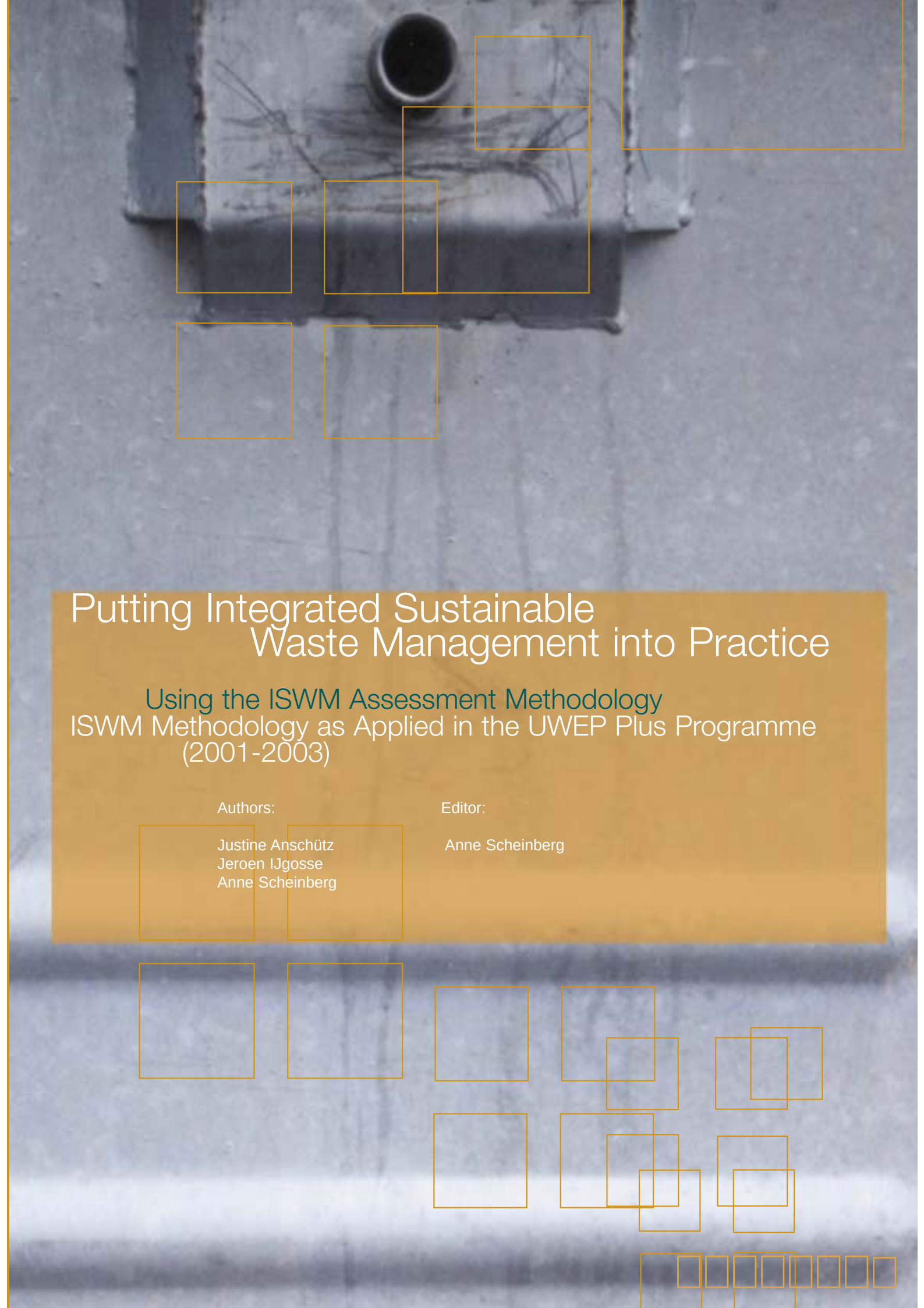

Putting Integrated Sustainable Waste Management into Practice

Using the ISWM Assessment Methodology
ISWM Methodology as Applied in the UWEP Plus Programme (2001-2003)

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Editor:

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This document, Putting Integrated Sustainable Waste Management into Practice, can be seen as a follow-up on Tools for Decision-makers, Experiences from the Urban Waste Expertise Programme (1995-2001). It is based on the experiences of the 2 year UWEP Plus programme (2001-2003), a continuation of the UWEP programme. The goal of the programme was to stimulate waste management planning and improvement in nine cities, of which 5 cities were added to the 4 cities already active in the first phase of UWEP. The experiences from the cities have been put to paper to give practical tips that can be used to strengthen governance and improve urban services.

WASTE would like to thank its partners for their contributions to the programme and making this publication possible: ACEPESA (Costa Rica), CEK (Mali), Mythri (India), CAPS (The Philippines), IEM (Bulgaria), IPES (Peru) and CEDARE (Egypt). Also thanks to Jane Olley (ERM UK), Michael Simpson (Antioch New England) and Lilia Casanova (UN-IETC) for their contributions to the further development of the Integrated Sustainable Waste Management concept. Furthermore, we would like to thank Kees van der Ree and Asha D'Souza of the ILO Geneva together with Alodia Ishengoma (ILO Tanzania) for supporting ISWM activities in Tanzania. WASTE is also grateful to the municipalities and stakeholders who agreed to work with our partners and us and have embraced the ISWM concept as an approach to improve the urban environment in their cities.

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Gouda, March 2004

Anne Scheinberg
UWEP Programme Director

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Abbreviations

ACEPESA	Asociación Centroamericana para la Economiá, la Salud y el Ambiente - *partner organisation in the UWEP programme in Costa Rica*
BATF	Bangalore Agenda Task Force
BMP	Bangalore Municipal Council
CAPS	Center for Advanced Philippines Studies - *partner organisation in the UWEP programme in the Philippines*
CBO	Community-Based Organisation
CEDARE	Center for Environment and Development in the Arab Region and Europe - *partner organisation in the UWEP programme in Egypt*
CEK-Kala Saba	Centre d'Études Keita, *partner organisation in the UWEP programme in Mali*
COGEVAD	Stakeholder platform in Bamako, Mali
COPIDUC	Stakeholder platform in Bamako, Mali
DGIS	Division for International Cooperation, Ministry of Foreign Affairs, the Netherlands
GIE	Groupe d'Intérêt Economique - *Community Based Organisation*
GPS	Global Positioning System
IEM	Institute for Ecological Modernisation - *partner organisation in the UWEP programme in Bulgaria, a joint venture between WASTE and Geopont-Intercom*
IPES	Promoción del Desarrollo Sostenible - *partner organisation in the UWEP programme in Peru*
ISWM	Integrated Sustainable Waste Management
IWB	Itinerant Waste Buyer
MoU	Memorandum of Understanding
MSE	Micro- and Small-scale Enterprise
Mythri	Mythri Sarva Sewa Samithi - *partner organisation in the UWEP programme in India*
NGO	Non-Governmental Organisation
OOPP	Objective-Oriented Project Planning, also called ZOPP
PRA	Participatory Rapid Appraisal
TOOLS	Publication on Integrated Sustainable Waste Management by WASTE
ToR	Terms of Reference
UWEP	Urban Waste Expertise Programme
UWEP Plus	Sequel of UWEP

Chapter 1. **Introduction**

1.1 Introduction

Solid waste management in any city has a close relationship to economic, social, health and many other aspects of urban life. Poor or inadequate management of solid waste from households and businesses, a situation typical of many cities in the South and in countries in transition, can undermine efforts at economic development and spread disease and discomfort. Well-planned and reliably executed waste management and recycling activities, in contrast, can be a source of pride to city residents and officials; can provide livelihoods to poor people; can enhance the availability of soil and water resources; and can serve as a model for good governance in other public services.

Good and adequate solid waste management does not, in ordinary circumstances, come about on its own. Most exemplary solid waste management systems have come into being as the result of a deliberate intervention on the part of one or more stakeholders in waste management, that is, those who have an interest in seeing something happen.

And in most cases, that intervention begins with an assessment and planning process, so that the authorities and other stakeholders understand the current situation, agree on what works and what does not, develop common priorities and formulate a strategic, long-term vision of what they want to do and define and implement the technical and organisational basis to make that vision real.

This document represents an in-depth introduction to a very specific planning framework, called the Integrated Sustainable Waste Management framework or ISWM. ISWM is a concept, which crystallised in the implementation of the eight-year Urban Waste Expertise Programme (UWEP), a programme supported by the Netherlands Ministry of Foreign Affairs, Division for International Co-operation (DGIS). UWEP has focused on bottom-up, participatory processes designed to improve waste management, livelihoods and urban governance in cities in the South and countries in transition, that is, cities in countries which are classified as ‘poor,’ ‘in-development’ or ‘non industrialised.’

1.2 A word about the UWEP programme

The UWEP programme was designed and implemented by WASTE, Advisers on Urban Environment and Development in Gouda, the Netherlands, in collaboration with partner organisations in Mali, Costa Rica, Peru, the Philippines, India, Bulgaria and Egypt. Collaborators from other countries such as Guatemala, Pakistan, Tanzania and Kenya also contributed to the knowledge basis, which led to the development of the ISWM framework.

The six-year UWEP (a phase now referred to as UWEP I) phase, from 1995 to 2001, began with extensive research done by local researchers in many countries, which led to some cumulative understanding of how solid waste management works in poor cities. In this, the roles of micro and small enterprises, the informal sector activities of scavengers, waste pickers and recyclers and community-based initiatives often spearheaded by women emerged as having an important impact on the effectiveness with which waste was handled.

The second part of UWEP I sought to replicate these processes in an organised way in four cities worldwide. In each of the four cities, which were located in India, Honduras, Mali and the Philippines, local experts and organisations set their own priorities and designed pilot projects to test whether deliberate, locally motivated interventions with a very modest amount of international financing and backstopping could replicate the small successes and models for sustainable development, which emerged from the research. The ISWM framework was created as a way to understand and theorise, at a certain level of abstraction, the factors that influenced the success or failure of the interventions. Providing a consistent framework for planning, documentation, evaluation and feasibility assessment rapidly followed as additional ways of using this framework in support of sustainable urban development.

During the UWEP Plus phase, in the years 2001 to 2003, ISWM has served as the basis for assessment and planning processes in nine cities with a clear double goal. The first goal has been to stimulate planning and improvement in the cities themselves. The second goal has been to learn from the experimental initiatives of those cities and to abstract from their experiences a set of methodological insights that other cities can also use to strengthen governance and improve urban services. The full ISWM planning process was completed in four cities, allowing programme staff to implement and validate the methodology for the ISWM assessment, the basis for planning, in five additional cities. The ISWM assessment represents a subsidiary process, which also has considerable value when implemented on its own.

Table 1 lists the cities and countries involved in UWEP Plus as well as the organisations taking the lead in the ISWM assessment process in each country.

Country	City	Characteristics city (size, economic activities, etc.)	Facilitating organisation
India	Bangalore	Regional central city of 6 million, with a high concentration of high-tech industries. The capital city of Karnataka State.	Mythri Sarva Sewa Samithi, an NGO whose primary focus is on self-help support to waste pickers and street children, in collaboration with the Swabhimana Platform, a city and regional civic society stakeholders' forum and BATF, a task force consisting of local officials and private businesses. In UWEP I there was also close collaboration with Centre for Environment, a para-statal environmental organisation.
Honduras	La Ceiba	City of about 120,000 on the Caribbean coast of Honduras. Former banana industry company town with some fishing and tourism. Reputation within Honduras as having a concentration of artists and intellectuals.	A serie of facilitating organisations, none of them based locally. The initial impetus came from IPES (Instituto de Promoción del Desarrollo Sostenible) from Peru, which created a local affiliate, IPESH (Instituto de Promoción Social y Desarrollo de Honduras). Co-ordination was passed to ACEPESA (Asociación Centroamerica para la Economía, la Salud y el Ambiente) in Costa Rica in 1999, as their regional co-ordination function grew.
The Philippines	Tingloy	Island with fifteen villages (Barangays) and a total population of 18,000. Semi-rural character, no roads. Connection to main land and transportation by boat. Reliant on fishing and subsistence agriculture.	CAPS (Center for Advanced Philippine Studies), located about 300 km distant in Manila, using local researchers.
Mali	Bamako Communes IV and VI	Capital city conurbation on the banks of the Niger with six municipalities (Communes), each of about 250,000. Commune IV is lower-income but some sections are mixed. Strong presence of agricultural activities, market city and has newly expanding industrial activities.	CEK (Centre d'Etudes Keita-Kala Saba), a private consulting, social research and action organisation, in collaboration with stakeholder platforms COPIDUC and COGEVAD.
Bulgaria	Asparuhovo section of Varna	A sub-municipality of the coastal city of Varna (population 600,000) with a population of about 200,000. Located around the harbour and with a manufacturing and shipping economic basis.	IEM (Institute for Ecological Modernisation), an NGO, together with CCSD Geopont-Intercom, a private consulting organisation focusing on environmental health planning and strategic environmental impact assessment.
Bulgaria	Blagoevgrad	A university city of about 180,000 on the border of Macedonia, with an agribusiness economic base focused on tobacco, wine, leather and the business created by universities.	IEM (Institute for Ecological Modernisation), an NGO focusing on urban environment and livelihood.

Table 1. Cities involved in UWEP Plus

Country	City	Characteristics city (size, economic activities, etc.)	Facilitating organisation
Peru	San Andres	A fishing city of 15,000, south of Lima. Economic basis in fishing, tourism and commerce. It forms part of the Buffer Zone of Paracas National Reserve.	IPES, located in Lima, 200 km distant, using a locally based coordination team and researchers.
Egypt	Quseir	A Red Sea coastal city, 600 km from Cuiro, with a population of 40,000 and its economic basis in fishing and marine tourism.	CEDARE, Center for Environment and Development of the Arabic Region and Europe, a para-statal institute with an environmental focus based in Cairo.
Costa Rica	San Isidro de Heredia	Small city of 16,000 population within the Greater Metropolitan Area of Costa Rica Semi-rural character, located at the base of the mountains, with mainly a residential population and some coffee producing activities.	ACEPESA, an NGO based in San José with a focus on urban environment and health, eco-tourism and support to the MSE sector.

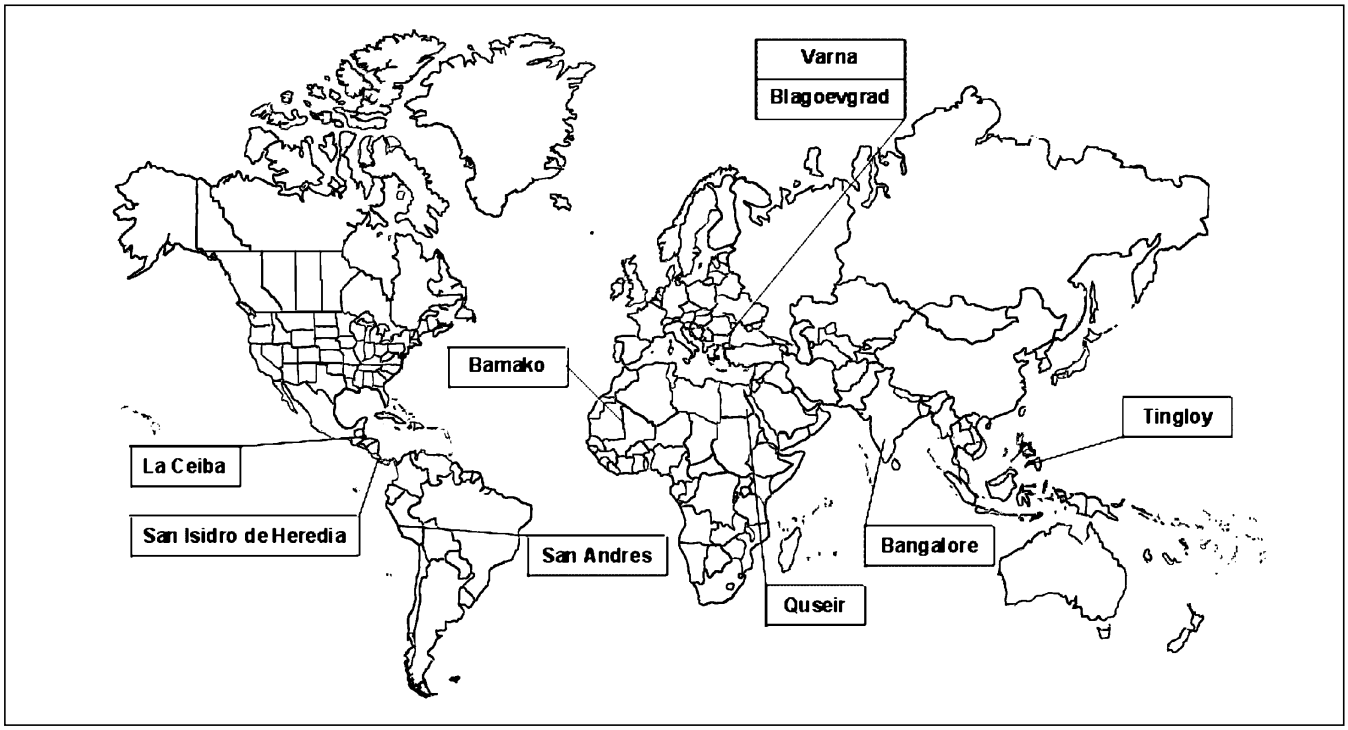


Figure 1. Map of the world with the location of the cities involved in UWEP Plus

1.3 Purpose of this document

The objective of this document is to offer the ISWM assessment methodology as a way of understanding the existing systems of waste management in a city[1] or town. While the UWEP I programme focused on cities in the South and UWEP Plus included countries in transition, the methodology and approach itself has also been extensively used, since the 1980s, in the North, in pursuit of environmentally sound waste management, improved governance and wider citizen participation and community development.

The collection of approaches, techniques, methods and experiences that form the subject of this document are collectively referred to by the term 'ISWM assessment', in which ISWM abbreviates Integrated Sustainable Waste Management. Chapter 2 presents more information about ISWM, which is a concept (or a framework, or a method, depending on the focus

[1] The basic focus for ISWM planning is the city or urban area. But the ISWM methodology is designed to work as well in wards or neighbourhoods; at districts, regional, state or provincial level; or in villages, firms, co-operatives and the like, as long as they have waste problems and core characteristics of urbanisation.

of the user) designed to help planners and activists achieve higher levels of sustainability and integration in waste management activities.

This methodology document can be seen as the latest in a series of publications from the UWEP Programme and the ISWM Tools for Decision-makers[2] (TOOLS), developed by WASTE and published in 2001. It is based on application of the ideas in the ISWM Tools in the context of nine cities in India, the Philippines, Honduras, Mali, Egypt, Bulgaria, Peru and Costa Rica. Many of the issues covered in this document were introduced and briefly discussed in TOOLS: Integrated SustainableWaste Management, the Concept.

This document is both descriptive and prescriptive, that is, it presents a methodology based on experience and shifts back and forth from reporting on that experience to giving instruction on how to apply the lessons learned. Some of the text is focused, therefore, on explaining to the reader how to do an ISWM assessment and some on illustrating these points with descriptions of how this has worked in the UWEP cities.

An ISWM assessment is a process-oriented activity, mainly derived from the stream of work called 'action research'. The 'assessment document' that it explains is only useful if it has been produced in an open-ended, participatory process with a high degree of transparency and commitment. The integrity of the results depends on who initiates, manages and evaluates the assessment, what they do, who provides feedback and how that feedback is integrated into the final results and the like. Therefore this document focuses on both the content of the research and the process of organising an ISWM assessment in a city. Prescriptions of methods, techniques and tools focusing on ways to mobilise stakeholders to engage in the preparation and implementation of an ISWM assessment are supplemented by practical examples, showing typical ways in which the processes play out and mixing these with samples of intermediate results produced by participants in the process in the nine UWEP Plus cities.

While not precisely a 'how to manual', this document is nevertheless designed to be a hands-on instrument offering the practitioner, public official or activist clear information on:

- The steps needed to complete an ISWM assessment
- Techniques, tools and instruments that can be used
- The roles of various individuals and team members during the implementation
- Context and conditions within which an ISWM Assessment can take place successfully
- Outputs and deliverables
- Costs involved

1.4 Intended audience

This document is designed to support the work of organisations and individuals who have the practical responsibility for assessing and planning for improvements in the waste management system in a city. This can be a department within a municipality, a representative of civil society (e.g. an NGO), a consultancy firm, a stakeholder platform, a working group or a Waste Management Board. Because the focus of TOOLS[3] was on ISWM processes initiated by municipalities, this document puts slightly more emphasis on methods useful for other stakeholders, but the statements are also useful for municipal staff and valid when the local authority initiates and leads the process.

In addition, the document can also be interesting for:

- Decision-makers in local, regional or national governments
- Legislators in city councils, ward committees, special committees responsible for environmental or waste related topics
- Community and sectoral activists, representatives of civil society, NGOs and CBOs, seeing solid waste as important to their constituencies
- Professional consultants, local experts and civil servants involved in planning, inspecting, controlling or operating waste management, sanitation and other urban services
- Stakeholder platforms, waste management boards, working groups
- Private-sector entrepreneurs in waste collection, disposal, recycling, composting, sanitation, urban cleansing, green space management, from the smallest informal sector scavengers to the largest multi-national firms
- Scholars and researchers at institutes or universities focusing on community development, gender analysis and environmental management
- Individuals and organisations interested in participatory planning as a part of development interventions in general and in those processes related to waste management in particular

1.5 A dialogue in the form of a document

The style of this document is informal, it is intended to stimulate the reader in exploring and developing their own ideas, tools and instruments, rather than as a cookery book, with all the recipes already in it. The authors welcome suggestions and feedback via the WASTE website, www.waste.nl.

Even something called an ISWM methodology cannot be a blueprint or a precise instruction, because each assessment occurs in a specific city, at a specific time, under specific

[2] Integrated Sustainable Waste Management , A Set of five Tools for Decision-makers. Experiences from the Urban Waste Expertise Programme (1995-2001). J. Anschütz, A. van de Klundert, M. Muller, N. Dulac, L. Hoffman & A. Scheinberg, 2001. WASTE

[3] See footnote 2.

circumstances and through the initiative and leadership of real people. The principles may remain the same, but the circumstances differ and so the methods have to be adapted to the needs of each situation. This document should be read as a reference and a basis for reflection, an accompaniment to the reader's own learning process and as support when things get difficult.

Some key stakeholders who might find this document useful are:

- The person or institution responsible for waste management in the locality
- An organisation lobbying for an evaluation of the current waste management practices in the search for potential improvements
- A member of a decision-making body, working group, stakeholder platform or environmental commission, with some relation to waste management
- Local, regional or international specialists in waste management contracted by a local authority or by an international donor agency to carry out an ISWM assessment or parts of an assessment
- An external facilitator for a participatory planning process or stages of such a process

Each of these stakeholders will read the document differently, but it is the intention that there is something in it for each of them.

1.6 The structure of the document

This document is structured in the following way. Chapter 1 gives an introduction to the nature and source of Integrated Sustainable Waste Management (ISWM), an ISWM assessment and the context in which it is useful.

Chapter 2 focuses on the ISWM framework in depth. It begins by highlighting common problems and shortcomings of conventional, civil engineering approaches to planning for waste management. It then introduces the ISWM concept in more detail, presenting the approach, the principles and contrasting these with those of conventional planning.

Chapter 3 describes how to initiate and manage an ISWM assessment process, defining the scope of the assessment, the steps in the process and the products of the assessment. The focus here is on the participatory process and the timing of the ISWM assessment. Examples from the nine cities in the UWEP programme illustrate the different steps and activities.

Chapter 4 gives an overview of the technical side of the ISWM assessment. While the methods in Chapter 3 could also, for example, be adapted for housing or energy planning, Chapter 4 is quite specific to the field of solid waste management, introducing the data that form the basis for an assessment, the tools and techniques that can be used and the like. Here too examples from the nine cities in the UWEP programme will be provided.

Chapter 5 concentrates on the practical side of the ISWM assessment. It explains the role of the facilitator, the organisational structure and composition of the team(s) involved, as well as the skills that are needed to round out the team. It also outlines the timing and duration of the assessment as well as budgeting and financial control functions.

Chapter 6 closes the document with some considerations when undertaking an ISWM assessment and a brief discussion of the potential impact of the ISWM assessment process on local stakeholders in the short and long term. It closes with some comments on integrating an assessment into the larger ISWM planning process. Chapter 6 is followed by Annexes with references and recommended reading.

Chapter 2. **ISWM: a Different Approach to Assessment and Planning**

2.1 Introduction

This chapter introduces the concept of ISWM and its approach for waste management assessment and planning, with a focus on the following issues:

- Limitations of conventional waste management assessments and plans
- Situations suggesting that an assessment is needed or could be useful
- The concept of Integrated Sustainable Waste Management (ISWM)
- ISWM assessment, its principles/goals, the issues looked at, the process
- ISWM Planning

2.2 Why conventional waste management plans usually end up in a drawer

Conventional waste management assessment and plans have several shortcomings. A conventional waste management assessment is usually conducted as follows:

1. An external consultant, often a foreigner and a representative of a donor government, but almost always a stranger to the area, is assigned to plan the improvement of the waste management system for the city. The consultant reads all existing reports and secondary sources, interviews key government staff and probably makes a visit to the landfill. He or she rarely talks to household or business clients or the private sector and NGO activists are seen only if they are already considered to be troublemakers. The consultant and his staff consult published statistics (performing a 'desktop' analysis of quantity, composition, effectiveness, etc.) and in rare cases make their own measurements, usually focusing on the quantity of waste.
2. In a relatively short time, usually a month, the consultant prepares an '(Integrated) Solid Waste Management Master Plan' whose focus is on the technologies available to the city or, more accurately, to cities in the North where his or her firm usually works. There may be sections describing the current system in the city, again focusing on quantity of waste and technology in use. There is rarely any analysis of interests or institutions, nor any investigation of the causes behind the problems he or she has noticed.
3. The resulting report almost always recommends a new landfill, better collection equipment and routes, more involvement of citizens in recycling, an incinerator in the middle term, fees to all clients of the system and other standard features of solid waste systems in medium- and large-sized cities in Europe or North America. This report is presented to the mayor and/or the city council, who endorse it but do not have the means or the knowledge to implement it. It is then archived and greatly increases the reading obligations of the next consultant who comes along in five years to begin the process all over again.

The conventional waste management consultant is usually a civil engineer. His or her education and experience leads to a quite specific focus on:

- The functioning of the municipality waste or public works division
- Technical and tangible elements of the waste system, like trucks and facilities
- Available sites for new facilities
- Costs, benefits and other financial questions

The indicators he/she uses to judge whether the system is working well or not are in most cases **effectiveness**: whether waste is collected, whether the city is dirty; and **efficiency**: how much solid waste management is delivered for what cost per ton; how much unused capacity there is in the system.

The above described situation occurs quite often in cities in the South and countries in transition. It must be emphasised that the kind of research that is described here is useful, but too narrow to be the basis for good planning, since it only includes part of reality and only for those in the central business district. Important aspects of the local situation, such as the involvement of micro and small enterprises (MSEs) and community-based organisations (CBOs); connections to urban and peri-urban agriculture; seasonal or cultural variations in waste generation; the activities of scavengers and itinerant waste buyers (IWBs) and worker health and safety for waste employees are usually considered as external to the analysis or not interesting and find no place in the resulting documents.

Besides this, the way conventional waste management assessment and planning usually take place does not lead to very sustainable results in the sense that:

- No-one owns (or in some cases even understands) the recommendations.
- In many cases the recommendations are not appropriate to the local circumstances.
- Local decision-makers lose confidence in planning processes in general.
- Local people and organisations do not feel responsible for the outcomes.
- Informal groups are excluded from both the assessment and decision-making on implementation of recommendations.
- Local knowledge is ignored.

In most cases this means that assessments and plans are not used and end up in drawers. For instance a project funded by a major international donor in Managua, the capital of Nicaragua, produced five meters of paper, which were supposed to be the Master Plan for solid waste management. They have been shelved and no one currently charged with solid waste management ever uses them or is even aware of the existence of this document (Frederiks, Municipality of Amsterdam, 2003).

This kind of planning can have important impacts on local sustainability, especially when the local situation is presented as a *tabula rasa* (empty slate) where nothing much is happening. This can lead to government-sponsored initiatives to implement solid waste activities that ignore the existing niches operated by local entrepreneurs. When the City follows the recommendations, MSEs can be forced out of their economic niches by new companies with shiny equipment, which appear bigger or better, but who may not be able to support themselves over the long term.

In the extreme, actions resulting from this kind of planning can cause riots, strikes and destruction of assets stakeholders who feel they are shut out of the process. In Cairo, Egypt, in the face of large-scale privatisation of solid waste management to multinational companies led to burning of trucks and wide protest by the Zabbaleen, the mainly Christian recyclers, who were excluded from the decision-making process on the privatisation (Kamel, 2003; Zekrie, 2003). In Kunduchi, outside of Dar es Salaam, Tanzania, Danish donor investment money for a new landfill was lost, when households in the designated site area protested (Alodia Ishengoma, personal communication, 2002).

In the mid-1990s, a group of practitioners in waste management, loosely assembled under the term Collaborative Working Group (CWG) and under the leadership of World Bank solid waste expert Carl Bartone (now retired), began working on a framework to describe, theorise and ultimately address these common problems with waste management assessment and planning in low-and middle-income countries in the South and in countries in transition. This framework was formalised as Integrated Sustainable Waste Management or ISWM.

2.3 The concept of Integrated Sustainable Waste Management (ISWM)

2.3.1 The dimensions of ISWM

The concept of Integrated Sustainable Waste Management (ISWM), which is presented in Figure 2, recognises three important dimensions in waste management: (1) the stakeholders involved in and affected by waste management,

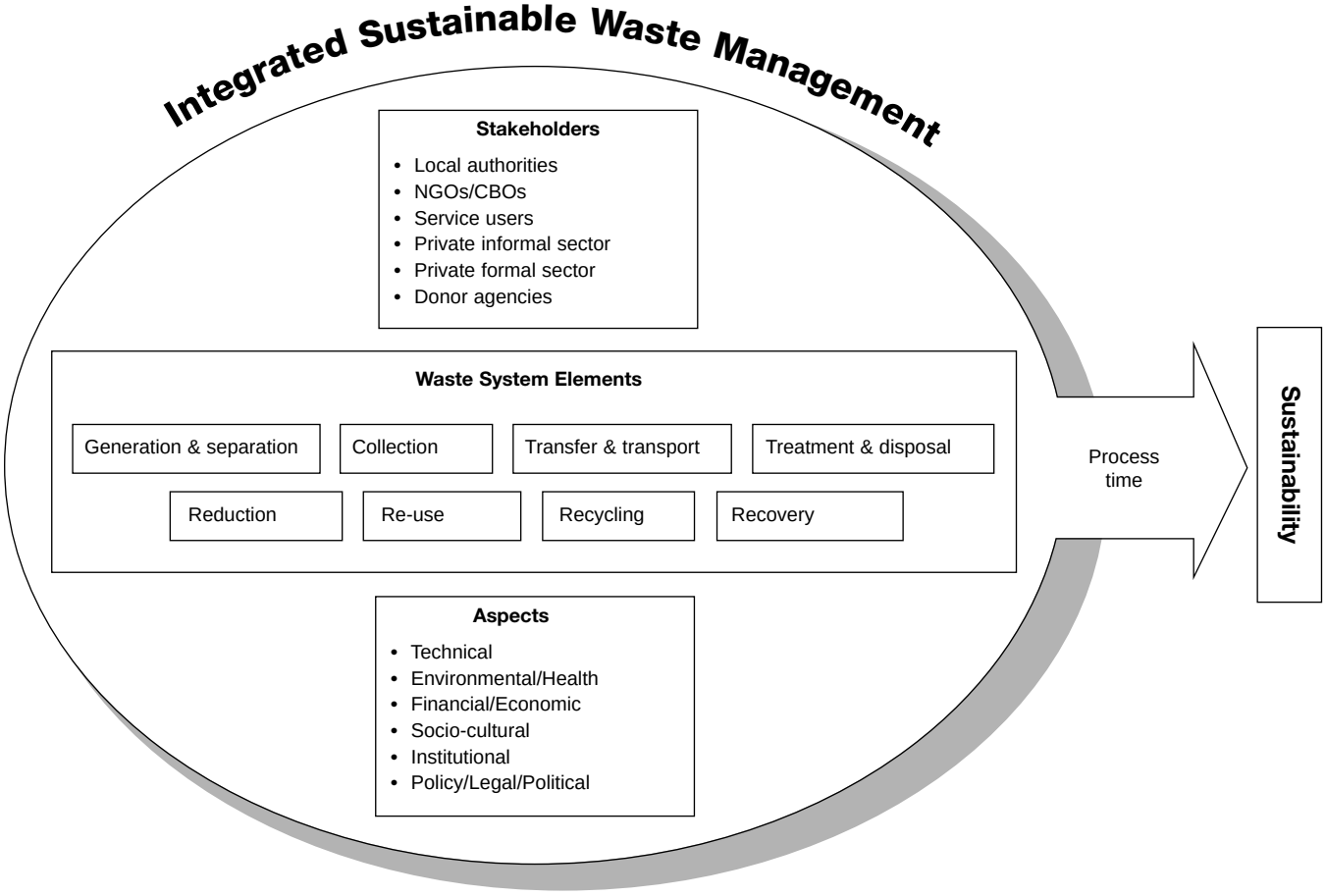


Figure 2. The ISWM model

(2) the (practical and technical) elements of the waste system and (3) the sustainability aspects of the local context that should be taken into account when assessing and planning a waste management system.

