The Philippine Environmental Governance 2 Project

Rapid Wastewater Management Assessment Report on Selected Partner LGUs

Visayas

Negros: Bais, Bayawan, Tanjay

Bohol: Dauis, Panglao, Tagbilaran

Mindanao

General Santos, Kidapawan, Koronadal, and Tacurong Cities

September 2005

This project is implemented by Development Alternatives, Inc. with the support of its subcontractors:

Cesar Virata & Associates, Inc. ■
Deloitte Touche Tohmatsu Emerging Markets ■
The Marine Environment and Resources Foundation, Inc. ■
The Media Network ■
Orient Integrated Development Consultants, Inc. ■
Resources, Environment and Economics Center for Studies, Inc. ■

This document was completed through the assistance of the United States Agency for International Development (USAID) Mission to the Philippines under Contract Number 492-C-00-04-00037-00. The views expressed and opinions contained in this publication are those of the authors and are not intended as statements of policy of USAID or the authors' parent organization.

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ACRONYMS

CENRO	-	Community Environment and Natural Resources Office
CWA	-	Clean Water Act
DENR	-	Department of Environment and Natural Resources
ECC	-	Environmental Compliance Certificate
EcoGov	-	The Philippine Environmental Governance Project
GOP	-	Government of the Philippines
LGU	-	Local Government Unit
LOI	-	Letter of Intent
SP	-	Sangguniang Panglungsod
TA	-	Technical Assistance
UEM	-	Urban Environmental Management
USAID	-	United States Agency for International Development
WWM	-	Wastewater Management

EXECUTIVE SUMMARY

A. INTRODUCTION

About 49% of the classified rivers in the Philippines are either biologically dying or dead. Ground water supply is 58% contaminated with coliform bacteria primarily due to discharges of partially treated or untreated strong effluent from domestic sources. Destruction of spawning areas in mangroves and coastal zones due to water pollution has caused declining fish catch since the 1980s. As a result, the country's annual economic loss due to water pollution is estimated to reach a staggering 67 billion pesos.

Domestic wastewater particularly from highly urbanized cities and municipalities contribute approximately 48% of the total organic pollution in the local water environment. Hospitals, abattoirs and public markets are among the generators of strong and highly pathogenic wastewaters which are discharged directly to rivers and aquifers untreated or partially treated due to the absence of or unmanaged septic vaults and stabilization lagoons (World Bank 2003).

The USAID-funded Philippines Environmental Governance 2 Project (EcoGov or the Project) supports the GOP's and USAID Philippines' goal of revitalizing the economy by promoting better environmental governance. EcoGov's technical assistance (TA) in wastewater management (WWM) addresses the increasing threat posed by water pollution and supports the implementation of the Clean Water Act (CWA). The Project's long-term objective is to improve the management and treatment of sewage and septage to reduce threats to human health and adverse impacts on the environment. The Project will achieve this by helping twenty LGUs invest in sanitation facilities.

The following LGUs shall serve as the Project's take-off points for improved WWM: in central Visayas: Bais, Bayawan, Dauis, Panglao, Tagbilaran, Tanjay; in southern Mindanao: General Santos, Kidapawan, Koronadal, and Tacurong Cities. Rapid assessments were conducted to identify wastewater management concerns and problems in the above mentioned cities through brief conferences with key LGU officials, site visits and interviews of informants. The findings were used as basis to recommend practical and long-term solutions, and to define the scope of the technical assistance package from the Project.

The rapid WWM assessments were conducted by EcoGov team members on the dates set forth below:

Mindanao

General Santos, Kidapawan, Koronadal, and Tacurong Cities	April 18 – 22, 2005

Visayas

Negros: Bais, Bayawan, Tanjay	May 4 – 6, 2005
Bohol: Dauis, Panglao,Tagbilaran	May 17 – 18, 2005

The Executive Summary presents overall findings and recommendations as many of the LGUs face the same problems and issues. Specific findings and recommendations concerning the point sources visited at the LGUs during each trip are presented in three separate sections.

B. OBJECTIVES

The objectives of the rapid WWM assessments were to:

1. Discuss with key LGU officials (city mayors, environment officers, community environment and natural resources officer (CENRO), etc.) the general WWM concerns and specific WWM problems in their LGU, vis-à-vis LGU compliance with the CWA.
2. Conduct ocular assessment and interviews with key informants in hospitals, abattoirs, public markets, and other relevant establishments of the LGUs to get first hand information and to evaluate the status of WWM in these target facilities.
3. Assess capacity of LGUs to finance proposed wastewater treatment facilities.
4. Share with the LGUs the observations and findings of the assessment team and recommend doable actions to address identified gaps and inadequacies of current wastewater management, and
5. Define the potential coverage of the WWM TA for these LGUs.

C. METHODOLOGY

The assessment in each of the LGUs followed four general steps:

1. Entrance conference with LGU key officials;
2. Actual on-site visits/interview of key informants at selected establishments;
3. Exit conference with same LGU; and,
4. Preparation and presentation of recommendations on doable actions relevant to the LGU's WWM problems/concerns.

At the entrance conference in each of the assessments, the UEM-WWM team explained the purpose of their visit and that the Project's TA is "demand driven". An LGU must express its need to avail or the Project's TA in WWM through a letter of intent (LOI) endorsed by the Sangguniang Panglungsod (SP) and duly approved by the city mayor.

Site visits at the selected facilities involved ocular and sensory evaluation of major sources of wastewater, existing wastewater treatment facilities (if any) such as septic tanks and lagoons and the condition of the final effluents coming out of the facility. The technical parameters considered in the evaluation included sources and uses of water, description and status of in-house water supply system of the establishment, description and condition (operation and maintenance) of the wastewater management system and

description and condition of the wastewater effluents discharged to receiving bodies of water and their observed adverse impacts. Organizational parameters that were assessed were personnel of facilities responsible for proper waste management and, training of personnel on waste management. Relevant regulatory permits and related local ordinances on waste management were also assessed in relation to sanitation practices specifically on desludging of septic vaults and lagoons. Brief round table discussions with the facility administrators were also conducted during the ocular inspections specifically to generate supplementary information on the water supply sources and uses, wastewater facilities, desludging frequency, disinfection process, etc.

In addition, financial data needed for a preliminary assessment of the LGUs' sources of income, expenditure pattern, savings rate, and debt position were obtained. The analysis is intended to measure the LGU's financial condition and performance using basic financial indicators or ratios, and estimate the LGU's debt capacity.

After the walkthrough of the facilities and interviews with key personnel, the team conducted exit conferences with the respective LGU officials and discussed strategies-technical, organizational, legal and financial, on how to address their respective WWM problems identified during discussions and site visits. The initial analysis of findings and observations became the basis for recommending what preventive and/or corrective measures the LGUs have to take to help solve their WWM problems. These findings and recommendations may also help LGUs make decisions whether or not they will avail of the WWM TA from EcoGov.

Table 1. Profile of the LGUs Covered by the Rapid WW Assessment

EcoGov Partner LGU	Geographic Area	Region	Province	Population (EcoGov's estimate)	Income Class	Total Income	Total Local Source	Internal Financing Ratio	Available Borrowing Capacity
1. Bais City	Visayas	7	Negros Oriental	71,354	2nd	224,306,721	36,588,472	22%	143,000,000
2. Bayawan City	Visayas	7	Negros Oriental	109,445	5th	322,120,445	20,436,843	10%	Fully utilized
3. Tanjay City	Visayas	7	Negros Oriental	72,566	5th	196,049,205	16,200,501	10%	207,000,000
4. Dauis	Visayas	7	Bohol	28,120	4th	26,809,291	4,118,492	15%	Fully utilized
5. Panglao	Visayas	7	Bohol	22,980	4th	28,453,268	8,087,955	35%	28,000,000
6. Tagbilaran City	Visayas	7	Bohol	88,472	3rd	249,949,254	121,358,494	59%	204,000,000
7. Kidapawan City	Mindanao	12	North Cotabato	111,593	4th	286,050,350	66,696,242	22%	19,000,000
8. Koronadal City	Mindanao	12	South Cotabato	146,877	4th	274,826,962	53,698,593	22%	311,000,000
9. Tacurong City	Mindanao	12	Sultan Kudarat	83,594	5th	199,774,090	45,050,059	19%	186,000,000
10. General Santos	Mindanao	12	South Cotabato	488,671	1st	710,354,820	263,552,860	42%	753,000,000

All figures are 2004 data

D. OVERALL FINDINGS AND RECOMMENDATIONS

All the LGUs visited lack ready blueprints for integrated wastewater management. Site visits revealed that all abattoirs, hospitals, public markets, water district, residences, resort and other establishments have inadequate systems for wastewater management. Wastewater quality monitoring system is virtually absent. Wastewaters are either partially treated or not treated at all prior to discharge through ground natural seepage or directly to creeks and coastal waters. The unconfined ground water level of many of these cities is shallow (only 1-2 meters from ground surface) and is highly prone to direct contamination by wastewaters particularly septic vault effluents.

Based on interviews, practically all concerned personnel need to be trained in wastewater management especially on the areas of assessment, operation and maintenance of existing and proposed sanitation facilities for hospitals, abattoirs and public markets. Retrofitting civil work design and regular desludging of existing septic vaults should be given urgent action to minimize pollution of receiving lands and water bodies and prevent possible outbreak of waterborne diseases.

Wastewater minimization at source particularly for the markets, slaughterhouses, residences and resorts should be a priority of the LGUs' IEC and permitting programs. Also when applicable, it is strongly recommended that strategic centralized wastewater treatment facilities be installed to treat wastewater effluents prior to discharge to rivers and coastal waters.

EcoGov's preliminary observations and recommendations for the LGUs are as follows:

❑ Technical

- ❖ Findings:

  Public Market
  - Incorrect slope and construction of drainage canals.
  - Absence of WW treatment prior to effluent discharge.
  - Generally unsanitary in-housekeeping practices.

