DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM

PROGRAMME FOR THE IMPLEMENTATION OF THE NATIONAL WASTE MANAGEMENT STRATEGY

Starter Document
for
Integrated Waste Management Planning
in South Africa

Reference Document

FINAL DRAFT

May 2000

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EXECUTIVE SUMMARY

This document reviews the current status of waste management planning in South Africa, as well as the policy and legislative context in which this planning process is taking place. In addition, a brief review of integrated waste management (IWM) planning as applied internationally is also presented. Based on these overviews, a framework for IWM planning for South Africa is given. This information is intended to assist the authorities and other stakeholders to plan appropriately for addressing high priority waste management issues in South Africa, such as the provision of waste management services for previously disadvantaged communities, job creation, as well as promoting waste prevention/minimisation.

A wide range of legislation, regulations and by-laws currently control and impact on waste management planning in South Africa. Key among these is the National Environmental Management Act (NEMA), which requires national departments and provinces to prepare environmental implementation plans (EIPs) and/or environmental management plans (EMPs). Integrated waste management plans form strategic inputs to these EIPs and EMPs.

The National Waste Management Strategy (NWMS) identifies a number of key issues relevant to waste management planning that require attention. Whereas waste management planning traditionally focused on waste collection and disposal, this strategy calls for a more holistic and integrated approach. For this reason the NWMS takes forward the planning principles outlined in the White Paper on Integrated Pollution and Waste Management, which promotes a hierarchical approach to waste management. This integrated approach promotes waste prevention/minimisation and recycling over disposal, and emphasises planning as a key activity for achieving integrated waste management (IWM).

Following this hierarchical approach, priority issues that need to be addressed by IWM planning include:

- The implementation of policy instruments to promote waste prevention, minimisation and recycling.
- The provision of waste management services for those sections of the population who currently do not have access to waste collection services or who do not receive adequate services.
- The promotion of waste recycling as an essential part of waste management, and the development of standards for its implementation and funding.
- The review of waste treatment facilities, specifically incineration of medical waste, to evaluate compliance with existing legislation.

- Registration and licensing of the many un-permitted landfill sites currently in operation, to address the lack of hazardous waste facilities, and to encourage the proper management and eventual phasing out of informal scavenging on landfills.

An overview of international IWM planning initiatives is given in Table 1. The lessons learnt from these international planning approaches, which may find application in South Africa, are highlighted below.

The requirement to develop, implement and regularly review waste management plans is a key component of relevant legislation promulgated in the EU and member states, as well as in the USA. Waste management planning is primarily controlled by a single environmental act. A hierarchical approach to the management of waste, with a shift in focus from disposal to minimisation and reuse of waste and then to prevention, has been implemented. This has been necessary in order to meet legislated targets for the quantity of waste disposed of in landfills. Often specific waste minimisation or recycling mechanisms are required, for example separation of recyclable material at source, or banning the landfilling of commodities that can be recycled. Guideline documents have been published to assist waste management planning and ensure compliance with the relevant legislation.

The availability of reliable waste and waste management data is seen to be essential for the development of effective waste management plans. An electronic catalogue of waste management data in the EU has been established, which overviews existing waste management plans at all levels of government. Other countries, such as Ireland, have established national waste databases to collect reliable and up-to-date information on waste disposal and recovery facilities.

The co-operation of all levels of government is essential to achieve an integrated approach to waste management planning. In the Netherlands a 'Co-operation Treaty' between the three levels of government has been formalised to secure mutual reliance and responsibility. Regional co-operation between local authorities is promoted. National government is responsible for the main points of policy and provincial and local government develop and implement more detailed plans and policies. The role of public/private partnerships is recognised in meeting the required level of service.

The need for good planning, careful site selection, public participation and awareness, and a policy of openness and transparency have been highlighted as successful mechanisms to mitigate opposition to waste management proposals. Furthermore, the implementation of effective integrated waste management planning has ensured that adequate disposal capacity is available for projected future waste generation.

Based on the findings and conclusions of this project, it is recommended that:

- A practical guideline document on the preparation of integrated waste management plans should be developed. A starter document, entitled *Guidelines for the Preparation of Integrated Waste Management Plans*, has been produced as part of this project.

- This starter document (*The Reference Document*) as well as the starter document on IWM Planning Guidelines (*Guidelines for the Preparation of Integrated Waste Management Plans)* should be used by DEAT as a basis for a programme of wide consultation with stakeholders, as also recommended in the NWMS Action Plan on Integrated Waste Management Planning.
- Those aspects of IWM planning identified as requiring legislation for their effective implementation are considered as part of DEAT's Law Reform Process.
- Integrated waste management planning should form an integral part of DEAT's environmental awareness and training programmes.

Table 1: Summary of Comparative International Review

Country	Legislative Instrument	Other Initiatives	Specific Requirements
European Union	• 1975 Framework Directive on Waste • Directive on Hazardous Waste • Directive on Packaging and Packaging Waste	*European Topic on Waste*: Currently developing electronic database on waste management	Waste management plans must: • Estimate the type, quantity and origin of waste, now and in the future; • Specify general technical requirements relating to waste management and disposal; • Make special arrangements for the management of particular wastes • Plan for suitable waste disposal sites or installations
The Netherlands	Environmental Management Act of 1990	*The Waste Management Council*: National control of waste disposal including the compilation of waste management plans	• Preference for waste management is prevention, reuse/recycling, incineration, and lastly landfill. • The landfilling of recyclable and combustible waste is prohibited. • The manufacture of certain products is prohibited. • Waste collectors may be obliged to separate waste. • Producers and importers may be obliged to take back end-of-life products. • A National Waste Management Plan is to be compiled every four years.

Country	Legislative Instrument	Other Initiatives	Specific Requirements
Denmark	• Environmental Protection Act • Order on Waste • Waste 21	Environmental Protection Agency established to deal with full range of issues including waste	• Overall aim is to reduce quantity of waste landfilled and incinerated. • Legislation requires a 12 year plan on waste management to be developed. • Source separation of eight waste types. • Co-operative initiatives are promoted.
Ireland	• Waste Management Act • Waste Management (Planning) Regulations	National Waste Database *Waste Management: Changing our Ways* published Regional strategic studies on waste management undertaken	• Waste management plans must be compiled by local authorities. • National waste management plans have been developed for hazardous waste. • Plans must be reviewed every five years. • Overall aims are waste prevention and minimisation to reduce reliance on landfill.
USA	Resource Conservation and Recovery Act 1976	Guideline documents on the development and implementation of waste management plans Education and outreach programmes Public/private partnerships	Waste management plans should address: • Organisational arrangements; • New and improved methods of collection, separation and recovery of solid waste; • Safe disposal of non-recoverable residues/.

Country	Legislative Instrument	Other Initiatives	Specific Requirements
Estonia	• Solid Waste Act • Water Act • Packaging Act • Planning and Building Act • Land Amelioration Act • Health Protection Act	National Environmental Strategy National Environmental Action Plan	The objectives are to: • Ensure more sustainable use of raw materials; • Reduce waste generation; • Promote waste recycling; • Reduce environmental pollution; • Reduce areas contaminated by waste; • Improve waste management.
Botswana	Waste Management Act	National waste management strategy Waste Management Planning: Procedural Manual for Local Authorities	The aims are to: • Minimise waste; • Maximise waste reuse and recycling; • Promote environmentally sound waste collection, treatment and disposal.

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1. INTRODUCTION AND BACKGROUND

The Department of Environmental Affairs and Tourism (DEAT) has launched a number of projects during January 2000 to fast track the implementation of the National Waste Management Strategy (NWMS). This process is part of DEAT's NWMS Implementation Programme. These projects cover the following areas:

- Integrated waste management planning;
- Waste information system;
- Waste collection services for high density unserviced areas;
- Waste recycling;
- Safe management of health care wastes.

The overall aim of this phase of the Implementation Programme is to produce *Starter Documents* for the above five high priority activity areas. Once these documents have been compiled by the end of March 2000, DEAT intends to take the process forward and *inter alia* consult wider with relevant stakeholders as part of its NWMS Implementation programme.

One of the tasks that was undertaken within this phase of the Implementation Programme was the compilation of a *Reference Document* and a *Guidelines Document* for integrated waste management planning (IWMP) for national, provincial and local government, as well as other affected parties. This *Reference Document* addresses the first part of the planning task. It includes information on the following topics:

- The policy and legislative context within which waste management planning is taking place in South Africa.
- A review of the current status of waste management planning in South Africa, including the roles functions and responsibilities of government and other stakeholders, waste management planning initiatives, and the identification of key waste management issues which need to be planned for.
- Brief summaries of IWM planning practices as applied in other countries.
- A proposed framework for IWM planning for South Africa, with specific emphasis on the needs of the previously disadvantaged communities, mechanisms to promote waste prevention and minimisation, and opportunities for job creation.

1.1 Limitations of Study

This study was not intended to be an exhaustive review of national and international waste management planning initiatives, but to provide the basis for discussions with a wide spectrum of stakeholders. To date, consultation with stakeholders has been limited and a full participatory process has not been implemented. The process of waste management regulation is dynamic with legal reform, both within the Department of Environmental Affairs and Tourism as well as other government departments,

currently being undertaken as part of an ongoing process. Consequently, the roles, functions and responsibilities of the key role players could not be unequivocally defined.

2. CURRENT STATUS OF WASTE MANAGEMENT PLANNING IN SOUTH AFRICA

This chapter sets out what is currently (1999) happening in waste management in South Africa. The chapter: examines the policy and legal context, and the roles, functions and responsibilities of government departments; provides an overview of waste management initiatives; and identifies key issues to be addressed by IWM planning.

2.1 Policy and Legislative Context

As part of this study, a review of legislation that is relevant to waste management planning was undertaken. This is presented in a separate document entitled '*Integrated Waste Management Planning: Review of Current Legislation'*. The most relevant policies and legislation are briefly discussed below.

The Consultative National Environmental Policy Process (CONNEPP) resulted in the development of the Environmental Management Policy for South Africa and the promulgation of the National Environmental Management Act (Act 107 of 1998) (NEMA, 1998). This Act provides for co-operative environmental governance by establishing principles and procedures for decision-making on matters affecting the environment. An important function of NEMA is to serve as an enabling Act for the promulgation of legislation to effectively address integrated environmental management, including integrated waste management.

Whereas the Environmental Management Policy delineates government's broad policy on environmental management, the White Paper on Integrated Pollution and Waste Management (IP&WM) provides more specific detail of government's policy on pollution and waste management (RSA, 2000). This White Paper formed the point of departure and the framework for the National Waste Management Strategy (DEAT, 1999).

The principles used in the development of the NWMS are *inter alia* those of the Constitution of the Republic of South Africa (Act 108 of 1996), the Bill of Rights contained in the Constitution, the Environmental Management Policy for South Africa (No. 18894 of 1998), the National Environmental Management Act (Act 107 of 1998) and the White Paper on Integrated Pollution and Waste Management for South Africa (DEAT, 2000). Some of the principles on which the NWMS is based are: Accountability; Affordability; Cradle to Grave Management; Equity; Integration; Open Information; Polluter Pays; Subsidiarity; Waste Avoidance and Minimisation; Co-operative Governance; Sustainable Development; and Environmental Protection and Justice.

2.1.1 National Environmental Management Policy

The White Paper on Environmental Management Policy for South Africa (DEAT, 1998) states that within the framework of the overarching goal of sustainable development, government has identified seven strategic goals for achieving environmental sustainability and integrated environmental management. One of the strategic goals is *holistic and integrated planning* and management. This goal

envisages the development of mechanisms to ensure that environmental considerations are effectively integrated into existing and new government policies, legislation and programmes, as well as spatial and economic development planning, and all economic activity.

Supporting objectives for planning are the following:

- To incorporate *integrated environmental management (IEM) principles and methodologies* in spatial development planning, including Integrated Development Plans and Land Development Objectives, and in plans for the use of natural and cultural resources.
- To develop *management instruments and mechanisms* for the integration of environmental concerns in development planning and land allocation.
- To develop *standards* for environmental management systems, environmental management impact assessment, monitoring and audit procedures and reporting for all activities.
- To develop agreed, appropriate *indicators to measure performance* in all areas of national, provincial and local environmental policies.
- To set *general and specific targets* for the control and, where necessary, reduction of environmental impacts.
- To develop transparent *review processes* for all aspects of environmental management.
- To develop *mechanisms to ensure disclosure of information* needed to protect people's environmental rights.
- To develop *guidelines or other instruments* for local government on the integration of environmental concerns into Integrated Development Plans and Land Development Objectives.
- To *review* policies, government responsibilities and decision-making processes and co-ordinate appropriate measures within and between departments and other organs of state in all spheres in order to: integrate environmental considerations in all activities; ensure effective integrated and holistic environmental management; and ensure the harmonisation and prioritisation of subsidiary environmental policies.

2.1.2 National Environmental Management Act

The National Environmental management Act (NEMA, 1998) devotes one chapter to Environmental Implementation Plans (EIPs) and Environmental Management Plans (EMPs). Key issues related to functions and responsibilities in regard to EIPs and EMPs are:

- Every national department *exercising functions which may affect the environment* and every province must prepare an environmental implementation plan within one year of the promulgation of the Act and at least every four years thereafter.

- Every national department *exercising functions involving the management of the environment* must prepare an environmental management plan within one year of the promulgation of the Act and at least every four years thereafter.
- Every organ of state referred to above must, in its preparation of an environmental implementation plan or environmental management plan, and before submitting such plans take into *consideration every other environmental implementation plan and environmental management plan already adopted* with a view to achieving consistency among such plans.

The purpose of Environmental Implementation and Management Plans is to:

- Co-ordinate and harmonise the environmental policies, plans, programmes and decisions of the various national departments that exercise functions that may affect the environment or are entrusted with powers and duties aimed at the achievement, promotion, and protection of a sustainable environment, and of provincial and local spheres of government, in order to minimise the duplication of procedures and functions, and promote consistency in the exercise of functions that may affect the environment.
- Give effect to the principle of co-operative governance in Chapter 3 of the Constitution.
- Secure the protection of the environment across the country as a whole.
- Prevent unreasonable actions by provinces in respect of the environment that are prejudicial to the economic or health interests of other provinces or the country as a whole.
- Enable the Minister to monitor the achievement, promotion, and protection of a sustainable environment.