2.3.2 Stakeholders, the first ISWM dimension

ISWM is, first and foremost, about participation of stakeholders. A stakeholder is a person or organisation that has a stake, an interest in - in this case- waste management. A number of key stakeholders are listed in Figure 2. The municipality, with its general responsibility for urban cleanliness and the citizens or households who use the system, are (almost) always stakeholders in waste management. But other stakeholders differ in each city, so they need to be identified in the local context and often also grouped according to their interests. Stakeholders by definition have different roles and interests in relation to waste management; the challenge of the ISWM process is to get them to agree to co-operate for a common purpose, that of improving the waste system. In addition, the stakeholders in a particular city or region share a common social and geographic context and may be bound together by other systems in addition to solid waste[4] .

2.3.3 Waste system elements, the second ISWM dimension

The waste system elements are sometimes referred to as the technical components of waste management. Most waste system elements are also stages in the (back end of the) life cycle of materials. This life cycling or flow of materials begins with extraction of natural resources and continues through processing, production and consumption stage towards final treatment and disposal. Figure 3 illustrates the idea of life cycle flow of materials.

Waste system elements refer to how solid waste is handled and where it ends up. Particularly this last has important environmental implications and for this reason a number of national environmental ministries have taken the idea of a **waste management hierarchy** as an operational policy guideline. The hierarchy, shown in Figure 4, is also a cornerstone of the ISWM approach and gives priority to waste prevention, minimisation, recycling and other forms of recovery of materials. Only when this is not possible is 'pure' disposal allowed. Unfortunately, this idea is not always put into practice.

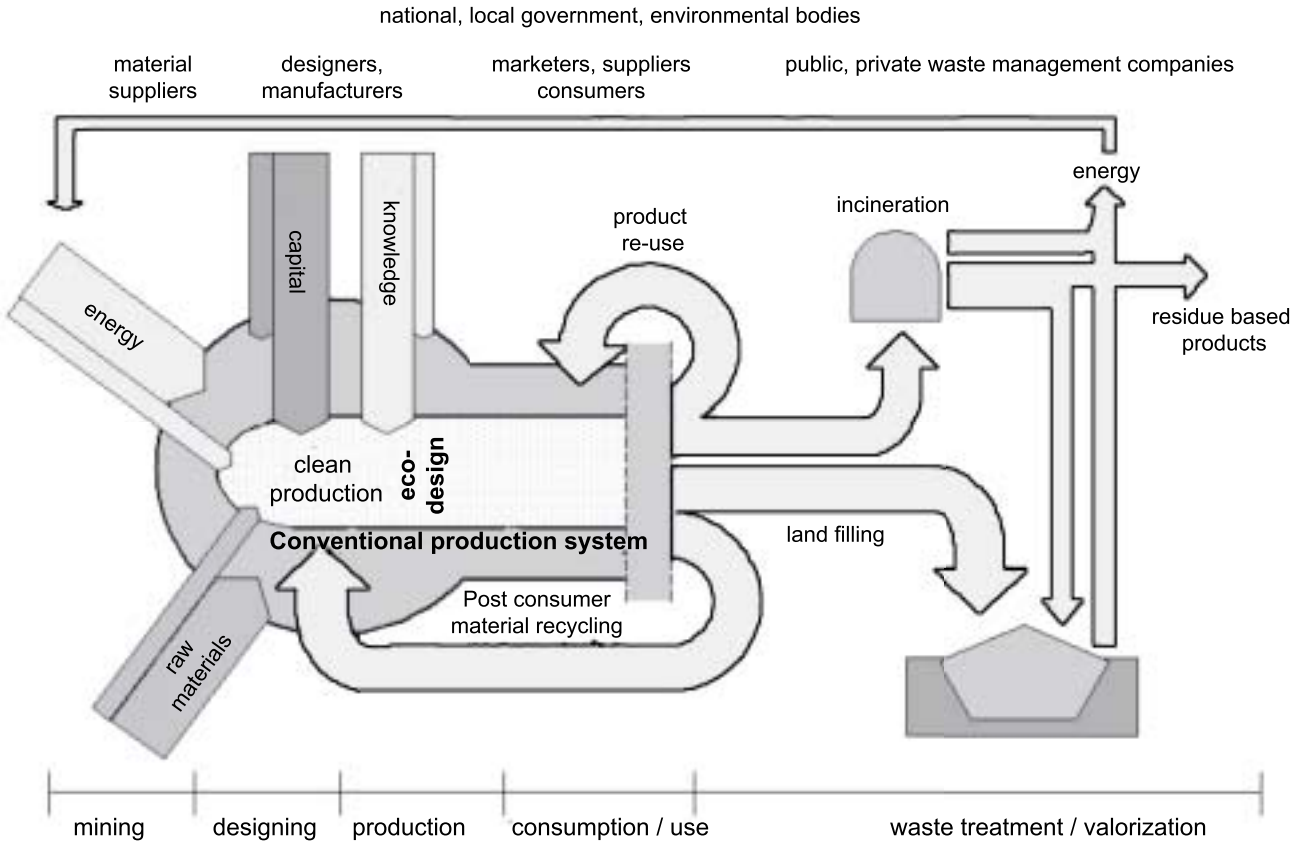


Figure 3. The material flow diagram

Adapted from TOOLS

[4] For example: clan, caste, ethnicity, professional affiliation, religion, school or university background, commercial relationship, kinship, sport.

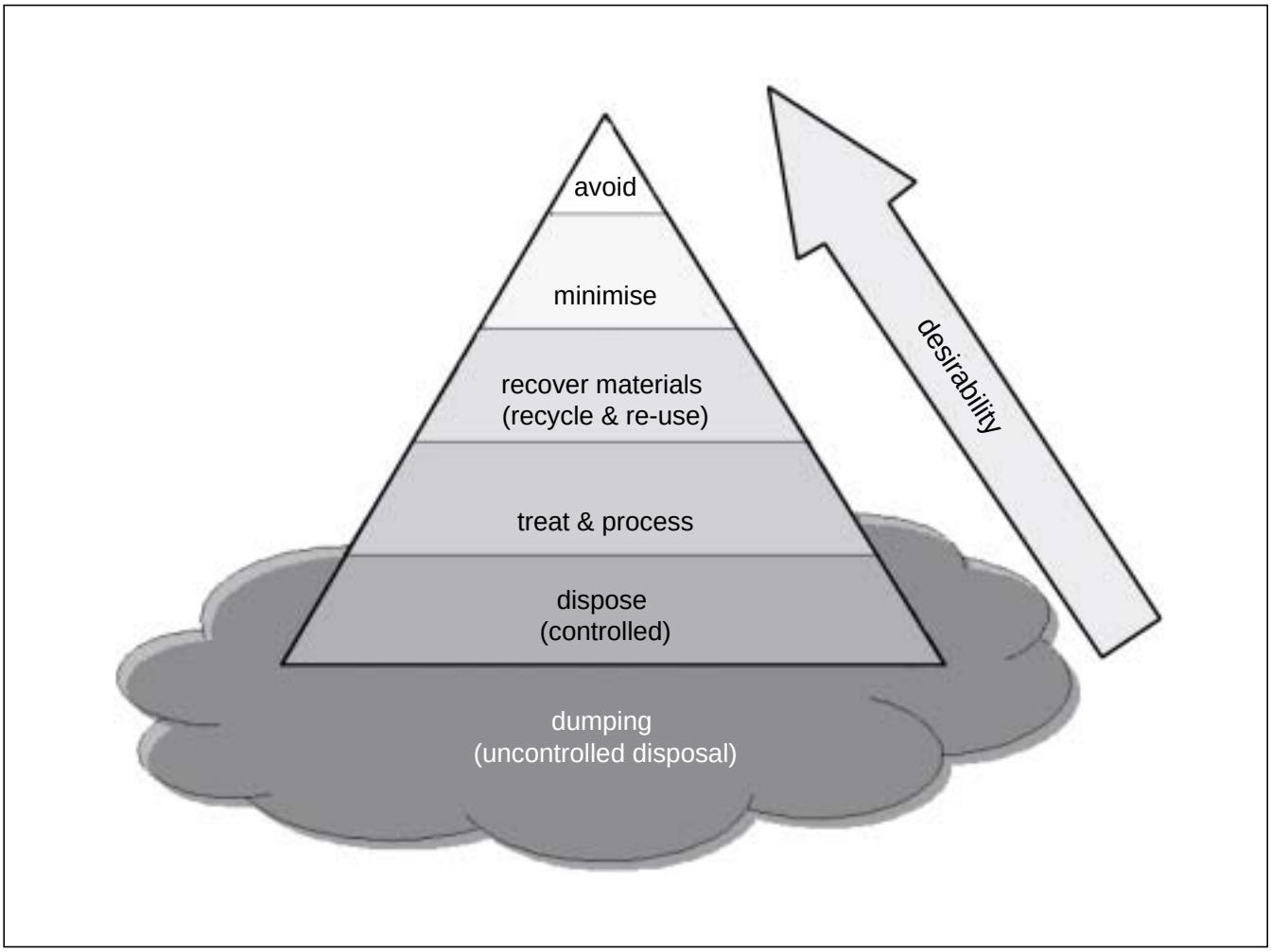


Figure 4. The waste management hierarchy

Source: Adapted from Strategic Planning Guide for Municipal Solid Waste Management; ERM, 2001

2.3.4 The third dimension: ISWM aspects

Within ISWM the third dimension consists of six sustainability aspects, or lenses, through which the existing waste system can be assessed and with which a new or expanded system can be planned. The sustainability aspects, ranging from political-legal, to social-cultural, institutional-organisational, technical performance, environmental-health and financial-economic, cover the range of factors influencing solid waste activities and, taken together, predict or influence the sustainability of the entire system.

2.4 The ISWM assessment: part of the solution to urban waste problems

An assessment generally involves an in-depth study of an existing situation, in the case of ISWM, of a waste management system in a particular city at a particular time. At certain moments in time there may be a need for an assessment of waste management in a particular city. Some situations, which may indicate the need for an assessment, include the following:

- Residents consistently throw waste next to containers, rather than in them.
- Low percentage of the clients pay for waste services.
- There are increasing complaints about waste pickers interfering with disposal activities.
- Streets are full of litter or waste.
- The city includes high percentages of unserved households.
- Households report regularly missed collections.
- Municipal waste departments spend all their time responding to complaints and are not able to organise regular collection or routes.
- There is a reported, observed or documented proliferation of illegal dumpsites for domestic, commercial or construction and demolition wastes.
- Municipal waste departments or private service providers are experiencing a decrease in availability and functioning of solid waste vehicles and other equipment.
- There is a persistent failure of service in certain areas, for example because the streets are narrow or the mud is too deep for trucks to pass.

Photo 1. Open dumping in the street, Bangalore India

©WASTE, Jeroen IJgosse

The most common reason for an assessment is an ambition, by one or more key stakeholders, to improve or upgrade waste management. To do this, it is always necessary to know what is working well in the city and what is not and to identify the bottlenecks, to analyse why certain aspects work and others do not and to understand what triggers sustainable improvement. In this way it can become clear what actions make sense.

Another good reason:
An assessment is always a good idea in assessing the feasibility or need for new investments, different technologies, modernised systems and the like. For example, if collection stops are being missed because the drivers do not know how to read maps, adding a GPS system to each truck will make the situation worse, rather than better. Similarly, buying compactor trucks for waste collection as a measure to decrease scavenging may do nothing more than shift the locus of scavenging from the landfill to the street set-outs, creating a bigger problem at the household level.

A third reason:
An ISWM assessment is useful as part of an evaluation of a waste management project or programme, or as a first step to combining certain divisions or services of the local authority. It may also help sort out discrimination or under-serving of certain castes or groups and can change people's ideas about scavengers, waste pickers and recyclers by quantifying the environmental and economic benefits that their activities provide to the city.

A fourth reason:
The ISWM assessment process facilitates smooth implementation as stakeholders share information on the waste situation and conflicting interests are already discussed.

A final reason:
Finally, an ISWM assessment provides a useful baseline from which to make decisions when:

- There is a proposal for an individual or a local group for a waste management or recycling pilot project.
- A foreign donor or foundation offers a grant or a loan for a new waste management facility such as a sanitary landfill, incinerator, composting plant or for used compactor trucks.
- There is pressure from the national government or external sources to privatise or modernise waste management in the city.

Photo 2. Dumpsite at Los Laureles, La Ceiba, Honduras
©ERM, Jane Olley

2.5 How is the ISWM approach to assessment and planning different?

An ISWM plan shares one important goal with conventional methods of assessment and planning: it uses an analysis of the present to create a pathway from the present to some desired future. It can be distinguished from more traditional, engineering-based waste management assessment and planning in the following ways:

- It is based on principles that include an explicit concern for disadvantaged groups and conservation of environmental resources.
- It looks very broadly at a wide range of conditions and issues.
- It uses participatory action research methods and multidisciplinary teams.
- The process is seen as being as important as the results. That is, the products (written plans or workshops) are not valid unless the process is inclusive and transparent.

2.5.1 The principles and goals guiding ISWM assessment and plans

ISWM assessment and planning is based on a wider range of normative principles than conventional assessment and planning, which focus on efficiency and effectiveness. ISWM assessment and planning follow three additional principles: equity, fairness and sustainability, which have evolved from the experience of practitioner working with disadvantaged people in poor countries. These principles can serve as the basis for indicators to judge the current status of the waste management system and to plan improvements. Thus, the ISWM approach to assessment and planning considers in total five principles:

- Efficiency
- Effectiveness
- Equity
- Fairness
- Sustainability

Equity means that the system is designed to serve all, irrespective of their social or economic status. It does not mean that everyone is served or participates in the same way, but that the system gives everyone more or less what he or she wants and needs.

Fairness is used to mean that the costs of the system are distributed, based on the ability of the stakeholders to bear those costs. Fairness as a principle will often result in cross-subsidies in practice, where payments from rich households are used to cover the cost of serving slum areas.

Sustainability means many things to many people, but in the case of ISWM, it means that the system can operate at a stable level, replace its resources and maintain its operations, without losing its potential to do so in the future. A system that is set up to take advantage of short-term gains may not continue beyond obtaining those gains.

ISWM accepts the generally recognised definition of **effectiveness:** the extent to which households are served, waste is collected, streets and open spaces are clean and litter-free, waste goes to a disposal facility and the like.

Likewise, ISWM borrows the concept of **efficiency** from engineering and economics: efficiency measures how much solid waste management (service) is delivered (per household, per ton, per street kilometre, etc) per unit of cost, energy or labour. Another measure of efficiency is how much unused capacity there is in the system attending solid waste management issues.

2.5.2 Issues included in an ISWM assessment

ISWM assessments take into account a whole range of stakeholders and aspects. An ISWM assessment allows decision makers to understand their locality more profoundly, starting from the question: What happens to the waste generated in my location?

Each day waste is generated from a range of different sources. This waste is processed using some kind of technology, e.g. part of the waste will be land filled, some may be recycled and another part may be composted. There may also be a part that is not collected and is instead dumped in an open area in an un-controlled manner. The ISWM assessment looks not only at where the materials end up, but how they flow in the city, where it would be possible to intervene and change the way things work.

After this initial question, an ISWM assessment process continues on to ask the following kinds of questions:

- Who is involved with waste and what do they do?
- What is gained or lost by each actor involved with waste?
- Who are the winners and who are the losers?
- What processes (technical, institutional, social, financial) are related to waste?
- How do those processes function and what are their results?
- What are the official procedures for handling waste?
- How much waste passes through the official channels and how much is handled outside those channels?
- What are the unofficial channels?
- How much does it cost to manage waste, what are the costs and benefits?
- Who pays and who gets the benefits?
- What rules and regulations control these activities?
- How do practices threaten public health and the environment?
- What opportunities come out of the waste system?

Within ISWM assessments there is an explicit effort to understand the full range of current realities not the fictions or ideals, even if they are uncomfortable to face. A good assessment provides a sound basis for local stakeholders to develop a vision for future improvements of waste management based on such a comprehensive view of local circumstances and resources.

ISWM assessment and planning means looking for technically appropriate, economically viable and socially acceptable solutions to waste management problems in cities in the South and countries in transition – with acceptable levels of environmental performance. By focusing on the current situation in all its aspects, ISWM assessment and planning take into account the particular conditions in countries in the South and in Eastern Europe, which can be quite different from those in OECD countries in the North, such as the United States and Canada, Europe, Japan and Australia.

2.5.3 The process of developing ISWM assessments and plans

There is another characteristic of ISWM, which is different, in a more subtle way, from more conventional waste management assessment and planning.

Based on unsuccessful and unsatisfying experiences with conventional assessment and planning in the South and countries in transition, as well as in the North, the practitioners mentioned above felt that the planning process itself needed to change from a technical and bureaucratic exercise to a decentralised and participatory exercise. What does this mean in practice? The most significant result was a shift in the approach towards stakeholders, who become, in ISWM, subjects or protagonists in a process actively involved in decision-making, rather than objects for study and sources and passive recipients of information.

The **participatory approach** means that local stakeholders are responsible for preparing, carrying out and evaluating the waste management system in their city. Here, stakeholders include the mayor, the public works department and the city council, but also: local residents, businesses, NGOs, informal sector actors, schoolchildren unions and the like. The participatory approach challenges local authorities to open governance and planning to non-professionals. Sometimes this means first assessing and then strengthening capacities of local stakeholders in waste management. Sometimes it also involves changing attitudes. In many cases just the fact of mobilising other stakeholders and involving them in the assessment and planning process works as a catalyst, a ‘can opener’, that opens the process up and in doing so changes its nature and character.

Photo 3. Working group of local authorities observing transfer station in Northern Lima, Peru

©Alternativa, Jeroen IJgosse

What can the ISWM approach to waste management assessment and planning offer that the conventional approach can not or usually does not offer?

1. When the stakeholders are subjects of and in control of the process, they **own** the outcome and are much less likely to find fault with it.
2. By mobilising stakeholders early in the process, commitment is built up slowly over time and when the time comes for

implementation of recommendations and ideas in the plan, the participants are ready, the resources are available and there is much more consensus about the desired results.
3. Because there is more gradual change, there is more sustainability: stakeholders invest in sufficient social, institutional and other kinds of capital (in time, money, ideas, etc) to carry the project beyond the initial stages, into stable implementation.
4. The ISWM assessment and planning process is iterative and is designed to repeat key steps on a regular basis, so that the results do not become irrelevant. A new round means new information and a higher level of understanding. An iterative ISWM assessment process is like a spiral, where on each turn one faces the same direction, but on a higher level. This built-in need for updating and revision keeps the ideas fresh and renews commitment.

2.5.4 Research approach used in ISWM assessments

The ISWM research approach, research skills and research methods also differ from those used in conventional engineering-based assessments. ISWM relies not only on technical engineering-based expertise, but also on deep knowledge of legal issues, policy development, economic and financial issues, health and occupational health issues, social cultural and gender issues and environmental science and policy. These multi-disciplinary fields are integrated to complement and strengthen each other, thereby attempting to avoid the risk that a number of individuals experts work in a parallel and isolated manner. In practice this means that, for instance, the sociologist involved in the assessment process has to have basic knowledge of and at least be open to technical and financial components of the waste management system. In addition, a balanced mix between local and external resource persons (consultants) keeps both local priorities and wider experience available.

The action research methods used in the ISWM assessment and planning process seek to counterbalance the document based approach of the conventional consultant. The cornerstones of this counterbalance are the use of visual aids, field visits and involving stakeholders in identification and assessment of issues. This range of participatory techniques allows the stakeholders to identify their reality in relation to solid waste management and represents the evolution of the techniques of Participatory Rapid Appraisal (PRA)[6], which were developed in the 1970s and 1980s. Examples of important PRA techniques are:

- Participatory mapping and diagramming
- Priority and criteria ranking exercises
- (semi-structured) interviews
- Group meetings
- Focus group analysis

A mixture of techniques is usually used, both to verify information and to increase the comfort level and engagement of women, children and men of different ages, ethnicities, educational levels, literacy and numeracy competence and cultural backgrounds. Visual methods and local materials in PRA create conditions for people, including illiterate stakeholders or those who don't speak the official language well, to participate far more effectively and not to feel inhibited by the formality of the environment. Additionally, having different stakeholders visualise their own situation in maps or pictures can bring out important differences between categories of stakeholders (e.g. men and women users of waste services).

Understanding the current reality goes beyond reading documents and sitting behind a desk. Direct confrontation with the reality through field visits and observation is an indispensable research method. These field visits and observations of the day-to-day waste related practices work best when the field team combines external advisers with key local stakeholders such as municipal staff, NGO members, community leaders and private company leaders. Walking around neighbourhoods with local stakeholders and mapping illegal dump sites, observing waste management practices, letting stakeholders take photos or videos of these practices can serve multiple goals: it adds local knowledge to the assessment, it creates a common awareness and consensus about realities and problems, it builds local capacities and increases chances of local ownership and acceptance of the outcomes.

Creating and facilitating these moments of confrontation allows stakeholders to express and demonstrate their own experience of how waste is being managed, but also to see those aspects of waste management that go beyond their daily reality. Therefore it is important to visit waste processing locations outside the neighbourhood such as landfills, transfer sites or junk shops that buy, sell and process recyclable materials.

2.6 What happens after an ISWM assessment?

An ISWM assessment can be a stand-alone process, focused, for example, on the identification of potential points of intervention in a specific waste topic: think for example of siting of a landfill, the expansion of a source separation programme or the introduction of a new waste management tax or collection fee. Another use is to evaluate a project or programme of waste related activities.

Alternatively, an ISWM assessment can also serve as the starting point for a strategic planning process, by identifying issues, establishing priorities and directing the focus of all stakeholders to intervene in those areas that need attention.

The gathering of data, gaining of insight and opening of permanent channels of communication with and between stakeholders create a stable foundation on which to build a full

[6] PRA refers to a set of approaches and techniques for community-based participatory planning. The letters PRA are used to abbreviate Participatory Rapid Appraisal or Participatory Rural Assessment.

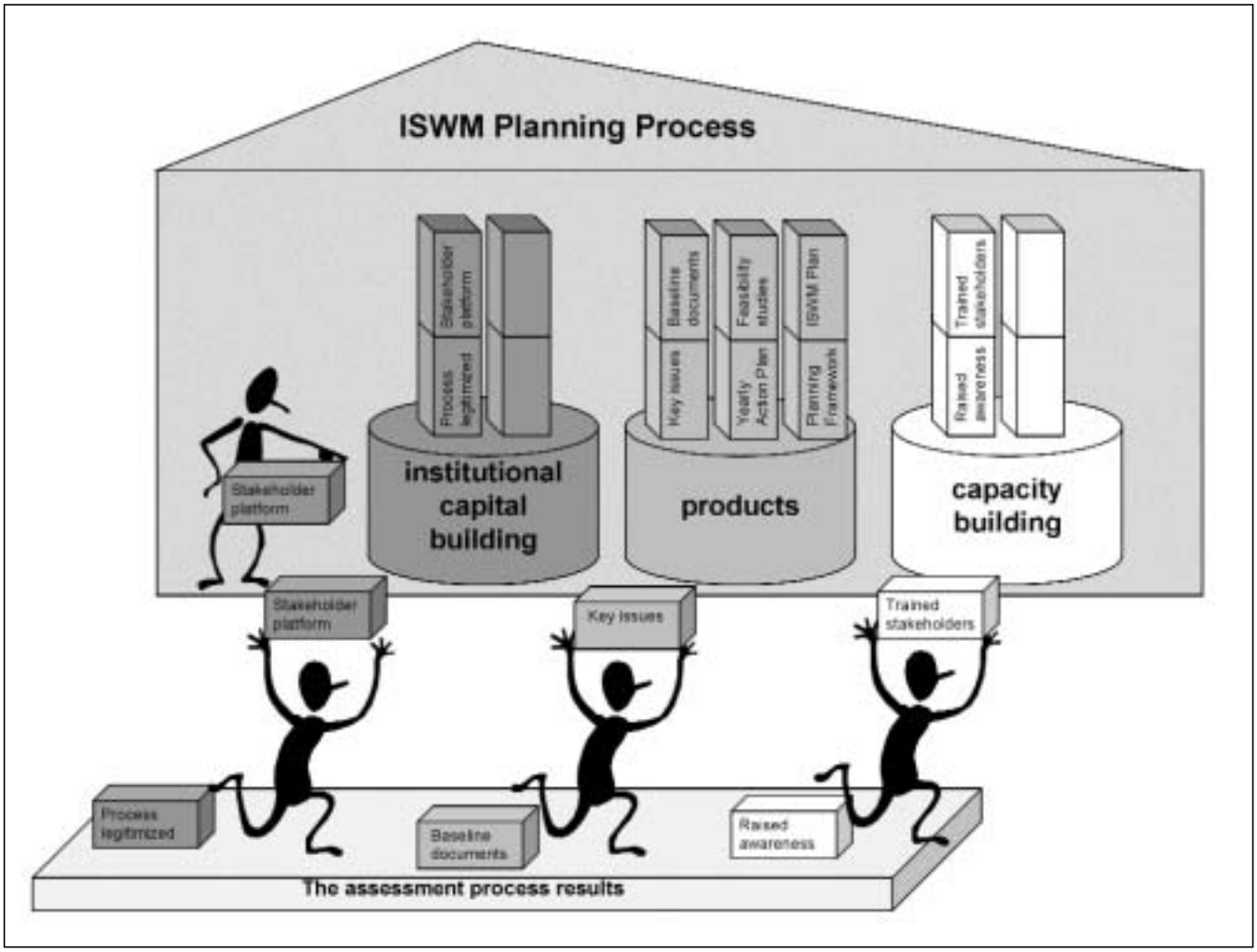


Figure 5. Relation between ISWM assessment and ISWM planning process

Figure created by Jeroen IJgosse and Verele de Vreede

planning process, including the formulation of a waste management strategy or plan for the city, evaluation and selection of technology, setting of fees, procuring equipment and facilities and the like.

Figure 5 shows the three principal ways in which the ISWM planning process can build upon the results of the ISWM assessment process. Documents elaborated during the assessment phase will serve as basis for plans and other results that flow from the next phase of the planning process. Mobilisation of stakeholders during the assessment phase can lead to the formation of a stakeholder platform or working group, which builds institutional capital to support the remainder of the planning process. Similarly, capacity building and awareness-raising activities done during the assessment phase will benefit the continuation of the participatory approach to the planning process.

2.6.1 In-depth focus on assessment

While the preceding chapter has considered both the ISWM assessment process and ISWM planning, the rest of the document focuses on the specifics of an ISWM assessment. The topic of ISWM planning is handled in other documents from UWEP and other programmes.

Chapter 3. **The ISWM Assessment Process**

3.1 Introduction

This chapter focuses on **what** to do in the ISWM assessment: the whole process of arriving at an assessment of the waste management system in a city, the steps to take and the expected outputs for each step. This chapter covers the following topics in detail:

- Steps to take in an ISWM assessment
- The importance of stakeholder mobilisation and Memorandums of Understanding
- The roles of various stakeholders in the ISWM assessment
- Outputs of the different steps

To be clear, Chapter 4 will build upon this chapter and concentrate on **how** to perform the ISWM assessment, i.e. the key research questions, data needed, indicators to use, tools and techniques. Chapter 5 will elaborate on the **practical issues** of implementing an ISWM assessment: roles of different actors, timing, budgeting etc.

3.2 Steps to take to implement the ISWM assessment

Implementing an ISWM assessment requires a number of steps, which can be divided into four stages, as shown in Table 2 and Figure 6. Not all of these steps are required for every assessment, nor do they have to follow this particular order, but taken together, they provide a helpful and reliable structure for the process. Certain steps can also occur simultaneously, at least if there are enough human resources to manage them. For example Stakeholder mobilisation (Step 3), MoU process (Step 4) and Capacity building (Step 5) can take place more or less at the same time. Capacity building (Step 5) is actually an ongoing process that also continues during Steps 6 and 7.

3.2.1 About financing an ISWM assessment

The mobilisation of funds for an ISWM assessment could be included in any of the steps in stages 1 and 2 and in practice there is a lot of variation in the way funds are allocated. In some cases, the municipal authority simply allocates a sum in their budget for planning and this is available before the process begins. Or, one stakeholder, such as a key NGO or platform, may receive external funding and then initiate the process. In other cases, the first steps may take place autonomously, that is, each stakeholder funds their own participation and only after the MoU is signed is it clear where the rest of the funds will come from. Because of this variation, financing, which is also discussed in greater detail in Chapter 5, is not considered as a separate step in the process.