  Abattoir
  - Incorrect design and management of septic vaults and lagoons.
  - Generally unsanitary in-house keeping.

  Hospital
  - Disinfection of infectious wastes does not follow standard procedures.
  - Incorrect design and management of septic vaults.

  Coastal Resorts in Panglao
  - Resorts are using the 3-chambered septic vaults for sewage treatment; they also practice zero discharge to the coastal waters.
  - The septic vaults have not been desludged.

- ❖ Recommendations:
  - Retrofit all septic vaults and treatment lagoons to prevent mixing of effluents with ground and surface waters. For the private abattoir, it requires

rehabilitation of its main facility including the wastewater treatment facility for it to maintain its class AA category and comply with the requirements of its ECC issued by the DENR.
- Install treatment facilities for public market effluents. Plans and budgets must be drafted and appropriated respectively for these facilities.
- Desludge all septic vaults including those at residential areas at least every three years.

❑ Organizational

❖ Finding:
- Concerned personnel of all LGUs lack sufficient training in WWM.

❖ Recommendation:
- Train or retool concerned personnel on waste minimization and on procedures, management and monitoring of sanitation facilities such as septic vaults and lagoons.
- The LGUs through institutional arrangements could extend the EcoGov TA on capacity building to establishments not managed by these LGUs such as resorts.

❑ Legal

❖ Finding:
- No ordinance requiring regular desludging of septic vaults and treatment lagoons.

❖ Recommendations:
- All LGUs must enact ordinances requiring regular desludging of septic vaults and treatment lagoons.
- Some LGUs must also enact ordinances prohibiting construction of dwelling houses on coastal waters.

❑ Financial

❖ Finding:
- The larger cities have sufficient capacity to access borrowings to finance the capital costs of the proposed facilities.

❖ Recommendations:
- All the LGUs should be ready to subsidize the facilities over the long-term because they are not commercially viable activities.
- All the LGUs should apply cost recovery mechanisms to minimize the financial burden on the LGUs. Consumption-based user charges can be levied on the discharge of wastewater into the sewage based on the volume and/or characteristics of the effluents.

- The LGUs must have the capacity (staff, expertise) to monitor financial performance of the utility; and separate billing and collection systems must be in place to ensure fees and subsidies are sufficient to sustain operations.
- Opportunities to partner with private sector operators through service contracts or management contracts to manage O&M activities should be explored by all LGUs. This would relieve the LGU of highly technical work until sufficient capacity is developed.

F. PROPOSED NEXT STEPS

The Project proposes the following steps as part of the TA program to partner LGUs:

Phase 1- Problem Identification

1. Identify the point sources (markets, slaughterhouses, hospitals) that the LGUs intend to address through the expansion/improvement or new construction of wastewater treatment facilities.

2. Secure commitments from LGUs through MOAs.

Phase 2 - Assessment and Planning

3. Help LGU staff prepare proposals to implement targeted waste waster treatment facilities for SB approval. Assistance will identify or develop the following inputs to the project proposal:
   a. Estimated costs of capital investments in the physical infrastructure and recurring expenses for O&M based on affordable technology;
   b. Requisite budgetary allocations, including need for bank borrowing;
   c. User fees system to allow recovery of O&M costs;
   d. Plan covering pre-construction, construction and O&M of the facility, including need for LGU to enter into contract with private sector through service contract, management contract.

Phase 3 - Implementation

4. Help LGU staff conduct public bidding or execute any contracts with private sector.

5. Help LGU staff access external sources of financing if necessary.

6. Train LGU staff on project monitoring to ensure that the construction, operation and maintenance of the facility will comply with the minimum standards.

I. REPORT ON THE CITIES OF GENERAL SANTOS, KORONADAL, KIDAPAWAN, AND TACURONG

A. OBSERVATIONS AND FINDINGS

GENERAL SANTOS CITY

The city government, through the City Planning and Development Coordinator, expressed their keen interest to avail of the Wastewater Management Technical Assistance (WWM TA) of the project. A letter of intent (LOI) was submitted to the project manifesting their interest. In response, the project dispatched a team made up of the UEM and Municipal Finance sectors to do a rapid assessment of the wastewater management and sanitation situation in the city.

Visits to the General Santos Doctor's hospital, abattoir and public market revealed the following observations and findings according to technical, organizational and legal considerations/ parameters:

Table 2. Status of General Santos' Sanitation Facilities in Selected Point Sources

Parameter	Private Hospital	Abattoir	Public Market
Technical	1. Very good wastewater and solid waste management except for some technical gaps in the in-house covered pit composting system 2. Excellent sanitation	1. Lagoons are inaccurately designed and abandoned and it is serving only as passage conduit for untreated wastewater. 2. Voluminous raw wastewater is directly discharged through ground seepage and the run-off to the river	1. Stagnant WW in drain canals due to poor slope and clogging caused by illegal dumping of garbage 2. Raw WW exits through a canal network and into the coastal area
Organizational	1. Inadequate training of personnel on composting 2. Good housekeeping practice	1. Poor house keeping practices.	1. Fair in-house keeping
Legal	1. No ordinance requiring regular desludging of septic vaults 2. No institutional arrangement with the city on waste management	1. No ordinance requiring regular maintenance of wastewater treatment facilities including desludging	1. No ordinance on the management of wastewaters of public markets

KORONADAL CITY

The city is the regional center and the seat of the government in Region XII. In 2000, the population was 133,786. Water and wastewater related problems are emerging that need to be addressed before these become more severe. Hence, the LGU has expressed its interest to avail of the WWM TA of the project.

Three establishments were assessed and the observations and findings in the provincial/district hospital, abattoir and public market of the city are summarized as follows:

Table 3. Status of Koronadal's Sanitation Facilities at Selected Point Sources

Parameter	Provincial Hospital	Abattoir	Public Market
Technical	1. Effluents from septic vaults exit through natural seepage and may pollute the ground water. 2. There is no discharge outflow for the sewage generated by the hospital. 3. Septic vault for infectious waste disposal is located near the deep well of the facility.	1. Heavily silted and poorly maintained wastewater treatment lagoons. 2. Raw WW discharged to city sewer 3. There is uncontrolled and wasteful use of water	1. Suspended solids mixed with stagnant wastewater due to poor canal slope 2. Deep well water source is less than 20 meters from the CR septic vault 3. Housekeeping is poor. 4. Raw WW is discharged to the city sewer
Organizational	1. Management is by the provincial government. .2. There is inadequate training of personnel on hospital waste management	1. Personnel have inadequate training on proper waste management	1. Personnel have inadequate training on proper waste management
Legal	1. There is no institutional arrangement with the host city on waste management 2. There is no city ordinance on regular desludging of septic vaults	1. There is no LGU ordinance on wastewater management	1. There is no ordinance on wastewater manage-ment.

KIDAPAWAN CITY

This city of 101,205 (2000 census) is located in North Cotabato province and it is geographically characterized as being flat to hilly with portions on rugged terrain. The city mayor signified his interest to avail of the WWM TA of the project through the submission of an LOI.

The observations and findings during the site visits to a health care facility, abattoir and public market in the city are as follows:

Table 4. Status of Kidapawan's Sanitation Facilities at Selected Point Sources

Parameter	Medical Center	Abattoir	Public Market
Technical	1. There is one septic vault for CR wastewaters and another one for kitchen and laundry wastewaters. 2. There is a plan to generate biogas using the septic vaults as anaerobic digesters 3. Final effluent from septic vault is lightly colored and relatively odorless. 4. Desludging interval for the septic vault is too long 5. Chlorination of the effluent is improperly done.	1. There is practically no operation and maintenance for the poorly designed wastewater treatment lagoons. Scum build up is very thick. 2. Raw wastewater is directly discharged to the receiving stream. 3. Housekeeping is very poor.	1. Practically the situation is similar to the other public markets visited with stagnant WW in canals due to minimal slope and clogging of these canals with garbage 2. Raw wastewater is discharged to a dying stream which receives other wastewaters from other sources. .
Organizational	1. There is no monitoring of WW quality 2. There is inadequate training of personnel on proper waste management	1. There is inadequate training of personnel on proper waste management	1. There is no WW quality monitoring prior to effluent discharge to city sewer 2. There is inadequate training of personnel on proper waste management
Legal	1. There is no LGU ordinance on proper wastewater management	1. There is no ordinance on proper operation and maintenance of septic vaults	1. There is no ordinance on proper wastewater management

TACURONG CITY

This city had a population of 76,424 in 2000. It is located in Sultan Kudarat province with a relatively flat topography. The city expressed its interest of availing the WWMA TA of the project through an LOI. In response, the project dispatched a team that conducted a rapid WWM assessment of key point-source wastewater generators of the city.

The following table shows the status of the city's WWM systems at the hospital, abattoir and public market:

Table 5. Status of Tacurong's Sanitation Facilities at Selected Point Sources

Parameter	Private Hospital	Abattoir	Public Market
Technical	1. Their septic vault has no provision for desludging. 2. Untreated dietary and laundry washings are directly discharged to open canals that lead to the city sewer. 3. Eventual exit point of the effluent is unknown	1. Odorous surroundings with decomposing solid wastes and stagnant water 2. Raw wastewater is directly discharged to an open canal that leads to the city sewer 3. Housekeeping is poor.	1. There is poor drainage of wastewater due to low slope and deposits of garbage on the canals. 2. CR effluent is mixed with the wet market wastewater. 3. Raw wastewater is discharged to the city sewer
Organizational	1. There is no monitoring of WW quality 2. There is inadequate training of personnel on proper waste management	1. There is inadequate training of personnel on proper waste management	1. There is no WW quality monitoring prior to effluent discharge to city sewer 2. There is inadequate training of personnel on proper waste management
Legal	1. There is no LGU ordinance on proper wastewater management	1. There is no ordinance on proper operation and maintenance of septic vaults	1. There is no ordinance on proper wastewater management

B. RECOMMENDATIONS ACCORDING TO POINT SOURCE

Recommended actions in relation to the foregoing observations and findings are proposed in the table set forth below. These recommendations are by no means sufficient to eliminate completely the wastewater management problems in these facilities. These are aimed at minimizing the adverse impacts through improvements in wastewater management facilities and practices. Each recommendation is marked either as:

* Signifies that action is important and urgent, and should be accomplished within the next six months, or

** Signifies that action is important but not urgent, and that it can be done later.

Also indicated are the corresponding environmental implications and descriptive cost estimates to help LGU decision-makers prioritize their actions.

