camera	15,000.00	
	Flatbed Scanner, Microtek ScanMaker, 1000XL Scanner, 3200 x 6400 dpi, 48 bit max color depth.	100,000.00	
Software	Windows 2003 Server	P50,000.00	-
	MySQL v5.0	Freeware	-
	PHP	Freeware	-
	InovaGIS 3.1	Freeware	-
	ArcView 3.x with extensions	Existing	-
	HEC-RAS & Other models	Freeware	-
Internet Services	1 Static public IP address and internet connection	-	P5,000.00 / mo
	Domain name registration	-	P5,500.00 / 2yrs
Trainings	Advance Spatial Analysis, 2 persons	20,000.00	
	Remote sensing and image interpretation, 2 persons	20,000.00	
	GIS modeling for water quality/quantity, 2 persons	20,000.00	
	Web-GIS applications, 2 persons	20,000.00	

8.10 RECOMMENDATIONS

- There is a need to integrate and access variety of information and applications from other databases in the province into one manageable system while maintaining data integrity and focusing on project direction. For example BEMO has a Natural Resource database stored in MS Access application. Other offices with databases include the IT unit, the DA-RIARC in Ubay, Bohol, and the DENR-7 GIS. Therefore, future development of server-side applications should be geared towards a distributive configuration of databases.

- Opportunities for collaboration between different agencies (i.e. Academe, NGOs, LGUs, NGAs, etc) must be looked into specifically on the generation and updating of spatial and tabular data.



CHAPTER 9
MARKETING PLAN

CHAPTER 9 – MARKETING PLAN

9.1 INTRODUCTION

The Terms of Reference asks for a Marketing Plan to promote private sector investment and local commercial and industrial development based on having improved access to safe and reliable water supplies. The Marketing Plan will include the promotion of water conservation measures in order to protect this valuable resource.

9.1.1 Project Marketing Plan

The Project Marketing Plan would have been fairly straightforward except that all the identified integrated river cluster projects that would supply bulk water to all the local government units of Bohol Province up to 2035 are not commercially feasible except for Phase 1 (2010-2012) of the Abatan-Loboc Option.

As indicated in the technical and financial analysis chapters, Phase 1 of the Abatan-Loboc Option would abstract water from the Abatan River to supply bulk water to Bohol Water Utilities, Inc. (BWUI) for Corella, Tagbilaran City, Dauis and Panglao. At 12% FIRR, the bulk water price would be PhP 21.14 per cubic meter, which is below the BWUI bulk water price of PhP 25/cum. The bulk water price could be lower if part of project cost is financed through loan.

The figure below shows the steps in implementing the Abatan Option and the other river cluster area projects.

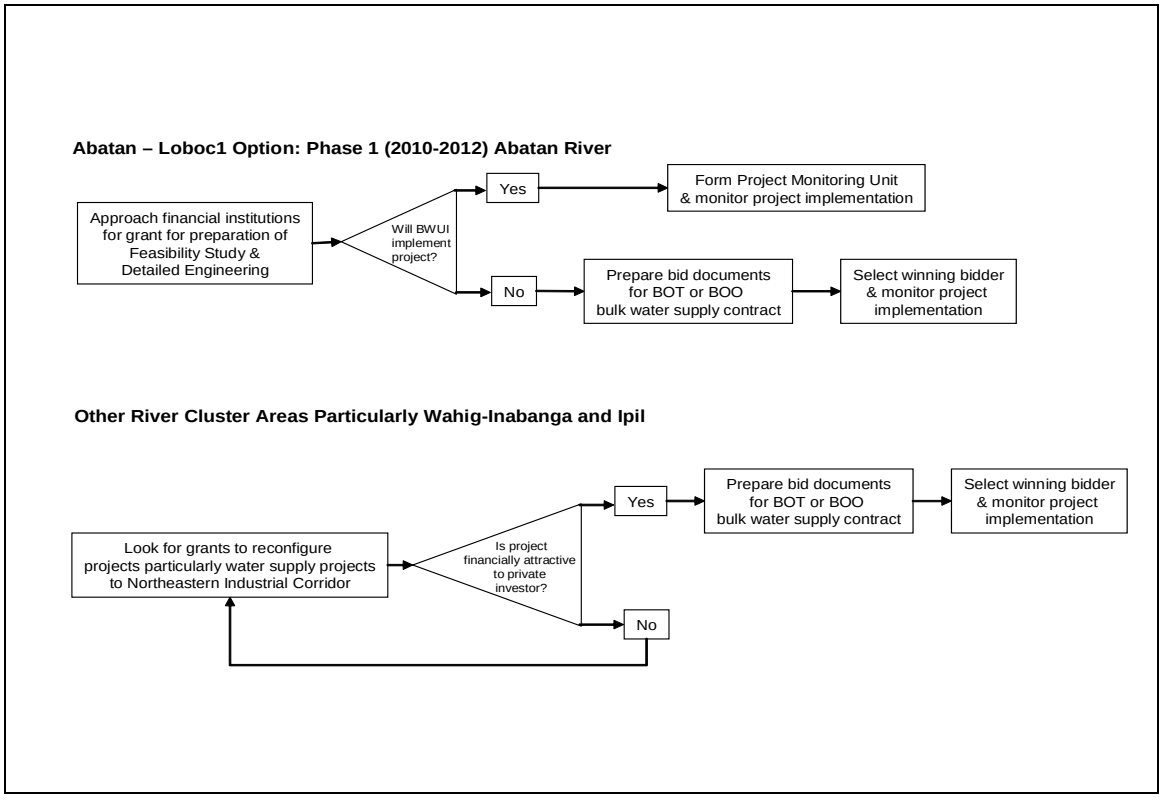


Figure 9-1 Project Marketing Plan

In the Abatan Option, the next step is to look for an international financial institution that would finance the preparation of the feasibility study and detailed engineering of the project. BWUI could approach ADB or World Bank for this, with the arrangement that the bank would provide the loan for project implementation.

Taking our cue from the Bohol Governor, the project is first offered to BWUI for implementation, and if BWUI is not interested, then the project could be bidded out on a build-operate-transfer or build-operate-own scheme. There should, however, be a guarantee from BWUI to "take or pay" the water that would be supplied.

After bidding out, selecting and awarding the winning proponent, the provincial government should then form a Project Monitoring Unit that would check if the winning bidder is implementing the project in accordance with the terms of the contract. A consultant could be hired to assist the government in bid preparation and selection, and in project monitoring.

In case of the other river cluster area projects, there is a need to reconfigure the projects so that they could be commercially viable and attractive for funding and implementation by private sector groups. One possibility is to tap ground water. As indicated by the Bohol Governor, the priority after the Metro Tagbilaran Area is to supply water to the Northeastern Industrial Corridor.

9.1.2 Donors' Meeting

The meeting with donors and Overseas Development Assistance (ODA) members is usually done at the national level. This is the time when ODA representatives pledge to fund the Philippines' various development and infrastructure projects

This could probably be done at the regional level and even at the provincial level for donors who might be interested. However, it would be wise for the province to get a profile of the donor agencies and their development thrusts for the Philippines so Bohol would know which projects to push for funding to particular donor agencies.

Some donors have Country Assistance or Partnership Strategies or Country Strategy and Program for the Philippines, and some have sectoral emphasis such as environment, water or ports. It would important to know these and to interview project officers so Bohol could identify and present the appropriate projects for ODA funding.

It is also important that Bohol prepare the project profiles of its priority projects so the province could give the donors an idea of the projects they would like to push. This "shopping list" is important since without this, discussions would just be at the level of ideas. This shopping list is also important as a take-off for discussion during business or economic foreign missions, and state visits.

It is therefore important for Bohol to continually identify development and infrastructure projects, prepare their project profiles including nature of project and justification, beneficiaries and identified economic benefits, some magnitude of capacity and rough estimate of project cost.

9.1.3 Estimated Costs

The estimated costs for various project implementation and marketing cost activities are presented in the table below. Linking with officers of donor agencies, presentation to them and development of project profiles would cost about PhP 224,000 for the first year and about PhP 184,000 per year after the first year. This assumes that the LGUs where the project would be located would help in providing information and in preparing the project profiles.

Table 9-1 Estimated Cost of Implementing Marketing Plan

Description	No.	Unit	Peso Unit Cost	Total PhP Mln
Abatan Option				
Preparation of Feasibility Study & Detaile Engineering				30.909
Estimated Project Cost				1,133.313
Wahig-Inabanga Option				
Pre-Feasibility Study				0.716
Preparation of Feasibility Study & Detaile Engineering				18.996
Estimated Project Cost				696.515
Ipil Option				
Pre-Feasibility Study				1.107
Preparation of Feasibility Study & Detaile Engineering				29.400
Estimated Project Cost				1,077.996
Project Monitoring Unit per Year				
Senior Project Engineer	13	months	15,000	0.195
Two Junior Engineers	26	months	8,000	0.208
Water Supply Engineering Consultant	12	months	50,000	0.600
Desktop Computers (core 2 duo)	3	units	40,000	0.120
Printer	1	unit	20,000	0.020
Other Expenses		lump sum		0.030
Total				**1.173**
Marketing Activities per Year				
Trips to Manila to meet Donor Agencies				
2 persons for six days	2	trips	20,000	0.040
Presentation to Donor Agencies in Bohol	20	pax	500	0.010
Preparation of Project Profiles				
Other LGUs would help; editing to be done by one person at provincial office	13	months	8,000	0.104
Desktop Computer (core 2 duo)	1	unit	40,000	0.040
Other Expenses		lump sum		0.030
Total				**0.224**

Note: International missions and foreign trips would be based on regular budget of the province.

The formation and operation of a Project Monitoring Unit is estimated to cost about PhP 1.17 million for the first year depending on the capability of the province to monitor the construction of water supply projects. For the first project, a consultant might be needed. However, in succeeding projects, in-house resources might be adequate.

9.2 IDENTIFIED BENEFITS WITH THE IMPLEMENTATION OF THE BOHOL INTEGRATED WATER SUPPLY SYSTEM

The Bohol Integrated Water Supply System aims to provide bulk water to all the municipalities and capitol city of mainland Bohol. This would benefit not only households that would be provided with level 3 water, but also commercial and industrial ventures that could then be implemented because of adequate water supply for their projects.

9.2.1 Households

The provision of safe and reliable water supply to households would provide significant benefits including the following:

- Members of households who used to fetch water from outside sources could spend that time on more productive activities
- Households that used to buy water by container at exorbitant prices would have water at much cheaper and affordable prices thereby enabling them to save or spend the differential for other purposes
- Households would have the opportunity to go into livestock raising such as piggery, poultry and goat-raising
- Households could go into backyard farming
- Households would have the opportunity to go into food processing like meat processing, candy and sweets-making, baking and bread making, etc.
- Communities would have reduced morbidity and mortality caused by waterborne diseases as a result of the availability of safe potable water and better hygiene. This would redound to savings in medicine, in time spent for medical consultations and in human lives.

9.2.2 Commercial and Industrial Ventures

With the availability of safe and reliable water supply, investors would not hesitate to launch projects that require adequate water supply. These would include tourism and commercial developments, real estate development, provision of recreational facilities such as golf courses and swimming pools, retirement villages, Asian regional hospitals and agro-processing industries.

It was indicated by the Bohol Poverty Reduction Management Office (BPRMO) that a seaweeds processing plant will be established in Talibon and that there would be an adequate supply of water for the project. Based on this Bohol Integrated Water Supply System Master Plan, surface water for Talibon could be accessed from Ipil River.

In May 2007, the first phase of the PhP 600 million Eskaya Beach Resort & Spa in Panglao was inaugurated. Eskaya refers to the only known indigenous people of Bohol.
The Eskaya Beach Resort & Spa, owned by a Boholano, has a varied topography. It has a short cliff, flat land, a ravine, even caves and has a commanding view of the sea. The boutique style resort is eyed for the very rich local and foreign tourists. The rate of a bargain villa is US$ 425++ per night during the lean season.

Currently, the Eskaya Beach Resort & Spa buys bulk water from Bohol Water Utilities, Inc., (BWUI) and places this in its storage tank for use by its guests. Eventually, Panglao Municipality should be able to provide piped water not only to Eskaya but also to present and future tourist facilities at lesser cost.

9.3 ACCESS TO RELIABLE WATER SUPPLY IS AN INVESTMENT PREREQUISITE

When an investor evaluates site locations, he/she has a list of prerequisite facilities and if any one of these is not available, then the project would be a “no go” in that location.

The prerequisite facilities on this list include basic infrastructure services such as transport facilities particularly roads and drainage, power, communications, and water and sanitation.

