PHILIPPINE ENVIRONMENTAL GOVERNANCE 2 PROJECT (EcoGov 2)

URBAN ENVIRONMENTAL MANAGEMENT PROGRAM ASSESSMENT AND ACTIVITIES

(Final Report)

May 2009

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(Final Report)

by: Leo R. Larochelle P.E.

May 2009

This report is presented as a supplement to the program assessment report prepared by Leo R. Larochelle P.E. in March 2008. The original report presented the initial consultant assessment of the EcoGov program activities and recommendations to enhance its effectiveness.

This supplemental report is intended to provide a summary of consultant activities since publication of the original program assessment report and to provide further observations concerning the EcoGov program and its results.

The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

USAID/Philippines Environmental Governance 2 Project

UEM ACTIVITIES AND ASSESSMENT SUPPLEMENTAL REPORT

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1
SUMMARY AND BACKGROUND

This report has been prepared by an international consultant (consultant) providing technical assistance to the Philippine Environmental Governance Project (EcoGov) program. The intent of the report is to update and supplement a previous assessment report prepared by the consultant in April 2008. The original 2008 report presented the consultant's perspective and assessment of the EcoGov program design and activities to that point in time. This current report seeks to update the consultant's observations concerning the EcoGov program after more experienced in dealing with EcoGov's program and projects and to review the current validity of the original recommendations made in 2008 report. The original report provided 59 recommendations concerning procedures that would potentially expand the results of the program to achieve target objectives and to provide a project legacy that would continue to be of benefit to local governments in the Philippines. This current report is also intended to update the summary of specific activities undertaken by the consultant on behalf of EcoGov during the past year.

The principal intent of the EcoGov program is to provide assistance to Republic of the Philippines national, regional and local governmental units with the aim of protecting geographical areas within the country with significant and endangered biodiversity and natural resources. To date, EcoGov's assistance has focused on three distinct initiative areas and program elements to achieve its desired results including:

- Forests and Forest Land Management,
- Coastal Resources Management and
- Urban Environmental Management.

Each of these program areas is important in working towards an objective that the biodiversity of EcoGov's target geographical areas is protected and that the rate of biodiversity loss is reduced. The consultant's assistance focus area was in the Urban Environmental Management (UEM) element of EcoGov's program with a primary

emphasis on solid waste and wastewater management within the urban areas in EcoGov's target project locations.

Many countries in the region, such as the Philippines, have unique physical features and are recognized for the extent of their biodiversity. However, because of significant concerns about general environmental conditions and degradation in these countries, the loss of biodiversity has often been a major focus issue for international environmental movements, projects and initiatives. Globally, the attempt to mitigate or slow the loss of biodiversity has led to a number of meaningful laws and regulations in many countries such as the Endangered Species Act in the United States. This concern about the rate of biodiversity loss in the Philippines has led to the USAID investment in the planning and technical assistance provided through the EcoGov program. A key element of this investment is the partnership that has evolved between EcoGov and the national Department of Environment and Natural Resources (DENR) of the government of the Philippines.

In attempting to provide technical assistance to the EcoGov program, the consultant recognizes that the term "biodiversity" is commonly defined as the variety of living things and the ecological complexes in which they occur. While humans have the intelligence and ability to positively impact biodiversity, they unfortunately also have the ability to cause the high rate of biodiversity loss that has been experienced in the last century particularly in countries with evolving environmental awareness and regulatory control systems such as the Philippines. There are many factors that contribute to loss of biodiversity and the above three EcoGov program elements seek to address the key issues associated with those factors.

Urban environmental management seeks to address the impact of encroaching or growing populations and the pollution that can be caused by urban concentrations. One of the major problems commonly faced by governments in many countries is increasing population and urbanization which places a significant stress on ecosystems and the natural resources that are available to support urban areas. Nonrenewal natural resources (such as oil and minerals) exist in finite quantities and are of particular concern since they cannot be readily replaced once they are used up. On the other hand, renewal resources, such as surface and ground water, are recycled and replaced naturally so long as the ecological functions and processes by which this happens remain healthy. The benefits and services provided by healthy natural ecosystems are numerous and include:

1. Generation of soils and maintenance of soil quality
2. Maintenance of air and water quality

3. Pest control
4. Decomposition and transformation of waste materials
5. Crop production and agricultural uses
6. Pole in climate stabilization
7. Provision of food security
8. Resource utilization and income generation
9. Other intrinsic values supporting spiritual and cultural interests

Unfortunately, experience throughout the world have shown that human actions can have a significant impact on ecological functions and processes to a point where their ability to function at an optimal manner or required level is jeopardized. This, in turn, curtails the availability or extent of the above benefits and can further cause environmental degradation that further impacts natural ecosystems. From an urban environmental management perspective, the effect of urban areas and their population on ecosystems is critically important. This is especially the case in areas that are currently perceived to be relatively pristine and which have a high degree of biodiversity. In the case of the EcoGov program, this has been the basis for the UEM element of its overall activities. The ability to protect forests and coastal resources (which are the focus of the other two elements of EcoGov's program) can be significantly impacted by the environmental function of urban areas within or near areas with significant forest and coastal resources.