No.	Stage	No.	Step
1	Preparing the ground	**1**	Initiate and start the process
		2	Set up the organisational framework
2	Building alliances and capacities	**3**	Stakeholder mobilisation and establishment of working group
		4	MoU process
		5	Capacity building
3	Producing the baseline document	**6**	Data collection, analysis, reporting and reviewing
4	Building consensus on the key issues	**7**	Identification and prioritisation of key issues

Table 2. Steps in an ISWM assessment process

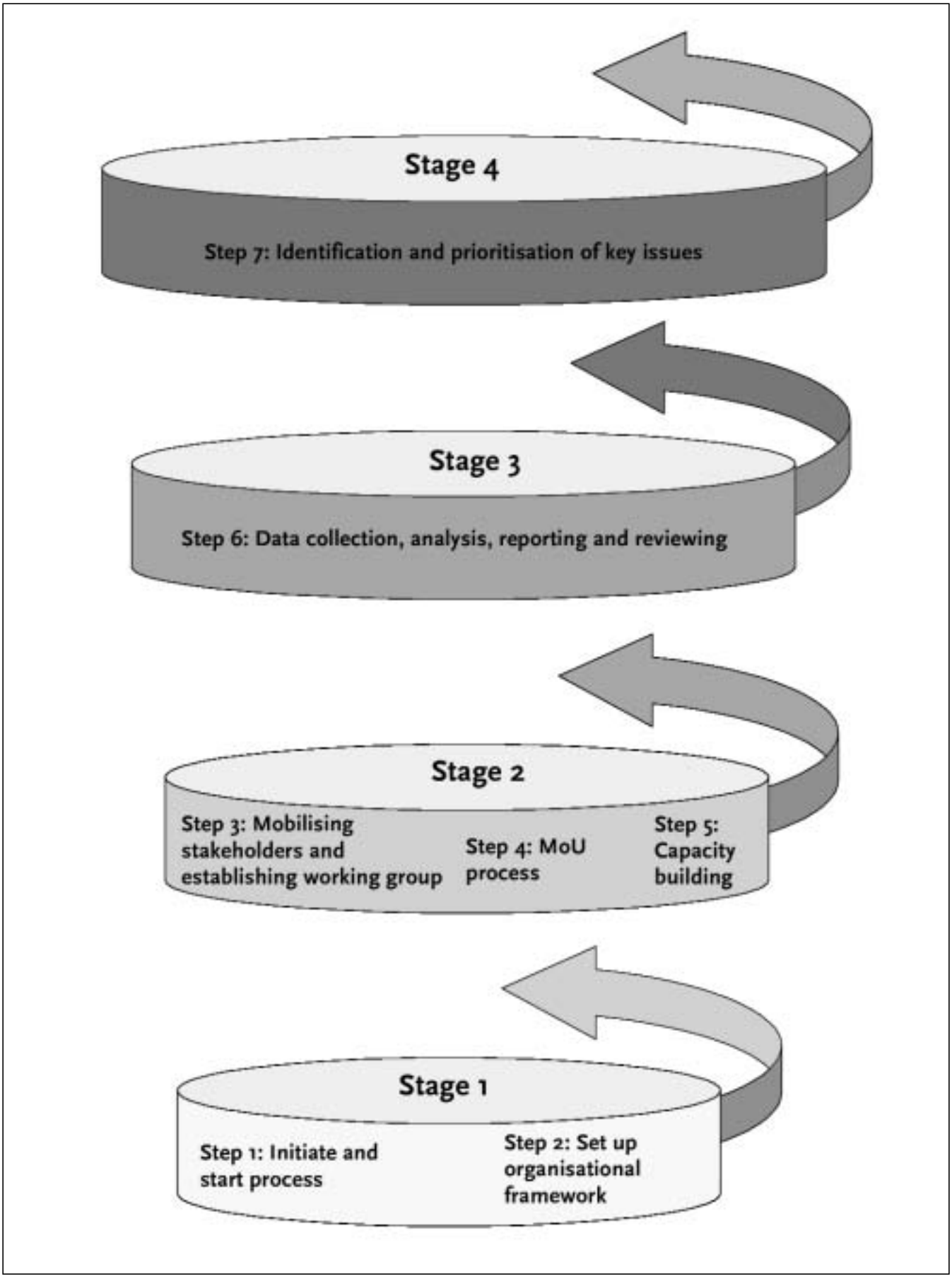


Figure 6. Steps in an ISWM assessment process

Figure created by Jeroen IJgosse and Verele de Vreede

3.3 Preparing the ground (stage 1)

3.3.1 Step 1. Initiate and start the process

Ideally the initiative for an ISWM assessment comes from local stakeholders in a particular locality, as this means there is a real interest in the issue of waste management and local demand for the outputs of an assessment. This initial demand can come from a variety of parties, for example a local municipality, a local NGO, a community activist, a private company or a combination of different local stakeholders, who then ask a national NGO, a consultancy firm or a donor agency for help with waste management. This will only become an ISWM assessment if the process facilitators are familiar with and endorse the concept of ISWM and the ISWM assessment methodology.

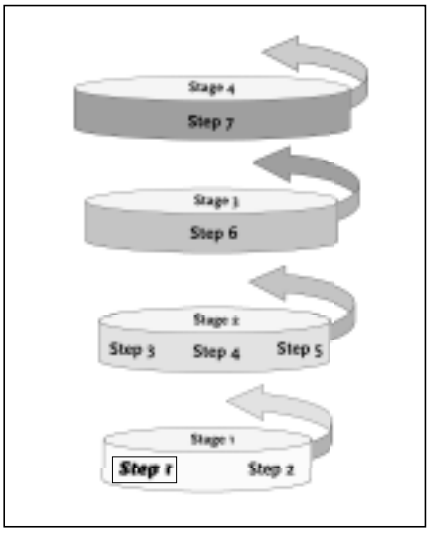
The initiator may or may not be the **lead agency**[7] , that is, the main implementer of the process, but at some point during the initial stage it is necessary for one organisation to take on this role. The lead agency moves from its own interests to explore and establish the need for the ISWM assessment process **among all the key stakeholders**. Another way of describing this process is **collective problem definition** and **action plan**. This is particularly important when the local authority responsible for waste management is not the initiator of the assessment process.

The problem definition and action plan together focus on:

- The problems that the ISWM assessment is designed to address.
- The steps envisioned in the implementation of the ISWM assessment.
- The expected outcome of the ISWM assessment.
- The benefits of a participatory approach to ISWM assessment.

So initiating an ISWM assessment means the lead agency working with other stakeholders to:

- Recognise a need or receive a demand for an assessment of waste management.
- Decide to use ISWM for this assessment.
- Establish contacts with the city and local stakeholders.
- Make the need or demand widely known in the locality.



Demand for an ISWM assessment can be stimulated by presenting the ISWM concept and methodology during conferences and through disseminating experiences with ISWM assessments among city stakeholders.

The lead agency often makes a high profile start of the assessment with a briefing/announcement workshop for various local stakeholders, to present the lead organisation, the programme or project framework and the ISWM assessment methodology. Meeting each of the various stakeholders in their respective locations works well when there is a high degree of polarisation about waste management, but it delays the beginning of a group process.

This lead agency has the key role in facilitating the process and sometimes will be referred to here as the **facilitating organisation**[8]. This organisation needs a **Terms of Reference** (ToR) for their activities and this ToR provides an important opportunity to gain common understanding of what the process will involve.

When the facilitating organisation agency is not the municipal government, it is essential to involve the municipality as early as possible in the process, so as to create legitimacy and local ownership of the initiative. Table 3 indicates the roles of various stakeholders in Step 1 of the ISWM assessment.

[7] Throughout the remainder of the document the term *lead agency* will be used

[8] Throughout the remainder of the document the term *facilitating organisation* will be used.

During the first phase of the UWEP Programme waste management research and pilot projects had been implemented in some cities that generated a local demand to upscale these processes to city level, based on the ISWM concept and approach. The facilitating organisation of UWEP Plus in Egypt, CEDARE, was approached by officials of the Red Sea Governorate, the provincial authority, with a request to support one of their cities with an waste management assessment and possibly planning process.

Box 1. Demand for an ISWM assessment in Egypt in UWEP Plus

Photo 4. Initial discussions between local authority of Quseir, Egypt and the facilitating organisation CEDARE

©CEDARE

Stakeholder	**Facilitating organisation**	**Working group** [9]	**Local authority**	**Non-governmental stakeholders**	**Advisers/resource persons**
Role 1	Receive and/or stimulate demand	--	Express demand	Express demand	Provide knowledge about iswm
Role 2	Secure funding	--	Secure funding	Secure funding	Secure funding

Table 3. Suggested roles of stakeholders in step 1, initiating and starting the process

Output, products, deliverables of Step 1

Each of the steps has some outputs or deliverables, which move the process one step further. In step 1 these usually are:

- Terms of reference for the lead agency or facilitating organisation
- A briefing/announcement workshop

[9] The working group is a multi-stakeholder group that guides the ISWM assessment and planning process. It will be explained further under Step 3.

3.3.2 Step 2. Set up the organisational framework

Once there is an initiative under way, it falls upon the facilitating organisation to put an organisational framework in place for the purpose of supporting the ISWM assessment process. This includes the following types of practical and logistical tasks:

- Designating or hiring working space
- Recruiting and selecting an ISWM city coordinator
- Starting up activities of the ISWM city coordinator
- Developing a work plan and a budget
- Dividing tasks within the facilitating organisation
- Identifying and formulating the need for specialist advice or consulting
- Setting up a monitoring and evaluation framework
- Establishing administrative procedures (reporting, financial procedures, etc.)
- Organising visits to the city and meetings with local stakeholders

Some of these tasks are expanded upon in the next paragraphs. The rest are either deemed self-explanatory or are covered in later sections and chapters.

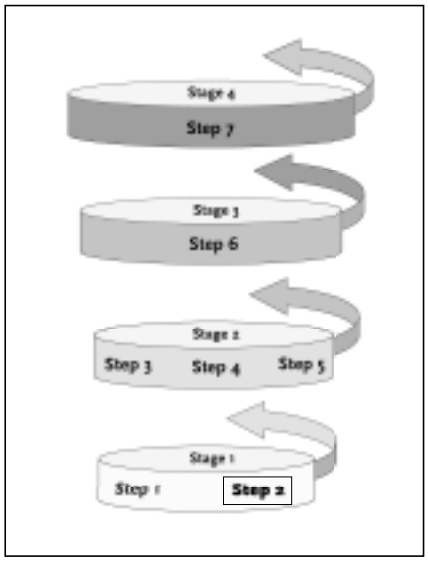
The ISWM assessment process needs to have a home, a **physical working space**. Often this is in the office of the facilitating organisation or in the offices of the municipality, but it can also be located:

- Inside the city council chambers
- At the premises of another key stakeholder such as a recycling end-use industry, an NGO or a school

The **ISWM city coordinator** is the individual who does most of the work on behalf of the facilitating organisation. When the lead is not with the municipality, the co-ordinator is also the link between the local authority and the facilitating organisation. A city coordinator can be:

- An employee of the facilitating organisation
- A local consultant or freelance professional
- An NGO staff member
- A volunteer who is offered a salary for their work during the assessment period
- A member of a local environmental commission
- An employee of the local city council or staff of the municipal public works department
- An intern finishing a university or technical education
- A competent individual from a different background

An important issue in relation to the city coordination is the internal communication needed within the municipality between the different departments. Especially if the city coordinator is not located physically within the municipality or a municipal employee. In this case the municipality has to assign a staff member that is responsible for this internal communication. If the ISWM city coordinator is a municipal employee this becomes an additional task for him or her.



Both successes and failures within the UWEP Plus programme lead to a strong recommendation that both the office and a city coordinator are based in the city where the ISWM assessment takes place. If the facilitating organisation does not have its home offices in the specific city, it is necessary to appoint a local co-ordinator who is based in the city and arrange local office space. A local office will ensure easier access for local stakeholders, more awareness of local developments, informal contacts with stakeholders and the like.

Within UWEP Plus, IPES, CAPS, CEDARE and ACEPESA all had cities at some distance from their home offices in the capital city and in the case of ACEPESA, the city of La Ceiba, Honduras was in a different country. IPES appointed a local co ordinator and set up a special office for them in the intervention city of San Andres, Peru ACEPESA (La Ceiba) and CAPS (Tingloy) appointed local co-ordinators who worked out of their homes and out of the local municipality offices, an arrangement that was agreed upon in the MoU. CEDARE appointed a local official also to serve as city co-ordinator, but also sent consultants from Cairo to Quseir and this created certain difficulties and meant that the ISWM process there was not very firmly rooted in the local community.

The **monitoring and evaluation framework** is needed for two principal purposes. The first purpose, more product-orientated, is to monitor the progress of the activities and expected products as laid down in the work plan. The second purpose, is to evaluate on a permanent basis more process related-issues such as:

- The participative approach used
- The strategies used to involve stakeholders
- The relation amongst stakeholders
- Enhancement of the ownership of the process
- The institutionalisation of the process
- The need for capacity building
- Approach to integrate all information

It is essential to ask the following kinds of questions on regular basis:

- In what way are the roles of the stakeholders involved changing? Why?
- Does this change effect the process negatively or positively?
- What corrective measures need to be taken? By whom?

Stakeholder	Facilitating organisation	Working group	Local authority	Non-governmental stakeholders	Advisers/resource persons
Role 1	Make organisational arrangements	--	Introduce facilitating organisation to the city	Express demand	--
Role 2	--	--	May provide office space and/or staff	May provide office space and/or staff	--

Table 4. Suggested roles of stakeholders in Setting up the organisational framework (step 2)

Outputs, products, deliverables of Step 2

The deliverables for step 2 include:

- Work plan and budget (further discussed in Chapter 5)
- Monitoring and evaluation framework
- Administrative procedures

3.4 Building alliances and capacities (stage 2)

3.4.1 Step 3. Stakeholder mobilisation and establishment of the working group

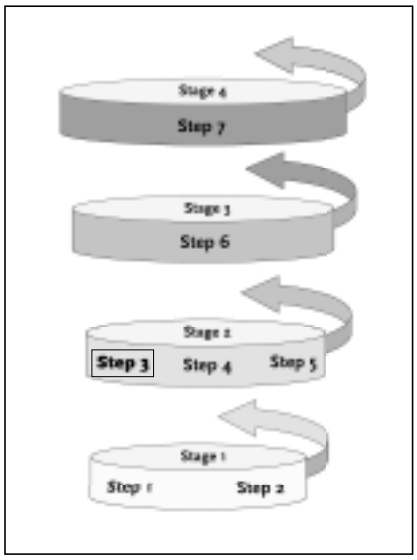
The facilitating organisation is responsible for facilitating the stakeholder mobilisation, which will need to be designed, planned, guided and monitored.

Stakeholder mobilisation means incorporating stakeholders into the ISWM assessment process as protagonists or subjects, each with specialised knowledge and resources. The benefits of this approach have been explained in Chapter 2.

There are two quite subtle goals to a stakeholder mobilisation, which are useful to articulate:

1. Opening **permanent channels of communication** between the facilitating organisation and local stakeholders, channels which are used both to exchange information and to give feedback, opinions and input to decisions. These channels must be real, trustworthy and they must be kept in good working order, to enable the establishment and maintenance of a climate of trust in the planning process.
2. Building into the assessment process **self-correcting mechanisms** that serve as early warning systems for deteriorating situations or plans being hi-jacked by particular interest groups.

Stakeholder mobilisation goes beyond talking to stakeholders, to giving them the primary role in making the assessment. This



may also mean inviting existing groups of stakeholders (such as a recycling association or a consumers' group) to participate in specific parts of the ISWM assessment process or, it may involve creating a working group, stakeholder platform or a waste management board. This is a group of stakeholders that meets regularly and has an official role in guiding and steering the ISWM assessment. Usually such a group has a stable core or executive committee and the larger participation fluctuates depending on the issues being discussed at any particular time. In the text we will use the term working group to refer to all these different forms. Chapter 5 will elaborate on their role. The facilitating organisation sets up a working group by:

- Identifying candidate organisations and individuals
- Inviting them to a formation meeting or workshop
- Choosing a regular or shifting meeting place
- Organising the launch of the group
- Securing a budget for activities
- Creating a work plan for the working group that includes goals, role, statutes, regulations, rules of the game and activities
- Serving as the secretariat and documenting meetings

The working group has a number of tasks, some of which are shared with the facilitating organisation. The tasks include:

- Participate in organizing consultative workshops / events
- Collect and study the existing information
- Assess the existing information
- Prepare documentations at various stages of the assessment process
- Participate in communicating and disseminating (intermediate) results to stakeholder groups
- Incorporate feedback from stakeholder groups into documents
- Participate in sensitising between stakeholder groups
- Participation in preparation of final document for City Council presentation and approval

In the UWEP programme, many of the lead agencies had budgets for their stakeholder platforms and working groups, but not all of the budgets were used for the same purposes. This is because the activity has different meaning in different cultures and also because the contribution of the lead organisation may make it unnecessary to cover some costs in the budget.

Some possible budget lines for the working group include:

- Travel allowance for coming to meetings
- Honoraria for participation, sometimes as a flat fee, sometimes as an attendance fee
- Allocation for communications, postage, email, telephone
- Purchase of equipment, such as a computer, digital camera
- Rental fees for meeting rooms for meetings
- Petty cash for office supplies, refreshments, gifts, participation certificates, flip chart paper, markers
- Funding for special events
- Tuition for training and capacity building
- Other costs

If the working group is not a permanent institionalised entity, it must be clear at the beginning what is to happen to any equipment or supplies after the completion of the assessment process.

Mobilising stakeholders in the beginning of an ISWM assessment process is usually not so difficult. However, keeping their interest and maintaining the momentum of the process, is much more complicated and requires more skills from the facilitating organisation. The ISWM assessment competes with other activities of stakeholders for which they might be paid. This means that it is important to plan the whole trajectory, including activities that raise and maintain their interest such as organising study tours, including lunch and beverage breaks in the programme of workshops and the like. The schedule should be flexible to take new developments into account.

Stakeholder mobilisation is an ongoing process. There should always be room to include new stakeholders later on in the process. Special attention needs to be paid to disadvantaged stakeholders ‘without a voice’ such as low-income groups, disabled people, informal actors and the like.

Stakeholder	Facilitating organisation	Working group	Local authority	Non-governmental stakeholders	Advisers/resource persons
Role 1	To set up and facilitate the working group	Develop procedures, internal regulations	Take part in working group	Take part in working group	Advise the working group
Role 2	To keep an antenna for uninvolved stakeholders	--	--	--	--

Table 5. Suggested roles of stakeholders in Stakeholder mobilisation (Step 3)

Outputs, products, deliverables of Step 3

- Working group formation
- Minutes of meetings with a more loose (existing) stakeholder group involved in the assessment

3.4.2 Step 4. MoU process

A Memorandum of Understanding (MoU) is a written agreement between various parties (An example is given in Annex 3). It is the outcome of a negotiation process and details rights and responsibilities, duties and contributions of the parties to it. It may or may not have legal status. While there may already be formal or informal agreements in the city, the UWEP experience suggests that a special MoU covering the ISWM assessment (or planning) process is useful, even if it is a new annex to an existing agreement (as was the case in Bamako).

An MoU helps the process because:

- It makes the responsibilities and contributions of various parties to the ISWM assessment explicit.
- It strengthens the idea that the ISWM assessment is a cooperative effort.
- It contributes to creating a feeling of ownership.
- It can give a degree of legitimacy to the ISWM assessment process.
- The parties commit themselves with (financial) contributions.

An ISWM assessment without an MoU is possible. However, this has more potential for conflicts, as there may be expectations about funding that have not been made explicit or responsibilities may overlap. On the other hand, there may be circumstances where it is better to begin the assessment without an MoU. In Bangalore, in UWEP Plus, this proved to be the case: key stakeholders were interested in the process and ready to engage, but securing an official written commitment from the municipality took many months. Municipal officials actually participated actively in the process although an official written commitment was not attained.

An MoU is different from a work plan, as it focuses on different issues such as roles and responsibilities, contributions and the

Photo 5. Signing of the MOU in San Andres, Peru by the key stakeholders involved.

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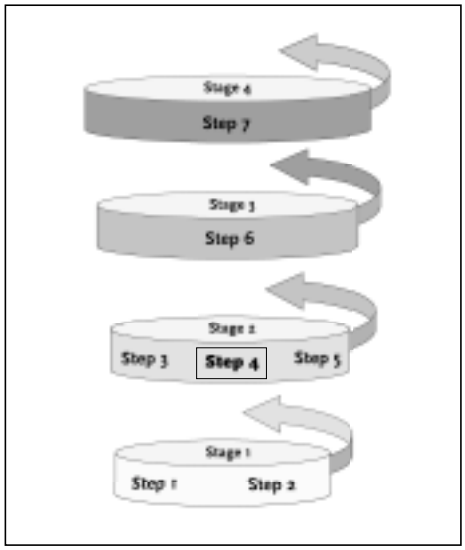


like. A detailed work plan may in some cases be included as an annex to the MoU.

In order to get to an MoU, some or all of the following activities are usually necessary:

- Holding preliminary discussions with organisations that may be interested in signing an MoU
- Deciding on organisations to sign MoU
- Negotiating roles, responsibilities and contributions with potential signatories
- Preparing a draft MoU
- Discussing the draft MoU with potential signatories
- Finalising the text of the MoU
- Signing the MoU, sometimes with a high-profile ceremony or coinciding with the presence of a foreign visitor
- Monitoring implementation of the MoU

The signing of the MoU can be a useful occasion to launch the ISWM assessment officially and draw media attention to the process.

The stakeholders involved in the development and signing of the Memorandum of Understanding (MoU) will be those with primary responsibility for facilitating the assessment process. Some, such as the City Council, may also have to officially approve the assessment and, in the case where there is also a plan, will have responsibility for accepting and implementing the recommendations.

The key signatory to an MoU will in most cases be the City Council, because they are usually legally responsible for waste management services, but it may also be the office of the Mayor. In UWEP Plus, the lead agency role was usually taken by an NGO or consultancy company already working with an institutionalised stakeholder platform, so both of these, together with the municipality, were key signatories to the MoU. Table 6 indicates the roles of various stakeholders in Step 4 of the ISWM assessment.

Stakeholder	Facilitating organisation	Working group	Local authority	Non-governmental stakeholders	Advisers/resource persons
Role 1	Develop MoU	May help develop MoU	May help develop MoU	May help develop MoU	May help develop MoU
Role 2	Commonly signatory to MoU	Possible signatory to MoU	Commonly signatory to MoU	Possible signatory to MoU	
Role 3	To monitor/ evaluate effectiveness of MoU	--	--	--	--

Table 6. Suggested roles of stakeholders in the MoU process (Step 4)

Outputs, products, deliverables of Step 4

- Memorandum of Understanding (MoU) signed by relevant parties

3.4.3 Step 5. Capacity building

Participation of local stakeholders is only possible if they understand what the ISWM assessment is about and if they have the skills to take a role. Often these skills need strengthening, not because the stakeholders lack experience, but because their experience is concentrated in some areas and missing in other areas. Chapter 5 says more about the specific types of skills needed for an ISWM assessment, which divide into two general types:

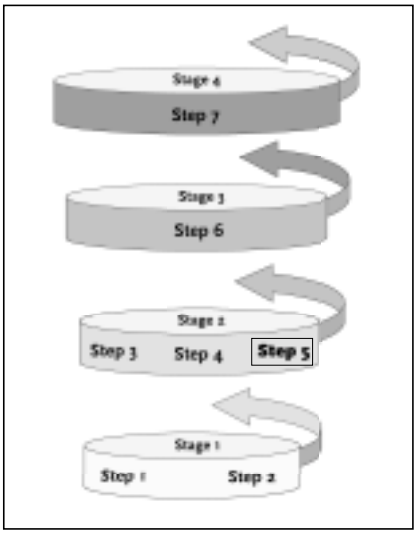
- Facilitation, mentoring and coordinating skills
- Data collection, analysis, reporting, documentation and presentation skills

The assessment process provides a valuable opportunity to strengthen both these *'process'* and *'technical'* skills and in the process to build intellectual and institutional capital in the city, that will continue to support development even after the end of the assessment itself. Technical training focusing on waste characterisation is useful, but a workshop on organising and facilitating meetings is just as important. In either case, when the active period of assessment is over and the lead organisation steps back into its normal role, there will still be people who can continue the assessment and planning work.

Step 5 includes, normally, some or all of the following activities:

- A needs analysis to identify missing skills and capacities.
- Identify specific capacity building for the stakeholders choosing to participate.
- Make a plan for providing training and supplementing existing skills.
- Conduct the trainings.
- Evaluate the effectiveness, re-visit the previous mentioned needs analysis and begin the cycle again.

It is good to have a mix of people and organisations, selected from the group of local organisations and individuals who are stakeholders in the ISWM assessment. This may include



politicians and decision-makers or municipal technical staff, NGO staff or board members, owners or employees of recycling enterprises, etc. An innovative strategy is to have each participant sign an agreement that if they are allowed to participate, they will commit a certain amount of time to the process, make one or more presentations and the like.

Capacity building can take different shapes, such as seminars or workshops (one to three days), training courses (usually several days), study tours, on-the-job training, peer exchange, as well as participation in national or international conferences. The most appropriate form needed will depend on the identified missing skills and needs of the individual stakeholders, as well as the functions these stakeholders have within their organisations. For example, on-the-job-technical training on waste characterisation studies or time and motion studies may be more appropriate for municipal operational staff and not for municipal decision-makers. Box 2 shows some capacity building events that were organised a part of the UWEP Plus programme.

International events involving regional programme managers and city coordinators:

- Start Seminar in Costa Rica (training on project management, producing the baseline document and MoU process)
- Mid-term seminar in Varna, Bulgaria (peer exchange between new and old regions)
- Training in Lima, Peru (training on ISWM assessment methodology)

Examples of events involving local stakeholders:

- Training on ISWM assessment methodology and participatory planning
- Training in waste characterisation and generation studies
- Training in routing and time and motion studies
- Guided field visits to waste-related activities in the UWEP Plus city
- Study tours to other cities and countries
- Mapping of city with 'waste focus'
- Taking pictures of the city with 'waste focus'

Box 2. Capacity building events organised as part of UWEP Plus

During UWEP Plus programme study tours and guided field visits turned out to be particularly useful, validating the idea that 'seeing is believing'. For example in La Ceiba, Honduras a study tour was organised for municipal staff to a major landfill, materials recovery facilities and other waste related activities in Costa Rica. The study tour was sponsored by the La Ceiba municipality. Guided field visits were organised in a number of UWEP Plus cities for Waste Management Boards or working groups, for example in Bangalore and in San Andres, Peru where local stakeholders visited the capital Lima. WASTE staff organised a study visit for Bulgarian UWEP Plus programme staff and local stakeholders, to learn about the management and institutional context for safe handling of household hazardous waste in the Netherlands.

Capacity building, like stakeholder mobilisation, should be an ongoing process during the assessment. Table 7 indicates the roles of various stakeholders in Step 5 of the ISWM assessment.

Photo 6. Field visit to municipal disposal site in San Isidro de Heredia, Costa Rica during UWEP training event
©WASTE, AnneScheinberg

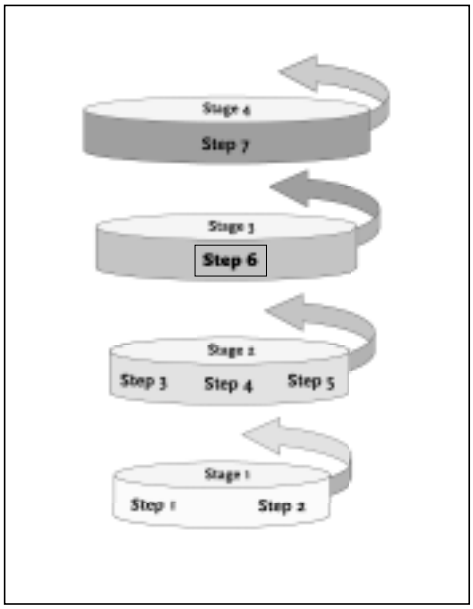
Stakeholder	Facilitating organisation	Working group	Local authority	Non-governmental stakeholders	Advisers/resource persons
Role 1	Identify capacity building needs	Express capacity building needs	Express capacity building needs	Express capacity building needs	Identify capacity building needs
Role 2	Co-organise capacity building				
Role 3	Provide capacity building	Participate in capacity building events	Participate in capacity building events	Participate in capacity building events	Provide capacity building

Table 7. Suggested roles of stakeholders in Capacity building (Step 5)

Outputs, products, deliverables of Step 5

- Capacity building events, trainings, workshops
- Programmes, study materials and proceedings of the above
- Programmes and reports from study tours
- Increased capacity of the stakeholders.

3.5 Producing the baseline document (stage 3)



3.5.1 Step 6. Data collection, analysis, reporting and reviewing

The baseline document describes the current waste management system in the selected city. It consists of different sections related to three main dimensions of the ISWM concept: stakeholders, waste system elements and sustainability aspects. The conclusion often discusses the integration of the three ISWM dimensions in order to arrive at a fully integrated view of the waste management system in the city under study.

The facilitating organisation is responsible for organising the activities of Step 6, which include:

- Developing a research plan, in consultation with key stakeholders
- Training of stakeholders as data collectors and analysts
- Collection and analysis of data
- Repeat visits to the field for verification of data or resolution of things which are not clear or accurate
- Preparation of draft baseline report
- Socialising the baseline: organising presentations, verifying details and gathering feedback from stakeholders
- Incorporation of results of socialisation into final report
- Presentation and dissemination of the report to stakeholders and technical or professional advisers political authorities etc.

The research plan defines the methods for collecting and analysing data, as well as setting parameters for how many data points, degree of accuracy, methodology, checks and the like. Key questions, indicators, data needs and research methods differ according to the focus of the assessment and some additional detail is presented in Chapter 4.

Stakeholder	Facilitating organisation	Working group	Local authority	Non-governmental stakeholders	Advisers/resource persons
Role 1	Organise feedback on research plan	Provide feedback on research plan	Provide feedback on research plan	Provide feedback on research plan	Develop the research plan
Role 2	Organise and facilitate training and data collection/ analysis	Provide and/or collect and/or analyse data	Provide and/or collect and/or analyse data	Provide and/or collect and/or analyse data	Provide training Collect and/or analyse data
Role 3	Organise feedback on draft report	Provide feedback on draft report	Provide feedback on draft report	Provide feedback on draft report	Write report

Table 8. Suggested roles of stakeholders in Data collection, analysis, reporting and reviewing (Step 6)

Outputs, products, deliverables of Step 6

- Research plan
- SWM assessment baseline document

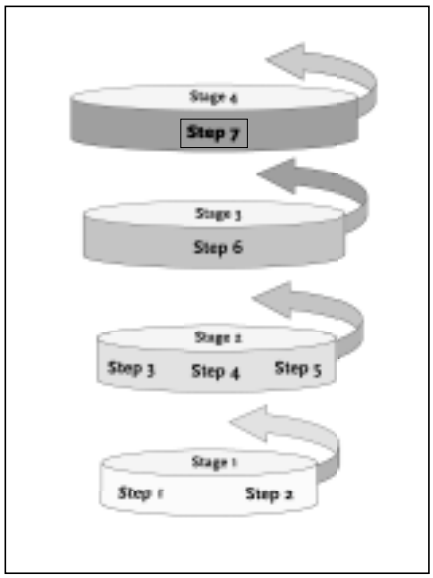
3.6 Building consensus on key issues (stage 4)

3.6.1 Step 7. Identification and prioritisation of key issues

The baseline document describes the waste management system in a city in an ISWM framework. However, this information should be the basis for action. Therefore consensus needs to be built among the local stakeholders on the main problems and bottlenecks regarding:

- Efficiency
- Effectiveness
- Equity
- Fairness
- Sustainability

When the key issues have been identified, they need to be prioritised: which key issues are the most important to be addressed?



Key issues can be identified in two basic ways:

- During the production of the baseline document (by the working group and/or by the local/external advisers)
- Key issues can also be forwarded by a group of diverse stakeholders, e.g. during a workshop

Various techniques can be used to rank and prioritise key issues in a group process. Chapter 4 will explain these further.

Table 9 indicates the roles of various stakeholders in Step 7 of the ISWM assessment.

Stakeholder	Facilitating organisation	Working group	Local authority	Non-governmental stakeholders	Advisers/resource persons
Role 1	Organise and facilitate workshop(s)	Identify and prioritise key issues	Identify and prioritise key issues	Identify and prioritise key issues	Identify and prioritise key issues

Table 9. Suggested roles of stakeholders in Identification and prioritisation of key issues (Step 7)

Outputs, products, deliverables of Step 7

- List of key issues and priorities

3.7 Summary of the steps

Nr.	Steps	Activities	Outputs
1	**Initiate and start the process**	- Recognise a need or receive a demand for an assessment of waste management - Decide to use ISWM for this assessment - Secure funding - Establish contacts with the city and local stakeholders - Make the need or demand widely known in the locality	- ToR for facilitating organisation - Briefing/ announcement workshop
2	**Set up organisational framework**	- Designate or hire office space - Develop a work plan and a budget - Divide tasks within the facilitating organisation - Identify the need for external advice - Set up a monitoring and evaluation framework - Establish administrative procedures (reporting, financial procedures, etc.) - Visits to the city and meetings with local stakeholders - Select a city coordinator	- Work plan and budget - Monitoring and evaluation framework - Administrative procedures
3	**Stakeholder mobilisation and establishment of working group**	- Identify potential members - Decide on a venue - Organise launching - Work with the group to develop their role and activities - Develop statutes or internal regulations - Monitor meetings	- Functioning working group, Stakeholder platform or Waste Management Board - Minutes of meetings with existing stakeholder groups
4	**MoU process**	- Hold preliminary discussions with organisations - Decide on organisations to sign MoU - Negotiate roles, responsibilities and contributions with potential signatories - Prepare a draft MoU - Discuss the draft MoU with potential signatories - Finalise text of MoU - Organise signing of MoU - Monitor implementation of the MoU	- Memorandum of Understanding (MoU) signed by relevant parties
5	**Capacity building**	- Select target groups for capacity building - Identify capacity building needs - Identify the most appropriate methods to build capacities - Deliver capacity building	- Capacity building events, e.g. workshops and study tours - Reports about capacity building events
6	**Data collection, analysis, reporting and review**	- Develop a research plan - Train stakeholders - Collect data - Analyse data - Write draft report - Organise and gather feedback from local stakeholders - Adapt and finalise report - Present the report to stakeholders and disseminate findings	- Research plan - ISWM assessment baseline document
7	**Identification and prioritisation of key issues**	- Identify main problems, bottlenecks, key issues - Prioritise key issues	- List of key issues and priorities

Table 10. Summary of the steps in the ISWM assessment process

Chapter 4. **Content and Techniques in the ISWM Assessment**

4.1 Introduction

This chapter concentrates on how to implement an ISWM assessment from a technical point of view, that is, the topics that are the focus of the assessment and the techniques that can be used to collect and analyse data and to prioritise key issues. It can be thought of as more detail about Step 6 and 7 in Chapter 3.

