SWAZILAND  **GOVERNMENT**

National Solid Waste Management Strategy

NATIONAL SOLID WASTE MANAGEMENT STRATEGY FOR SWAZILAND

SOLID WASTE MANAGEMENT STRATEGY

VOLUME I

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ABBREVIATIONS

CC	Council
CDP	Capacity Development Plan
CEO	Chief Executive Officer
CSO	Central Statistical Office
CT	Company Town
CTA	Central Transport Authority
DANCED	Danish Co-operation for Environment and Development
DANIDA	Danish International Development Agency
DFID	(British) Department for International Development
DKK	Currency in Danish Kroner
DPM	Deputy Prime Minister
DPMO	Deputy Prime Minister's Office
E	Currency in Swaziland; Emalangeni
EMA	Environment Management Act, 2002
EIA	Environmental Impact Assessment
EIS	Environmental Information System
ESRA	Economic and Social Reform Agenda
GENW	General Waste
HAZW	Hazardous Waste
HCRW	Health Care Risk Waste
HCW	Health Care Waste
HHW	Household Waste (domestic waste)
ICW	Industrial, Commercial and Primary Production Waste
MEE	Ministry of Enterprise and Employment
MOF	Ministry of Finance
MHSW	Ministry of Health and Social Welfare
MHUD	Ministry of Housing and Urban Development
MNRE	Ministry of Natural Resources and Energy
MOAC	Ministry of Agriculture and Co-operatives
MTEC	Ministry of Tourism, Environment and Communications
MPWT	Ministry of Public Works and Transport
NDS	National Development Strategy
NEP	National Environmental Policy
NGO	Non-Governmental Organisation
NHAZW	Non Hazardous Waste (General Waste)
NSWMS	National Solid Waste Management Strategy
PMG	Project Management Group
POP	Persistant Organic Pollutants
PS	Principal Secretary
PSC	Project Steering Committee
PSMP	Public Sector Management Programme
RG	Reference Group
RSSW	Registration System for Special Waste (Basel Convention.)
SABS	South African Bureau of Standards

SADC	Southern African Development Community
SCCI	Swaziland Chamber of Commerce and Industry
SEA	Swaziland Environment Authority
SEAP	Swaziland Environmental Action Plan
SEDCO	Small Enterprises Development Company
SME	Small and Medium-sized Enterprises
TB	Town Board
TC	Town Council
WHO	World Health Organisation
WIS	Waste Information System
WR2000	Waste Regulations 2000

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0. Executive summary

The National Solid Waste Management Strategy presented in this document was compiled by the Ministry of Tourism, Environment and Communication in consultation with a wide range of stakeholders, including government at all levels, business and industry, as well as non-governmental organisations. Financial support for the project was provided by the Danish Co-operation for Environment and Development (DANCED) (now DANIDA)[1]. The preparation of the project was initiated in April 2000, led by the Swaziland Environmental Authority (SEA). The SEA, in collaboration with a team of consultants, undertook a substantial Status Quo and Needs Analysis investigation. Based on this investigation, specific problems and related needs regarding waste management in Swaziland were identified. A set of possible options (solutions) were then developed and workshopped with all the relevant stakeholders. The strategy was subsequently based on the solutions selected by the various stakeholders as the most suitable options for Swaziland.

The National Solid Waste Management Strategy for Swaziland represents a long-term plan (up to 2010 for addressing key issues, needs and problems experienced with waste management in Swaziland. The strategy attempts to give effect to the National Environmental Policy National Environmental Management Act of 2002 and the Waste Regulations 2000. The focus of the strategy is to move towards a holistic approach in waste management, in line with internationally accepted principles but taking into account the specific context of Swaziland with regard to the institutional and legal framework, as well as land tenure and resource constraints. Integrated waste management thus represents a move away from waste management through impact management and remediation to a proactive management system that focuses on waste prevention and minimisation.

The strategic approach applied for the development of the strategy is based on the international waste hierarchy approach, which includes Waste Prevention, Recycling, Collection and Transport, Treatment and Disposal. The waste management hierarchy puts the focus on waste prevention (preventing the generation and minimising the waste that is being generated) as a first priority. Thereafter would follow reuse and recycling of waste (utilising waste as a resource) and only after that treatment and disposal of the remaining waste. Currently the focus of waste management in most developing countries (including Swaziland) is still on collection and disposal of waste.

Apart from the waste hierarchy, two other aspects also form an integral part of the strategy. These include Waste Management Planning backed up by a Waste Information System. Both of these led to the development of important management

[1] On behalf of DANIDA the Danish consultant RAMBOLL, www.ramboll.dk provided technical assistance.

tools e.g. long-term plans and an up to date database that is necessary for long term planning.

Critical aspects that were taken into account during the strategy formulation process are the existing institutional and legal framework with regard to waste management. The National Environment Policy, the National Environment Act 2002 and the Waste Regulations 2000 have been used as a legal framework.

A concerted effort was also made to allocate responsibilities for managing waste in the strategy within the existing responsibility framework of government. Key to the success of the implementation of the waste management strategy would be whether government and other stakeholders could actually provide the necessary resources needed for implementation.

The waste strategy has been divided into two sections (Volume I and Volume II). The first volume deals with the broad strategic approach and institutional framework without going into practical detail. The second volume describes the various initiatives that are proposed to implement the strategy (Chapter A 2). A more detailed description of the proposed institutional framework is also provided (Chapter A1).

The rationale and justification behind proposing a National Solid Waste Management Strategy for Swaziland are many. The Kingdom of Swaziland needs an integrated waste management strategy to address the identified needs and problems in both urban and rural areas. A clean environment means reduced public health problems, as well as reduced ground and water pollution.

A word of thanks and appreciation is conveyed to the SEA as the counterpart for this project, for their hard work and commitment, as well as to every ministry, institution and stakeholder that participated and contributed to the successful completion of the project.

1. Introduction

1.1 Definition and scope of the strategy

This National Solid Waste Management Strategy (NSWMS) for Swaziland sets out the following vision for the Kingdom:

" to develop, implement and maintain an integrated waste management system that will reduce the adverse impact of all forms of solid waste, so that social and economic development in Swaziland, the health of it's people and the quality of it's environment and it's resources benefit."

The strategy serves two purposes:

- to inform the public of the Government's objectives and how the government intends to achieve them, and
- to inform government agencies and state organs of the objectives and their roles in achieving them.

In the context of this strategy, waste is defined as "any substance or thing that the holder discards or dispose of irrespective of its value to anyone, and any substance or thing deemed by a regulation to be waste; and for the purpose of this definition: "holder" means a person in possession of the waste, or a person whose activities produced the waste or a person who carried out pre-processing, mixing or other operations that changed the nature or composition of the waste."

The development of the NSWMS was preceded by various other processes, including: - the National Development Strategy (NDS-September 1997), the Swaziland Environmental Action Plan (SEAP- August 1997), a Draft Environmental Bill (now the Environmental Management Act recently (2002) approved by Parliament) and the Swaziland Waste Regulations 2000 (April 2000). The need for a NSWMS for Swaziland was already identified as a priority area in the SEAP. Based on this identified need, a project was launched by the SEA in close co-operation with the Danish Co-operation for Environment and Development (DANCED) who provided the funding for the project. The project was established to assist the SEA with the development and implementation of a NSWMS.

The NSWMS is a strategy subsidiary to the National Environmental Policy and Environmental Management Act and serves as an enabling mechanism for the implementation and enforcement of the Waste Regulations 2000. The strategy therefore subscribes to the vision, principles, goals and regulatory approaches as set out in the above documents. The strategy applies to all government institutions, society at large and to all activities that impact on waste management. The fundamental approach to this strategy is to prevent and minimise waste and to control and remediate impacts. Through the strategy, the management of waste will

be undertaken in a holistic, planned and integrated way and will extend over the entire waste cycle, including generation, prevention, recycling, collection, transportation, treatment and disposal.

1.2 Reader's guide

The following guidelines are provided to assist with the reading of the document.

The document consists of Volume I and Volume II. Volume II includes a more detailed description of some of the components of the Strategy. The two documents are therefore complementary to each other.

Volume I of the document includes an overall summary of all the aspects of the strategy and is divided into six chapters. Chapter 2 provides the background to the project. Chapter 3 provides a summary of the technical aspects of the strategy, which is based on the Waste Hierarchy approach. Each of the components of the hierarchy is discussed and priority initiatives for each component are identified. A short overview of the enabling mechanisms related to each hierarchy component is also provided. Chapter 4 addresses the Institutional Framework, which includes all the key roleplayers, required for the successful implementation of the Strategy. Chapter 5 covers the enabling mechanisms related to the key roleplayers. A summary of the cost estimate for the implementation of the Strategy is presented in Chapter 6.

Volume II of the document is divided into four annexes. Annex 1 presents a detailed description of the Institutional Framework (related to Volume I, Chapter 4) for all the key roleplayers in the Strategy. It also presents a detailed outline of the Capacity Development interventions that are required for these institutions to operate effectively. Annex 2 covers all the strategic aspects related to the waste hierarchy (related to Volume I, Chapter 3) and includes the priority initiatives required for each component, as well as a detailed description of the various initiatives. An Implementation Plan indicating the timeframes and costing for each activity is provided in this annex. Annex 3 provides the Definition of Terms and Annex 4 provides a Waste Categorisation System.

2. Formulation of a National Solid Waste Management Strategy

2.1 **Why a National Solid Waste Management Strategy**

2.1.1 Current Waste Scenario

The growing waste management problem in the Kingdom of Swaziland can be seen as a symptom of many factors. Industrialisation, consumer patterns, urbanisation and population growth should be considered as only one perspective. From another perspective, it can be argued that the absence of waste management information has precluded strategic planning in the past. This has prevented the implementation of appropriate remedial action such as changes in behavioural patterns; establishment of waste infrastructure and the development of required legislation in order to prevent, recycle and eventually handle waste that must be collected, treated and disposed. Although good attempts have been made to rectify the problems at the urban local government level and through the establishment of private initiatives on recycling, there is currently a lack of institutional waste management capacity at all levels in Swaziland. This is reflected at both national and local authority level as skills deficiencies, lack of implementing waste management tools, financial shortages and inadequate institutional structures. Moreover, little monitoring and enforcement of existing legislation takes place due to the unclear, fragmented and overlapping allocation of responsibilities amongst the various authorities.

With the increasing pressure of population growth coupled with the investments being made into economic infrastructure in *peri-urban and rural areas* located on Swazi Nation Land, there is an urgent need to identify appropriate means to improve waste management in these areas. This is relevant for *household waste*, *waste from commercial nodes, as well as health care risk waste from health care facilities.* This is perhaps less a technical exercise, since a range of technological approaches are already in existence world-wide; but perhaps more an institutional exercise by looking into and agreeing on suitable institutional and also financial arrangements.

Although waste management services are in place in some areas, such as the *declared urban areas*, there is a growing problem of litter and illegal dumping of *household and demolition waste* and waste collection coverage rarely exceeds 50-60%. The lack of equipment is acknowledged as one reason for this, but there are also other reasons that are linked to limited management, little innovation in terms of approaches, and the lack of general public awareness concerning waste and littering. Some urban local government institutions do not operate any waste collection systems and in most local authorities it would be unrealistic to impose 100% cost-recovery rates on the waste generators, whether they are citizens, commercial or industrial enterprises. It should be noted that *hazardous components of household* waste, such as lead acid batteries, fluorescent tubes, car oil and tyres, are currently not addressed.

Some enterprises producing *commercial and industrial waste* have been established in areas where appropriate waste management infrastructure has not been provided. Commercial and industrial waste may be *hazardous* but there are few, if any, specially designated facilities for the treatment and disposal of hazardous waste substances in Swaziland. Part of this problem could be addressed by exporting waste to neighbouring countries where appropriate facilities are available. However, this will not be a feasible option until Swaziland has ratified the Basel Convention. The exportation of waste however, should not be pursued without looking into the scope for adoption of *cleaner production and waste minimisation* approaches within commerce and industry. A pro-active approach by these sectors is required. .

Recycling is an issue closely linked to all waste streams and sectors. There are currently only limited recycling activities ongoing in Swaziland that are operated mostly by the private sector and linked to paper, cans, glass and more recently plastic. There is however considerable scope to extend these activities although pro-active legislation and incentives need to be put in place to further promote recycling.

Health Care Risk Waste from hospitals, health care facilities and clinics is an area of particular concern. Currently, most health facilities have no separation of waste at source resulting in the mixing of health care risk waste, such as scalpels and remains of items used for medical treatment, with general waste items such as paper. The current handling methods increase the risk of staff members involved in waste management contracting infectious diseases, including HIV/AIDS.

The NSWMS has been developed to address the identified waste issues. The table below shows the current and anticipated waste management situation after implementation of the strategy.