One of the difficulties in dealing with a high rate of biodiversity loss (particularly in terms of forest and coastal resources) is the perceived competing nature of commercial interests with environmental concerns. The exploitation of resources or the development of land in highly biodiverse areas is often driven by commercial perspectives. This often makes it very difficult to slow the process of degradation. In addition, issues associated with the urban poor are also important. To be able to survive, the urban poor often feel obliged to build their houses and grow their food in the more dangerous, fragile and contaminated areas thus causing major impacts on the ecosystems they inhabit especially if they do not have the knowledge concerning the environmental ramification of their actions or cannot afford to develop effective environmental control (sanitation, etc.) infrastructure. A common issue associated with environmental improvements that can protect critical ecosystems is the costs of achieving them and the often limited governmental budgets available to expand new programs outside of the basic needs of its population. While environmental control should be considered a basic need because of its health ramifications, it is often given a lower priority in making budgetary decisions.

These considerations often form the impediments to achieving the full desired objectives of some environmental programs including EcoGov's attempt to mitigate the loss of biodiversity and its target areas. This ultimately becomes a critical issue in the implementation of projects identified through the EcoGov program since the financial resources must then be secured before the projects are actually implemented. To that end, the consultants recommendations concerning the EcoGov program have often been based on the project development process rather than solely on the best available technologies and processes associated with effective solid waste and wastewater management.

1.1. Urban Environmental Management Impact on Biodiversity

The maintenance of important ecosystem functions at an effective and sustainable level forms the basis for most environmental programs and certainly provides EcoGov's focus in attempting to mitigate the current rate of biodiversity loss in its designated project regions. In each of EcoGov's geographical focus areas, there is concern that biodiversity continues to be rapidly negatively impacted by land clearing for agricultural and development purposes, general pollution caused by encroaching urban activities and other human-caused changes to the ecosystems, atmosphere and climate within the target regions. While there are often many natural causes for prevailing environmental conditions, anthropogenic effects caused by societal factors (such as the disposal of solid waste and wastewater) can have a major effect on the magnitude and pace of environmental degradation experienced in any particular area. Globally, the impact of population growth and urbanization has led to residential, commercial and industrial land use concentrations that affect and emphasize the magnitude of the negative environmental situations that often result. This has often been the basis for land use and environmental laws and regulations aimed at managing those impacts. To this point, the growth in urban areas in the Philippines has not been thwarted by the location or need to protect critical biodiversity areas. As a result, the impact of expanding urban areas within the Philippines can affect areas with significant biodiversity in a number of ways some of which are outlined later in this report.

Ultimately, one of the primary positive impacts of addressing urban environmental issues as part of a program aimed at reducing the rate of biodiversity loss may be the effect that generally improved environmental conditions within an urban area can have on the attitude and support of people that must recognize the need for

and comply with proper procedures aimed at mitigating biodiversity loss. For example, if the population of an urban area recognizes that they are living in environmental conditions that have been improved by more effective wastewater or solid waste management programs, they may have a greater willingness to provide the necessary support for programs (cost, new regulations, enforcement, etc.) that are designed to prevent further loss of biodiversity. Improving the highly visible environmental aspects of urban areas (such as through proper management of solid waste or the cleanup of water bodies through the effective management of wastewater discharges) may create an important psychological (and potentially political) linkage between programs with near-term and readily evident results (such as the improvement of solid waste management conditions or the cleanup of water bodies or groundwater) and those that may require a more long-term commitment or result in less physically evident success such as programs aimed at affecting land use or the rate of biodiversity loss.

1.2. Biodiversity and the Impact of Ineffective Solid Waste and Wastewater Management

In addition to the above, there are direct physical impacts on biodiversity loss that can result as improvements in solid waste and wastewater management are achieved. In particular, EcoGov's focus in its UEM element has sought to assist Local Governmental Units (LGUs) to meet emerging national environmental legislation with a particular emphasis on solid waste and wastewater management. These are two of the most visible and important environmental management sectors in most urban settings and are the focus of considerable national government attention in the Philippines. National laws and regulations have been established to effectively manage these two important environmental sectors.

If not effectively managed, improperly managed wastewater can have a significant effect on receiving waters (both surface water bodies and groundwater). In turn, the deteriorating quality of these receiving waters can negatively affect the areas in which they are located or where they flow to. For example, wastewater discharges may pollute a surface water body located in or flowing to a coastal resource area (wetlands, mangroves, etc.). The condition of this water can then have an impact on the natural conditions and uses for that area. Similarly, poor solid waste management can also have a negative physical impact on areas with high biodiversity through the contribution of pollutants that can affect negatively environmental quality in sensitive areas. Additionally, the physical accumulation of improperly managed solid waste in sensitive areas

can certainly have a major impact on the perception of the value of those areas and the need to protect them.