Table 6. Summary of Recommendations According to Point Source for General Santos City, Koronadal City, Kidapawan City and Tacurong City

Recommendations	Implications Environmental/Health	Cost
A. General Santos City		
1. Hospital Technical ▪ Improve composting procedure* ▪ Desludge septic vaults at least every 3 years** Organizational ▪ Train concerned personnel in WWM* Legal/Institutional ▪ An institutional arrangement should be formulated between the hospital and LGU on waste management * ▪ Enactment of an ordinance requiring regular desludging of septic vaults*	▪ Better quality of compost product ▪ Reduced health hazard ▪ Reduced pollution ▪ Healthier environment at the work place	▪ Low ▪ Low
2. Abattoir Technical ▪ Rehabilitate wastewater treatment system* ▪ Collect and transport solid residue for off-site composting* ▪ Rationalize wash water usage. Install water meter** Organizational ▪ Train concerned personnel in WWM* Legal ▪ Enactment of ordinance requiring regular desludging of septic vaults*	▪ Will improve treatment efficiency ▪ Will prevent potential contamination of groundwater ▪ Healthier environment at the workplace ▪ Maintenance of treatment capacity and performance of septic vaults	▪ Low

Recommendations	Implications Environmental/Health	Cost
3. Public Market Technical ▪ Increase slope of drainage canals and install strainers at every manhole** ▪ Construct tower fixed bed trickling filter WW treatment system** ▪ Desludge septic vault yearly* Organizational ▪ Train concerned personnel in WWM* Legal ▪ Enactment of ordinance requiring regular desludging of septic vaults*	▪ Will eliminate stagnant, odorous and mosquito breeding pools ▪ Will reduce water pollution of creeks and rivers ▪ Maintained capacity and treatment performance of septic vaults	▪ Low ▪ Cost will depend on actual WW characterization
B. Koronadal City		
1. Provincial Hospital Technical ▪ Relocate leak-proof septic vault for infectious wastes* ▪ Monitor final effluent for pathogens and other toxic and infectious substances* Organizational ▪ Train hospital concerned staff on hospital wastewater management* Legal/Institutional ▪ Improve LGU capability for permitting and monitoring septic vaults maintenance and effluent discharge to municipal sewerage* ▪ Enactment of ordinance requiring regular desludging of septic vaults	▪ Will prevent mixing of pathogenic effluent with the very shallow ground water (1-2 meters only) ▪ Reduce aquifer contamination by infectious residues ▪ Hospital effluent to meet clean water act standard prior to discharge ▪ Cleaner waters in creeks and rivers ▪ Maintained capacity and treatment performance of septic vaults	▪ Low ▪ Low
2. Abattoir Technical ▪ Construct activated sludge WW treatment for supernatant** ▪ Collect and transport solid residue to off-site composting area* Organizational ▪ Train staff in WWM*	▪ Compliance to the effluent standards of CWA ▪ Separation of solids reduces pollutive effects of effluent when directly discharged to river ▪ Better environment at the workplace	▪ Cost depends on WW characterization (flowrate, BOD) ▪ Low

Recommendations	Implications Environmental/Health	Cost
3. Public Market		
Technical		
▪ Increase slope of drainage canals and install fixed strainers at manholes and exit point*	▪ Will eliminate stagnant, odorous and mosquito breeding pools	▪ Low
▪ Construct tower fixed bed trickling filter at effluent exit area**	▪ Will help reduce water pollution in the receiving water environment	▪ Cost depends on WW characterization
Organizational		
▪ Train concerned personnel on WWM*	▪ Better environment at the market	
C. Kidapawan City		
1. Hospital		
Technical		
▪ Monitor BOD, coliform of final effluent prior to discharge to city sewer*	▪ Will minimize contamination of ground water by infectious WW	▪ Low
▪ Desludge septic vaults at least once a year*	▪ Maintenance of treatment capacity and efficiency	▪ Low
▪ Provide filtration of wastewater prior to discharge to the septic vaults*	▪ Prevent accidents due to septic vault explosion	▪ Low
▪ Hold plans to extract and use biogas from the septic vault		
Organizational		
▪ Train concerned personnel in WWM and monitoring of hospital effluent prior to discharge to rivers*	▪ Cleaner quality of receiving waters and compliance to CWA standards	
Legal		
▪ Enactment of ordinance requiring regular desludging of septic vaults*	▪ Maintenance of treatment capacity and performance	
2. Abattoir		
Technical		
▪ Redesign and reconstruct lagoon following naturally aerated system*	▪ Will meet CWA effluent standard	▪ Medium
▪ Collect and transport SW to off-site composting area*	▪ Increase treatment efficiency of lagoons	▪ Low
▪ Waterproof floor and walls of septic vaults*	▪ Reduced pollution and improve sanitation	
▪ Monitor wastewater quality parameters –BOD, coliform) of final effluent*		
Organizational		
▪ Train concerned personnel in WWM*	▪ Better environment at the workplace	

Recommendations	Implications Environmental/Health	Cost
3. Public Market Technical ▪ Increase slope of drainage canals* ▪ Install fixed strainers at manholes and WW exit point* ▪ Construct tower fixed bed trickling filter treatment system** Organizational ▪ Train concerned personnel in WWM*	▪ Will eliminate stagnant, odorous and mosquito breeding pools ▪ Compliance to the CWA effluent standard ▪ Cleaner environment at the market	▪ Low ▪ Cost will depend on actual WW characterization
D. Tacurong City		
1. Private Hospital Technical ▪ Construct separate water tight septic vault for laundry and dietary wastewater* ▪ Retrofit CR septic vault according to standard specifications* Organizational ▪ Train hospital personnel in WWM specially for hazardous and infectious wastes* ▪ Close monitoring by concerned LGU officials on hospital wastewater management* ▪ Pass and strictly implement ordinance on WWM and THWM*	▪ Will minimize spread of infectious hospital WW to the community ▪ Will prevent contamination of ground water with fecal coliform and other pathogens ▪ Will improve hospital sanitation and WWM systems ▪ Will insure compliance with CWA	▪ Low ▪ Low
2. Abattoir Technical ▪ Rehabilitate existing open septic vault (desludge, waterproof floor and walls, retrofit pipe installations, provide manhole covers and install primary sedimentation tank for suspended solids)* ▪ Post closure rehabilitation is extremely necessary (back filling, leveling, removal of animal residues, etc.)* Organizational ▪ Train concerned personnel on wastewater and solid wastes handling* ▪ Implement improvements in abattoir sanitation meat processing*	▪ Will minimize spread of waterborne and airborne diseases to the adjacent households ▪ Will minimize spread of waterborne and airborne diseases and improve aesthetic view of the facility ▪ Will sustain good abattoir WWM	▪ Low ▪ Medium

Recommendations	Implications Environmental/Health	Cost
3. Public Market		
Technical		
▪ Increase drain canal slope to at least 2%, install strainers at manholes*	▪ Will eliminate breeding place for mosquitoes and odorous stagnant WW	▪ Low
▪ Desludge market toilets at least every three years**	▪ Improve efficiency of septic vault in removing BOD and other pollutants	▪ Low
▪ Install tower trickling filters at WW exit	▪ Reduce pollutive effects of market WW on the receiving river	▪ Medium
Organizational		
▪ In-house keeping needs improvements*	▪ Cleaner environment at the market	
▪ Improve in-house market sanitation**		

* Urgent and important
** Important but not urgent

Low Cost – Up to P500,000
Medium Cost – Greater than P500,000 up to P2M
High Cost – Greater than P2M

C. FINANCIAL ANALYSIS

All four Cities are good candidates for technical assistance based on their financing capacity. Each can pursue a range of options to finance and implement the proposed projects. They all show significant progress towards financial self-sufficiency from the national government, present high savings rates, and have low exposure to short- and long-term liabilities. Moreover, all four have large additional debt capacity (however, this must be confirmed with the LGUs). These factors validate their ability to finance additional wastewater facilities. Their financial position should be favorable to prospective creditors or private subcontractors that the LGUs may want to tap. However, it should be noted that the LGUs should continue to expand local sources of income and implement cost recovery through user fees and other types of service charges to minimize the financial burden of the proposed facilities over the long-term.

Summary of Key Data for 2003

Table 7. Statements of Income and Expenditure (in Pesos) of General Santos City, Koronadal City and Kidapawan City

LGU	Local Income	Total Income	Economic Expenditures*	Total Expenditures*	Net Income
General Santos City	229,328,300	683,874,000	200,430,544	622,288,029	188,362,000
Koronadal City	52,659,500	281,566,200	169,705,000	311,026,000	88,394,700
Kidapawan City	71,579,000	298,711,400	14,027,857	238,021,919	46,941,900
Tacurong City	41,008,800	203,521,600	17,689,669	199,436,736	77,521,900

*BLGF data. The rest are from COA.

Table 8. Balance Sheets (in Pesos) of General Santos City, Koronadal City and Kidapawan City

LGU	Total Assets	Current Assets	Current Liabilities	Long-Term Liabilities
General Santos City	2,066,829,100	856,862,600	190,402,500	63,443,600
Koronadal City	477,387,300	235,785,800	22,509,800	
Kidapawan City	495,311,900	128,550,200	42,449,900	50,269,200
Tacurong City	271,523,700	109,903,900	22,571,800	46,721,900

Financial Indicators

The table set forth below presents the selected financial indicators for the LGUs. For comparison, the range, median, and average values for 14 ISWM EcoGov LGUs are also presented.