This chapter covers the following issues:

- Scope of the assessment
- Substance of the ISWM assessment
- Key research questions, data needs and indicators
- Methods, techniques and tools
- Presentation of the outcome

4.2 Scope of the ISWM assessment

The scope of the ISWM assessment sets the boundaries of what will be assessed, specifying what to include and what to leave out. Table 11 shows three key decision points: the area of study, the type of waste to include and whether to include both liquid and solid waste.

The choice of focus - which waste streams and which wastes - depends most heavily on the goals of the assessment and where the initiative is coming from. In many countries, an assessment with a local authority as lead agency will focus on those wastes that are fixed in law as a municipal responsibility: usually waste materials generated from domestic, commercial and institutional sources.

Decision points	Examples	Determining factor	Remarks
Area of study	Neighbourhood, city, province, region	Political or governance units, privatisation or collection zones geographic areas, watersheds	There may be competing factors
Solid waste types	- Municipal solid waste (household, commercial, institutional waste) - Industrial waste - Dredge spoils and harbour waste - Medical or other special waste - Construction and demolition waste - Wastes from electronic and electrical equipment (WEEE)	- Goals of the assessment - Jurisdiction and priorities of the lead agency - Focus or limitation of financing - Availability of information - State of the art, previous initiatives - Nature of legislation and definitions in legislation	While the approach is similar, different types of waste are differently regulated and the stakeholders are different
Liquid waste types	- Industrial and wastewater treatment sludges - Drainage clean-outs - Latrine and pit latrine wastes and septage - Contaminated water		The choice to include liquid waste depends on the type of sanitation and goals of the assessment

Table 11. Determining the scope of the ISWM assessment

Even with this limitation, the influence that other fractions and types of waste have on the management of municipal solid waste usually means some focus outside of the designated area as well. In Blagoevgrad, Bulgaria, for example, there are no specific facilities for disposing of bricks, plaster, asbestos and other demolition materials, so that these are either illegally dumped or combined with municipal waste. Even though the municipality is technically not responsible for them, a complete ISWM assessment will need to include them. Similarly, infectious health care waste or hazardous waste from small scale industrial activities often end up in the municipal waste containers, so a complete assessment cannot ignore them.

4.3 The content of an ISWM assessment

The ISWM assessment has two main parts, a descriptive part that describes the current waste management situation and conclusions that identify key issues that need to be addressed. The descriptive part is most often, within the UWEP programme

and elsewhere, referred to as the baseline (An example of the table of content of the baseline is given in Annex 2). The conclusions are referred to as the key issues and problem definition.

4.3.1 Baseline

The baseline includes the following:

1. Stakeholder analysis: a description, classification and analysis of the **stakeholders** involved in the waste management system their interests, influences, roles and responsibilities.

2. Waste system elements analysis: a listing and description of the presence and functioning of the various waste system elements; how waste materials and fractions are stored, collected, transported and processed. Specifically, this includes describing:
   - The **flow** of waste materials and fractions within the system and between elements.
   - The materials **balance** of the system, showing inputs and outputs and tracking all materials.
   - Who is responsible for the activities undertaken in the different waste system elements.
   - Waste laws, policies and financing mechanisms and how these are translated into practice in the city. For example, is there a policy commitment to the waste management hierarchy and is this observed in practice?

3. Analysis of the system using the 'lens' of the six sustainability aspects:
   - The legal and policy framework within which the waste management system operates environmental and waste related laws, (inter) national waste policy and plans.
   - The economic and financial aspects of the operation of the waste management system the costs, fees, budgeting, whether the activities focus on providing services or using waste as an input for production and recycling, etc.
   - The social-cultural aspects influencing the waste management system, including religion, gender, ethnicity, community character, culture, income levels and the like.
   - The environmental and health implications of the waste management system. This includes working conditions of those involved in waste operation activities, levels of contamination and pollution, effectiveness of collection and processing systems.
   - The institutional and organisational characteristics of the waste management system: which agencies have planning responsibility and how does this relate to operations; is some part of the system privatised; does the National ministry have direct control; or is there meaningful decentralisation and devolution and the like.
   - The performance and technical aspects of the system: what actually occurs in practice, what kinds of equipment are used to pick up which kinds of waste how well is it working what percent of the city receives collection and how is this organised and the like.

4.3.2 Key issues and problem definition

The 'key issues and problem definition' document represents the results of a series of stakeholder consultations identifying the key issues, problems and bottlenecks in the waste management system. It is also designed to set out the priorities for desired change.

4.4 Key questions

The ISWM assessment aims to provide decision makers the tools to understand waste management in their locality more profoundly and to give an answer to the question: **What happens to the waste generated in my location?** Figure 7 shows a schematic overview of the key questions of the ISWM assessment and their relation to the main question of what happens to the waste.

Each of these key questions can be translated into a data set o an indicator, which can in turn be researched using various methods and techniques. The results, when presented and discussed, form the basis to define the priorities or refine the options.

4.5 Stakeholder identification, mobilisation and analysis

Within an ISWM assessment, there are three main activities around stakeholders:

- Stakeholder identification and classification
- Stakeholder mobilisation
- Stakeholder analysis

4.5.1 Stakeholder identification and classification

The first activity is identification of stakeholders, that is, defining the universe of who is a stakeholder. This is done much more broadly within ISWM than in more traditional, engineering oriented assessment and planning processes.

Traditional planning usually considers the interests and influences of a narrow range of stakeholders, mostly limited to service providers, public officials and the initiators of the planning process. In most cases, these are initially consulted in formulating the plans and programmes, but they are often not invited to provide feedback on the plans themselves, nor do they have any role in ongoing management or monitoring of the services.

ISWM includes a far larger group of stakeholders than this narrow definition, ranging from households and shopkeepers, waste pickers and employees of collection and street sweeping,

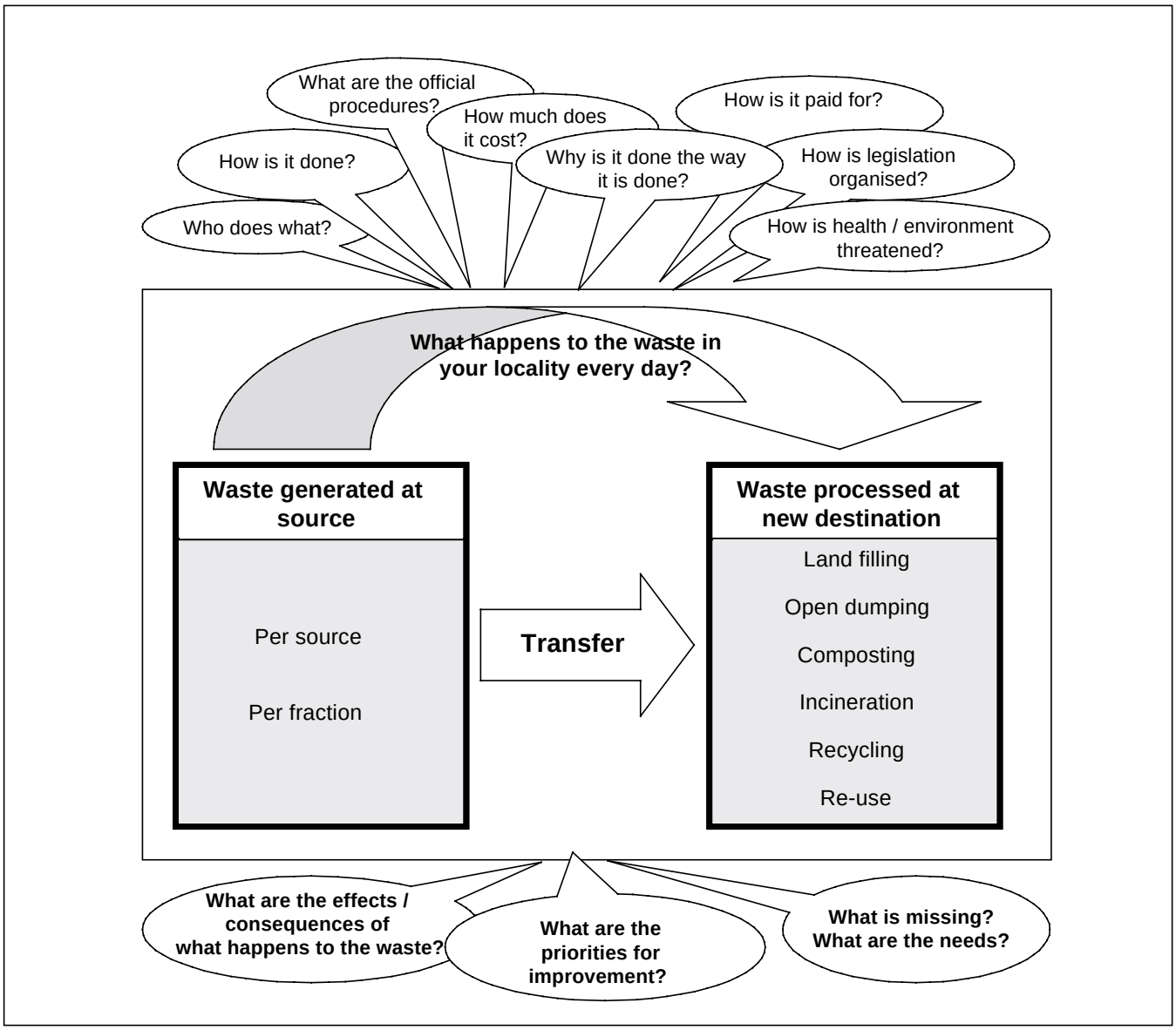


Figure 7. Key questions to understand waste management

Figure created by Jeroen IJgosse

people living close to disposal sites, to private sector and institutional waste generators, to packaging companies, hospitals, universities, highway departments and the like. Importantly, ISWM gives formal sector and informal sector stakeholders the same weight and the same access to the process.

These stakeholders can roughly be classified as follows:

1. **The municipality or local authority:** in most cases the major stakeholder and the most important one in most cities. There can also be different stakeholders within the local authority, specifically: the city council, the mayor, the designated municipal authority with enforcement jurisdiction and the municipal department(s) responsible for waste management.
2. **Other recognised stakeholders from the national government**, including ministries of local government, finance, internal affairs, environment[10], health[11] and public works.
3. **Recognised private stakeholders**: usually operators of waste management services such as waste collection and landfill operators, street sweepers, owners and operators of disposal facilities. These may also include the informal sector waste pickers.

[10] Ministries of environment have a surprising lack of influence as waste management stakeholders in most Southern countries and also sometimes in transition countries. Environmental ministries tend to concentrate on green (bio-diversity, natural area protection) and blue (coastal zone, water, air) environmental issues. They may be responsible for rulemaking about the brown (urban, waste, energy waste, transport) environmental sector, but in the South planning and practical implementation are usually the responsibility of municipalities, whose ministry is Local Government.

[11] In certain cases, as is in Costa Rica, the ministry of health also has a fundamental role to play in regulation and enforcement in waste management issues. This can lead to situations were there is of overlap and conflict in authority.

4. **Unrecognised private stakeholders**: these are stakeholders who are involved in the generation, processing or use of waste materials, but seem outside the main system. This includes formal recycling industries, hospitals, schools, the military and other large institutional waste generators, companies and industries, water and utilities authorities, environmental or recycling NGOs and CBOs and other activist organisations and local experts. Depending on the local context other stakeholders may be present but unrecognised by the local authorities.
5. **Expected stakeholders** (based on general knowledge of solid waste planning processes): these include large, medium and small waste generators recognised and unrecognised private enterprises involved in repair, reuse, recycling, waste collection and cleaning services; employees of the waste management companies and public agencies and their labour unions; regional and national end-user industries in the paper, glass, metal and textile sectors branch organisations for autos, batteries, electronics, white and brown goods; and packaging agricultural co-operatives fertiliser and soil producers and brokers large users of soil and soil conditioners (for example, cemeteries, golf courses, nurseries and housing developers) park and natural area authorities.
6. **Resource stakeholders**: those whose participation can enrich or bring resources to the process. These include, based on specific local conditions: multi-nationals who follow solid waste interests, such as Coca Cola, Procter and Gamble, Tetra-Pak and MacDonalds; large prominent local industries, such as those who formed BATF in Bangalore; resource-based manufacturing and energy industries public and private utilities [12] (the water company in San Isidro de Herédia is a major resource stakeholder); universities and research institutes transport and tourism industries and institutions and the like. The press and media can also be resource stakeholders, as can, under certain circumstances, political parties or international donor agencies.
7. **Risk stakeholders**: those whose reactions or forgotten interests represent risks to the process. The most common risk stakeholders are the neighbours ('abutters') to disposal facilities and proposed disposal sites. Risk stakeholders also include those suffering environmental or health effects from existing disposal activities, such as fishermen whose catch is reduced by discharges from a landfill. In Bangalore, a large compost facility outside the city, designed to handle Bangalore city waste, was closed by the violent riots of farmers, protesting what they believed where the negative health effects on cattle drinking from the pond where the leachate from the composting windrows was accumulating. Risk stakeholders are always angrier if they have not been consulted in the beginning stages of the process.

4.5.2 Mobilisation and engagement of stakeholders

Mobilisation, also called engagement, is the process of contacting each stakeholder or stakeholder group and inviting them into the process. This can occur rapidly in certain cases, but at other times it requires an entirely separate trajectory for building trust and confidence. For example, gaining participation of Roma women informal street-sweepers in Blagoevgrad and of contracted women street sweepers in La Ceiba, both required a whole preliminary process, with a series of 8-15 facilitated meetings, confidence-building exercises and the like. During this process some of the attendees dropped off, others emerged as leaders and it was possible to speak of group identification. Only after that was it possible to understand what the interests of this group in the planning process were.

On the other end of the socio-economic scale, it also took almost two years for Mythri, the UWEP programme partner, to gain the confidence and co-operation of the high-profile BATF, representing private sector stakeholders. Here too, it was necessary to attend meetings, have individual and group conversations, agree and re-negotiate priorities and the like, before BATF became fully engaged in the process.

Engagement of stakeholders also means giving them protagonist or subject roles in the process of creating the baseline and making the ISWM assessment. In Bulgaria, where ideas about participation of the public are new and still considered quite radical, this meant deliberately shifting the emphasis on training and capacity building: IEM, the UWEP partner, at first thought to train only local professionals and operators, but gradually came to the opinion that waste generators, businesses and the public had important roles in the process. In Quseir, Egypt, this 'giving away' of authority did not really occur: there the tradition of centralised management proved too strong, although the ISWM assessment provided an opportunity to introduce the concept of listening to unrecognised stakeholders such as Bedouin scavengers and local residents.

4.5.3 Stakeholder analysis

The process of stakeholder analysis occurs in parallel with the process of stakeholder mobilisation and sometimes the two are impossible to separate. But while mobilisation focuses on engaging stakeholders in a new process, analysis focuses on understanding their roles as actors within the existing system.

In the UWEP programme, the stakeholder analyses in the different cities used a variety of techniques drawn from the methods of Participatory Rapid assessment (PRA), as well as from other social and action research techniques, see Table 12 for an overview.

[12] In San Isidro de Heredia the department of environment of the national electricity company has a major resource stakeholder and recently also the provincial public cleansing company of the province of Heredia.

Topics	Methods and techniques	Presentation of the results
Roles and responsibilities, activities, timing	- Working group plan of action - Priority-setting and ranking exercises - Individual, semi-structured interviews - Diagramming - Field visits/observation, photos, videos - Maps - Local initiatives study	- Maps - Priority documents - Work plan - Timeline
Relations/alliances/ conflicts	- (Semi-structured) interviews - Diagramming - Focus group meetings - Interests and influences analysis - Transects and group mapping exercises	- Stakeholder relationship diagram - Interest and influence matrix - Minutes of focus groups - Vector diagrams - Venn diagram
Problems	- Objectives Oriented Project Planning (OOPP) - Role-playing and conflict resolution - Cartooning, caricatures, humour - Field visits, triangulation - Team-building and trust-building exercises - Time and motion studies - Historical analysis	- Problem tree - Problem circles
Interests	- Power exercises, differences between power over, power with, power to - Diagramming - Gender analysis	- Vector diagrams
Influence on decision-making	- Small-group discussions - Workshops and seminars - Diagramming - Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis	- Minutes, group documents - SWOT diagram
Socio-economic differences	- Home visits - Literature review and reading of popular literature - Women's' group meetings - Role-plays - Life history exercises - School-based initiatives - Daily schedule and weekly activity analysis - Wealth ranking - Gender analysis - Mapping exercises and transects	- Personal narratives - Photo-documentation - Life histories - Art, literature, music - Daily and weekly schedules - Maps
Willingness and ability to pay	- Willingness to pay studies - Analysis of payment records - Seasonal activity documentation - Gender analysis	- Pricing schemes, pricing schedules
Behaviour	- Interviews and role-plays with children - Field visits/observation - Photo- and video documentation - Surveys focusing on neighbours' behaviour	- Photos, videos - Reports
Strengths, Weaknesses, Opportunities and Threats	- SWOT analysis	- SWOT diagram

Table 12. Topics, techniques and presentation approaches for the Stakeholder analysis

One technique used widely was to visualise the roles of stakeholders and the relationship between them in a so-called stakeholder diagram. Figure 8 shows an example of a stakeholder diagram developed as part of the ISWM assessment training carried out within the UWEP programme. The diagram shows the following information regarding the stakeholders involved in hazardous waste management in Varna, Bulgaria.

- The **stakeholders**: in this case a distinction is made between the key or main stakeholders and the other stakeholders
- The **nature of the relationship** between the stakeholders and whether this relationship is bi-lateral or only one way
- The **role** of the stakeholders

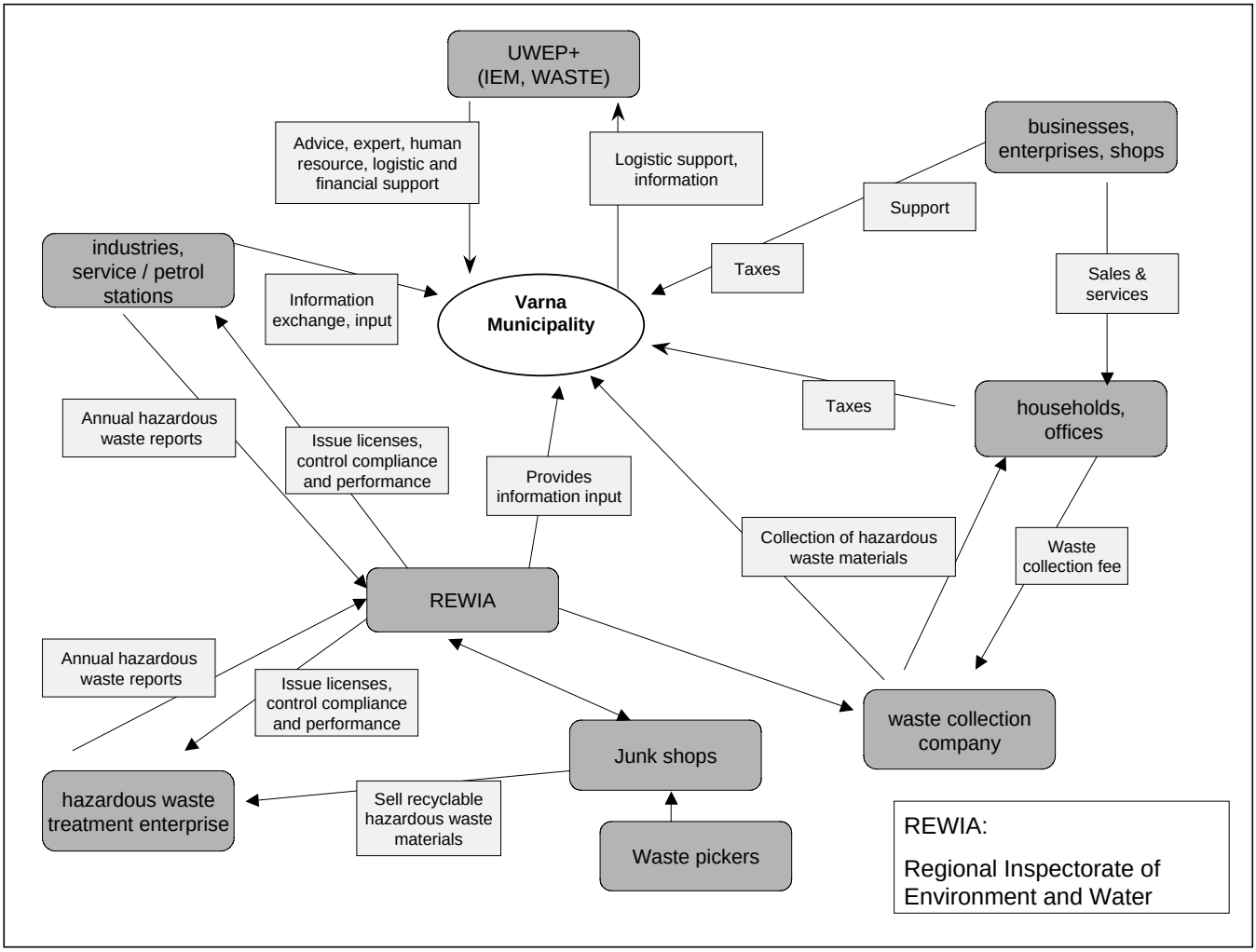


Figure 8. Analysis of stakeholders involved in hazardous waste management in Varna, Bulgaria using a Stakeholder relation diagram

The diagram can be extended to include those stakeholders outside the geographical boundaries of the assessment (i.e. the national government) or to assess the relationships between all the stakeholders not only between the main or key stakeholder and the other stakeholders.

4.5.4 Influence and Importance Matrix

Another way of analysing stakeholders and assessing their potential role in an assessment and/or strategic planning process is to determine their influence on the process and their importance for the process.

Influence in this context refers to how powerful a stakeholder is. That is the power or ability to persuade or coerce others into making decisions, to control the decision making process, to facilitate the implementation of the outcome of the assessment or strategic planning process. Assessing influence may be difficult and involves interpretation of factors such as:

- degree of dependence on other stakeholders
- degree of organisation, consensus and leadership within the stakeholder group
- authority of leadership

Importance refers to those stakeholders whose problems, needs and interests are the priority of the assessment and/or strategic planning process - if these 'important' stakeholders are not included then the assessment and/or strategic waste management plan cannot be considered a 'success'.

These two criteria can be combined using a matrix diagram[13]. Figure 9 gives an example of the influence stakeholders have in Bamako, Mali and their importance for the outcome of the ISWM assessment and strategic waste management plan. Table 13 lists the stakeholders for reference.

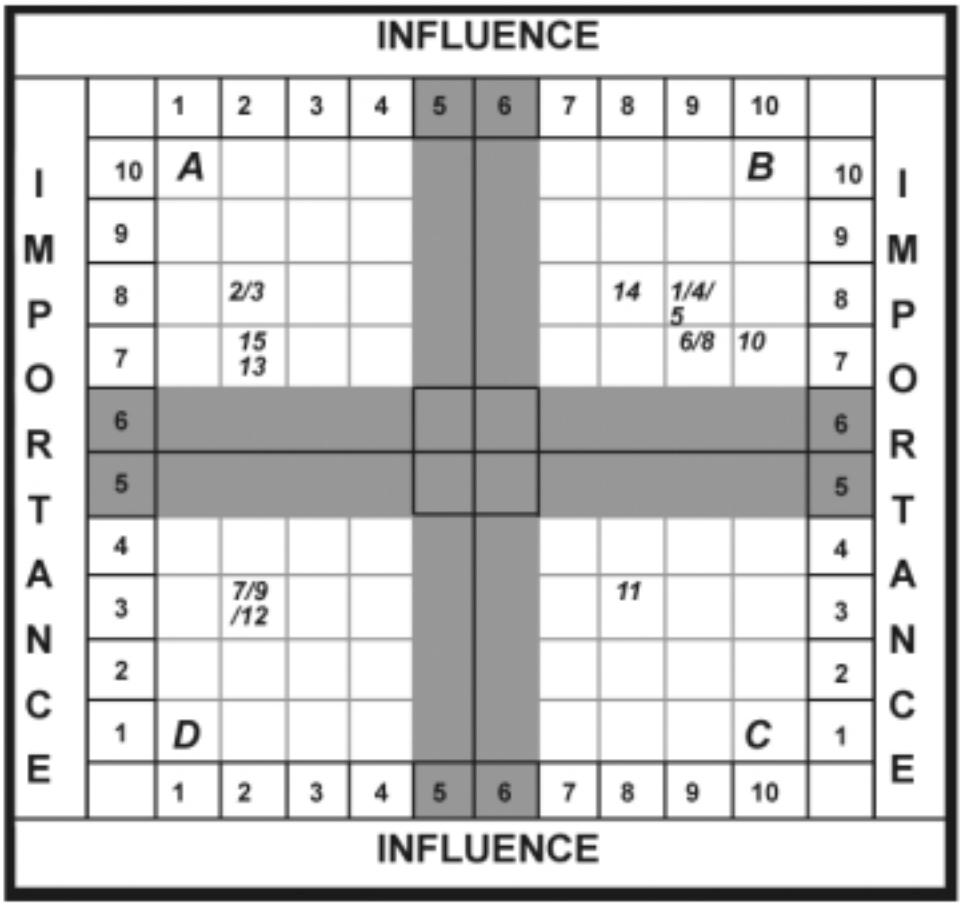


Figure 9. Influence and importance Matrix of Stakeholders involved in ISWM planning process in Commune VI in Bamako, Mali

1. Service Users in Served Areas
2. Waste pickers
3. Waste Collection Contractors (MSEs/GIE) and co-ordination of the MSEs/GIE
4. Municipality: Mayor and Councillors
5. Municipal Manager for hygiene (Brigade d'Hygiène, BH)
6. Dept. of Pollution Control (SACPN & DRACPN)
7. Dept of Environment (BUPE)
8. Dept of Urbanism (DRUC)
9. Administration in charge of urban services and sanitation at district level (DSUVA/VOIRIE)
10. Police
11. CEK, ERM and WASTE
12. NGO CAFO CVI
13. Young and Women Organisations
14. Commission for the attribution of service contracts
15. Vegetable gardeners/end users of compost

Table 13. Key to numbers in Figure 9

[13] For further details on the application of this tool see: Wilson. D., Strategic Planning Guide for Municipal Solid Waste Management, 2001, ERM. Annex 1.1. 'Stakeholder consultation and participation in MSWM Planning'

The matrix is divided into four main areas, labelled A, B, C and D. Each area indicates a combination of the degree of influence and importance the stakeholders have. The qualitative rating of each stakeholder needs to be verified with different sources and can also be established in a participative manner.

The **Group A** stakeholders are those that have **high importance** to the planning process but **low influence**, in this case Waste pickers, MSEs, Youth and Women organisations and Vegetable gardeners and end product users. Group A stakeholders represent those who may be marginalised in the planning process, but who are important to project success. Involving this group should include meetings and discussions to understand their key concerns and/or perceived vulnerabilities.

Group B stakeholders are those with **high importance** and **high influence**, such as municipality, households, Department of Urbanism (DRUC). Group B stakeholders are those with whom consultation is most important to ensure proper project definition.

Group C stakeholders are those with **low importance**, but **high influence**, in this case the facilitating organization CEK. Group C stakeholders are often those stakeholders who have an influence over project decisions, but have little to gain or lose directly from the project.

Group D stakeholders are those with **low importance** and **low influence** in relation to the project, such as Department of Environment. Group D stakeholders are those whom might not need to be consulted to ensure the success of the project. Stakeholders in this group may be excluded from decision making.

When interpreting the matrix special attention will have to be given to those stakeholders, which fall into the grey areas in the matrix (especially the dark grey box). Each of these stakeholders could fall into two or more groups and therefore it should be clarified into which group they should fall, given that each group of Stakeholders may require a different type of approach and involvement in the assessment and planning process.

4.6 Waste system elements analysis

All waste system elements should be looked upon as being stages in the movement or flow, of materials from the extraction stage, via processing, production and consumption stage towards final treatment and disposal, as was seen in Figure 3.

The ISWM concept recognises the high-profile elements collection, transfer, transport, disposal, energy recovery and final treatment. It gives equal weight to the less well understood elements of waste prevention or minimisation, reuse, street sweeping, recycling, composting and other forms of recovery. The history and character of the locality influences which system elements are present and/or dominant and which are absent or under-developed. Sometimes, for example, there is active recycling, but because it is in the informal (private) sector, it is not considered as part of solid waste management. On other occasions there is composting or anaerobic digestion of agricultural wastes or faeces, but because these are not normally considered to be part of the municipal waste stream, their existence is passed over or ignored.

A full ISWM assessment process looks broadly and deeply at the existing system so that all elements are represented. Often this means special emphasis on waste prevention or minimisation, reuse and recycling to see how they are present in the existing mix, even if the formal authorities are not aware of them.

The baseline document is the occasion for documenting, describing and analysing these elements. Table 14 shows some topics, data items and presentation approaches for documenting the waste system elements.

The various methods and techniques that can be used for the waste system elements analysis will be described briefly below. Detailed information on the methods, tools and techniques can be found in the literature references.

Topics	Methods and techniques	Presentation of the results
- Waste quantity - Waste composition - Density - Moisture content - Collection coverage - Uncollected waste - Performance of system - Equity of system	- Waste generation and characterisation studies - Review of reports on discharges to air, ground and water - Field visits to a range of socio-economic and geographic locations - Visual observation at discharge points - Volume measurement of waste discharges at (illegal) dumps and transfer points - Mapping and transects of illegal and informal disposal sites - Interviews with collection workers, street sweepers and waste collection entrepreneurs - Statistical economic data on inputs and outputs to the economy - Household surveys and interviews about backyard burial and backyard burning	- Tables, charts, statistical trends - Diagrams - Maps and routing diagrams - Photo and video-documentation
- Recycling, reuse and recovery	- Interviews with waste pickers, itinerant buyers, dealers, MSEs involved in pre-processing and recycling - Records of recycling plants and workshops - Sales records dealers - Interviews with collection workers, street sweepers and waste collection entrepreneurs - Social surveys and interviews about recovery and reuse within households and commercial establishments	- Recovery projections - SWOT diagram
- Flow of waste - Flow of materials	- Waste flow analysis - Material balances - Carbon and nitrogen balance	- Flow diagrams - Material balance diagrams
- Collection efficiency - Collection techniques - Collection rate	- Time and motion studies - Survey of percent filling of containers - Visual analysis of discharge at disposal facility	- Results in seconds per household or per connection - Results in time per ton and time per distance
- Description of current practices in collection, transfer and disposal	- Analysis of annual reports, budgets, documents - Interviews with collection workers, street sweepers, waste collection entrepreneurs - Photos, slides, videos - Field visits/observation	- Maps - Photo and video-documentation - Descriptive text
- Resource analysis	- Fleet and equipment inventories - Lists of municipal buildings from cadastre or other source - Field visits/observation - Budgets - Financial reports of previous years	- Lists - Descriptions of unused equipment and buildings

Table 14. Topics, techniques and presentation approaches for the Waste system elements analysis

4.6.1 Quantity and characterisation studies

Most waste assessments begin with assessing the amount of waste produced and analysing what materials are to be found in the waste stream. In spite of what is taught at university or in technical schools, in practice it is impossible to measure either of these two things accurately: all techniques are based on estimation, sampling, extrapolation, projections and in some cases statistical analysis[14]. Accurate data is almost impossible to gather and approaching any degree of accuracy is prohibitively expensive. For this reason it is important to stress that there will always an element of estimation and any claim to know exact amounts of waste produced and its composition is likely to be exaggeration. Quantification of quantity of waste generated is not as simple as it sounds, especially since in the ISWM approach it is the particular waste streams of the different fractions that are of interest, not the whole. Also, quantification can take place in at least three places and it matters a lot for the results, which of these is selected (See Figure 10 below for reference).