Environmental Implementation Plans must contain:

- A description of policies, plans and programmes that may significantly affect the environment.
- A description of the manner in which the relevant national department or province will ensure that the policies, plans and as well as any national norms and standards, achieve their objectives, and promote and protect the environment.
- A description of the manner in which the relevant national department or province will ensure that its functions are exercised so as to ensure compliance with relevant legislative provisions, including the principles and any national norms and standards envisaged under the Constitution, recommendations for the promotion of the objectives and plans for the implementation of the procedures and regulations for integrated environmental management.

Environmental Management Plans must contain:

- A description of the functions exercised by the relevant department in respect of the environment.
- A description of environmental norms and standards, including norms and standards contemplated in the Constitution, set or applied by the relevant department.
- A description of the policies, plans and programmes of the relevant department that are designed to ensure compliance with its policies by other organs of state and persons.
- A description of priorities regarding compliance with the relevant department's policies by other organs of state and persons.
- A description of the extent of compliance with the relevant department's policies by other organs of state and persons.
- A description of arrangements for co-operation with other national departments and spheres of government, including any existing or proposed memoranda of understanding entered into, or delegation or assignment of powers to other organs of state, with a bearing on environmental management.
- Proposals for the promotion of the objectives and plans for the implementation of the procedures and regulations.

The Department has recently prepared a document entitled "Guidelines for the Preparation of the First Edition EIPs and EMPs" to assist other departments and provinces in compiling these documents (DEAT, 1999). Integrated waste management plans will form strategic inputs to the EIPs and EMPs, and must therefore be structured to meet the requirements for these documents. The other departments and provinces are currently developing and compiling their plans for submission to DEAT by the end of August 2000. The focus of the plans will be those activities for which provision has been made in the government's Medium Term Expenditure Framework (MTEF).

2.1.3 White Paper on Integrated Pollution and Waste Management

The White Paper on Integrated Pollution and Waste Management (DEAT, 2000) represents a paradigm shift in South Africa's approach to waste management. Historically, waste management has generally focused on reactive impact management and remediation of pollution. However, to ensure sustainable development, the focus has moved to pollution prevention. The NWMS process was undertaken to ensure that the IP&WM policy is translated into practice. Central to the development of the strategy for integrated waste management has been:

- The pollution avoidance, prevention and waste minimisation approach that focuses on the source of waste and moves away from "end-of-pipe" solutions;
- The need to extend waste collection, waste transportation, treatment and disposal services to an acceptable level to all communities and provide waste management services for the country as a whole.

As a means of addressing these identified problems, the IP&WM policy sets the following goal, objectives and deliverables relating to holistic and integrated waste management planning:

- ***Goal**:* To develop mechanisms to ensure that integrated waste management considerations are effectively integrated into the development of government policies, strategies and programmes, all spatial and economic development planning processes, and all economic activities.
- ***Objectives***
  - To incorporate integrated environmental management principles and methodologies in spatial development planning, as it affects integrated waste management.
  - To make timely and appropriate provision for adequate waste disposal facilities.
  - To develop management instruments and mechanisms for integrating waste management concerns in development planning and land allocation.
  - To develop agreed, appropriate indicators to measure performance for inclusion in EIPs and EMPs, as provided for in NEMA.
- ***Short-term deliverables***
  - To develop Guidelines for preparing integrated waste management plans for general, hazardous and industrial (including mining, coal combustion and radioactive) waste.
  - To ensure that each provincial environmental department submits a first-generation integrated waste management plan, formulated in accordance with the Guidelines, to national government (i.e. the Committee for Environmental Coordination). These waste management plans will form an integral part of the environmental management plans and environmental implementation plans of national and provincial government.
  - To ensure that each local authority submits a first-generation integrated general waste management plan, formulated in accordance with the Guidelines, to the relevant provincial environmental department.
  - To reach consensus between national government (DEAT, DME and other relevant departments) and industry sectoral representatives on time schedules for submitting integrated management plans for industrial waste (including mining and power generation waste), currently disposed of at private and/or dedicated facilities.
  - To ensure that integrated industrial waste management plans are submitted by the owners/developers to the provincial environmental departments for review.

2.1.4 National Waste Management Strategy

In order to improve integrated waste management planning within South Africa, the National Waste Management Strategy: Version D (DEAT, 1999) identified the following priority initiatives:

- DEAT will draft and promulgate regulations and guideline documents for integrated waste management planning for all waste types, and will develop and implement capacity building plans and public awareness campaigns in conjunction with provincial environmental departments. In addition, DEAT will undertake/commission investigations into appropriate technologies for the management of hazardous waste.
- The provincial environmental departments will develop first generation integrated waste management plans for submission to the Committee for Environmental Co-ordination (CEC) to facilitate inter-provincial co-ordination, particularly in relation to planning for facilities for treatment and disposal of hazardous waste. These plans will also include a summarised report of the local government first generation general waste management plans.
- Local Government will develop and submit plans for integrated general waste management to the respective provincial environmental departments.
- Waste management plans for industrial waste (including mining and power generation waste) that is disposed of at private and/or dedicated disposal facilities, will be prepared by the developers/owners and submitted to the respective provincial environmental departments.

2.1.5 Action Plan for Integrated Waste Management Planning

On the basis of the NWMS, the *Integrated Waste Management Planning Action Plan* (DEAT, 1999) was developed in consultation with stakeholders. The long-term objective of this Action Plan is that all future waste management in South Africa will be carried out in accordance with approved integrated waste management plans by the year 2012.

To achieve this objective, the following short-term objectives were identified:

- DEAT will draft and promulgate regulations and guideline documents for integrated waste management planning, by December 2001.
- The provincial environmental departments will develop first generation integrated hazardous waste management plans for implementation, by December 2004.
- Local government will develop first generation integrated general waste management plans for implementation, by December 2004.
- Integrated waste management plans for industrial waste will be prepared by developers/owners by December 2004.

The outputs/deliverables that will facilitate successful implementation of this Action Plan, assuming that all the critical assumptions are realised, are:

- Regulations (or other appropriate legal instruments) to enforce co-ordinated, integrated waste management planning to be developed by DEAT by December 2001.
- Guidelines for preparing integrated waste management plans for general, hazardous and industrial (including mining and power generation) waste to be developed by DEAT by December 2001.
- Awareness campaigns for integrated waste management planning to be initiated by DEAT together with the provincial environmental departments and implemented by local government for general waste, and the provincial environmental departments for hazardous and industrial waste. Development of the awareness campaigns will commence in 1999, and implementation will take place during the period January 2002 to December 2004.
- Each provincial environmental department will submit a first generation integrated hazardous waste management plan, formulated in accordance with the Guidelines, to the CEC during the year 2004.
- Each local authority will submit a first generation integrated general waste management plan, formulated in accordance with the Guidelines, to the relevant provincial environmental department during the year 2004.
- Time schedules for the submission of integrated management plans for industrial waste (including mining and power generation waste), which is currently disposed of at private and/or dedicated facilities, will be agreed upon and documented by national government (DEAT, DME and other relevant departments) and industry sectoral representatives between July and December 1999. (*This objective has not been achieved and will shortly be revisited by DEAT).*
- Integrated industrial waste management plans will be submitted by the owner/developer to the provincial environmental departments for review by December 2004.

Further details on the governmental activities required to achieve these objectives and outputs is provided in section 3.5 of the Action Plan. These activities include requirements relating to the development of a legislative framework, and reference (this document) and guideline documents. Timeframes and budgets proposed in the Action Plan were seen as targets and estimates to be refined and negotiated between the different levels of government, taking due cognisance of resource constraints.

2.1.6 Law Reform Process

Since the 1994 elections, the Department of Environmental Affairs and Tourism has produced a number of policies on environmental management, tourism and marine resource management. This process of policy reform has given rise to the need for a process of law reform. The transformation and restructuring process in the Department led to the decision towards the end of 1998 to incorporate the different law reform projects ongoing in the department into a single programme that covers the entire

spectrum of legislation that falls under the Department's jurisdiction. The DEAT Law Reform Programme (DLRP) attempts to address the constitutional and policy imperatives in respect of environment, tourism and marine resource management in the form of concrete deliverables. Legislation envisaged under the DLRP may take the form of Acts of Parliament, regulations or by-laws. The Department has identified the DLRP as a special departmental priority project that extends over a two to three year period from 1999 to 2001/2

The drivers of the Law Reform Programme include:

- Constitutional obligations such as section 24, the 'environmental right', and the principles of cooperative governance;
- Policy objectives in for example the White Papers on Environmental Management, Biodiversity Conservation, Tourism and Marine Fisheries;
- International obligations;
- Statutory obligations in terms of framework acts such as the National Environmental Management Act;
- Political objectives and strategic challenges such as contributing to the government's overarching goal of creating a "Better Life for All" and to the Rural Development Strategy process; ensuring effective cooperative governance; and facilitating sustainable development through job creation, local natural resource management and tourism development.

Priority focus areas

Between 1999 and 2001/2 priority is to be given to the focus areas within each of the three major components of the DEAT Law Reform Programme, including pollution and waste management and environmental management (including, for example, regulations regarding environmental assessment, co-operation agreements and access to environmental information, and an amendment to the National Environmental Management Act, Act 107 of 1998).

Aims and objectives of the programme

The purpose of the DEAT Law Reform Programme is to:

- Give effect to Constitutional obligations and to translate adopted policies into relevant legislation;
- Give effect to section 7(3)(h) of the National Environmental Management Act;
- Eliminate, as far as practical, fragmentation of legislation and achieve integration, with particular emphasis on fragmentation in environmental legislation;
- Ensure that DEAT's legislation promotes sustainable development;
- Coordinate sectoral and subordinate law reform priorities and time frames;
- Give effect to international obligations;

- Ensure synchronisation of sectoral laws with NEMA;
- Build government's capacity and competency to implement legislation,
- Cost and initiate the process of developing strategies for the implementation of new legislation.

Generic law reform outputs

While outputs will be specific to each sectoral law reform project, they are likely to include:

- Identification of the type of law required (e.g. new Act, regulations, amendments);
- Description of the context, motivation and components of the new law;
- The development of business and communication plans;
- Analysis and reporting of relevant international and national legislation and the evaluation of suitability to the specific law reform projects;
- A contact list of interest groups, and a short description of the process and time frame for consultation with identified interest groups/stakeholders;
- Background research papers/briefing papers providing, for example, detailed motivation for each component of the proposed legislation;
- A skeleton framework, itemising contents of the Bill/Amendment Bill/Regulations;
- Completed chapters of the Bill/Regulations;
- A completed draft for circulation to the CEC and other relevant interest groups;
- Programme for obtaining Cabinet approval;
- Government Gazette containing the bill, published for public comment;
- Compilation of comments on the gazetted bill;
- Programme for taking the bill through Parliament;
- Final Act/Regulations;
- Date of commencement;
- Implementation strategy.

During a parliamentary briefing in February 2000, the Minister for Environmental Affairs and Tourism announced that within the next six months there would be amendments to NEMA to incorporate framework legislation for *inter alia* integrated waste management planning and the promulgation of appropriate regulations. The rationale behind these changes is to bring environmental planning into the local government sphere and to integrate environmental and spatial planning. It is further intended to consolidate waste management legislation and up-date gaps and deficiencies in respect of sectoral and technical norms and standards.

2.2 Roles, Functions, Responsibilities

Roles, functions and responsibilities with regard to waste management planning are currently defined in the legislation. In some instances there may be dual roles, functions and responsibilities. For example a local authority may be an enforcer of by-laws as well as being a waste collector and transporter. Similarly an industry might be a generator collector and disposer of waste. These must be taken into account in the planning process.

During the development of the NWMS, the institutional arrangement was reviewed and proposals were made for revised roles and responsibilities according to the principle of subsidiarity and co-governance. The following section describes the current roles, functions and responsibilities and those proposed for future integrated waste management planning as presented in the Action Plan.

2.2.1 Current Government Institutional Arrangement

2.2.1.1 National Government Departments

The following list defines the waste-related responsibilities of some of the different national government departments, as stipulated by current legislation. This list only highlights the principally affected national departments. A more comprehensive analysis of the different departmental responsibilities will be undertaken as part of the legal review within the Law Reform Process. This analysis will include consideration of other potentially important departments not listed here (such as the Departments of Transport, Trade and Industry, Defence and Public Works).

Department of Environmental Affairs and Tourism

- Develop national policy, strategy, action plans, guidelines and standards for waste management, within the context of the National Environmental Management Policy for South Africa.
- Monitor the implementation of waste management plans (as part of the environmental implementation plans (NEMA Sections 12 (e) and 16(2));
- Intervene if the environmental implementation plans are not being complied with (NEMA Section 16(2));
- Manage international agreements (NEMA Section 25(3));
- Act on environmental hazards as required (NEMA Section 28 (4) and (5));
- Make regulations regarding accessibility of information (NEMA Section 31(2));
- Establish and manage the National Environmental Advisory Forum (NEMA Section 3);
- Establish and manage the Committee for Environmental Co-ordination (NEMA Section 7 and 8);

- Fulfil the obligations as lead agent according to the Environmental Management Policy for South Africa;
- Make regulations stipulating how policies, plans and programmes that may affect the environment are exercised and complied with (NEMA 13(2)).

Department of Water Affairs and Forestry:

- Regulating and permitting the final disposal of waste at a waste disposal facility terms of Section 20 of the Environment Conservation Act (Act 73 of 1989).
- Disposal of the waste on land is regulated by Sections 19 and 21(g) of the National Water Act (Act 36 of 1998).
- Revise and update Minimum Requirements for the control and operation of landfills.
- Establish and develop partnerships with other national departments with reference to NEMA Section 35.

Department of Minerals and Energy:

- Regulating waste from mining operations (Mines and Works Act (No. 27 of 1956) Section 5.13).
- Approval of Environmental Management Programmes (EMPs) in respect of the surface of the land concerned in the mining operations (Minerals Act (No. 50 of 1991) Section 39).
- Regulate the monitoring and auditing of EMPs (Minerals Act (No. 50 of 1991) Section 63(1)(d)(viii)).
- Revise and update standards, norms and guidelines for the environmental management of mining operations (e.g. the Mining Environmental Management (MEM) Series).
- Regulate the disposal of hazardous substances used at the mine and waste produced at the mine (Mine, Health and Safety Act (No. 29 of 1996) Section 98).
- Regulate the management and discarding of radioactive waste (Nuclear Energy Act (No. 46 of 1999) Section 45).