Table 9. Summary of Financial Indicators of General Santos City, Koronadal City and Kidapawan City

LGU	Local Revenues Per Capita	Local Income / Total Expenditures	Economic Expenditures/ Total Expenditures	Net Income / Total Income	Long-Term Liabilities / Total Assets	Current Assets/Current Liabilities
General Santos	489	48%	32%	28%	3%	4.5
Koronadal	362	28%	55%	31%	0%	10.5
Kidapawan	657	32%	6%	16%	10%	3.0
Tacurong	501	37%	9%	38%	17%	4.9

Estimated Borrowing Capacities

The additional borrowing capacities of the LGUs are calculated below:

Table 10. Computed Borrowing Capacities of General Santos City, Koronadal City and Kidapawan City

EcoGov Partner LGU	20% of Total Income (legal limit for debt servicing)	Maximum borrowing capacity (see note 1)	Total Long-Term Liabilities 2003	Estimated Capacity to Assume Additional Borrowings
General Santos	136,774,800	772,808,125	63,443,600	709,364,525
Koronadal	56,313,240	318,182,365	0	318,182,365
Kidapawan	59,742,280	265,232,204	50,269,200	214,963,004
Tacurong	40,704,320	229,988,486	46,721,900	183,266,586

Note 1 : Assumes that 20% of total or regular income, which is the limit that an LGU can appropriate for debt servicing under the Local Government Code, can access a loan to be repaid in 10 years at 12% interest and in equal amortization payments.

Key findings are as follows:

- All four City LGUs have achieved significant progress towards financial self-sufficiency from the national government:
  - All four LGUs generate higher local revenues per capita, which range from P362 for Korondal to P657 for Kidapawan, than the fourteen EcoGov LGUs in Mindanao with SWM plans (comparable LGUs), which average P238;
  - Local income sources of the 4 LGUs, which range from 28% for Koronadal to 48% for General Santos, pay a significantly larger portion of their expenditures as compared to the average of 22% for comparable LGUs.

- Cites of Tacurong, Koronadal and General Santos show high savings rates of 28% - 38%, while Kidapawan at 16% is near the average of 18% for comparable LGUs.

- As of 2003, the cities of Kidapawan and Tacurong have some exposure to long-term debt while Koronadal and General Santos are relatively debt-free.

- All four LGUs have more than adequate capacity to access additional debt, ranging from P180m for Tacurong to P700m for General Santos.

D. PHOTOS OF SITES VISITED

GENERAL SANTOS

Drainage of wastewater from the wet market section

Solid waste clogging the drainage canal

Existing (left photo) and proposed (top photo) drainage outfall to the sea filled with solid wastes

Children bathing at an outfall carrying wastewater from the public market

Continuation of General Santos

Scalding vat operation at the city abattoir

Floor slaughtering operation at the city abattoir

Post-operation cleaning at the abattoir

Continuation of General Santos

Wastewater drainage canal

Effluent inlet at the lagoon wastewater treatment facility

Hardened scum on the lagoon

KORONADAL

Creek outfall of wastewaters from market and nearby residences

Solid wastes thrown to the creek outfall

Drainage canal at the wet section of the public market

Continuation of Koronadal

Close-up of wet market section's wastewater drainage canal

Scalding vat at the city abattoir

Slaughtering operation at the city abattoir

KIDAPAWAN

Wet market section of the public market

Drainage outlet of the public market wastewater

Creek outfall of wastewaters from market and other sources

Continuation of Kidapawan

Solid wastes in the creek outfall

Scalding vats at the city abattoir

Continuation of Kidapawan

Early morning operations at the city abattoir

TACURONG

Wet market section of the public market

Open drainage manhole at the market laden with solid wastes

Scalding vats at the city abattoir

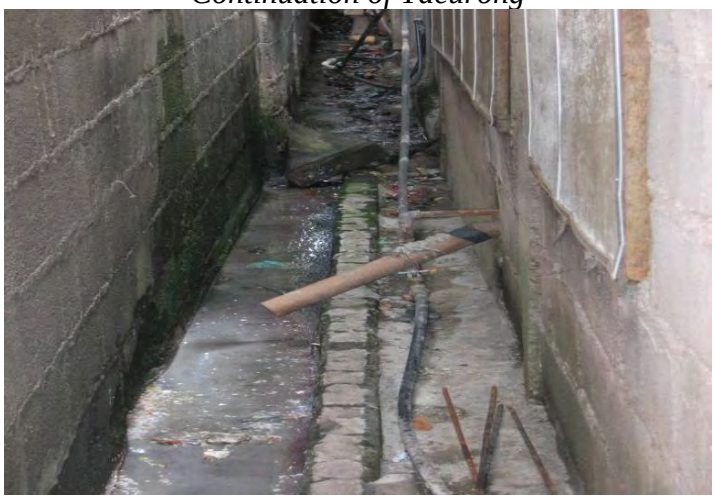
Continuation of Tacurong

Table slaughtering operation at the city abattoir

Blood spills and other wastewaters during operation at the abattoir

A private hospital which was assessed on its wastewater management

Continuation of Tacurong



Un-maintained wastewater drainage canal in the hospital

Drainage canal at the laundry area

Stagnant water in the drainage canal

E. PARTICIPANTS TO THE WWM ASSESSMENT

EcoGov Team

Name	Position
1. Dr. Casiano S. Abrigo, Jr.	UEM Wastewater Management Specialist
2. Mr. Mabini Arevalo, Jr.	UEM Regional Specialist for Mindanao
3. Mr. Erwin Patricio	UEM Assisting Professional
4. Dr. Victor S. Luis, Jr.	UEM Sector Leader
5. Mr. Mateo Ty	Regional Municipal Finance Specialist
6. Mr. Hector O. Florento	Municipal Finance Sector Leader

LGU Participants

Name	Position
General Santos City	
1. Nael Cruspero	Head, CPDO
2. Valiente Lastimoso	Head, CENRO
3. Others	
3 personnel	CPDC staff
1 Kagawad	SPmember
Koronadal City	
1. Augustus Bretana	Head, CENRO
2. Sergio Morales, Jr.	SP member
3. Aquilina Aguilos	OIC, CAO
4. Sofronio Andres	Market Supervisor
5. Dominador Samilin	CENRO staff
6. Gilbert Gayosa	CENRO staff
7. Marcelita Lucado	
8. Marivic Danos	
9. Neva Legayada	
Kidapawan City	
1. Edgar Paalan	Head, CENRO
2. Silverio Teofilo	CEO
3. Bienvenido Alera	Market
4. Stella Anima	MKWD
5. Rosauro Daga	MKWD
6. Divina Fuentes	DPDO
7. Annielyn Devero	CENRO staff
8. Joel Saladan	CENRO staff
9. Lisandro Alqueza	CENRO staff
10. Remedios Alagar	CENRO staff

Tacurong City

1.	Jun Carigaba	Head, CENRO
2.	Jaime Cedullo	Head, CPDO
3.	Psyche Sucaldito	SP member
4.	Joseph Lechonsito	SP member
5.	Ramon Losanes	CAO
6.	Elias Bustamante	Market Supervisor
7.	Elma Bides	City Accountant
8.	Roger Arzagon	Budget Officer
9.	Catherine Leguro	CEO
10.	SK Representative	
11.	Jose Tabuga	Water District staff
12.	Billy Flotibles	Water Dustrict staff
13.	Bobby Lopez	CENRO staff

II. REPORT ON THE CITIES OF BAYAWAN, BAIS AND TANJAY

A. OBSERVATIONS AND FINDINGS

BAYAWAN CITY

The city government has plans for a 1.5 hectares centralized lagoon system to stabilize all municipal WW prior to discharge to adjacent coastal areas. The city mayor expressed interest to avail of EcoGov TA in WWM in controlling odor via aeration systems, septic vault redesigns and municipal sewerage improvement. The city is open to WW minimization/recycling approaches for new proposed residential subdivisions and other establishments.

Visits to Bayawan district hospital, abattoir and public market revealed the following observations and findings according to technical, organizational and legal considerations/ parameters:

Table 11. Status of Bayawan's Sanitation Facilities in Selected Point Sources

Parameter	District Hospital	Abattoir	Public Market
Technical	1. Incorrect design of septic vaults-defective overflow system 2. No desludging practice – close and build operation system but without post closure vault rehabilitation 3. No disinfection of infectious SW but discharged to bottomless pit-potential source of contamination to the very shallow groundwater (1-2 meters from ground surface level)	1. Insufficient capacity of septic vault for WW treatment 2. Excessive use of wash water 3. Planned for transfer to new site but still without WWM facility design.	1. Stagnant WW in drain canals due to poor slope 2. WW exits to septic vault but without regular desludging
Organizational	1. Inadequate training of personnel on hospital waste management 2. No standard procedure for disinfecting laundry and dietary WW	1. Good in-house keeping. With separation of SW (manure) prior to washings	1. Fair in-house keeping
Legal	1. No ordinance requiring regular desludging of septic vaults 2. No institutional arrangement with the city on waste management	No ordinance requiring regular desludging of septic vaults	No ordinance requiring regular desludging of septic vaults

BAIS CITY

This coastal city with a population of 68,115 in 2000 is planning to formulate an integrated municipal wastewater management plan to address the city's wastewater problems. The LGU affirmed its interest to avail of the EcoGov TA in WWM.

Three establishments were assessed and the observations and findings in the provincial hospital, abattoir and public market of the city are summarized according to the parameters previously cited, as follows.