Due to the drainage of wastewater from different sources into water bodies or to pollution caused by improper solid waste management, natural conditions and life forms can be affected in a number of ways including:

- Increase in the organic content of water bodies (as measured by BOD and COD)
- Increase in the chemical and biological content of water bodies
- Increase in the nutrient content of water bodies thereby causing algal blooms and eutrophication
- Discharged compound reactions in receiving waters possibly yielding toxic components
- Increase in the contamination of groundwater that may be the source of potable water

Specifically, pollutant flow to wetlands can have a significant negative impact. Algal blooms can be caused by wastewater discharges from domestic, commercial and industrial sources. The water color of the wetlands may turn green and may have an increased level of turbidity which directly influences light penetration thereby affecting the natural biological functions occurring in the wetlands. Mangroves can also be affected by the flow of pollutants since they are highly fragile ecosystems and wastewater discharges can cause asphyxiation and clogging of roots. In addition, the accumulation of discharged chemicals may also be lethal to mangrove wildlife. In either of these ecosystems, the level of pollution can accumulate over time until major impacts are readily observable or that it is extremely difficult to correct the conditions that caused degradation.

The direct effect on human beings resulting from the discharge of pollutants is also a significant factor anywhere where they are exposed to them. This is a universal issue and not necessarily specifically related to only critical biodiversity areas. Pollutants from ineffectively treated wastewater or through groundwater (or surface water) contamination due to improper solid waste disposal have been linked to various health problems. Worldwide, over a billion people are at risk due to the lack of sanitary waste disposal and the availability of clean water for drinking, cooking and washing. In addition, a significant proportion of all global infant mortality is linked to infectious and parasitic diseases, most of which are water related.

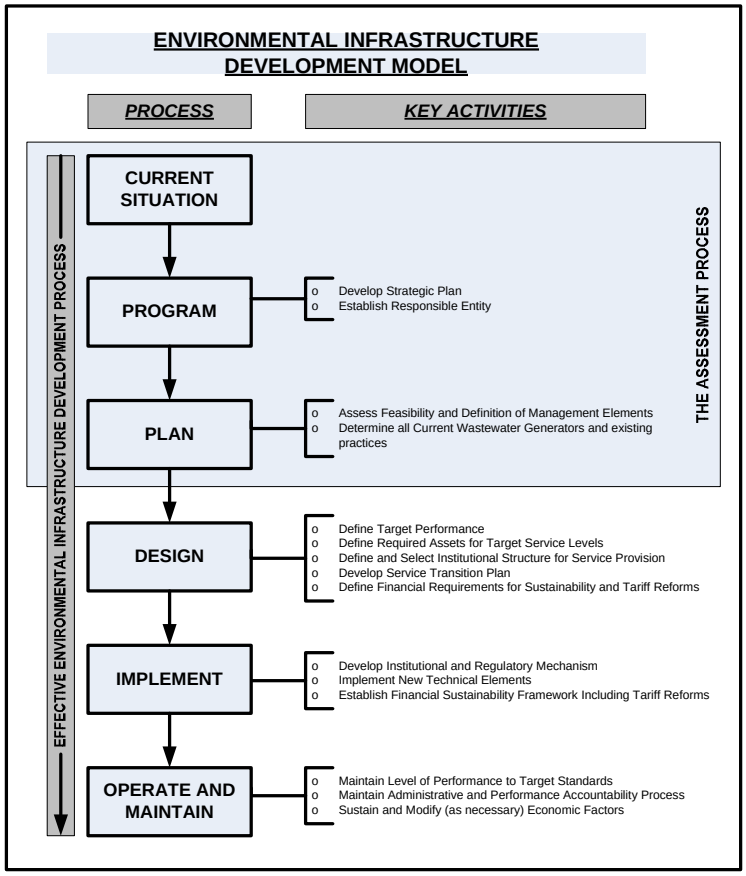
In addition to the above negative physical effects, one must also consider the important effect that the negative impression of environmental conditions in any area can have on any attempt to increase biodiversity awareness and to deal with urban impacts on biodiversity resources in critical areas. Many of the actions required to protect biodiversity and environmentally sensitive ecosystems require the strong commitment of people living and working in or near these critical areas. These people may have less enthusiasm or willingness to do their part to manage the use of or their impact on a critical biodiversity area (or be limited in their actions in areas of high biodiversity) if there is a general perception that the government is doing very little to manage the more evident environmental issues such as solid waste and wastewater management that may have a direct and visible impact on their health and quality of life.

The above concerns establish the basis for the need to improve urban conditions as an important element of any program aimed at reducing the rate of biodiversity loss in critical areas. As a result, the management of urban impacts associated with solid waste and wastewater management is the focus of the assistance that the consultant was asked to provide in assisting EcoGov.

2

FOCUS AND FRAMEWORK FOR CONSULTANT ASSISTANCE

As an international consultant, the author of this report was asked to provide assistance in the development and management in two of EcoGov's urban environmental impact sectors including solid waste and wastewater management. For the reasons previously stated in this report, these environmental impact sectors are viewed as important elements of EcoGov's overall program and, in particular, its UEM component. In many developing countries, these areas encompass critical common needs for improving systems and practices as governmental agencies seek to address and improve general environmental conditions within their jurisdictions. In the Philippines, national legislation has been passed and regulations developed to address the management of both wastewater and solid waste derived from all sources within the country. Accordingly, local and regional governmental units must now attempt to comply with these regulations and EcoGov is seeking to assist them. In addition, EcoGov has also attempted to assist government personnel involved in dealing with these environmental sectors at the national level (DENR, National Solid Waste Management Commission, etc.) to increase their technical capacity to manage the regulatory and long-term planning process necessary to achieve meaningful results.