Aside from these prerequisites, the more compelling reasons to locate in Bohol include the abundance of highly-educated and trainable manpower with the proper work attitude, friendly and very hospitable people, ease of doing business and of relating to the bureaucracy, beautiful natural attractions, well-endowed natural resources and sustainable environment, favorable peace and order situation, low cost of doing business, and low cost of living (more so for foreign executives and their families).

9.3.1 Transport Facilities

In the case of Bohol, roads and drainage infrastructure is serviceable to all types of vehicles. The circumferential road is nearly complete including lateral and diagonal connecting roads.

Tagbilaran City and seven other ports of call in Bohol cater to regular sea routes to destinations in Visayas and Mindanao. Fast and luxurious ferry boats connect to Cebu, which is an international gateway in central Philippines.

The Tagbilaran Domestic Airport connects Bohol to Manila via at least four daily flights provided by the country's two major airlines. In April 2010, the Panglao International Airport would become operational and would cater to both local and foreign tourists. Bohol could then have direct flights to neighboring Asian countries.

9.3.2 Power

The province is fully energized with actual generating capacity estimated at 103.7 MW. Consumption is now about 50 MW. TransCo has recently committed to implement next year the Negros Oriental-Bohol Interconnection Project that would provide an additional 100 MW to the province.

9.3.3 Communications

Voice and data communication facilities are adequate with around 40 internet cafes in operation. There is a plan to connect Bohol to Cebu via fiber optic cable, which would make Bohol part of the country's fiber optic backbone. Once this is done, at least one US-based business process outsourcing (BPO) firm would set up a BPO center in Bohol.

9.3.4 Water

Water is available 24-hours in Tagbilaran City and in some nearby municipalities. With the implementation of the Bohol Integrated Water Supply System, good quality and reliable water supply would be available to all the local government units (LGUs) of Bohol Province, and to existing and planned industrial centers.

9.4 THE MARKETING PLAN IS BEING SPEARHEADED BY BOHOL INVESTMENT BOARD ASSISTED BY THE BOHOL INVESTMENT PROMOTION CENTER

The task of promoting private sector investment, and local commercial and industrial development based on having improved access to safe and reliable water supplies falls under the broader objective of investment promotion, since water availability is one of a number of prerequisites for investors in establishing their projects in a specific location. This is what is called a "negative list". If a facility in the "negative list" is not available, then the site would not be further considered for the implementation of an investment project.

This is not to downplay the critical nature of adequate water supply. While the other infrastructure facilities could be constructed, e.g., roads, or brought to the site, e.g., power

and communications, water has to be endowed in the area. Transporting water over long distances has so far been very costly and has at times proved uneconomical.

The provincial body that has been created through the Bohol Investment Code of 2001 is the Bohol Investment Board, which has been tasked to implement the provisions of the Code particularly the promotion and encouragement of domestic and foreign investments in the Province of Bohol.

The Bohol Investment Promotion Center (BIPC), created through Provincial Ordinance No. 99-02, serves as the Secretariat of the Bohol Investment Board and undertakes the pro-active market development and investment promotion activities.

To implement its assigned tasks, BIPC coordinates with provincial executive agencies and LGUs, as well as with national government agencies including the departments of Tourism, and Trade and Industry. It also networks with counterpart investment and promotions organizations.

The offices of the Provincial Planning and Development Coordinator, and the Provincial Engineer have been providing relevant data and information, and should be able to provide information on the extent and location of water sources, and water supply availability. With this Master Plan, a GIS-based information system that would show water sources and other relevant information, would be uploaded to a web-based information system.

The Bohol Poverty Reduction Management Office (BPRMO) promotes livelihood and small scale industries at the barangay level.

9.5 THE MARKETING PLAN

The Province of Bohol is on the right track in promoting local and foreign investments in the province including the following:

- Through the Bohol Investment Code of 2001, Bohol Province provides fiscal and non-fiscal incentives to registered enterprises which are in addition to the incentives that might be provided under Republic Act (RA) 7190 otherwise known as the “Local Government Code of 1991”, RA 7916 known as “The Special Economic Zone Act of 1995”, Executive Order 226 known as the “Omnibus Investments Code of 1987”, and other pertinent laws.

  The fiscal incentives provided by the Bohol Investment Board to qualified registered enterprises include tax credit equivalent to 10% of total cost of approved infrastructure project, and exemption from real property tax (pertains to the 35% share of the province) for a period of seven years from date of registration.

- The province has readily available relevant policies, laws, information and data to prospective investors and the public through reports, materials, hand-outs, CDs, and well-designed web sites (Provincial Government, BIPC, PPDO and the Office of the Vice Governor)

- BIPC, as Secretariat of the Bohol Investment Board, a) serves as one-stop processing and approval center for existing and potential investors, b) assists in (i) securing licenses and permits, (ii) arranging for availment of local and national government incentives, and (iii) identifying business or joint venture partners, raw material supplies, possible project sites and other requirements, and c) maintains a data bank of business and economic information

- The province, led by its Governor and other LGU officials, promotes investment through fares, official foreign visits and missions.

The Province of Bohol has been maximizing the July celebration of Sandugo, including the invitation of foreign dignitaries and tourists.

Bohol should continue to promote international meetings and conventions, and should try to expand its capacity to accommodate guests so that it could host United Nations meetings, as a long term goal. Things to consider would be the construction of a convention center and the construction of major hotels by world chains such as Marriott, Hyatt, Shangri-La and Oberoi.

Bohol could also launch contests or competitions for the annual search of outstanding products and designs that use local materials for bags and accessories, dresses, food products such as sweets and candies (ubi sweets, dried mangoes, mangorind candies, banaba chips, peanut kisses), furniture, etc.

It should be noted that the Philippines is moving away from the mass production model of China to the limited volume/high value production of outstanding world-class design-oriented products model wherein the Philippines is usually compared to Italy. It is no surprise that there are a lot of excellently-designed products bearing Italian names.

However, we do not have to look to Italy or other countries to prove this point. Cebuana Diane Monique Lhuillier is a Filipino fashion designer based in the United States. She made the news with two high-profile celebrity weddings in a row. She designed Christine Baumgartner's wedding dress for the fall 2004 wedding to Kevin Costner shortly after designing both of Britney Spears' wedding dresses in her wedding to Kevin Federline.

Luxurious fabrics, striking details and exquisite workmanship define her creations as trendsetting, traditional and romantic. Now, say "I do!" to a Monique Lhuillier bridal dress Barbie® doll who wears a breathtaking gown with a white lace bodice, full tulle skirt and sable-colored satin sash with a rhinestone floral brooch.

The other famous designer is Cebuano Kenneth Cobunpue, who has been featured and hailed by Time Magazine (Stylewatch section July 24, 2006 issue) as the rattan's first true virtuoso designer.

Kenneth won the 2005 Design for Asia Award, and his Voyage bed design has been bought by Hollywood actor Brad Pitt. He also designed the furniture set of the movie, Ocean 13.

The annual search for outstanding designs could help identify Boholanos and Boholanas who could be world-famous designers.

9.6 INVESTMENT OPPORTUNITIES

The preferred investment areas, as indicated by the Bohol Investment Board, are presented below:

Tourism/Ecotourism	Agri-business
• Accommodation Facilities • Theme and Novelty Parks • Nature Parks/Mountain Resort • Transportation Services • Golf Course • Restaurants/ Food Outlets • Health and Wellness • Retirement Villages • Other Tourism - Related Services	• Production of High Value Crops • Culture and Processing of Inland Fishing or Freshwater Species • Post-Harvest Facilities • Fruit/Meat Processing • Feedmill

Light Manufacturing	Services
• Precision Assembly • Semiconductors • Farm Implements • Furniture/ Furnishings • Garments	• Media/ Advertising • Medical Services/ Facilities • Information Technology • Financial Services • Engineering/ Architectural Services • Training and Sports Facilities • Development of Indigenous Power Sources • Human Resource Development i.e. as training facilities, educational institutions, etc.
Information Technology	
• Potential Site for IT/Call Centers	

Bohol has designated specific areas in the island as priority development areas.

9.6.1 Panglao Island Tourism Estate

Panglao Island, the premier resort destination in the province, provides 2,023 hectares, or 20% of the 9,000-hectare area, as an estate development project under a Presidential proclamation known as the Panglao Island Tourism Estate. It is an ideal location for tourist facilities, such as integrated resort complexes; convention, sports, recreation and shopping centers; a golf course; and retirement villages.

The priority investment areas identified for the Panglao Island Tourism Estate are:

- Integrated Resort Complex
- Hotels
- Retirement Village
- Spas
- Medical and Health Facilities
- Marina
- Dive Shops
- Golf Course
- Craft Village
- Other Tourism-Related Facilities

As indicated by LGU officials and the Boholanos themselves, the whole province could be promoted as a major tourist destination. Bohol Province has indeed a lot more attractions when compared to other sun and sand island destinations in the country and in Southeast Asia. Aside from the beach, tourists could visit other attractions such as Chocolate Hills, river cruise, churches, caves, island-hopping and deep sea diving.

9.6.2 Northeastern Industrial Zone

This part of the island lies strategically across Cebu. The availability of land for industrial use and its strong agricultural base can serve as an expansion area for the region's urban and industrial growth. The corridor comprises seven coastal towns, i.e., Clarin, Inabanga, Buenavista, Getafe, Bien Unido, Talibon and Ubay, and the interior town of Trinidad.

The priority investment areas identified for the Northeastern Industrial Zone are:

- Roll-On Roll-Off (Ro-Ro) Port Facility
- Ship Building/Ship Breaking Facilities
- Plantations/Agro-Forestry
- Agri-Based Industries Including Processing and Post Harvest
- Infrastructure and Utilities
- Light Manufacturing
- Agro-Tourism

9.6.3 Southeastern Tourism Circuit

Explore the southeastern part of Bohol. Jumping off from Anda Peninsula – a diver's best kept secret, and upwards to Cogtong Bay in Candijay and then to Mabini – a rich mangrove ecosystem, one feels the potential of a rich and varied ecotourism flavor in the coastal landscape.

9.7 BOHOL POVERTY REDUCTION MANAGEMENT OFFICE

BPRMO has been promoting livelihood and agro-industrial development at the grassroots level. It was initially created to reduce poverty in insurgency – infiltrated and – threatened barangays, and has now evolved as the main livelihood-promoting agency of the province.

BPRMO's approach is to first organize the residents such farmers or fisher folk into cooperatives, which would be the main organization to propel growth and respond to institutional requirements. The BPRMO boasts of several millionaire cooperatives.

One of BPRMO's programs is a piggery dispersal program that provides five-month old gilts to households to provide livelihood, and encourage capital build up and savings for the recipients. This, together with the livestock dispersal program of the Provincial Veterinarian would encourage livestock raising in the province. The animals raised could then be sold at the Livestock Auction Center at Catigbian.

Other livelihood activities initiated by BPRMO involve the provision of sewing machines to barangays, hand tractors to farmer cooperatives, promotion of banana cultivation in 75 barangays, raffia-cultivation in Calape, ubi (yam)-cultivation in Carmen, introduction and expansion of seaweed farming in Getafe, and promotion of fish-raising in fish cages along the Northeastern Industrial Zone.

BPRMO is currently establishing a packaging center backed by the Bohol Chamber of Commerce and Industry.