Department of Health:

- Regulate the disposal of waste that may cause a development of a communicable disease (Health Act (No. 63 of 1977) Section 33).
- Regulate the control of health related solid or liquid waste aspects (Health Act (No. 63 of 1997) Section 38(1)).
- Regulate the disposal of human bodies and tissues (Human Tissues Act (No. 65 of 1983) Section 37).

Department of Agriculture:

- Regulates registration and renewal of registration of agricultural remedies (Fertilisers, Farm feeds, Agricultural Remedies and Stock Remedies Act (No. 36 of 1947)

2.2.1.2 Provincial Government

Specific functions to be carried out by Provincial Government include:

- Within the context of the Constitution:
  - Developing a provincial environmental implementation plan (NEMA Section 11(1));
  - Developing provincial guidelines and standards;
  - Developing provincial regulations – these may be more strict but not less strict than national standards.
- Act on environmental hazards as required (NEMA Section 28(4) and (5)).
- Monitor compliance with provincial implementation plans (NEMA Section 16(4)).
- Intervene if the environmental implementation plans are not being complied with (NEMA 16(3)(d))(i)).
- Participate as part of the CEC (NEMA Section 8(1)(k).

2.2.1.3 Local Government

Local government in South Africa is currently still in transition. This process of transition began with the drafting of the Interim Constitution and was carried forward with the enactment of the Local Government Transition Act 209 of 1993. The final Constitution of South Africa sets out the framework for the transformation of local government, and sets out the principles on which the final system of local government must be based. It is anticipated that this period of transition will be completed during the course of 2000, with promulgation of the Municipal Systems Bill, which will complement the Municipal Structures Act (Act 117 of 1998) and the Municipal Demarcation Act (Act 27 of 1999).

The specific responsibilities for waste management allocated to local government by the existing legislation are as follows:

- Waste management activities at metropolitan councils (Local Government Transition Act (No. 209 of 1993) Schedule 2A).
- Waste management activities at district council, transitional local council or rural council (Local Government Transition Act (No. 209 of 1993) Section 10D).
- Health related aspects at local authority level (Health Act (No 63 of 1977) Section 20).

2.2.2 NWMS Proposed Roles, Functions and Responsibilities

During the development of the NWMS a review was made of the current roles, functions and responsibilities of national, provincial and local government. In order to meet the objectives of integrated waste management planning the following responsibilities were proposed (*Action Plan on Integrated Waste Management Planning*) and still need to be finalised:

DEAT:

- Develop regulations and guidelines for the implementation of integrated waste management planning.
- Develop a campaign to promote awareness regarding integrated waste management planning.
- Develop a capacity building programme to capacitate all tiers of government.

CEC and Mintech Workgroup 3:

- Review and approve the first generation hazardous waste management plans and integrated environmental and waste management plans submitted by the provincial environmental departments.

Provincial Environmental Departments:

- Develop first generation hazardous waste management plans.
- Review the first generation general waste management plans submitted by local government.
- Negotiate time schedules for the submission of industrial waste management plans with the relevant industry sectoral organisations.
- Review the industrial integrated waste management plans submitted by industry owners/developers.
- Prepare provincial environmental and waste management plans and incorporate into these plans in a summarised form the integrated waste management plans submitted by local government and industries.
- Implement public awareness campaigns.
- Implement capacity building programmes.

Local Government:

- Develop first generation general waste management plans.
- Implement public awareness campaigns.
- Implement capacity building programmes.

2.2.3 Waste Generators, Transporters and Disposers

2.2.3.1 Waste Generators

Waste generators are from all sectors, including mining, metallurgy, power generation, agriculture, industry, commerce, residential and the public. Local authorities are also considered as waste generators, because residential, commercial and industrial waste is generated in their area of jurisdiction.

The generic roles, functions and responsibilities of waste generators include the following:

- All waste generators must familiarise themselves and comply with the legislation, regulations and controls that specifically apply to them. These may be in the form of a by-law, an SABS code, an ISO or EMPR requirement, or a requirement of NEMA.
- Generators are required to record the quantities and waste types that they generate (general or hazardous). Hazardous waste must be hazard rated in accordance with the Minimum Requirements for Hazardous Waste (DWAF, 1998).
- Waste generators have a responsibility to manage their waste in a way that does not threaten the environment and public health. They must be aware of the Duty of Care principle, and where appropriate in the case of hazardous wastes, must use waste manifest systems to track the wastes from cradle (the waste generators' premises) to grave (final disposal).
- Waste generation must be minimised by applying the approaches of clean technology, resource recovery and recycling, in line with the principles of integrated waste management and the NWMS.
- Hazardous waste generators must register with DEAT when the waste information system database for the registration of waste generators is in place.
- As waste generation information is fundamental to the compilation of integrated waste management plans, generators must co-operate with local authorities, consultants and planners, and provide the best qualitative and quantitative baseline information possible, to serve as the basis for projections and planning.
- Generators must make provision for the proper storage of their waste on their premises, prior to collection or treatment. Storage areas must be in accordance with the appropriate regulations and by-laws and must make adequate provision for projected generation.

- Waste generators must compile plans to ensure that adequate and appropriate provision is made for the management of their current and projected waste streams. Where appropriate, this must be addressed in the generator's own integrated waste management plan.

2.2.3.2 Waste Transporters

The responsibility of general waste collection and its transportation to a waste disposal facility is vested with the local authority. This is the case, whether it is a metropolitan council, metropolitan local council, district council, local council, a rural council or a representative council. Although the local authority may contract out collection and transport services in the area under its jurisdiction, it still retains ultimate responsibility for delivering the service. Certain industries and mines may, collect, transport and dispose of their own waste, often on their own properties, or they may use contractors to fulfil this service. There are relatively few hazardous waste landfill sites, which often necessitates the transportation of hazardous waste over long distances on public roads, thus posing a risk to the public and the environment.

The generic roles, functions and responsibilities of waste collectors and transporters include the following:

- Local authorities are responsible for the collection and transportation of all general waste generated in the area of their jurisdiction, to a waste disposal facility.
- All waste collectors and transporters must be aware of and comply with the legislation, regulations and controls that specifically apply to them. These may be in the form of a by-law, road and traffic ordinances, SABS codes 0230/1/2, and ISO or EMPR requirements.
- Compliance with local authorities' by-laws is the principle legislation controlling the collection and transportation of general waste. Provision should be made in contracts for contracted services for the protection of the public and the environment.
- Hazardous waste collectors and transporters have specific responsibilities including the requirement for registration with the province, displaying a transportation emergency card (Trem card) decal, as well as carrying special equipment and special documentation. Equipment includes protective clothing, fire-fighting equipment and in some instances, special equipment such as respirators. Documentation that must be carried includes a public driver's permit in terms of the Road Traffic Act, and waste manifest documents (delivery notes) and transfer notes.
- In unserviced areas, it is the responsibility of the local authority to implement suitable collection and transport systems in accordance with guidelines being drawn up by DEAT.

- The minimisation of the total transport distances and hence transport costs, (the major cost component) is a key factor in integrated waste management planning. The siting of new landfill sites must be given due consideration to address this. The proper planning in terms of vehicles used and systems implemented, and the construction of transfer stations in strategic positions can be used to optimise the transportation costs.

2.2.3.3 Waste Disposers

Local authorities have the responsibility of disposing of general waste generated in their areas of jurisdiction, as well as minimising the impact of landfill sites on surrounding communities. A number of private sector organisations also operate landfill sites on their properties, e.g. mines and industries. Private contractors are used to operate general landfill sites on behalf of local authorities and industries and also for the operation of hazardous waste sites.

In terms of Section 20 of the Environment Conservation Act (Act 73 of 1989), DWAF is currently responsible for the permitting of waste disposal sites. In terms of Section 20 and the DWAF Minimum Requirements, the permit holder, who may be the local authority or the private sector, is ultimately responsible for the waste disposal site. Mine waste disposal is regulated by the Minerals Act (Act 50 of 1991) and the EMPR.

The generic roles, functions and responsibilities of waste disposers, with regard to awareness, compliance and planning include the following:

- All waste disposers must be aware of, and comply with, the legislation, regulations and controls that specifically apply to them. These will include Section 20 of the Environment Conservation Act (Act 73 of 1989), DWAF's Minimum Requirements and permit requirements, Sections 19 and 21(g) of the National Water Act (Act 36 of 1998), Section 16(2) of NEMA, the Minerals Act 50 of 1991 and the EMPR, and where applicable ISO requirements.
- Disposal of wastes to landfill as covered under Section 20 of the Environment Conservation Act, requires the disposer to follow the procedures set out in the DWAF's Minimum Requirements for Waste Disposal by landfill, which also determine the permit conditions.
- Owners of operating landfills must comply with the permit conditions and/or the DWAF Minimum Requirements and the EMPR conditions in the case of mine waste disposal.
- All waste disposal site operators must register their operations with DEAT waste information system.
- Waste disposers must be aware of the Duty of Care principle, and where appropriate, waste manifest systems must be implemented to track the waste from generation to final disposal.

- Disposers must co-operate with local authorities consultants and planners, and provide the best qualitative and quantitative baseline information possible, to serve as the basis for projections and planning. This is particularly important when evaluating the feasibility of developing regionalised waste disposal facilities, which is proposed in the NWMS.
- All landfill operators will be required to submit waste disposal plans to either the local or provincial authorities. Plans must include the shortfalls in complying with the DWAF Minimum requirements or EMPR conditions and how this will be rectified. For unpermitted sites, the progress made towards permitting must be given.
- All waste disposal site operators must allow for monitoring and auditing as required by the Minimum Requirements, EMPR requirements and NEMA Section 16(2).

2.2.4 Other Stakeholders

2.2.4.1 NGOs and CBOs

The role of NGOs and CBOs in integrated waste management planning include the functions of monitoring of waste management and 'whistle blowing role, as well as increasing public awareness. They can play an essential role in mobilising community assistance and support for waste management initiatives. NGOs may also assist in research, training, technology transfer and the implementation of certain aspects of waste management.

2.2.4.2 Organised Labour

The role of trade unions could include the monitoring of waste management, advisory capacity and 'whistle blowing' with regard to integrated waste management. Trade unions could also be directly involved in raising the awareness of workers on waste-related issues.

2.2.4.3 Professional Organisations and Institutions

The following professional organisations and institutions could play a role in the dissemination of information and capacity building in integrated waste management:

- Institute of Waste Management of Southern Africa (IWM (SA));
- Industrial Environmental Forum (IEF);
- The South African Local Governments Association (SALGA);
- South African Institute for Consulting Engineers (SAICE);
- South African Institute for Mining and Metallurgy (SAIMM);
- South African Medical and Dental Council;
- Nursing Council.

2.2.4.4 Other Organisations

Other organisations that could assist in the dissemination of information, capacity building and the implementation of waste management projects, include:

- Universities, technikons and other educational institutions;
- National Recycling Forum;
- Packaging Council of South Africa (PACSA);
- Glass Recycling Association;
- Collect-a-Can;
- Mondi recycling;
- Sappi War on Waste;
- Plastics Federation of South Africa;
- Tyre Recycling Association and Vredestein (recycling of tyres);
- Plastics Environmental Initiative;
- Recycling Oil Saves the Environment Foundation (ROSE);
- Waste Aware (Eastern Gauteng Services Council);
- Jacana Education (develops and publishes material for environmental and health education).

2.2.4.5 Salvagers

The participation and co-operation of people undertaking informal salvaging at landfills will be required in order to formalise and control this practice in the short term, and to completely phase it out in the longer term.

2.2.4.6 Members of the Public

Members of the public in their individual capacities should be afforded an opportunity to participate in the waste management planning process, and provide comment and input during the compilation of waste management plans.

2.3 Status Quo of Waste Management and Associated Planning Initiatives

In South Africa, waste management has traditionally been undertaken on an *ad hoc* basis to meet immediate needs. Although acceptable waste collection systems were operational in many areas, the disposal of the waste was a significant problem. Prior to the development of the Department of Water Affairs and Forestry "Minimum Requirements for Waste Disposal by Landfill" (DWAF, 1998), the siting of landfills was generally haphazard, without adequate planning and design. A number of waste disposal sites were located on previously undeveloped land, without any consideration for the possible expansion of nearby communities. Communities were not involved in the siting of new waste disposal sites, and consequently resisted their development. These problems resulted from a lack of integrated planning and inadequate enforcement

of buffer zones. The management and operation of landfill sites was, and in some cases still is, poor, with inadequate control on the waste types disposed at them.

Often the local authorities had neither sufficient funding, nor adequately trained staff, to effectively plan and execute their waste management functions. The level of services varied between different areas and many people, particularly the previously disadvantaged, were left without proper waste management services.

Waste management planning within local authorities was primarily focused on waste disposal. Some regional authorities initiated waste management planning projects for the location of transfer stations and landfill sites, as well as the establishment of regional landfill sites, which could be shared by neighbouring local authorities, thus reducing the costs of development. However, this type of waste management planning was, and is still not commonly practised.

The lack of capacity within all tiers of government, due to insufficient funding, as well as the low priority previously accorded to waste management, were the main factors contributing to inadequate waste management planning. However, the development of the DWAF Minimum Requirements documents initiated a change within the waste management sector. Planning of landfill sites, proper site location, buffer zones, public participation and proper operating procedures has led to an improvement in the disposal and management of waste.

Further change was initiated by the development of policy documents such as the Environmental Management Policy and the White Paper on IP&WM. These documents introduced concepts such as 'cradle-to-grave' management and the waste management hierarchy, and placed an emphasis on waste prevention and minimisation. The National Waste Management Strategy was developed from the IP&WM policy and further emphasised planning as a critical element of environmentally sound integrated waste management.