Through the direction of EcoGov, the consultant provided assistance in a number of initiatives aimed at addressing both solid waste and wastewater management deficiencies in EcoGov's geographic focus areas. While this assistance, by necessity, sought to address the need for increased technical capacity and knowledge concerning the technology and procedure alternatives available for effective solid waste and wastewater management, it also focused on the consultant's experience in project development throughout the world. Through an understanding of the development process as illustrated by the above schematic, an attempt was made to provide direction and tools by which local officials could identify and develop environmental projects both in solid waste and wastewater management. The schematic illustrates the project development process and also forms the basis for a number of the approaches and tools recommended by the consultant. Throughout the process, the consultant's perspective was that the project development process must have a structured approach that will provide a means for ultimately accomplishing the desired result through a number of iterative steps that move a project from concept to realization. While many programs aimed at improving environmental conditions have focused significantly on defining available technologies for solving environmental problems, the consultant strongly recommended that EcoGov's focus also be maintained on the actual development process which moves projects toward actual implementation. The intent of these recommendations was to apply a scientific process to the steps that should be taken in moving a project forward to a point where they financial investment is made to implement it.

Principal among the processes illustrated in the project development schematic is the completion of a detailed assessment of actual conditions within any evaluated area to identify necessary projects and to begin the development of action plans whereby the identified projects may be planned, designed and constructed. To achieve this desired result, templates and manuals were developed to serve as tools for local officials to undertake their planning and development work. In addition, workshops were held aimed at training local officials in the use of the tools and in understanding the project development work necessary to identify and achieve solid waste and wastewater management projects. These workshops were aimed at beginning the process of actually developing local assessments and work plans that would eventually lead to the implementation of identified high priority projects. They were also intended to provide a greater understanding of the project development process from a scientific standpoint beyond simply an understanding of available technologies which has often been the focus of past training programs.

So as to categorize the nature of the development process and the assistance provided by the consultant as it relates to the individual environmental sectors that were the focus of the consultant's activities, the following sections of this report present information specific to solid waste and wastewater management. While there are many common elements to the project development process described above, there are also unique characteristics to each environmental sector that makes them unique and that influence the development process.

3
SOLID WASTE MANAGEMENT

Solid waste management is one of the most visible urban environmental problems faced by LGUs in the Philippines. For example, an ineffective solid waste collection system may mean that accumulations of waste materials are visible along roadways or on vacant lots. The importance of solid waste management issues has been recognized nationally in the Philippines through the passage of the Ecological Solid Management Act of 2000 (Republic Act 9003) and its Implementing Rules and Regulations (IRR). This national legislation has led to extensive solid waste management infrastructure development activities throughout the Philippines. A significant proportion of EcoGov's UEM assistance to its client public agencies has been aimed at assisting LGUs in meeting the requirements of Republic Act 9003. In providing technical assistance, the consultant was asked to help in a number of ongoing initiatives aimed at increasing the ability of Filipino governmental units in dealing with solid waste management issues and in responding to the requirements of current laws. As a key program element, EcoGov has provided direct assistance to many LGUs in the development of their mandated Integrated Solid Waste Management (ISWM) plans. These plans are intended to define the manner by which the LGU will improve the way that solid waste is collected, recycled and disposed of. The assisted LGUs are located within the geographical areas where EcoGov is seeking to protect and sustain biodiversity such as the Davao Gulf region. Also, a key focus of EcoGov's assistance has been to increase the technical and planning capacity of people involved in solid waste management ranging from national government agencies (such as DENR and the National Solid Waste Management Commission) to the LGUs who are directly responsible for developing and implementing their ISWM plans.

3.1. Capacity Building

During the consultant’s ongoing involvement in the EcoGov program, capacity building initiatives were undertaken at the LGU, regional and national level of governance. Training and direct

technical assistance was provided in a variety of subjects including the construction and operations of solid waste landfills in accordance with national regulations and prevailing international sound practice. In addition, information was also provided to the National Solid Waste Management Commission concerning various approaches for establishing waste product liability for various materials that comprise the solid waste stream in the Philippines.

3.1.1 Solid Waste Management Program Assessment –

In reviewing past and ongoing EcoGov program initiatives, the consultant worked directly with EcoGov staff to facilitate their assessment of solid waste management conditions in a number of LGUs and in the development of ISWM plans located in critical biodiversity areas. In undertaking this assistance, the consultant reviewed work completed to date and provided recommendations concerning the procedures and methodology utilized in the development of the ISWM plans. These recommendations, contained in the original assessment report, were aimed at 1) creating added sustainability to the approaches defined in the plans, 2) expanding the reach of EcoGov's efforts to the maximum number of LGUs and 3) providing a greater degree of "business" planning required to actually implement the projects defined through the ISWM plans.

In general, the consultant continues to be very impressed with the quality and quantity of work completed by the EcoGov staff. In addition to EcoGov's demonstrated technical competence, the consultant was extremely impressed with the ongoing working relationship that the EcoGov staff has with the governmental officials that they are working with in providing assistance. Based on the consultant’s experience, the excellent working relationship that EcoGov staff has fostered with the people that they have been advising is extremely important in assuring that the systems and processes defined in the ISWM plans will move forward in the manner envisioned. It will also be important in providing assistance during the actual implementation process that should result from completion of the ISWM plans.