Table 12. Status of Bais' Sanitation Facilities in Selected Point Sources

Parameter	A 50 Bed Capacity Provincial Hospital	Abattoir	Public Market
Technical	1. Incorrect disposal system for infectious wastes (covered vaults) 2. Incorrect design of effluent overflow in septic vaults. 3. Wastewaters are mixed with stormwaters in the drainage canal	1. There is no WW treatment facility 2. WW with manure is discharged to city sewer 3. The facility is planned for transfer to a 4-hectare property but still without WW treatment facility design	1. Suspended solids mixed with stagnant wastewater due to poor canal slope 2. Odorous 3. No strainers for solid wastes like plastics, bottles, etc. 4. Raw WW discharge to city sewer
Organizational	1. Management is by the provincial government with some contribution from the city for the operation of the facility 2. There is no quality control for disinfecting laundry WW 3. There is poor maintenance of septic vaults and sewer 4. There is inadequate training of personnel on hospital waste management	1. Personnel have inadequate training on proper waste management	1. Fair in house keeping 2. Personnel have inadequate training on proper waste management
Legal	1. There is no institutional arrangement with the host city on waste management 2. There is no city ordinance on regular desludging of septic vaults	1. The facility is operating without ECC	

TANJAY CITY

The city is in the process of developing a comprehensive WWM plan and needs immediate TA on the design of a centralized WW lagoon system, and on the design of a new proposed abattoir that incorporates a wastewater treatment facility. The city mayor signified his interest to avail of the WWM TA of the project through the submission of an LOI that is duly endorsed by the SP.

The observations during the visits to a health care center, abattoir and public market in the city are listed below:

Table 13. Status of Tanjay's Sanitation Facilities in Selected Point Sources

Parameter	Health Care Center	Abattoir	Public Market
Technical	1. There is no disinfection of WW and other infectious wastes. These are discharged directly to pits and exits through natural seepage 2. Depth of unconfined groundwater table is shallow (1-2 meters from ground surface)	1. Wastewater treatment is through septic vaults with open manholes. Abundant mosquito larvae were observed inside the vaults. 2. There is extremely unsanitary conditions in the facility with manure, hair, etc dumped at sides and back of abattoir 3. The facility is located in a shallow ground water table area (1-2 meters from ground surface)	1. Practically the situation is similar to the other public markets visited with stagnant WW in canals 2. There is insufficient septic vault capacity.
Organizational	1. There is no monitoring of WW quality 2. There is inadequate training of personnel on proper waste management	1. There is inadequate training of personnel on proper waste management	1. There is no WW quality monitoring prior to effluent discharge to city sewer 2. There is inadequate training of personnel on proper waste management
Legal		1. There is no ordinance on proper operation and maintenance of septic vaults	1. There is no ordinance on proper operation and maintenance of septic vaults

B. RECOMMENDATIONS ACCORDING TO POINT SOURCE

Recommended actions in relation to the foregoing observations and findings are proposed in the table set forth below. These recommendations are by no means sufficient to eliminate completely the wastewater management problems in these facilities. These are aimed at minimizing the adverse impacts through improvements in wastewater management facilities and practices. Each recommendation is marked either as:

* Signifies that action is important and urgent, and should be accomplished within the next six months, or

** Signifies that action is important but not urgent, and that it can be done later.

Also indicated are the corresponding environmental implications and descriptive cost estimates to help LGU decision-makers prioritize their actions.

Table 14. Summary of Recommendations According to Point Source for Bayawan City, Bais City and Tanjay City

Recommendations	Implications Environment / Health	Cost
A. Bayawan City		
1. District Hospital		
<u>Technical</u>		
▪ Waterproof septic vaults' floorings and walls*	▪ Will prevent mixing septic vault contents with ground water	▪ Low
▪ Retrofit septic vaults' interchamber and exit pipes*	▪ Reduced health hazard	▪ Low
▪ Backfill abandoned septic vaults*		
▪ Stop build-close-build septic vault system of operation*	▪ Will prevent exit of excreta to municipal sewer	▪ Low
▪ Desludge septic vaults at least every 3 years**	▪ Reduced pollution	
▪ Follow standard procedures for disinfecting WW and SW prior to discharge to septic vaults**		
<u>Organizational</u>		
▪ Train concerned personnel in WWM*	▪ Healthier environment at the work place	
<u>Legal/Institutional</u>		
▪ An institutional arrangement should be formulated between the hospital and lgu for the improvement of waste management at the facility*		
▪ Enactment of an ordinance requiring regular desludging of septic vaults *		

Recommendations	Implications Environment / Health	Cost
2. Abattoir Technical ▪ Install primary sedimentation tank* ▪ Desludge septic vault yearly* ▪ Collect and transport solid residue for off-site composting* ▪ Relocate proposed new abattoir site far from recharge area for water supply* ▪ Rationalize wash water usage. Install water meter** Organizational ▪ Train concerned personnel in WWM* Legal ▪ Enactment of ordinance requiring regular desludging of septic vaults*	▪ Will increase capacity of existing septic vault to stabilize the effluent ▪ Will prevent potential contamination of groundwater for water supply ▪ Healthier environment at the workplace ▪ Maintenance of treatment capacity and performance of septic vaults	▪ Low
3. Public Market Technical ▪ Increase slope of drainage canals and install strainers at every manhole** ▪ Construct tower fixed bed trickling filter WW treatment system** ▪ Desludge septic vault yearly* Organizational ▪ Train concerned personnel in WWM* Legal ▪ Enactment of ordinance requiring regular desludging of septic vaults*	▪ Will eliminate stagnant, odorous and mosquito breeding pools ▪ Will reduce water pollution of creeks, rivers and coastal areas ▪ Maintained capacity and treatment performance of septic vaults	▪ Low ▪ Cost will depend on actual WW characterization
B. Bais City		
4. Provincial Hospital Technical ▪ Waterproofing septic vaults' flooring and walls* ▪ Retrofit septic vault interchamber and exit pipes according to standard design* ▪ Construct separate storm drainage to by- pass septic vaults** ▪ Backfill closed septic vaults**	▪ Will prevent mixing of pathogenic effluent with the very shallow ground water (1-2 meters only) ▪ Will avoid washout of microbes and undigested solid	▪ Low ▪ Low ▪ Low ▪ Low

Recommendations	Implications Environment / Health	Cost
▪ Desludge septic vault at least every 3 years* ▪ Stop the practice of construct-abandon-construct system of septic vault operation* Organizational ▪ Train hospital concerned staff on hospital wastewater management* Legal/Institutional ▪ Improve LGU capability for permitting and monitoring septic vaults maintenance and effluent discharge to municipal sewerage* ▪ Enactment of ordinance requiring regular desludging of septic vaults	▪ Maintained capacity and performance of septic vault ▪ Reduce aquifer contamination by infectious residues ▪ Hospital effluent to meet clean water act standard prior to discharge ▪ Cleaner waters in creeks, rivers and coastal areas ▪ Maintained capacity and treatment performance of septic vaults	
5. Abattoir Technical ▪ Construct WW primary settling tank* ▪ Construct activated sludge WW treatment for supernatant** ▪ Collect and transport solid residue to off-site composting area* Organizational ▪ Train staff in WWM*	▪ Compliance to the effluent standards of CWA ▪ Separation of solids reduces pollutive effects of effluent when directly discharged to river ▪ Better environment at the workplace	▪ Low ▪ Cost depends on WW characterization (flowrate, BOD)
6. Public Market Technical ▪ Increase slope of drainage canals and install fixed strainers at manholes and exit point* ▪ Construct tower fixed bed trickling filter at effluent exit area** Organizational ▪ Train concerned personnel on WWM*	▪ Will eliminate stagnant, odorous and mosquito breeding pools ▪ Will help reduce water pollution in the receiving water environment ▪ Better environment at the market	▪ Low ▪ Cost depends on WW characterization
C. Tanjay City		
1. Health Care Center Technical ▪ Construct new water tight septic vaults for sewage and other hospital effluents* ▪ Desludge septic vaults every three years* Organizational ▪ Train concerned personnel in WWM and monitoring of hospital effluent prior to discharge to rivers and coastal areas*	▪ Will stop contamination of ground water by infectious WW ▪ Maintenance of treatment capacity and efficiency ▪ Cleaner quality of receiving waters and compliance to CWA standards	▪ Low ▪ Low

Recommendations	Implications Environment / Health	Cost
Legal ▪ Enactment of ordinance requiring regular desludging of septic vaults*	▪ Maintenance of treatment capacity and performance	
2. Abattoir Technical ▪ Decommission the facility and transfer to a new site which is not water logged* ▪ If immediate transfer is not possible, rehabilitate the site through improved sanitation and proper operation of septic vaults* ▪ Collect and transport SW to off-site composting area* ▪ Waterproof floor and walls of septic vaults* ▪ Collect and transport WW for discharge to municipal sewerage* Organizational ▪ Train concerned personnel in WWM*	▪ Will prevent direct discharge of WW to groundwater ▪ Prevent outbreak of waterborne and airborne diseases ▪ Reduced pollution ▪ Minimize mixing of WW with ground water ▪ Better environment at the workplace	▪ High ▪ Low
3. Public Market Technical ▪ Increase slope of drainage canals* ▪ Install fixed strainers at manholes and WW exit point* ▪ Construct tower fixed bed trickling filter treatment system** Organizational ▪ Train concerned personnel in WWM*	▪ Will eliminate stagnant, odorous and mosquito breeding pools ▪ Compliance to the CWA effluent standard ▪ Cleaner environment at the market	▪ Low ▪ Cost will depend on actual WW characterization

* Urgent and important
** Important but not urgent

Low Cost – Up to P500,000
Medium Cost – Greater than P500,000 up to P2M
High Cost – Greater than P2M

C. FINANCIAL ANALYSIS

In relation to capacity to access financing, all three LGUs are good candidates for technical assistance. Each can pursue a range of options to finance and implement the proposed projects. They all present high savings rates, prioritize economic services, and have low exposure to short- and long-term debt. Moreover, all three have large additional debt capacity (however, this must be confirmed with LGU). These factors validate their ability to finance additional wastewater facilities, particularly if cost recovery mechanisms are created. Their financial positions would appear favorable to prospective creditors or private subcontractors that the LGUs may want to tap. However it should be noted that the LGUs are also highly dependent on the IRA to finance the bulk of their expenses, and that they should develop additional local sources of income through user fees and other types of service charges. While they have been more successful than most EcoGov LGUs in generating local revenues per capita, expanding local revenue sources is essential to improving their financial viability over the long-term.