2.3.1 Waste Generation, Prevention and Minimisation

Annual reporting of waste generation in South Africa is currently not undertaken, although it is a legal requirement. Several isolated attempts to quantify waste generation in South Africa have been carried out by DEAT and DWAF. For example, a survey to identify the total waste stream was commissioned by DEAT during 1992, estimated that 460 million tonnes of waste are generated each year. A follow up study commissioned by DWAF, as part of the baseline study for the NWMS, estimated the total production of waste in 1996 to be 566 million tonnes per year, with the majority of waste, 464 million tonnes (82%), being generated by the mining sector. The total waste generation in South Africa is approximately 14.5 tonnes per capita per year.

Waste generated by domestic households and trade is estimated to be between 14 and 15 million tonnes per year, industrial waste generated amounts to approximately 22 million tonnes per year and hazardous waste generation is in the order of 2 million tonnes per year. Estimates of per capita generation rates vary considerably between the local authorities, depending on the composition of the waste and the socio-economic status of the community. The average domestic and trade waste production per capita per year is 0.36 tonnes.

Waste prevention and minimisation refers to activities taken by the waste generator to reduce waste generation at source or to implement internal recycling. A number of problems have been identified that impede the implementation of waste minimisation, including:

- Insufficient awareness and understanding of the benefits and methodology of waste minimisation.
- Inappropriate incentives and inadequate regulatory pressure.
- The prevalent perception by industry that waste minimisation is a cost factor rather than an opportunity for savings.

A number of initiatives have been implemented to promote waste minimisation. These include:

- Water Research funded project into the establishment of Waste Minimisation Clubs and Waste Minimisation Self-Assessment Guides for the textile industry.
- Danced funded capacity building programmes on Cleaner Production for the provinces of Mpumalanga and Gauteng.
- Establishment of Waste Minimisation Clubs in Durban and Cape Town.

2.3.2 Waste Collection and Transportation

The current level of general waste collection service varies for different areas and ranges from non-serviced to fully serviced areas. Although waste collection is an integral part of waste management, attention has in the past focused mainly on disposal. The variation in levels of service for different areas is shown in Table 2.1. The proportion of waste that a remains uncollected is increasing and it is estimated that in excess of 20 million people, mostly in rural and informal peri-urban and urban communities, do not receive acceptable waste management services.

Table 2.1: Collection Service Levels in Settlements in SA 1995/96

	Urban Core	Urban Fringe	Dense Rural	Villages	Scattered Settlements	Farms	TOTAL
Households							
Households 1995 (mill.)	4.32	0.80	1.06	1.94	0.17	0.61	8.90
Household Distribution 1995	49%	9%	12%	22%	2%	7%	100%
Household growth rate (% pa)	3.5%	1.4%	1.4%	1.2%	0.5%	0%	2.2%
Households 2005 (mill.)	6.10	0.92	1.08	2.18	0.18	0.61	11.07
Solid Waste Management							
Kerbside	74%	8%	0%	0%	0%	0%	37%
Communal skip	17%	16%	27%	0%	0%	5%	13%
None / on site	9%	75%	73%	100%	100%	95%	50%

Source: Department of Constitutional Development: "Municipal Infrastructure Investment Framework", p. 3-5

Collection systems, such as kerbside collection, are feasible and practicable in established urban townships with infrastructure, but are not appropriate in rural settlements. In low-density rural settlements waste is traditionally buried in pits situated on each property so formalised waste collection systems are not immediately required. Where centrally placed skips are provided in rural areas and urban townships, the distances between waste generation and collection points are often long. This results in littering, illegal dumping and burning of waste. Litter and illegal dumping are some of the symptoms of the non-collection of waste or poor waste collection services in residential, industrial and commercial situations. This dumping has negative environmental impacts and poses health hazards to the communities.

Historically, waste collection systems were imposed on communities without consultation. This lack of transparency and undemocratic practice resulted in the services being discredited by the recipient communities. Since attention was focused on issues such as housing, health and unemployment, there was a limited development of waste management services, which contributed to the practice of non-payment of services. Often human resources, infrastructure and financial capacity in the authorities responsible for providing the waste collection services is limited. In some areas, the rates levied for waste collection are not sufficient to cover the cost of the collection service.

Within the DEAT NWMS Implementation Programme, a study has been initiated to investigate appropriate waste collection services for high-density unserviced areas and to develop guidelines for the implementation of sustainable waste collection systems in these areas. This investigation included an analysis of recent waste collection initiatives in South Africa with respect to affordability sustainability of the system. These include:

- Sebokeng, Western Vaal Metropolitan Local Council;
- Southern Metropolitan Local Council, Greater Johannesburg;
- Independent Development Trust (IDT);
- Stinkwater, Eastern District Council, North West Province (NWP);
- Duncan Village, East London;
- One man contracts, KSAB community waste Collection;
- Various Sole Proprietor Contracts.

The key principles and factors that were identified for successful waste collection systems for high-density unserviced areas included the following:

- There must be sufficient political will at both government and local authority level.
- The community must be actively involved in the decision making process.
- Ultimate responsibility for collection services remains with the local authority.
- Community education and awareness programmes are necessary.

- Technology needs to be appropriate for the local situation.
- Primary collection services are ideally suited to entrepreneurial contractors.
- Secondary collection services are better suited to larger contractors.
- Street sweeping and litter clearing are an integral part of waste collection.
- Secondary collection points must be strategically located.
- Appropriate training and capacity building for all parties is essential.
- Private sector participation can result in more cost effective and efficient services.
- There needs to be adequate cost recovery. i.e. payment for services rendered.
- Capital funding in the form of donor grants or soft loans is necessary to establish waste collection services.

2.3.3 Waste Recycling

Recycling of waste is not generally viewed as an essential part of waste management in South Africa. Consequently no standard mechanism exists for implementing and funding recycling. The majority of initiatives have been developed on an *ad hoc* basis and have been funded by the private sector, with minor financial inputs from the authorities. Some schools are involved in the collection of recycled material, especially cans and returnable bottles, partly as part of the education in environmental issues, and partly to earn money for the school budgets.

Recycling centres and garden waste-drop-off centres are established in some of the larger cities, to which waste separated into e.g. glass, paper/cardboard, cans, scrap metal, plastics, garden waste and other waste may be delivered by members of the public. Separation of this waste may be poor, thus hampering recycling. Collection banks are used on a small scale for glass and paper.

A number of capital-intensive recycling plants have been unsuccessful in South Africa, e.g. Robinson's Deep Waste Flow Plant in Johannesburg, and Resource Recycling Plant in Randburg. A labour intensive initiative in Durban, Tempo Recycling, also failed. Although the plants worked from a mechanical point of view, their failure has been attributed to an overestimation of the value of recoverable materials, unrealistic requirements of the municipalities involved, the economy experienced a down turn at the time that the projects were launched, informal pickers had removed recyclable materials from the waste stream at source and decreases in price of recycled materials, often due to flooding the unstable market. A number of attempts at kerb side recycling in Durban and Johannesburg have also failed due to public apathy.

There are no regular systems for source separation of waste in South Africa, although various trials are underway. Due to poverty and the large quantities of recyclable materials in the waste arriving at landfill sites, informal salvaging is widespread in South Africa. This practice leads to unacceptable health and safety risks for the salvagers, as well as operating problems for the landfill manager.

The poor co-ordination of the collection for recycling and the lack of data on the amount of waste suitable for recycling have impeded the recycling process.

A number of *private sector organisations* are currently very active in recycling initiatives including for example: the pulp and paper industry, the Glass Recycling Association; Collect-a-Can, the Plastics Federation of South Africa; the Packaging Council of South Africa (PACSA); the Tyre Recycling Association; and the National Recycling Forum. The private recycling sector has a significant role not only in directly recycling material, but also as co-ordinators in the collection of recyclable material through local agents.

2.3.4 Waste Treatment

The current approach to general waste treatment in South Africa is typical of that of a developing country, in that treatment involves mainly a reduction of its volume, for example through baling or shredding, although some small-scale incineration and composting is practised. As landfill airspace is readily available in South Africa, the emphasis has traditionally been on the disposal of general waste by landfill without treatment as the lowest cost disposal option. For this reason, the lack of pre-treatment of general waste before disposal was not regarded as a significant problem in South Africa. However, the situation is changing, particularly for the large cities where suitable landfill areas are becoming limited and more expensive.

Co-disposal of hazardous with general wastes on specially designed landfill sites is commonly practiced. Pre-treatment of certain hazardous wastes prior to landfilling is an essential requirement, as stipulated by the DWAF Minimum Requirements. This is necessary due to the danger of reaction with other wastes and the landfill liner, as well as potential odour problems and effects on the quality of the leachate. The most common forms of treatment of hazardous waste (other than medical/infectious waste) practised in South Africa are:

- **Encapsulation** of extreme and high-hazard waste. This technology incurs a high cost and, although it isolates the waste from the environment, it is really storage rather than treatment, since the process does not destroy or reduce the toxicity of the waste.
- **Chemical, Physical and Biological Treatment** of hazardous waste are processes used to reduce the toxicity of the waste before disposal. Limited standards and guidelines are available for these practices.

Household hazardous waste is not usually separated from the general waste stream and treated, but is co-disposed in a general waste disposal site.

Incineration of general waste does not take place on a large scale, but there are large operating medical waste incinerators, and a number of small sub-standard general waste incinerators, located mainly in small towns. The construction, siting and use of these incinerators were undertaken to address an urgent need but without due regard to integrated planning. The quantities of infectious waste received by these incinerators are often cyclic. A maximum occurs in the winter, when more persons tend to become sick, and a minimum occurs at the end of the financial year, due to a lack of available

funds. Some of waste generated at the end of the financial year ends up being treated in inadequate incinerators, although disposal with the general waste and even illegal dumping are possibilities (Draft Starter Background Document for Health Care Waste). In South Africa incineration of general waste and hazardous waste is not acceptable to many stakeholders. This is primarily due to a history of poor operation and control of many of existing facilities, as well as non-compliance with the Atmospheric Pollution Prevention Act (Act 45 of 1965). The incineration of general waste and the recovery of the energy is not economically feasible in most instances, *inter alia* because South Africa's warm climate and relatively inexpensive energy limit the market for the sale of heat/energy derived from the incineration process. The majority of operating incinerators in South Africa are used for the treatment of infectious medical waste, as required by the Human Tissues Act (Act 65 of 1983).

2.3.5 Waste Disposal

Most waste in South Africa is disposed of by landfilling. A study identified about 540 landfill sites in South Africa, of which to date 61% have been permitted in terms of section 20(1) of the Environment Conservation Act (Act 73 of 1989). However, it is estimated that there could be up to 15 000 landfills in South Africa, including communal sites, many of which are environmentally unacceptable and unsafe.

General waste is disposed of at general waste landfills and hazardous waste is disposed of in hazardous waste landfills, which are operated as co-disposal sites. Industrial general waste is disposed of together with domestic waste on general waste landfills. Solid waste from the mining industry is mainly disposed of on tailings dams and mine dumps.

The provinces of the Free State, Gauteng, KwaZulu-Natal and Mpumalanga each appear to have more than five years of combined environmentally acceptable landfill airspace available for general waste, but the remaining provinces have less than five years of environmentally acceptable airspace. The hazardous waste landfill airspace situation is critical in most provinces. In Gauteng, there is approximately 22 years of hazardous waste airspace available, but this is at a single commercially operated landfill site, which is not ideally located for some of the waste stream. There is a lack of hazardous waste landfills within South Africa and large quantities of potentially hazardous industrial waste are thought to be illegally disposed of at general waste landfills.

Local government has traditionally been responsible for the management, collection and disposal of urban domestic and commercial waste, while industry has been responsible for its own waste. However, illegally dumped industrial waste is frequently observed on undeveloped land, particularly near industrial areas. Most general waste landfill sites are established, developed and operated by local authorities, while hazardous waste landfill sites are established and operated by private companies, although in some cases, provision has been made for co-disposal of hazardous waste at regional landfills. DWAF is currently responsible for issuing permits for landfill sites and enforcing compliance therewith.

The disposal of both general and hazardous waste by landfill is considered the most cost-effective disposal option for South African conditions. However, illegal dumping

and the creation of informal landfills (often in the form of burning of waste on open dumps) is a major problem in the lower socio-economic communities, often due to the lack of organised waste collection and exacerbated by a lack of adequate resources. Medical waste is at times disposed of at these sites, and informal salvagers, as well as the general public (especially young children), are at risk of contracting *Tetanus, Hepatitis* and other diseases from this practice. Another serious problem is the illegal disposal of hazardous chemical wastes on general waste landfills and open dumps.

Waste disposal can have an adverse impact on the environment and public health, particularly in cases where there has been no thorough planning, or when the landfill has been inappropriately sited and designed, and is inadequately operated and maintained. Increased environmental awareness during the 1980s focused attention on landfill sites and the Department of Water Affairs and Forestry (DWAF) developed a landfill registration and permitting system to address these problems. To establish standards for implementing the landfill permitting system, DWAF also produced the Minimum Requirements documents, including the *Minimum Requirements for Waste Disposal by Landfill (*1st Edition in September 1994 and the 2nd edition in September 1998). The implementation of the Minimum Requirements has resulted in the gradual improvement of the quality of landfilling throughout the country, due to upgrading and higher environmental standards required for landfill sites. However, the cost associated with environmentally responsible landfilling has resulted in a significant increase in the cost of disposal.

2.4 Identification of Issues to be Addressed by Planning

Historical and current waste management practices have resulted in significant impacts on South Africa's biophysical and social environment. The NWMS and its Action Plans were developed to address existing problems, improve the current situation and provide for integrated waste management planning for the future.

2.4.1 Waste Prevention, Minimisation and Recycling

The overriding objective is to identify and implement measures to promote existing and new waste prevention/minimisation and recycling initiatives in South Africa. An analysis of existing initiatives for waste prevention, minimisation and recycling has identified the following problems and priority issues that need to be addressed by government, industry and the public/civil society.

Government

- Insufficient awareness and understanding of the benefits and methodology of waste minimisation and recycling. There is still a predominant emphasis in both the public and the private sectors on "end-of-pipe" waste treatment, rather than preventative strategies.
- Government is seen to have a predominant focus on "command-and-control" strategies with limited perceived benefits to industry.
- Inappropriate incentives: government should publicise its support for waste minimisation and recycling and should emphasise its commitment to making waste minimisation and recycling in South Africa more economically viable.