Photo 7. On the job training in quantification and characterisation study of working group of San Andres in Peru

©IPES

Quantification of the target waste stream is important in planning, to be able to identify the real size and nature of the problem, to be able to quantify environmental and economic impacts of the current management system (defined as the **'status quo'**) and as a design factor in arriving at a solution.

Quantification is usually done at the **point of disposal (C)**, that is, when the waste arrives at the landfill. This is useful for analysing the impact on the disposal facility, but not very useful for planning recycling or designing an upstream separation process, for the following reasons.

1. It is impossible to tell what the condition of the waste was when it was disposed, since it has been mixed and contaminated in the truck.
2. What arrives at the landfill is a net disposal figure and is net of three potential diversions (marked with (a), (b) and (c) in Figure 9, (a) the household's own activities in the area of waste burning, illegal dumping or sale to scavengers or junk shops (b) the action of scavengers in removing recyclables from containers, together with the deliberate or accidental burning of waste in containers and (c) the recovery activities of the collection crews themselves, in separating and selling valuable materials while they are collecting the route.
3. Depending on the season, the waste that arrives at the landfill may have absorbed rain or snow, so its moisture content and thus its weight have changed.

Quantification at the **point of collection (B)** is more accurate and works fairly well as long as each individual house has its own waste bin. This allows measurement of the quantity per household and it is also possible to either sort the waste at the household or tag the waste and sort it at a separate location. However, quantification at point of collection may also fail to calculate the effects of scavenging or household management of the waste.

Quantification at the **point of generation (A)** is the most useful, but it requires the collaboration of the generators in managing their waste during the survey period. This is useful as a public education strategy as well. However, it works poorly when there is suspicion that the measurement is designed to justify price increases in the waste tax, as people will tend to underestimate their waste. Household measurement also may have a general **Doppler effect**, that is, the very fact of measuring may change the household's ideas about waste so that they also change their behaviour.

[14] A clear example how to do an estimation of waste quantification and characterisation is given in Annex 4

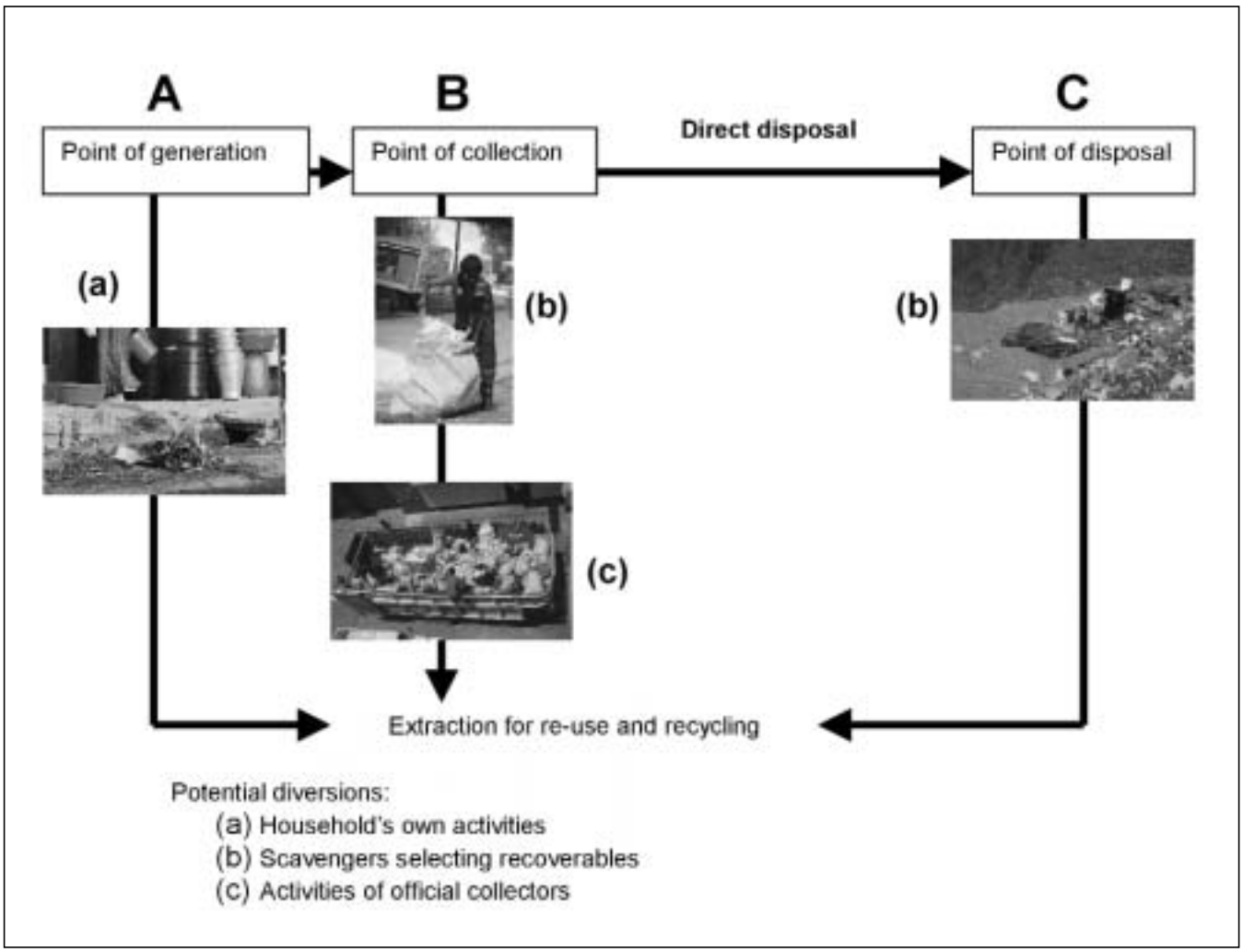


Figure 10. Points in the waste stream where waste quantification and characterisation can be done
Source: Adapted from Strategic Planning Guide for Municipal Solid Waste Management; ERM

4.6.2 Future projections and estimates

Most planning processes assess the waste stream in order to support a planning process, so the goal of current estimates are to make future projections: how much and what kind of waste will there be in five, 10 or 20 years. These projections are even less precise than the estimates of the current waste stream, since they are based on assumptions about how much the economy and population will grow, changing material use in packaging and products and the like. The most important thing to know about these projections is that they are indicative, not precise. The good news is that indicative estimates are fine for the purposes of an assessment: it is important to be able to say whether one tenth or one quarter of the waste stream is compostable, because that affects plans about what kind of disposal or treatment is necessary, but it is not important to know precisely whether this is 22 or 27 percent.

When the UWEP programme began to work on health care waste at Ramaiah Medical college in India, there was a general presumption that all hospital waste was infectious or dangerous. A careful quantification of the separate waste streams generated by laboratories, food service, patient care and apothecary services, showed, in contrast, that only 7% of the waste was potentially infectious or dangerous at the point of generation and the rest was basically the same as household waste. However, mixing of this waste at the point of generation spread the infection to a much larger waste stream.

Box 3. Quantification of Health Care Waste in Bangalore, India

4.6.3 A note on involving stakeholders in waste analysis

Involvement of stakeholders in waste quantity and other kinds of analysis is an extremely powerful tool in the process of ISWM assessment, since it plays to the strengths in the system. Stakeholders are almost always knowledgeable about some aspect of the waste system, but training them in analysis gives them deeper understanding of their own priorities, while creating an atmosphere of transparency and collaboration.

The clearest example of this in the UWEP programme was in Bamako, where the active participation of a wide variety of groups and individuals in Commune IV allowed CEK and other platform members to gain insight into their own waste streams. The Bangalore health care waste study described above also used key stakeholders in this analysis.

However, when involving stakeholders in actual handling of waste materials, special measures are needed to:

- Train stakeholders in the use of quantification and survey instruments.
- Protect against accidents or illness.
- Monitor closely the interactions of ethnic or social groups who are not usually in direct contact with each other.
- Ensure that there is adequate transfer from data collection to documentation at the end of the day or shift.

4.6.4 Waste flow analysis and material balance analysis

Waste is composed of materials. These materials are a process of extraction and processing of natural resources, manufacturing of products; the packaging and distribution of these products; the consumption and use of them; and finally their discarding as mixed waste. However, not all solid waste ends up as mixed waste at a disposal site. Some actually start a new life as useful items or packages within households or businesses. Understanding what happens to these individual materials is very important so as to avoid looking at waste as only mixed waste.

Materials flow diagrams are extremely useful for assessment and planning, since they show where the materials are coming from and where they are going. But they are also quite difficult to produce and the level of detail and accuracy varies widely.

When analysing the waste stream, one can strive towards flow analysis for:

- All waste materials and fractions together
- Dry or wet fraction
- Specific fractions, such as paper, kitchen organics animal faeces
- Specific neighbourhoods and geographical areas

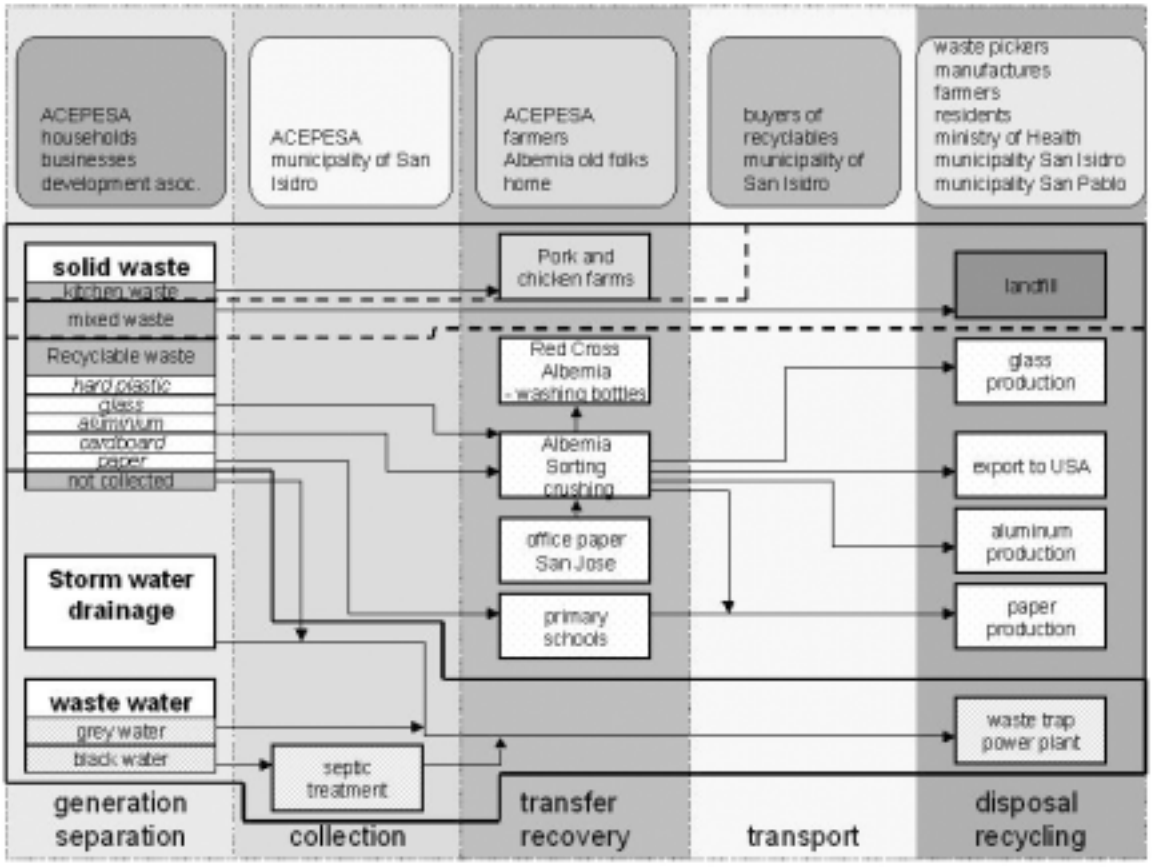


Figure 11. Waste flow diagram per material of waste management in San Isidro de Heredia, Costa Rica elaborated as part of the training programme of UWEP

- Specific type and size of waste generator, for example: hotels with more than 50 beds community hospitals and nursing homes small and large office buildings flats from low- and moderate-income housing caravan parks and the like

As the example from Costa Rica in Figure 11 shows, this form of visual presentation is very useful in identifying the most fruitful points for intervention in the system. In this case the different stakeholders involved per waste system element were also included in the analysis.

The rigour of materials flow diagramming varies widely in ISWM assessment. The ideal is to have a global system materials balance, which indicates, **in orders of magnitude**, the source, experience and destination of different types of materials. As the example of the material balance diagram in Figure 12 shows, one fundamental characteristic of this technique is that the total of the incoming flows of materials at one stage of the process should be equal to the total of the outgoing flows at the same stage. In this case the total of 3.37 tons/day at stage 'mixing & bay #1 loading' is composed of the following incoming flows:

- Yard waste (0.55 tons/day)
- Food waste (2.30 tons/day)
- Waste paper (0.25 tons/day)
- Recycled compost (0.24 tons/day), coming from the 'active curing' stage
- Recycled compost (0.03 tons/day), coming from the 'hand screening & removal' stage

The total of the outgoing flow is 3.37 tons/day that goes to the next stage 'active composting (agitated bay)'.

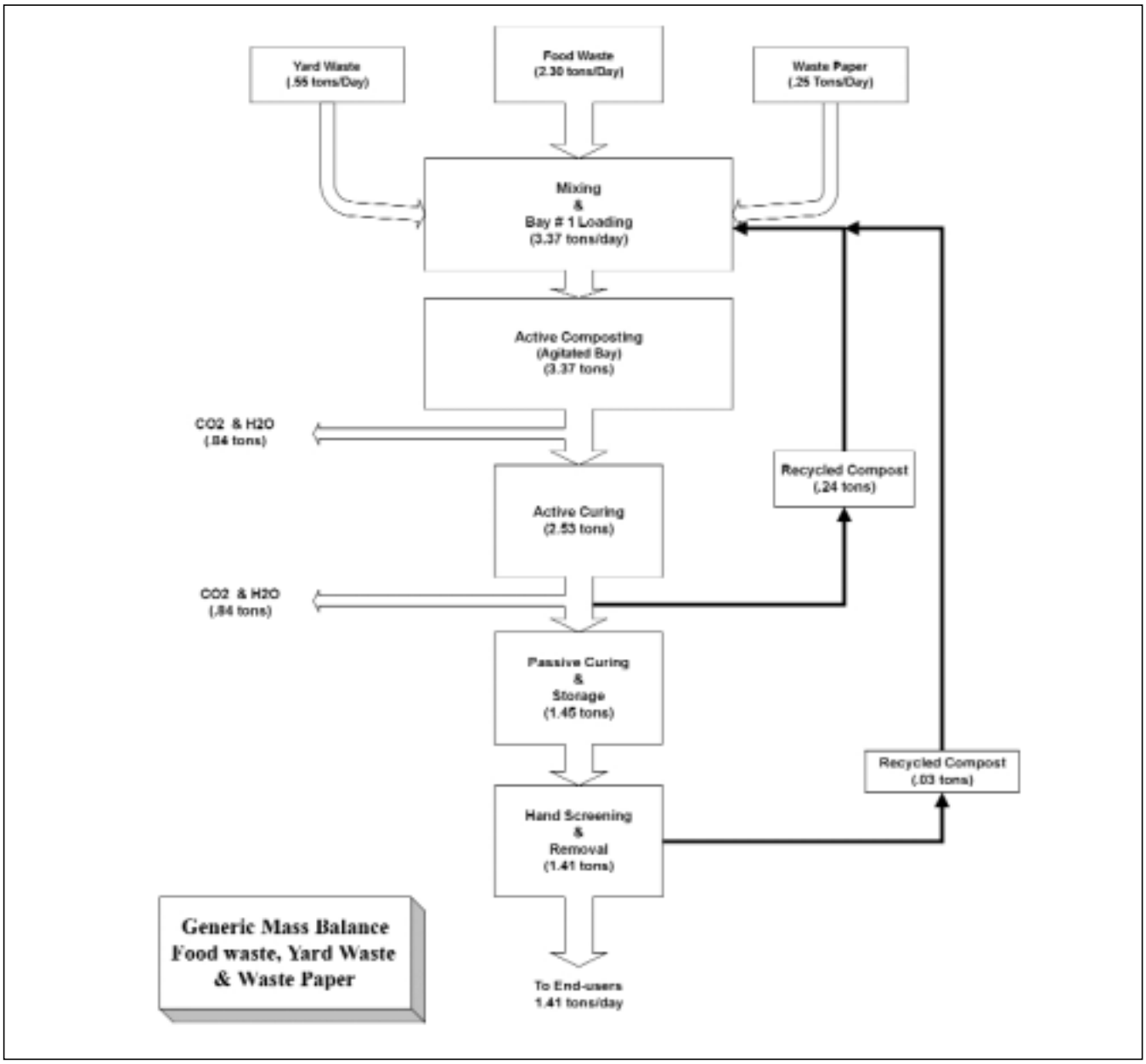


Figure 12. Example of material balance diagram of Composting plant

Source: Michael Simpson

4.6.5 Time and motion studies

A time-and-motion study is detailed field-based research to make a diagnosis of the present waste collection system and to obtain basic data to plan for its improvement. Time-and-motion studies usually provide an in-depth insight into collection practices and efficiency. A time and motion study involves following the collection vehicles and noting, among other things, the:

- Time and location of departure.
- Time spent going from the garage to the route, from the route to transfer or disposal point and return to the route.
- Seconds spent collecting each household's or business's waste and putting it into the collection vehicle.
- Quantity of waste per stop, especially, if there are containers, how full they are.
- Number of workers and how they work, for example, does the driver (in case of a truck) ever get out and help are there special activities when the cart or truck is full and the like.
- Do the supervisors ever accompany the collection?
- Do the collectors work alone or all together in a particular zone or neighbourhood?
- Are the routes the same every day or week or is there a dynamic and varying assignment of routes?
- Does the waste get weighed before discharge?

Photo 8. Series illustrating time and motion study training of municipal staff in Bangalore, India

©WASTE, Jeroen IJgosse

4.6.6 Narrative description of current practices for collection, transfer and disposal

In order to prepare the baseline, the ISWM working group members go to the field and observe the municipal waste collection, transfer and disposal practices, usually after an orientation by the municipal waste department and local site managers and after reading some formal materials describing the ideal or formally designed system. What is special about the ISWM approach is that this narrative description focuses on the actual, but without judgement: if the containers are only 10% full when they are collected, that is what is important to document, rather than immediately criticising the inefficiency of the system. It is helpful to make a table showing different methods and to indicate the flow of materials going to each option.

Also, an ISWM assessment includes all of the different collection and disposal methods, both illegal and legal. Because of a general conviction that 'we know what is going on', there may be some resistance to describing current practices. But it is strongly recommended to do so, because many interesting features may arise from the description. It is also a good opportunity to train stakeholders and to let those least involved with the collection actually do the describing.

Narrative description may seem simple, but it can also be both threatening and powerful. In many cities, the mayor and other public officials may have a tendency to idealise the process of collection and deny that it is difficult or dangerous for workers. Narrative description, combined with photo-documentation (see below), can bring discussions about what is happening more in line with reality. Box 4 describes the waste collection process in La Ceiba, Honduras. Combined with documentation in photos, this gives a strong basis for discussion with local officials on safety and protection measures.

In order to describe collection practices it is useful to follow the waste collection routes for each type of waste, each type of vehicle used and each type of collection method used for at least one entire day.

In La Ceiba, Honduras, many of the waste collection trucks are dump trucks with a loading height of nearly 3 metres. The normal way of loading them is for two workers without proper footwear or gloves and masks, working at street level, to fill broken palm leaf baskets with waste that has been left in heaps on the street. They then throw each basket three meters over their heads to another worker, who stands usually without gloves) right in the middle of the waste in the back of the truck, catches the baskets, empties them, looks for and separates valuable recyclables and then throws the baskets back to the collectors on the street.

Box 4. Waste collection in La Ceiba

Photo 9. Series showing process described in Box 4 in Bangalore, India

©WASTE, Jeroen IJgosse

The checklist in Table 15 is helpful in indicating activities and aspects to observe.

Element	Location and ativity	Focus of what to observe
Waste treatment and disposal	- Disposal sites and sanitary landfills - Composting facilities - Community or neighbourhood level recycling and composting activities - Transfer stations - Waste separation facilities - Illegal dumpsites - Company dumpsites	- Technology and methods used - Equipment and instruments used - Safety and protective measures taken for employees - Potential health hazards and environmental implications - Degree of effectiveness and efficiency of operation
Collection	- Accompany waste collection vehicles - Garage - Workshop	- Number and types of vehicles - Behaviour of the crew - Safety and protective measures taken for employees - potential health hazards and environmental implications - Degree of effectiveness and efficiency of operation
Waste picking Recycling	- Observing waste pickers in landfill site, open dump sites - Junk shops around landfills - Junk shops in residential districts - Itinerant waste buying in neighbourhoods - Vulcanisation shops for tire repair - Equipment repair shops - Community recycling drives and centres - Scavenging of cardboard from business districts - Illegal dismantling of public infrastructure to recover metals	- Buying and selling of recyclables - Use of weigh scales and other measurement methods - Types of materials and classification of materials - Levels of secrecy and security - ‘Dumpster-diving’: scavenging containers by jumping inside or putting a small boy inside them and extracting valuable materials - Public attitudes towards the recycling sector

Table 15. Checklist of sites to visit and focus for observation and narrative descriptions

4.7 Aspect analysis

The ISWM concept distinguishes six aspects, or lenses, through which the existing waste system can be assessed and with which a new or expanded system can be planned. The ISWM aspects, as shown in Table 16, give a municipal manager a set of tools[15] to perceive study and balance priorities and create measures to give the desired results.

Aspect analysis is an extensive, rather than an intensive method of looking at the waste system: the fact of considering the aspects is usually enough to create new insights, as Box 5 illustrates.

[15] For further reading, please refer to TOOLS: Integrated Sustainable Waste Management; Tools for Decision makers, Experiences from the Urban Waste Expertise Programme (1995-2001).

Sustainability Aspects	Methods and techniques	Presentation of the results
Legal, political and policy	- Official legal and policy documents - Literature review of laws and regulations - Interviews and field visits with inspectors and enforcement agents - Review of formal plans - Survey of articles in press for the last year - Review of statements and literature from Recent or ongoing political campaigns - Interviews with political candidates - Anti-scavenging laws and laws to restrict the Informal sector - Legal framework for formalising informal enterprises - Zoning restrictions for dumps, compost sites, junk shops	- Text description - Photo-, video and audio-documentation - Tables and charts
Environmental and health implications	- Environmental and health plans and documents - Review documents and programme of environmental and health NGOs and activists, interview activists - Epidemiological studies - Health policy documents - Reviewing of programmes of activist organisations	- Overlay maps - Text analyses and descriptions - Summary of programmes and problems
Social and cultural	- Observation visits of museum, concert, theatre and exhibitions - Home and group visits - Interviews of primary and secondary school teachers, religious leaders, sport club leaders - PRA techniques - Consultations with folklorists and anthropologists working in the area - Conversations with elderly citizens at home or in r esidential centres	- Narratives - Photo- and video-documentation - Audio materials and recordings - School projects
Financial and economic	- Review and analysis of annual budgets, audits, financial reports, relevant city council minutes and budget justification information - Review of donor-funded projects and the analysis they have done - Willingness to pay studies - Review of municipal fee schedules, fines, sanctions, permits - Review of taxation policy and records - Inventory of capital infrastructure and preparation of depreciation schedule - Analysis of capital and operating costs	- Institutional analysis of budgets and financing responsibilities - Calculation of costs per household, per ton, per type of waste - Calculation of capacity-based costs for disposal, recycling - analysis
Institutional and organisational	- Organigram of relevant departments - Statutes of companies and departments - Review and analysis of job descriptions - Skills analysis - Review of existing contracts and licensing arrangements with private companies - Complaints procedures	- Revised or more detailed alternative organigram - Vector and flow diagrams for funds and influence - Text description

Table 16. Topics, techniques and presentation approaches of the aspect analysis

The Dying Donkeys of Bamako

In 1999 there was a UWEP workshop in Bamako, Mali, which focused on the economic and financial aspects of the activities in Commune IV, the UWEP Pilot Project Setting. Early in the workshop, the small collectors, representing the GIEs (groupes d'intérêt économique), brought up the problem of their donkeys dying after only one year of service in waste collection.

The GIE representatives had been offered the traditional development assistance solution: train the owners to take better care of the donkeys. But it had not solved the problem. So the workshop focused for a while on this problem, which is also useful to show how aspect analysis can help in an ISWM assessment.

Phenomenon: the donkeys that draw the waste collection carts die within a year, meaning their owners do not recover the cost of the donkey purchase.

Environmental and health aspect
Collecting waste in Bamako is a health issue: the city does not do the collection and without any private collection, the waste would end up in the street. The social and cultural aspect gives insight into what is in the waste. It turns out that in Bamako, about 40% of the waste by volume is dirt and gravel. Where does this come from? Most of the households are in compounds that have dirt floors (some of the houses also have dirt floors). Women keep the house clean by sweeping up the loose dirt, together with rubbish (and sometimes animal or human faeces). They consider this unsanitary and put it into the garbage (or if there is no collection, throw it into the street). Even though to an outsider, the dirt that is swept up is the same as the dirt that remains, culturally one is defined as clean and the other as dirty. And when there are faeces in the dirt, then it is indeed a health hazard. When it is thrown in the street and children play or people walk barefoot, disease can spread.

Economic and financial aspect.
The GIEs collect domestic waste based on a franchise system, similar to waste collection arrangements in many African cities. The city council gives them the right to collect the waste from a residential area and also the right to collect fees. The fees are set by the city council, without knowing anything about the costs of providing the service. It turns out that the fees of 200 CFA per month per household just barely cover the cost of picking up the waste, but not the cost of transporting waste to far away secondary collection sites. The result is that the owners need to keep their costs low and so they tell the collectors to overfill the carts. This strains the donkeys who usually die in less than a year of service. Then the GIE owners have to pay to replace the donkeys.

Policy and legal aspect
But why is it so far to dump? This moves the analysis to the policy and legal area. Even though the GIEs are officially recognised, there are two distinct legal problems that hinder their work. The first is that the city council, in 1997, made a law prohibiting the donkey carts from using the paved roads. This means that either the drivers have to take a much longer route or pay fines. The owners choose for the longer route, the donkeys suffer. The second policy and legal issue has to do with the fee setting. The city council sets the fees based on their political sense of what is possible, not based on what it costs. This violates the idea of full cost recovery and shows once again why the owners have to cheat the donkeys.

Performance and technical aspect
The consequence of the economic problems causes the owners of the GIEs to make a technical decision: use bigger carts and overload them. This has other consequences: the carts may break or spill. The donkeys need more nutrition if they are to pull such heavy carts, but the owners are not getting fees that cover these costs: it is simply too far that the donkeys have to go.

Social and cultural aspect
The cultural and social aspect relates back to the payment question. The city council sets the rates per household, but this does not distinguish between an extended household and a nuclear family. In Islamic Mali, a man may have up to four wives, each with children, so sometimes one 'household' has as many as 15 people: the more people, the more waste (in most cases), so the GIE owners suffer again – and pass their suffering along to the poor donkeys.

Also, even the fact that the waste is collected at all is due to social action, some of which was supported by the UWEP programme. In order to increase the interest in waste services, it was necessary for community activists in Bamako to look

behind the façade of daily social life to the traditional chief and clan structure. Only when the traditional leadership was involved, was it possible to create a general commitment to community cleanliness and only then was there willingness to pay for waste collection service. (Source UWEP Working Document-13, 2000)

Conclusion for the ISWM assessment

The aspect analysis gives a rich and full set of ideas about the problem of the donkeys, one which suggests that priorities lie in the area of the policy and legal system (raising fees, allowing the carts on paved roads), in the social and cultural system (willingness to pay and agreement on the maximum size of the household and health and environment (work with women to reduce the amount of 'clean' dirt that comes into the waste stream.) All of these are quite different approaches than 'educate the GIEs to take better care of their donkeys'. Because these priorities are based on an actual understanding of the situation, they are more likely to lead to sustainable improvement.

Box 5. Example of using aspects analysis in Bamako, Mali

Photo 10. GIE collector with donkey cart arriving at the compost site to dump waste, Bamako, Mali
©WASTE, Justine Anschütz

4.8 Methods and techniques for all dimensions

While certain research techniques are primarily useful for waste systems element or aspect analysis, others are of general relevance and can be used to support research in any area.

4.8.1 Maps and transects

Maps can be an effective instrument to use in an ISWM assessment. They can summarise information, simplify complex situations and be use in presentations and aid in analysing waste related activities, specifically:

- To research or present data
- To understand better the interests and influences of stakeholders
- To triangulate official information
- To investigate illegal or informal dumping
- To understand routing and efficiency
- To check official statements about coverage

However, in many cultures, there is no tradition of map-reading and interpretation, so that reliance on maps may automatically intimidate some stakeholders or exclude them from the discussions.

Photo 11. Series showing Tanzanian workshop using mapping to set out collection route

©WASTE, Jeroen IJgosse

Use of existing maps

At the start of the assessment process it is useful to make an inventory of maps that already exist, the information they contain, for what purpose the map has been elaborated and who uses it. Some reflection on accuracy is also helpful.

Making new maps with stakeholders

New maps or transects -diagrams of main land use zones- can also be created as part of the ISWM assessment, usually together with stakeholders such as private waste collection entrepreneurs, supervisors of municipal waste collection, local residents or community leaders. Mapping exercises and transect walks with stakeholders have two main functions: the first is to capture and document the knowledge that stakeholders have of their own area and neighbourhood and the second is to turn that information into common property of the planning or assessment process, that is, to gain agreement on what has been seen and to allow it to pass into formal information.

Administrative maps with jurisdictional boundaries

- Maps with collection routes
- Maps indicating different collection zones
- Urban Master Plans with location of major waste treatment facilities
- Detailed maps of waste treatment facilities, e.g. landfill, composting plant
- Cadastre and property maps
- Geological and seismological survey maps (faults, rock and soil types)
- Water source maps
- Aerial surveys of vegetation or buildings
- Street maps
- Railroad, waterway, canal, bicycle, walking path and highway maps

Box 6. Examples of existing maps useful for waste management

Some examples of transect and mapping exercises include:

- Following the collection routes of primary and secondary vehicles.
- Walking through neighbourhoods or parks or ravines to see and describe permitted or illegal points of waste accumulation and dumping and to see what kinds of waste appear at those sites.
- Discovering and discussing similarities, parallels or direct linkages between different geographical areas and features, waste system elements and stakeholders.
- Triangulating official information and claims.

Type of information	Example
Generation of waste	- Different residential areas - Commercial activities - Industrial activities
Factors that influence collection of waste	- Identification of high and/or low density areas - Residential areas with difficult access (steep slopes, bad road conditions, narrow passages) - Traffic conditions, one way streets, dead-end streets - Type of vehicle permitted on different streets (e.g. Animal drawn carts not allowed on main roads or larger vehicles in residential areas)
Storage facilities	- Communal bins, public bins, temporary transfer site, backyard burn barrels
Collection activities	- Primary and secondary collection routes - Division of city in zones according to collection frequency - Collection routes of different waste fractions - Different types of collection vehicles being used - Different type of collection method being used - Times of collection services (night and/or day) - Formal and informal collection activities
Public cleansing activities	- Street sweeping routes - Drainage cleansing routes
Waste treatment, recycling and disposal facilities	- (Sanitary) Landfills - Composting facilities - Community or neighbourhood level recycling activities - Transfer stations - Waste separation facilities - Location of weighing bridges
Material recovery and recycling activities	- Areas where waste pickers are active - Areas where itinerant buyers are active - Areas where recyclable materials are bought and sold - Areas where recyclable materials are pre-processed - Industry that use recyclable materials as input for their production process

Table 17. Use of maps for the waste system elements analysis

In Bangalore, India one essential activity of the assessment process was the creation of updated maps of the administrative wards. These maps contain information related to solid waste management activities, such as location of black spots, major collection routes, location of junkshop dealers. The maps were developed with the participation of different stakeholders municipal officers, residents, waste collectors and junkshop dealers. The process of gathering and verifying information was facilitated and co-ordinated by a local task force comprised of a local NGO (Mythri), the local municipal authority (BMP) and a stakeholder platform (Swabhimana).