Summary of Key Data for 2003

Table 15. Statements of Income and Expenditure (in Pesos) of Bayawan City, Bais City and Tanjay City

LGU	Local Income	Total Income	Economic Expenditures*	Total Expenditures*	Net Income
Bayawan	17,634,500	327,083,500	31,696,000	239,544,000	108,345,100
Tanjay City	15,573,800	198,738,500	24,899,338	145,118,793	76,748,700
Bais City	27,455,300	222,956,700	38,787,186	166,179,590	47,742,800

*BLGF data. The rest are from COA.

Table 16. Balance Sheets (in Pesos) of Bayawan City, Bais City and Tanjay City

LGU	Total Assets	Current Assets	Current Liabilities	Long-Term Liabilities
Bayawan	647,185,700	325,531,900	133,862,200	6,152,100
Tanjay City	223,616,600	78,085,200	30,130,500	22,720,500
Bais City	576,449,200	201,288,000	22,680,300	-

Financial Indicators

The table set forth below presents the selected financial indicators for the LGUs. For comparison, the range, median, and average values for all 79 EcoGov Partner LGUs are also presented.

Table 17. Summary of Financial Indicators of Bayawan City, Bais City and Tanjay City

LGU	Local Revenues Per Capita	Economic Expenditures/ Total Expenditures	Local Income/ Total Expenditures	Net Income/ Total Income	Long-Term Liabilities/ Total Assets	Current Assets/Current Liabilities
Bayawan	164	61%	12%	33%	1%	2.4
Tanjay City	216	53%	13%	38%	10%	2.6
Bais City	389	65%	17%	21%	0%	8.9

Estimated Borrowing Capacities

The additional borrowing capacities of the LGUs are calculated below:

Table 18. Computed Borrowing Capacities of Bayawan City, Bais City and Tanjay City

EcoGov Partner LGU	20% of Total Income (legal limit for debt servicing)	Maximum borrowing capacity (see note 1)	Total Long-Term Liabilities 2003	Total Long-Term Liabilities 2004	Estimated apacity to Assume Additional Borrowings
Bayawan City	65,416,700	369,618,945	6,152,100	85,000,000	278,466,845
Bais City	44,591,340	251,951,016			251,951,016
Tanjay City	39,747,700	224,583,370	22,720,500		201,862,870

Note 1: Assumes that 20% of total or regular income, which is the limit that an LGU can appropriate for debt servicing under the Local Government Code, can access a loan to be repaid in 10 years at 12% interest and in equal amortization payments.

Key findings are as follows:

- All three LGUs generate higher local revenues per capita than the majority of EcoGov LGUs, particularly Bais.
- Economic expenditures are substantial for all three LGUs. Bayawan and Bais City spend substantially more on economic services than most EcoGov LGUs.
- Local income sources, ranging from 12% - 17%, pay for only a small portion of their total expenditures. Clearly, all three LGUs are heavily dependent on IRA. This underscores the need for them to take advantage of opportunities to apply user fees or other charges for new infrastructure facilities.
- All three LGUs have high savings rates of 21% - 33%, which far exceed the median and average values of 14% and 15%, respectively, for all EcoGov LGUs.
- All three LGUs have little or no exposure to long-term borrowings (as of 2003).
- All three LGU have highly liquid short-term financial positions, especially Bais City.

D. PHOTOS OF SITES VISITED

BAIS CITY

Stagnant wastewater at the public market

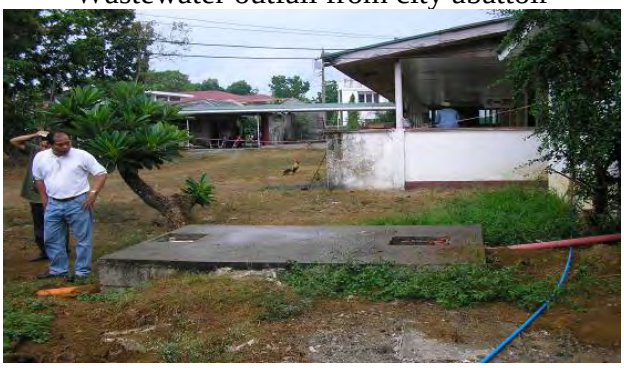
The slaughterhouse of the city

Elevated concrete water storage tank for the abattoir

Scalding vats and the slaughtering tables

BAYAWAN CITY

Wastewater outfall from city abattoir

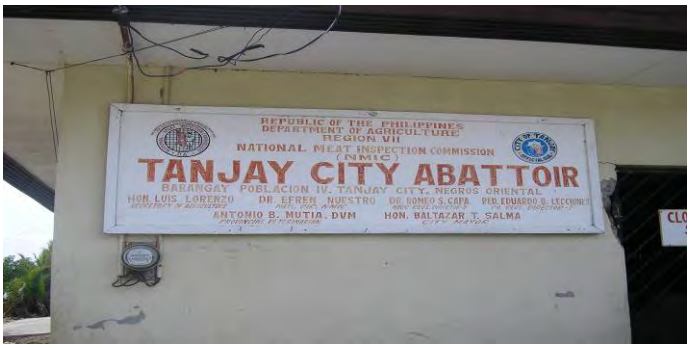


Septic vault of the city abattoir

Cleaned floor after slaughtering operation

Tiled vats for cleaning entrails of butchered animals

TANJAY CITY



The city abattoir

Concrete slaughtering tables with wastewater canals

The interior of the main abattoir facility

Solid wastes mostly hairs are disposed near the abattoir

E. PARTICIPANTS TO THE WWM ASSESSMENT

EcoGov team

1.	Dr. Casiano S. Abrigo Jr.	UEM STTA on Wastewater Management
2.	Ms Stella Mariz Salas	Regional Mun. Finance Specialist
3.	Mr. Romulo Kintanar	UEM Assisting Professional

LGU participants

Bayawan City

	Name	Position
1.	Mr. German Serana	Mayor
2.	Novelito Herrero	SB Kagawad for Environment
3.	Michael Mananquil	City Engineer
4.	Rogelio Dael	City ENRO
5.	Faith Napigkit	City DA Technician
6.	Luis Sumalpon	City Agriculturist
7.	Alma Abrasaldo	Manager, Water District
8.	Marchita Tuale	City Planning Development Officer
9.	Engr. Saturnino Cabanban	City ENRO staff
10.	Engr. Antonio Aguilar	City Pollution Control Officer

Bais City

1.	Ma. Angeles Soccor Bonogon	City Planning Development Officer
2.	Alfredo Maturan	City Consultant
3.	Engr. Eric Laxina	City Planning Development Officer
4.	Lynette Balansag	CPDO Staff
5.	Ronie Cablao	City Engineer
6.	Engr. Nelia Ramirez	City Sanitary Inspector
7.	Dr. Chucita Villapando	City Health Officer
8.	Melijon Baqueran	Engineer II, SLP Manager
9.	Melania Pescadilla	City Agriculturist

Tanjay City

1.	Baltazar Salma	Mayor
2.	Anthony Duran	City Planning Development Officer
3.	Ronald Bermudez	City Information Officer
4.	Servideo Deputado	City Agriculturist
5.	Adolfo Adeza	City Meat Inspector
6.	Luido Vano	City Information Officer
7.	Rey Ybanez	City Information Office Staff
8.	Chester Reyes	City Engineer
9.	Noel Calumpang	Water District Officer
10.	Virginia Kadili	City Health Officer
11.	Pedro Ramirez	Non-Government Agency Officer
12.	Reynaldo Tines	City Administrator
13.	Dr. Elizabeth Sedello	District Health Administrator

III. REPORT ON TAGBILARAN CITY, DAUIS AND PANGLAO, BOHOL

A. OBSERVATIONS AND FINDINGS

TAGBILARAN CITY

Tagbilaran is the only city in the Island of Bohol and its present population is 77,700 distributed in 15 barangays. It is the commercial, educational and government center of the province. Major establishments found normally in urban cities in the country are present in this 2nd class city. A letter of intent (LOI) was submitted to the project manifesting their interest for wastewater management technical assistance. In response, the project dispatched a team made up of the UEM and Municipal Finance sectors to do a rapid assessment of the wastewater management and sanitation situation in the city.

Visits made to the abattoir and 2 public market sites revealed the following observations and findings according to technical, organizational and legal considerations/parameters:

Table 19. Status of Tagbilaran's Sanitation Facilities in Selected Point Sources

Parameter	Abattoir	Old Public Market	New Public Market
Technical	1. Butchering operations are generally on the floor because of inadequate facilities. Wastes and carcasses are on the same floor. 2. Water hoses are generally free flowing. 3. Wastewater treatment is inadequate and is poorly maintained and operated. There is discharge of partially or almost untreated wastewater to the receiving creek.	1. Drainage canals are occasionally clogged with trash and portions are with inadequate slopes causing stagnation 2. The septic vault have not been desludged	1. Stagnant WW in drain canals due to poor slope and clogging caused by illegal dumping of garbage. This situation generates septic odorous condition 2. Raw WW is treated by a septic vault system. 3. The septic vault effluent is conveyed by gravity to a nearby sinkhole
Organizational	1. Inadequate training of personnel on waste management	1. Poor house keeping practices.	1. Fair in-house keeping
Legal	1. No ordinance requiring regular maintenance of wastewater treatment facilities including desludging	1. No ordinance requiring regular desludging of septic vaults and waste treatment lagoons	1. No ordinance on the management of wastewaters of public markets

DAUIS, BOHOL

The small island of Panglao which is adjacent but separated by a channel from Tagbilaran city is very popular among local and foreign tourists because of its pristine coastal waters, dive spots and white sands. The northern section of the slightly rolling island is occupied by Dauis which is a 4th class municipality with a population of 26,415 distributed in 12 barangays. The main sources of livelihood of the municipality are fishing, agriculture and tourism. Its water supply comes from the Bohol mainland through the Salcon company, a private entity that also supplies the water needs of Tagbilaran City together with the Bohol Water Utility Inc. Water and wastewater related problems are emerging that need to be addressed before these become more severe. Hence, the LGU has expressed its interest to avail of the WWM TA of the project.