It is noteworthy that this same excellent working relationship appears to exist between the EcoGov staff and the LGU and DENR officials involved in wastewater management. The consultant believes that this is a very positive reflection on the quality of both EcoGov's field staff as well as its program leadership in Manila. It is also a reflection on the perceived value of the work that EcoGov has completed in support of the LGUs.

3.1.2 Landfill Construction Monitoring –

In accordance with Republic Act 9003, all local governments in the Philippines are required to develop landfills that are in compliance with the criteria of the national law. The required sophistication (extent of lining infrastructure, etc.) of these facilities is a function of the amount of solid waste to be placed in them which is usually a function of the population being served. In all cases, construction is required to manage the potential environmental impact of residual solid waste disposal practically in preventing groundwater pollution. The mitigation of groundwater pollution is accomplished through a number of factors including: proper siting, surface drainage control, and the installation of effective liners that allow leachate to be collected and treated prior to its discharge into the environment. Since there were few sanitary landfills constructed in the Philippines to sound international standards, there was a critical shortage of knowledge and technical capacity concerning landfill construction and operations techniques that would be required to meet the standards defined in the existing regulations. This lack of capacity was prevalent in the local LGU officials who are directly responsible for developing the landfills. However, as a result of the fact that the process of effective landfill design and construction was emerging in the Philippines, there was also a lack of technical capacity on the part of the national and regional regulatory officials responsible for verifying that the constructed landfills complied to the existing regulations. It was noted during the original assessment work undertaken by the consultant that, although the existing solid waste management regulations in the Philippines are specific in terms of the physical requirements for design and construction and operations, there was little experience available concerning the processes required to achieve the required criteria.

To address the lack of general technical capacity concerning landfill design and construction, a training program was developed that was aimed at providing information about the construction and construction monitoring techniques for sanitary landfill facilities. The criteria for this training program was the requirements of the current Filipino landfill regulations as well as sound practice for such facilities used throughout the world to achieve similar regulatory criteria. The training program included detailed information concerning construction techniques such as the installation of clay liners as well as the startup and operating procedures intended to assure effective and sustained operations after construction is completed.

3.1.3 Project Development Support –

The consultant also focused a significant portion of his efforts with EcoGov staff in defining the development process (as reflected in the schematic process previously described) that would move the ISWM plans into actual implementation of required infrastructure. The excellent working relationship that EcoGov's staff has with the LGU officials that they have worked with was a good starting point for defining how further EcoGov strategic assistance could help to actually implement the projects defined in the ISWM plans. This required an emphasis on the business aspects of solid waste management as well as on the ability to measure the effectiveness and results of planning and development. To that end, assistance was provided whereby performance results could be tracked so as to achieve required projects. The development process reflected in the schematic provides a number of strategic opportunities to measure implementation progress and to verify that identified projects are moving towards completion.

It is important to note that, in both solid waste and wastewater management, the primary driver for implementing environmental projects is commonly regulatory. (A discussion of project development drivers is presented in the original consultant assessment report.) While most LGU officials have a clear interest in improving living and environmental conditions within their jurisdictions, the lack of financial resources often impedes the progress. Accordingly, experience in many developed countries has shown that effective enforcement of regulations was often the principal driver for implementing environmental projects. The consultant believes that the Philippines DENR has not yet developed the full means for enforcing the existing laws and regulations particularly as they relate to solid waste and wastewater management projects. This is a significant factor that may hinder EcoGov's ability to meet its development goals since EcoGov is not in control of assuring that the financial resources will be available for physically constructing identified environmental projects or for enforcing existing regulations and laws that require action on the part of the LGUs. A phase of the project development support provided by the consultant was aimed at defining implementation stimulus processes that have worked in other developing countries. This has included the development of project specific Action Plans aimed at defining detailed procedures and schedules for planning and implementing individual projects. One aspect of action plans in both solid waste and wastewater management is the need for initial and periodic political commitment to achieving the steps within the action plan. This experience has shown that this ongoing involvement of political leadership in the implementation process defined in an action plan provides an increased impetus towards

their eventually providing necessary funding for final implementation.

3.2 Summary of Key Support Activities –

The following are some of the key support activities undertaken by the consultant as they relate to solid waste management within EcoGov's UEM program element.

1. In September 2008, a training program on landfill construction monitoring was developed and presented in two locations. Initially, the program was presented in Mindanao (Davao City) for staff from LGUs in the Davao Gulf region and from DENR/EMB Region 11/12. This was then followed by another presentation of the training program for LGUs from Region 7 in Dumagette. Each of these presentations included a site visit to an existing landfill (Tacarong and Bais) so as to provide physical contact with many of the issues and concepts presented during training. Following each of these site visits, the consultant provided feedback to management of each disposal site concerning observations and recommendations to optimize and sustain effective operations and maintenance.
2. During each of the fieldwork periods in the Philippines, the consultant met with representatives of General Santos City to discuss and provide input to their evolving landfill development plans. In addition, a work session was also held in Davao with General Santos City representatives concerning the issues and approaches necessary to optimize solid waste collection routes.
3. A landfill operations manual template was also prepared by the consultant and provided to EcoGov to serve as an example for the development of landfill operations and maintenance manuals for newly constructed landfills. The table of contents for this draft manual is shown in Annex 1 of this report.