- Inadequate regulatory pressure, as well as potential conflicts between existing legislation, on environmental permits for industrial companies and the promotion of waste minimisation and recycling practices.
- Insufficient data available on waste minimisation opportunities, existing recycling and the total amount of recyclable materials in the waste stream. Such data is a prerequisite for establishing appropriate waste minimisation and recycling initiatives.

Industry

- Insufficient commitment to waste minimisation by management. The amount of information targeted at management level should be increased and information on the techniques and benefits associated with waste minimisation, recycling and cleaner production should be made available.
- The prevalent perception that waste minimisation and recycling is a cost factor rather than an opportunity for savings, should be rectified.
- The lack of knowledge about the availability of waste minimisation and recycling technology and existing case studies must be addressed.
- Better training and appropriate courses in waste minimisation and recycling should be instituted.

Public/Civil Society

- Improving the dissemination of information on waste minimisation and recycling would enhance public awareness and increase pressure from civil society that environmentally friendly methodologies be adopted.
- Salvaging at landfills is a major problem due to the health and safety risks for the informal salvagers. By encouraging source separation of recyclable materials, this practice will be discouraged.

2.4.2 Waste Collection and Transportation

An analysis of current general waste collection during the development of the NWMS and the Action Plan on General Waste Collection, identified the following problems:

- The legislation and enforcement of legislation is inadequate. Furthermore, there are no national waste collection standards.
- The current legislation (local by-laws) has not been fully implemented.
- In some instances, the service providers do not have the support of the stakeholders and cannot provide acceptable services.
- There are limited human resources, poor infrastructure and limited financial capacity in many local authorities responsible for providing the waste collection services.
- Financial resources are crucial to quality service delivery. Insufficient funding and unsustainable financial resources result in projects/initiatives losing momentum.

- Some contractors have limited waste management expertise.
- Although waste collection is an integral part of waste management, sufficient emphasis has not been given to appropriate waste collection services in the past.
- Inappropriate services, in the form of skips and by using front-end loaders to remove accumulated waste, were provided in the past.
- Illegal dumping and waste accumulation in residential areas.
- Existing waste collection services are often inefficient.
- There is a limited awareness of the need for effective waste management in the high density, low-income communities.
- It is difficult for contractors (particularly small contractors) to obtain finance for capital investment in machinery and equipment.
- Non-payment for services because of insufficient transparency, credibility and undemocratic practices, inappropriate and inadequate service delivery, and, in certain instances, an inability to pay.
- In some cases, the services provided are not appropriate, adequate nor affordable for the recipient community.
- Service charges levied by most local authorities are not a true reflection of the actual cost of the service and this directly affects the quality of service delivery and/or its sustainability.
- There are inadequate controls for the transportation of hazardous wastes.

2.4.3 Waste Treatment and Disposal

The main problems associated with the treatment and disposal of waste that have been identified are:

- National government (DEAT and DWAF) has insufficient financial and personnel resources to effectively administer and enforce the existing environmental legislation. This situation has resulted in illegal dumping and an apparent reluctance on the part of some disposal site owners to comply with the current waste disposal standards.
- Technical knowledge and experience in the field of waste treatment and disposal lies predominantly within DWAF. As DWAF is understaffed and is obligated, in terms of the NWA, to implement water quality-related source control, it will not be able to second staff to DEAT for the implementation of the NWMS.
- Limited technical and environmental expertise at the local and provincial level of government will impact on the effective planning, development and establishment of waste disposal facilities.
- Due to a lack of resources, provincial governments have generally not accepted the responsibility of managing the hazardous waste stream (treatment facilities/disposal sites).

- Many disposal or treatment facilities, including medical waste, are not properly managed, and will be unable to comply with the expected standards. They are often also poorly located and create unacceptable environmental conditions for adjacent communities.
- The legislative control and enforcement of existing standards within the waste treatment field is inadequate. For example, DEAT have only six air pollution control officers operating throughout the country.
- The current classification system and emission standards applicable to incinerators need to be revised.
- The current definition of medical waste is inadequate and needs to be revised.
- There are many waste disposal sites, which are still impacting on the physical and social environments, due to poor planning in the past. A lack of enforcement and resources is delaying the remediation of these sites.
- Due to poor controls and standards, medical waste, hazardous waste and sewage sludge are being illegally dumped or disposed of at sub-standard waste disposal sites, often without appropriate pre-treatment. These practices result in increased health risks.
- Informal salvaging at the working face of landfills is widespread in South Africa. This practice is problematic, as salvagers are exposed to health and safety risks, and proper operation of the landfill is disrupted.
- There are no guidelines available for the separation of non-infectious waste and chemical hazardous waste from the medical waste stream, and personnel are inadequately trained in this regard.
- Generally, there is widespread public opposition to the incineration of wastes, as well as the siting of many waste disposal and treatment facilities in the vicinity of urban communities.
- The cost of modern treatment technologies and environmentally acceptable disposal of waste is high in comparison to those costs incurred for the management of waste in the 1980's. The waste generator is not used to high disposal costs, and often does not understand why high costs/tariffs are necessary.
- The Minimum Requirements for the Classification, Handling and Disposal of Hazardous Waste (DWAF, October 1998), is considered inadequate in certain critical aspects. Features that need attention include: the development of the concept of a landfill risk factor (based on a decrease in risk due to the landfill design and operation), and a revision and augmentation of the list of compounds and wastes that have been rated as hazardous. It is considered important that standards for the minimisation, recycling and treatment of hazardous waste be developed.

- The Minimum Requirements for Waste Disposal by Landfill (DWAF, 1998) are sometimes applied to temporary storage and handling facilities for waste, such as waste transfer stations and recycling plants. The Minimum Requirements for such waste facilities are inappropriate, and unrealistically conservative in some respects and appropriate and practicable Minimum Requirements must be developed for such facilities.
- The current treatment and disposal guidelines for power generation and mining wastes are considered to be inadequate and need upgrading.
- The storage of chemicals and hazardous waste residues (paint, dyes, solvents etc) on industrial and farming sites without proper controls is commonplace. This situation exists because of the reluctance of the waste generators, particularly in the smaller industries, to pay higher disposal tariffs, inadequate planning (exacerbated by poor waste collection services and ineffective controls within the larger metropolitan areas).

3. IWM PLANNING IN OTHER COUNTRIES

This section of the report provides a comparative review of the integrated waste management (IWM) initiatives and associated planning activities that have been undertaken in the following countries and regions: the European Union, the Netherlands, Denmark, Ireland, the United States, Estonia and Southern Africa. As far as possible, using readily accessible data, this comparative review provides information on the following issues for each of the identified countries and regions:

- Organisations involved in waste management planning;
- Legal and policy framework;
- A brief assessment of IWM initiatives.

This review of IWM planning in other countries forms the basis for the comparative evaluation with the current IWM planning situation in South Africa. This is has been the basis for the development of the *Guidelines for Integrated Waste Management,* the companion volume to this *Reference Document.*

3.1 Waste Management Planning in the European Union

The requirement to develop and implement waste management plans is a central component of European legislation relating to waste issues, and forms the basis of the implementation of waste management strategies at local, regional and national levels. In addition to the strategic and environmental aspects of waste planning, the plans also serve as important instruments for awareness raising and for ensuring the participation of citizens in waste management.

3.1.1 The Framework Directive on Waste

The legislative instrument setting out the requirements for waste management plans is the 1975 Framework Directive on Waste (Council Directive 75/442/EEC, 1975), as amended by Council Directive 91/156/EEC (Council Directive 91/156/EEC, 1991). The Directive requires Member States to establish or designate a competent authority or authorities to be responsible for implementing the requirements of the Directive, including the drawing up of waste management plans. These plans should in particular relate to:

- The type, quantity and origin of waste to be recovered or disposed of;
- General technical requirements relating to waste management and disposal;
- Any special arrangements for particular wastes;
- Suitable disposal sites or installations.

A key objective of the plans is to promote self-sufficiency in waste management, both within EU as a whole, as well as ultimately within each Member State, taking into account geographical circumstances and the need for specialised installations for certain types of waste. To achieve this, the waste plans should result in the establishment of an

integrated network of disposal installations, taking account of the best available technology not entailing excessive cost, and enabling waste to be disposed of in one of the nearest appropriate installations. Member states should collaborate where appropriate with other member states and the Commission in drawing up these plans, and are obliged to notify the European Commission of all plans.

In addition to the above framework directive, provision is also made for waste management plans in the Directive on Hazardous Waste (Article 6) (Council Directive 91/6892/EC, 1991) and the Directive on Packaging and Packaging Waste (Council Directive 94/62/EC, 1994). Both of these Directives provide for specific waste plans to be drawn up either separately (in the case of hazardous waste) or within the framework of the general waste management plan (in the case of either waste stream).

Despite the fact that the requirement for drawing up waste management plans dates back to 1975, the situation within the EU regarding waste planning is currently regarded as unsatisfactory. Although over 600 waste management plans (mainly local) have been notified to the European Commission, these do not cover the full territory of the EU. Furthermore, the European Commission has initiated infringement procedures against 14 Member States (European Commission, 1999).

In recognition of this unsatisfactory state of affairs, the European Commission's Directorate General for Environment, in co-operation with Eurocities (a network of metropolitan cities of Europe), organised a European Conference on Waste Management Planning. This conference, which was held in Stockholm in June 1999, brought together more than 100 experts and political decision makers from European Union Member States, European Institutions and more than 25 cities from across the EU and the accession countries. The aim of the conference was to review the status of waste management planning throughout the European Union, and to facilitate the exchange of information among national governments and between Member States and local and regional governments on a range of aspects relating to waste management planning, including technical, organisational, economic and policy level aspects. This was seen to be particularly timely in light of the fact that new planning processes are currently under way in a number of Member States including Ireland, Spain, Portugal, Luxembourg, the United Kingdom, and France. The Conference proceedings present a review of the current status of waste management planning in a number of EU member states. (European Commission, 1999)

3.1.2 European Topic Centre on Waste

The European Topic Centre on Waste (ETC/W) was established in 1997 as part of the European Environment Agency's objectives and work programme, with the aim of "providing the Community and Member States with objectives, reliable and comparable information about waste and waste management in Europe, enabling them to take the requisite measures to protect the environment, to assess the results of such measures and to ensure that the public is properly informed about waste and waste management in Europe."

The ETC/W is a consortium built around the Danish Environmental Protection Agency and the Environmental Protection Agency (City of Copenhagen) as lead organisations. The partners in the consortium are:

- ABAG-itm GmbH, Baden-Württemberg, Germany;
- Environmental Protection Agency, Ireland;
- Federal Environment Agency, Austria;
- Junta de Residus, Generalitat de Catalunya, Spain.

To achieve its stated objective of providing reliable data, the ETC/W is currently developing a series of electronically available data catalogues that will provide European-wide information on the following aspects of waste management: (EEA, 1999)

- Waste Management & Cleaner Technology Institutions/Centres (Catalogue I);
- Waste Management Plans (Catalogue II);
- Competent Authorities (Catalogue III);
- Waste Management Strategies and Instruments (Catalogue IV);
- Cleaner Technology/Waste Minimisation Strategies and Instruments (Catalogue V).

The objective of Catalogue II is to provide an overview of all existing waste management plans at a local, regional and national level that have been notified to the Commission. The electronic catalogue will include various structured search possibilities, as well as abstracts of selected plans, with the aim of encouraging an effective exchange of experiences between Member States. In addition to including a description of existing waste management strategies, it is also proposed to describe which instruments (economic and legislative) Member States may use to achieve the objectives set out in the strategies. The electronic catalogue will be established as a part of the Internet based "Wastebase" by the middle of the year 2000. The catalogue will be regularly updated as new information on strategies and instruments becomes available. (EEA, 1999)

In addition to developing the above catalogue, the ETC/W has recently published the *Waste Guide: Framework and Strategies for Waste Management in European Cities.* This "Good Practice Guide for Waste Management Planning" aims to ensure that the new generation of waste management plans in the EU comply with the requirements of the relevant waste directives. It is also anticipated that this will result in more comparable waste plans, which in turn will facilitate meaningful evaluation of the most effective methods for addressing common waste concerns.

3.2 Waste Management Planning in the Netherlands

3.2.1 Responsibility for Waste Management Planning

During the late 1980s in the Netherlands, it became increasingly evident that it was necessary to introduce measures to reduce the landfilling of waste, and to promote waste prevention and recycling. In recognition of the fact that this could not be addressed within the existing provincial and municipal responsibilities, the government

was advised to establish a national planning system in addition to the existing provincial planning, so as to ensure close co-operation amongst all of the governmental bodies involved.

For this reason, the Dutch national government, the provinces and the municipalities collectively established the Waste Management Council (AOO, from the Dutch "Afval Overleg Orgaan") in 1990. The AOO is mainly occupied with the national control of waste disposal for both hazardous and non-hazardous waste streams. The specific tasks of the AOO include:

- Drawing up a waste management plan for non-hazardous wastes (the Ten Year Waste Management Programme, 1995);
- Drawing up a waste management plan for hazardous wastes (the Multi-Year Plan for the Disposal of Hazardous Wastes II, 1997);
- Drawing up programmes supporting the separate collection of waste;
- Monitoring waste streams and costs;
- Facilitating consultation with reference to policy-making, planning, and decisions for large disposal facilities;
- Preparing solutions for, and agreements regarding, current and future waste management problems.

The implementation of waste policy in the Netherlands is largely decentralised. Central government (through the AOO) establishes the main points of policy while the provincial and local governments develop and implement more detailed policies and plans. For example, provincial government is responsible for developing Provincial Environmental Policy Plans and granting licenses to waste producers and handlers (to date, 12 provincial waste management plans have been adopted) (Ministry of Housing, Spatial Planning and the Environment 2000 (Poulsen, personal communication, 2000). Local authorities are required to plan and implement systems for the separate collection of waste. The three government levels have agreed in a "Co-operation Treaty" to implement the waste management programmes and to comply with all agreements reached by the council, thus securing mutual reliance and responsibility for the implementation of planning decisions.