Two establishments and one community were assessed. The observations and findings at the private abattoir, Bohol Bee Farm resort and Badjao community are presented below:

Table 20. Status of Dauis' Sanitation Facilities in Selected Point Sources

Parameter	Private Abattoir	Bohol Bee Farm Resort	Badjao Community
Technical	1. This facility is not well maintained although there was on-going repair work during the visit 2. Butchering operations are done on GI pipe tables 3. Wastewater treatment system is overloaded with effluent flowing over adjacent land and infiltrating and percolating into the soil profile	1. It operates its own groundwater supply system with elevated and cistern storage tanks. 2. It uses a 3-chambered septic vault for its sewage treatment and practices no discharge as the overflow of the septic vault is pump to a depression for storage and possible treatment	1. The houses on stilts directly discharge their sewage and other wastewaters to the sea 2. Nobody from the community is using the public toilet provided by the LGU. (It was padlocked during the visit) 3. Garbage and human wastes are in the immediate water environment of the community.
Organizational	1. Management is by the provincial government. 2. There is inadequate training of personnel on hospital waste management	1. Personnel have inadequate training on proper waste management	1. Strong cultural practices of the community resist change especially on the aspect of improved sanitation

Parameter	Private Abattoir	Bohol Bee Farm Resort	Badjao Community
Legal	1. There is no institutional arrangement with the host city on waste management 2. There is no city ordinance on regular desludging of waste treatment facility	1. There is no LGU ordinance on wastewater management	1. There is no banning the building of residences on coastal waters

PANGLAO, BOHOL

Panglao which occupies the southern part of the island is also a 4th class municipality with a population of 21,337 distributed in 10 barangays. The main sources of livelihood are similar to Dauis. However, there are more tourist resorts in this municipality. Consequently, water is a scarce commodity in the municipality. The June 7, 2005 issue of the Manila Bulletin on the proposed international airport project in the island by the provincial governor was met with a counter challenge to prioritize first and solve the looming water crisis in the municipality. The soil formation in the entire Panglao Island is mainly limestone making the soil permeable hence the groundwater is highly susceptible to contamination. This is also the situation in Tagbilaran City. It is reported that the presence of coliforms in the wells subjected to bacteriological analysis is due to the percolation of human and animal wastes into the groundwater. The municipality signified its interest to avail of the WWM TA of the project through the submission of a LOI.

The observations and findings during the site visits to Palm Island resort and the public market of the municipality are listed below:

Table 21. Status of Panglao's Sanitation Facilities in Selected Point Sources

Parameter	Palm Island Resort	Public Market
Technical	1. Domestic water supply is supplied by the LGU but used only for washing, flushing and cooking. Commercial mineral water is used for drinking. 2. A 3-chambered septic vault with no sea outfall discharge is used to treat sewage. 3. Water harvesting using the roof and gutter system of the main resort building provides supplemental water for the swimming pool of the resort.	1. The wet market building is located in an area relatively lower than the street and the main drainage canal. Pools of stagnant water are present in ground depressions along the building. 2. Water for cleaning stalls, fish and other goods are taken from a shallow well with a pitcher pump. Another source of water is harvesting rainwater collected from the roof and gutter system of the market buildings and storing this in a ground level water tank building Housekeeping is very poor.

Parameter	Palm Island Resort	Public Market
Organizational	1. There is inadequate training of personnel on proper waste management	1. There is inadequate training of personnel on proper waste management
Legal	1. There is no LGU septage management or regular desludging of septic vaults	

B. RECOMMENDATIONS ACCORDING TO POINT SOURCE

Recommended actions in relation to the foregoing observations and findings are proposed in the table set forth below. These recommendations are by no means sufficient to eliminate completely the wastewater management problems in these facilities. These are aimed at minimizing the adverse impacts through improvements in wastewater management facilities and practices. Each recommendation is marked either as:

* Signifies that action is important and urgent, and should be accomplished within the next six months, or

** Signifies that action is important but not urgent, and that it can be done later.

Also indicated are the corresponding environmental implications and descriptive cost estimates to help LGU decision-makers prioritize their actions.

Table 22. Summary of Recommendations According to Point Source for Tagbilaran City, Dauis and Panglao

Recommendations	Implications	
	Environmental/Health	Cost
A. Tagbilaran City		
1. Abattoir Technical ▪ Complete butchering facility and put an end to Flor de Luna type of butchering* ▪ Proper maintenance by regular desludging of the lagoon system coupled with the use of probiotic agents to improve treatment efficiency.* Organizational ▪ Train concerned personnel in WWM* Legal/Institutional ▪ Enactment of an ordinance requiring regular desludging of septic vaults and treatment lagoons*	▪ Health risks to operators and buying public ▪ Reduced health hazard ▪ Reduced pollution ▪ Compliance with CWA effluent standards ▪ Healthier environment at the work place	▪ Low ▪ Low

Recommendations	Implications Environmental/Health	Cost
2. Old Public Market		
Technical		
▪ Slope of the canals must be improved and grit chambers with strainers installed in strategic locations such as bends.*	▪ Reduction in pollution load	▪ Low
▪ Collect and transport solid residue for off-site disposal*	▪ Will prevent potential contamination of groundwater	
▪ Rationalize water usage water usage. Install water meter**		
Organizational		
▪ Train concerned personnel in WWM*	▪ Healthier environment at the workplace	
Legal		
▪ Enactment of ordinance requiring regular desludging of septic vaults*	▪ Maintenance of treatment capacity and performance of septic vaults	
3. New Public Market		
Technical		
▪ Increase slope of drainage canals and install strainers at every manhole**	▪ Will eliminate stagnant, odorous and mosquito breeding pools	▪ Low
▪ Regular flushing of the canals must be practiced**	▪ Will reduce water pollution of creeks and rivers	
▪ Desludge septic vault yearly*		
▪ Regular water quality monitoring of sinkhole		
Organizational		
▪ Train concerned personnel in WWM*		
Legal		
▪ Enactment of ordinance requiring regular desludging of septic vaults*	▪ Maintained capacity and treatment performance of septic vaults	
B. Dauis, Bohol		
1. Bohol Bee Farm Resort		
Technical		
▪ Desludge septic vault regularly*	▪ Will maintain treatment capacity and efficiency	▪ Low
▪ Regular monitoring of the depression where the overflow effluent from the septic vault is pumped. This facility must be secured and with signage*	▪ Reduce aquifer contamination	▪ Low
Organizational		
▪ Train concerned staff on wastewater management*	▪ Hospital effluent to meet clean water act standard prior to discharge	
Legal/Institutional		
▪ Improve LGU capability for permitting and monitoring septic vaults maintenance*	▪ Cleaner waters in water bodies	
▪ Enactment of ordinance requiring regular desludging of septic vaults*	▪ Maintained capacity and treatment performance of septic vaults	

Recommendations	Implications	
	Environmental/Health	Cost
2. Private Abattoir <u>Technical</u> ▪ Need rehabilitation work including the internal drainage system for wastewater* ▪ Collect and transport solid residue to off-site composting area* ▪ Treatment facility must include use of probiotic agents to cope up with the pollution load of the wastewater generated by the facility.* ▪ There must be a separate storm drain for the facility* <u>Organizational</u> ▪ Train staff in WWM* <u>Legal</u> ▪ Enact ordinance requiring regular desludging of wastewater treatment lagoons	▪ Compliance to the effluent standards of CWA ▪ Separation of solids reduces pollutive effects of effluent when directly discharged to river ▪ Better environment at the workplace ▪ Compliance with the CWA effluent standard	▪ Cost depends on WW characterization (flowrate, BOD) ▪ Low
3. Badjao Community a. The community should relocate to land near the coast. The LGU must support the on-going effort of a Bagobo pastor to lease the land upstream of the community for the relocation of the Badjaos. The land would be occupied by the Badjaos for free. b. Basic necessities must be provided like water and sanitation. c. IEC and advocacy materials and activities on proper sanitation suited for the community must be produced and conducted to gradually wean them from their unsanitary culture and practices. d. Alternative livelihood suited to the community must also be explored and promoted. e. The LGU must formulate and enforce an ordinance prohibiting anyone from constructing dwelling structures directly over water and the discharge of untreated wastes directly to the sea.		
C. Panglao, Bohol		

Recommendations	Implications	
	Environmental/Health	Cost
1. Palm Island Resort		
Technical		
▪ Monitor BOD, coliform of final effluent prior to discharge to city sewer*	▪ Will minimize contamination of ground water by infectious WW	▪ Low
▪ Desludge septic vaults at least once a year*	▪ Maintenance of treatment capacity and efficiency	▪ Low
▪ Provide filtration of wastewater prior to discharge to the septic vaults*	▪ Prevent accidents due to septic vault explosion	▪ Low
▪ Hold plans to extract and use biogas from the septic vault		
Organizational		
▪ Train concerned personnel in WWM and monitoring of hospital effluent prior to discharge to rivers*	▪ Cleaner quality of receiving waters and compliance to CWA standards	
Legal		
▪ Enactment of ordinance requiring regular desludging of septic vaults*	▪ Maintenance of treatment capacity and performance	
2. Public Market		
Technical		
▪ A wastewater drainage system must be constructed to include a septic vault located near the road drainage canal. At the overflow end of the septic vault, a stilling pumping well must be added and any accumulated effluent overflow of the vault at a certain level is automatically pumped into the street drainage canal. This way pools of wastewater emitting foul odor and serving as breeding places for disease vectors and pathogens are eliminated*	▪ Reduced pollution and improved sanitation	▪ Medium
	▪ Elimination of breeding pools for disease vectors	▪ Low
▪ Collect and transport SW to disposal*	▪ Improved aesthetics	
Organizational		
▪ Train concerned personnel in WWM*	▪ Better environment at the workplace	

* Urgent and important
** Important but not urgent

Low Cost – Up to P500,000
Medium Cost – Greater than P500,000 up to P2M
High Cost – Greater than P2M

C. FINANCIAL ANALYSIS

Tagbilaran City is in the strongest position in terms of access to financing as it belongs to a much higher income class than Panglao and Dauis. It is worth noting that Tagbilaran City generates the highest local own source revenues per capita (P1,347) and is the most financially-self sufficient (63% of expenditures internally financed) among all 79 LGUs being assisted by EcoGov. The city also has more than adequate surplus income (P63 million) and savings rate (25%) to provide the requisite financing for capital and O&M expenditures of the proposed waste water treatment facilities. Moreover, the city also has a large additional borrowing capacity (P172 million).