9.8 WATER CONSERVATION CAMPAIGN

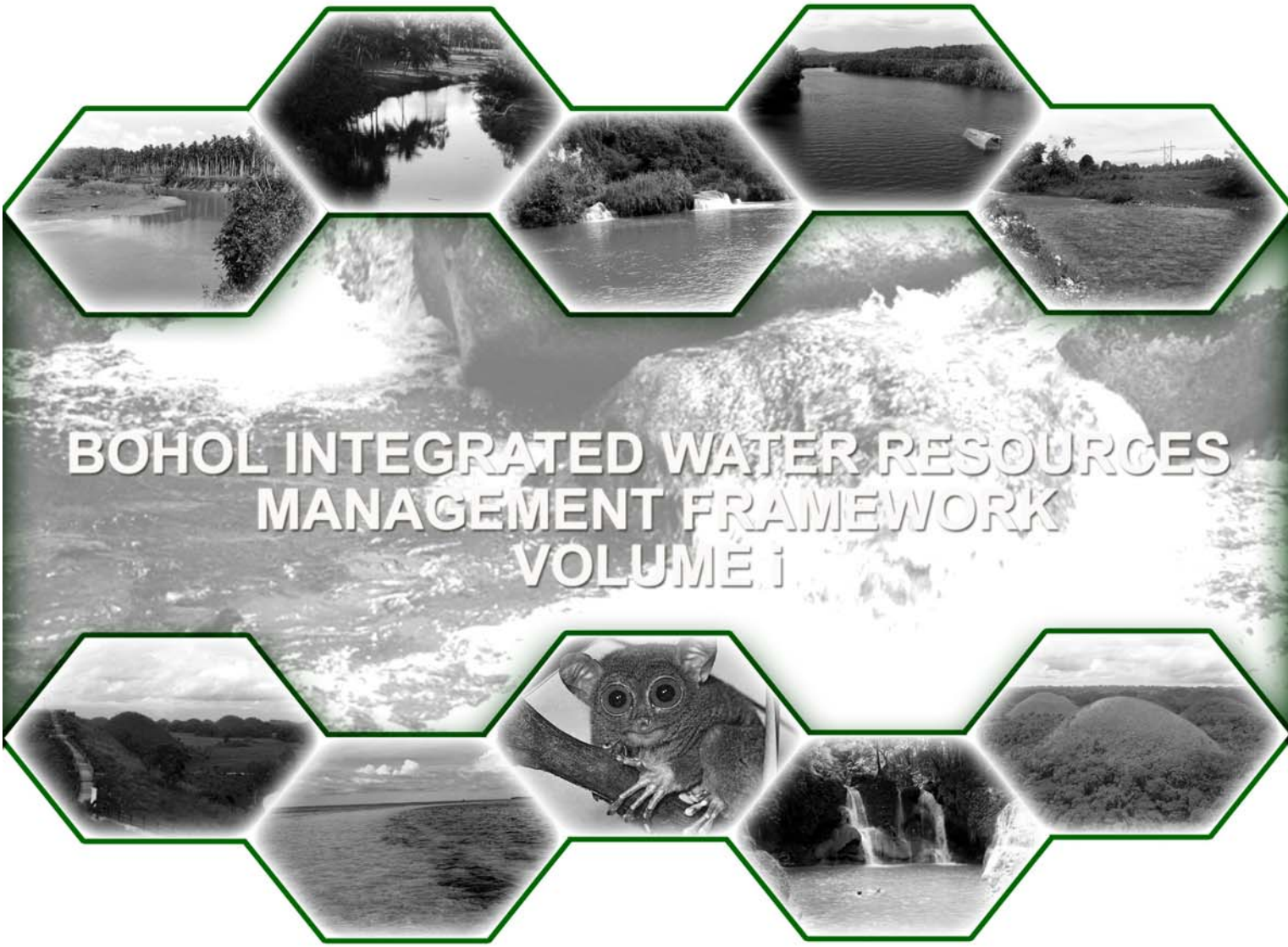
To emphasize the importance of safe and reliable water supply, an initial three-year campaign could be launched that would include lectures to elementary and high school students, presentations to select business and private groups, and media campaigns (print, TV and radio).

Emphasis would be in the prudent use of water, measures to eliminate leaks in household faucets and piping system, elimination of water theft and illegal connections, and the establishment of a central reporting and monitoring unit for leaks within water systems.

The other major area of emphasis would be the proper watershed (from water source or sources to catchment area or basin) management and conservation that would include water sources, trees and vegetation, rivers, and land and land resources.

In the management of the watersheds, the communities and LGUs concerned should actively participate.

After the intensive three – year campaign period, water conservation and watershed management should become continuous and evolving processes that should involve the monitoring and evaluation of results.



CHAPTER 10
MONITORING AND EVALUATION

CHAPTER 10 – MONITORING AND EVALUATION

10.1 GENERAL

Monitoring and evaluation (M&E) is the collection, analysis and interpretation of data and the provision of feedback regarding project performance necessary to ensure the continuing quality of the project or the implementation of a plan. M&E is a system that will generate critical management information on project or the implementation of a plan so that it is possible to know in sufficient time: (i) if the project or plan is achieving its expected outputs and outcome (both immediate and longer term); and (ii) if not, to stimulate management action to remedy the situation.

Monitoring is the surveillance by the project team that project inputs are being delivered, are being used as intended, are producing the expected outputs and outcome and are having initial effects as planned. Monitoring takes place continually or periodically providing feedback to project management at all levels, enabling it to improve operational plans and to take timely corrective action.

Evaluation is the internal assessment by the project or plan implementation team, aimed at analyzing: (i) results, effects and impacts of particular project intervention; and (ii) the appropriateness of a project's design and implementation methods in achieving the specified objectives.

This chapter presents the M&E system proposed for the monitoring and evaluation of the implementation of the Bohol Integrated Water Supply System Master Plan (BIWSSMP). The proposed M&E system was developed adopting the strategy map and the balanced scorecard.

10.2 STRATEGY MAP

The strategy map[1] was adopted for translating the vision and mission of the Province of Bohol into interrelated objectives of the BIWSSMP along a balanced set of perspectives. Accomplishment of the objectives under each of the perspectives would contribute to the achievement of the purpose of the BIWSSMP, i.e. the "*utilization of Bohol's water resources for safe domestic, commercial and industrial use in order to improve the health of the community, while increasing opportunities for local economic development and protecting the depleted groundwater systems*". The attainment of the purpose of the BIWSSMP in turn would contribute to the realization of Bohol's vision and mission.

The objectives of the BIWSSMP under each of the four perspectives are:

a) Customer perspective: The main beneficiaries of the integrated water supply system are the communities and business/industries. The objectives are:

   - Increase number of households served with sustainable 24-hour potable water supply.
   - Increase number of establishments served with sustainable 24-hour potable water supply.

b) Process perspective: In order to attain the desired outcome under the customer perspective, the following enhancements are identified:

[1] Kaplan, Robert S. and Norton, David P. (2005). Strategy Maps. Converting Intangible Assets into Tangible Outcome. Boston: Harvard Business School Press.

- Build the infrastructure requirement for integrated water supply system (i.e. bulk water supply system, and distribution systems).
- Provide the necessary O&M trainings to operators of: (i) community-operated water systems, (ii) local water utilities, and (iii) LGU-owned water systems.

c) Financial perspective: To facilitate access to funds and to enhance the viability of the project, the following strategies are proposed:

- Promote private sector investment to fund, build and operate the integrated water supply system.
- Increase willingness of households to connect to and pay for the water supply service.

d) Learning and Growth: The following policy and legal framework, and institutional capability building for the LGUs are necessary for the achievement of objectives in the first three perspectives.

- Develop the legal framework on water resource regulation, and watershed management to protect and sustain water supplies.
- Establish water management information system in the PPDO that is accessible to stakeholders.
- Provide necessary training for the implementation of BIWSSMP, and its updating based on lessons learned from its implementation.

The Strategy Map developed for the BIWSSMP is shown in **Table 10-1**.

10.3 BALANCED SCORECARD

The balanced scorecard[2] is adopted for translating the BIWSSMP strategy map into measurable objectives and a basis for tracking and measuring performance of the different stakeholders.

10.3.1 Performance Measures for Objectives Under Customer Perspective

The performance measures for Objective no. 1 "*Communities: Increase number of HHs served with sustainable 24-hr potable water supply*" are:

- % of HHs served in the Province. – This indicates the service coverage of the Bohol Integrated Water Supply System (BIWSS) and other water supply projects in the Province.

- % increase in HHs served in the Province. – This quantifies the increase in the share in the total households in the Province that is directly benefited by the BIWSS and other water supply projects.

- % reduction in cases (morbidity rate) of waterborne diseases in the Province. – This assesses the improvement in the health of the populace of the Province as an effect of safe water supplied by the BIWSS and other water supply projects.

[2] Kaplan, Robert S. and Norton, David P. (1996). The Balanced Scorecard. Translating Strategy into Action. Boston: Harvard Business School Press.

Table 10-1 Strategy Map: Bohol Integrated Water Supply System Master Plan (BIWSSMP)

Planning Tool # 1: LADP Strategy Map for a Package of Technical Assistance

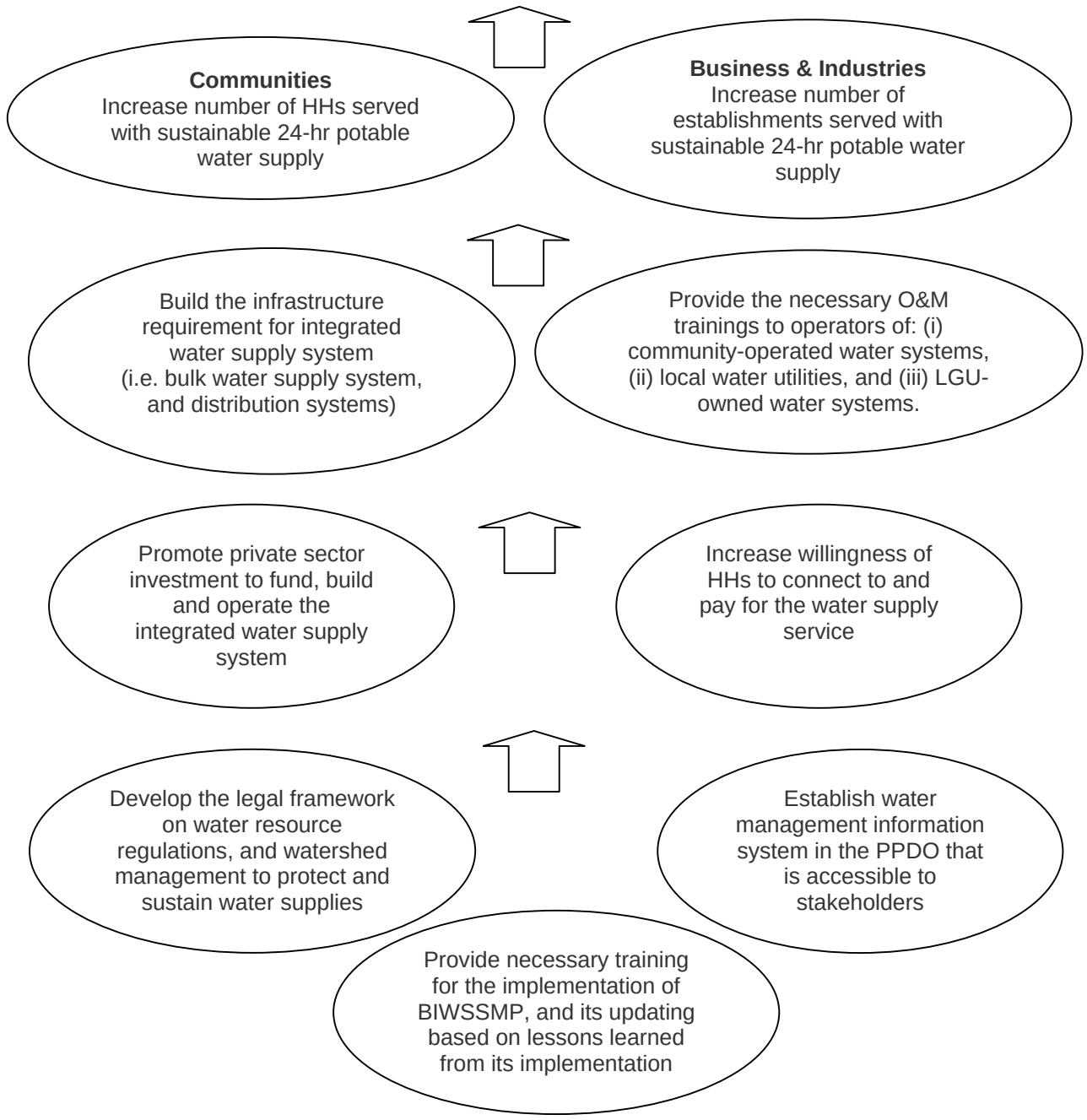
LADP Site	☑ Bohol		☐ MIGEDC	
Strategic directions of the LADP Site	Vision Statement Bohol is a prime eco-cultural tourist destination and a strong agro-industrial province with an empowered and self-reliant people who are God-loving, law-abiding, proud of their cultural heritage and committed to the growth and protection of the environment.		Mission Statement To continuously transform its social, economic, political and cultural life through effective collaboration of people from various sectors of the province to achieve and sustain its vision.	
Package of Technical Assistance (TA)	☐ Agriculture	☑ Infrastructure	☐ Tourism	☑ Water Supply
Performance/Service Area to which the TA contributes to:	☑ Social Services	☑ Economic development	☑ Environmental management	
	☐ Governance	☐ Administration		
Potential impact of the development thrust on the Performance Area	Utilization of Bohol's water resources for safe domestic, commercial and industrial use in order to improve the health of the community, while increasing opportunities for local economic development and protecting the depleted groundwater systems.			