Features of current Waste Management in Swaziland	**Anticipated outcome after implementation of the NSWMS**
Fragmented and reactive approach	Integrated proactive approach
Limited focus on control mechanisms	Focus on sustainable environmental protection
Adverse effect on safety, health and the environment	Sustainable protection of safety, health and the environment
Insufficient information on waste	Waste Information System
Inadequate waste planning	Integrated Waste Management Planning
Poor management of hazardous waste	Waste Prevention and Recovery
Little support for recycling	Encouragement of Recycling
Inadequate waste collection services	Extension of Waste Collection services
Inadequate disposal services	Environmentally acceptable Disposal Facilities
Inadequate cost recovery for waste	Realistic cost recovery for waste services

services	
Regulations inadequately enforced Solid waste management not a priority in many sectors	Integrated regulatory approach Focus on waste issues in sectors where waste management creates severe health and environmental problems

The rationale and justification behind proposing a National Solid Waste Management Strategy are many and varied. A Solid Waste Management Strategy is required that addresses the problems highlighted in the table above and that covers the country as a whole. A clean environment will impact positively on public health and result in a reduction of health problems. Through improved waste management, water pollution will also be reduced, which will contribute to economic growth.

2.1.2 Current Legislative Scenario

The guiding principles underpinning the integrated National Solid Waste Management Strategy (NSWMS) are stated in the *National Environment Policy*. The policy is implemented through the new *Environment Management Act, 2002*, while the regulatory framework has been developed in the *Waste Regulations 2000* that became enforceable during April 2000. The National Environmental Policy defines eleven core principles for environmental management [2]

- Environmental Responsibility;
- Buntfu;
- Environmental Rights;
- Sustainable Development;
- Public Awareness and Participation;
- Community Management;
- Preventive Action;
- Precautionary Approach;
- Polluter Pays Principle;
- Proximity Principle;
- Global and Regional Responsibilities.

The *Environment Management Act, 2002* sets out the following guiding principles for the NSWMS[3]:

- Long-term integrated planning and co-ordination, integrated and co-operative efforts, which consider the whole environment must be used to prevent pollution;
- The Precautionary Principle and the Polluter Pays Principle will be applied;

[2] The principles are defined in Annexure 1 – Definition of Terms

[3] The principles mentioned are defined in Annexure 1 – Definition of Terms

- Generation of waste must be minimised wherever practicable and waste should, in order of priority be reused, recycled, recovered and disposed of safely;
- Non-renewable natural resources should be used prudently while renewable resources and ecosystems should be used in a manner that is sustainable.

Section 41 of the *Environmental Management Act* in also gives effect to the principle of Duty of Care and provides the Minister, responsible for the Environment, with the mandate to regulate waste management. Regulations controlling waste management have been issued by the Swaziland Environmental Authority (SEA) who was also given the responsibility to develop the NSWMS. .

The *Waste Regulations 2000* came into force during April 2000 and provide the regulatory framework for future waste management in the country. Waste Regulations 2000 also specify the duties and responsibilities of the SEA, waste generators and waste service providers. The Regulations introduce new regulatory instruments, such as waste management licensing and waste management planning to enforce the following principles[4]:

- The Duty of Care;
- The control of the import, export and trade in waste;
- No disposal may take place before the disposal facility has been approved;
- All premises in an urban area shall provide waste receptacles;
- Generators of commercial or industrial waste shall arrange for waste to be collected and transported to an approved waste disposal facility.

The Waste Regulations allows an area to be declared as a "*Waste Control Area"*. This option could be particularly relevant to peri-urban and rural areas that are located on Swazi Nation Land, as well as Company Towns. The declaration of a Waste Control Area provides for a similar allocation of waste portfolios and responsibilities to that of Town Councils and/or Town Boards. They may, however, be implemented through different institutional arrangements.

2.1.3 Current Institutional Scenario

To date, the responsibility for waste management is fragmented and each individual line ministries is responsible for those waste generators that are within their legal jurisdiction.

This is discussed and commented below:

Swaziland Environment Authority (SEA) within the *Ministry of Tourism, Environment and Communications (MTEC)*

[4] The principles are defined in the Appendix I – Definition of Terms

The main function of SEA´s is that of *conceptual lead agency* for waste management. This includes, enforcement of the regulations issued by the Authority, co-ordination of the activities of the other ministries with waste management functions, development of waste management policies and strategies, and setting of standards. The Authority is also responsible for waste management of those institutions and economic agents that are not covered by the above, such as. hotels.

In general, the SEA is the lead agent for development of environmental policies, strategies, setting up environmental regulations, including Environmental Impact Assessment Projects (EIA's) and ensuring enforcement of the duties of the monitoring responsible parties.

SEA is also responsible for the assessment of Environment Impact Assessment Documents from, for example, larger development projects. These projects often require co-ordination between different ministries such as the Ministry of Tourism, Environment and Communication (MTEC)/SEA, Ministry of Housing and Urban Development (MHUD), and the Ministry of Enterprise and Employment (MEE).

The institutional and the legal framework for duties and responsibilities of the SEA are fully defined in the Environment Management Act, 2002, the Environmental Impact Assessment Regulations, and the Waste Regulations 2000. The organisational and financial implications of transforming SEA into a parastatal are currently not known.

The SEA is establishing itself as a co-ordinating body in order to meet the future challenge of co-ordinating all environmental issues within the government. This will require a streamlined organisation, where every staff member has clearly defined duties and responsibilities.

The Ministry of Housing and Urban Development (MHUD). Local Authorities and Company Towns.

The Ministry of Housing and Urban Development is responsible for the monitoring and control of household and commercial waste management, undertaken by the urban local government bodies, such as City Councils, Town Councils and Town Boards. Their responsibilities are outlined in the Urban Management Act of 1969 and the Environment Management Act 2002.

There is no specific section or department within the MHUD that has responsibility over environmental management issues. However, the associated functional responsibilities are commonly understood to be vested with the Health Inspectors. Monitoring and support to local authorities on environmental management issues or policies is limited.

A local authority means a City Council, a Town Council or a Town Board "declared" under the Urban Government Act of 1969 (currently under revision). The obligations of local authorities with regard to waste management are defined in the Environment Management Act 2002 and the Waste Regulations 2000. These obligations have however, not been sufficiently communicated to the local authorities, in particular the Town Councils and the Town Boards. The current financial constraints experienced by many local authorities make it difficult for them to prioritise waste management services over and above a minimum of waste collection services.

The Building and Housing Act also makes provision for MHUD to declare an area a *"Controlled Area"* even when it is located in Swazi Nation Land. This provision only requires a "Structural Plan" to be put in place, but the declaration could be dovetailed with the provision made for the declaration of *"Waste Control Areas"*, described in Waste Regulations 2000 and the Environment Management Act 2002.

Company Towns are urbanised areas that are not under the jurisdiction of the Ministry of Housing and Urban Development. These towns have been established through economic development such as. the sugar industry and forestry. Industrial, commercial, residential and medical facilities have been established within the Company Towns. . Currently, Company Towns are not under the jurisdiction (physical planning and/or waste management planning) of any ministry. Waste management services are independent of the government.

The Ministry of Health and Social Welfare (MHSW)

The MHSW is responsible for all issues relating to public health and specifically for the monitoring and control of the Waste Regulations,2000 with respect to Health Care waste generated from hospitals, health centres, clinics and medical retailers. Furthermore, the Ministry is responsible for regulating, enforcing and monitoring health standards, including solid waste management issues, related to food supplies intended for human consumption.

Health officers, both at national government and local government level, do not have a specific legal mandate to enforce improved medical waste management. This has resulted in alack of proposals for interventions and requests for supporting budgets for improvements of medical waste management. Improved o-ordination between the MHSW and the SEA is required to remedy this situation, with a focus on a proactive approach.

The Office of the Deputy Prime Minister (DPMO)

The DPMO is legally responsible for Tinkhundlas, Regional Administrations and Community Development. Consequently, the Ministry is considered to be

responsible for the monitoring and control of the Waste Regulations 2002 with respect to domestic waste generated in the rural and peri-urban areas, although. these responsibilities have no legal basis.

A number of geographical areas within the jurisdiction of the DPMO are densely populated settlements in the peri-urban areas, where waste management systems and services are often limited. It is difficult to access these areas with modern/conventional waste collection equipment and alternative approaches have not been pursued. In addition, these settlements are typically located on Swazi Nation Land, where residents do not pay rates or fees that could be used for the financing of waste management services. The institutional framework also typically comprises an Inkhundla Office, which has no technical capacity to operate waste management services. The residents in these areas are divided on their understanding of whether they are entitled to waste management services and if/how they should pay for it. Waste management issues are also not placed high on the agenda.

The Waste Regulations 2000 and the Environment Management Act 2002 does provide for the declaration of "Waste Control Areas", for which a waste management plan and waste management system must be implemented. This provision however, has to date not been applied.

The Ministry of Enterprise and Employment (MEE)

The MEE is responsible for monitoring and control of the implementation of the Waste Regulations 2000 in the Industrial Estates. It is generally understood, that this responsibility includes not only the Matsapha Industrial Estate and other industrial estates, but also in the Company Towns. There is currently no dedicated unit or staff group within MEE assigned enforce waste legislation or to advise and monitor environmental management issues or policies within the industrial and commercial sector. The industrial and commercial sector is also uncertain about the duties and responsibilities of the different government institutions and requires guidance with regard to which department they should approach to assist with environmental and waste management issues.

Ministry of Agriculture and Co-operatives (MOAC)

The MOAC is generally perceived to be responsible for the monitoring and control of wastes generated as a result of agricultural practices and their control and compliance with the Waste Regulations 2000. This responsibility is however not explicitly defined in the regulations.

The responsibility is mainly confined to the disposal of used agrochemical containers. The monitoring and enforcement of wastes generated from the processing of agricultural products, is the responsibility of the other ministries as discussed above. MOAC officers at national government and local government level, do not have specific responsibilities and mandates to enforce

improved agricultural waste management. This has resulted in limited improvements in the management of agricultural wastes.

Ministry of Natural Resources and Energy (MNRE)

The MNRE is responsible for authorisations under the Mining Act. This responsibility includes: - Mineral Exploration, Industrial Minerals, Mapping, Fossil Fuels, Groundwater Resources, Drilling and the Laboratory. MNRE is generally considered to be responsible for waste generated as a result of mining practices. Mining waste is however, not specifically addressed within the legal mandate of the ministry.

The assessment of the current institutional framework for waste management, undertaken as part of the National Solid Waste Management Strategy Project, provided useful information on the challenges that will be encountered when implementing the Strategy. There is generally a lack of clarity on legal mandates to ensure commitment from the various ministries regarding their waste management responsibilities. This ultimately leads to a lack of funding and other resources required to fulfil their responsibilities. There are also significant capacity development challenges. These include addressing the gaps in skills and knowledge and developing structural/organisational capacity, system tools (equipment, procedures, guidelines and manuals),as well as inter-ministerial co-operation, local level co-operation, and financial and other incentives. New and appropriate institutional opportunities have been identified during the assessment, which may be developed as suitable and sustainable options in Swaziland.

The **main outcomes of the Capacity Assessment** can be summarised as follows:

"Strengths" of the existing institutional framework:

- SEA now has the Environment Management Act 2002, as the basis for its transformation into a parastatal.
- Mbabane and Manzini City Councils already have functional units responsible for solid waste management.
- Piggs Peak Town Council and Matsapha Town Board have learnt important lessons with regard to the outsourcing of waste management operations.
- Some Company Towns have invested significantly to ensure appropriate waste management operations.
- There are several private initiatives on recycling (paper, plastic, glass and cans) that can be used as a platform for local authorities and others to link with and learn from.
- There appears to be a genuine desire among stakeholders to improve the existing standards of waste management despite resource constraints.

"Weaknesses" of the existing institutional framework:

- The current institutional framework cannot easily accommodate the changed and additional responsibilities proposed in the NSWMS (e.g. the MEE, DPMO, the MNRE, MOAC and most Town Councils and Town Boards).

- In some instances, there is a lack of clarity and contradictions in the interpretation of existing ministerial and/or departmental portfolios (e.g. the SEA, MEE and the DPMO).
- Resource and capacity constraints pose a considerable challenge for the different institutions.
- Despite the recent enactment of the Environment Management Act, the future institutional status of SEA is still pending and hence also the final relationship between SEA and the other national and local agencies.
- The institutional framework for waste management in peri-urban and rural areas is limited. There is no clear definition of the institutional framework responsible for service provision (including the identification and implementation of appropriate waste management systems), for capacity building, for financial issues and for monitoring and enforcement. There is also a relatively weak link between traditional and government authorities.
- It is difficult to determine the ministerial "host and regulatory" arrangements for Company Towns. Historically, the Company Towns have been established through agreements entered into with different ministries. (The Ministry of Finance and the Ministry of Agriculture were mentioned but not the Ministry of Enterprise and Employment).

