UNEP

INTEGRATED WASTE MANAGEMENT SCOREBOARD

A tool to measure performance in municipal solid waste management

UNITED NATIONS ENVIRONMENT PROGRAMME

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Integrated Waste Management Scoreboard

A Tool to Measure Performance in Municipal Solid Waste Management

United Nations Environment Program

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Disclaimer

This **Integrated Waste Management Scoreboard** is a planning tool to measure performance in municipal solid waste management. It has been prepared for use by nations in the ASEAN region and it provides a methodology for evaluating municipal solid waste programs and systems at the national, State/Provincial/Regional, municipal, community, and institutional levels. It is not intended to replace or supersede legislation, policies, or requirements that may already be in place.

Foreword

Management of municipal solid waste is one of the many challenges that face communities they move into the new millennium. While the overall quantities of waste are generally increasing, it is becoming increasingly difficult to site new facilities to manage these wastes.

Current strategies incorporate an integrated approach that includes a hierarchy of waste management alternatives, including waste avoidance, resource recovery, and environmentally sound treatment and disposal. The selection and mix of these alternatives must be technically and economically sustainable based on local considerations.

This publication presents an Integrated Waste Management Scoreboard, which is a planning tool that incorporates a methodology for evaluating existing municipal solid waste management programs and systems. It has been developed by the United Nations Environment Program for use by representatives from governmental authorities in the ASEAN Region as well as for communities and institutions that are involved in management of municipal solid waste. It can be applied at the national, state/provincial/regional, municipal, community, and institutional levels.

The Scoreboard can be used in a variety of ways. For example, it can be used for problem solving - once problem areas in a solid waste management system are identified, strategies can be developed and implemented to provide solutions. Alternatively, it can be used as a basis for an awards program - programs that are successful and show innovation can be recognised, and ideally the knowledge shared so that they can be replicated elsewhere. The ultimate objective is to improve municipal solid waste management practices.

Per Bakken
Director
International Environmental Technology Centre
UNEP Division of Technology, Industry and Economics

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UNEP experts contributing to the preparation of the document included:

- Hari Srinivas, Chief of Urban Environmental Management Unit, UNEP IETC

The document was also subject to an independent peer review. The peer reviewer was:

- Ryo Hiraga, Institute for Environmental Management, Japan
- Dan Lapid, Solid Waste Management Association of the Philippines (SWAPP)
- Luis Diaz, International Solid Waste Association (ISWA)

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Executive Summary

Overview

This Integrated Waste Management (IWM) Scoreboard has been prepared by United Nations Environment Program (UNEP) for use by countries within the ASEAN region. The IWM Scoreboard is a tool for managing an integrated waste management system and the ultimate objective is to improve municipal solid waste management practices.

The IWM Scoreboard provides a methodology for evaluating municipal solid waste programs and systems at the national, state/provincial/regional, municipal, community, and institutional levels. It operates on a point system and utilises performance indicators, which are based on the principles of integrated waste management. Review and scoring of a solid waste management system can be performed by an individual or study team that may include representatives from international, national, state/provincial/regional, municipal, or local levels, as is considered to be appropriate for the situation.

However, in order for a solid waste management system to be successful the principles of sustainable development, integrated solid waste management, and the waste management hierarchy must be embraced, coordinated, and implemented at the national, state/provincial/regional, municipal, community, and institutional levels. The IWM Scoreboard has been developed to recognise these linkages, as summarised below.

National Level

The role of national government in integrated solid waste should be three-fold; to develop and enact legislation and policies that promotes and ensures protection of the environment, to establish an agency or department to implement these programs, and to perform pertinent research and development. Ideally, these programs should be generally consistent with the objectives of programs that have been adopted at the international level, such as those outlined in Agenda 21 and UNFCCC.

Implementation of the solid waste management programs and activities is commonly delegated to others and once the national institutional framework is in place, these activities may occur at the State/Provincial/Regional, municipal, community, and institutional levels. However, the national government is ultimately responsible for ensuring that these activities take place in their jurisdiction and indicators are used to monitor these achievements. This information can be used to complete the scoreboard for the National Level.

State/Provincial/Regional Level

The role of State/Provincial/Regional government in integrated solid waste should also be three-fold; to develop and enact legislation and policies that promote and ensure protection of the environment, to establish agencies to implement these programs and to regulate solid waste management practices. State/Provincial/Regional government should be directly involved in planning for solid waste management and they may also support research and development activities and pilot projects.

To be effective, these activities should not only be consistent with legislation, policies, and programs that have been adopted at the National level. Implementation of the solid waste management activities is often delegated to others, and these activities may occur at the municipal, community, and institutional levels.

The State/Provincial/Regional government is ultimately responsible for ensuring that these activities take place within their jurisdiction and indicators are used to monitor these achievements. This information can be used to complete the scoreboard for the State/Provincial/Regional Level.

Municipal Level

The municipal government is generally responsible for implementation of municipal solid waste management programs and facilities within their jurisdiction. The actual role of the municipal government typically involves making a decision whether to be directly involved in providing solid waste management services or licensing companies to provide these services within their jurisdiction. These activities should be consistent with legislation, policies, and programs that have been adopted at the National and State/Provincial/Regional levels.

The municipal government is ultimately responsible for ensuring that these activities take place within their jurisdiction and indicators are used to monitor these achievements. This information can be used to complete the scoreboard for the Municipal Level.

Community Level

While the municipal government is generally responsible for implementation of municipal solid waste management programs and facilities within their jurisdiction, communities often take an active role in solid waste management planning and implementation. The actual role will vary on a community-by-community basis and ideally these activities should be consistent with programs that have been adopted at the National and State/Provincial/Regional, and municipal levels.

A community often has a strong interest in the activities that take place within their jurisdiction and indicators are used to monitor these achievements. This information can be used to complete the scoreboard for the Community Level.

Institutional Level

Institutions, such as government agencies, universities, hospitals, and private companies often employ many staff and generate significant quantities of solid waste. Proactive institutions often take an active role in managing their municipal solid waste, from avoidance through disposal.

An institution often has a strong interest in the activities that take place within their organisation and indicators are used to monitor these achievements. This information can be used to complete the scoreboard for the Institutional Level.

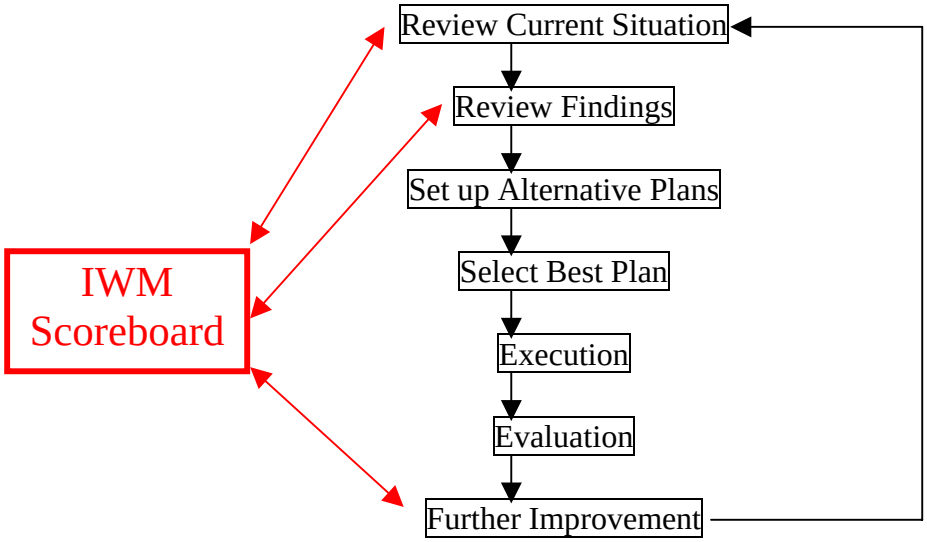
Chapter I
Introduction

I.A Purpose

This Integrated Waste Management (IWM) Scoreboard has been prepared by United Nations Environment Program (UNEP) for use by countries within the ASEAN region. The IWM Scoreboard is a tool for managing an integrated waste management system and the ultimate objective is to improve municipal solid waste management practices.

The IWM Scoreboard provides a methodology for evaluating municipal solid waste programs and systems at the national, state/provincial/regional, municipal, community, and institutional levels. It operates on a point system and utilises performance indicators, which are based on the principles of integrated waste management. The general flow for utilization of the IWM Scoreboard is provided in Figure I-1.

Figure I-1
Flowchart for IWM Scoreboard



Review and scoring of a solid waste management system can be performed by an individual or a study team that may include representatives from international, national, state/provincial/regional, municipal, or local levels, as is considered to be appropriate for the situation. The relationship between the scorer and the Scoreboard is shown in Figure I-2.

II.B Procedures

Overview

The review and scoring process associated with the IWM Scoreboard should be performed in general accordance with the principles that are applicable to all types of environmental audits. Accordingly, the review and scoring process should include the following steps:

- Initiating the review
- Preparing for the review

- Conducting the review/scoring
- Reporting

A brief description of the activities associated with implementing each of these steps is provided below.