Customer Perspective
(*Identify customers. Identify outcome of the process improvements in the specific development thrust on the behavior, mindsets, attitudes of the customer. Please state in objective format. Start with a verb.)*

Process Perspective
(*Identify the processes involved in the supply chain of the development thrust. Identify enhancements in the processes to be able to achieve the desired outcomes in the behavior & mindsets of target customers. Please state in objective format. Start with a verb.).*

Financial Perspective
(*Identify policies/ systems that would facilitate access to funds/ enhance savings/ increase revenues that can be used to implement the process improvements. Please state in objective format. Start with a verb.)*

Learning & Growth
(*Identify the human, information and organization capital required to implement the process improvements in the strategy map. Please state in objective format. Start with a verb.)*



The attainment of Objective no. 2 "*Business & Industries: Increase number of establishments served with sustainable 24-hr potable water supply*" is assessed using the following performance measure:

- Number of establishment served in the Province. – This quantifies the actual number of establishments benefiting from the BIWSS as against the target.

10.3.2 Performance Measures for Objectives Under Process Perspective

The performance of Objective no. 3 "*Build the infrastructure requirement for integrated water supply system*" is measured using the following indicators:

- Bulk water supply system built according to design specifications and standards. – This evaluates if the construction of the system is in accordance with the master plan, and detailed engineering design.

- % Non-Revenue Water (NRW) in the bulk water supply system. – This reflects the effectiveness of the construction and the efficiency in the operation and maintenance of the system.

- % of demand (for bulk water) supplied by the bulk water supply system. – This indicates not only the effectiveness of the construction and the efficiency in the operation and maintenance of the system, but also the dependability and sustainability of the water sources.

- Water quality at tapping points of water supply distribution systems. – This examines the quality of bulk water (if safe for drinking) supplied to the distribution systems. It also reflects the effectiveness of the water treatment facilities.

- % of HHs served by each water supply distribution system. – This indicates the service coverage of each water supply distribution system.

- Number of hours of water service per day in each water supply distribution system. – This reflects not only the effectiveness of the construction and the efficiency in the operation and maintenance of each water distribution system, but also the dependability of the bulk water supply system.

- Minimum pressure in each water supply distribution system. – This manifests water availability for households in the different parts of each water supply distribution system.

- Number of establishments served by each water supply distribution system. – This quantifies the actual number of establishments benefiting from each water supply distribution system as against the target.

- Water quality in each water supply system. – This examines the quality of water (if safe for drinking) supplied to the customers. It also reflects the efficiency of the operation and maintenance of each water supply distribution system.

The performance measures for Objective no. 4 "*Provide the necessary O&M trainings to operators of : (i) community-operated water system, (ii) local water utilities, and (iii) LGU-owned water systems*" are:

- Number of target participants from operators of water supply distribution systems trained. – This quantifies the number of staff of operators of water supply distribution systems who successfully completed O&M capacity building courses.

- % Non-Revenue Water (NRW) in each water supply distribution system. – This reflects the effectiveness of the construction and the efficiency in the operation and maintenance of the system. This also indicates the effectiveness of the O&M capacity building courses.

- % of complaints in a month acted upon, in each water supply distribution system. – This reflects the efficiency in the operation and maintenance of the system. This also manifests the effectiveness of the O&M capacity building courses.

10.3.3 Performance Measure of Objectives Under Financial Perspective

The achievement of Objective no. 5 "*Promote private sector investment to fund, build and operate the integrated water supply system*" is assessed using the following performance measure:

- Private sector investment to fund, build and operate the bulk water supply system. – This indicates the viability of actual private sector investment in the bulk water supply system.

- Private sector investments to fund, build/rehabilitate, and operate the water supply distribution systems. – This shows the viability of actual private sector investment in each water supply distribution system.

The performance of Objective no. 6 "*Increase willingness of HHs to connect to and pay for the water supply service*" is measured using the following indicators:

- HHs' willingness-to-connect in each water supply distribution system. – This does not only manifest the need of the households for a piped water supply but also the acceptability by the households of the water rates.

- Average HH water expense (as % of HH income) in each water supply distribution system. – This indicates the affordability of the water rates.

- Collection efficiency in each water supply distribution system. – This is a measure of the community's acceptance of their financial responsibility for the development and use of scarce water resources.

10.3.4 Performance Measure of Objectives Under Learning and Growth Perspective

The performance measure for Objective no. 7 "*Develop the legal framework on water resource regulations, and watershed management to protect and sustain water supplies*" is:

- Timeliness in the approval of ordinances or resolutions relevant to water resource regulations and environmental/watershed management. – This manifests the Provincial/City/Municipal LGUs' commitment to sustain water supplies, water resources regulation, and environmental/watershed management.

The attainment of Objective no. 8 "*Establish water management information system in the PPDO that is accessible to stakeholders*" is assessed using the following performance measure:

- Timeliness in the establishment and maintenance/updating of the water management information system in the PPDO. – This indicates the Provincial LGU's support to the dissemination of knowledge base of information about Bohol's water resources to stakeholders.

The performance of Objective no. 9 "*Provide necessary training for the implementation of BIWSSMP, and its updating based on lessons learned from its implementation*" is measured using the following indicator:

- Timeliness in the implementation and updating of master plan. – This reflects the effectiveness of the training for the implementation and updating of BIWSSMP. This also manifests the Provincial/City/Municipal LGUs' commitment to sustain water supplies, water resources regulation, and environmental/watershed management.

The scorecard formulated for the BIWSSMP is presented in **Table 10-2**. The targets for the measures by 5-year period are indicated in **Table 10-3**, while those for each water supply distribution system are shown in **Table 10-4**.

Table 10-2 Scorecard: Bohol Integrated Water Supply System Master Plan (BIWSSMP)

Planning Tool # 2: LADP Scorecard for a Package of Technical Assistance

LADP Site	☑ Bohol		☐ MIGEDC	
Strategic directions of the LADP Site	Vision Statement Bohol is a prime eco-cultural tourist destination and a strong agro-industrial province with an empowered and self-reliant people who are God-loving, law-abiding, proud of their cultural heritage and committed to the growth and protection of the environment.		Mission Statement To continuously transform its social, economic, political and cultural life through effective collaboration of people from various sectors of the province to achieve and sustain its vision.	
Package of Technical Assistance (TA)	☐ Agriculture	☑ Infrastructure	☐ Tourism	☑ Water Supply
Performance/Service Area to which the TA contributes to:	☑ Social Services	☑ Economic development	☑ Environmental management	
	☐ Governance	☐ Administration		
Strategic measures of the performance / service area	☑ Economic indicators o % of households served – 62% in 2010, 89% in 2015, and 94% in 2020-2035 o Number of establishments served – 2,458 in 2010 to 8,211 in 2035 o Reduction in cases (morbidity rate) of waterborne diseases – at least 3% in 2010, 26% in 2015, and 30% in 2020-2035 ☑ Environmental indicators o Development of framework for integrated water resource management o Ordinances or resolutions relevant to water resource regulations and environmental/watershed management o Improvement in the conditions of watershed areas o Improvement in the conditions of groundwater			
Potential impact of the development thrust on the Performance Area	Utilization of Bohol's water resources for safe domestic, commercial and industrial use in order to improve the health of the community, while increasing opportunities for local economic development and protecting the depleted groundwater systems.			

Objective:	Measure	Formula	Baseline data	Target
Culled from the strategy map.	Indicators of performance	Operational definition or further elaboration of the measure.	Identifies the actual performance data to date.	Desired or standard performance level for the measure. Must be challenging but feasible.
1. **Communities**: Increase number of HHs served with sustainable 24-hr potable water supply.	1.1 % of HHs served in the Province.	Computed for the whole Province (Number of HHs Served) / (Total Number of HHs) x 100	Total: 59% in 2003 (base year)	Total: 62% in 2010 89% in 2015 94% in 2020 – 2035. Bulk supply: 38% in 2010 58% in 2015 64% in 2020 66% in 2025 68% in 2030 – 2035. Other sources: 24% in 2010 31% in 2015 30% in 2020 28% in 2025 26% in 2030 – 2035.
	1.2 % increase in HHs served in the Province.	{[(current no. of HHs served) less (no. of HHs served during base year)] / (no. of HHs served during base year)} x 100	129,610 household in 2003 (base year)	19% in 2010 89% in 2015 112% in 2020 127% in 2025 140% in 2030 153% in 2035
	% reduction in cases (morbidity rate) of waterborne diseases in the Province.	{[(current morbidity rate) less (morbidity rate during base year)] / (morbidity rate during base year)} x 100		At least: 3% in 2010 26% in 2015 30% in 2020 – 2035

Objective:	Measure	Formula	Baseline data	Target
Culled from the strategy map.	Indicators of performance	Operational definition or further elaboration of the measure.	Identifies the actual performance data to date.	Desired or standard performance level for the measure. Must be challenging but feasible.
2. **Business & Industries** Increase number of establishments served with sustainable 24-hr potable water supply.	2.1 Number of establishments served in the Province.	Actual no. of establishments served as against target.		2,458 in 2010 3,285 in 2015 6,963 in 2020 7,268 in 2025 7,823 in 2030 8,211 in 2035
3. Build the infrastructure requirement for integrated water supply system For Bulk Water Supply System	3.1 Bulk water supply system built according to design specifications and standards.	Actual infrastructure built as against detailed engineering design and master plan.	-	In accordance with the Bohol Integrated Water Supply System Master Plan, and detailed engineering design.
	3.2 % Non-Revenue Water (NRW) in the bulk water supply system.	(total water produced – total water billed) / (total water produced) x 100	-	At most 3%
	3.3 % of demand (for bulk water) supplied by the bulk water supply system.	Actual volume of water supplied to tapping points as against actual demand for bulk water of each water supply distribution system.	-	100%
	3.4 Water quality at tapping points of water supply distribution systems.	Results of physical, bacteriological and chemical laboratory analyses.	-	Within allowable limits set in the Philippine Standard for Drinking Water

Objective:	Measure	Formula	Baseline data	Target
Culled from the strategy map.	Indicators of performance	Operational definition or further elaboration of the measure.	Identifies the actual performance data to date.	Desired or standard performance level for the measure. Must be challenging but feasible.
For Water Supply Distribution Systems	3.5 % of HHs served by each water supply distribution system.	Computed for each water supply distribution system: (HHs served by each water supply distribution system) / (total HHs in the service municipality/ city) x 100	-	*See Table 10.4 for breakdown by water supply distribution system*
	3.6 Number of hours of water service per day in each water supply distribution system.	Actual no. of hours of water supply availability to HHs.	-	24 hours
	3.7 Minimum pressure in each water supply distribution system.	Minimum pressure actually measured in the different parts of the system.	-	7 meters
	3.8 Number of establishments served by each water supply distribution system.	Actual no. of establishments served as against target.	-	*See Table 10.4 for breakdown by water supply distribution system*
	3.9 Water quality in each water supply distribution system.	Results of physical, bacteriological and chemical laboratory analyses.	-	Within allowable limits set in the Philippine Standard for Drinking Water
4 Provide the necessary O&M trainings to operators of: (i) community-operated water systems, (ii) local	4.1 No. of target participants from operators of water supply distribution systems trained.	No. of target participants issued certificate of completion.	-	For a training on a specific O&M aspect, at least 2 staff responsible for such aspect in the operator's organization should have successfully

Objective:	Measure	Formula	Baseline data	Target
Culled from the strategy map.	Indicators of performance	Operational definition or further elaboration of the measure.	Identifies the actual performance data to date.	Desired or standard performance level for the measure. Must be challenging but feasible.
water utilities, and (iii) LGU-owned water systems.				completed the training.
	4.2 % Non-Revenue Water (NRW) in each water supply distribution system.	Computed for each water supply distribution system: (total water produced – total water billed) / (total water produced) x 100	-	At most 17%
	4.3 % of complaints in a month acted upon, in each water supply distribution system.	(No. of complaints in a month acted upon, in each water supply distribution system) / (Total complains in a month in each water supply distribution system) x 100	-	100%
5. Promote private sector investment to fund, build and operate the integrated water supply system	5.1 Private sector investment to fund, build and operate the bulk water supply system.	Financial indicators showing viability of actual private sector investment in the bulk water supply system.	-	Financial internal rate of return of at least 12%
	5.2 Private sector investments to fund, build/rehabilitate, and operate the water supply distribution systems.	Financial indicators showing viability of actual private sector investment in each water supply distribution system.	-	Financial internal rate of return of at least 12%