Box 7. Mapping in Bangalore

4.8.2 Photo and video-documentation

Photos and videos and even drawings, are very helpful not only in documenting information on the waste management baseline, but also for certain kinds of analysis. For example, photos taken of heaps of refuse dumped at a disposal site can be an important supplement to a visual composition study: in the photos, different waste materials can be identified and conclusions drawn about the composition of the waste.

Photos can bring discussions about what is happening more in line with reality. The series of Photo 8, Photo 9 and Photo 11 serve as examples.

Photo-documentation can also help to describe and analyse work processes and to give an overall perspective of the current situation related to waste management. Figure 13 shows the waste system elements or stages of the waste management

Photo 12. Examples of previous map being used and updated version in Bangalore, India

©WASTE, Jeroen IJgosse

system in the district municipality of Surco, Lima, Peru. This presentation proved very useful to explain to stakeholders in Surco how these different elements are linked. Using it as a training tool can also enhance a more integrated vision of the stakeholders when analysing their own activities within solid waste management in their city.

Using video, especial digital video, can be even more effective when describing and analysing the work processes. Operations such as sweeping or passing through a narrow street can be registered with a short 20-30 second digital video, which can be shown during trainings or working meetings with the stakeholders involved.

4.8.3 Visits and observation

Observation in the field forms an essential part of understanding the different waste management activities and those factors influencing them. Too often opinions are given and decisions are made based on information from documents or the press, without having visited the experiences in the field. Such 'desktop' analysis often misses key realities. In the field, observation can take a number of different forms:

- Guided field visits to different parts of the city and different elements of the waste system with stakeholders, e.g. with municipal officers of different departments and local council persons
- Formal field visits and following of vehicles
- Informal field visits
- Observation of piled waste or litter in the city, even when there is not a field visit
- Waste walk-through audits of large institutional and industrial generators
- Any other form of 'going and looking with your eyes'

Observation can easily be combined with meetings and discussions with waste workers, junk shop operators, street sweepers, household clients and collectors and interviews with waste pickers.

4.8.4 Triangulation or verification of information

In preparation of the baseline, there will be many kinds of information which appear to be clear and about which there is no apparent conflict. Other pieces of information will be more contested: there may be too little information to draw conclusions or information from one set of stakeholders may contradict official statistics or the claims of the operators. In some cases what some stakeholders say also contradicts with what the people carrying out the assessment have observed in reality. This contradiction is usually due to a difference of opinion or in some cases an official denial of a reality that is politically too sensitive to be acknowledged. In these cases, triangulation is a key technique to arrive at a more accurate, if more complex, view of the reality. The goal here is not to prove anyone wrong, but to supplement biased views with balancing information.

Triangulation is a powerful tool, but it is also threatening, as it can explode received wisdom and ideas that have the status of sacred cows. Well-conceived and strategically publicised triangulation can function like a political bombshell and change the political landscape in significant ways. For this reason, in some cases the working group or facilitating organisation may decide that the political consequences of triangulation are too damaging to the future of the assessment and planning process and then the they need to arrive at a collective substitute for a triangulated description of the reality. While doing this is both challenging and dangerous (if the reality comes out anyway, the working group and/or facilitating organisation can lose its credibility), there may be situations in which it appears to represent the better choice.

Triangulation of official estimates of waste quantity and characterisation

Most national governments and environmental ministries have official quantity and characterisation data, which varies widely in accuracy and currency. If possible, some field observation,

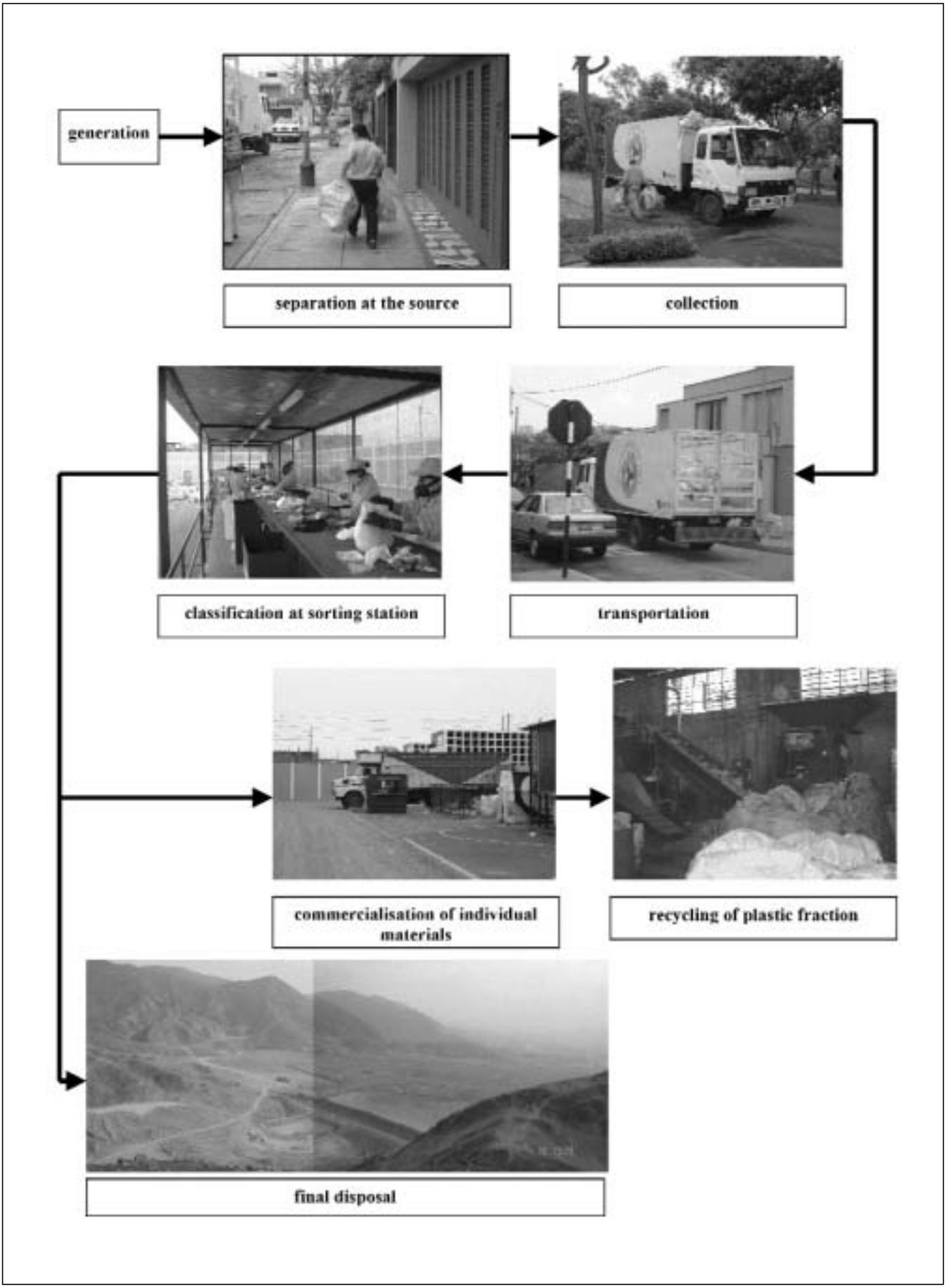


Figure 13. Using of photos to describe waste management system in Lima, Peru

Source: IPES, ERM, WASTE

based on photographing and measuring loads delivered to landfill or the limited use of passing trucks over weighbridges, is highly recommended as a check on the reality of the official data.

For special waste streams such as crankcase oil, interviews with the generators can be combined with data on how much is sold in the municipality to come up with a rough estimate, within ranges, of the likely amount that ends up in landfill or other media.

Techniques for triangulation in preparation of a baseline
Triangulation generally consists of empirical measurement of some type, done in the presence of the relevant actors, especially those whose reality has been seen to clash. Examples of empirical measurement include:

- Measuring the volume of dumped waste to show that the truck is carrying less than its design capacity
- Timing collection
- Using simple survey technology (i.e. transporting angles) to estimate the volume of an existing landfill
- Tracking distance in routes or to a disposal site
- Surveying a small number of households or businesses (15-100) to check whether official generation estimates are realistic
- Correlating waste generation estimates with sale figures for the relevant materials in the region
- Sampling waste at the household level, before it is put out for disposal
- Projecting volumes or revenues by scaling them up or down or showing them in relation to total income of households or total expenditures or tax revenue of the city

Mapping, transects and triangulation
One extremely useful method of triangulation is to take the disagreeing parties together into the field, to make photographs, measurements or time and motion observations together and then, also together, to write up the conclusions.

4.9 Integration of the three dimensions

The three dimensions of the ISWM model –stakeholders, waste system elements and aspects– are often described as if they were really separate, but this is a device that is used to ensure that the three ISWM dimensions get adequate attention. In practice, they are all more or less integrated with each other. Integration of two or three dimensions is most easily represented in graphic form. One way is to describe those stakeholders involved per waste system element as was done in the ISWM assessment of the waste management system of electronic waste in Costa Rica Figure 14.

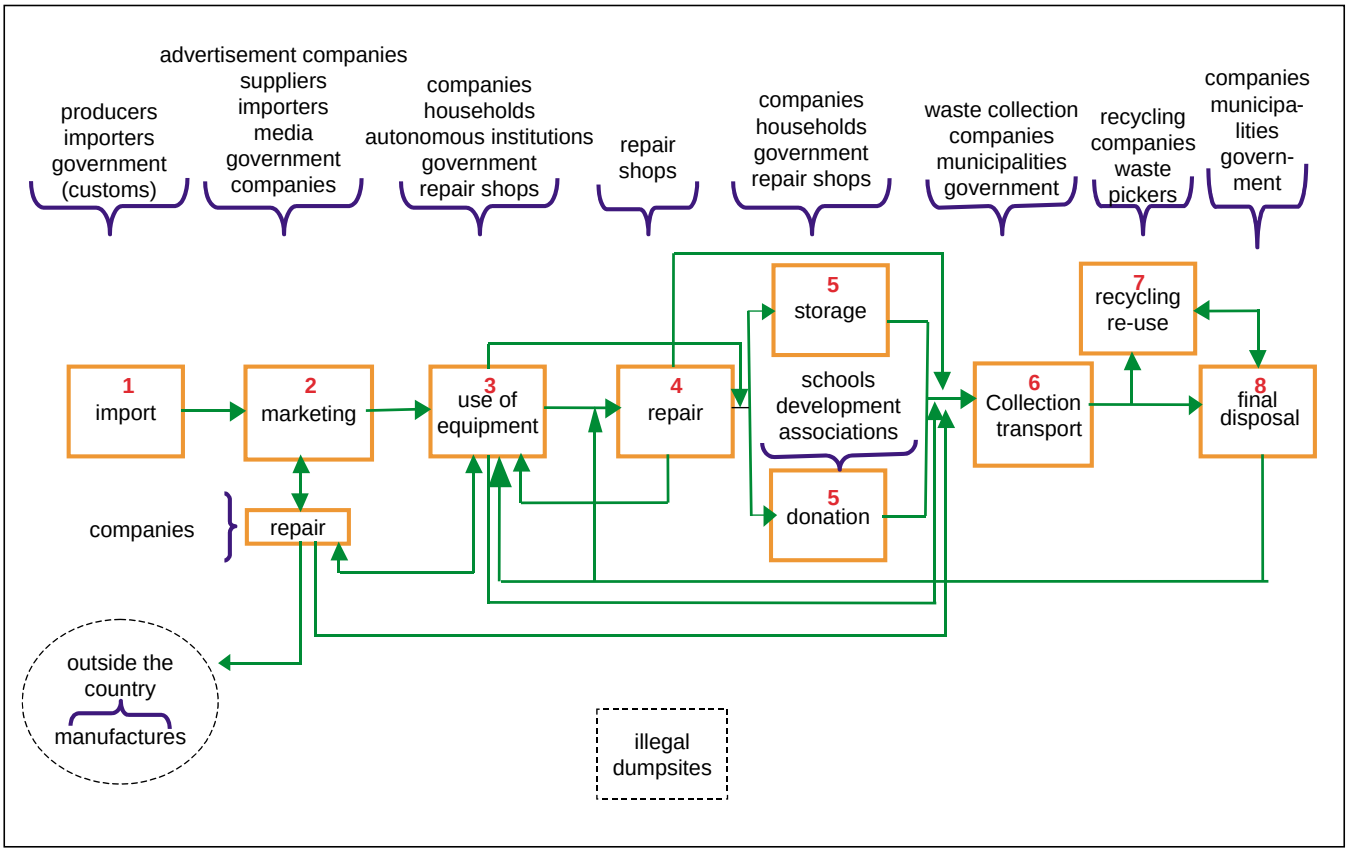


Figure 14. Stakeholders and waste system elements involved in management of electronic wastes in Costa Rica.

Stakeholders	Generation Seperation	Collection	Transfer Storage	Reduce	Recycling	Reuse	Treatment Disposal
Pupils	X	X	X				
Teachers	X	X	X	X	X	X	X
Admin Staff	X						
Parents	X	X		X		X	
Other Households	X						
IPES							
Municipality							
Waste Dealers			X				
Other Schools	X	X	X				
Recycling Companies					X		

Table 18. Stakeholders involved in waste systems of a recycling project in Lima, Peru

Table 18 shows a matrix which relates those stakeholders involved in each of the waste system elements of a recycling project in Lima, Peru.

For example, in the policy-legal and financial-economic aspects of solid waste management, the influence and importance exercise is particularly useful in the integration process, as it helps to identify those actors with key or determining roles in relation to each of the aspects and to answer questions about: who approves legislation what entities enforce laws who gets the benefit of enforcement who assesses fees and who collects them where does the money go and who controls its expenditure who determines which tariffs are to be paid who controls the budgets.

Two examples are useful here. In Bulgaria, solid waste fees are the only form of discretionary income that municipalities have. The amounts are set by a cost analysis of the solid waste activities and this is translated to a *pro mille* real estate tax on solid waste. The City Council sets this tax, based on information from the solid waste department or municipal company. But once the tax is collected, it goes into the general fund and is used to support the Mayor's budget (which the City Council also approves). There is nothing that requires the municipality to actually spend this money on solid waste.

In Dar es Salaam, small collectors have franchises to collect waste from micro-zones and the franchise gives them the right to collect fees as well. When the households don't pay, the collectors can take them to court and ask for a judgement. So far so good, but when the court makes a judgement, and the clients pay. They pay something that is called a fine, not a fee and fines represent payments that go to the general municipal treasury, not back to the collectors, who get nothing other than the ill-will of their clients.

This kind of process-analysis is one way of integrating the information from the three dimensions. Historical analysis is another, as is a technology assessment which looks at each technical option through the lens of the six dimensions.

Whatever option is used, an integration is necessary and helpful to get a complete understanding of the situation.

4.10 Key issues and problem definition

As mentioned earlier, the ISWM assessment has two main activities, which result in the **baseline** and the **key issues and problem definition** respectively. The baseline document provides a basis for socialising the information and also a focus for discussions about priorities. These lead into the process of identifying and agreeing on key issues, which, in turn, form the basis for a problem definition.

Identifying those principal key issues and defining the problems encountered in waste management is, in a sense, the climax of the assessment process and the gateway to subsequent stages of the planning process, which proceed to investigate how to address these problems, identify a menu of solutions and arrive at decisions.

4.10.1 Methods to identify key issues

Identifying key issues is a process of filtering and weighing the essence of the issues and problems identified and socialised in the baseline. The foundation technique for doing this is the brainstorm methodology, where the first phase of the process focuses on creating a long list of issues and problems, either in one workshop or over a period of time. The second phase involves creating a transparent method for eliminating or ranking the issues, in such a way that the priorities of the group emerge. n a workshop, using the brainstorming method, the facilitator designates one person to write and then invites everyone to contribute ideas in a free way. Nothing is censored and no discussion is allowed, everything that is offered is included. Such a brainstorm session can result in a problem tree, which relates effects, actions and reasons behind the actions; see example from San Andres, Peru in Figure 15. A similar method which works over a longer period of time and various sessions, is to create a so-called **'parking-lot'**, a notebook or large sheet of paper, on which the facilitator writes down issues that emerge in workshops, meetings and discussions. The paper or notebook remains accessible, preferably visible, in a public place. When the moment arrives to make key decisions or set priorities, it can also be circulated amongst stakeholders, so that comments and additional issues can be added. Both techniques result in a so-called 'long list' of problems or issues, that is inclusive of all the concerns of all stakeholders.

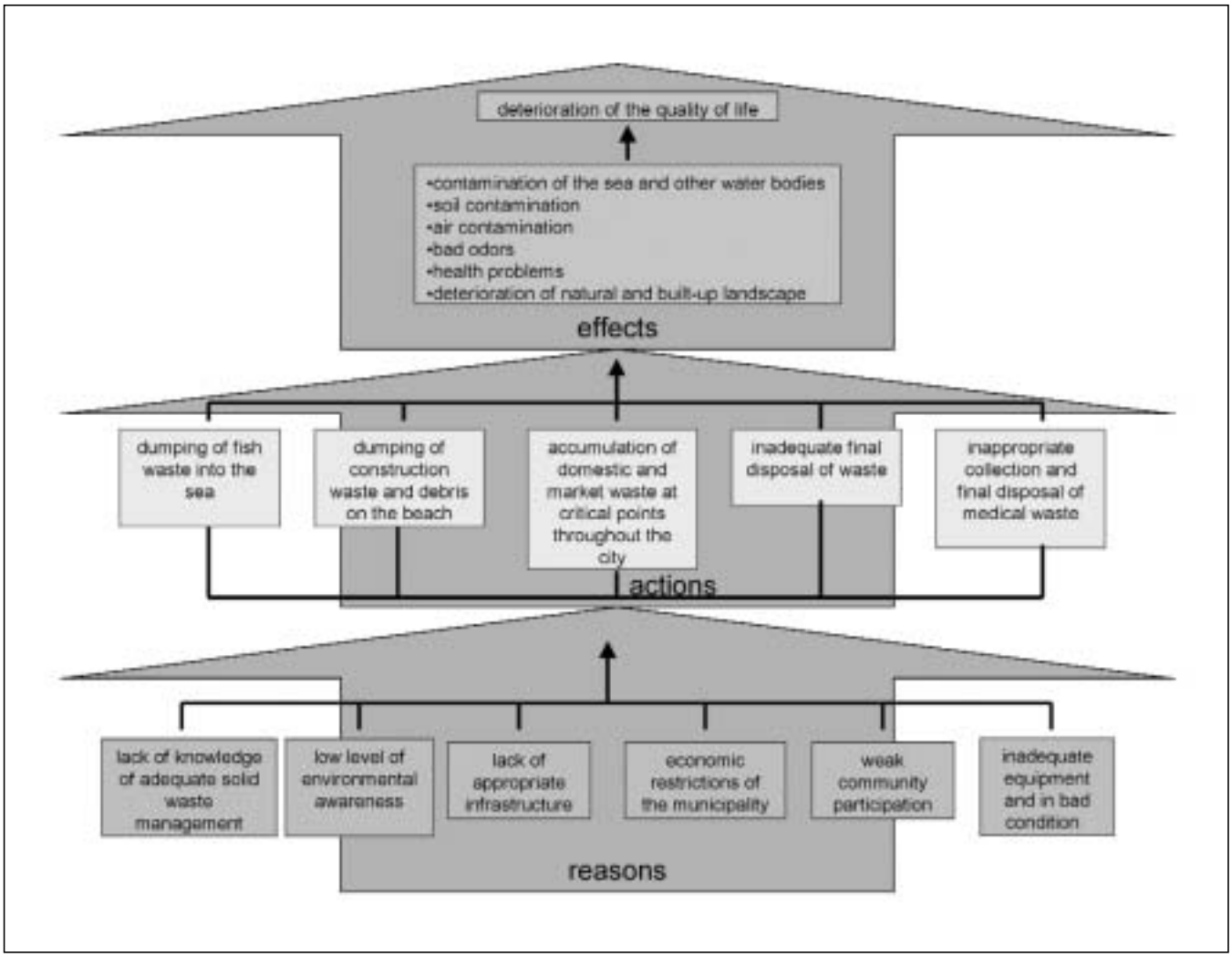


Figure 15. Problem tree analysis of solid waste management situation in San Andres, Peru

4.10.2 Prioritising or ranking key issues

This long list of key-issues can then form the basis for a workshop or series of workshops that focus on ranking or prioritising issues.

All forms of prioritisation or ranking involve ordering or ranking the key issues and problem definitions in order of importance. Within the framework of PRA, such prioritising is usually done in a group, so that the decision-making is transparent and all stakeholders have access to influencing the outcome. Within this framework, a number of different ranking methods are available that can be used, such as:

- **Preference ranking:** each stakeholder gets a copy of the long list and, sitting alone, puts a ranking number by their priorities. Then everyone marks their top three or top five priorities on a large version of the long list. This can be done by making a checkmark or sticking a paper dot by the preferred options. The facilitator then lets the group see the large list, where the collective priorities are easy to see. At that point and depending on the size of the group, the issues with few or no dots can be eliminated and the ones with the most dots become the priorities.
- **Pair-wise or small-group ranking:** the group is divided into groups of two, three or four. These negotiate the priorities among themselves, coming back to the group with the top three. The same method can be used to collect the ranking or for each option the ranking numbers of the small groups can be added, which the ones scoring the highest becoming the priorities.
- **Matrix scoring or ranking:** this is useful when there are multiple criteria for choosing priority problems. In this case, the long list of identified problems goes down the page and across the page are three, four or more criteria for ranking problems, such as: creates health risks prevents commercial development creates dangerous spaces for children harms livestock etc. Working individually or in groups, each line gets scored for each criteria, usually using a system of +, 0 and – . The items that get the most plusses have the highest priorities.

4.10.3 Double-checking

All of these methods are dynamic and there is a high potential for the group dynamics to influence the outcomes. On the one hand this is useful, as it begins to create commonly held views, but on the other, it requires careful management, so that vocal, better educated or socially and culturally dominant stakeholders do not dominate the discussion. The facilitator can check in with groups and an end-of-session evaluation can also ask the attendees whether the results accurately reflect their views.

4.10.4 The key-issues and problem definition document

After the priority-setting, the lead agency prepares the **'key issues and problem definition'** document. This is short and to the point, normally not more than one to two pages and includes a graphic repetition of the ranking and a list of the priorities. Experience recommends not more than eight to ten key issues in total. For each key issue a brief description should define the problem and or bottlenecks.

The process is not complete until each group of stakeholders has seen this document, commented on it and given their endorsement of the conclusions. At that point, the assessment process is complete. Within the logical framework method, this document is the output, result or deliverable of the entire assessment process. This forms the input for elaborating the goals, objectives, targets and subsequent activities of the project, programme or plan.

Chapter 5. **Organisation of an ISWM Assessment**

5.1 Introduction

This chapter concentrates on **how** to implement an ISWM assessment from a practical point of view, that is, the roles of different actors, skills needed, timing, budgeting and financing.

This chapter addresses the following issues:

- The issue of ownership of the ISWM assessment process
- Roles and composition of ISWM assessment team
- Capabilities and skills of the team
- Planning, duration, timing
- Budgeting and financing

5.2 Ownership of the ISWM assessment process

One of the key elements of the participatory approach is the issue of ownership. Ensuring the ISWM assessment process is owned goes together with ensuring its legitimacy in the eyes of stakeholders. Some of the most fundamental and recurring questions that arise include:

- Who is the initiator of the ISWM assessment process?
- Who implements it and assures the momentum is kept?
- Who owns the ISWM assessment process itself?
- Who owns (or comes to own) the results or products?
- Who owns the strategic planning process of which the assessment may form one of the initial stages?

In many cases, the assumption is that the owner is the local authority, in the form of a municipal government, city council or the like. But the owner can also be an informal platform an NGO with or without external funding local experts who have a contract from outside a group of local farmers concerned about water quality a donor agency a group of private investors and/or researchers interested in identifying potential investment projects in MSWM or the national ministry of local affairs. In the UWEP programme, it was possible to see virtually all of these variants and even some additional ones.

In all cases, there is a need to identify, in the ISWM assessment process, **a lead organisation** or **lead agency**, also called, in this document, the **facilitating organisation**. This is the organisation who takes general responsibility for the process. The lead agency may or may not also be the **owner** of the process.

5.2.1 How do you characterise ownership?

This document uses the term ownership to refer to the feeling of those involved in the process that they control the process and the outcome: that it is grounded in their reality and reflects their interests. They feel that they have the major say in the direction of the process and the products that come out of it. Another way of saying this is that the owners of the process are **committed to it** and the process itself is **committed to them**.

Financial commitment to an ISWM process takes the form of financial or 'in-kind' support from the stakeholders involved, especially those with more economic resources than the local authority. Stakeholders indicate ownership through the **time commitment** they make to the process, especially since for most stakeholders their time is scarce and competes directly with earning their livelihoods or other priorities of their organisation. Stakeholder commit time to attend meetings, conferences, workshops and training they donate their time to provide information. Host researchers and planners show their operations they choose to give their time to research ideas, to read and comment on the different documents that are produced during the process to represent the process and its results at different levels of government and in the international sphere.

Ownership also has a strong relationship to **trust**. The process depends on trust relationships between and among stakeholders, trust in the public officials from the municipality, trust in the working group leading the process, trust in the accuracy and integrity of information given by the private sector, but most of all, through trust in shared intentions to improve the local situation. Stakeholders demonstrate their trust when they bare their operations to others, even when they are not perfect or when they share their problems in an open way.

Ownership is felt when those stakeholders involved actively **promote the process and its (intermediate and final) results**. This can be through talking in a positive way about the process presenting the process and its results in a public or private forum or writing for the press or scholarly publications.

5.2.2 Ownership and approval

True ownership contributes to consensus and a feeling that the results of the process are fair to all the stakeholders, even if the results do not precisely follow the wishes of any particular individual group. In this sense, ownership can reduce the risk of rejection of the final results or of particular stakeholders breaking ranks and supporting their own interests rather than the shared goals.

In contrast, a process where decision-making is closed and key features are kept secret creates an atmosphere where

stakeholders may feel obliged to protest against siting of new facilities, plans for source separation or the privatisation of waste collection. Even though this opposition may be neither informed nor reasonable, it comes about almost on principle when key actors feel threatened because they have not been contacted or consulted.

Involving stakeholders can, in this sense, contribute to a preventative or precautionary approach to the process. The initial contact can be brief, low-profile, almost pro-forma, as a means to assess whether there is a need for more intensive involvement and also to arrive at a sense of the willingness of any particular stakeholder to participate in the process. A single telephone call or even a letter informing them that a process is starting, with contact information in case they want to learn more, is often enough.

If the initial contact indicates that there is a reason to go further or to invite representatives to participate in a platform or discussion process, that is then the second step.

Owning a process is not the same as giving formal approval to the product of the process, usually either an assessment or a plan document. The mayor or city council most likely will be the one to approve the ISWM assessment or the Strategic Plan. They may not be responsible for the day to day activities of the process and may not be involved on a permanent basis: solid waste management represents only one of a number of competing priorities.

5.2.3 What is needed to establish and maintain ownership?

To establish and maintain ownership will require different strategies and will vary throughout the process and from locality to locality.

Specifically, building the following steps into the process contributes to the growth of healthy ownership:

- **Clear information**: stakeholders should be informed what the process is about and what is the expected outcome of the process, why their participation is needed and what is expected from them
- **Asking, not telling**: in a participative and open process, the most important thing to do is ask for opinions, ideas, objections
- **Showing respect**: the opinion of all stakeholders is important and has an equal weight to quick a judgement or ignoring an opinion can be seen as a breach of trust and can result in the affected persons dropping out of the process
- **Maintaining momentum**: goodwill usually has a time limitation: keeping the process going and being clear about the next stages prevent boredom and attrition.

Three tips for increasing ownership are:

- **Use an expanded definition of stakeholder**: try to involve as many stakeholders as possible in working groups and during consultations rounds
- **Seek active participation of the local authorities**: these are the formal decision makers and their high-profile presence authority at workshops and meetings transparency and openness with information and facilitation of field visits lends legitimacy and seriousness to the initiative.
- **Work with a Memorandum of Understanding(MoU).** This is a useful mode to formalise terms of reference, goals, steps and agreements between the formal authorities and key stakeholders involved in the process, as well as clarifying how the results of the process will be formally endorsed and become part of the formal view of the future.

5.3 Roles and composition of the team

5.3.1 Roles and responsibilities in the ISWM assessment process

The ISWM assessment and subsequent planning process requires stakeholders play different roles. Each role, in turn, means different responsibilities. Figure 16 gives an overview of the main roles that stakeholders can play, which can be broadly divided as follows: before the process actually starts, during the actual process and when the process finishes, the stage of using the results of the process.

Table 19 explains the roles in the ISWM assessment process and gives examples of actors that can play these roles.

5.3.2 Different organisations and their roles in the ISWM assessment process

One actor or organisation can play various roles in the ISWM assessment process. Actors and organisations involved in the ISWM assessment process in the UWEP cities were:

- facilitating organisation [16]
- a working group or stakeholder platform [17]
- the local authority
- non-governmental stakeholders
- advisers and resource persons

[16] The facilitating organisation can form part of the working group or be an independent (external) organisation. The experience from the UWEP cities confirmed that the role of ‘facilitating’ the fundamental requirement of a participatory process which has to be addressed. It is just as important to recognise this function within the process as it is to determine who does the facilitating.

[17] In some of the UWEP cities staff from the local authority formed part of the working group or stakeholder platform.