4
WASTEWATER MANAGEMENT

Poor wastewater management and the resulting pollution of surface water and groundwater can negatively affect the natural conditions within ecosystems in critical biodiversity area elements such as mangroves and wetlands. Because of this, most of the assistance provided by the consultant in supporting EcoGov's UEM component wastewater activities has included an attempt to identify and facilitate the development of projects aimed at more effective wastewater management.

4.1. Capacity Building

Similar to solid waste management, EcoGov initiatives include program elements aimed at increasing the technical capacity of both local officials responsible for developing wastewater management systems as well as the staff of agencies responsible for regulating wastewater discharges. To that end, EcoGov and other USAID supported programs have provided high-quality technical information concerning alternative technologies and processes that define sound practice in wastewater management. A significant portion of the consultant's assistance to EcoGov in wastewater management has focused on providing information concerning the methodology for assessing local conditions. Specific local conditions can affect the nature of decisions, initiatives and projects required to effectively manage wastewater discharges from both point and nonpoint sources. While the common approach in many developed countries is to develop centralized wastewater collection and treatment systems that manage most, if not all, nonhazardous wastewater sources, that approach is capital intensive and may be beyond the reach of many Filipino LGUs. This is especially the case as all LGUs in the country are beginning to come to grips with their wastewater issues. In many developed countries, significant financial resources were provided by national governments for the development of comprehensive wastewater management systems and facilities which normally included both collection and treatment. However, given the situation that effective wastewater management is just emerging in the Philippines as a result of recent

laws and regulations, the initial steps that may be taken in managing wastewater issues in the country will, most likely, be focused towards individual solutions for individual wastewater sources such as slaughterhouses and markets or smaller scale residential areas with similar characteristics. Initially, decentralized system focusing on specific point sources with significant wastewater flows provides a good starting point for beginning to manage wastewater conditions in the EcoGov client LGUs. Initial assessment of wastewater management conditions within EcoGov's focus areas showed that this is apt to be the approach that will lead to the highest level of construction activity in achieving EcoGov's project implementation goals in regards to wastewater management.

4.1.1 Wastewater Management Technologies –

Globally, there is considerable experience available concerning the use of many alternative technologies and approaches for effective wastewater management both for individual wastewater sources and for comprehensive infrastructure that serves a number of diverse sources. In its program to date, EcoGov has provided considerable information through published data as well as training programs on sound and sustainable practice in wastewater management. A considerable emphasis within these programs was placed on the utilization of natural and low-cost processes and technologies that have proven to be successful throughout the world. This information has also been presented in the proper technological scale applicable to the typical LGUs located within EcoGov's biodiversity focus areas. To this end, EcoGov made excellent use of training and background materials that have been developed in other prior USAID programs (both in the Philippines and in other locations).

4.1.2 Wastewater Assessment Process –

One of the critical elements facing local LGU officials in the Philippines is the proper identification and characterization of existing wastewater conditions, deficiencies and problems in their areas of jurisdiction. An initial and thorough assessment is necessary to develop the effective means for addressing the situations that are identified. Accordingly, the consultant assisted EcoGov in developing a local assessment procedures manual and template that defines a sound approach for correctly identifying local wastewater conditions to effectively plan and design solutions. A wastewater assessment manual was prepared to assist LGU officials with the identification and characterization of key individual wastewater sources (both point and nonpoint sources) that must be addressed to improve conditions within their jurisdictions. The table

of contents for the assessment toolkit manual prepared by the consultant is shown in Annex two of this report.

The ability to physically quantify wastewater management issues provides LGU officials with the information necessary to define the technologies that will be required to comply with applicable regulations in the Philippines. The information was also intended to develop a means of assuring the effectiveness of derived solutions and technologies in the long-term. The assessment process defined through the consultant's assistance was also intended to tie closely to the capacity building elements relative to wastewater management technologies so as to provide a means for linking the sources identified in the assessment to the solutions that could be provided based on sustainable and sound practice approaches. As shown in the project development schematic, the wastewater assessment process is intended to be a prelude to the development of a detailed action plan that would define the methodology and schedule for implementing the required infrastructure.

4.1.3 Wastewater Development Action Plans –

A wastewater development action plan template was developed by the consultant aimed at creating a "roadmap" for implementing projects identified during the wastewater assessment process. The intent of the wastewater development action plan was to provide a basis for establishing a framework for all the work that was required to implement identified projects. The action plan was also intended to serve as a basis for beginning to provide a final technical definition of the required project as well as to solicit political and budgetary support for its implementation.

The action plans are intended to provide a detailed step-by-step process for implementing projects. One important element of the action plans is the ability to seek the validation and approval of political leaders in each LGU or region for implementation of the projects defined in the assessment process and during the action plan development. The intent of these action plans was also to begin the process of soliciting and receiving the commitment of LGU elected or senior officials for developing the projects defined through the assessment. The table of contents for the action plan template is shown in Annex three of this report.