Objective:	Measure	Formula	Baseline data	Target
Culled from the strategy map.	Indicators of performance	Operational definition or further elaboration of the measure.	Identifies the actual performance data to date.	Desired or standard performance level for the measure. Must be challenging but feasible.
6. Increase willingness of HHs to connect to and pay for the water supply service	6.1 HHs' willingness-to-connect in each water supply distribution system (%).	(HHs willing-to-connect in each water supply distribution system) / (total HHs within the service area of each water supply distribution system) x 100	-	At least 70%
	6.2 Average HH water expense (as % of HH income) in each water supply distribution system.	(Actual average monthly HH water bill in each water supply distribution system) / (average monthly HH income in each water supply distribution system) x 100	-	At most 5%
	6.3 Collection efficiency in each water supply distribution system (%).	(Actual water bills paid in each water supply distribution system) / (total water bills in each water supply distribution system) x 100		At least 95%
7. Develop the legal framework on water resource regulations, and watershed management to protect and sustain water supplies	7.1 Timeliness in the approval of ordinances or resolutions relevant to water resource regulations and environmental/watershed management.	Actual vs target	-	Ordinances or resolutions approved before 2010
8. Establish water management information system in the PPDO that is accessible to stakeholders	8.1 Timeliness in the establishment and maintenance/ updating of the water management information system in the PPDO.	Actual vs target	-	Water management information system established in the PPDO before 2010, and updated every year

Objective:	Measure	Formula	Baseline data	Target
Culled from the strategy map.	Indicators of performance	Operational definition or further elaboration of the measure.	Identifies the actual performance data to date.	Desired or standard performance level for the measure. Must be challenging but feasible.
9. Provide necessary training for the implementation of BIWSSMP, and its updating based on lessons learned from its implementation	9.1 Timeliness in the implementation and updating of master plan.	Actual vs target	-	Master plan implemented before 2010 and updated every five years starting 2010

Table 10.3 Target for the Measures

Objective	Measures			Baseline Data 2003	Target 2010	2015	2020	2025	2030	2035
1. **Communities**: Increase number of HHs served with sustainable 24-hr potable water supply.	1.1	% of HHs served in the Province.	Total							
			% served	59	62	89	94	94	94	94
			No. of HHs served	129,610	154,201	244,421	275,090	293,789	311,550	328,122
			Served population	732,219	840,590	1,327,568	1,496,431	1,600,192	1,697,423	1,788,683
			Bulk Supply							
			% served		38	58	64	66	68	68
			No. of HHs served		95,297	159,190	186,958	206,785	225,275	238,212
			Level 2		6,896	20,186	42,765	39,437	42,209	44,333
			Level 3		88,401	139,004	144,193	167,347	183,067	193,880
			Served population		519,490	864,638	1,017,012	1,126,300	1,227,369	1,298,559
			Other Sources							
			% served		24	31	30	28	26	26
			No. of HHs served		58,904	85,231	88,132	87,005	86,275	89,910
			Served population		321,100	462,930	479,419	473,892	470,054	490,124
	1.2	% increase in HHs served in the Province.	%	-	19	89	112	127	140	153
	1.3	% reduction in cases (morbidity rate) of waterborne diseases in the Province.	%		at least 3	at least 26	at least 30	at least 30	at least 30	at least 30
2. **Business & Industries**: Increase number of establishments served with sustainable 24-hr potable water supply.	2.1	No. of establishments served in the Province.	No.		2,458	3,285	6,963	7,268	7,823	8,211

Objective	Measures		Baseline Data 2003	Target 2010	2015	2020	2025	2030	2035
3. Build the infrastructure requirement for integrated water supply system.									
For Bulk Water Supply System	3.1 Bulk water supply system built according to design specifications and standards.			In accordance with the Master Plan and detailed engineering design.					
	3.2 % Non-Revenue Water (NRW) in the bulk water supply system.	%	-	at most 3	at most 3	at most 3	at most 3	at most 3	at most 3
	3.3 % of demand (for bulk water) supplied by the bulk water supply system.	% cumd	- -	100 42,319	100 103,882	100 148,021	100 177,982	100 195,107	100 208,353
				see Table 10.4 for breakdown by water supply distribution system					
	3.4 Water quality at tapping points of water supply distribution systems.			Within allowable limits set in the Philippine Standard for Drinking Water					
For Water Supply Distribution Systems.	3.5 % of HHs served by each water supply distribution system.			see Table 10.4 for breakdown by water supply distribution system					
	3.6 Number of hours of water service per day in each water supply distribution system.	Hr.		24	24	24	24	24	24

Objective	Measures		Baseline Data 2003	Target					
				2010	2015	2020	2025	2030	2035
	3.7 Minimum pressure in each water supply distribution system.	meter		7	7	7	7	7	7
	3.8 No. of establishments served by each water supply distribution system.			see Table 10.4 for breakdown by water supply distribution system					
	3.9 Water quality in each water supply distribution system.			Within allowable limits set in the Philippine Standard for Drinking Water					
4. Provide the necessary O&M trainings to operators of: (i) community-operated water systems, (ii) local water utilities, and (iii) LGU owned -water systems.	4.1 No. of target participants from operators of water supply distribution systems trained.	participant		at least 2 per operator					
	4.2 % Non-Revenue Water (NRW) in each water supply distribution system.	%	-	at most 17	at most 17	at most 17	at most 17	at most 17	at most 17
	4.3 % of complaints in a month acted upon, in each water supply distribution system.	%		100	100	100	100	100	100

Objective	Measures	Baseline Data 2003	Target 2010	2015	2020	2025	2030	2035
5. Promote private sector investment to fund, build and operate the integrated water supply system	5.1 Private sector investment to fund, build and operate the bulk water supply system.		Financial internal rate of return of at least 12%					
	5.2 Private sector investments to fund, build/rehabilitate, and operate the water supply distribution systems.		Financial internal rate of return of at least 12%					
6. Increase willingness of HHs to connect to and pay for the water supply service	6.1 HHs' willingness-to-connect in each water supply distribution system (%).		at least 70	at least 70	at least 70	at least 70	at least 70	at least 70
	6.2 Average HH water expense (as % of HH income) in each water supply distribution system. %		at most 5	at most 5	at most 5	at most 5	at most 5	at most 5
	6.3 Collection efficiency in each water supply distribution system (%). %		at least 95	at least 95	at least 95	at least 95	at least 95	at least 95

Objective	Measures	Baseline Data 2003	Target					
			2010	2015	2020	2025	2030	2035
7. Develop the legal framework on water resource regulations, and watershed management to protect and sustain water supplies	7.1 Timeliness in the approval of ordinances or resolutions relevant to water resource regulations and environmental/watershed management.		Approved before 2010					
8. Establish water management information system in the PPDO that is accessible to stakeholders	8.1 Timeliness in the establishment and maintenance/updating of the system in the PPDO.		Established before 2010 updated yearly					
9. Provide necessary training for the implementation of BIWSSMP, and its updating based on lessons learned from it implementation	9.1 Timeliness in the implementation and updating of master plan.		Implemented before 2010 updated every 5 years					

Table 10.4 Targets for the Measures, by Water Supply Distribution System

Cluster	Water Supply Distribution System	Measures			Baseline Data 2007	Target 2015	2020	2025	2030	2035
Abatan	Antequera		Average-day demand (ADD)	cumd		1,176	1,415	1,676	1,793	1,888
			Existing supply	cumd	1,080	1,080	1,080	1,080	1,080	1,080
		3.3	% of demand (for bulk water) supplied	%		100	100	100	100	100
			by the bulk water supply system.	cumd		96	335	596	713	808
		3.5	% of HHs served	% served		51	56	58	59	59
				Total HHs served		1,798	2,120	2,316	2,481	2,605
				Level 2		245	599	556	588	614
				Level 3		1,553	1,520	1,761	1,893	1,991
				Served population		8,834	10,411	11,377	12,184	12,795
		3.8	No. of establishments served			27	62	68	73	77
Abatan	Balilihan		Average-day demand (ADD)	cumd		1,540	1,875	2,223	2,400	2,534
			Existing supply	cumd	831	831	831	831	831	831
		3.3	% of demand (for bulk water) supplied	%		100	100	100	100	100
			by the bulk water supply system.	cumd		709	1,044	1,392	1,569	1,703
		3.5	% of HHs served	% served		53	59	60	61	61
				Total HHs served		2,165	2,579	2,833	3,053	3,230
				Level 2		300	751	707	754	795
				Level 3		1,864	1,828	2,125	2,298	2,435
				Served population		11,753	14,002	15,380	16,575	17,536
		3.8	No. of establishments served			35	84	92	99	105
Abatan	Catigbian		Average-day demand (ADD)	cumd		1,916	2,362	2,838	3,141	3,359
			Existing supply	cumd	412	412	412	412	412	412
		3.3	% of demand (for bulk water) supplied	%		100	100	100	100	100
			by the bulk water supply system.	cumd		1,504	1,950	2,426	2,729	2,947
		3.5	% of HHs served	% served		49	54	55	57	57
				Total HHs served		2,794	3,381	3,761	4,153	4,444
				Level 2		390	994	952	1,032	1,101
				Level 3		2,404	2,387	2,810	3,121	3,343
				Served population		14,645	17,724	19,716	21,772	23,296
		3.8	No. of establishments served			44	106	118	131	140
Abatan	Corella		Average-day demand (ADD)	cumd		549	720	841	904	950
			Existing supply	cumd	333	333	333	333	333	333
		3.3	% of demand (for bulk water) supplied	%		100	100	100	100	100
			by the bulk water supply system.	cumd		216	387	508	571	617
		3.5	% of HHs served	% served		53	58	59	60	60
				Total HHs served		855	1,013	1,104	1,182	1,245
				Level 2		120	73	67	73	77
				Level 3		735	940	1,036	1,109	1,168
				Served population		4,095	4,851	5,285	5,660	5,964
		3.8	No. of establishments served			12	29	32	34	36
Abatan	Sagbayan		Average-day demand (ADD)	cumd		1,696	2,036	2,333	2,446	2,558
			Existing supply	cumd	681	681	681	681	681	681
		3.3	% of demand (for bulk water) supplied	%		100	100	100	100	100
			by the bulk water supply system.	cumd		1,015	1,355	1,652	1,765	1,877
		3.5	% of HHs served	% served		57	63	63	63	64
				Total HHs served		2,581	3,022	3,208	3,368	3,518
				Level 2		349	841	764	799	830
				Level 3		2,232	2,181	2,444	2,570	2,688
				Served population		12,840	15,032	15,960	16,755	17,502
		3.8	No. of establishments served			39	90	96	101	105
Abatan	San Isidro		Average-day demand (ADD)	cumd		817	964	1,109	1,167	1,219
			Existing supply	cumd	34	34	34	34	34	34
		3.3	% of demand (for bulk water) supplied	%		100	100	100	100	100
			by the bulk water supply system.	cumd		783	930	1,075	1,133	1,185
		3.5	% of HHs served	% served		55	60	60	60	60
				Total HHs served		1,299	1,521	1,618	1,709	1,795
				Level 2		195	507	485	513	538
				Level 3		1,104	1,014	1,133	1,197	1,256
				Served population		6,400	7,493	7,974	8,423	8,843
		3.8	No. of establishments served			19	45	48	51	53