"Opportunities" of the existing institutional framework:

- Several national restructuring processes (e.g. the Public Sector Management Programme (PSMP) and Economic and Social Reform Agenda (ESRA)) and policy initiatives (e.g. revisions of the Urban Government Act and Public Health Act) have been initiated. It is important that the requirements of the Environment Management Act 2002, Waste Regulations 2000 and the NSWMS are integrated and incorporated into these processes. As an example, the PSMP strategic and action planning process offer an opportunity for central government agencies to have future waste management responsibilities included into their portfolios, structure and staffing.
- The customary law system needs to be explored as a possible opportunity and means to "formalise" waste management responsibilities along the Thinkhundla system of authority. Kwaluseni and Siphofaneni Pilot Projects undertaken as part of the National Solid Waste Management Strategy Project, offer important learning lessons on the institutional framework for waste management in peri-urban areas of Swaziland.
- There is a wealth of regional and international experience of appropriate and low-cost waste management approaches, which can be used at limited cost to identify suitable solutions for Swaziland.
- The Mbabane recycling pilot project, undertaken as part of the National Solid Waste Management Strategy Project, offers important learning lessons with a regard to institutional arrangements.

"Threats" of the existing institutional framework:

- Waste management is not the "top priority" in many of the agencies that are expected to play a key role in its implementation.
- Some waste management problems are not necessarily solved through environmental legislation. The authority by MHUD to declare urban areas (e.g. Siphofaneni and similar settlements) is important, as well as the legislation governing local urban government.

2.1.4 Key Strategic Lessons learnt from the Pilot Projects

In the preparation of the Draft National Solid Waste Management Strategy, it became clear that there was a strong need to show the future direction for the implementation of practical, viable and affordable waste management systems in Swaziland. A number of pilot projects were designed and implemented in order to test various elements proposed in the NSWMS. The pilot projects covered the issues of inter-municipal co-operative arrangements, health care risk waste, commercial waste management systems in rural areas, general waste management systems in peri-urban areas, as well as recycling systems and facilities. Hence the pilot projects were used to test the proposed strategy against reality in Swaziland and the results were used to revise and finalise the strategy. Comprehensive pilot project reports were compiled and these provide the details of the lessons learnt. A summary of each pilot project is presented in the paragraphs below**.**

The general elements tested in the pilot projects included the following:

- Clarification and confirmation of the proposed Institutional Framework and arrangements for waste management.
- Testing of the proposed technical and organisational aspects of the strategy.
- Facilitate co-operation between the various ministries and, where appropriate, facilitating the local authority in applying waste services.
- Evaluation of different institutional co-operation agreements between local authorities, communities, private contractors and other stakeholders.
- Identifying gaps and requirements for capacity development.

The key lessons learnt from each pilot projects have been taken forward into the final strategy formulation.

2.1.4.1 Inter-municipal Co-operation

It was proposed in the draft strategy that the number of landfills be reduced and that landfill facilities should be shared by the various local authorities where logistically possible. This would improve the quality of staff and reduce the cost of facilities and equipment required. The purpose of this pilot project was therefore to assess the feasibility and mechanisms by which local authorities could co-operate on waste management by sharing facilities and costs. The project included an assessment and establishment of a possible structure for inter-municipal co-operation in relation to

waste management in the Mbabane-Matsapha-Manzini Region, as well as exploring and assessing the technical and financial feasibility of viable regional approaches towards minimisation, collection, transport, recycling, treatment and disposal of waste. Furthermore, it included the drafting of an appropriate co-operative agreement for an inter-municipal co-operative system for waste management, as well as a Draft Business Plan/Implementation Plan for operation of a co-operative structure/body.

The key lessons learnt include:

Institutional Lessons

- Inter municipal co-operation (regional approach – sharing of costs, facilities and re-sources) is strongly supported by the local authorities, MHUD and SEA and must be taken forward.
- MHUD should be the implementing ministry for waste management in local authorities.
- The roles and responsibilities proposed in the strategy for MHUD are correct and are fully supported by MHUD. They will therefore be responsible for proactively pursuing regionalisation on a national level.
- The establishment of a single institution that can take full responsibility for waste management in a specific catchment area is applicable and broadly supported by stakeholders and relevant authorities.
- Various and flexible models of co-operation within different catchment areas should be developed.
- When establishing a company, the legal issues regarding ownership and liabilities must be addressed.
- Board membership needs to be clarified.

Technical Lessons

- Full cost recovery and payments are difficult issues to resolve and must be further investigated.
- Legislation (Waste Regulations 2000) must be revised to address regional co-operation.
- A centralised hazardous waste facility must be considered with the development of the Manzini/Matsapha landfill development.
- Waste management companies (new or existing), including regional Health Care Waste facilities, must be responsible for waste planning and provision of data (WIS).

2.1.4.2 Health Care Risk Waste

The objective of this pilot project was to plan, develop and implement a technically and financially feasible Health Care Risk Waste Management System in Mbabane

Hospital, which is appropriate for developing countries and taking cognisance of the geographical, institutional and financial context of Swaziland. The project included: - the clarification of institutional arrangements for facilities in urban and rural areas, the facilitation and evaluation of institutional co-operation between the different levels of government and health care institutions, and testing of various technical, organisational and capacity development aspects. The system implemented covered all aspects of waste management, from cradle to grave, including appropriate treatment of Health Care Risk Waste (HCRW).

Institutional Lessons

- Health Care Waste Management systems must be introduced nationwide. The concept is fully supported by MHSW, who is capable and willing to take institutional responsibility.
- Separation at source of HCRW and general waste (GENW) in health care facilities must take place.
- MHUD, through the relevant local authority in urban areas, takes responsibility for the GENW once it leaves the health care facility.
- The management system in hospitals and other health care facilities must be revised to ensure proper authority and supervision.
- Proper job descriptions and protocols (policies and guidelines) must be developed to ensure that staff members are well acquainted with their responsibilities.

Technical Lessons

- Providing the equipment is available, a source separation system in hospitals should be established. Close supervision and training is necessary.
- It is unlikely that the financial means (a realistic budget) to sustain such a system will be made available from the central fiscus.
- A centralised Health Care Risk Waste Treatment Plant should be seriously considered. In rural areas, other sustainable solutions (upgrading of existing facilities or alternative solutions) must be given high priority.
- Capacity development will need serious attention if the system is pursued throughout the country to other health care institutions.
- Legislation pertaining to Health Care Risk Waste needs to be revised and amended, where necessary, to accommodate the proposed system.
- Outsourced contracts must be managed more effectively by the Health Care institutions.

2.1.4.3 Peri-urban and Rural Waste Management Systems

The objective of the two pilot projects, which were carried out in Kwaluseni and Siphofaneni, was to plan, develop and implement a technically and financially

feasible Waste Management System in the areas. The system addresses the waste management needs and complies with the Waste Regulations 2000, as well as the draft National Solid Waste Management Strategy. The pilot projects developed, tested and evaluated a Waste Management Plan, an operational waste management system for waste collection and disposal, the establishment of an appropriate structure, organisation and staff to manage the system, a cost-recovery system/financing schedule and plan based on the polluter pays principle that will ensure the operation and maintenance of the waste management system, and implementation of a project related community awareness campaign.

Lessons learnt include:

Institutional Lessons

- The DPMO should be the responsible ministry, taking institutional responsibility for peri-urban and rural areas. The ministry will proactively pursue and provide support to the establishment of waste management systems in these areas, including the development of appropriate disposal sites.
- The DPMO currently does not have technical expertise on waste management, and will not develop this competency in the future. . A Memorandum of Understanding can be signed with MHUD to provide technical support in these areas.
- A non-profit legal entity within the community (Society/Cooperative) is needed to implement the system. This should be supported and guided by the DPMO.
- The newly appointed and trained Inkhundla officers can,, and should, take responsibility for monitoring and enforcement of the implementation of the systems.

Technical Lessons

- Establishment of waste collection systems is supported by the local communities.
- The mechanism to declare Waste Control Areas is available via waste regulations and a process must be developed to take this forward. It was not possible within the time constraints of the pilot project to establish this before project termination.
- The declaration of Waste Control Areas could be dovetailed with the controlled areas declared by MHUD.
- Communities indicated a great need for receiving waste services and also a willingness to pay. However residents have not yet started to pay even though they receive the service.
- The system must be based on a full cost recovery fee collection and willingness to pay is a critical success factor. The pilot project result was promising but more time is needed to create the necessary mind shift among all residents. None of the systems tested will be sustainable if the collection of fees fail.
- The system must be low key technology and therefore cheap to install and easy to operate.

- A very strong awareness and education programme needs to be implemented to ensure full participation by all citizens.
- Training programmes on waste management, as well as business- and resource management (package), need to be developed and made available by the SEA. These packages need to be amended for each area to suit the specific circumstances.
- Waste recycling is definitely an option once a system has been established and should be promoted.

2.1.4.4 Recycling (Buy Back Centre)

The objective of the pilot project was to establish, maintain and evaluate a recycling system in Mbabane. The waste included all post consumer packaging and commercial waste streams, as well as waste paper from government offices. The project included: - an awareness campaign, assessments of markets and facilities, areas of coverage, roles of government and local authorities, licensing and establishment of the buy-back centre, facilitate and support collection and recycling of recyclable waste from government offices, commercial centres and other sources.

The lessons learnt that are of strategic importance includes:

Institutional Lessons

- The positioning of the Buy-Back Centre must be under the supervision of the Local Authority or Inkhundla.
- As MHUD is the line ministry responsible for local authorities, they will be responsible for promoting recycling with local authorities on a national level.
- A recycling forum for Swaziland would be of support to the recycling industry and should be strongly pursued by the SEA.

Technical Lessons

- The Buy Back Centre can operate under the waste management licence of the relevant local authority.
- Providing that the Buy Back Centre is operated correctly, the viability and sustainability is high based on local support it received. .
- Operators must be trained correctly to ensure the sustainability of the system. Such a training package should be developed by MHUD.
- A strong awareness programme is needed to ensure full support from the public.
- Involvement of public institutions like schools and churches should continuously be encouraged.
- The Basel Convention must be signed as soon as possible to make provision for the transport of hazardous materials e.g. oil and batteries, to South Africa.
- Economic incentives (e.g. deposit return systems and reduced fees payable for less waste generated) need to be developed by SEA to promote the recycling industry.

2.2 Strategising for a National Solid Waste Management Strategy

The project to develop a National Solid Waste Management Strategy was initiated on 1 April 2000. Financial support was provided by DANCED (now DANIDA) and the technical support provided by the Danish consulting company RAMBØLL (www.ramboll.dk). The development of the strategy was carried out in close co-operation with the Government of Swaziland and was anchored in Swaziland Environment Authority.

The project implementation was divided into four phases, namely. the Inception Phase (April 2000 – June 2000) , the Design Phase (June 2000 – May 2001), the Pilot Project Phase (February 2001 – June 2002) and the Fine-tuning Phase (July2002 – September 2002).

The process that was followed to develop the National Solid Waste Managements Strategy for Swaziland, was structured to make provision for active and continuous participation of the various stakeholders in Swaziland. These stakeholders represented a wide range of constituencies, including commerce and industry, government, non-governmental organisations (NGOs), civil society, and education. It was intended that the strategy would be developed within a Swaziland context, taking into account issues such as land tenure and the available institutional and resource base. The process also made provision for structured interaction with the various stakeholders through internal management review of documents, forums, meetings and workshops. This was achieved mainly through following a Logical framework Analysis (LFA) Approach.

The development of a National Solid Waste Management Strategy is a dynamic process. The Strategy is therefore a living document and will need revision at least every four years. The strategy represents a solid background for future initiatives concerning waste management in Swaziland.

2.2.1 The Waste Hierarchy

The waste hierarchy, illustrated below, has been used as the core around which the strategy and the priority initiatives are presented. The strategic approach applied for the development of the strategy is based on the internationally recognised waste hierarchy, which includes Waste Prevention, Recycling, Collection and Transport, Treatment and Disposal. Even though the waste management fraternity in both developed and developing countries know the components of the waste hierarchy , its use in developing the Strategy ensured that the focus is on waste prevention (preventing the generation and minimising the waste that is being generated) as a first priority. Thereafter, would follow reuse and recycling of waste (utilising waste as a resource) and finally treatment and disposal of the remaining waste. It also ensures a holistic and integrated approach as all links in the waste management cycle are considered and incorporated.

The waste hierarchy is core to the concepts of *cradle to grave* (from generation to disposal) and *Sustainable Development* in waste management. The waste hierarchy approach has resulted in reductions in the amount of waste disposed of at landfill sites and the reduced utilisation of primary resources, such as wood (trees). It has also resulted in an increase in the utilisation of waste as a resource, for example for raw materials, and heat and electricity, in countries where this approach has been adopted. Companies have also adapted their manufacturing processes and substituted their raw materials to prevent hazardous waste being generated and, in some cases, to improved quality of the final product. Currently, the focus of waste management in most developing countries (including Swaziland) is however still on collection and disposal of waste (impact management and remediation).