4.2 Project Development Support

EcoGov has focused a considerable portion of its attention to development support aimed at the actual physical implementation of wastewater management projects in specific LGUs within its area of focus. (Logically, this has focused on easily identified point sources such as markets and slaughterhouses.) The more general assistance provided by EcoGov support has been based on an iterative process whereby the local communities must identify their problems, develop action plans for solving them and then developing the projects that identified as a result of planning. To that end, EcoGov has provided assistance, with input from the consultant, concerning the process for completing a detailed wastewater assessment and for developing follow-on action plans.
In addition to providing the basic assessment methodology, the consultant was involved in directly assisting a number of the EcoGov LGUs with their specific assessments and development of their action plans. This included direct meetings with officials from a number of LGUs to discuss their specific wastewater situations and to provide recommendations concerning the work and approaches that may be applicable to their specific issues.

4.3 Summary of Key Support Activities

The following are some of the key support activities undertaken by the consultant as they relate to wastewater management within EcoGov's UEM program element.

1. In May 2008, a training and workshop program was presented in Mindanao (Samal Island) concerning procedures for assessing wastewater conditions in LGUs. LGU participants in this workshop worked towards establishing assessments and action plans for their wastewater issues. LGUs participating in this workshop included: Samal Island, Malalag, Tagum, Digos and Panabo.
2. A wastewater assessment manual and toolkit was prepared by the consultant to assist in the evaluation of individual LGUs. This toolkit included an assessment manual as well as for lawns for evaluating specific wastewater sources such as markets, slaughterhouses, residential areas, and other significant wastewater generators.
3. During each of the fieldwork periods in the Philippines, the consultant provided direct wastewater management assistance to a number of the LGUs. This included review of wastewater assessments for Lake Sebu and Polomolok in Mindanao as well as Bayawan City and Maribojoc. A draft

action plan for a specific wastewater project in Maribojoc was prepaired by the consultant to serve as an example of the level of detail that should be incorporated into recommended action plans.

5

CONCLUSIONS AND RECOMMENDATIONS

Consistent with the original assessment, the consultant believes that the EcoGov program is important because the Philippines has experienced a high rate of biodiversity loss as a result of many factors often caused by rapidly increasing populations and the growth of urban areas. This and other factors have resulted in a significant decline in the quality and extent of critical ecosystems and natural habitats such as coral reefs, mangroves and forests. The basic design of the EcoGov program has been based on a recognition that high rate of biodiversity loss must be mitigated by addressing its root causes which can include the overharvesting of forest resources and the conversion of forest lands to other uses and the destruction of nearshore coastal ecosystems due to the extraction of fuel and construction materials and the extensive development of fish ponds.

In developing a supplemental report, the consultant reviewed the conclusions and recommendations contained in the original assessment report prepared approximately 1 year ago. The consultant currently believes that each of the recommendations made at that time remain valid. However, in gaining additional experience with the EcoGov program and the efforts of its staff in providing assistance to its many client LGUs, it has become obvious that there is a finite ability for available EcoGov staff to be of assistance to the number of LGUs within their areas of jurisdiction. As previously discussed, the consultant remains very impressed with the quality of EcoGov's staff both from a technical and interpersonal relationship basis as well as from the level of effort that they expend in being of service.

Many of the recommendations in the original assessment report were aimed at providing a means for assuring that EcoGov's efforts included the preparation of legacy materials that would remain useful beyond the completion of the EcoGov program. Recognizing the limited budget and time that is available to EcoGov to provide its services to all who are requesting it, the consultant believes that the EcoGov program should definitely be extended as is being

contemplated by USAID to provide both additional services to new LGUs as well as to potentially address a number of the recommendations previously made particularly in terms of providing legacy materials based on the experiences gained in the program.

In addition, the consultant recognizes the need to provide follow-on assistance to the LGUs that have developed their ISWM plans. This focus on the "business" planning associated with the development of solid waste management infrastructure will provide an increased opportunity for the LGUs to be successful in implementing projects defined in their plans. EcoGov has considerable experience in the development of the ISWM plans and lessons learned in this experience can be applied to similar efforts another LGUs. However, the follow-on focus on business planning should be enhanced so that the LGUs that have been assisted by EcoGov in developing their plans can now move forward with actual implementation of the projects. The assistance that EcoGov may provide in this matter should consist of capacity building associated with the procedures required to successfully operate and maintain infrastructure after it has been constructed. Similarly, this business-oriented assistance can apply to wastewater projects that may be developed through EcoGov assistance.

ANNEX 1
LANDFILL OPERATIONS PLAN TEMPLATE – TABLE OF CONTENTS

Draft Sanitary Landfill Operations and Maintenance Plan

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1.2. Justification for Effective Operations and Maintenance.....