Cluster	Water Supply Distribution System	Measures			Baseline Data 2007	Target 2015	2020	2025	2030	2035
Abatan	Sikatuna		Average-day demand (ADD)	cumd		931	1,115	1,273	1,341	1,405
			Existing supply	cumd	362	362	362	362	362	362
		3.3	% of demand (for bulk water) supplied	%		100	100	100	100	100
			by the bulk water supply system.	cumd		569	753	911	979	1,043
		3.5	% of HHs served	% served		86	94	94	94	94
				Total HHs served		1,289	1,513	1,610	1,701	1,786
				Level 2		184	463	434	458	479
				Level 3		1,106	1,050	1,176	1,243	1,306
				Served population		7,232	8,485	9,031	9,539	10,015
		3.8	No. of establishments served			22	51	54	57	60
Abatan	***Sub-Total***		***Average-day demand (ADD)***	***cumd***		***8,624***	***10,486***	***12,294***	***13,191***	***13,912***
			Existing supply	***cumd***	***3,733***	***3,733***	***3,733***	***3,733***	***3,733***	***3,733***
		3.3	***% of demand (for bulk water)***	***%***		***100***	***100***	***100***	***100***	***100***
			supplied by the bulk water supply	***cumd***		***4,891***	***6,753***	***8,561***	***9,458***	***10,179***
		3.5	***% of HHs served***	***% served***		***55***	***60***	***61***	***62***	***62***
				Total HHs served		***12,781***	***15,148***	***16,450***	***17,647***	***18,623***
				Level 2		***1,783***	***4,228***	***3,966***	***4,216***	***4,435***
				Level 3		***10,999***	***10,919***	***12,485***	***13,431***	***14,188***
				Served population		***65,798***	***77,997***	***84,723***	***90,908***	***95,951***
		3.8	***No. of establishments served***			***198***	***467***	***508***	***546***	***576***
Loboc 1	Alburquerque		Average-day demand (ADD)	cumd		1,092	1,308	1,505	1,600	1,674
			Existing supply	cumd	650	650	650	650	650	650
		3.3	% of demand (for bulk water) supplied	%		100	100	100	100	100
			by the bulk water supply system.	cumd		442	659	855	951	1,024
		3.5	% of HHs served	% served		72	78	78	78	78
				Total HHs served		1,530	1,776	1,895	2,008	2,115
				Level 2		192	433	381	400	418
				Level 3		1,338	1,342	1,514	1,608	1,697
				Served population		7,984	9,266	9,891	10,479	11,035
		3.8	No. of establishments served			24	56	59	63	66
Loboc 1	Baclayon		Average-day demand (ADD)	cumd		1,521	1,981	2,388	2,610	2,773
			Existing supply	cumd	946	946	946	946	946	946
		3.3	% of demand (for bulk water) supplied	%		100	100	100	100	100
			by the bulk water supply system.	cumd		575	1,035	1,442	1,664	1,827
		3.5	% of HHs served	% served		56	62	65	66	66
				Total HHs served		2,253	2,705	3,036	3,318	3,531
				Level 2		296	331	304	332	353
				Level 3		1,957	2,374	2,732	2,986	3,178
				Served population		11,346	13,619	15,289	16,708	17,783
		3.8	No. of establishments served			34	82	92	100	107
Loboc 1	Cortes		Average-day demand (ADD)	cumd		1,206	1,465	1,740	1,878	1,969
			Existing supply	cumd	340	340	340	340	340	340
		3.3	% of demand (for bulk water) supplied	%		100	100	100	100	100
			by the bulk water supply system.	cumd		867	1,125	1,400	1,539	1,630
		3.5	% of HHs served	% served		56	62	64	66	66
				Total HHs served		1,810	2,135	2,349	2,526	2,655
				Level 2		242	580	533	565	590
				Level 3		1,569	1,556	1,816	1,961	2,065
				Served population		9,027	10,649	11,717	12,597	13,240
		3.8	No. of establishments served			27	64	70	76	79

Cluster	Water Supply Distribution System	Measures		Baseline Data 2007	Target 2015	2020	2025	2030	2035
Loboc 1	Dauis	Average-day demand (ADD)	cumd		3,583	4,716	5,955	6,402	6,900
		Existing supply	cumd	2,060	2,060	2,060	2,060	2,060	2,060
		3.3 % of demand (for bulk water) supplied	%		100	100	100	100	100
		by the bulk water supply system.	cumd		1,523	2,656	3,895	4,342	4,840
		3.5 % of HHs served	% served		65	72	76	76	76
			Total HHs served		2,511	3,082	3,595	3,880	4,196
			Level 2		306	411	359	388	420
			Level 3		2,204	2,672	3,235	3,492	3,776
			Served population		24,858	30,504	35,578	38,402	41,528
		3.8 No. of establishments served			75	183	213	230	249
Loboc 1	Dimiao	Average-day demand (ADD)	cumd		1,122	1,348	1,567	1,687	1,767
		Existing supply	cumd	752	752	752	752	752	752
		3.3 % of demand (for bulk water) supplied	%		100	100	100	100	100
		by the bulk water supply system.	cumd		369	596	815	935	1,014
		3.5 % of HHs served	% served		48	53	53	54	54
			Total HHs served		1,647	1,944	2,098	2,251	2,365
			Level 2		236	598	565	599	628
			Level 3		1,411	1,345	1,533	1,652	1,737
			Served population		8,605	10,156	10,961	11,762	12,358
		3.8 No. of establishments served			26	61	66	71	74
Loboc 1	Lila	Average-day demand (ADD)	cumd		952	1,152	1,372	1,471	1,544
		Existing supply	cumd	254	254	254	254	254	254
		3.3 % of demand (for bulk water) supplied	%		100	100	100	100	100
		by the bulk water supply system.	cumd		698	898	1,118	1,217	1,290
		3.5 % of HHs served	% served		54	60	61	63	63
			Total HHs served		1,191	1,409	1,544	1,659	1,746
			Level 2		162	397	369	392	410
			Level 3		1,029	1,011	1,175	1,267	1,335
			Served population		7,136	8,438	9,252	9,936	10,458
		3.8 No. of establishments served			21	51	56	60	63
Loboc 1	Loay	Average-day demand (ADD)	cumd		1,477	1,816	2,207	2,404	2,547
		Existing supply	cumd	500	500	500	500	500	500
		3.3 % of demand (for bulk water) supplied	%		100	100	100	100	100
		by the bulk water supply system.	cumd		977	1,316	1,707	1,904	2,047
		3.5 % of HHs served	% served		58	64	67	69	69
			Total HHs served		1,973	2,347	2,633	2,868	3,034
			Level 2		251	584	531	568	596
			Level 3		1,722	1,762	2,102	2,300	2,438
			Served population		10,889	12,953	14,534	15,829	16,745
		3.8 No. of establishments served			33	78	87	95	100
Loboc 1	Loboc	Average-day demand (ADD)	cumd		1,752	2,418	2,913	3,129	3,257
		Existing supply	cumd	713	713	713	713	713	713
		3.3 % of demand (for bulk water) supplied	%		100	100	100	100	100
		by the bulk water supply system.	cumd		1,039	1,705	2,200	2,416	2,544
		3.5 % of HHs served	% served		54	59	61	62	62
			Total HHs served		1,951	2,332	2,576	2,787	2,957
			Level 2		268	670	631	675	713
			Level 3		1,682	1,663	1,945	2,113	2,244
			Served population		11,210	13,403	14,803	16,018	16,991
		3.8 No. of establishments served			34	80	89	96	102
Loboc 1	Panglao	Average-day demand (ADD)	cumd		10,732	17,536	18,365	18,685	18,991
		Existing supply	cumd	1,340	1,340	1,340	1,340	1,340	1,340
		3.3 % of demand (for bulk water) supplied	%		100	100	100	100	100
		by the bulk water supply system.	cumd		9,392	16,196	17,025	17,345	17,651

Cluster	Water Supply Distribution System	Measures		Baseline Data 2007	Target 2015	2020	2025	2030	2035
		3.5 % of HHs served	% served		79	84	85	85	86
			Total HHs served		4,070	4,738	5,115	5,475	5,819
			Level 2		465	658	511	547	582
			Level 3		3,604	4,079	4,603	4,927	5,237
			Served population		22,322	25,986	28,054	30,029	31,917
		3.8 No. of establishments served			67	208	168	180	191
Loboc 1	Tagbilaran City	Average-day demand (ADD)	cumd		30,019	32,688	35,703	37,505	39,206
		Existing supply	cumd	14,445	14,445	14,445	14,445	14,445	14,445
		3.3 % of demand (for bulk water) supplied	%		100	100	100	100	100
		by the bulk water supply system.	cumd		15,574	18,243	21,258	23,060	24,761
		3.5 % of HHs served	% served		95	95	95	95	95
			Total HHs served		19,798	21,518	23,164	24,719	26,187
			Level 2		1,980	2,152	2,316	2,472	2,619
			Level 3		17,818	19,366	20,848	22,247	23,568
			Served population		98,703	107,277	115,487	123,239	130,556
		3.8 No. of establishments served			986	1,089	1,202	1,202	1,202
Loboc 1	Valencia	Average-day demand (ADD)	cumd		1,924	2,308	2,687	2,889	3,040
		Existing supply	cumd	360	360	360	360	360	360
		3.3 % of demand (for bulk water) supplied	%		100	100	100	100	100
		by the bulk water supply system.	cumd		1,564	1,948	2,327	2,529	2,680
		3.5 % of HHs served	% served		48	53	53	54	54
			Total HHs served		2,679	3,166	3,420	3,672	3,861
			Level 2		384	976	923	979	1,027
			Level 3		2,296	2,190	2,497	2,693	2,834
			Served population		14,863	17,562	18,969	20,370	21,418
		3.8 No. of establishments served			45	105	114	122	129
Loboc 1	***Sub-Total***	***Average-day demand (ADD)***	***cumd***		***55,380***	***68,738***	***76,401***	***80,261***	***83,667***
		Existing supply	***cumd***	***22,359***	***22,359***	***22,359***	***22,359***	***22,359***	***22,359***
		3.3 % of demand (for bulk water)	***%***		***100***	***100***	***100***	***100***	***100***
		supplied by the bulk water supply	***cumd***		***33,021***	***46,379***	***54,042***	***57,902***	***61,308***
		3.5 % of HHs served	***% served***		***72***	***76***	***77***	***77***	***78***
			Total HHs served		***41,413***	***47,150***	***51,425***	***55,163***	***58,465***
			Level 2		***4,783***	***7,790***	***7,424***	***7,916***	***8,355***
			Level 3		***36,630***	***39,360***	***44,001***	***47,246***	***50,110***
			Served population		***226,945***	***259,813***	***284,534***	***305,369***	***324,029***
		3.8 No. of establishments served			***1,372***	***2,057***	***2,216***	***2,295***	***2,362***
Loboc 2	Batuan	Average-day demand (ADD)	cumd		1,066	1,296	1,546	1,669	1,752
		Existing supply	cumd	150	150	150	150	150	150
		3.3 % of demand (for bulk water) supplied	%		100	100	100	100	100
		by the bulk water supply system.	cumd		916	1,146	1,396	1,519	1,602
		3.5 % of HHs served	% served		53	59	61	62	63
			Total HHs served		1,529	1,802	1,988	2,140	2,249
			Level 2		201	478	438	464	484
			Level 3		1,327	1,324	1,550	1,677	1,765
			Served population		7,910	9,325	10,288	11,075	11,637
		3.8 No. of establishments served			24	56	62	66	70
Loboc 2	Bilar	Average-day demand (ADD)	cumd		1,431	1,730	2,058	2,259	2,375
		Existing supply	cumd	614	614	614	614	614	614
		3.3 % of demand (for bulk water) supplied	%		100	100	100	100	100
		by the bulk water supply system.	cumd		817	1,116	1,444	1,645	1,761
		3.5 % of HHs served	% served		51	56	58	60	60
			Total HHs served		1,919	2,271	2,494	2,727	2,872
			Level 2		260	634	589	629	659
			Level 3		1,659	1,636	1,905	2,098	2,213
			Served population		10,757	12,725	13,977	15,284	16,097
		3.8 No. of establishments served			32	76	84	92	97
Loboc 2	Carmen	Average-day demand (ADD)	cumd		4,614	5,331	6,196	6,625	6,857
		Existing supply	cumd	315	315	315	315	315	315