<table>
<tr><th colspan="3">WASTE HIERARCHY</th></tr>
<tr><td>Cleaner Production</td><td>Prevention</td><td rowspan="4">Waste Minimisation</td></tr>
<tr><td rowspan="3">Recycling</td><td>Re-Use</td></tr>
<tr><td>Recovery</td></tr>
<tr><td>Composting</td></tr>
<tr><td>Collection</td><td>Transport</td><td rowspan="5"></td></tr>
<tr><td rowspan="3">Treatment</td><td>Physical</td></tr>
<tr><td>Chemical</td></tr>
<tr><td>Destruction</td></tr>
<tr><td>Disposal</td><td>Landfilling</td></tr>
</table>

Standard terminology for the Waste Hierarchy

The *waste hierarchy* is a hierarchical structure, where the highest priority must be given to the prevention/minimisation of waste. If the prevention/minimisation option is neither practical nor technically or socio-economically feasible, then other solutions have to be considered, for example the re-use or recovery of the waste. If re-use or recycling are not feasible, different treatment alternatives must be considered.
Through the application of this hierarchical approach and the process of elimination, the best practical environmental and locally feasible solution with the least negative impact on the environment for any particular waste stream will be selected.

2.2.2 The Waste Management Tools

For any waste management system to work, three critical strategic management tools must be implemented. The ***Waste Management Planning System*** is a

management tool by which national and local authorities can identify, plan and co-ordinate investments into waste management. The ***Waste Information System (WIS)*** is an information system, whereby information on general and hazardous waste is captured. The ***Registration System for Special Wastes*** **(RSSW)** is also an information system, but dedicated to the registration, transport and monitoring of hazardous waste. All of these tools have been included in the formulation of the strategy and initiatives. Central to the WIS and the RSSW, is the ***Waste Categorisation System.*** The Waste Categorisation system is used to define and categorise different waste types to enable officials to manage the waste effectively. The system is based on two divisions, namely Source of Waste and Impact on the Environment.

Source of Waste:

- **Household Waste sources** –from any of the following premises: - a home (a building or self-contained part of a building which is used wholly for the purposes of living accommodation); a caravan; a mobile home; premises forming part of a university or school or other educational establishment; premises forming part of a residential home, hospital or nursing home; litter and garden waste. Commercial, industrial, hazardous waste, sand earth and effluent are excluded
- **Commercial Waste sources** –from premises used wholly or mainly for the purposes of a trade or business or for the purposes of sport, recreation or entertainment. Household waste; industrial waste; waste from any mine or quarry, and waste from premises used for agriculture are excluded.
- **Industrial Waste sources** –from factories or from any premises used for the purposes of, or in connection with, the provision to the public of: transport services by land, water or air; gas, water, electricity or sewerage services; or postal or telecommunications; construction and demolition rubble.
- **Health Care Waste (formerly Clinical waste) sources** –from hospitals, clinics, nursing homes, doctor's offices and consulting rooms, medical laboratories, medical research facilities, traditional healers and veterinarians.
- **Mining Waste sources –**from mines and quarries, including rock spoil, stone tailings, sand and soil.
- **Agriculture Waste sources –**from premises used for agriculture, the processing of agricultural produce, the storage of agricultural chemicals, including remedies, pesticides and fertilisers.
- **Residual Waste sources -** from the processing of waste streams at waste treatment facilities in order to extract recyclable, (including biodegradable), waste material and reduce the hazardous nature of the waste.

Impact on the Environment:

- **General Waste -** General waste is defined in the Waste Regulations 2000 as waste that does not exceed any of the threshold criteria for certain hazardous properties set out in Part III of Schedule Three, i.e. due to its composition and characteristics it does not pose a significant threat to public health or the environment, if managed properly. However, it should be noted that general waste will produce leachate, landfill gas, residual waste, effluent and flue gas

when treated and disposed of. These products of waste treatment and disposal have to be managed properly to avoid pollution of the environment.

- **Special Waste:** Special Waste is defined in the Waste Regulations 2000 as being hazardous and clinical waste (now redefined as health care risk waste) - with the potential, even in low concentrations, to have significant adverse effects on public health and/or the environment. Special waste is further categorised in the Waste Regulations 2000 as follows:
  - **hazardous waste** - any waste which is listed in Part I of Schedule Three and to which a six digit waste code has been assigned in that Schedule, and which displays any of the properties specified in Part II of Schedule Three; or which displays any of the following hazardous properties as defined therein:
    - highly flammable (only liquid substances and preparations having a flash point below 21°C, irritant, harmful, toxic, carcinogenic or Corrosive. Hazardous wastes are found in all the sources of waste, i.e. household, commercial, industrial, agriculture, mining and waste treatment facilities;
  - **health care risk waste** - waste produced by hospitals, health care facilities, nursing homes, doctor's offices and consulting rooms, medical laboratories, medical research facilities and veterinarians which is infectious or potentially infectious, and without limitation, includes: microbial wastes such as cultures and stocks of infectious wastes; human blood and blood products; pathological wastes of human origin such as tissues, organs and body parts; contaminated animal wastes including animal carcasses, body parts and bedding which have been exposed to infectious agents; being infected with a disease; and contaminated and uncontaminated sharps including hypodermic needles, scalpels and broken glassware; time expired antibiotics, drugs, and other medical or veterinary remedies, as well as radioisotopes used in chemotherapy and radiography.

An overview of the structure of the Waste Categorisation System is presented in Volume II Annex 4 of this document. A list of important definitions is to be found in Volume II, Annex 3 of this document.

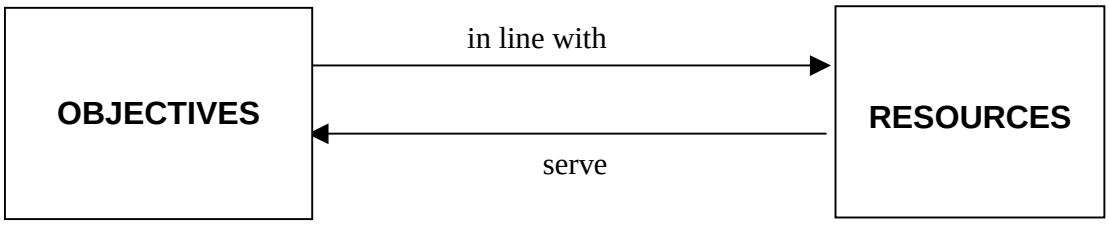
2.2.3 Matching Objectives and Resources

A strategy must contain a goal, or set of ***objectives***, and the requisite ***resources*** to achieve those objectives. Furthermore, a strategy would comprise ***capacitating aspects,*** by which the resources are transformed to achieve the intended objectives.

Four of the most basic capacitating aspects have been illustrated in the figures presented below. These figures provide six elements (Objectives, Resources, Institutional Framework and Structure, System Tools, Skills and Awareness and Incentives) by which the strategy formulation process can be described and discussed, particularly from an institutional perspective.

Matching objectives and resources

The *optimal* strategy is one which achieves the resource transformation, i.e. the capacitating aspects, in such a way that the *agreed upon objectives* are achieved with the *least amount of resources*.

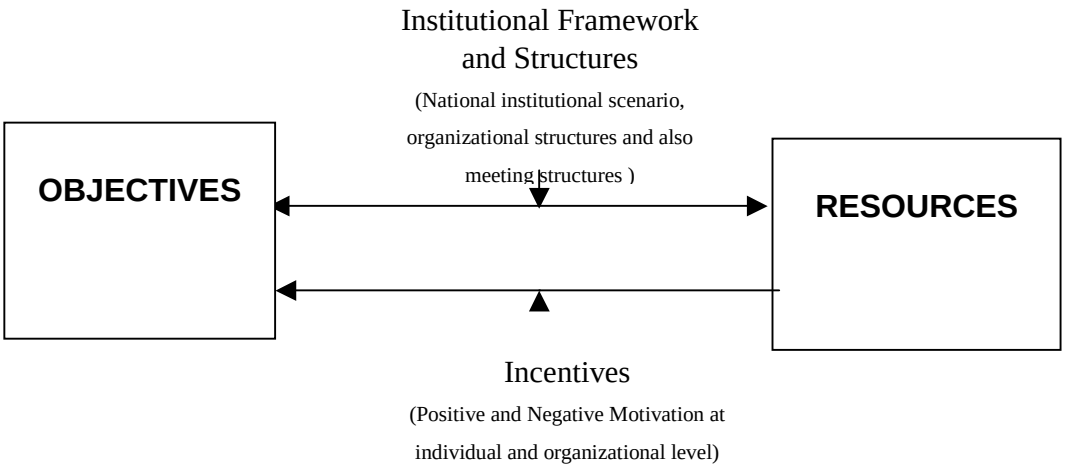


Transforming the resources to objectives by organised and motivated people

It is people that transform the resources to meet the objectives. This process can be described in the way that the work is organised (i.e. the Institutional Framework and Structures), and in the way it is motivated (i.e. the Incentive Structure).

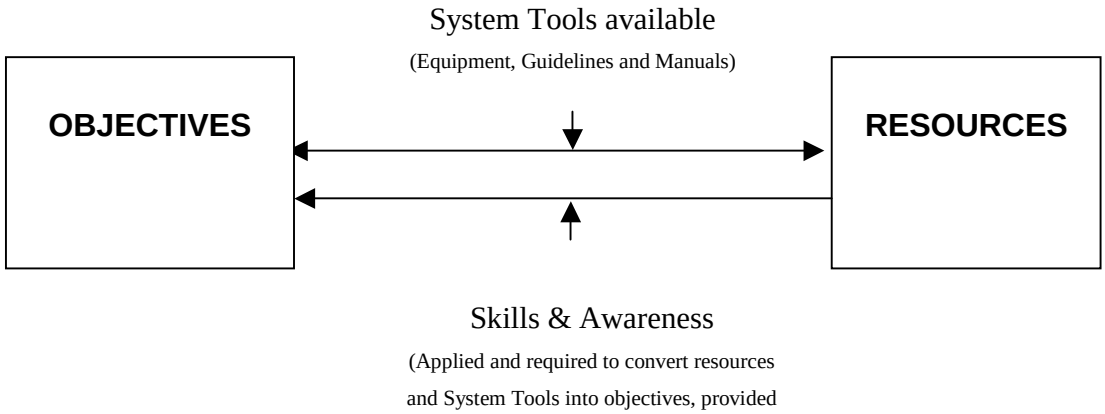
The **Institutional Framework and Structures** is the network of relevant roleplayers (e.g. SEA, MHUD, MHSW and the Local authorities), and the nature and frequency of their interactions (e.g. co-operative government agreements and committees).

The **Incentives Structure** is the different mechanisms by which people are motivated (material and otherwise) to act, individually and collectively.



Skilfully applying technologies

Two other "capacitating" aspects of human effort are the **system tools** applied to reach the objectives and the ***skills*** required to handle those tools. System tools are not only the hardware assets and instruments, such as disposal sites, trucks and incineration facilities, but also include the software tools, such as legal instruments, guidelines, manuals, procedures, formats



It is important to note that ***these elements are interactive.*** This interdependency can be highlighted by considering some of the elements in pairs:

1. Resources have to match the objectives, or else the latter have to be adjusted to match the former.
2. There is no point in contemplating the best division of work, if there is no motivation to work. Conversely there is no reason to work, if the labour is not organised appropriately.
3. If skills are not available, or acquirable, to handle the tools, the tools have to be adjusted to fit the available skills.

The approach outlined above enables an assessment to be made of the current institutional framework for waste management and allows for a modification of the level of ambition of the strategy in order to ensure that it will be accessible and implementable.

2.2.4 Priority Initiatives and Capacity Development Planning

A number of ***technical priority initiatives*** have been developed within the Strategy (See Chapter 3, Volume I and Chapter A2, Volume II). These initiatives are directly linked to the various management systems and waste hierarchy components of the strategy. The priority initiatives have been categorised as *short-term* initiatives (up to four years after official approval by Cabinet of the NSWMS) and *long-term* initiatives (from five to ten years after Cabinet approval). This prioritisation has been undertaken to assist in the implementation of the strategy. A detailed description of the initiatives is given in Volume II, Annex 2, including the time schedules, cost estimate and enabling mechanisms.

A first draft ***Capacity Development Plan***, which is linked to both the priority initiatives for each waste management tool, and the waste hierarchy, has also been compiled. The Plan addresses capacity development in all the relevant sectors, including the different ministries, local authorities, civil society and the private sector. This Plan is described in Chapter 4 of Volume I and in Volume II Annex 1.

3. The National Solid Waste Management Strategy

The Government of Swaziland has expressed a desire for the development of a National Solid Waste Management Strategy that has a clear **"VISION",** but which at the same time is immediately accessible for implementation by taking a **"PRACTICAL"** and realistic approach. A process-oriented approach was followed to develop the National Solid Waste Managements Strategy for Swaziland, which was structured in such a way that it made provision for active and continuous participation of all the various stakeholders in Swaziland. These stakeholders represented a wide range of constituencies including commerce and industry, government, NGO's, civil society, education etc. It was a deliberate attempt to ensure that the strategy is developed within a Swaziland context eg. land tenure, institutional and resource base. The process also made provision for structured interaction with the various stakeholders through internal management scrutiny, forums, meetings and workshops. This was done mainly through following a Logical framework Analysis (LFA) Approach. The development of the strategy is seen as a dynamic process that will continue after the completion of the project. The Strategy is therefore also seen as a living document and will need revision at least every four years. The strategy only represents a framework for waste management in Swaziland within which specific action plans could be developed. This would ensure a holistic approach towards waste management from all sectors in the country.