Figure I-2
Relationship between Scorer and the Scoreboard

Scorer	Scoreboard
National government study team	National, State/Provincial/Regional, municipal, community, and institutional levels
State/Provincial/Regional Government study team	State/Provincial/Regional, municipal, community, and institutional levels
Municipal government study team	Municipal, community, and institutional levels
Community study team	Community level
Institute study team	Institutional level
Other parties: • International study team • Donor country for assistance or cooperation for developing countries • Private sector study team • Researchers	National, State/Provincial/Regional,municipal, community, and institutional levels

Initiating the Review

The first step should involve identifying the scope/study area of the IWM Scoreboard review. The scope/study area should be defined in terms of both jurisdictional responsibilities (national, State/Provincial/Regional, municipal, community, institution) as well as the geographic area.

Other activities should include identifying the individual or establishing a study team that will be responsible for conducting the review. If a study team is to be established, the roles and responsibilities of personnel should be defined.

This step should also involve making a determination on how to obtain data and information on the programs and facilities to be reviewed. For example, if the review to be a "desk top" study based on available reports and other documents or a field "audit" of programs and facilities.

The source of funding for the review may have to be identified and a budget and request prepared in order to obtain approval. All parties should be notified regarding the plans and the schedule for conducting the review.

Preparing for the Review

An introductory telephone call should be made to the person who is in charge of the solid waste system that is being reviewed. The purpose of the call should be to explain the IWM Scoreboard and to request their support and assistance.

In order to obtain background data and information and prepare for the review, contact persons will need to be identified for the following programs and activities:

- Institutional Framework
- Waste Reduction/Avoidance
- Storage and Collection
- Resource Recovery
- Disposal
- Public Awareness

Once the background information has been obtained, an in-house" training session/workshop should be conducted to assign specific responsibilities to members of the review team, to ensure that the purpose of the review is understood and that the objectives, work procedures, and reporting will be performed in a consistent manner. If necessary, the review guidelines and Scoreboards that are provided in this document can be revised to suit local requirements.

The review program that is to be followed should be formalised in a Work Plan, and this document can be used as a guide. Amendments may be required to address the situation and conditions in the study area.

Logistical arrangements will need to be coordinated to ensure that resources are used effectively. The level of effort required to prepare for and conduct the review will be directly related to the size of the study area and the population that is being served. If "field surveys" are to be performed safety equipment, such as appropriate safety clothing and footwear should be provided.

Conducting the Review

The program and facility managers should be advised prior to commencement of the review. Once on site, the lead reviewer should meet with key program and facility operations and management personnel to advise them of the purpose of the review.

The review work should be performed in accordance with the procedures that are set forth in the Work Plan and the results recorded on the forms provided. Supporting information should be compiled and filed for easy retrieval at a future date. The program and facility managers should be advised and thanked at the completion of the review.

Reporting

The results of the review should be reviewed internally for accuracy and consistency (particularly if there are a number of different reviewers involved). Opportunities for improvement should be identified. Supporting information should be compiled and filed appropriately.

Once the results have been compiled, they can either be presented to and discussed with the person in charge of the solid waste system that is being reviewed. Alternatively, the results may be used as a basis for an award program that provides recognition for achievements in municipal solid waste management.

I.C Terminology

It is recognised that there is not a universal set of terms and definitions that are used to describe integrated solid waste management programs and systems. Experience has shown that these can vary from country-to-country as well as from region-to-region.

As this IWM Scoreboard has been developed specifically for use by the ten nations in the ASEAN region it provides the flexibility to allow for these differences. A list of the common terms and definitions that are used in the field of solid waste management are provided in Appendix A. Examples of performance indicators for solid waste management are provided in Appendix B.

Chapter II
International Context

II.A Regional Profile

The ASEAN region, which includes Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam, is home to over 520 million people. It includes some of the most affluent as well as some as the most impoverished nations. These include highly populous countries and some of the smallest.

The region also contains a large and diverse range of ecosystems, many of which are threatened due to rapid urbanisation and development. Priority environmental issues in the ASEAN region include land and coastal degradation, deforestation, food and water security, atmospheric pollution, biodiversity loss, urbanisation, waste management, and freshwater quality.

There is also a wide range of historical, cultural, trade and political differences within the region and significant socio-economic disparities even within countries. Similarly, there is a wide range of methods and strategies that are used to manage municipal solid waste.

II.B Sustainable Development

From an international perspective, development raises many issues that must be addressed, including management of municipal solid wastes. Sustainable development requires that we find an appropriate balance between poverty and development, and the United Nations defines it as:

"Development that meets the needs of the present, without compromising the ability of future generations to meet their needs"

The principles of sustainable development include integrating the environment into the decision making process, reorienting technology and management of risks, conserving and enhancing the resource base, and strengthening international cooperation. These principles were the focus of discussions at the United Nations Conference on Trade and the Environment (or Earth Summit), that was held in Rio de Janeiro in 1992.

The two primary outcomes from the Earth Summit that relate to municipal solid waste management were Agenda 21 and the United Nations Framework Convention on Climate Change (UNFCCC). Agenda 21 is a 40-Chapter document that provides guidance for countries, cities, companies, and individuals implement strategies for achieving sustainability.

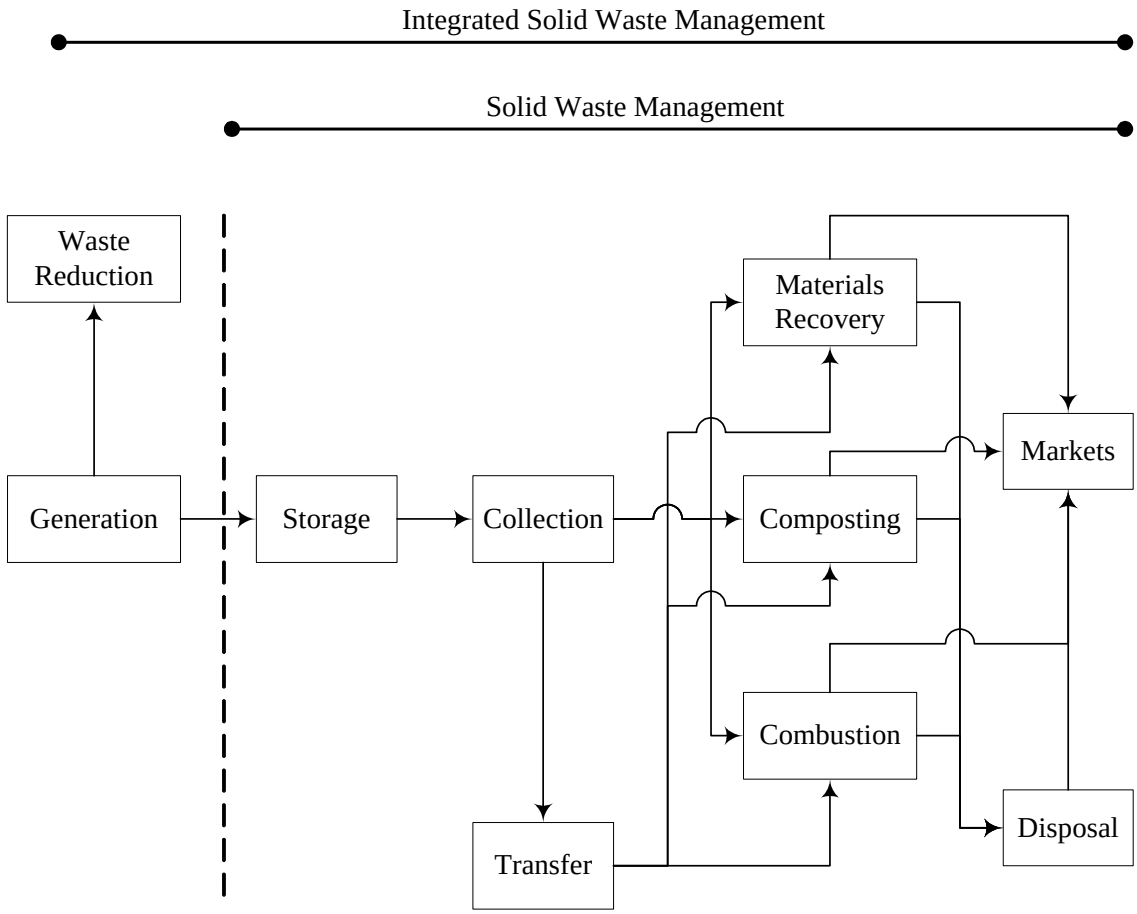
The strategies outlined in Agenda 21 include social and economic, environment and resources, and implementation. Social and economic strategies include changing consumption patterns and protecting human health. Environment and resource strategies include protecting the atmosphere, water, oceans, and dealing with municipal solid wastes. Implementation strategies include transfer of technology, education and public awareness, and capacity building.