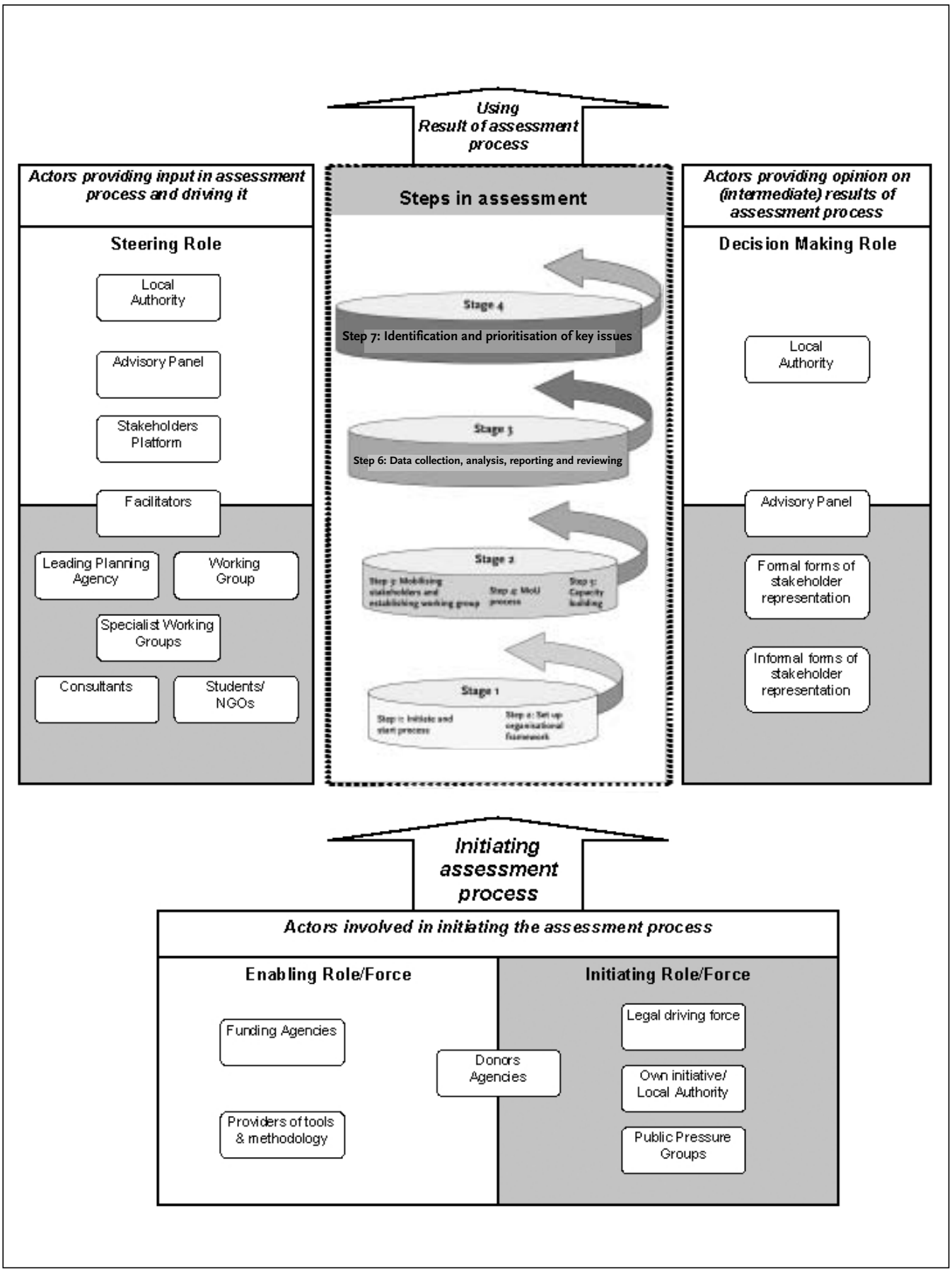


Figure 16. General Overview of the roles in ISWM assessment process

Figure created by Jeroen IJgosse

Responsibility	Role	Actors and activities
1. Initiating the assessment and / or planning process	Enabling role	Providing funds for the assessment and/or planning process
	Driving force behind initiation	National legislation obliging strategic waste management plans to be developed
2. Providing input into the assessment and / or planning process and driving the process	Steering and guidance	Steering Committee, Solid Waste Management working group, Solid Waste Management Board
	Operative and facilitating tasks	Facilitators, specialists, volunteers
3. Participating in consultations and providing feedback to the (intermediate) results of the assessment and / or planning process	Decision making approval intermediate and final documents	Local Authority, City Council
	Provide feedback in participative and/or consultative manner	Organised stakeholder platforms and other forms of stakeholder representation.
4. Using the outcome of process, implementing recommendations	Responsible for implementation and review	Local authority, City Council, Public Works or Sanitation Department
	Involved in implementation	Organised stakeholder platforms and other forms of stakeholder representation Sanitation workers Scavengers and recyclers
5. Payers of costs and receivers of benefits of the results of the process	Clients of the service or daily participants in waste generation	Households, businesses, ward representatives, farmers, institutions, host communities and abutters to solid waste facilities
	Ultimately, the ones who pay for the service	Households, businesses, ward representatives, farmers, institutions

Table 19. Roles of stakeholders in the ISWM assessment process

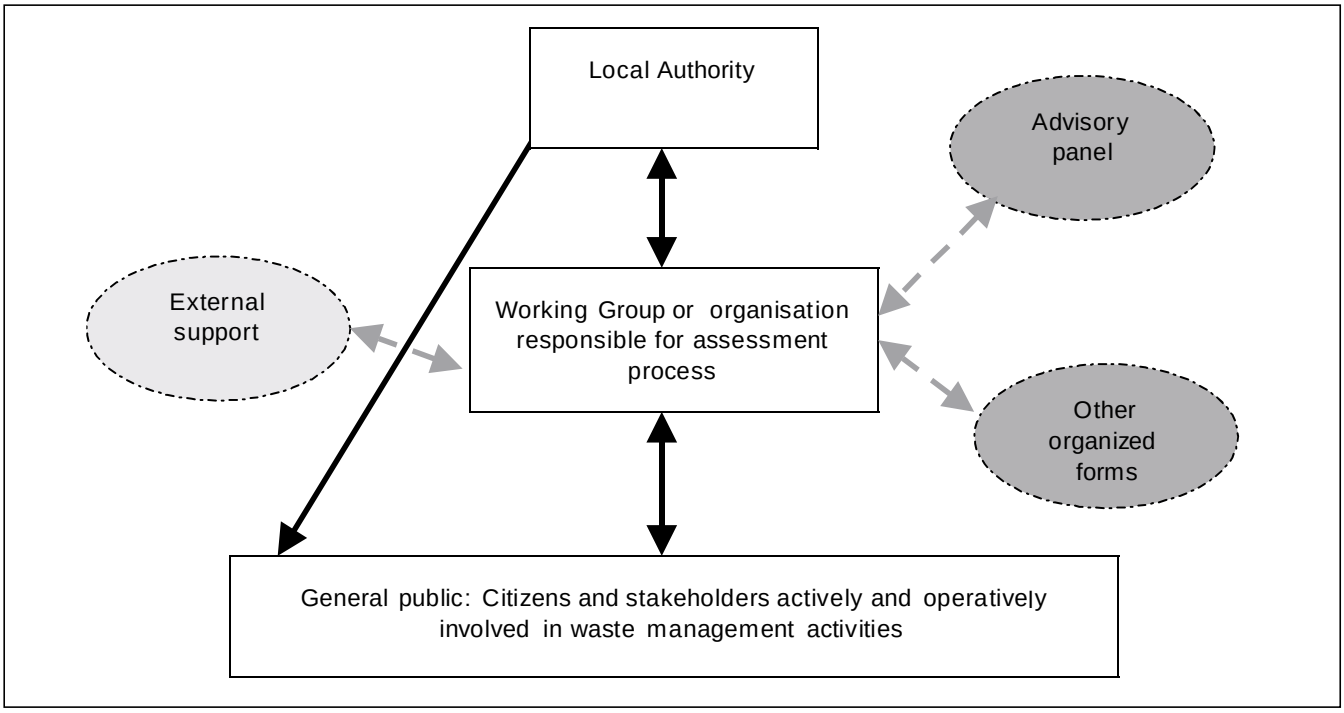


Figure 17. Organisational structure of ISWM assessment process

Figure 17 shows the generic organisational structure of those involved in the ISWM assessment process and identifies the five principal groups involved.

5.3.3 Roles of the facilitating organisation

The ISWM assessment process is designed to be facilitated. Facilitation, in this regard, means not only that an individual or organisation[18] has to lead the process, plan and organise the day-to-day activities, communicate with the other stakeholders, but also that there is an external facilitator for most or all meetings, workshops, trainings etc. and that this facilitator creates a group atmosphere, vocabulary, 'rules of the road', meeting habits, approaches to resolving conflict and quick releases for tension. The process in this way acquires a culture and set of norms which are extremely important to building trust and ownership.

In most of the cities where the UWEP Programme has been active, the regional UWEP partners have played this facilitating role, even though their own position within the planning process was different in different cities. CEK in Bamako, IEM in Varna and Blagoevgrad and Mythri in Bangalore were seen as key local stakeholders and both of them are also located in the middle of the cities they work with. ACEPESA, IPES and CAPS are located at some distance from La Ceiba, San Andres and Tingloy respectively, but had staff living or working nearby who became the 'local face' of a facilitating organisation which was recognised as being external but not 'foreign'.

In the UWEP programme, core facilitation activities included:

- Initiating and guiding the process
- Setting the pace, keeping the schedule and maintaining the momentum
- Organising workshops, trainings, field visits and stakeholder activities
- Facilitating meetings
- Deciding when specialised support from waste or local consultants was necessary, formulating the terms of reference for and organising the logistics of that support
- Preparing information for the press and for key stakeholders
- Documenting meetings and field visits
- Providing the secretariat and serving as the budget-holder for meetings and workshops

- What is expected of you as the organisation or person facilitating and leading the process? Can you fulfil these expectations?
- Are you yourself considered a stakeholder? If so, how much respect and trust do you have from the other stakeholders / actors involved in the ISWM assessment process? Are you seen as neutral or biased? If you have influence, is that influence accepted and transparent?
- What are your strengths and weaknesses as a facilitator? Do you work better alone or in a team? Who can you draw on to compensate for your own weaknesses? Do you need to organise a separate secretariat, so that you are not responsible for documenting the meetings you facilitate?
- In your locality, what is the of the local or municipal authority? If they are not the initiator, what role do they play? Does the process represent any kind of a threat to them?
- In what way does your role overlap with that of the local or municipal authority? Does that cause a conflict or rather strengthen both your positions?
- What is expected of each of the stakeholders during the ISWM assessment process?

Box 8. Key Questions for facilitators

5.3.4 Roles of the working group or stakeholder platform

In most cities in the UWEP programme a **working group, stakeholder platform** or a **waste management board** already existed and was able to take on an official role in guiding and steering the ISWM assessment. In general, such a working group is a mixed group of stakeholders, both governmental and non-governmental. It can be either newly created or built upon existing organisational structures. The group meets regularly and decides on the directions of the assessment.

The working group can play a number of crucial roles in the ISWM assessment process, such as:

- Prepare work plan for the whole ISWM assessment process.
- Co-organise capacity building events, meetings, workshops.
- Provide feedback (both on intermediate and final products.
- Provide, collect and analyse information.

5.3.5 Roles of the local authority

The local or municipal authorities deserve special attention in an ISWM assessment and planning process, because it has multiple faces linked with several different roles in waste management:

1. In most countries the local authorities are legally responsible for the management of waste. This means that under ordinary circumstances, they have the role of managers of the system and that the public budget also pays for their role in the system.
2. Most local authorities are also the inspectors or regulators of the solid waste system.
3. Municipalities and municipal institutions are also the generators of much waste, including wastes from markets and transport terminals and medical, institutional and utility wastes, many of which are hazardous. National institutions

[18] See footnote 16

like the military, the tax authorities, the post office and the civil service also are large waste generators.

4. Local authorities also have fiscal responsibility for waste and are key economic actors in collecting revenues from waste activities. While it is assumed that the local authority is neutral, this may not be the case at all, especially when there is a financial dimension to waste management. In many countries, it was formerly the case that local real property taxes were dedicated to paying for solid waste, but it is increasingly common to make these costs explicit and transparent with a payment per week or per bag of waste. Municipalities may also own the landfill and have an economic interest either in keeping it open or closing it and the like.

Photo 13. COGEVAD team in Bamako, Mali, during participative workshop

©ERM, Adam Read

The roles of the local authority in the ISWM assessment process include among others:

- Facilitate meetings, provide meeting space.
- Provide office space, staff, vehicles.
- Provide or host the ISWM city co-ordinator.
- Endorse the final document (ISWM assessment and/or plan).

The politically sensitive and high-profile position of the local authority brings both power and vulnerability and plays into the issue of confidence and legitimacy in two ways. On the one hand, the local authority needs to show its confidence and commitment to lead a participatory process and to combine formal authority with openness in exposing potential weaknesses in management and resources and in being willing to change. On the other hand, the other stakeholders – the citizens, private companies, institutions and representatives of the central government – need to have confidence and trust in the capabilities and political will of the local authority, in order to believe that the process is legitimate. Table 20 describes the different roles expected and tasks given from both the local authority and working group during the planning process in Bangalore, India.

5.3.6 Roles of non-governmental stakeholders

Non-governmental stakeholders include service users such as households, commercial establishments, private companies and service operators, i.e. waste collectors, recyclers, waste pickers and the like. Roles of non-governmental stakeholders in the ISWM assessment process include:

- Participate in working group.
- Provide, collect and analyse information.
- Provide feedback on the ISWM assessment document and/or plan.
- Provide office space, staff, vehicles.

ISWM Working group	Actors and activities
- Facilitate and organise the process of defining the road map - Organise consultative workshops / events - Collect and study the existing information - Assess the existing information - Communicate the findings to other groups - Prepare documentation at various stages - Documentation of the planning process - Facilitate feedback by the other groups - Incorporate feedback by other groups into the strategy document - Disseminate (intermediate) results of the process - Seek advise from the Advisory Panel at various stages of planning - Facilitate sensitisation between stakeholder groups - Preparation of final document for City Council presentation and approval	- Lead the Planning Process - Designated official representation in the working group - Partner in providing the infrastructure and other resources for the different events at various stages of the Planning Process - Share the data and information on the various field initiatives (both present and past) with the working group as part of the baseline document - Share the existing policies pertaining to SWM in Bangalore to enable the working group to define and frame the workplan - Channel / route any new proposals or informal initiatives being undertaken through the working group so that they can be placed into the integrated SWM strategy appropriately and in the right perspective. - Agree and commit to the working plan and timelines as agreed upon by the working group - Interface with the elected body for inputs and keep it updated on the stages of the process - Front end the communication of the process and stages of the process to the various stakeholder groups involved - Defend the process and outcome of process towards the advisory panel/stakeholder/general public - Presentation of the final document to the elected approval (facilitated by the working group) and approval

Table 20. Roles of the working group and local authority in Bangalore, India

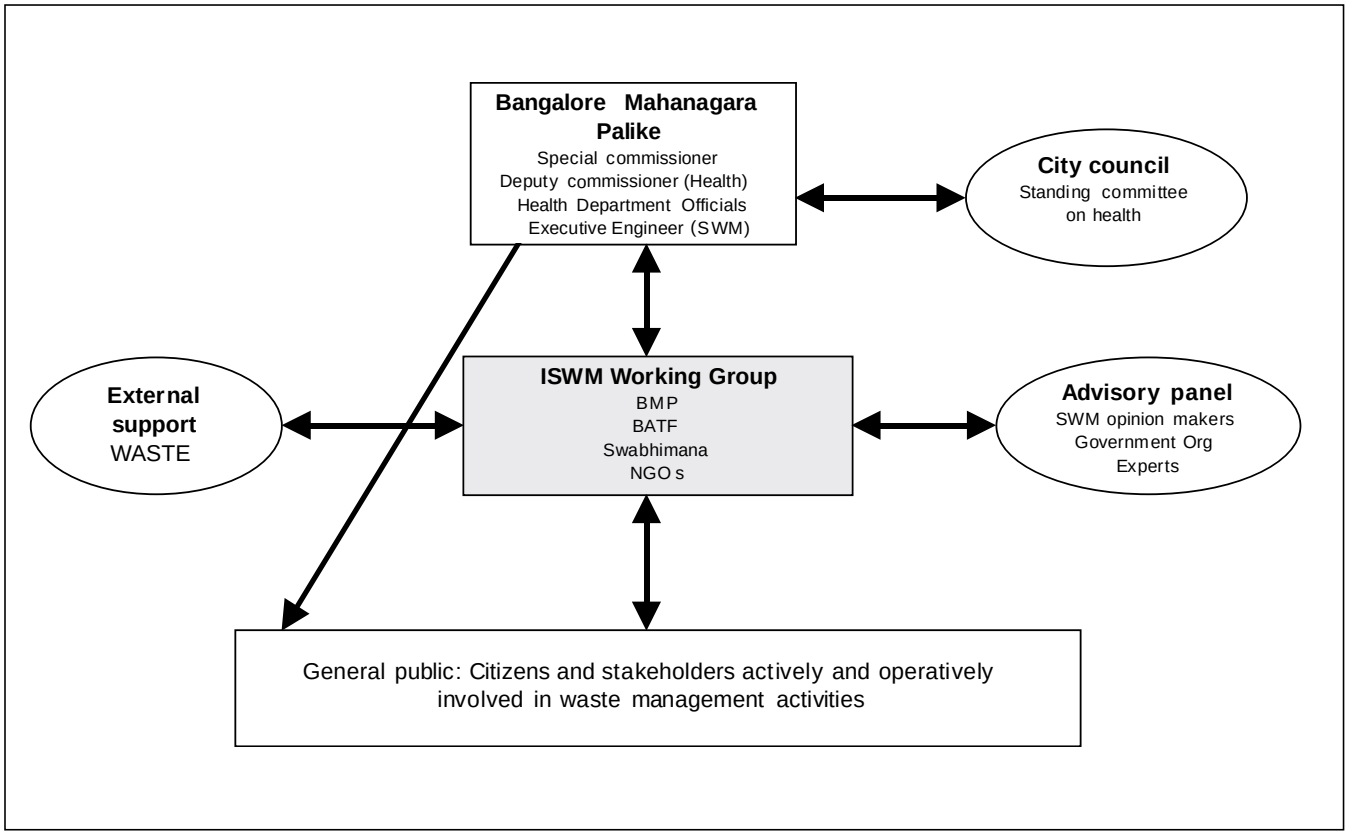


Figure 18. Organisational Structure of those involved in the ISWM assessment and Planning Process in Bangalore, India

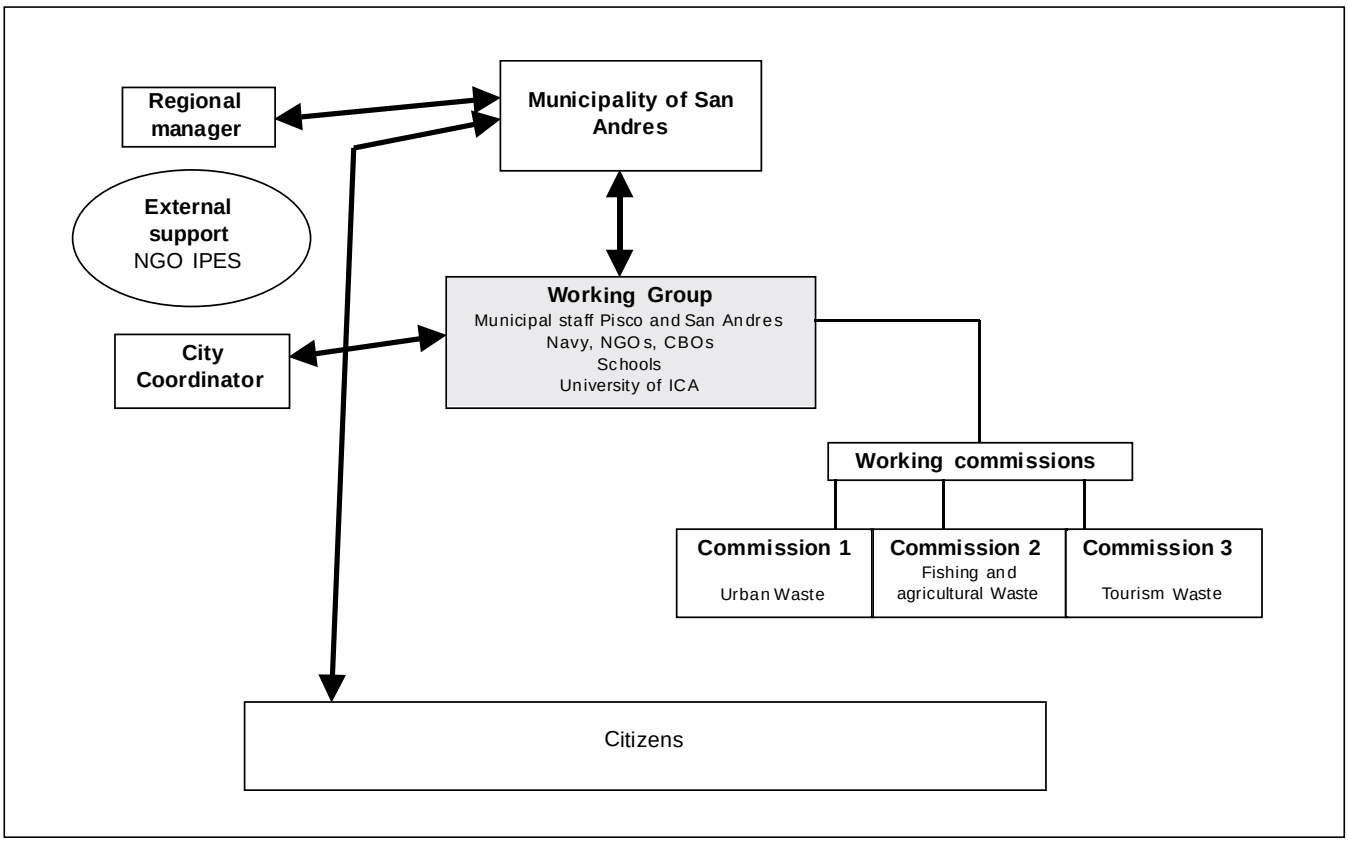


Figure 19. Organisational Structure of those involved in the ISWM assessment in San Andres, Peru

5.3.7 Roles of advisers and resource persons

Advisers and resource persons can contribute through:

- Providing specialised input to capacity building and training on ISWM.
- Preparing a research plan and conducting (action) research.
- Producing research, analysis, triangulation.
- Documenting elements and processes and writing and editing reports.

Sometimes the facilitating organisation provides this kind of advice. In other cases a separate advisory panel and/or external resource group exists.

5.3.8 Organisation of the ISWM assessment process within the UWEP programme

In each of the UWEP cities, specific groups were involved in the ISWM assessment process, each with their own set of roles, responsibilities and tasks. Figure 18 and Figure 19 show how the process was organised in the two UWEP cities Bangalore, India and San Andres, Peru.

In both cities the staff from the local authority formed a part of the working group (called project team in Peru), while the mayor and the city council interacted as a separate body with the working group.

In Bangalore the working group was built around a strategic alliance between a stakeholder platform on environmental issues Swabhimana, staff of the municipality (BMP), BATF (a task force consisting of local officials and private investors) and the facilitating organisation Mythri.

In Peru members of the working group/project team included representatives from the provincial authority of Pisco and the regional representatives from the national government sectors of Health and Fishing. They were identified by IPES. The working group was divided into three commissions, each assigned different tasks.

The role played by the UWEP partner, the facilitating organisation, was different in the two cities. In Peru, the organisation IPES was not a member of the working group and as such was an independent organisation in the organisational structure. Staff from IPES undertook two levels of tasks. The day-to-day tasks of facilitating the project team was done by the city coordinator and the local staff resident in San Andres. The planning and monitoring the progress of the project as well as keeping contact with the political authorities were done by the regional coordinator from Lima.

In Bangalore, on the other hand, the UWEP partner formed an integral part of the working group and shared the facilitating tasks with other members of the working group. In Bangalore

two additional actors were present, an advisory panel composed of high level officials at state and municipal level that gave intermittent advice at on the products of the assessment and planning process. Use was also made of an external resource group that had a more coaching role of guiding the facilitators within the working group during the planning process.

Variations were found in the other cities were the UWEP programme was active. In the Philippines, each municipality is obliged by law to have a municipal solid waste management board. This board with representatives from the municipality, civic society and actors active in solid waste management formed the starting point of the organisational structure in Tingloy. The UWEP partner, CAPS, played an important facilitating role in the process.

5.4 Capabilities and skills

Using the ISWM approach and conducting an ISWM assessment requires a number of skills and abilities of the different stakeholders involved. These requirements differ per stakeholder and role.

The ISWM approach strongly builds upon the ability:

- To think city wide and not only at a local level (e.g. A street or a ward)
- To be objective and un-biased
- To obtain, map, assess and analyse the opinion of different stakeholders
- To analyse situations in a holistic and integrated manner
- To link the different elements with the waste system
- To incorporate and balance the effects different aspects have on waste management

The working group should have access to persons with skills in the following fields:

- Facilitation, negotiation and conflict resolution
- Logistics and engineering
- Public communication and pr
- Research and investigation, both desk-top and in the field
- Writing and photo-documentation skills

In addition, the facilitating organisation has to have access to experience and knowledge of the technical, legal, social, institutional, policy and environmental aspects of waste management, either within their own organisation or through access to consultants and advisers.

Some capacities can be built up in the course of the assessment, as Chapter 3 indicated. The challenge is to find a balance between hiring external advisers and training local stakeholders. It is recommended to undertake as much as possible with local stakeholders, because of the greater degree of ownership and sustainability that this will create. However, certain tasks may be too specialised to be carried out by local stakeholders, such as analysis of social surveys, studies related to hazardous waste, materials balance, etc. or the trajectory to provide training to make this possible would make the process too long to be credible.

5.4.1 Additional considerations

The working group will interact with a number of other stakeholders varying from citizens groups, officials from regional provincial authorities, waste collectors and waste pickers from the informal sector. All these stakeholders possess a wealth of information and often have valuable insights and suggestions for improvements related to waste management.

Some key determinants of strategy and methodology are:

- Language, ethnicity, culture: different stakeholders may speak different local languages. The facilitating team has to be capable in different languages. Also, the attitudes towards wastes may differ radically, e.g. Muslims may not want to raise food in compost made from swine manure; certain Asian groups may not want to use or donate second-hand goods because of their potential association with ancestors and dead persons and certain native peoples have no word for ‘waste’.
- Literacy and numeracy: the literacy level of all stakeholders might not necessarily be the same some will not be able to read maps or meeting minutes others may not be able to understand a budget presented in a spread-sheet.
- Educational level: beyond literacy and numeracy, there may be wide differences in the ability of different stakeholder groups to interpret graphs, figures, flow charts, planning schemes, etc.[19]
- Sex and gender: in many cultures, women manage the household (and control waste generation and management within the household, but men go to the meetings and make commitments on household payments or participation. This can lead to difficulties in implementation and compliance.
- Caste and class: in the UWEP programme in Bangalore, there was considerable discussion about the role of servants in managing waste, something that would not be true in low-income communities. In India, it used to be the case that only certain ‘low’ caste members could handle night soil or the material from emptying latrines. The Zabbaleen waste collectors in Egypt are Christians the landfill waste pickers and recyclers in Bulgaria are Roma. These groups are important stakeholders, but they have low social status and even lower self-esteem, so involving them requires building trust and sensitivity within the group.

[19] A good reference for alternatives is Robert Chambers’ classic book on participatory techniques: Whose Reality Counts, Putting the Last First.

5.5 Planning

The planning of the ISWM assessment process involves a number of issues, such as making, using and following a work plan, fixing the duration of the ISWM assessment and the issue of time and timing.

5.5.1 Work plan

The work plan, presented in Chapter 3, is the operational instrument for lead organisation to plan the entire process of an ISWM assessment. The work plan serves as a guide to monitor progress in the planned activities. A work plan usually contains the following:

- Goals and objectives
- Criteria that the assessment (or plan) must fulfil
- Activities
- Inputs (e.g. time, equipment, formats)
- Results and outputs at various stages during the assessment period
- Timetable
- Budget

In some cases, for example in Bangalore, India the work plan was more elaborate. It was called a Conceptual Note and included also:

- Approach (e.g. participatory, in stages/steps)
- Division of tasks
- Skills
- Instruments and tools
- Indicators for monitoring

5.5.2 Working group meetings

One recurring activity within the work plan will be the meetings of the working group. It is important that these working group meetings fall within a larger framework and time planning. It is the facilitator's role and task to assure the focus of the working group in this context. A pre-determined agenda can contribute to this, as setting clear deadlines by which tasks/agenda points/items have to be dealt with. This allows the process to maintain its momentum and also the stakeholders to see intermediate results emerging from their efforts.

Figure 20 shows a meeting of the ISWM working group in Bangalore together with the meeting's agenda, the list with actions and tasks agreed upon during the meeting and the signatures of the members.

5.5.3 Time during the ISWM assessment process

When preparing the work plan, one important issue to think of is the issue of the time and the timing of the events. A number of factors to consider are:

- Finding the **most appropriate time** for meetings and other events is a challenge. The selection of timing for meetings and key events has a profound influence on the process. Meeting during the day may eliminate professionals: meeting in the evening may eliminate women meeting on Friday afternoon means most Moslems won't come meeting in the weekend may also bias attendance to men who are 'free' rather than women who are busy with marketing and washing, but will also exclude weekend farmers or those who commute long distances to the city. Like other aspects

Photo 14. Participative workshop during ISWM assessment process in Tingloy, Philippines
©CAPS

ISWM working group meeting at the offices of BATF

The Agenda

1. Actions from the previous meeting (28th July 2003)
   a. Preparation of master list of stakeholders
   b. Proceedings of the announcement workshop
   c. Letters to participants and non-participants of the announcement workshop
   d. Collation of feedback on the planning process from workshop participants
   e. Letters to Advisor panel members
   f. ToR for the working group
2. Guidelines for filling the assessment formats
3. Meeting with the Advisory Panel
4. Cluster meetings with the stakeholder groups
5. Revision of the Concept Note

Read and agreed by the Working Group

Sl. No.	Working Group Member & Organisation	Signature	Sl. No.	Working Group Member & Organisation	Signature
1	V P Ilori, DC (Health), BMP		7	Sheena, BATF	
2	Dr. Krishna Prasad, MOH, BMP		8	Seemi, BATF	
3	K.Atmanand, SHI, BMP		9	Anselm Rosario, Waste Wise	
4	Puttamallaiah, EE (SWM), BMP		10	Govardhan, Swabhimana	
5	Kalpana Kar, BATF		11	Anjana Iyer, Swabhimana	
6	Manjula, BATF		12	Rajeev Kumar, Project Agastya	

Signatures from the ISWM working group

Actions / tasks from this meeting

Sl. No.	Task	WG members responsible	Timeline for completion
1.	Revision of Concept Note	Rajeev, with inputs from WG members	August 1, 2003
2.	Revision of ToR for working group	All, anchored by BATF	
3.	Letters to cluster groups	BATF	August 2, 2003
4.	Finalisation of proceedings of Announcement Workshop	BATF	August 2, 2003
5.	Preparation of master list of stakeholders	Anjana, Dr. Krishna Prasad, Sheena	Ongoing but all WG members give their inputs to the database
6.	Preparation of guidelines for filling of assessment format	Anselm, BATF	August 2, 2003
7.	ToR for Advisory Panel	BATF	August 4, 2003
8.	Guideline document for Cluster meetings	BATF	August 4, 2003

The next working group meeting has been scheduled on **august 4, 2003** at **3.30 p.m.** at BATF. The core group working on the above tasks would meet at 2.00 p.m. prior to the WG meeting

Figure 20. Example of agenda and agreed minutes of a meeting of the ISWM working group in Bangalore (WG mom 310703)

Photo 15. Participative workshop during ISWM assessment process in Bamako, Mali

©ERM, Adam Read

of the process, it is important to **ask first**. The time for the initial meetings should vary, to get everybody present at least once.

- Setting and keeping to the **duration** of meetings and workshops requires practice and commitment. A work group meeting might need between one and two hours, while a workshop with stakeholders could require an evening, a half day or a whole day. It is important to distinguish between the total time needed for the activity (including preparation, intervals for coffee and or lunch, waiting time before all participants are present) and the actual time reserved for that part for which the activity was planned (presentation of the content and allowing time for questions or feedback).
- **Respecting time limits** means that sometimes it is not possible to achieve the planned objectives of the meeting or event extending the time may only make participants angry and will not necessarily mean that the goal will actually be reached
- Creating a **culture of punctuality** is a good way to start. The facilitation team and representatives of the lead organisation should be careful to set role models for punctuality. Sometimes serving food or drinks first is a way to handle expected delays in arrival another strategy is building in time for introductions before the programme actually starts. In most cases some participants will be late and others very late. In general, the more important the speaker, the less likely they are to be punctual: it is not uncommon to have to wait an hour to speak to a mayor and then only being given ten minutes of his or her time. For this reason it is better to put a VIP in the middle of the day, so that his or her delay doesn't keep the whole meeting waiting.
- **Keeping a log or notes about timing** or including information on who arrived when in the minutes, not only helps refine the techniques and match expectations to reality: it also has the function of putting light pressure on participants to arrive on time if they don't want to be singled out in the documentation.

5.5.4 Duration of an ISWM assessment

The ISWM assessment process can take three to six months to complete, but might take longer, depending upon a number of factors. The first factor is whether one includes the preparation in the three to six month period, since convincing the key stakeholders, including the local authority, of the **need and value added** can take more time than expected, especially if the local authority is not the initiator of the initiative.

Secondly, extensive stakeholder analysis prior to the process of mobilising the stakeholders and organising the planning will influence the length of the process. Furthermore, the size of the locality both in population and territory plays a role, as do the types of wastes that are included in the assessment. Finally, a variety of unforeseen factors can influence the length of the process, such as a change in political leadership, the need for training of the stakeholders, difficulty in obtaining data, hesitancy or even resistance of stakeholders to participate in participatory events or conflicting jurisdictions and contested bureaucratic responsibilities.

Often it is better to have a process which advances slowly but steadily and maintains modest momentum, rather than have a process that takes shortcuts in order to finish before a particular deadline. Working too quickly can result in cutting off the process or ignoring the input of certain stakeholder groups.