A sustainable waste management strategy is one that recognises amongst other factors, the following as necessary elements for a starting point:

- Appropriateness – A waste management system cannot be sustainable if it is not appropriate, as continuous high inputs would be needed to keep it going.
- Dynamic nature of waste issues – An appropriate waste management system must take cognisance of dynamic issues, such as the culture of the people, available technology, complexity of waste streams, and level of national development.
- Priorities at various levels – Government and local communities will have specific problems that would determine their priorities. Hence, the need to integrate the implementation of the waste management system into the livelihood of society.
- Political support – Politicians need to be informed and educated about the environmental and economic impact of waste.
- Legal requirement – An appropriate legal framework must support the implementation of a waste management strategy to ensure suitable standards and standardised systems. A legal system without the necessary enforcement tools should be discouraged.

This chapter (Chapter 3) provides an overview of the proposed objectives and strategic intervention approach that need to be implemented in order to achieve environmentally sound and sustainable solid waste management in Swaziland. Chapter 3, supported by Volume II Annex 2, outlines the practical aspects of the strategy and the specification of a number of "priority initiatives" that are recommended for implementation within three stages of a 12-year time horizon.

Strategy objectives have been formulated at two levels. The ***overall objective*** for the National Solid Waste Management Strategy is:

"to develop, implement and maintain an integrated waste management system, that will reduce the adverse impacts of all forms of solid waste, so that social and economic development in Swaziland, the health of its people and the quality of its environment and its resources benefit".

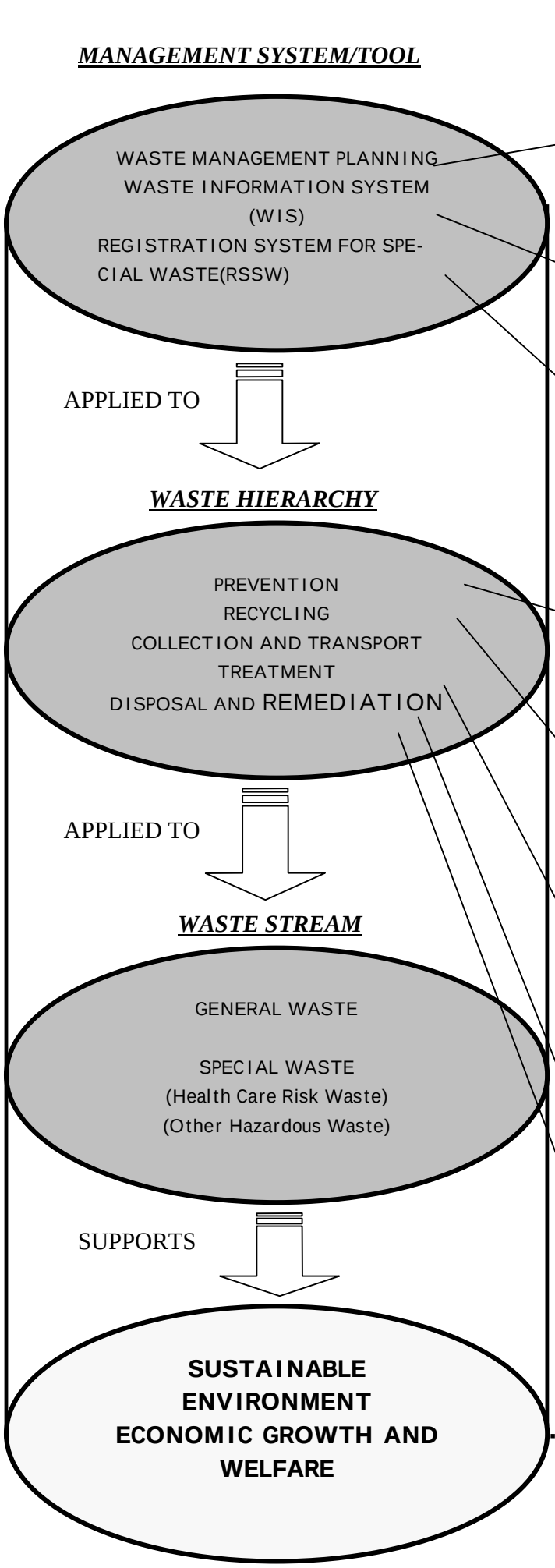
Secondly, ***specific objectives*** have been developed for the proposed interventions. A summary of the strategic intervention approach and related objectives is illustrated in the figure underneath.

The Strategy has been developed as ***"Interventions"*** towards the ***"Waste Hierarchy",*** (prevention, recycling, collection and transport, treatment and disposal) in order to address solid waste management issues in the two main ***"Waste Streams",*** namely***" general waste"*** and ***"special waste"*** (as defined in the WR2000). However, in order to ensure sound financial, socio-economic and technical management within the hierarchy and the two waste streams, it was considered necessary to also develop a strategy towards the institutionalisation of three key management tools i.e**.. *"Waste Management Planning", "Waste Information System (WIS)" and a "Registration System for Special Waste (RSSW)".*** The three tools are interlinked, and will be developed simultaneously, where possible. Within the proposed short-term horizon (2003-2006), the three management tools will gradually become central to integrated waste management in Swaziland.

For each of these interventions, a strategy and short-term (from strategy approval – four years after Cabinet approval) and long-term (five to ten years after approval) initiatives were formulated. These timeframes were selected by taking into account existing enabling mechanisms, such as capacity and structure at all levels of government; legislation; guidelines and appropriate standards development, as well as political and financial constraints. After categorisation of the initiatives within time frames, a series of criteria were developed during the stakeholder workshops for the final prioritisation of initiatives in the NSWMS. This resulted in a series of tables that facilitated the selection of the ***priority initiatives*** that would realistically provide the most support for each strategic element (see Identify Preferred Solutions Document Output Number 12). Priority initiatives were identified and evaluated at the workshops using the criteria shown in the table below:

Criteria	Relevance
Solve urgent environmental and health problems	
Give direct, visible and immediate results	
Ensure environmental sustainability	
Enhance prevention and recycling	
Address waste issue that is annoying to the public	
Compliance with international conventions	
Low investment costs	
High operational costs	
Labour intensive technology	
Create jobs in the waste sector	
Improvement and change of technology	
Sufficient legislation in place	
Administrative burden is low	
Create capacity (trained staff) within the waste sector	
Create public awareness	

An assessment of the capacity within the different institutions currently managing waste, indicated gaps and barriers that must be overcome in order to implement the NSWMS. This Strategy includes a number of priority initiatives – those for short-term implementation and those for the long-term implementation. The priority initiatives are described in detail in Volume II Annex 2.



SPECIFIC STRATEGY OBJECTIVES

"To develop and institutionalise a waste management planning system, which covers all sources and types of waste from generation to final disposal, and which would be fully operational in the short term, when based on reliable waste information provided through the WIS.

"To develop and institutionalise a Waste Information System (WIS) at local and national levels for all types of waste, which will in the short term constitute a main data source for the preparation of detailed local and national waste management plans"

"To develop and institutionalise a Registration System for Special Waste (RSSW), which in the short term will provide for effective control of hazardous and health care risk waste from generation to final disposal in order to ensure safe management of special waste and to meet the requirements of the Basel Convention."

"To identify and make available technological options and supporting incentives that will minimise the generation of waste from industrial, commercial and other enterprises including SMEs."

"To organise the existing recycling industry and to make provision for further recycling of both general and hazardous waste, through the implementation of awareness, information and training campaigns, support for the Cleaner Production/Waste Minimisation Centre, new regulatory and incentive instruments and the implementation of new specific recycling activities"

"To increase the collection of general waste in formal and informal urban areas, waste control areas, peri-urban and rural areas and, if deemed feasible, by means of income generating collection approaches and the use of transfer stations".
"to develop and install a system for the safe collection, transportation and storage of hazardous and health care risk waste"

"To provide for the safe treatment of hazardous and health risk waste in accordance with international standards".

"To develop and implement a coherent solid waste management disposal and remediation system for general and hazardous

"To develop, implement and maintain an integrated waste management system, that will reduce the adverse impacts of all forms of solid waste, so that social and economic development in Swaziland, the health of its people and the quality of its environment and its resources benefit"

The next step in the implementation of the priority initiatives will involve detailed planning through the development of Action Plans.

The **"implementing and enabling mechanisms"** required to realise the strategy are many and varied. They include: - the preparation of legislative instruments and guidelines, development of monitoring and enforcement systems and procedures, training, information and awareness programme design and implementation, review of institutional portfolios and responsibilities, a range of multi-facetted feasibility studies to provide a sound basis for investments into waste management related infrastructure and equipment. The mechanisms are outlined below, but are described in more detail in Volume II, Annex 2, for each overall initiative.

It is also important to identify the **"underlying assumptions"** related to the technical, financial, socio-economic and political proposals made and particularly the **"killer assumptions".** . A review of the Strategy revealed a number of important assumptions that need to be tabled at a high level. In particular, it is necessary to highlight three identified killer assumptions, namely: (a) the implied increase in staff complements at SEA and MHUD, (b) the assumption that Swaziland will ratify the Basel Convention and (c) that the requisite financial, institutional and other resources are identified for the extension of waste management services into Swazi Nation Land. A further elaboration of the enabling and sustaining elements of the Strategy has been provided in Chapter 6.

3.1 The Waste Information System Strategy

The section describes the *Waste Information System* (WIS) and the *Registration System for Special Waste* (RSSW), which is a subset of the WIS. The WIS is the future information database for Swaziland and the RSSW is the international registration system for special waste, which specifically aims at meeting the Basel Convention registration requirements.

Strategy Intervention Objective(s)
"To develop and institutionalise a Waste Information System (WIS) at local and national level for all types of waste, which will constitute a main data source for the preparation of detailed local and national waste management plans"

"To develop and institutionalise a Registration System for Special Waste (RSSW), which will by 2007 provide for effective control of hazardous and health care risk waste from generation to final disposal in order to ensure safe management of special waste and to meet the requirements of the Basel Convention."

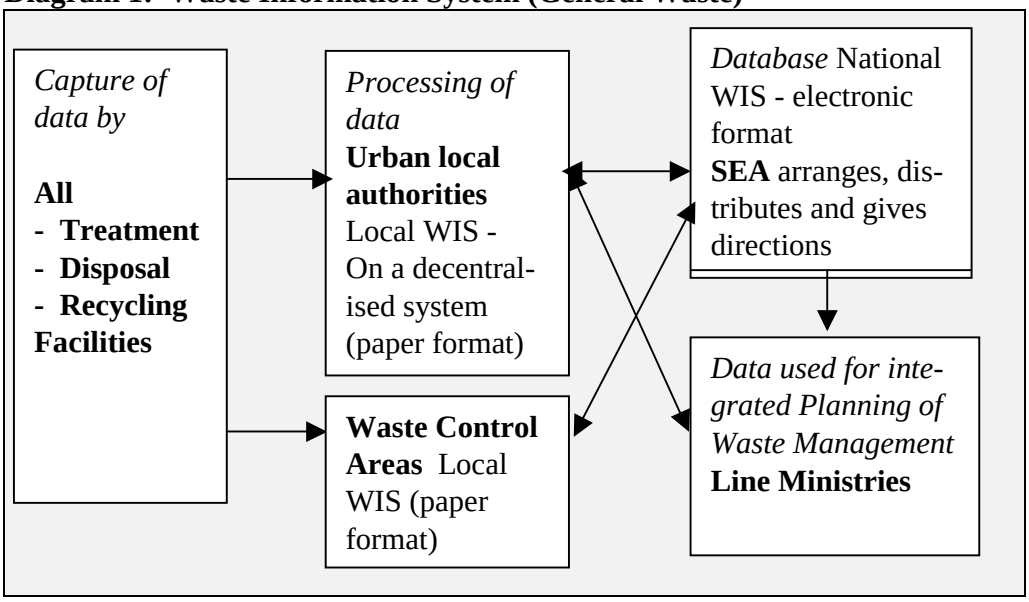
Strategy Intervention Approach

Overview of the Waste Information System (general waste)

In the short-term, SEA will amend the legal basis for the **Waste Information System**. The system will consist of a central database, where waste data obtained from all waste disposal facilities[5] and local waste disposal sites, will be captured. At a national level, the database will be operated and maintained by the SEA. A standardised format will be used to ensure uniform reporting from the waste disposal facilities. The waste regulation authorities (i.e. institutional structures responsible for waste management in urban areas, waste control areas and other areas) will ensure that data are captured by, and provided from the waste disposal facilities and local waste disposal sites within their area of jurisdiction. The waste regulation authorities will also be responsible for processing the data and for reporting quarterly to the SEA and their respective line ministries. The system will be fully operational for waste management planning purposes in the long-term.

On the basis of the incoming reports, the SEA will be able to issue annual reports on waste and carry out projections for waste generation. The line ministries will use the data to compile national integrated waste management plans. The waste regulation authorities will use the data in the preparation of local waste management plans.