The second key area that relates to waste management at the international level is the UNFCCC. UNFCCC commitments made by developed countries (Annex I Parties) include maintaining an inventory of greenhouse gas emissions, including those from the waste sector, and taking climate change considerations into account in relevant environmental policies.

II.C Integrated Solid Waste Management

Integrated solid waste management systems are also recognised at the international level, and they incorporate all the policies, programs, and technologies that are necessary to manage the waste stream. The mix and emphasis of approaches that are taken generally varies from region-to-region and from country-to-country, and depends on local conditions. The process of solid waste management is summarised in Figure II-1.

Figure II-1
Solid Waste Management Process



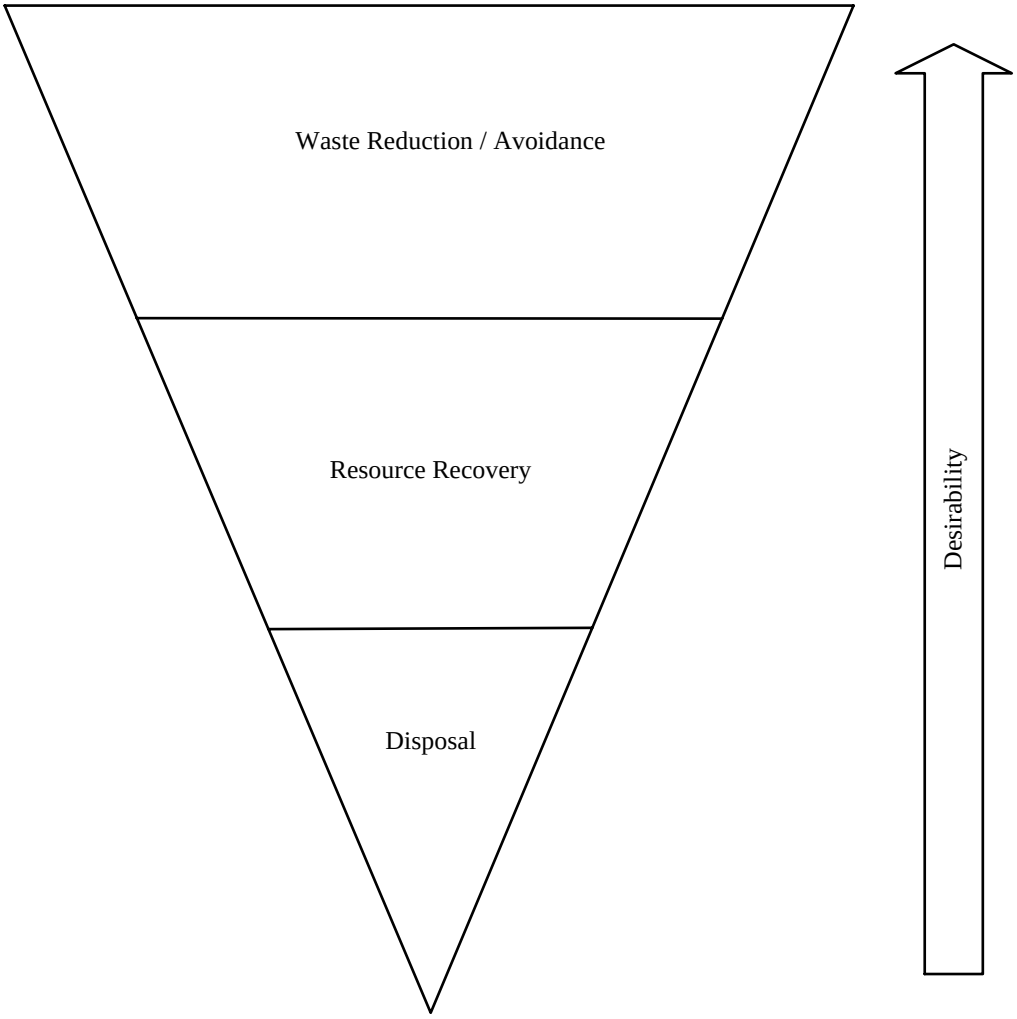
Source: Hickman

However, in order for an integrated solid waste system to be successful they must be embraced, coordinated, and implemented at the national, state/provincial/regional, municipal, community, and institutional levels. The IWM Scoreboard has been developed to recognise these linkages. The overall framework for the IWM Scoreboard is summarised in Exhibit C-1 that is contained in Appendix C.

II.D Waste Management Hierarchy

The "Waste Management Hierarchy" is an internationally recognised strategy for management of municipal solid wastes. It places greatest emphasis on strategies and programs for avoiding and reducing waste, with treatment and disposal being the least favoured options. The waste management hierarchy is shown in Figure II-2.

Figure II-2
Waste Management Hierarchy



Chapter III
Guidelines - National Level

III.A Overview

The role of national government in integrated solid waste should be three-fold - to develop and enact legislation and policies that promotes and ensures protection of the environment, to establish an agency or department to implement these programs, and to perform pertinent research and development. Ideally, these programs should be generally consistent with the objectives of programs that have been adopted at the international level, such as those outlined in Agenda 21 and UNFCCC.

Implementation of the solid waste management programs and activities is commonly delegated to others and once the national institutional framework is in place, these activities may occur at the State/Provincial/Regional, municipal, community, and institutional levels.

The national government is ultimately responsible for ensuring that these activities take place in their jurisdiction and indicators are used to monitor these achievements. Descriptions of activities that can contribute to scoreboard points and guidelines for allocation of points are provided below. A maximum score of 1,000 points is possible. The IWM Scoreboard for the National Level is provided in Exhibit C.2 that is contained in Appendix C.

III.B Institutional Framework

Legislation and Policies

Legislation and policies should establish national standards or guidelines for management of municipal solid waste. The legislation and policies should also promote a business framework that provides the basis for implementing a modern solid waste management system that is financially sustainable. Examples of legislation and policies that can form the basis of a nation's institutional framework may include adoption of the following:

- Environmental protection, including air, water, and land
- Solid waste management, including collection, treatment, and disposal
- Waste reduction/avoidance, including targets or mandates
- Resource recovery, such as recycling, composting, and combustion guidelines or standards
- Landfill disposal, including guidelines or standards
- Financial sustainability, including requirements for "user-pays"
- Other relevant initiatives

To be effective, the legislation and policies must incorporate specific links to programs that are to be adopted at the State/Provincial/Regional, municipal, community, and institutional levels. Scoreboard points should be awarded based on the extent of the legislation and policies.

Two primary criteria should be taken into consideration when reviewing legislation and policies. The first is the "extent" of the legislation and policies, i.e. do they cover all aspects of an integrated solid waste management program, as outlined above. The second is "applicability" of the legislation and policies ie. Do they apply to the residential, commercial/industrial, and construction and demolition solid waste streams, or only a portion of the total solid waste stream?

A maximum of 100 points has been allocated for this category. Comprehensive national legislation that applies to the residential, commercial/industrial, and construction and demolition waste streams could earn maximum points.

Environmental Agency

The national government should establish an environmental protection agency that includes a department that is responsible for solid waste management. This agency and/or department should be responsible for developing and updating environmental legislation and policies and monitoring and coordinating these activities at an international level.

This agency should provide leadership and support to implement programs at the State/Provincial/Regional levels. Scoreboard points should be awarded for establishing a functional solid waste management agency/department. The agency should not only be responsible for drafting legislation and policies, but should be involved in monitoring and enforcement of its programs. A maximum of 100 points has been allocated for this category.

Research and Development

The national government, through its environmental protection agency or department performs, funds, and promotes research and development on solid waste management issues. At a minimum, this should include development and maintenance of a database on solid waste management in the nation. Information contained in this database would provide the basis for performance indicators for the nation's solid waste management system. Such information may include:

- Generation, such as demographic information and quantities of waste generated
- Waste characteristics, such as waste composition
- Storage, such as container types
- Collection and transport, such as service coverage, and frequency
- Resource recovery, such as an inventory of existing and planned facilities, quantities of materials recycled, composted, and combusted
- Landfill disposal, such as an inventory of existing and planned facilities, their capacity, and quantities of materials managed on an annual basis
- Financial sustainability, including costs

Other activities may include establishing and funding a program that performs research on solid waste management practices, funding demonstration projects, and providing training and capacity building. Scoreboard points should be awarded for each activity based on the comprehensive nature (i.e. are they applicable to the whole waste stream or just a portion?) of the program(s). A maximum of 100 points has been allocated for this category.

II.C Waste Reduction/Avoidance

Due to concern over the quantity and toxicity of waste that is being produced; waste reduction/avoidance, which is defined as "the prevention of solid waste generation", is placed at the top of the waste management hierarchy because it is a "waste avoidance" technique. Waste reduction/avoidance (also referred to as source reduction or waste minimisation) has the potential to conserve resources, save energy, and reduce pollutants and greenhouse gas emissions. In addition, waste reduction/avoidance can also reduce solid waste collection system costs and reduce the need for new landfills and incinerators.