5.6 Financial issues related to an ISWM assessment process

Most of the costs of an ISWM assessment are in time, especially, in the time of the lead organisation, the working groups and the facilitators. One of the most significant influences on the cost of the process is (1) **whether** these people need to be paid (2) **how** they are paid, that is, based on a salary or as consultants or volunteers and (3) **who** pays them.

5.6.1 Costs usually covered by the local authority

For this reason, one typical arrangement for an ISWM assessment is to have the local authority commit one or more staff-persons to the process as part of their regular duties, in effect **detailing or seconding a staff-person**. This is usually included as the local government's main financial contribution to the process. The municipality is the best stakeholder to do this, because staff in a government entity are usually in the civil service and so are a long-term fixed cost. Also, a local authority cannot normally shift resources in the middle of a budgetary cycle, so the chance of their being able to commit to pay cash is small. There is usually someone available for this. The question is: is the person available up to the job and do they want to learn?

There are several other costs which it makes sense to have the municipality pay, because they cost the municipality very little, but if they have to be provided in some other way, they represent large budget items. One is **office space and support**. Again, most municipalities have a permanent town hall or mairie where it is possible to find some space, a desk and to give a small amount of secretarial support to the process. The municipality will most often not be willing to cover telephone costs these have to be found elsewhere.

The second is **meeting and workshop facilities or space**, again, something which is usually present, but has to be scheduled. In post-communist countries like Bulgaria, the municipality also frequently has its own guesthouse or apartment and can provide **free or low-cost overnight accommodation** to local experts, consultants or attendees at workshops and meetings. Where the municipality themselves do not have this, they may be able to leverage it by special price arrangements with local hotels.
A fourth cost which frequently comes to the municipality is **transportation support**. This is tricky, because the municipality may have vehicles but not the budget to pay the fuel. In Varna, for example, during the time and motion study for the ISWM recycling assessment, there was a need for cars to follow waste vehicles on their routes. The municipality provided two cars, drivers and staff for data collection, but donor funds had pay for filling up the cars with fuel.

Similarly, the assessment project can often make use of office and municipal infrastructure but have to pay the variable costs. Examples include:

- Using municipal copiers, faxes and printers but buying separate paper or paying per page
- Using collection vehicles for a pilot project but paying for fuel
- Using a telephone or internet connection or grid, but paying separately for calls from the project's extension or for the project's own email address
- Using the municipal or department kitchen, including stove, refrigerator, etc, for coffee and tea and event refreshments but buying separate supplies
- Paying municipal staff outside of the project, such as security guards and cleaning staff, separately for working on weekends or evenings

A note on grant funding and 'in-kind contribution'
When the ISWM assessment and/or planning process is paid for with a grant or out of an external fund, there may be a need for the lead agency or grant recipient to contribute up to 50% of the costs. The costs born by the municipality can usually count, but they have to be certified by the municipal accountant as having actually been paid.

The above-mentioned costs have a **high value** to the process but a **low cost** to the municipality. When the accountant documents these 'in-kind' contributions, she or he should be careful to quantify the value, rather than the cost.

5.6.2 Costs which have to be budgeted in the process

Costs which cannot normally be covered by the local authority, but must be financed from elsewhere, include:

- Costs for external facilitation or managing the process
- Specialist consulting and advice, including fees, accommodation, subsistence allowance
- Training and capacity building: costs include the cost of trainers, materials, venue, etc.

- Meeting costs: space (if not provided by the municipality) flip charts, audio-visual equipment preparation, printing and distribution of invitations, registration materials, programmes and proceedings refreshments registration and other staff
- Costs of preparing materials and presentations for meetings
- Costs of providing the working group(s) with a budget
- Hard costs of communication and information: telephone and internet costs postage courier fax printing and copying subscriptions and memberships clipping services etc.
- Publication costs: writing, layout, printing or digital printing, distribution
- Field research costs, such as transport and vehicles costs of data collectors, drivers or other field staff (for taking data, sorting materials, etc) equipment sorting table, balance, camera supplies (sorting bags, clipboards, pens) special permits other costs
- Desktop research costs: library and statistical bureau fees and costs literature and journal purchase telephone and internet costs

How much does an ISWM assessment cost?
Without going into too much detail, it is possible to give an idea that an ISWM assessment for a medium-sized city should cost around $ or € 20,000 to 30,000, excluding the costs of external specialist consultants. About half of these costs relate to staff and fixed costs which can be born by the municipality and the rest to costs which must be budgeted. This means that about $/€ 15,000 needs to be financed externally. The good news is that many small grant programmes provide this kind of money for clear, well-defined projects.

When there is a private-sector partner, such as the BATF in Bangalore, some of the hard costs may be born by this private stakeholder. It is important to structure the financial relationship so that the contribution does not appear to be a way of buying influence on the outcome of the process, but rather, is part of a commitment to accept that outcome, whatever it may be.

Budgetary and Fiscal Responsibility
In all but exceptional cases, the lead organisation takes responsibility for the budget of the ISWM assessment and also manages that budget. It is useful for there to be one single person responsible for preparing the budget and exercising budgeting control, even if they are not the main participant in the substantive activities.

Donor Funding or Programmatic Funding
A good source of financing is donor programmes, especially those operated by embassies in the host country. The Dutch government has several of these small grant funds: in Eastern Europe they are called MATRA CAP funds USAID also has small funds programmes, DANIDA has Local Environmental Funds in a number of countries. The ceiling of these programmes is low, but in cases where the in-kind contributions come from the municipality, they will usually be enough to cover the other costs.

In some countries, where there is a national requirement for cities, provinces or counties to have a waste management plan, funds may also be available from these sources.

Chapter 6. **Considerations around the ISWM Assessment Process**

6.1 Introduction

There are many factors that can influence the process of conducting an ISWM assessment and affect its outcome. The assessment process in its turn can also be a source of influence on other activities and developments in the city. This chapter gives some examples of these factors and influences.

6.2 Factors that support or favour the ISWM assessment process

Many cities and communities are full of poorly managed waste, litter, faecal matter, dirty water etc. However, this does not necessarily lead to a recognition of the need for better solid waste management. In most cities, especially in the South, the need for better solid waste management comes into focus on the political and practical agenda only when other, more basic needs for water, shelter and sanitation have been met.

Once a city has gotten to the point where the decision makers or other stakeholders have made better solid waste management a priority, they can proceed to a number of actions. Choosing an assessment and planning process is only one of these actions. Box 9 describes various local and external actors and influences that can encourage the demand for an ISWM assessment and planning process.

Local actors and influences:

- A local authority makes an election promise to improve waste management in the city and this stimulates a commitment to plan, as well as fostering the development of a strategic long-term vision.
- There is a tradition of planning that has helped in other areas, such as housing or energy.
- It is clear that a continuation of the status quo, in terms of institutions, finances, technologies, etc, will not solve the problem.
- There is conflict or a lack of consensus about the direction of future development of the solid waste system.
- Public statements from the private sector about the need to clean up the city and improve the business climate may put pressure on local authorities to improve waste management in the city. In Bangalore, the BATF (Bangalore Area Task Force) represents a group of businesses in the high-technology and tourist industry, who put the City under precisely this type of pressure. At first, they were invited to do it themselves, but as momentum grew, the legitimacy of the process also increased and the City became a co-owner of the process.

External actors and influences:

- A national policy or legislation obliging every city to have a waste management plan, such as in Bulgaria, can create a need for assessments.
- An external donor programme based on commitments made in an international context may offer waste-related funding or technical assistance to the city.
- It can be part of the requirements for meeting some other political or environmental goal, such as accession to the European Union ISO 14000 certification or subscribing to Local Agenda 21.

Box 9. Circumstances that encourage the demand for an ISWM assessment and planning process

The first set of factors that can support or favour the assessment process are political. If there is political will, the process has a much better chance of taking place and the concentration of decision making power can help the process along.

This plays several ways during an election year. In UWEP I, it was possible to proceed with activities in the lead-up to an election (as in La Ceiba) by meeting separately with each candidate and getting each one to sign a document stating that if they were elected, they would proceed with the ISWM activities. But in other circumstances an election period makes the assessment process more difficult, for one strategic and one logistical reason. The strategic reason is that none of the candidates wants to commit themselves if they think it will decrease their chances of getting elected. The logistical reason is that an election campaign frequently fills up all the time of all the stakeholders, as well as making it difficult to get rooms for meetings or press coverage.

The passage of international conventions or national legislation requiring a solid waste planning process or introducing new requirements for solid waste management can also stimulate an assessment process and in some cases provide funding for it as well. In UWEP Plus, national or state requirements were a source of support for ISWM assessments and planning in the Philippines, India and Bulgaria. Also in Bulgaria, at the time that UWEP Plus was beginning, a new national planning requirement had been added to require municipalities to plan for management of several materials in the household hazardous waste stream, including fluorescent lights, household and automobile batteries and accumulators and used crankcase oil. Precisely this new requirement made it possible for IEM researchers to speak with representatives of many businesses that deal in these materials and to be able to get interest and co-operation from them.

In some cases a (resource) stakeholder such as a public utility, the tourism industry, a major investor may promote the development of an ISWM assessment or plan, because its interests are at stake. For example in San Isidro de Heredia, in Costa Rica, the department of environment of the national electricity company financed education activities for the households in topics related to waste management and the protection of drinking water sources. It also participated, together with the rest of the municipal committee of environment, in the waste management planning process for the municipality. It justified this on the basis of the disturbance in their operations created by unmanaged waste in their areas.

6.3 Factors that hamper or impede the ISWM assessment process

Other activities in the city, especially planning or construction activities, may hamper the ISWM assessment process, which then seems like a distraction. Preparations for large public events can create a focus on short-term solutions and foster a general unwillingness to look at root causes or acknowledge the realities. When Rio de Janeiro was preparing for the original conference on environment and development in 1992, for example, there was a massive effort to remove scavengers and street waste pickers from public places, without any interest in what the effects would be.

National commitments to privatisation, centralised fiscal policy and/or externally imposed restructuring of public finances (and policy or planning activities leading towards these) can also impede the ISWM assessment process. In Bangalore, expenditure on public services is connected to the central civil service and there is a general agreement that government pays for waste management. This makes it difficult to assess the willingness of people to pay for improved waste management, since it seems contrary to their reality. In Egypt, government commitments to privatisation and the perceived threat they pose to small independent collectors makes it a challenge to get data from those small collectors.

Previous experience with planning processes, especially when these are disappointing, can also make it difficult to do an assessment. In certain cities where a donor-financed plan has been developed and it sits gathering dust on a bookshelf in an archive, there is an understandable reluctance on the part of key stakeholders to (re-)engage and (re-)commit their time and energy to something that was useless to them the first time.

A lack of experience with or belief in the power of participation can also impede the planning process. This is a characteristic of many, if not most post-communist countries, where the relationship between government and citizens before 1989 can be described by the phrase: ‘the government tells, the people listen and obey.’ In these countries it is not too difficult to get to the idea of stakeholder as object, but it takes a concentrated effort to explain and convince the authorities that the more important role for the stakeholder is as subject.

There can also be difficulties with the lack of availability of planning tools, local planning experts or a planning culture. Post-communist countries usually have a strong planning tradition, so this problem is likely to surface more in countries with a history of authoritarian rule or a strong connection to pre-industrial traditions.

Finally, the lack of horizontal communication within a city, either within government or among less formal stakeholders, can make the ISWM assessment process a challenge.

6.4 Impact of an ISWM assessment process on solid waste development

An ISWM assessment process is not only influenced by outside factors, it can also exert influence on other socio-political developments or be integrated with other developments.

- In Varna, Bulgaria, an ISWM assessment and planning process focusing on recycling and composting brought many stakeholders together for the first time, creating an opportunity for new business contacts.
- In San Andres, Peru, the ISWM assessment process created a forum for integrating the plans for a new national park with existing environmental and development initiatives.
- In La Ceiba, the ISWM assessment process highlighted not only the technical and financial problems with the local waste collection sector, but provided an opportunity for them to organise themselves into an association.
- In San Isidro de Heredia, Costa Rica, the ISWM assessment process lead to the strengthening of the municipal committee on the environment and resulted in the implementation of

municipal system whereby the waste collection fees are revised and updated annually.

- In Commune IV in Bamako, Mali, the ISWM assessment process stimulated resolution of a long-term feud between followers of two rival chiefs, by creating an overarching motivation for them to work together.
- In Bangalore, the ISWM assessment process created the basis for a compromise between the environmental community and the small plastics manufacturers around the management of waste from plastic bags.
- In Tingloy, The Philippines, a willingness to pay study as part of an ISWM assessment provided convincing evidence that citizens would pay for waste removal, which opened the way for new, commercial services that had a profound impact on cleanliness of the island and health of the fisheries.

Photo 16. Waste collectors in La Ceiba, Honduras
©ACEPESA, Patricia Ulloa

6.5 Long-term social and economic impacts

In addition, the ISWM assessment process can have the following long-term social, economic and other impacts, some positive and some not so positive:

- Increase awareness amongst citizens of issues related to solid waste in their own homes and businesses, leading to new ideas, behaviour and demands.
- Create greater insight into the non-technical aspects influencing a waste management system and the role that legal-policy, financial, social-cultural, institutional and environmental aspects play in the decision making process. In La Ceiba, for example, the assessment process revealed the system of political patronage behind the assignment of routes to the 22 private waste collection firms and brought this information into the discussions of the waste collectors in a transparent way.
- Raise or allay fears about siting of new disposal facilities, depending on how transparently the authorities operate. When residents hear that there will be a new disposal facility in their neighbourhood, they usually oppose it, but if they understand that it will not be an open dump, if there is convincing information about the need and if they have seen how other similar facilities operate, they objections may disappear.
- Create a city-wide view, being able to link different system elements and relating the different aspects of waste management.
- Lead to or increase the recognition and acceptance of role of informal and unrecognised stakeholders in waste management activities: in Bangalore, the assessment showed how waste pickers contribute to keeping the city clean and in turn identified new opportunities for waste pickers to earn their livelihoods in a more stable way.

Annexes

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Annex 2 Example of a Table of Contents of an ISWM Assessment

General	***Example from San Andres, Peru***
Introduction to the study	- Presentation - Introduction
Chapter 1: Justification of the assessment and methodology used	Chapter 1: Antecedents and characteristics of the study 1.1 Antecedents 1.2 Characteristics of the study 1.2.1 Objectives of the study 1.2.2 Geographical characteristics 1.2.3 Type of wastes 1.2.4 Duration of the study 1.2.5 Those responsible for the study 1.2.6 Working methodology 1.3 The Integrated Sustainable Waste Management approach
Chapter 2: General description of the location being assessed	Chapter 2: General characteristics of the study 2.1 Jurisdictional boundaries 2.2 Geophysical characteristics 2.3 Climate and soil 2.4 Urbanization and population characteristics 2.5 Health and education 2.6 Economic activities 2.7 Hydrology 2.8 Flora and fauna 2.9 Ecosystems and habitat zones 2.10 Socio-economic and political characteristics
Chapter 3: Description of waste management system, covering all three dimensions: stakeholders, waste system elements and aspects	Chapter 3: Actual situation of solid waste management in San Andres 3.1 Stakeholders 3.1.1. Stakeholders and their roles - District Municipality of San Andres - Provincial Municipality of San Andres - Maritime Institute of Peru - National Service of Agrarian Health - IPES – Promoción del Desarrollo Sostenible - PRO NATURALEZA - National Reserve of Paracas - National technical training centre - Health centre of San Andres - Regional department of Fishery 3.2 Waste system elements 3.2.1. Generation and storage - Generation and characteristics of waste - Storage of waste 3.2.2 Public cleansing 3.2.3 Collection per type of waste

General	***Example from San Andres, Peru***
Chapter 3: Description of waste management system, covering all three dimensions: stakeholders, waste system elements and aspects	3.2.4 Transportation 3.2.5 Recycling - Organic wastes - Non-organic wastes 3.2.6 Final disposal 3.3 Aspects 3.3.1. Technical aspects - Operational indicators 3.3.2 Health and environmental aspects 3.3.3 Financial and economic aspects - Municipal budget - Waste management service payment - Financial resources for solid waste management - Budget for solid waste management 3.3.4. Social cultural aspects - Interaction between local actors 3.3.5. Institutional aspects - Municipal organisation - Training of personal 3.3.6. Legal aspects 3.4 Management indicators of integrated solid waste management
Chapter 4: Problem definition and key issues	Chapter 4: Problem identification and key issues 4.1 Problem identification - General functioning of the system - Financial and economic aspects - Institutional and legal aspects - Health and environmental aspects - Social cultural aspects - Technical aspects 4.2 Causal problem analysis and key issues
Chapter 5: Conclusions and recommendations	Conclusions Recommendations
Additional information	Bibliography Glossary of terms used Annexes

Annex 3 Example of an MoU For Facilitating the ISWM Assessment Process

MEMORANDUM OF UNDERSTANDING

BY AND AMONG

MUNICIPALITY OF TINGLOY

PANGKAUNLARANG KILUSAN TUNGO SA KALINISAN (PKK)
(MOVEMENT FOR CLEANLINESS)

CENTER FOR ADVANCED PHILIPPINE STUDIES (CAPS) INC.

AND

PROVINCIAL GOVERNMENT OF BATANGAS

MEMORANDUM OF UNDERSTANDING

KNOWN BY ALL MEN THESE PRESENTS:

The **Municipality of Tingloy**, with office address at Municipal Building, Poblacion 15, Tingloy, Batangas, represented by the **Municipal Mayor**;

The **Pangkaunlarang Kilusan Tungo sa Kalinisan**, a multi-sectoral waste management coordinating body with office address at the Office of the Municipal Engineer, Municipal Building, Poblacion 15, Tingloy, Batangas, represented by Hon. Benita Lerma R. Belino and herein referred to as **PKK;**

The **Center for Advanced Philippine Studies, Inc.**, with office address at Room 202, Loyola Heights Condominium, Loyola Heights, Quezon City, represented by Mr. Danilo G. Lapid, the UWEP Regional Programme Coordinator and herein referred to as **CAPS**;

and

The **Provincial Government of Batangas** through the **Provincial Government – Environment and Natural Resources Office**, with address at Capitol Site, Batangas City herein referred to as **PG-ENRO** represented by **Hon. Hermilando I. Mandanas**.

WITHNESSTH THAT:

WHEREAS, UWEP's mission through CAPS is to enable local initiatives in waste handling by communities and entrepreneurs with the aim to generate additional employment and income in waste handling and to improve environmental conditions for low income communities;

WHEREAS, the UWEP has adopted the policies for integrated sustainable waste management and, therefore, developing expertise by means of pilot projects implementation, workshops, training and exchange visits;

WHEREAS, a bridge program called UWEP Plus, of UWEP I, in collaboration with CAPS has been developed as another two-year programme (October 2001 – September 2003) and to have its core funding from the Dutch Ministry of Development Cooperation and additional funding from other local sources;

WHEREAS, the Provincial Government through the Provincial Government-Environment and Natural Resources Office had supported the implementation of UWEP I and intends to be an active partner of CAPS in implementing various UWEP Plus activities in the municipality of Tingloy consistent with its mandate on waste management;

WHEREAS, UWEP Plus in collaboration with CAPS is to be implemented in the municipality of Tingloy;

WHEREAS, the LGU of Tingloy agrees to the idea of developing the island into a tourist haven, hence, it should promote cleanliness and orderliness in the whole island to add to its natural abounding beauty;

WHEREAS, the LGU of Tingloy in partnership with PKK intends to enhance its service to its residents beyond the issue of wastes, thus, desire to improve the solid and liquid human wastes management to contribute to the realization of the tourism development agenda of the municipality;

NOW THEREFORE, for and in consideration of the premises, the parties to this Memorandum of Understanding (MOU) do hereby commonly declare and agree to strengthen collaboration and complementary support and assist to the further development and implementation of UWEP Plus consistent with the objectives and requirements of their respective programs and mandates.

Part I

Collaborative Activities

For the purpose of the present MOU, the parties have agreed to collaborate in:

1. Formulation and implementation of technical assistance in projects relating to waste management in the municipality of Tingloy, Batangas in accordance with the objectives and stipulations under R.A. 9003;

2. Survey, studies and/or assessments contributing to the formulation of SWM Plan of the municipality and component barangays;

3. Development of projects for enhancing public awareness and community participation of the UWEP Plus including mobilization of non-government organizations, community based organizations and entrepreneurs;

4. On the training of personnel in Batangas (City/Municipal Coordinators) and other project partners for the further development and implementation of UWEP Plus;

5. Provisions of technical assistance and management support to LGUs in the implementation of the 2-year SWM Plan; and

6. Exchange of information and documentary outputs on the waste management produced under their respective programmes and mandates.

Part II

Responsibilities

To carry out the activities as stated above, the parties agreed to undertake the following responsibilities:

WASTE/CAPS

1. Implement UWEP Plus activities in collaboration with the host municipality, partner agencies and organizations prioritizing all provisions under R.A. 9003;

2. It shall provide technical assistance, like, coordination, consultancy services, and other logistical resources needed by the UWEP Plus plans and activities;

3. It will provide a Programme staff in the person of a city/municipal coordinator, Mr. Dominador H. Manguiat, who will liaise with all parties concerned; and

4. Provide updates or documented reports to partner agencies regularly as deemed necessary.

TINGLOY

1. As mandated in R.A. 9003, the LGU of Tingloy shall allocate funds and make it available for use in all activities regarding ISWM Board formation and planning as well as in the implementation of the would-be identified projects;

2. Provide a counter part staff or designate a staff from the department concerned with solid waste management to work hand in hand with UWEP Plus City Coordinator;

3. Provide a working space in the municipal building under the department concerned with solid waste management where the staff of UWEP Plus could hold office to perform his assigned tasks;

4. Provide venues for activities like seminars, workshops and training and other administrative support to UWEP Plus City Coordinator;

5. Allow the use of office equipment and other office supplies of the said department by the UWEP Plus staff in line of performing his official tasks; and

6. Incorporate the promotion of ISWM as an approach to solid waste management to the would-be Municipal Solid Waste Management Plan.

PKK

1. Spearhead the implementation of the planned activities included in UWEP Plus proposal; hand in hand with UWEP staff;

2. Conduct regular monitoring and evaluation of the implemented activities in collaboration with the staff of UWEP Plus; and

3. Submit regular reports (in collaboration of the UWEP Plus staff) to the SWM Board regarding the status of the activities conducted.

PG-ENRO

1. Assist in the monitoring and evaluation and technical assistance to UWEP Plus project site and activities;

2. Assist in the facilitation and development of integrated sustainable waste management activities in UWEP Plus and UWEP II activities.

Part III

Duration of the Agreement

The parties to the present MOU shall carry out the activities and responsibilities as stated in the present MOU during the life of respective programmes.

Part IV

Waiver

Nothing contained in the MOU shall constitute a waiver, expressed or implied of any privilege or immunity which the parties to the present MOU may enjoy, whether pursuant to the Convention on Privileges and Immunities of the Specialized Agencies or any other convention or agreement, law, order or decree of any international and/or national character.

Part V

Settlement of Disputes

Any dispute among the parties to the present MOU concerning the interpretation or application of this MOU shall be settled amicably.

Part VI

Effectivity

This Memorandum of Understanding shall take effect upon the signing of all parties.

IN WITNESS WHEREOF, the parties have hereunto affixed their signatures this 11th day of February 2002 at the _____.

On behalf of the
Province of Batangas

HON. HERMILANDO I. MANDANAS
Governor

On behalf of the
Municipality of Tingloy

HON. ANTONIO H. ATIENZA
Mayor

Pangkaunlarang Kilusan tungo sa Kalinisan (Movement for Cleanliness)

HON. BENITA LERMA R. BELINO

Center for Advanced Philippine Studies (CAPS), Inc.

MR. DANILO G. LAPID
UWEP Plus
Regional Programme Manager

Annex 4 Estimating the Quantity and Composition of Waste at the Point of Disposal

This is a method that allows you to estimate the waste quantity and composition for a very low cost, and even with the help of waste pickers or collection workers. because it does not require the data collector be literate.

Some things to know first:

1. It is important to do your estimating for a period of one or two weeks in a row, to allow for the estimate to take into account the effect of different days of the week (Fridays in Islamic countries; Mondays after the weekend; etc.)

2. It is important to repeat the estimate in each major season, and to think about the seasonality of waste generation when you pick the part of the season. So for example, in Mali there should be a period in the middle of the rainy season and in the middle of the dry season. In Bulgaria there should be one estimation period in September-October when it is still warm and households are doing a lot of food preserving, one in January-February when it is cold and some households burn wood or coal, and one in the spring-summer. Avoid major holidays or festival weeks, when there is either much more or much less waste generated than normal.

3. For this waste estimation method, it is necessary to train the stakeholders who will collect the data and to have a "trial run" to make sure that everyone is doing it the same way.

4. In order to have some confidence in the data, you need to make a decision whether to estimate ALL loads coming in during the sample period, or only a fraction of them. If it is a fraction, then you need to make and follow a SAMPLING PROTOCOL: estimating every fifth vehicle, or only those with odd numbers, or the first three that arrive after each whole hour, or choose some other way of choosing the ones to sample. Ask a statistician how to do this in your city.

5. You will need to actually weigh a few loads to get the **reference volume-weight ratio**. This is a frightening-sounding phrase: all it means is that you need to know how much one cubic meter of waste weighs in your city and during the sampling season. You can do this by visiting 20 households (randomly selected but representing different social and ethnic groups) and weighing and measuring the volume of their waste, or by weighing and measuring some waste collected at the dump. In most cases, the answer will be somewhere between 250 kg and 400 kg per cubic meter, depending on season, social class, etc.

6. For each data collector, it is good to make a **reference stride measurement**. That is, to have the person walk 20 steps and then measure the distance they have walked. This allows you to say, for example, that one step or stride is 20 centimetres. Then in order to measure the volume of the waste, that person can count their own footsteps.

The basic method: visual inspection, measuring, and quartering

The visual quantification method involves using your eyes and legs to estimate the quantity and composition of waste. The basic technique is using your footsteps to measure the length and width of a pile of waste, and a stick with half-metres marked off to determine the height. If a person who has a 25 cm stride walks 16 steps (4 metres) on one side and 12 steps (3 metres) on the other side, the length of the pile is 12 square metres. If that person holds up a stick and sees that the pile is 1.5 metre high at its highest point, and 1 metre high in most places, then the maximum volume of that pile is 18 cubic metres and the minimum is 12 cubic metres, so that 15 cubic metres is a reasonable example.

Now suppose that using the reference volume-weight ratio, you know that there are usually 330 kg in a cubic metre,. Then you can say that the weight will be approximately 1/3 in kilos of the volume, or, in this case, 5.000 kg or 5 tons. This is the basic method for estimating quantities.

Quartering method for estimating composition

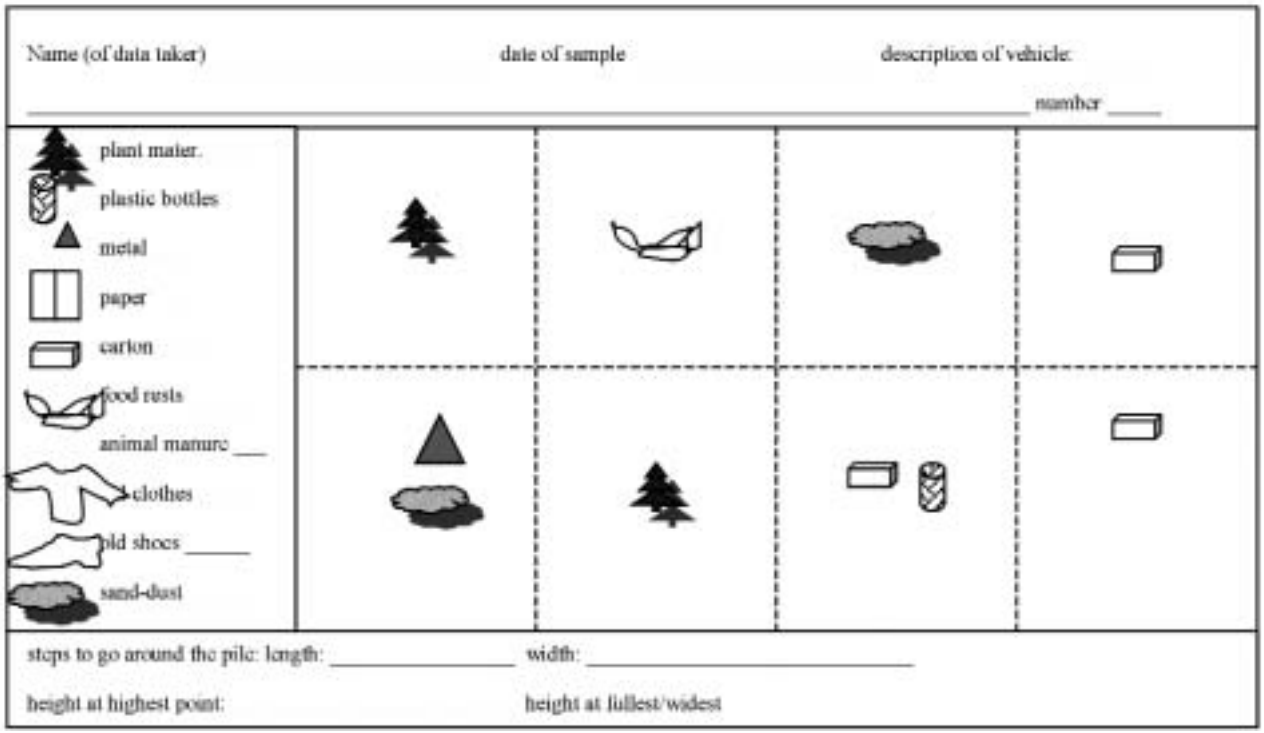
For this, the data collectors do not need to be literate, but they need top be able to count to 25 and also to do fractions up to one sixteenth.

First, make a list of all the different materials in the waste stream that you want to have in your composition estimate: paper, glass, kitchen wastes, plastic bottles, sand and gravel, ashes, and the like.

Find someone with drawing skills and ask them to make a single clear picture-icon of each of the materials you want to count. For example cardboard boxes, plastic bottles, soda and beer bottles, etc. With these you make a key, with each icon being represented by itself or by a simple picture or number.

Now make your data sheets. The main part of the data sheet is a big rectangle that represents the pile of waste, with a lightly-coloured grid placed in it. On one side is a list of the icons with a box next to each one for the amount.

The instruction is for the data collector to divide the pile in half in their mind. If each half is predominantly one material, they can note that in the half of the grid. If one half is a mix of materials, they keep dividing it in half until it is possible to say what material predominates, or put a combination of symbols in each block. Then they mark this in the grid. Below is a sample grid with eight fractions, with some symbols in each, and a key at the left.



This document, *Putting Integrated Sustainable Waste Management into Practice* is a practical guide towards applying the ISWM concept in waste management planning. Integrated Sustainable Waste Management (ISWM) is a concept, an analytic framework and assessment methodology that pays attention to aspects often neglected in conventional waste management planning. ISWM covers institutional, social, environmental, health, political, legal, technical and financial aspects, while emphasizing the critical role that a variety of stakeholders – including waste pickers, women and micro- and small enterprises – play everyday in waste management operations such as collection, treatment, reuse, recycling and prevention.

Putting Integrated Sustainable Waste Management into Practice is primarily written to support the work of organisations and individuals who have the practical responsibility for assessing and planning for improvements in the waste management system in their city. The readers may represent a department within a municipality, civil society, a consultancy firm, a stakeholder platform, a working group or a Waste Management Board or any individual or organisation with a stake in a cleaner city.

This methodology document can be seen as the latest addition to the series of publications from the UWEP Programme, including the Set of Five Tools for Decision-makers (Tools), developed by WASTE and published in 2001. It is based on the application of the ideas in the context of nine cities in India, the Philippines, Honduras, Mali, Egypt, Bulgaria, Peru and Costa Rica.

The Urban Waste Expertise Programme (UWEP) was an eight year programme divided in UWEP I and UWEP Plus. The programme was coordinated by WASTE and funded by the Netherlands Agency for International Cooperation (DGIS) of the Ministry of Foreign Affairs. Many people and organisations were involved in the UWEP programme. In UWEP Plus the most important have been ACEPESA in Costa Rica, CAPS in The Philippines, CEDARE in Egypt, CEK in Mali, IEM in Bulgaria, IPES in Peru and Mythri in India.

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