3.2.2 Policy Framework

Waste management planning in the Netherlands is guided by the *Environmental Management Act 1990.* This is a framework Act that sets out general objectives for waste management. It states that:

- The order of preference for waste management is prevention, reuse/recycling, incineration, landfill;
- The landfilling of recyclable and combustible of waste is prohibited;
- The manufacture or import of certain products can be prohibited;
- Waste collectors may be obliged to separate waste;

- Producers and importers may be obliged to take back end-of-life products (Ministry of Housing, Spatial Planning and the Environment 1998b).

Various orders containing more specific guidelines for waste management have been issued under the Act by the Minister for Housing, Spatial Planning and the Environment, including:

- A decree designating hazardous substances;
- A waste incineration (air emissions) decree;
- A decree banning over 30 substances from landfill;
- Decrees on the disposal of batteries, tyres, vehicles and waste oil.

Rules on the collection and exporting of waste have also been developed (Ministry of Housing, Spatial Planning and the Environment 1998b). The success of waste management planning in the Netherlands is discussed below.

3.2.3 The Success of Waste Management Planning

3.2.3.1 Planning for waste prevention and recycling as primary goals

A principle goal of waste management policy in the Netherlands is to achieve the national targets relating to waste prevention and recycling. With the aim of reaching recycling targets, national government, provinces, and municipalities have focused efforts specifically on promoting the separate collection of glass, paper, textiles and organic waste. For example, in 1993, the AOO published the *Programme for Source Separated Organic Waste*; two years later it compiled a *Programme for Separate Collection of Household Waste*, endorsing the national target of 60% recycling of household waste by 2000. This programme, accepted in general by the municipalities in the Netherlands, establishes a uniform system and structure for the separated collection of dry components of household waste. To complete the separation enforcement, a *Programme for Separate Collection of Industrial Waste* was launched in 1998, supported by national decrees directed at specific industrial and commercial branches. Recycling rates have increased (although not significantly) in the Netherlands since the implementation of these recycling programmes.

3.2.3.2 Securing sufficient disposal capacity

The Ten Year Waste Management Programme 1995

Based on projections of future non-hazardous waste streams, the *Ten Year Waste Management Programme* estimates what landfill, incineration and composting capacities will be required in the future. It assesses what capacity is currently available and, if necessary, where and how additional capacity should be supplied. The development of the disposal structure is laid down in a Plan of Action. Progress is closely monitored by the AOO office and regularly reported to the Council.

Over time, there has been continuous up-scaling of the *Ten Year Waste Management Programme*. In the first programme compiled in 1992, a transition was made from a provincial to a regional planning level. In the second programme in 1995, planning was

lifted to a national level. In 1998, it was decided that a third plan would not be compiled because preparations had already made for the plan forthcoming in 2001 (the *National Waste Management Plan*), in which all waste streams, including hazardous wastes, will be dealt with. In the meantime, the second plan from 1995 is frequently reviewed and adjusted by the AOO. In the forthcoming plan in 2001, the next step will be attuning to international developments. The Dutch government has already announced that the incineration structure in the Netherlands must prepare for a European market, to be expected after 2005.

According to the last *Ten Year Waste Management Programme*, issued in 1995, the planned capacities in the Netherlands will be sufficient for many years, providing waste prevention and recycling proceed according to national policy goals and thermal recovery develops as expected. Ultimately, the intention is to arrive at a situation in 2001 in which 75% of waste is recovered and 25% of the total waste stream is disposed of either by disposal in landfills or incineration. The final composting capacity was already established in 1994, with some 1.5 million tonnes of bio-waste being composted every year. The target of 60% separate collection of organic waste, supported by a legal obligation to separate bio-waste in households, has almost been reached. Restricting the opportunities for landfilling waste that can be reused or recycled is another incentive to prevent and reuse/recycle waste.

The Multi-Year Plan for the Disposal of Hazardous Wastes, 1997

Provincial and national authorities compiled the Multi-Year Plan for the Disposal of Hazardous Wastes in 1997. The plan sets goals for hazardous waste management and provides a framework for licensing facilities. Goals include waste prevention, the appropriate treatment of waste, and the development of sufficient national handling capacity, particularly incineration facilities. It is considered that sufficient landfill and incineration capacity is either available or under construction, mainly due to the planning system (Ministry of Housing, Spatial Planning and the Environment 1998a).

National Waste Management Plan

Recent amendments to the Environmental Management Act 1996 require the Minister of Housing, Spatial Planning and the Environment to draft a National Waste Management Plan every four years. The plan will succeed the Ten Year Waste Programme and the Multi-Year Plan for the Disposal of Hazardous Wastes. The plan must consist of three parts:

- A general policy framework;
- A series of sector plans for the various waste streams and disposal methods; and
- Capacity plans for incineration and dumping.

The Minister for Housing, Spatial Planning and the Environment will take responsibility for drawing up the policy framework. The AOO will compile the sector and capacity plans. The first plan for the period 2001 to 2011 is currently being prepared, with input from the Central Government, provincial government, local government, the business community, other interested organisations and the general public (AOO 2000).

3.2.4 Waste Management Planning in Denmark

3.2.4.1 Responsibility for waste management planning

Since the 1980s, the competence for waste management planning and handling waste (including planning, regulating and controlling the entire waste management process) is at the municipal level (European Academy of the Urban Environment 1996). In contrast to many other countries, Denmark has chosen to manage household waste, and industrial and commercial waste in a comprehensive waste management system, covering both packaging waste and hazardous waste. (Danish Ministry of Environment and Energy, 1999).

During the 1980s and 1990s, the focus of waste management planning in Denmark shifted from the upgrading of disposal infrastructure to the minimisation and reuse of waste. Until the early 1980s, the major objective of waste planning was to establish appropriately located and designed waste treatment facilities. However, as waste generation increased, it was recognised that the focus should be shifted to waste minimisation. This led to an amendment of the *Environmental Protection Act* in 1985, requiring municipalities to find ways to reduce the amount of waste landfilled and incinerated. Municipalities are now required to survey different waste fractions to identify the potential for recycling, in order to meet national recycling targets. It is up to the individual municipalities to determine how to reach these targets. It is also the responsibility of municipalities to secure sufficient capacity for the treatment of all wastes, including hazardous waste (European Academy of the Urban Environment 1996). Municipalities can obtain support for the development of new, environmentally sound technologies from the Danish Council for Recycling and Cleaner Technology (Danish EPA 1999).

The Central Government, through the Environmental Protection Agency (EPA), provides guidance to municipalities through an Order on Waste (Order No. 299 of 1997-04-30) and the national waste plan, *Waste 21*. The EPA also administers national level product take-back legislation and a subsidy scheme to promote recycling.

3.2.5 Policy Framework

Order on Waste

The Order on Waste was made to carry into effect various European Union Directives on waste, including hazardous waste and packaging waste. The Order sets out the obligations of municipalities with regard to waste planning, the regulation of waste carriers and collection schemes, and the monitoring of waste generation and treatment. The Order requires that municipalities prepare a 12-year plan on waste management every four years, starting from 1 January 2000. These plans must include:

- A "strategy" section that reports the overall objectives for hazardous and non-hazardous waste;
- A "survey" section that describes the status of waste management within the municipality;
- A short-term, detailed waste management plan for the coming four years;

- A long-term plan for the remaining 8 years of the 12-year period.

The survey must include information on waste generation, analysed by source, waste type, treatment method and material fraction. It should also provide details of waste management facilities in the municipality and the costs of waste management.

Short-term plans must include:

- A detailed plan for waste management;
- An account of the planned import of waste for recycling, incineration or landfill;
- An account of planned waste treatment facilities;
- A detailed statement of the financial consequences of the waste management plan on the local budget;
- A statement of planned measures to promote the prevention and recycling of waste.

Waste 21

In 1992, the objectives of the Danish waste policy were described in the Government's *Action Plan for Waste and Recycling 1993-97*. This plan was replaced in 1998 by *Waste 21*, a document that sets the agenda for waste management in Denmark to the year 2004. The overall aim of *Waste 21* is to stabilise waste generation and improve waste management, in order to remove environmentally hazardous substances and optimise the exploitation of energy resources. *Waste 21* requires the expansion of source separation activities to facilitate the individual treatment of different waste fractions. For example, in the future, organic waste, PVC, wood, batteries, and electrical and electronic waste must now be separated at source.

Responsibility for the implementation of *Waste 21* lies with municipalities, through the development and implementation of waste plans. Municipalities are encouraged to place greater emphasis on information and waste taxes as a means to increase public participation in, and responsibility for, waste management. *Waste 21* also encourages municipalities to improve cooperation during the development of new waste management solutions, both in Denmark and internationally (Danish EPA 1999).

3.2.6 The Success of Waste Management Planning

3.2.6.1 Planning for waste minimisation and recycling

Despite efforts at waste minimisation, levels of waste generation in Denmark have continued to increase (Ministry of Environment and Energy, 1999). Nevertheless, it is likely that waste generation levels would have been higher in the absence of waste minimisation measures.

Measures to increase recycling levels have been very successful. The overall objectives that were set in the *Action Plan for Waste and Recycling 1993-97* for the year 2000 have been attained, namely: 54% recycling, a maximum of 25% incineration, and a maximum of 21% landfilling. In 1997 total recycling was already 9% above the

objective for year 2000, and landfilling was reduced to a level below the objectives set for year 2000. (Danish Ministry of Environment and Energy, 1999). The objectives for recycling of waste from manufacturing industries, the building and construction sector, wastewater treatment plants, and coal-fired power plants were attained by a good margin. On the other hand, recycling efforts for waste from households and institutions, trade and offices are far from being attained. (Danish EPA, 1998).

3.2.6.2 Planning for sufficient disposal capacity

Denmark's waste management facilities are considered to be sufficient for current and expected future levels of waste generation. A major factor in achieving this has been the planning of waste management systems since the mid-1980s. The municipal-based planning system has:

- Encouraged the monitoring of waste streams, to provide essential information for the planning of treatment and disposal capacity;
- Increased waste separation at source;
- Increased recycling activities;
- Facilitated municipal co-operation with private collection companies;
- Resulted in stricter requirements for the approval of landfills. This has resulted in fewer but "cleaner" landfills being developed to cope with waste. (European Academy of the Urban Environment 1996).

3.3 Waste Management Planning in Ireland

The level of waste generation in Ireland is relatively small, comprising (in 1995) of 1.8 million tonnes of household waste, 7.4 million tonnes of non-hazardous industrial waste and 0.24 million tonnes of hazardous industrial waste. In 1995, 8% of waste was recycled and 92% was sent to landfill sites. There are currently 85 landfill sites that are managed by 34 different local authorities (towns or counties). Although half of these sites collect less than 15 000 tonnes per year, a number of sites are reaching capacity, particularly in the South East. (Whelam, 1999; EPA 1996).

3.3.1 Policy and Organisational Framework

In 1996, the Irish *Waste Management Act* was enacted (after a long passage through parliament) to facilitate a shift towards "a more rigorous and sustainable approach to waste management in Ireland" (EPA 1996). The Act places a strong emphasis on waste planning, with local authorities required to prepare waste management plans for waste, either individually or jointly. The Act also requires the EPA to prepare a national plan for hazardous waste management; the provisions of this plan must be incorporated into local plans. To assist in the development of waste management plans, the EPA has also developed a National Waste Database to collect more reliable and up-to-date information on waste disposal and recovery facilities throughout Ireland. The Minister for Environment and Local Government provides financial and other support for waste management planning and the provision of the necessary waste infrastructure.

The *Waste Management Act 1996* and the *Waste Management (Planning) Regulations 1997* specify matters that are to be addressed in waste management plans. Both the Act and the Regulations emphasise waste prevention and minimisation as a basic objective of the planning process, in order to reduce the "unnecessary reliance on landfill" and achieve Ireland's (non-binding) national recycling and recovery targets for the next 15 years:

- A diversion of 50% of household waste away from landfill;
- A 65% reduction in biodegradable wastes sent to landfill;
- The development of facilities employing environmentally beneficial technologies, such as composting, to treat up to 30 000 tonnes of biodegradable waste annually;
- Recycling of 35% of municipal waste;
- Recycling of 85% of construction and demolition waste;
- Rationalisation of municipal landfills, leading to an integrated network of approximately 20 state-of-the-art landfills (Dempsey 1998, Whelam, 1999).

The Act and Regulations require waste management plans to:

- Clearly state policies, objectives, targets and priorities;
- Insist on waste prevention and reduction;
- Estimate current and estimated future waste volumes;
- Identify what waste management infrastructure is necessary to collect, recycle and dispose of waste;
- Identify what infrastructure currently exists, and what additional infrastructure will be necessary to deal with expected future waste volumes;
- Develop measures to facilitate the attainment of the stated objectives, including waste charges that reflect the full costs of collection, treatment and disposal;
- Identify and clean up installations that have been decommissioned (Whelam, 1999).

Plans must be reviewed and updated every five years.

In 1998, the Minister of the Environment issued a strategic document entitled *Waste Management: Changing Our Ways.* This document advocates an integrated approach to waste management. Local authorities are strongly encouraged to undertake "waste management strategy studies" as part of the waste management planning process. These studies are intended to provide the context for evaluating all the available options and for identifying the combination of integrated measures that are most likely to promote optimum waste management.

Waste Management: Changing Our Ways encourages public consultation and participation in the development of waste management plans. It highlights the need for

"good planning, careful site selection, public participation and awareness, and a policy of openness and transparency" to mitigate opposition to waste management proposals (EPA 2000; Dempsey 1998). Local authorities are also encouraged to allow increased participation of the private sector in all areas of waste management. The private sector is seen as being able to provide capital investment in infrastructure, specialist expertise on waste technologies, and a better understanding of the dynamics of the market for recycled materials (Dempsey 1998).

Although the autonomy of local authorities is respected, they are nevertheless strongly urged to co-operate, with the aim of achieving a regional approach to waste planning. In this regard a number of regional strategic studies have been undertaken; seven regional groups have been created, with only three of the 34 local authorities remaining autonomous. (Whelam, 1999) The recommendations resulting from the regional strategic studies lay the way open for:

- The selective, door-to-door collection of recyclable materials in urban areas;
- The provision of waste container banks, at the level of 1 for every 500 habitants;
- Securing an adequate transport network for waste collection;
- Ensuring the biological treatment of organic waste;
- Providing additional material recycling facilities (Whelam, 1999).