Waste reduction/avoidance includes the design, manufacture, purchase, or use of materials, such as products and packaging, to reduce their quantity and toxicity before they enter the solid waste management system. Establishing waste reduction/avoidance targets, education, including promotion, technical assistance, planning and reporting, and economic incentives are also typically included as key elements of avoidance programs and legislation.

It is recognised that waste generation rates are generally a function of economic prosperity and measuring waste reduction/avoidance is very difficult to accomplish in practice. As a result, scoreboard points should be awarded for each activity based on the comprehensive nature of the waste reduction/avoidance program(s) that are established at the national level. A maximum of 100 points has been allocated for this category.

III.D Storage and Collection

Providing for proper storage and collection of municipal solid waste is one of the fundamental steps that are necessary to ensure protection of human health. While the specific details regarding storage and collection are generally managed at the municipal level, IWM Scoreboard points should be awarded based on the percent of the total population or households receive frequent (minimum weekly) collection service nationally. A maximum of 100 points has been allocated for this category.

III.E Resource Recovery

Resource recovery, including recycling, composting, and combustion with heat recovery, is on the second step of the waste management hierarchy because it is a "waste reuse" technique. The benefits of resource recovery include conserving natural resources, energy, and landfill space and providing useful products and economic benefits.

However, recycling and composting are more than just separation and collection of post-consumer materials. These materials must be processed and reused in order to have a beneficial effect on reducing the waste stream.

Similarly, combustion facilities must incorporate some form of heat recovery system so that the energy can be utilised. Combustion facilities should also incorporate modern air pollution control systems to reduce air pollution.

At the national level, IWM Scoreboard points should be awarded for each of the various resource recovery activities including recycling, composting, and combustion with heat recovery. Resource recovery facilities may use a variety of technologies, depending on the national and local situation, environmental regulations, and economics.

Points should be allocated based on the percent of the total waste stream that is managed by these programs and facilities. Resource recovery activities that rely on scavenging at open dumpsites should not be awarded points. A maximum of 200 points has been allocated for this category.

III.F Disposal

Disposal of municipal solid waste in a landfill is at the bottom of the waste management hierarchy. However, landfills are recognised as providing the only ultimate "waste disposal" option, and are considered to be a necessary component of the waste management system for non-recyclable and noncombustible wastes.

Siting of new landfills has generally proven to be problematic, and new facilities are often located outside the metropolitan areas. As a result, transfer vehicles, rail haul, and barges currently provide a cost-effective option for communities that do not have their own disposal facilities, which results in them having to transport their solid waste for landfill disposal in distant areas.

In order to comply with the regulations and guidelines, modern landfills are typically well-engineered facilities that are located, designed, operated, monitored, closed, maintained, and financed to protect the environment. Along with the increased regulation, there have been significant improvements in the technologies used in landfills. These include liner systems, leachate control systems, stormwater control systems, landfill gas control systems, environmental monitoring systems, and final cover systems. Today's landfills must also be operated to higher environmental standards by trained personnel. Larger landfills often utilise landfill gas as an alternative or renewable energy source.

As a result of these changes, the trend has been towards closure of poorly sited and operated "dumps". However, as these old dumpsites often pose a threat to the environment, steps must be taken to close and rehabilitate these sites to minimise adverse impacts to the environment. These activities often include recontouring of the site to achieve desired closure grades (for surface water control), placing final capping, and installing stormwater, leachate, and landfill gas management systems. The rehabilitated sites can often be used for open-space purposes.

At the national level, IWM Scoreboard points should be awarded for based on the percent of the total waste stream that is currently being managed by modern disposal facilities. Scoreboard points should also be allocated based on the percent of old disposal sites that have been properly closed and/or been rehabilitated. A maximum of 200 points has been allocated for this category, and it is suggested that 100 points be allocated for current disposal practices and 100 points for management of closed disposal sites.

III.G Public Awareness/Education

The general public must be made aware of the relationship between managing municipal solid waste and protection of human health and the environment. A key concept is to provide for consistency of these messages at the National, State/Provincial/Regional, municipal, community, and institutional levels.

In developing countries the emphasis should be placed on proper waste collection and minimising littering and illegal disposal. In countries with economies in transition and developed countries the messages often focus on promoting waste reduction/avoidance and resource recovery.

These messages can be conveyed to the public by a variety of methods including television, radio, and newspapers, adoption of characters or icons to promote recycling, and adoption of national environment or clean-up days. Due to the diversity of the population, the messages should be conveyed in multiple languages.

At the national level, IWM Scoreboard points should be awarded for based on the establishment of a program or programs that raise public awareness regarding solid waste management issues and practices. A maximum of 100 points has been allocated for this category.

Chapter IV
Guidelines - State/Provincial/Regional Level

IV.A Overview

The role of State/Provincial/Regional government in integrated solid waste should also be three-fold - to develop and enact legislation and policies that promote and ensure protection of the environment, to establish agencies to implement these programs and to regulate solid waste management practices. State/Provincial/Regional government should also be directly involved in planning for solid waste management and they may also support research and development activities and pilot projects.

To be effective, these activities should not only be consistent with legislation, policies, and programs that have been adopted at the national level. Implementation of the solid waste management activities is often delegated to others, and these activities may occur at the municipal, community, and institutional levels.

The State/Provincial/Regional government is ultimately responsible for ensuring that these activities take place within their jurisdiction and indicators are used to monitor these achievements. Descriptions of activities that can contribute to scoreboard points and guidelines for allocation of points are provided below. A maximum score of 1,000 points is possible. The IWM Scoreboard for the State/Provincial/Regional Level is provided in Exhibit C.3 that is contained in Appendix C.

IV.B Institutional Framework

Legislation and Policies

At the State/Provincial/Regional level, legislation and policies should be consistent with the national standards or guidelines that have been established for management of municipal solid waste. These requirements may be more stringent than the national standards, and can be tailored to meet the unique needs of the State/Province/Region.

The legislation and policies should incorporate specific links to programs that have been adopted at the national, as well as the municipal, community, and institutional levels. Scoreboard points should be awarded based on the extent and applicability of the legislation and policies, as described in Chapter II. A maximum of 100 points has been allocated for this category.

Environmental Agency

The State/Provincial/Regional government should establish an environmental protection agency that includes a department that is responsible for solid waste management. This agency and/or department should be responsible for implementing solid waste management programs.

This agency should provide leadership and support to implement programs at the municipal, community, and institutional levels. Scoreboard points should be awarded for establishing a functional State/Provincial/Regional solid waste management agency/department. A maximum of 100 points has been allocated for this category.

Research and Development

The State/Provincial/Regional government, through its environmental protection agency or department, should perform, fund, and promote research and development on solid waste management issues. At a minimum, this should include support and maintenance of a national database on solid waste management. Information contained in this database should be consistent with the national program, as described in Chapter III.

Other State/Provincial/Regional activities may include establishing and funding a program that performs research on solid waste management practices, funding demonstration projects, and providing training and capacity building. Scoreboard points should be awarded for each activity based on the comprehensive nature of the program(s). A maximum of 100 points has been allocated for this category.

IV.C Waste Reduction/Avoidance

As previously indicated, it is recognised that waste generation rates are generally a function of economic prosperity and measuring waste reduction/avoidance is very difficult to accomplish in practice. As a result, scoreboard points should be awarded for each activity based on the comprehensive nature of the waste reduction/avoidance program(s) that are established at the State/Provincial/Regional level. A maximum of 100 points has been allocated for this category.

IV.D Storage and Collection

As previously indicated, storage and collection are generally managed at the municipal level. While this is typically not an issue in developed countries, the State/Provincial/Regional government in developing countries and countries with economies in transition should be monitored.

IWM Scoreboard points should be awarded based on the percent of the total population or households receive frequent collection service within the State/Province/Region. A maximum of 100 points has been allocated for this category.

IV.E Resource Recovery

At the State/Provincial/Regional level, IWM Scoreboard points should be awarded for each of the various resource recovery activities including recycling, composting, and combustion with heat recovery.

Points should be allocated based on the percent of the total waste stream that is managed by these programs and facilities. A maximum of 200 points has been allocated for this category.

IV.F Disposal

At the State/Provincial/Regional level, IWM Scoreboard points should be awarded for based on the percent of the total waste stream that is managed at modern disposal facilities and the percent of old disposal sites that have been properly closed. A maximum of 200 points has been allocated for this category.

IV.G Public Awareness/Education

The elements of a public awareness/education program have previously been described in Chapter III. These considerations are also applicable at the State/Provincial/Regional level.

At the State/Provincial/Regional level, IWM Scoreboard points should be awarded for based on the establishment of programs that raise public awareness regarding solid waste management issues and practices. A maximum of 100 points has been allocated for this category.