1.3. Modifications to the O&M Plan.....

2. DESCRIPTION OF THE SANITARY LANDFILL FACILITY.....

2.1. General.....

2.2. Physical Description.....

2.3. Administrative Organization.....

2.4. Facility Permits.....

2.5. Staffing Levels and Responsibilities.....

2.6. Fixed Assets.....

2.6.1. Signage.....

2.6.2. Weighbridge.....

2.6.3. Scale house/Office.....

2.6.4. Access Gate and Fence.....

2.6.5. Leachate Treatment System.....

2.6.6. Groundwater Monitoring Wells.....

2.7. Mechanized Equipment.....

3. REGULATORY AND TARGET PERFORMANCE BASIS FOR OPERATIONS AND MAINTENENCE.....

3.1. Environmental Performance Standards.....

3.2. Target Performance Standards.....

3.3. General Approach to Meeting Performance and Environmental Criteria for a Category __ SLF.....

3.4. Acceptable and Unacceptable Waste.....

4. SLF OPERATIONS .....
4.1. Administrative Management and Control .....
4.1.1. Hours of Operation and Waste Receipt .....
4.1.2. Weighbridge Function and Record Keeping.....
4.1.3. Budget, Accounting and Cost Control .....
4.1.4. Administrative Reporting Visitor Access .....
4.1.5. Staff Training .....
4.1.6. Complaints .....
4.1.7. Tours and Public Relations .....
4.2. Site Security.....
4.3. Waste Receipt Procedures.....
4.4. Waste Placement Procedures.....
4.5. Cover Application.....
4.5.1. Daily Cover .....
4.5.2. Intermediate Cover .....
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4.6. Cell Development.....
4.7. Load Tracking and Inspection .....
4.8. Mechanized Equipment Activities.....
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4.8.2. Compaction .....
4.8.3. Site Maintenance .....
4.9. Leachate Collection and Management .....
4.9.1. Leachate Head Monitoring.....
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4.11. Waste Picking and Recycling.....
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6.3. Staff and Waste Delivery Personnel Health Exposure Control .....

6.3.1. Personal Protection Equipment.....
6.3.2. Workface Activities.....
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Appendices

Annex 1 - Sound Practice in Solid Waste Disposal.....
Annex 2 - SLF Site Inspection Checklist .....
Annex 3 - Waste Delivery Rules and Regulations .....
Annex 4 - Site/Equipment Preventative Maintenance Checklists .....
Annex 5 - Reporting Tables and Forms .....

ANNEX 2
WASTEWATER ASSESSMENT TOOLKIT – TABLE OF CONTENTS

Republic of the Philippines

LOCAL GOVERNMENTAL UNIT

WASTEWATER MANAGEMENT ASSESSMENT

Procedures Manual

TABLE OF CONTENTS

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- 1.2 Background
- 1.3 What is Wastewater?
- 1.4 Potential Wastewater Impact on the Environment
- 1.5 Wastewater Management Regulations in the Philippines
- 1.6 Local Governmental Unit Responsibilities for Wastewater Management
- 1.7 Procedures for Improving Wastewater Management
- 1.8 Wastewater Assessment Activity Categories

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- 2.1 Staff and Resources for the Wastewater Assessment
- 2.2 Defining LGU Evaluation Areas

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- 3.1 Background
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- 4.1 Defining Target Objectives

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- 5.1 Background
- 5.2 Defining LGU Wastewater Management Stakeholders
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- 6.1 Background
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Annex 2 - Wastewater Questionnaire for Water District Officials
Annex 3 - Hospital Wastewater Management Profile Form
Annex 4 - LGU Wastewater Management Profile
Annex 5 - Slaughterhouse Wastewater Management Profile Form
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ANNEX 3
WASTEWATER PROJECT DEVELOPMENT ACTION PLAN TEMPLATE

WASTEWATER MANAGEMENT PROJECT DEVELOPMENT ACTION PLAN CONTENT

PROJECT DESCRIPTION.....
PROJECT DEVELOPMENT PROCESS BASICS .....

Activity 1 - Identify and Characterize the Current Wastewater Management Situation that the Project is Intended to Address .....

Activity 2 - **Program the Project Implementation Process**.....
1. Determine the projects compliance with the LGUs overall strategic development plan.....
2. Establish responsibility for developing, implementing and operating the project.....
3. Define target intent of the project .....

Activity 3 - Plan the Project .....
1. Determine all wastewater generators and their existing practices .
2. Determine design flows and wastewater characteristics for all system components.....
3. Define the existing physical conditions and land use in the project service area.....
4. Define alternatives for required technical wastewater management elements including collection and .....treatment
5. Define alternatives for meeting project financial requirements.....
6. Define alternatives for informing and involving the public.....

Activity 4 - Design the Project.....
1. Design the required components to achieve target service levels...
2. Select institutional structure for implementation and operations...
3. Develop service transition plan (if necessary) .....

Activity 5 - Implement and Construct the Project .....
1. Construct new technical elements .....
2. Establish financial sustainability framework including tariff reforms .....
3. Develop performance and environmental monitoring program.....
4. Develop start-up plan for the project.....
5. Develop operation and maintenance plan for the project.....

Activity 6 - **Operate and Maintain the Project in a Sustainable Manner** .....
1. Start up the project.....

2. Monitor and maintain the desired level of performance of all components to target standards.....

TIMELINE .....

Annex 1 - ENVIRONMENTAL INFRASTRUCTURE DEVELOPMENT MODEL.....

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