Cluster	Water Supply Distribution System	Measures		Baseline Data 2007	Target 2015	2020	2025	2030	2035
		3.3 % of demand (for bulk water) supplied by the bulk water supply system.	%		100	100	100	100	100
			cumd		4,299	5,016	5,881	6,310	6,542
		3.5 % of HHs served	% served		51	56	58	61	61
			Total HHs served		4,607	5,381	5,859	6,360	6,640
			Level 2		618	1,476	1,349	1,429	1,483
			Level 3		3,989	3,905	4,510	4,932	5,157
			Served population		25,420	29,690	32,329	35,093	36,634
		3.8 No. of establishments served			76	178	194	211	220
Loboc 2	Dagohoy	Average-day demand (ADD)	cumd		1,439	1,755	2,082	2,281	2,420
		Existing supply	cumd	219	219	219	219	219	219
		3.3 % of demand (for bulk water) supplied by the bulk water supply system.	%		100	100	100	100	100
			cumd		1,220	1,536	1,863	2,062	2,201
		3.5 % of HHs served	% served		49	54	55	57	57
			Total HHs served		2,015	2,405	2,644	2,889	3,062
			Level 2		281	706	668	717	757
			Level 3		1,734	1,699	1,976	2,172	2,305
			Served population		10,964	13,092	14,391	15,723	16,664
		3.8 No. of establishments served			33	79	86	94	100
Loboc 2	Pilar	Average-day demand (ADD)	cumd		2,126	2,584	3,059	3,345	3,551
		Existing supply	cumd	898	898	898	898	898	898
		3.3 % of demand (for bulk water) supplied by the bulk water supply system.	%		100	100	100	100	100
			cumd		1,228	1,686	2,161	2,447	2,653
		3.5 % of HHs served	% served		49	54	55	57	57
			Total HHs served		2,907	3,467	3,806	4,154	4,398
			Level 2		405	1,018	962	1,031	1,088
			Level 3		2,502	2,448	2,844	3,123	3,310
			Served population		16,253	19,381	21,277	23,221	24,587
		3.8 No. of establishments served			49	116	128	139	148
Loboc 2	Sevilla	Average-day demand (ADD)	cumd		894	1,089	1,301	1,429	1,513
		Existing supply	cumd	267	267	267	267	267	267
		3.3 % of demand (for bulk water) supplied by the bulk water supply system.	%		100	100	100	100	100
			cumd		627	823	1,034	1,162	1,246
		3.5 % of HHs served	% served		49	54	55	57	57
			Total HHs served		1,208	1,446	1,593	1,744	1,852
			Level 2		169	426	404	435	460
			Level 3		1,039	1,020	1,189	1,309	1,392
			Served population		6,749	8,082	8,902	9,743	10,347
		3.8 No. of establishments served			20	48	53	58	62
Loboc 2	Sierra Bullones	Average-day demand (ADD)	cumd		2,247	2,755	3,356	3,763	3,977
		Existing supply	cumd	370	370	370	370	370	370
		3.3 % of demand (for bulk water) supplied by the bulk water supply system.	%		100	100	100	100	100
			cumd		1,877	2,385	2,985	3,393	3,606
		3.5 % of HHs served	% served		51	56	59	62	63
			Total HHs served		2,891	3,427	3,847	4,302	4,543
			Level 2		363	831	749	810	848
			Level 3		2,528	2,596	3,098	3,492	3,695
			Served population		16,479	19,535	21,929	24,525	25,900
		3.8 No. of establishments served			49	117	132	147	155
Loboc 2	***Sub-Total***	***Average-day demand (ADD)***	***cumd***		***13,817***	***16,541***	***19,598***	***21,371***	***22,445***
		Existing supply	***cumd***	***2,833***	***2,833***	***2,833***	***2,833***	***2,833***	***2,833***
		3.3 % of demand (for bulk water) supplied by the bulk water supply	***%***		***100***	***100***	***100***	***100***	***100***
			cumd		***10,984***	***13,707***	***16,764***	***18,537***	***19,612***
		3.5 % of HHs served	***% served***		***50***	***56***	***57***	***60***	***60***
			Total HHs served		***17,076***	***20,199***	***22,232***	***24,316***	***25,616***
			Level 2		***2,298***	***5,571***	***5,157***	***5,514***	***5,779***
			Level 3		***14,778***	***14,629***	***17,074***	***18,803***	***19,837***
			Served population		***94,534***	***111,830***	***123,093***	***134,664***	***141,867***
		3.8 No. of establishments served			***283***	***670***	***739***	***807***	***852***

Cluster	Water Supply Distribution System	Measures			Baseline Data 2007	Target 2015	2020	2025	2030	2035
Manaba	Anda		Average-day demand (ADD)	cumd		1,864	2,252	2,732	2,824	2,866
			Existing supply	cumd	677	677	677	677	677	677
		3.3	% of demand (for bulk water) supplied	%		100	100	100	100	100
			by the bulk water supply system.	cumd		1,187	1,576	2,056	2,147	2,190
		3.5	% of HHs served	% served		50	55	56	57	57
				Total HHs served		1,919	2,231	2,379	2,479	2,530
				Level 2		267	654	599	618	629
				Level 3		1,652	1,577	1,779	1,861	1,901
				Served population		11,151	12,963	13,819	14,406	14,699
		3.8	No. of establishments served			33	78	83	86	88
Manaba	Candijay		Average-day demand (ADD)	cumd		3,038	3,736	4,551	4,971	5,261
			Existing supply	cumd	688	688	688	688	688	688
		3.3	% of demand (for bulk water) supplied	%		100	100	100	100	100
			by the bulk water supply system.	cumd		2,350	3,048	3,863	4,283	4,573
		3.5	% of HHs served	% served		57	63	67	69	70
				Total HHs served		3,975	4,712	5,309	5,788	6,110
				Level 2		492	1,108	991	1,058	1,106
				Level 3		3,483	3,603	4,318	4,731	5,004
				Served population		22,286	26,417	29,767	32,453	34,260
		3.8	No. of establishments served			67	159	179	195	206
Manaba	Duero		Average-day demand (ADD)	cumd		1,553	1,879	2,234	2,409	2,533
			Existing supply	cumd	752	752	752	752	752	752
		3.3	% of demand (for bulk water) supplied	%		100	100	100	100	100
			by the bulk water supply system.	cumd		800	1,127	1,482	1,657	1,780
		3.5	% of HHs served	% served		56	61	63	64	65
				Total HHs served		2,304	2,725	2,996	3,223	3,393
				Level 2		311	756	700	743	778
				Level 3		1,993	1,969	2,296	2,480	2,615
				Served population		11,702	13,842	15,220	16,373	17,239
		3.8	No. of establishments served			35	83	91	98	103
Manaba	Garcia Hernandez		Average-day demand (ADD)	cumd		2,430	2,837	3,375	3,728	4,103
			Existing supply	cumd	1,300	1,300	1,300	1,300	1,300	1,300
		3.3	% of demand (for bulk water) supplied	%		100	100	100	100	100
			by the bulk water supply system.	cumd		1,130	1,537	2,075	2,428	2,803
		3.5	% of HHs served	% served		51	57	59	61	61
				Total HHs served		2,624	3,105	3,427	3,765	3,967
				Level 2		350	843	777	833	872
				Level 3		2,274	2,263	2,649	2,933	3,095
				Served population		14,098	16,681	18,407	20,226	21,312
		3.8	No. of establishments served			42	100	110	121	128
Manaba	Guindulman		Average-day demand (ADD)	cumd		2,440	2,851	3,267	3,468	3,572
			Existing supply	cumd	1,295	1,295	1,295	1,295	1,295	1,295
		3.3	% of demand (for bulk water) supplied	%		100	100	100	100	100
			by the bulk water supply system.	cumd		1,146	1,556	1,972	2,174	2,277
		3.5	% of HHs served	% served		53	58	60	62	62
				Total HHs served		3,560	4,071	4,319	4,574	4,702
				Level 2		490	1,169	1,058	1,098	1,124
				Level 3		3,070	2,902	3,260	3,476	3,578
				Served population		18,630	21,305	22,601	23,938	24,607
		3.8	No. of establishments served			56	128	136	144	148
Manaba	Jagna		Average-day demand (ADD)	cumd		2,983	3,737	4,440	5,015	5,294
			Existing supply	cumd	500	500	500	500	500	500
		3.3	% of demand (for bulk water) supplied	%		100	100	100	100	100
			by the bulk water supply system.	cumd		2,483	3,237	3,940	4,515	4,794
		3.5	% of HHs served	% served		57	62	65	70	70
				Total HHs served		4,304	5,094	5,686	6,388	6,736
				Level 2		550	1,276	1,156	1,252	1,309
				Level 3		3,754	3,818	4,531	5,136	5,427
				Served population		22,140	26,205	29,251	32,859	34,652
		3.8	No. of establishments served			66	210	176	197	208

Cluster	Water Supply Distribution System	Measures		Baseline Data 2007	Target 2015	2020	2025	2030	2035
Manaba	***Sub-Total***	***Average-day demand (ADD)***	***cumd***		***14,308***	***17,291***	***20,599***	***22,416***	***23,629***
		Existing supply	***cumd***	***5,211***	***5,211***	***5,211***	***5,211***	***5,211***	***5,211***
		3.3 % of demand (for bulk water)	***%***		***100***	***100***	***100***	***100***	***100***
		supplied by the bulk water supply	***cumd***		***9,097***	***12,080***	***15,388***	***17,205***	***18,418***
		3.5 % of HHs served	***% served***		***54***	***60***	***62***	***65***	***65***
			Total HHs served		***18,686***	***21,938***	***24,115***	***26,217***	***27,439***
			Level 2		***2,460***	***5,806***	***5,282***	***5,601***	***5,818***
			Level 3		***16,226***	***16,132***	***18,834***	***20,616***	***21,621***
			Served population		***100,007***	***117,414***	***129,066***	***140,254***	***146,769***
		3.8 No. of establishments served			***299***	***758***	***775***	***841***	***881***
Carood	Alicia	Average-day demand (ADD)	cumd		1,595	1,873	2,146	2,279	2,356
		Existing supply	cumd	103	103	103	103	103	103
		3.3 % of demand (for bulk water) supplied	%		100	100	100	100	100
		by the bulk water supply system.	cumd		1,491	1,770	2,043	2,175	2,253
		3.5 % of HHs served	% served		48	53	54	55	55
			Total HHs served		2,310	2,673	2,837	2,999	3,107
			Level 2		330	818	758	791	818
			Level 3		1,981	1,855	2,079	2,208	2,289
			Served population		12,279	14,208	15,077	15,941	16,515
		3.8 No. of establishments served			37	85	90	96	99
Carood	Danao	Average-day demand (ADD)	cumd		1,543	1,896	2,276	2,516	2,682
		Existing supply	cumd	533	533	533	533	533	533
		3.3 % of demand (for bulk water) supplied	%		100	100	100	100	100
		by the bulk water supply system.	cumd		1,009	1,363	1,742	1,983	2,148
		3.5 % of HHs served	% served		50	55	57	58	58
			Total HHs served		2,001	2,406	2,672	2,948	3,141
			Level 2		275	689	652	705	748
			Level 3		1,726	1,717	2,020	2,243	2,393
			Served population		11,680	14,043	15,595	17,208	18,333
		3.8 No. of establishments served			35	84	94	103	110
Carood	Mabini	Average-day demand (ADD)	cumd		2,550	3,315	3,989	4,461	4,746
		Existing supply	cumd	257	257	257	257	257	257
		3.3 % of demand (for bulk water) supplied	%		100	100	100	100	100
		by the bulk water supply system.	cumd		2,293	3,058	3,732	4,204	4,488
		3.5 % of HHs served	% served		52	58	60	63	63
			Total HHs served		3,537	4,242	4,758	5,308	5,648
			Level 2		465	534	476	531	565
			Level 3		3,073	3,708	4,282	4,777	5,083
			Served population		19,099	22,905	25,688	28,657	30,493
		3.8 No. of establishments served			57	137	154	172	183
Carood	Pres. Garcia	Average-day demand (ADD)	cumd		1,701	2,000	2,337	2,530	2,605
		Existing supply	cumd	-	-	-	-	-	-
		3.3 % of demand (for bulk water) supplied	%		100	100	100	100	100
		by the bulk water supply system.	cumd		1,701	2,000	2,337	2,530	2,605
		3.5 % of HHs served	% served		54	60	63	66	67
			Total HHs served		2,446	2,785	3,007	3,246	3,330
			Level 2		311	689	601	628	639
			Level 3		2,136	2,096	2,406	2,618	2,691
			Served population		12,492	14,223	15,355	16,577	17,007
		3.8 No. of establishments served			37	85	92	99	102