Chapter V
Guidelines - Municipal Level

V.A Overview

The municipal government is generally responsible for implementation of municipal solid waste management programs and facilities within their jurisdiction. The actual role of the government typically involves making a decision whether to be directly involved in providing solid waste management services or licensing companies/contracting with companies to provide these services within their jurisdiction. These activities should be consistent with legislation, policies, and programs that have been adopted at the National and State/Provincial/Regional levels.

The municipal government is ultimately responsible for ensuring that these activities take place within their jurisdiction and indicators are used to monitor these achievements. Descriptions of activities that can contribute to scoreboard points and guidelines for allocation of points are provided below. A maximum score of 1,000 points is possible. The IWM Scoreboard for the Municipal Level is provided in Exhibit C.4 that is contained in Appendix C.

V.B Institutional Framework

Regulations and Policies

At the municipal level, regulations and policies should be consistent with the national and State/Provincial/Regional standards or guidelines that have been established for management of municipal solid waste. These requirements may be more stringent than the national and State/Provincial/Regional standards, and can be tailored to meet the unique needs of the municipality.

The regulations and policies should incorporate specific links to programs that have been adopted at the national, as well as the State/Provincial/Regional, community, and institutional levels. Scoreboard points should be awarded based on the extent and applicability of the regulations and policies, as previously described in Chapter II. A maximum of 100 points has been allocated for this category.

Environmental Department

The municipal government should establish an environmental department that includes a division that is responsible for solid waste management. This department and/or division should be responsible for implementing solid waste management programs within the jurisdictional area.

This department/division should provide leadership and support to implement programs at the community and institutional levels. Scoreboard points should be awarded for establishing a functional municipal solid waste management department/division. A maximum of 100 points has been allocated for this category.

Research and Development

The municipal government, through its environmental department or solid waste division, should support research and development on solid waste management issues. At a minimum, this should include support and maintenance of a national database on solid waste management within the municipality. Information contained in this database should be consistent with the national program, as described in Chapter II.

Other municipal activities may include funding pilot or demonstration projects and providing training and capacity building. Scoreboard points should be awarded for each activity based on the comprehensive nature of the program(s). A maximum of 100 points has been allocated for this category.

V.C Waste Reduction/Avoidance

As previously indicated, it is recognised that waste generation rates are generally a function of economic prosperity and measuring waste reduction/avoidance is very difficult to accomplish in practice. As a result, scoreboard points should be awarded for each activity and initiative based on the comprehensive nature of the waste reduction/avoidance program(s) that are established at the municipal level. A maximum of 100 points has been allocated for this category.

V.D Storage and Collection

Storage and collection are generally managed at the municipal level. Storage methods may be specified as being at the household level, communal level, or at drop-off facilities. The design for the storage methods that are chosen must take into account local conditions (hi-rise buildings vs low-density development, access, and well as climatic conditions.

Collection involves all of the steps necessary for moving the solid waste from the storage point to the place of treatment or disposal. There are three main methods of collection, manual, semi-automated, and automated.

IWM Scoreboard points should be awarded based on the percent of the total population or households that receive frequent collection service (defined as once per week) within the municipality. A maximum of 100 points has been allocated for this category.

V.E Resource Recovery

At the municipal level, IWM Scoreboard points should be awarded for each of the various resource recovery activities including recycling, composting, and combustion with heat recovery. Recycling and composting can be implemented with varying levels of technology, as may be required to meet local conditions and requirements. These technologies can generally be classified as being “low technology”, “medium technology”, or “high technology”. Low and medium technology options are generally considered to be the most suitable for implementation in developing countries and countries whose economies are in transition.

Incineration is considered to be a “high technology” option for management of solid wastes and these facilities. These facilities are only considered to be suitable for countries with developed economies.

Points should be allocated based on the percent of the total waste stream that is managed by these programs and facilities. A maximum of 200 points has been allocated for this category.

V.F Disposal

At the State/Provincial/Regional level, IWM Scoreboard points should be awarded for based on the percent of the total waste stream that is managed at modern disposal facilities and the percent of old disposal sites that have been properly closed. A maximum of 200 points has been allocated for this category.

I.G Public Awareness/Education

The elements of a public awareness/education program have previously been described in Chapter II. These considerations are also applicable at the State/Provincial/Regional level.

At the State/Provincial/Regional level, IWM Scoreboard points should be awarded for based on the establishment of programs that raise public awareness regarding solid waste management issues and practices. A maximum of 100 points has been allocated for this category.

Chapter VI
Guidelines - Community Level

VI.A Overview

While the municipal government is generally the agency responsible for implementing municipal solid waste management programs and facilities, proactive communities often take an active role in solid waste management planning. They may also be involved in a review capacity for operational facilities. The actual role will vary on a community-by-community basis and ideally these activities should be consistent with programs that have been adopted at the National and State/Provincial/Regional, and municipal levels.

A community often has a strong interest in the activities take place within their geographic area and indicators are used to monitor these activities and achievements. Descriptions of activities that can contribute to scoreboard points and guidelines for allocation of points are provided below. A maximum score of 1,000 points is possible. The IWM Scoreboard for the Community Level is provided in Exhibit C.5 that is contained in Appendix C.

VI.B Institutional Framework

Policies

At the community level, policies may be adopted on key environmental issues, including solid waste management. Ideally, these policies should be consistent with the national standards or guidelines that have been established for management of municipal solid waste. These policies may also be tailored to meet the unique needs of the community.

The policies should incorporate specific recognition and links to programs that have been adopted at the national, as well as the State/Provincial/Regional, municipal, and institutional levels. Scoreboard points should be awarded based on the extent and applicability of the policies. A maximum of 100 points has been allocated for this category.

Environmental Committee

The community group may establish an environmental committee that is responsible for solid waste management. These responsibilities may include monitoring solid waste management activities that are performed by the municipality or their contractors. The committee may also be responsible for implementing pilot or small-scale solid waste management programs.

Scoreboard points should be awarded for establishing a functional municipal solid waste management committee. A maximum of 100 points has been allocated for this category.

Research and Development

The community group often has very limited financial resources, but proactive groups may choose to apply for and obtain funding to promote research and development on solid waste management issues and/or to develop a pilot or demonstration project. In developing countries, community groups may also help promote training and capacity building to provide alternate employment opportunities for workers who have relied on scavenging for a source of income.

Scoreboard points should be awarded for each activity based on the comprehensive nature of the program(s). A maximum of 100 points has been allocated for this category.

VI.C Waste Reduction/Avoidance

As previously indicated, it is recognised that waste generation rates are generally a function of economic prosperity and measuring waste reduction/avoidance is very difficult to accomplish in practice. As a result, scoreboard points should be awarded for each activity based on the comprehensive nature of the waste reduction/avoidance programs that are established at the community level. A maximum of 100 points has been allocated for this category.

VI.D Storage and Collection

It is recognised that storage and collection are generally managed at the municipal level. However, IWM Scoreboard points at the community level can be awarded based on whether the community has successfully implemented the municipal program. For example does each household use a standardised container, are the containers placed in the designated collection points at the designated times, etc. A maximum of 100 points has been allocated for this category.

VI.E Resource Recovery

At the community level, IWM Scoreboard points should be awarded for each of the various resource recovery activities including recycling and composting programs. While community groups are typically not directly involved in the operation of resource recovery facilities, they may have involvement from a monitoring perspective. Additionally, community groups may implement their own recycling programs.

Points should be allocated based on the percent of the total waste stream that is managed by these programs and facilities. A maximum of 200 points has been allocated for this category.

VI.F Disposal

Community groups are typically not directly involved in the operation of landfill disposal facilities, however, they may have involvement from a monitoring or review perspective.

At the community level, IWM Scoreboard points can be awarded for based on the nuisance impacts that are impacting the community (such as litter, odor, dust, birds, noise, traffic, and visual impacts) associated with the active disposal facility. In addition, Scoreboard points can be awarded for based on the control of nuisance impacts associated with former disposal sites that have been closed or are abandoned within the community. A maximum of 200 points has been allocated for this category.

VI.G Public Awareness/Education

The elements of a public awareness/education program have previously been described in Chapter II. Elements of these programs are also applicable at the community level, such as in schools, churches, and service organisations, etc.

At the community level, IWM Scoreboard points should be awarded for based on the establishment of program(s) that raises public awareness regarding solid waste management issues and practices. A maximum of 100 points has been allocated for this category.

Chapter VII
Guidelines - Institutional Level

VII.A Overview

Institutions, such as government agencies, universities, hospitals, and private companies often employ many staff and generate significant quantities of solid waste. Proactive institutions often take an active role in managing their municipal solid waste, from avoidance through disposal.

An institution often has a strong interest in the activities take place within their organisation and indicators are used to monitor these achievements. Descriptions of activities that can contribute to scoreboard points and guidelines for allocation of points are provided below. A maximum score of 1,000 points is possible. The IWM Scoreboard for the Institutional Level is provided in Exhibit C.6 that is contained in Appendix C.

VII.B Institutional Framework

Policies

At the institutional level, policies should be consistent with the national standards or guidelines that have been established for management of municipal solid waste. The policies should incorporate specific references and links to programs that have been adopted at the national, as well as the municipal levels.