While Panglao and Dauis have more limited revenue sources than Tagbilaran City, they have sufficient capacity to finance the proposed facilities using surplus income (P4.9 million and P3.7 million, respectively) and/or access external borrowings (P27 million and P19 million, respectively). Panglao has relatively high local revenues per capita (P320 vis-à-vis median of P182 for comparable LGUs), and is fairly self-sufficient (32% of expenditures internally financed vís a vís median of 16% for comparable LGUs). Dauis, on the other hand, has relatively smaller own source revenues per capita (P136) and is at the median for financial self-sufficiency (16%). Yet both LGUs must recover the costs of service delivery through user fees or service charges to minimize the financial burden of the proposed facilities as they both have relatively limited financial resources. Moreover, they both must continue expanding their local revenue sources to enhance their financial viability over the long-term.

Summary of Key Data for 2003

Table 23. Statements of Income and Expenditure (in Pesos) of Tagbilaran City, Dauis and Panglao

LGU	Local Income	Total Income	Economic Expenditures*	Total Expenditures*	Net Income
Tagbilaran City	115,539,800	251,913,500	40,929,335	169,597,140	63,083,500
Panglao	7,229,300	27,612,000	3,879,319	22,212,748	4,857,100
Dauis	3,760,500	27,882,900	2,751,984	23,459,328	3,676,300

*BLGF data. The rest are from COA.

Table 24. Balance Sheets (in Pesos) of Tagbilaran City, Dauis and Panglao

LGU	Total Assets	Current Assets	Current Liabilities	Long-Term Liabilities
Tagbilaran City	587,695,100	118,901,200	38,603,400	113,069,600
Panglao	41,320,400	11,884,300	3,064,200	0
Dauis	31,204,400	15,264,800	7,405,300	1,200,000

Financial Indicators

The table set forth below presents the selected financial indicators for the LGUs. For comparison, the range, median, and average values for 21 ISWM Visayas EcoGov LGUs are also presented.

Table 25. Summary of Financial Indicators of Tagbilaran City, Dauis and Panglao

LGU	Local Revenues Per Capita	Local Income / Total Expenditures	Economic Expenditures/ Total Expenditures	Net Income / Total Income	Long-Term Liabilities / Total Assets	Current Assets / Current Liabilities
Tagbilaran City	1,347	63%	24%	25%	19%	3.1
Panglao	320	32%	18%	18%	0%	3.9
Dauis	136	16%	12%	13%	4%	2.1

Estimated Borrowing Capacities

The additional borrowing capacities of the LGUs are calculated below:

Table 26. Computed Borrowing Capacities of Tagbilaran City, Dauis and Panglao

EcoGov Partner LGU	Total Income 2003	Legal Limit for Debt Service, 20% of Total Income (A)	Actual Limit for Debt Service, Surplus Income 2003 (B)	Effective Debt Ceiling (based on lower of A or B x 5.65)	Less: Total Long-Term Liabilities 2003	Estimated Capacity to Assume Additional Borrowings
Tagbilaran City	251,913,500	50,382,700	63,083,500	284,673,492	113,069,600	171,603,892
Panglao	27,612,000	5,522,400	4,857,100	27,443,698		27,443,698
Dauis	27,882,900	5,576,580	3,676,300	20,771,915	1,200,000	19,571,915

Note 1 : Assumes that 20% of total or regular income, which is the limit that an LGU can appropriate for debt servicing under the Local Government Code, can access a loan to be repaid in 10 years at 12% interest and in equal amortization payments.

Key findings are as follows:

- All three LGUs have sufficient capacity to access borrowings to finance the capital costs of the proposed facilities, although Tagbilaran City is in a much stronger position.
- Tagbilaran City is in a class of its own among 79 LGUs assisted by EcoGov as the city collects the most in terms of taxes and fees per capita (P1,347), is the most financially self-sufficient (over 60%), and maintains a high savings rate (25%). The city also has a high economic expenditure ratio (24% vis-à-vis median of 17% for

comparable LGUs) which reveals a high priority to continue developing the local economy.

- Dauis and Panglao have relatively smaller revenue sources but have little or no exposure to long-term borrowings. Among the two, Panglao collects more revenues per capita (P320 vs. P136), is more self-sufficient (32% vs. 16%), and generates a higher savings rate (18% vs. 13%). Both should continue to develop local sources of revenues to reduce dependency on IRA similar to Tagbilaran City.

D. PHOTOS OF SITES VISITED

PANGLAO

Water tank in the market for rain water harvesting

Peripheral canal around the fish section of the Panglao Public Market

Deepwell within the market complex: current source of water

Fish section of Panglao Public Market .

E. PARTICIPANTS TO THE WWM ASSESSMENT

EcoGov Team

Name	Position
1. Dr. Victor S. Luis, Jr.	UEM Sector Leader
2. Engr. Czar Migrino	UEM Assisting Professional
3. Ms. Stella Sallas	Regional Municipal Finance Specialist
4. Mr. Hector O. Florento	Municipal Finance Sector Leader

LGU Participants

Name	Position
Bohol Environment Management Office	
1. Ms Ana Estologa	Geodetic Engineer
Tagbilaran City	
1. Mr. Eduardo Macalandag	Head, CPDO
2. Ms. Tess Dohig	CPDO staff
3. Mr. Val Gamutin	ESWM TWG member
Dauis, Bohol	
1. Engr. Alex Dolanta	Mun. Engineer
2. Ms. Vicky Wallace	Owner, Bohol Bee Farm Resort
3. Bogobo Pastor at the Badjao Community	
4. Head of the Badjao Community	
Panglao, Bohol	
1. Ms. Jovencia Asilo	MPDC
2. Ms. Marites Bonao	MPDC Staff
3. Mr. Cristo Rey Cabilugan	Manager, Palm Island Resort

ANNEX 1 – FINANCIAL INDICATORS

Financial Characteristics

1. Local Revenues per Capita – Measures the average amount that each citizen is contributing to the local income of the LGU. A low per capita figure in relation to other LGUs of the same income class means that the LGU could improve its collection efficiency or can further use its legislative powers to reach other taxable properties, income, or businesses. The indicator can be used to show differences in economic welfare among LGUs.

2. Economic Expenditures/Total expenditures – Measures in relative terms the financial resources used by the LGU to support economic activities, and reveals the importance of economic growth to the LGU. Economic sector expenditures include areas such as agriculture, industry, construction, trade services, and tourism, etc. LGUs supporting these sectors will improve their economic prospects and potential to grow local revenue sources over the long term. Higher ratio is more favorable.

3. Total Income from Local Sources/Total Expenditures – Measures the LGU's internal financing capacity or ability to sustain its expenditures based on local sources of income. Higher ratio is more favorable.

Financial Performance

4. Net Income/Total Income – Savings or dissavings rate; measures relative capacity to pay for interest payments on new long-term debt or assume the O&M expenses of new facilities. Ratio should be positive. A higher ratio shows a larger capacity to service debt and/or assume additional O&M expenses for new facilities.

Municipal Debt Position

5. Long Term Liabilities/Total Assets – Indicates the LGU's long-term debt position, specifically the amount of long-term liabilities relative to the value of the assets owned by the LGU. Long-term liabilities are to be repaid in a period greater than one year. The lower the ratio, the less exposure to fiscal risks and the higher the capacity to assume additional long-term borrowings.

6. Current Assets/Current Liabilities – Indicates the LGU's capacity to meet short-term liabilities. Ratio should be greater than 1. The higher the ratio, the more liquid the company is.

ANNEX 2 – OPTIONS FOR PROJECT IMPLEMENTATION

Set forth below are three basic approaches to implement waste water management projects:

1. LGU constructs, operates and maintains the facility

LGU assumes full responsibility for financing, contracting out construction, and operating and maintaining the facility. Staff should be dedicated to the management of the facility, and separate financial accounts should be maintained.

2. LGU enters into partnership with the private sector

Benefits – Private companies can offer innovative solutions, have professional managerial capacity, are technically better qualified and equipped, operate at higher efficiency levels -- all resulting in lower operating costs for the LGU. They offer access to additional financing sources that may be cheaper.

Possible contractual arrangements with private firms are as follows:

- Service Contract
  - Description: Specific O&M components are contracted out to the private sector while the LGU retains overall responsibility for O&M.
  - Characteristics: Examples are operation of the treatment plant, billing, or collection operations
  - Duration: 1-2 years.

- Management Contract
  - Description: Responsibility for operation and maintenance is transferred to the contractor.
  - Characteristics: Payments can be a fixed fee, but should generally be related to achievement of specific targets. This creates an incentive for increasing productivity.
  - Duration: 3-5 years.

Summary of Options

Option	Ownership of Assets	Operations and Maintenance	Duration
LGU as Investor and Operator	LGU	LGU	n.a.
Service Contract	LGU	LGU and Private Contractor	1-2 years
Management Contract	LGU	Private Contractor	3-5 years