Diagram 1: Waste Information System (General Waste)



Overview of Registration System for Special Waste (RSSW)

SEA established the legal basis for the RSSW during 2000. The registration system will consist of a central database containing information pertaining to special waste flows in Swaziland, as well as information on the import and export of the waste. All generators (with the exception of small generators), waste collectors, transporters and treatment and disposal facilities of special waste will be required to register before the end of 2002 and submit data and information annually to the

[5] The Terms used in this section are defined in Volume II Annex 3

SEA. An outline of the RSSW registration system is illustrated in Diagram 2. The RSSW is expected to be fully operational by 2007.

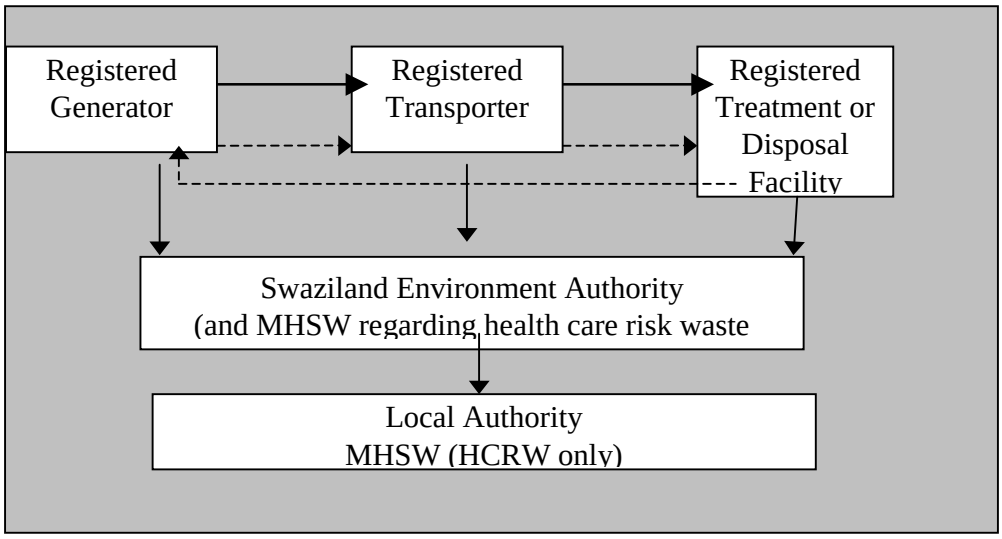
A consignment note must be used to track each load of special waste from generator to the final disposal facility. The possibility of specifying specific routes for transport of special waste requires investigation. Emergency response programmes will also be implemented by the SEA. The system will be continuously revised and adjusted.

The generator, transporter and disposer of special waste has the Duty of Care[6] to ensure that waste is managed correctly and is only handled, transported, stored, treated and disposed of by registered or permitted companies or facilities. The cradle to grave principle will apply and will be enforced in all aspects of special waste management. Product stewardship will be promoted within industry through the implementation of awareness programmes.

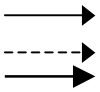
The SEA will compile a statistical report on special waste statistics on an annual basis, which will also include storage and the import and export of special waste, and will make this available for relevant stakeholders. The status report will be submitted to the local authorities for local waste management planning purposes. This report will also be the point of departure for the development of the Integrated National Hazardous Waste Management Plans by the SEA and National Health Care Risk Waste Management Plans by the MHSW.

The priority initiatives formulated for the waste information system and the registration system for special waste are outlined below and are described in detail in Volume II Annex 2.

Diagram 2: Registration System for Special Waste (RSSW)



[6] Please refer to Definition of Terms in Volume II Annex 3



Priority initiatives

Waste Information System and Registration System for Special Waste

WASTE INFORMATION SYSTEM (WIS)
Short-term (Approval – 4 years after Cabinet approval) ➢ SEA to initiate amendments to the WR2000, where necessary. ➢ Agreement on institutional roles and responsibilities related to the WIS, as proposed in the Strategy. ➢ Institutions and staff involved in data registration, collection and submission to the SEA trained to meet their WIS responsibilities. ➢ Agreement on alternative institutional arrangements to compensate for the lack of available local capacity to provide the required WIS information. ➢ Waste Regulation Authorities provide quarterly waste management data to SEA in the agreed format.
Long-term (5 – 10 years after Cabinet approval) ➢ WIS operational and all data entered into the electronic database by SEA. ➢ SEA issues Annual Reports on waste management. ➢ SEA convenes a Waste Management Forum. ➢ SEA issues projections for waste generation to all waste regulation authorities. ➢ WIS database operated, maintained and continuously developed by SEA and the required institutional arrangements consolidated. ➢ WIS data used for local and national waste management planning.

REGISTRATION SYSTEM FOR SPECIAL WASTE (RSSW)
Short-term (Approval – 4 years after Cabinet approval) ➢ SEA to identify the required amendments to the WR2000. ➢ Agreement on institutional roles and responsibilities related to the RSSW. ➢ Institutions involved in data registration, collection and submission to the SEA trained to meet their RSSW responsibilities. ➢ Agreement on alternative institutional arrangements to compensate for the lack of available local capacity to handle RSSW responsibilities. ➢ Swaziland government to ratify the Basel Convention. ➢ Registration of Special Waste generators, transporters, importers, exporters, and treatment and disposal facilities, with SEA.

- Annual submission of data to SEA, by those registered with the RSSW.
- Training and Information session held for those registered with the RSSW on a regular basis.
- Consignment note made operational.

Long-term (5 – 10 years after Cabinet approval)

- An emergency response programme implemented.
- SEA compiles annual report on hazardous waste.
  MHSW compiles annual report on Health Care Risk Waste.
- RSSW operated, maintained and continuously developed by SEA.
- RSSW institutional arrangements consolidated and maintained.

Priority Initiatives completed:

Waste Information System

- The electronic database for the WIS was established during 2001/2.
- SEA commissioned a WIS system development and design, including an implementation and user manual..
- User and Implementation Manual for WIS electronic database has been completed.
- Waste Categorisation System has been developed.
- SEA staff trained in the use and maintenance of WIS and electronic database.
- Waste Regulations 2000 were approved by Cabinet during April 2000.
- Training on the operation of the WIS conducted during 2002.
- All available data on general waste was captured in the WIS during 2002.

Registration System for Special Waste.

- The electronic database for the RSSW was established during 2002.
- SEA commissioned a RSSW system development and design that meets with international requirements. This includes “registration forms”, a “consignment note” and a “hazardous waste classification system”. Alignment and interfaces between the WIS electronic database and the RSSW has been ensured.
- User and Implementation Manual for the RSSW has been completed.
- Training of SEA staff on the operation of the RSSW was conducted during 2002.
- All available data on Special Waste was captured in the RSSW during 2002.
- The design and testing of a RSSW electronic database has been completed.

Proposed Capacitating Interventions

The following proposals outline the overall capacitating interventions required for the implementation of the WIS and RSSW in Swaziland.
The specific capacitating interventions that relate to the institutional framework are discussed in Volume I Chapter 4 and described in more detail in Volume II Annex 2.

The enabling mechanisms are summarised under the following main headings:

Structure, Staff and Interrelations

- Adequate time allocated to staff at all local and national planning agencies for WIS and RSSW purposes.
- Support system provided by SEA and line ministries must be formalised, the required expertise and capacity built, and the resources secured.
- Responsibilities for the WIS to be designated to the staff and organisational entities at the local authority, national authority and private sector.
- Finances must be secured for the WIS and RSSW operation and maintenance.
- Establishment of a structure that provides for public access to waste information.
- Co-operative Government Agreements formalised (where necessary) in order to provide for an effective sharing of WIS and RSSW information.
- SEA must take a major enabling responsibility towards national and local agencies, as well as the private sector in order to introduce and institutionalise the WIS and RSSW systems.
- Public:Private partnerships need to be established in order for the RSSW to function.

System tools (Equipment, Guidelines and Manuals)

- WIS and RSSW Systems for use at disposal sites, industry, local authority and national level.
- WIS and RSSW Guidelines, Manuals, Electronic and Manual Forms (of an enabling, user-friendly, how-to-go-about nature).
- Computer and required WIS and RSSW application programmes, available within SEA (and other national and local authorities, where appropriate).
- Manual WIS and RSSW systems available and disseminated relevant stakeholders.
- Declaration of Waste Control Areas to provide for organisational WIS entities.
- Amendment to the WR2000, where necessary.

Skills Development and Awareness Raising

- WIS and RSSW Information, Training and Coaching programmes developed and facilitated through the most appropriate structures, for example the UNISWA, Swaziland Federation of Employers, the Swazi Chamber of Commerce and Industry and/or sector representative bodies.
- Staff at national, local authority, disposal site, factory, transporter etc. must be trained/coached in the WIS and RSSW, where appropriate.

Incentives

- Environmental awards/recognition for efficient and timeous information management by institutions.
- Enforcement towards agencies not fulfilling their WIS and RSSW responsibilities.

3.2 Waste Management Planning Strategy

Strategy Intervention Objective(s)

"To develop and institutionalise a waste management planning system which covers all sources and types of waste from generation to final disposal and which would be fully operational 10 years after approval by Cabinet when based on reliable waste information provided through the Waste Information System and the Registration System for Special Waste".

Strategy Intervention Approach

The strategy is to instil a waste management planning system that will be operational at both the national and local government levels.

The **local waste management planning** framework for urban, peri-urban and rural areas is as follows:

Local waste management plans will be developed for *urban local authorities* i.e.. City Councils, Town Councils and Town Boards. Waste management plans will also be developed for *Waste Control Areas* that may include company towns; peri-urban areas and rural areas and commercial nodal points in rural areas. Individual mines can also be declared as waste control areas in order to secure proper waste management planning for these sites.

Included in the Strategy, is the implementation of enabling mechanisms that will ensure planning support for Urban Local Authorities and Waste Control Areas that currently do not have the necessary institutional capacity. The NSWM Strategy also recommends that full advantage be taken of the provision made in the Waste Regulations 2000, to declare certain areas as *Waste Control Areas.* In the short-term the waste management plans will be based on existing data. In the longer-term, the plans can increasingly be improved and justified by waste data captured through the Waste Information System.

Local waste management plans will be prepared every four years. They will contain detailed plans that cover a 4 year period and also a 12 year long-term plan. The plans will be based on the Waste Hierarchy and are for the Strategy period only envisaged to cover general waste, including the hazardous household waste fraction. The local waste management plans will, as a minimum, cover the following: - Short-term and long-term planning for general waste generated from all sources,

such as households, commerce, trade, industry, agriculture, mining, healthcare facilities and littering; Plans for public awareness campaigns; waste approach/technology investments; and proposed local legislation, for example by-laws. Local waste management plans will require stakeholder participation and consultative processes, and approaches to ensure this need to be developed.

Regional planning and co-operation (e.g. waste catchment areas and regional waste disposal facilities) is the responsibility of the relevant local authorities.

Local waste management plans will be submitted to MHUD for integration with other local authorities and forwarded to the SEA for approval.

The **national waste management planning** framework is as follows:

- SEA will be responsible for the compilation of an overall National Integrated Waste Management Plan, covering all types and streams of waste.
- SEA will be responsible for the compilation of a National Hazardous Waste Management Plan, covering both hazardous waste from industry, commerce, trade, agriculture and mining.
- MHSW will be responsible for the compilation of a National Health Care Risk Waste Plan, covering health care risk waste from hospitals, clinics and veterinarians, as well as the general waste component from such places. To support this, the MHSW will prepare guidelines for medical and veterinary institutions for waste management planning at the local level.
- MHUD will be responsible for the preparation of a National General Waste Management Plan, covering waste from households and also general waste from clinics, commerce, industry, agriculture and mining.

From a national perspective, the **national waste management plans** will, include:

- The identification of opportunities and plans for the development and use of common /regional waste management facilities. This may be in terms of sharing equipment and plants through the co-operation of several formal and traditional local authorities.
- Plans for the safe collection and transportation of hazardous and HCR Waste..
- Plans for national or regional hazardous waste treatment and disposal.
- Provision of guidelines to Local Authorities for the next generation of local plans for waste management.
- Routine systems to ensure the co-ordination between the local and national planning cycles and the required feedback. Such a system requires that the SEA will have overall responsibility for the design, co-ordination and implementation of the waste management planning system and process. This will include systems design, development of guidelines, identification of appropriate institutional arrangements and related capacity development. SEA will undertake this responsibility under Co-operative Government Agreements with the MHUD, MHSW and the DPMO.

SEA will be the co-ordinating body for all plans and will be responsible for the timely and appropriate dissemination of the integrated plans and other information to the different national planning stakeholders.

A phased approach will be used for the implementation of the waste management planning system, starting with the development of Local Waste Management Plans and progressing to the development of National Waste Management Plans. Local plans will be monitored regularly by the respective line ministry. Each line ministry will prepare Environmental Management Plans that contain waste management plans. The SEA tool for monitoring is the approval of these plans.

The priority initiatives formulated for the waste planning strategy are outlined below and described in detail in Volume II Annex 2.