Scoreboard points should be awarded based on the extent and applicability of the policies. The policies should also be practical in nature so that they can be implemented within the structure of the institution. A maximum of 100 points has been allocated for this category.

Environmental Department

The institution should establish an environmental department that includes a person or group that is responsible for solid waste management. This person or group should be responsible for overseeing and monitoring solid waste management activities.

Scoreboard points should be awarded for establishing an environmental department that includes a position for dealing with solid waste management. A maximum of 100 points has been allocated for this category.

Research and Development

Proactive institutions may be involved in performing, funding, and promoting research and development on solid waste management issues. At a minimum, this may include support and maintenance of a database on solid waste generation and management.

Other institutional activities may include establishing and funding a program that performs research on solid waste management practices, funding demonstration projects, and providing training and capacity building.

Scoreboard points should be awarded for each activity based on the comprehensive nature of the program(s). A maximum of 100 points has been allocated for this category.

VII.C Waste Reduction/Avoidance

Institutions can provide an ideal showcase for waste reduction/avoidance initiatives. These may include purchasing programs that require recycled content and other similar programs.

As a result, scoreboard points should be awarded for each activity based on the comprehensive nature of the waste reduction/avoidance programs that are established at the institutional level. A maximum of 100 points has been allocated for this category.

VII.D Storage and Collection

Storage and collection of solid waste at institutions are generally handled by private contractors. IWM Scoreboard points at the institutional level should be awarded based on whether the organisation has successfully implemented a waste storage collection program. For example, are different containers provided for different waste types (such as at hospitals), are standardised containers used, are the containers placed in the designated collection points at the designated times, etc. A maximum of 100 points has been allocated for this category.

VII.E Resource Recovery

At the institutional level, IWM Scoreboard points should be awarded for each of the various resource recovery activities including recycling and composting. These activities may include recycling of office paper, recycling of printer cartridges, composting of food scraps, composting of green waste from landscaping maintenance. Combustion with heat recovery may be used at larger institutions.

Points should be allocated based on the percent of the institution's total waste stream that is managed by these programs and facilities. A maximum of 200 points has been allocated for this category.

VII.F Disposal

Institutions are generally not directly involved in operating landfill disposal facilities. If this is the case, IWM Scoreboard points should be awarded for based on the percent of the total waste stream that is currently being managed at modern disposal facilities (rather than open dumpsites).

However, it is recognised that some larger institutions may operate their own disposal facilities. In this case, IWM Scoreboard points could be awarded for based on the performance of their disposal program. If applicable, told disposal sites that are under the direct control of the institution that have been properly closed should be reviewed. A maximum of 200 points has been allocated for this category.

VII.G Public Awareness/Education

At the institutional level, IWM Scoreboard points should be awarded for based on the establishment of programs that raise awareness of staff regarding solid waste management issues and practices. These programs may include orientation of new staff, training, internal promotion, participation in industry programs and awards events, and reporting of achievements. A maximum of 100 points has been allocated for this category.

References

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Diaz, Luis F. et. al., Solid Waste Management for Economically Developing Countries, International Solid Waste Association and CalRecovery, Inc., 1996.

Hickman, Jr., H. Lanier, Principles of Integrated Solid Waste Management, American Academy of Environmental Engineers, 1999.

United Nations Environment Programme, Division of Technology, Industry and Economics, Waste Management in Agenda 21, 2004.

Appendices

Appendix A – Terms and Definitions

Aftercare – The work that needs to be performed to a sanitary landfill after it has been closed.

Avoidance – Programs, strategies and activities that prevent materials from entering the waste stream.

Baler - A machine that is used to compress and bind solid waste or other materials.

Buffer Zone – Is a strip of unused land around a waste management facility to separate it from its surroundings.

Calorific Value – The quantity of heat generated when unit mass of a material undergoes complete combustion.

Capital Cost – Investment cost.

Cell – Compacted solid wastes that are enclosed by natural soil or cover material in a sanitary landfill.

Closure – The procedure a landfill operator must follow when the landfill reaches legal capacity.

Collection Points – Places set aside for the transfer of waste from small vehicles (such as handcarts) to large vehicles.

Commercial Waste – Solid waste generated by commercial establishments such as shops, offices, and restaurants, etc.

Compactor Truck - A waste collection vehicle designed for collecting low-density solid wastes.

Composting – The biological decomposition of organic materials such as leaves, grass clippings, brush, and food waste into a soil amendment.

Construction and Demolition Waste – Solid waste that results from construction and demolition activities.

Controlled Landfill – The two extremes of landfilling are open dumping and sanitary landfilling. A controlled landfill is a dumpsite that has been upgraded to incorporate some of the practices associated with Sanitary Landfills.

Cover – In the context of landfilling, "cover" refers to the soil or alternate materials that are used to cover the waste. Soil cover types include daily, alternate, intermediate, and final.

Curbside Collection – Method of collecting domestic waste in which the householder is responsible for putting the waste (in a bag or container) outside his property.

Disposal - The final placement of solid waste that is not recovered or reused.

Drop-Off Station – A location where recovered materials or waste can be set-aside for collection.

Dustbin – Container for storing domestic waste.

Engineered Landfill - Modern landfill that is sited, designed, constructed, operated, and closed in accordance with regulatory requirements.

Generator – Any person or organisation that produces municipal solid waste.

Hauler – The company that transports waste to a transfer station, resource recovery facility, or disposal site.

Incinerator – A facility that processes solid waste, but does not recover energy.

Industrial Waste – Solid waste that results from industrial processes and manufacturing.

Integrated Solid Waste Management – The process of solid waste management that incorporates all steps from generation through to disposal.

Leachate – Liquid that is produced after water comes in contact with waste.

Municipal Solid Waste – Residential and commercial solid waste generated within a community.

NIMBY – Acronym for "Not in my backyard; an expression of resident opposition to the siting of municipal solid waste management facilities.

Open Burning – The practice of setting fire to waste at open dumpsites.

Open Dumpsite - Uncontrolled method for disposing of waste.

Precycling – Making purchasing decisions that will reduce waste, such as buying bulk goods.

Private Sector – The part of the economy in which economic activity is carried out by private enterprise, as distinct from the public sector.

Privitization – The process of transferring the provision of existing services from the public sector to the private sector.

Public Awareness and Education - Public relations campaigns focused on informing the public or to try to change habits.

Public Consultation – The process of informing interested members of the public about plans for projects and discussing the details with them with the objective of obtaining their support.

Public/Private partnership – A joint venture by government with the private sector.

Recyclables – Components in municipal solid waste that still have useful physical or chemical properties that can be reused or remanufactured.

Recycling – The process by which waste materials are transformed into new products.

Refuse – Another term for municipal solid waste.

Residential Waste – All solid waste that normally originates in a residential environment.

Sanitary Landfill – A site where solid waste is disposed of using sanitary techniques (waste compaction and covering). See Engineered Landfill.

Scavenging – The uncontrolled removal of materials at any point in the waste stream.

Secondary Materials – Materials that have been manufactured and used at least once and are to be used again. Also can be materials obtained from the municipal solid waste process of reuse, recycling and/or recovery.

Solid Waste – Useless, unwanted, or discarded materials with insufficient liquid to be free flowing.

Storage – Temporary holding of municipal solid waste pending collection.

Sustainable Development - Development that meets the needs of the present, without compromising the ability of future generations to meet their needs.

Transfer Station – A facility at which municipal solid waste from collection vehicles is consolidated into loads that are transported by larger trucks or other means (such as by rail or barges) to distant disposal sites.

Transfer Vehicle – A vehicle with a large capacity for transporting waste from a transfer station to a disposal facility.

Solid Waste Management – The purposeful systematic control of the generation, storage, collection, transport segregation, processing, recycling, recovery, and disposal of solid wastes.

Tipping – Unloading of waste at a waste management facility.

Tipping Fee – A fee that is charged for unloading of waste at a transfer station, resource recovery facility, or disposal facility.

User Fee – Fee charged for solid waste services (typically includes collection, transportation and disposal.

Waste – See solid waste.

Waste Management Hierarchy – Internationally recognised strategy for management of municipal solid wastes that places greatest emphasis on strategies and programs for avoiding and reducing waste, recovery and reuse of materials, with treatment and disposal being the least favoured options.

Waste Minimization – The action taken to eliminate or reduce the quantity or toxicity of materials before they enter the waste stream.

Waste Prevention – Programs, strategies and activities that prevent materials from entering the waste stream (Synonymous with Avoidance).

Waste-to-Energy Facility – A facility that processes solid waste to produce energy or fuel.

Vericomposting – The process whereby worms feed on slowly decomposing materials in a controlled environment to produce a nutrient-rich soil amendment.

Appendix B – Examples of Performance Indicators

GENERATION

Demographic Information:

1. Administrative or political service area (in square kilometres)
2. Population (urban, rural, and total)
3. Number of households, commercial/industrial establishments, and institutions in service area.