Cluster	Water Supply Distribution System	Measures		Baseline Data 2007	Target 2015	2020	2025	2030	2035
Carood	San Miguel	Average-day demand (ADD)	cumd		1,713	2,075	2,439	2,646	2,801
		Existing supply	cumd	-	-	-	-	-	-
		3.3 % of demand (for bulk water) supplied	%		100	100	100	100	100
		by the bulk water supply system.	cumd		1,713	2,075	2,439	2,646	2,801
		3.5 % of HHs served	% served		48	53	54	55	55
			Total HHs served		2,366	2,819	3,074	3,331	3,524
			Level 2		337	859	817	874	922
			Level 3		2,029	1,960	2,257	2,457	2,602
			Served population		13,181	15,707	17,129	18,559	19,634
		3.8 No. of establishments served			40	94	103	111	118
Carood	Ubay	Average-day demand (ADD)	cumd		6,914	8,455	9,897	10,934	11,511
		Existing supply	cumd	1,272	1,272	1,272	1,272	1,272	1,272
		3.3 % of demand (for bulk water) supplied	%		100	100	100	100	100
		by the bulk water supply system.	cumd		5,641	7,183	8,625	9,661	10,239
		3.5 % of HHs served	% served		51	56	58	60	61
			Total HHs served		7,467	8,833	9,710	10,701	11,272
			Level 2		1,009	2,456	2,277	2,441	2,558
			Level 3		6,458	6,377	7,433	8,259	8,714
			Served population		38,811	45,911	50,467	55,615	58,586
		3.8 No. of establishments served			116	367	303	334	352
Carood	***Sub-Total***	***Average-day demand (ADD)***	***cumd***		***16,014***	***19,614***	***23,086***	***25,366***	***26,700***
		Existing supply	***cumd***	***2,166***	***2,166***	***2,166***	***2,166***	***2,166***	***2,166***
		3.3 % of demand (for bulk water)	***%***		***100***	***100***	***100***	***100***	***100***
		supplied by the bulk water supply	***cumd***		***13,848***	***17,448***	***20,919***	***23,200***	***24,534***
		3.5 % of HHs served	***% served***		***51***	***56***	***58***	***60***	***60***
			Total HHs served		***20,128***	***23,759***	***26,057***	***28,533***	***30,022***
			Level 2		***2,726***	***6,046***	***5,581***	***5,971***	***6,250***
			Level 3		***17,402***	***17,714***	***20,477***	***22,562***	***23,772***
			Served population		***107,542***	***126,999***	***139,312***	***152,558***	***160,568***
		3.8 No. of establishments served			***322***	***852***	***836***	***915***	***964***
Ipil	Bien Unido	Average-day demand (ADD)	cumd		2,892	3,786	4,792	5,354	5,704
		Existing supply	cumd	184	184	184	184	184	184
		3.3 % of demand (for bulk water) supplied	%		100	100	100	100	100
		by the bulk water supply system.	cumd		2,708	3,602	4,608	5,170	5,520
		3.5 % of HHs served	% served		69	77	84	89	90
			Total HHs served		3,622	4,334	5,094	5,688	6,053
			Level 2		384	739	603	658	687
			Level 3		3,237	3,595	4,491	5,031	5,366
			Served population		20,161	24,125	28,353	31,662	33,691
		3.8 No. of establishments served			60	145	170	190	202
Ipil	Buenavista	Average-day demand (ADD)	cumd		1,936	2,383	2,727	2,910	3,014
		Existing supply	cumd	108	108	108	108	108	108
		3.3 % of demand (for bulk water) supplied	%		100	100	100	100	100
		by the bulk water supply system.	cumd		1,828	2,274	2,619	2,802	2,906
		3.5 % of HHs served	% served		49	54	55	57	57
			Total HHs served		2,602	3,001	3,192	3,401	3,517
			Level 2		365	891	818	855	881
			Level 3		2,237	2,111	2,374	2,547	2,636
			Served population		14,844	17,123	18,212	19,405	20,067
		3.8 No. of establishments served			45	103	109	116	120
Ipil	Getafe	Average-day demand (ADD)	cumd		2,688	3,416	4,132	4,694	4,936
		Existing supply	cumd	44	44	44	44	44	44
		3.3 % of demand (for bulk water) supplied	%		100	100	100	100	100
		by the bulk water supply system.	cumd		2,644	3,372	4,088	4,650	4,892
		3.5 % of HHs served	% served		59	65	69	74	75
			Total HHs served		3,429	4,029	4,517	5,113	5,367
			Level 2		419	925	815	885	919
			Level 3		3,010	3,104	3,703	4,228	4,448
			Served population		19,597	23,027	25,817	29,222	30,673
		3.8 No. of establishments served			59	138	155	175	184

Cluster	Water Supply Distribution System	Measures			Baseline Data 2007	Target 2015	2020	2025	2030	2035
Ipil	Talibon		Average-day demand (ADD)	cumd		6,704	9,142	11,080	12,312	14,214
			Existing supply	cumd	892	892	892	892	892	892
		3.3	% of demand (for bulk water) supplied	%		100	100	100	100	100
			by the bulk water supply system.	cumd		5,811	8,249	10,188	11,420	13,322
		3.5	% of HHs served	% served		64	71	76	79	80
				Total HHs served		8,417	10,143	11,773	13,103	14,001
				Level 2		977	2,100	1,838	1,996	2,105
				Level 3		7,441	8,044	9,935	11,106	11,896
				Served population		46,930	56,552	65,640	73,050	78,059
		3.8	No. of establishments served			141	452	394	438	468
Ipil	Trinidad		Average-day demand (ADD)	cumd		2,105	2,590	3,018	3,259	3,429
			Existing supply	cumd	101	101	101	101	101	101
		3.3	% of demand (for bulk water) supplied	%		100	100	100	100	100
			by the bulk water supply system.	cumd		2,004	2,490	2,918	3,159	3,329
		3.5	% of HHs served	% served		48	53	54	55	55
				Total HHs served		2,907	3,435	3,724	4,014	4,222
				Level 2		412	1,038	978	1,039	1,090
				Level 3		2,495	2,397	2,746	2,975	3,133
				Served population		15,859	18,744	20,318	21,904	23,039
		3.8	No. of establishments served			48	112	122	131	138
Ipil	***Sub-Total***		***Average-day demand (ADD)***	***cumd***		***16,325***	***21,317***	***25,750***	***28,530***	***31,297***
			Existing supply	***cumd***	***1,329***	***1,329***	***1,329***	***1,329***	***1,329***	***1,329***
		3.3	***% of demand (for bulk water)***	***%***		***100***	***100***	***100***	***100***	***100***
			supplied by the bulk water supply	***cumd***		***14,996***	***19,988***	***24,421***	***27,201***	***29,968***
		3.5	***% of HHs served***	***% served***		***59***	***65***	***69***	***73***	***73***
				Total HHs served		***20,977***	***24,943***	***28,300***	***31,319***	***33,160***
				Level 2		***2,557***	***5,692***	***5,052***	***5,432***	***5,682***
				Level 3		***18,420***	***19,251***	***23,248***	***25,887***	***27,479***
				Served population		***117,391***	***139,570***	***158,339***	***175,243***	***185,530***
		3.8	***No. of establishments served***			***353***	***950***	***950***	***1,050***	***1,112***
Iwahig-Inabanga	Calape		Average-day demand (ADD)	cumd		4,010	6,008	6,637	6,961	7,186
			Existing supply	cumd	1,440	1,440	1,440	1,440	1,440	1,440
		3.3	% of demand (for bulk water) supplied	%		100	100	100	100	100
			by the bulk water supply system.	cumd		2,570	4,568	5,197	5,521	5,746
		3.5	% of HHs served	% served		54	59	62	64	64
				Total HHs served		3,845	4,553	5,059	5,474	5,772
				Level 2		501	1,183	1,082	1,151	1,205
				Level 3		3,344	3,370	3,977	4,324	4,567
				Served population		19,213	22,751	25,279	27,354	28,839
		3.8	No. of establishments served			58	137	152	164	173
Iwahig-Inabanga	Clarin		Average-day demand (ADD)	cumd		1,672	2,231	2,629	2,828	2,969
			Existing supply	cumd	493	493	493	493	493	493
		3.3	% of demand (for bulk water) supplied	%		100	100	100	100	100
			by the bulk water supply system.	cumd		1,179	1,738	2,136	2,335	2,476
		3.5	% of HHs served	% served		55	61	63	64	64
				Total HHs served		2,495	2,944	3,237	3,479	3,657
				Level 2		334	365	324	348	366
				Level 3		2,161	2,579	2,913	3,131	3,291
				Served population		12,591	14,855	16,333	17,555	18,452
		3.8	No. of establishments served			38	89	98	105	111
Iwahig-Inabanga	Inabanga		Average-day demand (ADD)	cumd		3,560	4,444	5,187	5,596	5,723
			Existing supply	cumd	735	735	735	735	735	735
		3.3	% of demand (for bulk water) supplied	%		100	100	100	100	100
			by the bulk water supply system.	cumd		2,825	3,709	4,453	4,862	4,989
		3.5	% of HHs served	% served		52	58	60	63	63
				Total HHs served		5,160	6,004	6,505	6,988	7,142
				Level 2		679	1,589	1,426	1,490	1,513
				Level 3		4,481	4,415	5,079	5,498	5,629
				Served population		26,705	31,072	33,667	36,164	36,961
		3.8	No. of establishments served			80	186	202	217	222

Cluster	Water Supply Distribution System	Measures		Baseline Data 2007	Target 2015	2020	2025	2030	2035
Iwahig-Inabanga	Loon	Average-day demand (ADD)	cumd		5,747	12,234	14,776	16,609	18,154
		Existing supply	cumd	2,911	2,911	2,911	2,911	2,911	2,911
		3.3 % of demand (for bulk water) supplied	%		100	100	100	100	100
		by the bulk water supply system.	cumd		2,836	9,323	11,865	13,698	15,243
		3.5 % of HHs served	% served		58	64	67	68	69
			Total HHs served		7,495	9,522	11,317	12,987	14,398
			Level 2		963	2,410	2,334	2,629	2,893
			Level 3		6,532	7,112	8,983	10,358	11,505
			Served population		42,814	54,398	64,650	74,190	82,252
		3.8 No. of establishments served			128	435	388	445	494
Iwahig-Inabanga	Maribojoc	Average-day demand (ADD)	cumd		2,468	3,064	3,505	3,708	3,901
		Existing supply	cumd	1,158	1,158	1,158	1,158	1,158	1,158
		3.3 % of demand (for bulk water) supplied	%		100	100	100	100	100
		by the bulk water supply system.	cumd		1,310	1,905	2,346	2,550	2,743
		3.5 % of HHs served	% served		85	92	92	92	92
			Total HHs served		2,855	3,300	3,513	3,713	3,901
			Level 2		352	435	351	371	390
			Level 3		2,503	2,865	3,162	3,342	3,511
			Served population		18,222	21,059	22,425	23,700	24,897
		3.8 No. of establishments served			55	126	135	142	149
Iwahig-Inabanga	Tubigon	Average-day demand (ADD)	cumd		7,366	11,463	12,930	13,679	14,178
		Existing supply	cumd	1,040	1,040	1,040	1,040	1,040	1,040
		3.3 % of demand (for bulk water) supplied	%		100	100	100	100	100
		by the bulk water supply system.	cumd		6,326	10,423	11,890	12,640	13,138
		3.5 % of HHs served	% served		62	69	73	76	76
			Total HHs served		6,280	7,498	8,573	9,438	10,017
			Level 2		751	1,651	1,459	1,569	1,646
			Level 3		5,529	5,848	7,114	7,869	8,371
			Served population		32,876	39,256	44,880	49,411	52,443
		3.8 No. of establishments served			99	236	269	296	315
Iwahig-Inabanga	***Sub-Total***	***Average-day demand (ADD)***	***cumd***		***24,822***	***39,443***	***45,664***	***49,382***	***52,112***
		Existing supply	***cumd***	***7,777***	***7,777***	***7,777***	***7,777***	***7,777***	***7,777***
		3.3 % of demand (for bulk water)	***%***		***100***	***100***	***100***	***100***	***100***
		supplied by the bulk water supply	***cumd***		***17,045***	***31,666***	***37,887***	***41,605***	***44,335***
		3.5 % of HHs served	***% served***		***59***	***64***	***67***	***69***	***70***
			Total HHs served		***28,130***	***33,821***	***38,205***	***42,080***	***44,887***
			Level 2		***3,580***	***7,632***	***6,976***	***7,558***	***8,013***
			Level 3		***24,550***	***26,189***	***31,229***	***34,521***	***36,874***
			Served population		***152,422***	***183,390***	***207,234***	***228,373***	***243,845***
		3.8 No. of establishments served			***458***	***1,209***	***1,244***	***1,369***	***1,464***
	Province	**Average-day demand (ADD)**	**cumd**		**149,291**	**193,430**	**223,391**	**240,516**	**253,762**
		Existing supply	**cumd**	**45,409**	**45,409**	**45,409**	**45,409**	**45,409**	**45,409**
		3.3 % of demand (for bulk water)	**%**		**100**	**100**	**100**	**100**	**100**
		supplied by the bulk water supply	**cumd**		**103,882**	**148,021**	**177,982**	**195,107**	**208,353**
		3.5 % of HHs served	**% served**		**58**	**64**	**66**	**68**	**68**
			Total HHs served		**159,190**	**186,958**	**206,785**	**225,275**	**238,212**
			Level 2		**20,186**	**42,765**	**39,437**	**42,209**	**44,333**
			Level 3		**139,004**	**144,193**	**167,347**	**183,067**	**193,880**
			Served population		**864,638**	**1,017,012**	**1,126,300**	**1,227,369**	**1,298,559**
		3.8 No. of establishments served			**3,285**	**6,963**	**7,268**	**7,823**	**8,211**