Priority Initiatives

Integrated Solid Waste Management Planning

LOCAL WASTE MANAGEMENT PLANNING
Short-term (Approval – 4 years after Cabinet approval) ➢ Determine institutional arrangements and responsibilities for local waste management planning for urban local government (City Councils, Town Councils and Town Boards) in accordance with the agreed institutional framework in the Strategy. ➢ Determine institutional arrangements and responsibilities for local waste management planning for waste control areas and company towns. ➢ Determine institutional arrangements and responsibilities for local waste management planning for peri urban and rural areas. ➢ Based on the WR2000, SEA will prepare guidelines for the local waste management plans. ➢ City Councils will compile waste management plans. ➢ Town Councils and Town Board will compile waste management plans (possibly with assistance by MHUD). ➢ Company Towns will compile local waste management plans (possibly with outside assistance). ➢ Local waste management plans will be compiled for Waste Control areas and other peri-urban and rural areas. (This will possibly be the responsibility of DPMO but undertaken through special institutional arrangement that could differ). ➢ SEA will prepare updated guidelines and enabling instruments for the four year and ten year local waste management plans.
Long-term (5 - 10 years after Cabinet approval) ➢ City Councils will compile four year and ten year waste management plans. ➢ Town Councils and Town Board will compile four year and ten year waste management plans (possibly with assistance by MHUD).

- Company Towns will compile four year and ten year waste management plans (possibly with outside assistance).
- Four year and ten year local waste management plans will be compiled for peri-urban and rural areas (possibly with assistance from national agencies, such as the DPMO and MHUD).
- Local waste management plans finalised and implementation commenced and preparations made for the next generation of plans.

NATIONAL WASTE MANAGEMENT PLANNING
Short-term (Approval – 4 years after Cabinet approval) ➢ Determine institutional arrangements and responsibilities for National Waste Management Planning undertaken by SEA, MHUD, and MHSW (includes involvement of MOAC, MNRE and other national agencies). ➢ SEA will develop comprehensive guidelines and enabling mechanisms for National Waste Management Planning and issue them to line ministries (particularly MHUD, MHSW and DPMO). ➢ SEA will convene working groups pertaining to general and special wastes to be headed by the respective responsible national agency (SEA, MHUD, MHSW and DPMO) to commence the development of National Waste Management Plans. ➢ Consultations on the three national plans with the relevant constituencies to provide for agreement and co-ordination with Local Waste Management Plans.
Long-term (5 – 10 years after Cabinet approval) ➢ Ongoing National Waste Management Planning undertaken by SEA, MHUD and MHSW and DPMO. ➢ SEA will compile a National Hazardous Waste Management Plan. ➢ MHUD will compile a National General Waste Management Plan. ➢ MHSW will compile a National Health Care Risk Management Plan. ➢ Consultations on the three national plans with the relevant constituencies to provide for agreement and co-ordination with local waste management plans. ➢ SEA will compile a National Integrated Waste Management Plan for all wastes.

Proposed Capacitating Interventions

The following proposals outline the overall capacitating interventions required for the implementation of waste management planning in Swaziland.

The specific capacitating interventions that relate to the institutional framework are discussed in Volume I Chapter 4 and described in more detail in Volume II Annex 2.

The enabling mechanisms are summarised under the following main headings:

Structure, Staff and Interrelations

- Adequate time allocated to staff at all local and national planning agencies for planning purposes.
- Support system provided by SEA and line ministries must be formalised and resources secured.
- Waste management planning responsibilities must be designated to staff and organisational entities.

- Finances must be secured for the planning process.
- Establishment and/or identification of an existing appropriate Waste Planning Forum at intra and inter-institutional level that makes provision for stakeholder involvement.
- Inter-ministerial sub-working groups commissioned and members appointed.
- Decision taken regarding to what extent consultants will be used.
- Co-operative Government Agreements formalised (where necessary) in order to provide for effective co-ordination and overcome the problem of lack of planning capacity at certain institutions.
- SEA must take a major enabling responsibility towards all national agencies, which must in turn assume a similar responsibility towards their respective constituencies.
- Public:Private partnerships could be established both in relation to the use of consultants and the involvement of the private sector in the planning process.

<u>System tools (Equipment, Guidelines and Manuals)</u>
- Planning Systems for local and national waste management planning.
- Local and National Planning Guidelines and Manuals (of an enabling how-to-go-about nature) and specifying of minimum requirements.
- Declaration of Waste Control Areas.
- Legal instruments to provide for the planning system.

<u>Skills Development and Awareness Raising</u>
- Staff at both national and local level must either be trained/coached or a decision taken to obtain the necessary expertise through the use of consultants.
- Training, coaching and support structure and programmes formalised, staff designated and implementation plan elaborated.
- Organisation of national workshops and seminars on waste management.
- Attendance in international workshops and subsequent dissemination of information obtained to all stakeholders.

<u>Incentives</u>
- Sanctions developed towards agencies not fulfilling their planning responsibility.

3.3 The Waste Minimisation Strategy

As the term “Waste Minimisation” is a non-specific and broad Southern African terminology, the definition, understanding and breakdown of the term is included below.

Waste minimisation includes both the reduction of waste generated at source (waste prevention/source reduction), as well as reducing the amount of reusable materials that would otherwise go to landfills (through recycling). Reducing waste generation at source is primarily industry based and focuses on reducing both the amount and toxicity of the waste being generated. This could include activities such as, good

operating practices, raw material modification, process modification, product modifications and inventory control.

Recycling focuses on reducing the reusable materials in the waste streams. This could be undertaken by promoting separation of waste at source and providing opportunities to earn money from recyclable waste products. This could also be assisted by the duty of care principle, as well as product stewardship where industry can be compelled to take back the used and worn out products. The percentage of recyclable materials incorporated into products could also be prescribed to industry.

3.3.1 The Waste Prevention Strategy

Strategy Intervention Objective(s)

"To identify and make available technological options and supporting incentives that will minimise the generation of waste".

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In accordance with the waste hierarchy, waste prevention should be the key focus area of the Strategy. However, due to the current status of waste management, major investments in waste collection, treatment and disposal are needed in order to achieve a satisfactory coverage and implement proper procedures. Notwithstanding the importance of waste prevention, waste minimisation is the focus of this component of the waste hierarchy for the duration of this Strategy.

Strategy Intervention Approach

A *Waste Minimisation Centre (WMC)* will be established within the first two years of Strategy implementation in order to ensure a structured accumulation and dissemination of knowledge and experience about waste prevention/minimisation. The SEA, MEE, as well as industrial, commercial and SME representative bodies, will all play a major role by proactively providing information packages and presentations on waste prevention to industry.

In the long-term, the WMC should, be responsible for the establishment and implementation of *cleaner production clubs or forums* to support the dissemination of knowledge on prevention and minimisation of waste, primarily in the industrial sector. Simultaneously, larger industries will be sensitised and motivated to appoint *environmental officers* who will be responsible for promoting sustainable environmental management at each industry. It is the intention to promote *"good housekeeping"* with regard to water and energy consumption, processes to reduce raw materials, as well as waste minimisation and prevention.

Industry should be required to practice *'product stewardship'* and recover certain wastes (producer responsibility) for waste recycling. Commerce should similarly be sensitised and encouraged to re-use transport packaging and reduce the packaging of consumer goods. Importation of non-recyclable items and goods of inferior quality will be controlled. A public awareness programme will be launched

in this regard to prevent Swaziland from becoming a dumping ground for other countries' wastes. Control measures will be developed by the SEA, in collaboration with MEE, to ensure conformance to Swaziland requirements.

In the longer term, incentives to support the proposed initiatives will need to be established. SEA will take a lead role in this activity.

The priority initiatives formulated for the waste prevention/minimisation strategy are outlined below and described in detail in Volume II Annex 2.

Priority initiatives

Waste Prevention

PRIORITY INITIATIVES
Short-term (Approval – 4 years after Cabinet approval) ➢ Awareness programmes for industry on the benefits of cleaner production and waste prevention developed and implemented. ➢ Establishment of a Waste Minimisation Centre (WMC) by industry. ➢ Training Courses facilitated or offered by the WMC to industry and mines. ➢ Information packages to be developed for industry on good operating practices, raw material modification, process modification, product modifications and inventory control.
Long-term (5 – 10 years after Cabinet approval) ➢ SEA, in collaboration with MEE, to develop and implement an import/export control system for companies not registered in Swaziland. ➢ Training for industry, commerce, and mines in cleaner production, including waste prevention and minimisation, will be provided through the Waste Minimisation Centre or industry and private sector bodies. ➢ The WMC to promote the implementation of *cleaner production clubs or forums* to support the dissemination of knowledge on prevention and minimisation of waste. ➢ SEA, supported by MHUD (general waste), MEE and industrial representative bodies, will design and implement information and motivation/incentive campaigns towards the larger industries to appoint/designate environmental officers. ➢ SEA, assisted by MHUD (general waste), MEE and industrial representative bodies, will lead the introduction of formal requirements to industry to practise "product stewardship" and to recover certain waste. ➢ SEA, MHUD, the MEE and private sector representative bodies will commission research into different "incentive approaches" that can be introduced in order to promote the concepts of waste prevention and waste minimisation.

Proposed Capacitating Interventions

The following proposals outline the overall capacitating interventions required for the implementation of waste prevention/minimisation in Swaziland.

The specific capacitating interventions that relate to the institutional framework are discussed in Volume I Chapter 4 and described in more detail in Volume II Annex 2.

The enabling mechanisms are summarised under the following main headings:

Structure, Staff and Interrelations

- A "home" must be established for waste prevention/waste minimisation in Swaziland. To this effect, a Waste Minimisation Centre (WMC) has been proposed. The detailed structure, staffing, location, mandate, industrial linkages and financing of the Centre need to be addressed by SEA, in conjunction with stakeholders.
- The feasibility of establishing waste minimisation clubs need to be investigated.
- Make provision for the required organisational structure and staffing (SEA and WMC) to support the initiative.
- Linkages between industry and the WMC must be established and reinforced.
- Linkages between the WMC and regional and international sister structures is seen as an important means of obtaining information.

System tools (Equipment, Guidelines and Manuals)

- Establishment of a WMC to acquire and disseminate knowledge on waste prevention and minimisation.
- Development and regular updating of industry sector specific guidelines and recommendations for waste prevention and waste minimisation.
- Management tools could be introduced. These could relate to: - product stewardship, life cycle assessment, industrial environmental officers, total cost accounting, performance indicators, environmental management systems and environmental auditing.
- A new regulatory framework on waste minimisation practices could include: substitution of hazardous pollutants, reduction of excess packaging, phasing out of pollutants, government procurement practices and waste minimisation assessments.

Skills Development and Awareness Raising

- Waste minimisation information campaign and training courses should be offered to industry by the WMC and industrial and commercial associations.
- Waste minimisation approaches should be introduced to all public sector employees.

Incentives

- Incentive packages for small, medium and large enterprises need to be investigated and implemented (legal action may also be needed). This could include, tax incentives, levies, product design requirements, certificates, awards, as well as specified labelling.
- Where necessary, legal and regulatory instruments need to be formulated, officiated and enforced to ensure waste prevention and minimisation.

3.3.2 The Waste Recycling Strategy

Strategy Intervention Objective(s)

"To organise and strengthen the existing recycling industry and to make provision for further recycling of both general and hazardous waste, through the implementation of awareness, information and training campaigns, support for the Waste Minimisation Centre, recycling centres, new regulatory and incentive instruments and the implementation of new specific recycling activities".

Strategy Intervention Approach

Recycling is the second stage of the waste hierarchy. After evaluating and strategising for different waste prevention and minimisation options, the potential for recycling must then be investigated. It is a fundamental principle that separation of materials at source must take place, as it is more difficult to recycle material once it has been mixed with those elements of the waste stream destined for treatment or ultimate disposal. This is not necessarily the situation in Swaziland today, where considerable "picking and scavenging" takes place at waste disposal sites.

The NSWMS is based on the assumption that recycling must become self-sustainable in the long-term but also that both regulatory and economic instruments will be required as a means of initiating the recycling initiatives. SEA will have to assume a major responsibility with regard to this, but the private sector is also of crucial importance. Moreover, there is currently a range of existing recycling initiatives in Swaziland, and these should be considered a national resource to further develop the principle and the specific local requirement for them to succeed. It is therefore proposed that SEA convenes a "National Recycling Forum" where all recycling stakeholders meet to identify opportunities and to discuss possible incentives and regulatory instruments.

In the short-term, the existing recycling companies operating in Swaziland need encouragement to improve, consolidate and expand their recycling operations. Swaziland has an established paper and glass recycling industry, which are supplied by formal and informal collectors. These industries need more raw materials and are currently importing them. The recycling of waste paper and cardboard from Government Offices would substantially improve recycled paper supplies in Swaziland and SEA would be responsible for the initiation of an appropriate government initiative. Existing organisations are active in Swaziland, and there are opportunities for improvement in tinplate steel and aluminium can recovery. Recently, a facility for the recycling of plastic has been established in Matsapha.