Quantities of Waste Generated:

4. Waste generation rate for households, commercial/industrial, and construction and demolition sectors (in kilograms/capita/day)

Waste Characterization:

5. Waste composition (major categories including paper, plastic, glass, metal, wood, food waste, yard waste, textiles, and inerts).

COLLECTION AND TRANSPORT

Service Performance Indicators:

6. Waste collection coverage (by population, households, etc.)
7. Waste collection frequency
8. Waste service complaints

Resource Input Indicators:

9. Human resources involved in solid waste management (number of employees)
10. Physical resources (list of equipment)

Efficiency Indicators:

11. Weight or volume collected daily per dollar of collection cost
12. Population served per worker
13. Population served per vehicle
14. Households served per worker

RESOURCE RECOVERY

Service Performance Indicators

15. Processing plant capacity and throughput

Resource Input Indicators:

16. Human resources involved in solid waste management (number of employees)
17. Physical resources (list of equipment)

Efficiency Indicators:

18. Weight or volume processed
19. Processing cost per ton
20. Quantity of materials recovered per worker

FINAL DISPOSAL

Service Performance Indicators:

21. Disposal capacity (total and remaining)
22. Waste acceptance rate
23. Waste service complaints

Resource Input Indicators:

24. Human resources involved in solid waste management (number of employees)
25. Physical resources (list of equipment)

Efficiency Indicators:

26. Cost for disposal (per ton or cubic metre)

Appendix C – ISWM Scoreboard Exhibits

Exhibit C-1
Integrated Waste Management Scoreboard - Overall Framework

Item	Category	National Level	State/Provincial/Regional Level	Municipal Level	Community Level	Institutional Level
A	**Role**	To develop and enact legislation and policies that promote and ensure environmental protection. To establish and agency or department to implement these programs. To perform pertinent research and development.	To develop and enact legislation and policies that promote and ensure environmental protection. To establish and agency or department to implement these programs. To be directly involved in planning and approvals for solid waste management prigrams and facilities. Support research and development and pilot projects.	Responsible for implementation of municipal solid waste programs and facilities.	Active in solid waste management planning and review during implementation. May also implement projects at the community level.	Active in management of solid wastes that are generated at the institution.
B	**Institutional Framework**					
	- Legislation and Policies	Environmental protection. Solid waste management. Waste reduction/avoidance. Resource recovery (recycling, composting, and combustion). Landfill disposal. Financial sustainability. Other relevant legislation and policies.	Environmental protection. Solid waste management. Waste reduction/avoidance. Resource recovery (recycling, composting, and combustion). Landfill disposal. Financial sustainability. Other relevant legislation and policies.	Environmental protection. Solid waste management. Waste reduction/avoidance. Resource recovery (recycling, composting, and combustion). Landfill disposal. Financial sustainability. Other relevant legislation and policies.	Environmental protection. Solid waste management. Waste reduction/avoidance. Resource recovery (recycling, composting, and combustion). Landfill disposal. Financial sustainability. Other relevant policies.	Environmental protection. Solid waste management. Waste reduction/avoidance. Resource recovery (recycling, composting, and combustion). Landfill disposal. Financial sustainability. Other relevant policies.
	- Environmental Agency	Environmental protection agency or department.	Environmental protection agency or department.	Environmental/solid waste department.	Environmental/solid waste committee.	Environmental/solid waste department/committee.
	- Research and Development	Maintain database on solid waste performance indicators. Establishing a funding program. Providing training and capacity building. Other relevant initiatives	Maintain database on solid waste performance indicators. Establishing a funding program. Providing training and capacity building. Other relevant initiatives	Maintain database on solid waste performance indicators. Establishing a funding program. Providing training and capacity building. Other relevant initiatives	Maintain database on solid waste performance indicators. Solicit funding for local programs. Participate in training and capacity building. Other relevant initiatives	Maintain database on solid waste performance indicators. Provide funding for local programs. Providing training and capacity building for staff. Other relevant initiatives
C	**Waste Reduction / Avoidance**	Adoption of waste reduction/ avoidance initiatives.	Adoption of waste reduction/ avoidance initiatives.	Adoption of waste reduction/ avoidance initiatives.	Adoption of waste reduction/ avoidance initiatives.	Adoption of waste reduction/ avoidance initiatives.
D	**Storage and Collection**	% of national population or households that receive frequent collection service.	% of state population or households that receive frequent collection service.	% of city population or households that receive frequent collection service.	Level of success in implementation of a storage and collection program.	Level of success in implementation of a storage and collection program.

Exhibit C-1 Continued
Integrated Waste Management Scoreboard - Overall Framework

Item	Category	National Level	State/Provincial/Regional Level	Municipal Level	Community Level	Institutional Level
E	**Resource Recovery**	% of national waste stream that is managed by resource recovery programs and facilities.	% of state waste stream that is managed by resource recovery programs and facilities.	% of city waste stream that is managed by resource recovery programs and facilities.	Level of success in implementing community resource recovery programs and facilities.	Level of success in implementing institutional resource recovery programs and facilities.
F	**Disposal**	% of the residual waste stream that is currently managed at landfills that are designed, operated, and closed according to national standards or guidelines. % of old disposal sites (nationally) that have been properly closed and/ or rehabilitated.	% of the residual waste stream that is currently managed at landfills that are designed, operated, and closed according to national standards or guidelines. % of old disposal sites (state-wide) that have been properly closed and/ or rehabilitated.	% of the residual waste stream that is currently managed at landfills that are designed, operated, and closed according to national standards or guidelines. % of old disposal sites (city-wide) that have been properly closed and/ or rehabilitated.	Level of success in reducing nuisance impacts on the community.	Level of success in reducing nuisance impacts on the institution.
G	**Public Awareness / Education**	Adoption of public awareness / education initiatives at the national level.	Adoption of public awareness / education initiatives at the state level.	Adoption of public awareness / education initiatives at the city-wide level.	Adoption of public awareness / education initiatives at the city-wide level.	Adoption of staff awareness / education initiatives within the institution.

Exhibit C-2
Integrated Waste Management Scoreboard - National Level

Item	Category	National Level Goals	**Description** (Include attachments to support answers)	Points Allocation	Score
A	**Role**	To develop and enact legislation and policies that promote and ensure environmental protection.		Not Applicable	Not Applicable
		To establish and agency or department to implement these programs.		Not Applicable	Not Applicable
		To perform pertinent research and development.		Not Applicable	Not Applicable
B	**Institutional Framework**				
	- Legislation and Policies	Environmental protection. Solid waste management. Waste reduction/avoidance. Resource recovery (recycling, composting, and combustion). Landfill disposal. Financial sustainability. Other relevant legislation and policies.		Up to 100 points maximum if all items are addressed	
	- Environmental Agency	Environmental protection agency or department.		Up to 100 points maximum	
	- Research and Development	Maintain database on solid waste performance indicators. Establishing a funding program. Providing training and capacity building. Other relevant initiatives		Up to 100 points maximum	
C	**Waste Reduction / Avoidance**	Adoption of waste reduction/ avoidance initiatives.		Up to 100 points maximum	
D	**Storage and Collection**	% of national population or households that receive frequent collection service.		Up to 100 points maximum	

Exhibit C-2 Continued
Integrated Waste Management Scoreboard - National Level

Item	Description	National Level	**Description** (Include attachments to support answers)	Points Allocation	Score
E	**Resource Recovery**	% of national waste stream that is managed by resource recovery programs and facilities.		Up to 200 points maximum	
F	**Disposal**	% of the residual waste stream that is currently managed at landfills that are designed, operated, and closed according to national standards or guidelines. % of old disposal sites (nationally) that have been properly closed and/ or rehabilitated.		Up to 100 points maximum Up to 100 points maximum	
G	**Public Awareness / Education**	Adoption of public awareness / education initiatives at the national level.		Up to 100 points maximum	
				Maximum 1,000 Points	**Total =** _____

Exhibit C-3
Integrated Waste Management Scoreboard - State / Provincial / Regional Level

Item	Category	State/Provincial/Regional Level Goals	**Description** (Include attachments to support answers)	Points Allocation	Score
A	**Role**	To develop and enact legislation and policies that promote and ensure environmental protection.		Not Applicable	Not Applicable
		To establish and agency or department to implement these programs.		Not Applicable	Not Applicable
		To be directly involved in planning and approvals for solid waste management prigrams and facilities.		Not Applicable	Not Applicable
		Support research and development and pilot projects.		Not Applicable	Not Applicable
B	**Institutional Framework**				
	- Legislation and Policies	Environmental protection. Solid waste management. Waste reduction/avoidance. Resource recovery (recycling, composting, and combustion). Landfill disposal. Financial sustainability. Other relevant legislation and policies.		Up to 100 points maximum if all items are addressed	
	- Environmental Agency	Environmental protection agency or department.		Up to 100 points maximum	
	- Research and Development	Maintain database on solid waste performance indicators. Establishing a funding program. Providing training and capacity building. Other relevant initiatives		Up to 100 points maximum	
C	**Waste Reduction / Avoidance**	Adoption of waste reduction/ avoidance initiatives.		Up to 100 points maximum	
D	**Storage and Collection**	% of state population or households that receive frequent collection service.		Up to 100 points maximum	