The total investment required to achieve the recommendations in the regional plans is estimated at about USD 800 million (Whelam, 1999).

3.3.2 The Success of Waste Management Planning

The introduction of waste management planning in Ireland has facilitated the generation of more reliable data on waste generation and treatment, an essential component of waste management planning. It has also resulted in the consolidation of landfill sites, with the number of landfill sites being reduced from 115 to 85 between 1995 and 1999. Recycling rates have increased, but are still low compared to other European countries (O'Connor & Gaule, 1999).

However, it would seem that the most significant challenges lie ahead. Firstly, the country now generates about one third more waste than a decade ago, mainly due to strong economic growth. Many of Ireland's landfills are now close to maximum capacity, with the lack of landfill capacity being particularly pronounced in urban areas. Waste planners must now "face the uncomfortable political reality… that the public is vehemently opposed to new landfills". (O'Connor & Gaule 1999) While infrastructure for the collection and treatment of recyclable materials has improved significantly in recent years, it is still underdeveloped. (O'Connor & Gaule 1999).

In addition, there is a need to develop facilities to deal with hazardous waste. At present there are only two facilities and the majority of hazardous waste is exported to Great Britain. However, it is expected that this practice will not be allowed to continue for much longer. (O'Connor & Gaule 1999). It is yet to be seen whether the waste

management planning framework developed by the Irish Government will withstand these challenges.

3.4 Waste Management Planning in the USA

3.4.1 Responsibility for Waste Management Planning

Waste management planning in the USA is largely decentralised. Plans are prepared at the local, regional and state level, with the technical and financial assistance of the Federal Government. Waste management plans at all levels must be consistent with national waste policies, including the waste management hierarchy promoted by the US EPA principle of "reduce-reuse-recycle".

3.4.2 Policy Framework

The principal legislative basis for the development of waste management plans is the *Resource Conservation and Recovery Act 1976* (RCRA) that requires all states to develop solid waste plans that *"*promote improved solid waste management techniques (including more effective organisational arrangements), new and improved methods of collection, separation, and recovery of solid waste, and the environmentally safe disposal of non-recoverable residues" (Title 40, Section 6902).

To guide the development and implementation of waste management plans, the US EPA has produced a set of guidelines. These guidelines suggest that plans should:

- Define a set of guiding policy principles that take into account the policy framework within which the plan is being developed, the existing waste management system, the interests of major stakeholders, and the economic and environmental situation.
- Define the scope of the plan, in terms of geographic scope and the waste streams covered by the plan.
- Define the strategic objectives of the plan, as well as specific targets (such as recycling or waste reduction targets).
- Establish "measures" to facilitate the attainment of these objectives and targets. These measures might include for example the reservation of land for waste management facilities, the assurance of funds for the creation of waste management infrastructure, the creation of an organisational framework for waste reduction and waste recycling programmes, economic incentives for compliance with the plan, or the establishment of public awareness programmes.

3.4.3 The Success of Waste Management Planning

As a result of the legislative requirement for waste management plans in the USA, a large number of plans have been developed at the local, regional and state levels. The waste management plans employ a variety of strategies to try and reduce levels of waste generation and increase recycling levels. Some examples include: (NRC, 2000)

- *In-House Source Reduction Measures:* The local government in Dunn County, Wisconsin set itself a goal to reduce the quantity of waste generated by government offices by 15% over a one-year period, and to reduce county-wide waste generation by 5%. Both goals were achieved by 1998.
- *Economic Incentives:* Tompkins County, New York instituted a "pay-as-you-throw" programme that requires residents to purchase a tag for each container of garbage set out. The programme creates an economic incentive for residents to reduce their household waste, and to adopt alternatives such as recycling and backyard composting. Soon after the programme was implemented, the county noted an increase in residential recycling, with some municipalities reporting a reduction of up to 50% of kerbside waste.
- *Education Programmes:* The San Francisco, California Bay Area conducted a unique public-private partnership education campaign, involving 103 cities and counties working together with 225 supermarkets to educate shoppers about the importance of waste prevention and encouraging them to buy products made with recycled content. Exit polls showed that 43% of shoppers remembered one or more elements from the campaign, with almost 30% saying it affected their buying habits.
- *Business Assistance Programmes:* Austin, Texas established a Waste Reduction Assistance Program (WRAP) that provides local businesses with technical assistance to achieve reductions in the quantity and toxicity of waste generated. The programme uses on-site assessments, materials exchanges and a business information clearinghouse to accomplish this goal. Since 1995, WRAP staff has helped prevent and divert more than 1 350 tonnes and saved Austin small businesses more than $472 000.

Many communities in the USA have shown that there are potential economic and environmental benefits from the development and implementation of waste management plans. Communities have reduced waste generation, improved the economic feasibility of waste management systems and created jobs in the waste management industry. Involving the community in the development and implementation of plans has also increased public understanding of the importance of waste reduction and resource conservation efforts.

From the experiences in the USA, the following lessons can be learned:

- *Education and Outreach are Key:* Because the public is still largely unaware of the value of source reduction and how such ideas can be put into practice, a targeted and comprehensive education programme is critical.
- *Public/Private Partnerships are Needed:* As all members of the community generate waste, local governments often form partnerships with multiple parties to effectively reach their target audience. These partnerships help city and county governments gain the trust of constituents, and increase community-wide participation in their programmes.

- *Integrating Waste Minimisation with Recycling:* Some communities reported conflicts between source reduction and recycling, as the two may compete for programmatic support, staff and budgetary resources. Piggybacking source reduction programmes onto already successful recycling efforts is a good approach. In many communities, source reduction has actually grown out of successful recycling efforts. The two should be integrated in state and local waste reduction goals and MSW planning.
- *Measure Source Reduction to Track Progress and Results:* It is critical to document a programme's value and success to residents, businesses and elected officials. Communities have found a variety of both quantitative and qualitative ways to measure the results of their programmes. However, this is an area that requires continued attention and development.
- *Securing Financing Is Important:* Communities are financing source reduction in a variety of ways, including from the general fund, the recycling budget, disposal tipping fees, unit-based fees or federal and state grants. Although source reduction, recycling and municipal solid waste management may compete for limited resources, these issues can be minimised though integrated solid waste planning and programme budgeting.
- *Opportunities for Support from State Government:* States can assist communities in getting credit toward recycling and waste reduction goals for source reduction achievements by developing measurement methods and programme guidance. States also can assist local initiatives by providing start-up grants for source reduction programs, educational information and technical assistance.

3.5 Waste Management Planning in Estonia

Previously in Estonia, waste was often dumped indiscriminately without concern for its environmental impact, resulting in large deposits of solid and liquid residues in some parts of Estonia. The issue of waste disposal has only been recognised in recent years when the responsibility for waste management moved to the Ministry of the Environment.

3.5.1 Policy Framework

In response to the growing waste problems in Estonia, the government has developed environmental legislation to regulate waste management. This legislation includes the Act on Pollution Charges, the Act on Solid Waste, the Water Act, the Act on Packaging, the Planning and Building Act, the Land Amelioration Act, the Act on Sustainable Development, the Health Protection Act, and regulations in accordance with the Basel Convention. During 1996 the integration of Estonian waste legislation with the European Union waste directives and regulations was initiated.

The need to reduce waste generation and improve waste management is recognised in the National Environmental Strategy (NES), 1997. The main goal of the NES is to support the sustainable use of raw materials, to reduce waste generation, to stimulate waste recycling, to reduce environmental pollution caused by waste, to reduce areas contaminated by waste and to improve waste management.

With a view to implementing the NES, a detailed National Environmental Action Plan (NEAP) was developed during 1997/8. The Ministry of Environment bears the responsibility for the implementation of the NEAP. The NEAP prioritises waste prevention in order to achieve a reduction in the volume and hazardousness of waste. Waste reuse, recycling, composting and incineration are also preferred to landfilling. The NEAP also promotes consideration of environmental safety in waste treatment and disposal.

Under the NEAP, the following short term (2000) and medium-term (2005) tasks have to be carried out:

Tasks by the year 2000

- Stabilise waste generation in industry and in households at 1995 levels.
- Appoint owners/operators for existing landfills and close down landfills, which do not have an owner/operator.
- Increase the degree of waste recycling to 30% - 40%.
- Establish new landfills and close down old disposal sites in accordance with the requirements of the European Union.
- Dispose 40% of municipal waste in accordance with environmental and health protection requirements.
- Introduce a hazardous waste management system.
- Develop a programme for radioactive waste treatment and ensure environmental safety of the existing disposal sites.
- Achieve compliance monitoring of all waste generators.

Tasks by the year 2010

- Improve disposal methods and the use of oil-shale processing waste.
- Increase recycling levels to 50%.
- Stabilise municipal waste generation at an annual level of 250 - 300 kg per person.
- Optimise the number of municipal landfill sites (up to 150).
- Treat, dispose and dump all wastes according to internationally accepted environmental and health protection requirements.
- Reduce the share of hazardous waste in the total waste volume.
- Construct a radioactive waste storage facility that meets European Union requirements.
- Offer waste management services throughout Estonia.

3.5.2 The Success of Waste Policies

A number of positive developments in the field of disposal have taken place since 1996. A new landfill has been constructed in Tallinn for the disposal of inert waste, mainly

construction waste. In the Ida-Viru County, a new landfill has been designed and commissioned ahead of the closure of the existing landfill in the Jõhvi and Kohtla-Järve areas. Also, the closure and rehabilitation of small rural landfills have been undertaken in several places. Finally, a special programme for the disposal of pesticides and pesticides waste was initiated during 1996. The main goals the programme were to eliminate acute environmental hazards and to make arrangements for the final treatment and disposal of pesticide waste.

3.6 Waste Management Planning in Southern Africa

This section gives a brief overview of waste management planning in southern African countries, i.e. Zimbabwe, Namibia, Swaziland, Lesotho and Botswana. The activities in these developing countries are of interest with regard to a regional perspective in contrast to the systems and experiences of the developed countries of the Northern hemisphere, dealt with in sections 3.1 to 3.5. Also, in terms of regional initiatives and concerns of the Southern African Development Community (SADC), waste management planning should form an important input to the regional environmental management. SADC has developed a policy and strategy for environmental and sustainable development, which makes provision for the control, movement and disposal of hazardous waste in the region. Furthermore, there are there are bilateral issues such as the cross-country transfer of hazardous waste for treatment in South Africa.

3.6.1 Zimbabwe

Problems are being experienced with solid waste management by most cities and towns in Zimbabwe (Murevanhema, 1999). Most local authorities are still using the open dump waste disposal method. A particularly problematic aspect of these waste dumps is that of waste pickers or 'scavengers', a problem experienced by many of the developing countries. Initiatives are underway to address this situation. It is felt that scavengers should be given official recognition by local authorities, accompanied by the establishment of recycling stations at landfills or at transfer stations. Another scheme being planned is the one at Bindura, where widows will be charged with the door-to-door collection of separated wastes, which will then be transported to a recycling centre that will serve as a convenient location for the buyers to collect the recyclables. The salaries of the waste collectors and the recycling station staff will be covered by the proceeds from the sale of the recyclables.

A number of recycling initiatives are operational in Zimbabwe, as well as a developed industrial recycling sector. Informal recycling activities are also widespread. A major recycling initiative in Zimbabwe is the Environment 2000 'Recycling and Anti-Litter Programme (RAP)' that was established in Cupertino during 1995, in close co-operation with the disposal industry. It aims to engender a recycling and reuse culture in Zimbabwe. The programme has set up over 100 informal return centres at schools, where paper, plastic and beverage cans are collected and sold to recyclers. The Canadian International Development Agency (CIDA) has sponsored 32 of the recycling centres with a view to raising public awareness about waste and the environment. Other organisations such as the Lions Clubs and Island Hospice have started similar schemes. Linked to the Environment 2000 initiative is the "Clean Up Zimbabwe Campaign." These community clean up campaigns provide an opportunity for

individuals to take positive action in their own environment. The campaign has seen participation by business, schools, government, local authorities, churches and individuals.

Zimbabwe has a well-developed formal recycling sector. A large number of materials are being collected by organised intermediaries and used as industrial input. These include paper, glass, plastics, cans and bones. However, there are serious constraints in the distribution chain of waste. For example, with collapse of the kraft paper market, scavengers who collected this type of waste had no company to sell it to.

3.6.2 Namibia

Two of the main impediments to the improvement of waste management in Namibia are a lack of information on waste production and management, and a lack of integrated and comprehensive environmental management legislation (Hochobeb, 1999).

A draft National Waste Management and Pollution Control Strategy has been developed and is awaiting official approval. Furthermore, the draft Environmental Management Act and draft Pollution Control and Waste Management Act are being finalised for consideration and enactment. Key to the successful implementation of the initiatives are the planning of a National Environmental Enforcement Agency and the provision of adequate resources to implement plans and programmes.

3.6.3 Swaziland

Swaziland has appropriate legislation and regulations to enforce appropriate waste management, including for example the Swaziland Environmental Authority Act and the (draft) Solid Waste Regulations (UNEP, 1998). The regulations are only enforced to a limited degree by the Authority. Industry has recently overtaken agriculture as the most economically active sector. Problems experienced with waste management include a lack of information about waste quantities and qualities. Of particular concern is hazardous waste, e.g. phenols and pesticide wastes.

The Swaziland Environmental Action Plan was developed during 1997 and highlighted the need for a national waste management strategy. This strategy needs to *inter alia* identify appropriate legal and institutional framework to implement the strategy. The Swaziland authorities will be launching a strategy development process in April 2000.

3.6.4 Lesotho

Lesotho's waste management situation is similar to that of Swaziland, except that there is less industrial activity in Lesotho. Lesotho adheres to the SADC policy and strategy for environmental and sustainable development, which makes provision for the control of movement of and disposal of hazardous waste in the region.

3.6.5 Botswana

On an integrated waste management planning and legislative front, Botswana is probably one of the most progressive countries in southern Africa. Also of strategic importance is that the head office of the South African Development Community

(SADC) is situated in Botswana, and hence could contribute to regional planning on environment protection and specifically waste management.