Exhibit C-3 Continued
Integrated Waste Management Scoreboard - State / Provincial / Regional Level

Item	Description	State/Provincial/Regional Level Goals	**Description** (Include attachments to support answers)	Points Allocation	Score
E	**Resource Recovery**	% of state waste stream that is managed by resource recovery programs and facilities.		Up to 200 points maximum	
F	**Disposal**	% of the residual waste stream that is currently managed at landfills that are designed, operated, and closed according to national standards or guidelines. % of old disposal sites (state-wide) that have been properly closed and/ or rehabilitated.		Up to 100 points maximum Up to 100 points maximum	
G	**Public Awareness / Education**	Adoption of public awareness / education initiatives at the state level.		Up to 100 points maximum	
				Maximum 1,000 Points	**Total =** _____

Exhibit C-4
Integrated Waste Management Scoreboard - Municipal Level

Item	Category	Municipal Level Goals	**Description** (Include attachments to support answers)	Points Allocation	Score
A	**Role**	Responsible for implementation of municipal solid waste programs and facilities.		Not Applicable	Not Applicable
B	**Institutional Framework**				
	- Legislation and Policies	Environmental protection. Solid waste management. Waste reduction/avoidance. Resource recovery (recycling, composting, and combustion). Landfill disposal. Financial sustainability. Other relevant legislation and policies.		Up to 100 points maximum if all items are addressed	
	- Environmental Agency	Environmental/solid waste department.		Up to 100 points maximum	
	- Research and Development	Maintain database on solid waste performance indicators. Establishing a funding program. Providing training and capacity building. Other relevant initiatives		Up to 100 points maximum	
C	**Waste Reduction / Avoidance**	Adoption of waste reduction/ avoidance initiatives.		Up to 100 points maximum	
D	**Storage and Collection**	% of city population or households that receive frequent collection service.		Up to 100 points maximum	

Exhibit C-4 Continued
Integrated Waste Management Scoreboard - Municipal Level

Item	Description	Municipal Level Goals	**Description** (Include attachments to support answers)	Points Allocation	Score
E	**Resource Recovery**	% of city waste stream that is managed by resource recovery programs and facilities.		Up to 200 points maximum	
F	**Disposal**	% of the residual waste stream that is currently managed at landfills that are designed, operated, and closed according to national standards or guidelines. % of old disposal sites (city-wide) that have been properly closed and/ or rehabilitated.		Up to 100 points maximum Up to 100 points maximum	
G	**Public Awareness / Education**	Adoption of public awareness / education initiatives at the city-wide level.		Up to 100 points maximum	
				Maximum 1,000 Points	**Total =** _____

Exhibit C-5
Integrated Waste Management Scoreboard - Community Level

Item	Category	Community Level Goals	**Description** (Include attachments to support answers)	Points Allocation	Score
A	**Role**	Active in solid waste management planning and review during implementation. May also implement projects at the community level.		Not Applicable Not Applicable	Not Applicable Not Applicable
B	**Institutional Framework**				
	- Legislation and Policies	Environmental protection. Solid waste management. Waste reduction/avoidance. Resource recovery (recycling, composting, and combustion). Landfill disposal. Financial sustainability. Other relevant policies.		Up to 100 points maximum if all items are addressed	
	- Environmental Agency	Environmental/solid waste committee.		Up to 100 points maximum	
	- Research and Development	Maintain database on solid waste performance indicators. Solicit funding for local programs. Participate in training and capacity building. Other relevant initiatives		Up to 100 points maximum	
C	**Waste Reduction / Avoidance**	Adoption of waste reduction/ avoidance initiatives.		Up to 100 points maximum	
D	**Storage and Collection**	Level of success in implementation of a storage and collection program		Up to 100 points maximum	

Exhibit C-5 Continued
Integrated Waste Management Scoreboard - Community Level

Item	Description	Community Level Goals	**Description** (Include attachments to support answers)	Points Allocation	Score
E	**Resource Recovery**	Level of success in implementing community resource recovery programs and facilities.		Up to 200 points maximum	
F	**Disposal**	Level of success in reducing nuisance impacts on the community.		Up to 100 points maximum Up to 100 points maximum	
G	**Public Awareness / Education**	Adoption of public awareness / education initiatives at the city-wide level.		Up to 100 points maximum	
				Maximum 1,000 Points	**Total =** _____

Exhibit C-6
Integrated Waste Management Scoreboard - Institutional Level

Item	Category	Institutional Level Goals	**Description** (Include attachments to support answers)	Points Allocation	Score
A	**Role**	Active in management of solid wastes that are generated at the institution.		Not Applicable Not Applicable Not Applicable Not Applicable	Not Applicable Not Applicable Not Applicable Not Applicable
B	**Institutional Framework**				
	- Legislation and Policies	Environmental protection. Solid waste management. Waste reduction/avoidance. Resource recovery (recycling, composting, and combustion). Landfill disposal. Financial sustainability. Other relevant policies.		Up to 100 points maximum if all items are addressed	
	- Environmental Agency	Environmental/solid waste department/committee.		Up to 100 points maximum	
	- Research and Development	Maintain database on solid waste performance indicators. Provide funding for local programs. Providing training and capacity building for staff. Other relevant initiatives		Up to 100 points maximum	
C	**Waste Reduction / Avoidance**	Adoption of waste reduction/ avoidance initiatives.		Up to 100 points maximum	
D	**Storage and Collection**	Level of success in implementation of a storage and collection program.		Up to 100 points maximum	

Exhibit C-6 Continued
Integrated Waste Management Scoreboard - Institutional Level

Item	Description	Institutional Level Goals	**Description** (Include attachments to support answers)	Points Allocation	Score
E	**Resource Recovery**	Level of success in implementing institutional resource recovery programs and facilities.		Up to 200 points maximum	
F	**Disposal**	Level of success in reducing nuisance impacts on the institution.		Up to 100 points maximum Up to 100 points maximum	
G	**Public Awareness / Education**	Adoption of staff awareness / education initiatives within the institution.		Up to 100 points maximum	
				Maximum 1,000 Points	**Total =** _____

About the UNEP Division of Technology, Industry and Economics

The UNEP Division of Technology, Industry and Economics (DTIE) helps governments, local authorities and decision-makers in business and industry to develop and implement policies and practices focusing on sustainable development.

The Division works to promote:

> sustainable consumption and production,
> the efficient use of renewable energy,
> adequate management of chemicals,
> the integration of environmental costs in development policies.

The Office of the Director, located in Paris, coordinates activities through:

> **The International Environmental Technology Centre** - IETC (Osaka, Shiga), which implements integrated waste, water and disaster management programmes, focusing in particular on Asia.

> **Production and Consumption** (Paris), which promotes sustainable consumption and production patterns as a contribution to human development through global markets.

> **Chemicals** (Geneva), which catalyzes global actions to bring about the sound management of chemicals and the improvement of chemical safety worldwide.

> **Energy** (Paris), which fosters energy and transport policies for sustainable development and encourages investment in renewable energy and energy efficiency.

> **OzonAction** (Paris), which supports the phase-out of ozone depleting substances in developing countries and countries with economies in transition to ensure implementation of the Montreal Protocol.

> **Economics and Trade** (Geneva), which helps countries to integrate environmental considerations into economic and trade policies, and works with the finance sector to incorporate sustainable development policies.

UNEP DTIE activities focus on raising awareness, improving the transfer of knowledge and information, fostering technological cooperation and partnerships, and implementing international conventions and agreements.

For more informtaion,
see **www.unep.fr**

This publication presents an Integrated Waste Management Scoreboard, which is a planning tool that incorporates a methodology for evaluating existing municipal solid waste management programs and systems. It has been developed for use by representatives from governmental authorities in the ASEAN Region as well as for communities and institutions that are involved in management of municipal solid waste. It can be applied at the national, state/provincial/regional, municipal, community, and institutional levels.

www.unep.org

United Nations Environment Programme
P.O. Box 30552 Nairobi, Kenya
Tel.: ++254-(0)20-62 1234
Fax: ++254-(0)20-62 3927
E-mail: cpiinfo@unep.org

UNEP

For more information, contact:
UNEP DTIE
International Environmental Technology Centre
E-mail: ietc@unep.or.jp
www.unep.or.jp/

Osaka Office
2-110 Ryokuchi Koen,
Tsurumi-ku Osaka 538-0036, Japan
Tel.: +81-6 6915 4581
Fax: +81 6 6915 0304

Shiga Office
1091 Oroshimo-cho, Kusatsu City
Shiga 525-0001, Japan
Tel.: +81 77 568 4581
Fax: +81 77 568 4587

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