A national strategy for waste management for Botswana was developed during 1998 (Simon & Phatshwe, 1999). This strategy embodies the following principles aimed at minimising environmental pollution – waste prevention, polluter pays, and co-operation. The strategy also adopted the internationally accepted waste management hierarchy, i.e. reduce, reuse and recycle. The main aims of the strategy are to:

- Minimise wastes from industry, commerce and households;
- Maximise environmentally sound waste reuse and recycling;
- Promote environmentally sound waste collection, treatment and disposal.

Based on the strategy a Waste Management Act was developed and promulgated during September 1998. The Act provides for the establishment for an independent Department of Sanitation and Waste Management with *inter alia* the following functions:

- To provide policy direction and leadership in matters pertaining to waste management;
- To enhance sectoral co-ordination by developing plans and programmes;
- To ensure implementation of strategic projects and recover costs;
- To promote and co-ordinate human resources development and institutional capacity;
- To register persons who manage controlled waste;
- To register and licence waste carriers, waste disposal sites and waste management facilities;
- To monitor the trans-boundary movement of controlled waste;
- To inspect, restrict and prohibit unsound environmental practices related to waste management.

The Act also requires all waste carriers and waste disposal sites to be registered within 12 months and licensed within 18 months of the effective date of the Act. Strict guidelines have been developed for disposal of waste by landfilling, primarily aimed at preventing the pollution of ground water. Requirements include: landfill and waste classification; landfill selection, site investigation and characterisation; EIAs; landfill design, construction, operation, monitoring, restoration and aftercare; as well as water quality monitoring.

There are well over 175 waste disposal sites in Botswana of which only two are properly engineered landfills and only one currently meets the Guidelines management requirements (Simon & Phatshwe, 1999). The registration, licensing and upgrading of all the landfills to meet the Guideline requirements will be very costly and require careful planning in terms of available finance and other resources. Licensing is seen as a critical activity in this regard. The main obstacles to the full implementation of the

Guidelines and the other provisions of the Act are: a lack of financial and skilled human resources; the country's sparse population distributed over a vast country which makes servicing difficult; and, a lack of co-operation between local authorities.

4. IMPLICATIONS FOR IWM PLANNING

4.1 Lessons Learnt from the South African Situation

Many of the waste-related problems that the NWMS seeks to address, are a direct or indirect result of inadequate integrated waste management (IWM) planning. Without proper planning, it is unlikely that sustainable integrated waste management will be achieved in South Africa. IWM planning, addressing all levels of the waste management hierarchy, places a greater emphasis on waste prevention and minimisation than in the past, and will assist in achieving optimal utilisation of available resources. Once the IWM plans, developed by local government, the provincial environmental departments and industries, and co-ordinated by the national government have been implemented, the quality of life for all South Africans, and particularly the previously disadvantaged communities, should improve due to the reduced negative environmental and health impacts from waste.

Integrated waste management planning has largely been neglected in South Africa, because of the lack of co-ordination between the different tiers of government and fragmented legislation. This planning initiative is therefore focused on the provision of guidelines for the compilation of integrated waste management plans and a framework for supporting legislation. These instruments will aid provincial government with the compilation of their integrated waste management plans (inclusive of their first generation hazardous waste management plans), local government with the compilation of their first generation general waste management plans, and industry with the compilation of their general and hazardous industrial waste management plans. This process should ensure that IWM planning (short, medium and long-term) receives the attention that it requires in order that the objectives of the NWMS are realised.

In order to ensure effective waste management planning, DEAT's IWM planning initiative has to be integrated with other planning initiatives of government. Due cognisance has been taken of existing planning legislation such as the Development Facilitation Act (DFA), the Physical Planning Act (PPA), Local Government Transition Act (LGTA), Organised Local Government Act (OLGA) and the draft Municipal Services Bill, as well as the Land Development Objectives (LDO) process. However, planning initiatives as a whole are in flux and hence compilers of waste management plans should familiarise themselves with the latest situation relevant to their particular province or local authority.

The process of IWM planning must consider the needs and priorities of all stakeholders, which should be identified through a process of ongoing public participation. These needs and priorities may include for example: capacity building, developing financial and human resources, and raising general public understanding of the financial implications of the plans and job creation. Furthermore, in formulating the plans, the respective local authorities and provincial environmental departments should identify sensitive areas and where regional partnerships between local authorities (a group of local authorities developing a joint plan and working together) could be viable.

4.2 Lessons Learnt from International Initiatives

The requirement to develop, implement and regularly review waste management plans, is a key component of relevant legislation promulgated in the EU and member states, as well as in the USA. Waste management planning is primarily controlled by a single environmental act that defines the objectives. A hierarchical approach to the management of waste, with a shift in focus from disposal to minimisation and reuse of waste and then to prevention, has been implemented. This has been necessary in order to meet legislated targets for the quantity of waste that can be disposed to landfill. Often specific waste minimisation or recycling mechanisms are required, for example separation of recyclable material at source or banning the disposal to landfill of commodities that can be recycled. Guideline documents have been published for waste management planning to ensure compliance with the relevant legislation.

The availability of reliable waste and waste management data is seen to be essential for the development of effective waste management plans. An electronic catalogue of waste management data in the EU has been established, which overviews all existing waste management plans at all levels of government. Other countries, such as Ireland, have established national waste databases, to collect reliable and up-to-date information on waste disposal and recovery facilities.

The co-operation of all levels of government is essential to achieve an integrated approach to waste management planning. In the Netherlands a 'Co-operation Treaty' between the three levels of government has been formalised to secure mutual reliance and responsibility. Regional co-operation between local authorities is promoted. National government is responsible for the main points of policy and provincial and local government develop and implement more detailed plans and policies. The role of public/private partnerships is recognised in meeting the required level of service.

The need for good planning, careful site selection, public participation and awareness a policy of openness and transparency have been highlighted in order to mitigate opposition to waste management proposals.

The implementation of effective integrated waste management planning has ensured that adequate disposal capacity is available for projected waste generation rates.

4.3 Structure for Integrated Waste Management Plan

Integrated waste management planning can be divided into the following essential steps:

- Defining the guiding policy principles and the scope of the plan;
- Gathering background information;
- Developing strategic objectives;
- Establishing instruments for reaching the objectives;
- Developing an implementation plan;
- Monitoring and reviewing progress towards meeting the objectives.

A brief outline of what should be addressed under each of the steps is set out below.

4.3.1 Defining Guiding Policy Principles:

The first step in the development and implementation of an effective IWM Plan is to ensure that there is clarity as to the overriding *policy goals* of the plan, for example:

- The policy principles specified in the Constitution, NEMA, IP&WM Policy, NWMS and Action Plans, as well as those specific to the relevant province, local authority or industry, as appropriate.
- The waste management hierarchy (waste prevention, minimisation, collection, transportation, recycling, treatment and final disposal) as appropriate.

Some of the above policy goals may be supportive of each other, while others may involve making trade-offs. Resolving such trade-offs involves making a political decision, which ideally should be taken in consultation with appropriate stakeholders, as guided by agreed principles and criteria. In terms of integrated waste management planning for South Africa, the principal goals and priorities to guide the development and implementation of the plans are reflected at a general level in the requirements of the Environmental Management Policy for South Africa and the National Environmental Management Act (NEMA), as well as more specifically within the White Paper for Integrated Pollution and Waste Management for South Africa, and the National Waste Management Strategy and associated Action Plans. The key priorities of these policy initiatives, as they relate to integrated waste management planning, are outlined in Section 2.1 of this report.

4.3.2 Gathering Background Information

The next step in the compilation of an effective integrated waste management plan is to collect appropriate and reliable information. The type of information to be collected should include:

- The provisions of existing applicable legislation (national, provincial and local) and guidelines.
- Information about the existing population dynamics and future growth estimates, to develop projections of future waste quantities, demographic developments such as informal settlements and associated waste problems such as illegal dumping, the basis for waste volumes and types, financial recovery, associated integrated waste management structure and services, job creation, etc.
- A measure/estimate of the quantity and characteristics of the different waste types, both now and in the future.
- Details on the nature, location and capacity of existing waste management systems, installations, and practices.

- Details on waste economics (for selection of the elements of the waste management system), as well as financial information (on the cost of waste management and waste charges).
- Description of key stakeholders.
- Description of the organisational structure of the authority or industry in question.
- Identifying waste management needs and alternatives for each stage of the waste hierarchy.
- Analysing the present situation and predicting future scenarios.

4.3.3 Developing Strategic Objectives for Integrated Waste Management

Based on the baseline information collected on the present situation on waste, the planners and decision-makers should set up the strategic objectives. These objectives must be established within legislative requirements for integrated waste management, addressing each stage of the waste hierarchy. The objectives should:

- Set goals, objectives and targets;
- Specify the immediate and long-term policy;
- Set time-frames for the upgrading of existing facilities and/or building new ones;
- Define standards, criteria and norms;
- Ensure effective co-operation with other authorities that may directly or indirectly impact on or influence the planning process.

4.3.4 Establishing Instruments for Reaching Strategic Objectives

This could include:

- Developing policy instruments in the relevant authority or industry to meet the requirements of the guidelines.
- Developing appropriate partnerships (e.g. public-public and private-public).
- Developing appropriate legislative instruments for each stage of the waste hierarchy that needs to be addressed.
- Developing economic instruments (funding mechanisms, market risk factors, comparative economic analyses on waste management facilities and structures).
- Identifying the nature of financing arrangements (i.e. a financial plan).
- Undertaking environmental impact assessments in terms of the ECA for the construction of waste infrastructure.
- Developing a public awareness, communication and participation strategy.

4.3.5 Developing an Implementation Programme

The implementation of integrated waste management plans will rely primarily on structures that are established in terms of the National Environmental Management Act (NEMA), as well as on responsibilities that are vested in various levels of government in terms of the Constitution. Implementation may involve:

- Developing an implementation programme and time schedule;
- Setting review schedules of integrated waste management plans;
- Outlining institutional responsibilities;
- Specifying the workings of the relevant committees.

4.3.6 Monitoring, Evaluation and Review

Monitoring, evaluation and review is a system for assessing the success or otherwise of the design and implementation of an integrated waste management plan. Although it is described as a phase of the planning, it should be implemented as an ongoing or cyclical activity that constitutes an essential and integral part of all the phases of the integrated development planning process. Performance and development indicators need to be developed during the course of the planning process. This involves joint effort and co-operation between national, provincial and local authorities and a range of external parties. The indicators will be used to monitor the performance of government institutions, and ensure a transparent and accountable government.

Monitoring is a continuous activity that forms the basis for performance management. Monitoring focuses on the short-term objectives of the integrated waste management planning process for each stage of the waste hierarchy. The results of monitoring will enable authorities and industry to make adjustments to plans and implementation programmes and to take corrective action where necessary.

Evaluation is a medium-term activity that is designed to measure whether, and to what degree, waste management goals are being achieved through the implementation of strategic objectives. The outcomes of waste management planning initiatives need to be assessed in terms of waste management planning indicators. Evaluation results provide information to reappraise the goals and to assess the appropriateness of goals, strategic objectives and policies and whether they need to be amended and adjusted.

The review of the planning process is necessary to make adjustments and revisions on the basis of the monitoring and evaluation.

The Five Ps of an Effective Waste Management Plan

The following is based on the recommendations in the US EPA's "Decision Maker's guide to Solid Waste Management" (US EPA, 1995)

Planning: Develop and follow comprehensive plan based on realistic long-term forecasting

Price: Decisions based on sound economic analysis of community and government resources

Publicity: Maintain strong public support and commitment through education & communication

Politics: Necessary for financing support – need effective communication with political leaders

Perseverance: Acknowledge that visible results may only materialise in the long-term

5. CONCLUSIONS AND RECOMMENDATIONS

This document has reviewed the current status of waste management planning in South Africa, as well as the policy and legislative context in which this planning process takes place. A wide range of legislation, regulations and by-laws currently impact on waste management planning. Of particular importance and relevance is the National Environmental Management Act (NEMA), which requires national departments and provinces to prepare environmental implementation plans (EIPs) and/or environmental management plans (EMPs). Integrated waste management plans form strategic inputs to these EIPs and EMPs and hence their content needs to closely align with the requirement of these EIPs and EMPs.

Waste management planning traditionally focuses primarily on waste collection and disposal. For this reason, the NWMS takes forward the planning principles outlined in the White Paper on IP&WM, and promotes a hierarchical approach to waste management. This integrated approach promotes waste prevention/minimisation and recycling over disposal, and emphasises planning as a key activity to achieving integrated waste management (IWM).

IWM planning, as applied internationally, was reviewed and the following main lessons were learnt and are recommended for consideration in IWM planning in South Africa:

- Legislate for IWM planning through a single environmental act.
- Regulate for IWM plans, their objectives, content and regular review.
- Institute the internationally accepted hierarchical approach to waste management, (namely: waste prevention/minimisation, followed by recycling and reuse, treatment, and finally disposal).
- Consider legislating targets for promoting waste minimisation and recycling.
- Collect reliable waste and waste management data for the development of effective IWM plans, and collate and store for future use in an appropriate waste database, be it at local, provincial and/or national level.
- The co-operation of all levels of government is essential to achieve IWM planning. National government should be responsible for overarching policy, and provincial and local government for developing and implementing more detailed plans and policies.
- Public/private partnerships can play an important role in providing IWM services.
- Good planning, careful site selection, public participation and awareness, and a policy of openness and transparency can mitigate against opposition to waste management proposals.
- Effective IWM planning helps in ensuring that adequate disposal capacity is available to meet future waste disposal needs.
- Publish guidelines for IWM planning to aid proper planning and to ensure compliance with the relevant legislation.

Based on the review of the current status of waste management planning nationally and internationally the following is recommended that:

- A practical guideline document on the preparation of integrated waste management plans should be developed. A draft starter document, entitled *Guidelines for the Preparation of Integrated Waste Management Plans*, has been produced as part of this project;
- This draft starter document (*The Reference Document*) as well as the draft starter document on IWM Planning Guidelines (*Guidelines for the Preparation of Integrated Waste Management Plans)* should be used by DEAT as a basis for a programme of wide consultation with stakeholders, as also recommended in the NWMS Action Plan on Integrated Waste Management Planning;
- Those aspects of IWM planning identified as requiring legislation for their effective implementation are considered as part of DEAT's Law Reform Process;
- Integrated waste management planning should form an integral part of DEAT's environmental awareness and training programmes.

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