In the short-term, separation of waste at source in commerce and industry must be implemented for the recovery of clean and easily recyclable material. To support this, awareness and information campaigns, directed towards the industrial and commercial sector, need to be designed and implemented. While these campaigns could be effected both through private sector bodies and the proposed Waste Minimisation Centre, the SEA would be expected assume a lead role in keeping the

initiative on track. Recycling offers potential employment opportunities at almost every scale of operation. SEA, together with the Ministry of Labour, could, , investigate and assess potential opportunities and how these could be made available to the poorer segments of the Swazi population. However, prior to the implementation of any economic instruments or other incentives, the available market for the sale of the recovered materials in Swaziland or other Southern African Development Community (SADC) countries must be carefully evaluated.

A second step in the short-term would be to work towards the implementation of a common deposit and return system for reusable glass and plastic bottles. The timetable for the implementation of this would benefit from being co-ordinated with other SADC member countries.

SEA will take the lead to implement the necessary regulatory and incentive framework to ensure recycling of hazardous and general waste from the automotive industry, e.g. used engine oil, used car batteries and scrap tyres. Before this can be effected, SEA will need to ensure that Swaziland meets with the requirements of the Basel Convention. Swaziland's trade in recycled waste in southern Africa will then be restricted to southern African countries that comply with the Basel Convention.

In the long-term, waste picking at landfill sites must be phased out through job-creation in the recycling sector, including segregation and collection of recyclable materials at source. Recycling by waste picking at waste disposal sites is unacceptable because it exposes the waste pickers to disease and other hazards whilst yielding dirty material that is difficult to process. This activity must comply to the Occupational Health and Safety Act for Swaziland. The discouragement of waste picking should start immediately. The registration of scavengers should also be investigated.

Source separation of waste must be gradually introduced as the best way of reducing waste whilst recovering raw material for a growing recycling industry. Recycling must also increase in the commerce and industry sector. *Composting* of organic waste from all sources should be initiated to produce soil enriching media for organic farming. The utilisation of general mining waste and the recovery of mineral values should also be investigated.

The priority initiatives formulated for the waste recycling strategy are outlined below and described in detail in Volume II Annex 2.

Priority Initiatives

Waste Recycling

PRIORITY INITIATIVE/INTERVENTIONS
Short-term (Approval – 4 years after Cabinet approval) ➢ SEA will convene a Recycling Forum for Swaziland. ➢ Linkages between industry and the WMC must be established and reinforced. ➢ Recycling Forum and the private sector will develop and launch a recycling

awareness programme and implement sorting at source, where possible.
- Private recyclers, with support of local authorities and SEA, will establish drop-off points and buy-back centres.
- SEA will negotiate with private contractors to establish a system to recycle waste paper from government offices.
- SEA will initiate and launch an information campaign directed at producers of hazardous waste. The campaign will be implemented through private sector representative bodies.
- SEA will initiate a process to identify possible incentives for commerce to reduce all types of packaging waste.
- SEA will introduce a deposit and return system for reusable bottles.
- Sea will introduce reusable shopping bags and the reduction of existing low quality plastic shopping bags.
- SEA will promote a recovery system for used oil, batteries and tyres.
- SEA will promote a recovery system for pesticide and agricultural remedy containers.
- SEA will initiate the development of the necessary regulatory and economic instruments, as required.
- Local Authorities will explore and initiate communal and market composting programmes.
- SEA will promote Swaziland's ratification to the Basel Convention and ensure the implementation of the convention requirements.

Long-term (5 – 10 years after Cabinet approval)

- Local authorities will identify strategies to phase out waste picking at landfill sites.
- Development and implementation of training courses and information activities on waste minimisation for all sectors of commerce and industry.
- SEA will commission a review of tax/levy opportunities for non-reusable bottles and cans.
- SEA will investigate the introduction of an incentive system for used agro-chemical containers.
- SEA will develop and implement a control system for the importation of non-recyclable and inferior goods.
- SEA will initiate and maintain a process to develop and implement regulatory instruments, including by-laws and/or financial incentives to increase recycling of industrial waste.

Proposed Capacitating Interventions

The following proposals outline the overall capacitating interventions required for the implementation of waste recycling in Swaziland. The specific capacitating interventions that relate to the institutional framework are discussed in Volume I Chapter 4 and described in more detail in Volume II Annex 2.

The enabling mechanisms are summarised under the following main headings:

Structure, Staff and Interrelations

- A “home” must be established for waste recycling in Swaziland To this effect SEA will convene a “Recycling Forum” and also provide the secretariat for the Forum.
- Make provision for the organisational structure and staffing (SEA and WMC) required to support the initiative.
- Linkages between the WMC and regional and international sister structures are seen as an important means of obtaining information.

System tools (Equipment, Guidelines and Manuals)
- Establishment of a WMC to acquire and disseminate knowledge on waste recycling.
- Development and regular updating of industry sector specific guidelines and recommendations for waste recycling.
- Introduce drop-off points and buy-back centres. The lessons learnt from the NSWMS Pilot Projects should be considered.
- Structured recycling system of waste paper from government and other offices.
- Recovery system for used oil, batteries, tyres and pesticide containers from agriculture.
- Introduction of communal and homestead composting where feasible.
- A new regulatory framework on waste recycling.

Skills Development and Awareness Raising
- Waste recycling information campaign and training courses should be offered to industry by the WMC.
- Launch awareness campaigns on recycling.

Incentives
- Incentive packages for small, medium and large enterprises, as well as the public, need to be investigated and implemented (legal action may also be needed). This could include volume based disposal fees, taxes and tax incentives, and deposit return systems.
- If necessary, legal and regulatory instruments need to be formulated, officiated and enforced to ensure waste recycling.

3.4 The Waste Collection and Transportation Strategy

Strategy Intervention Objective(s)

“to increase the coverage and efficiency of collection of general waste in formal and informal urban areas, waste control areas, peri-urban and rural areas and, where possible, by means of income generating collection approaches and the use of transfer stations”.

"to develop and instil a system for the safe collection, transportation and storage of hazardous and health care risk waste"

Strategy Intervention Approach

MHUD, and where relevant in conjunction with the DPMO´ , would hold the main responsibility to investigate and implement viable technical solutions related to the collection and transportation of general waste. For waste collection and transportation of general waste, the phasing in of the extension of waste collection services to areas and sectors that previously did not receive services, and the substantial reduction of littering are key elements. The Waste Regulations 2000 provide important directions regarding the collection and transportation of waste. Compliance with these regulations should be a top priority. *Transfer stations*, as part of the collection system, will be encouraged where feasible, standards will be developed on suitable and economical types, their locations, sizes and general operational guidelines.

Inter-municipal co-operation between local authorities within reasonable distance from each other, based on sharing of costs, facilities and resources, will be co-ordinated by MHUD, in collaboration with the SEA. Different models of co-operation will be considered, depending on each individual situation. The use of the existing railway line in the country should be taken into account.

Littering in pedestrian corridors in towns and cities will be reduced. The key pedestrian corridors link residential areas with either the city centre, or the industrial and or commercial areas. The reduction of litter will *involve anti-litter campaigns and the provision of additional dustbins*. The urban local authorities will be responsible for this. The involvement of the general public will be promoted through research and action plan development. This involvement will seek to change people's attitudes towards littering and towards keeping their cities and towns clean.

No waste collection and transportation system for general waste has been envisaged for *rural areas and sparsely populated peri-urban areas*. In these areas, the SEA, working together with MHSW, and through Rural Health Motivators will promote the use of a pit system for household waste. However, in more densely populated peri-urban and rural areas, the SEA will, in conjunction with the DPMO, designate *"Waste Control Areas"* to handle commercial waste. Such waste control areas could be designated in areas around cross roads and economic nodes and in areas of high population density. In these economic nodes, there are large movements of people as a result of buses stopping to drop or pick-up passengers. . In some of these areas, there are several shops, markets, schools and health facilities. Substantial quantities of waste are generated and there is no authority responsible for its collection and transportation. The collection and transportation of waste in these areas will involve the local community and its leadership. This will ensure the anchoring of waste management responsibilities in the community and will create a culture of public

responsibility and environmental awareness at the “grass root” level. Moreover, it will make the National Waste Management Strategy relevant to the whole country.

SEA will be responsible for the development and implementation of *guidelines for source separation and for the collection and transportation of Hazardous Waste.* This will allow large producers to store hazardous industrial waste in appropriate containers or facilities for transportation to a designated hazardous waste disposal site in Swaziland. The guidelines will also make provisions for the *transportation of hazardous industrial waste to other SADC* countries or overseas for treatment or disposal. Transboundary shipment of hazardous waste will take place in compliance with the Bamako and Basel Conventions. *Codes of practice* for the packaging and transportation of hazardous waste will be developed as part of a Registration System for Special Wastes. These codes of practice will ensure that the system adopted in Swaziland is in line with international practices. The problem of the lack of a formal system for the segregation, collection and control of hazardous waste will be addressed and the associated risks to the health of the people and the dangers of environmental degradation will be minimised.

MHSW will be responsible for the preparation of *Codes of Practice* for source separation, packaging, storage, collection and transportation of *Health Care Risk Waste* that will be aligned with international guidelines, such as the World Health Organisation. Health care professionals, such as doctors and nurses, should package health care waste according to the Codes of Practice. Direct contact with health care risk waste after packaging by the health care professionals should be avoided.

The collection and transportation of *hazardous agricultural waste* (used agrochemical containers) will require SEA, in collaboration with MOAC, to develop an effective system of collecting used containers and the implementation of a *deposit system for the containers*. This will address the problem of the lack of incentives for large users of agricultural chemicals to adopt environmentally friendly practices in the disposal of used containers. The current method of burying them in pits in close proximity to where they were used, poses a health threat to the community. The MOAC should provide SEA with information on organic agricultural waste or residuals resulting from the processing of animal products. Such information should be processed and quantified to determine the feasibility of collecting and transporting the waste to a central location for disposal or recycling. This may result in the development of new industries and may limit the current wastage of re-usable resources. The implications for the country with regard to the POP Convention, in terms of pesticides and industrial chemicals, must be investigated.

The *collection and transportation of Mining Waste* will be restricted to on-site activities. Collection for transportation of hazardous waste outside the boundaries of the mine will take place within the context of the registration system for special waste, developed and maintained by SEA

The priority initiatives formulated for the waste collection and transportation strategy are outlined below and described in detail in Volume II Annex 2.

Priority initiatives

Waste Collection and Transport

PRIORITY INITIATIVE/INTERVENTIONS
Short-term (Approval – 4 years after Cabinet approval) Urban local authorities will increase waste collection services to cover 100% of the formal urban areas. ➢ Urban local authorities, waste control areas and others designated waste management responsibilities will design and implement public awareness campaigns that promote the benefits of a clean environment and waste reduction. ➢ MHSW, supported by SEA, will develop codes of practice for the collection, packaging, storage and transportation of health care risk waste. ➢ SEA will develop guidelines to ensure implementation of correct procedures for the packaging, storage, collection and transportation of Health Care Risk Waste. ➢ SEA will develop codes of practice to ensure that the transportation of mining waste is restricted to on site activities. ➢ SEA will ensure the implementation of correct procedures for the collection and transportation of mining waste. ➢ Urban local authorities will reduce littering in key pedestrian corridors to, and from residential areas to the city/town centres, the business districts and industrial areas. ➢ Urban local authorities will ensure increased waste collection services to cover all Informal Areas within urban boundaries and in public markets. ➢ DPMO will ensure the necessary organisation and financial arrangements are established to implement appropriate waste collection and transportation services to cover densely populated peri-urban areas, areas bordering local authorities and in commercial nodes in rural areas. ➢ SEA will develop agricultural waste collection guidelines as part of the RSSW. ➢ SEA will develop codes of practice for the transportation of hazardous waste as part of the RSSW. ➢ SEA will set minimum standards for Special Waste transporters. ➢ SEA, MHUD and Urban local authorities will commission a study to assess the feasibility of, and required standards for, transfer stations that are to be used by City Councils, Town Councils, Towns Boards and Company Towns as transit stations for waste that is to be transported to regional waste disposal facilities.
Long-term (5 – 10 years after Cabinet approval) Urban local authorities provide 100% waste collection services in all informal areas within urban boundaries. ➢ DPMO and MHUD have made the necessary arrangements to ensure that organisational and financial arrangements are in place to secure waste collection services in waste control areas, (economic nodes) in sparsely populated peri-urban areas and commercial nodes in rural areas. ➢ SEA has implemented codes of practice for hazardous waste packaging and transportation. ➢ SEA has implemented a system for the collection of hazardous agricultural waste.

- SEA and MOAC will investigate the implications for the country regarding the POP convention, in terms of pesticides and industrial chemicals.
- MHUD to proactively promote *Inter-Municipal co-operation* between local authorities, where feasible.
- Urban local authorities collect and transport waste to regional facilities using transfer stations.

Proposed Capacitating Interventions

The following proposals outline the overall capacitating interventions required for the implementation of waste collection and transportation in Swaziland. The specific capacitating interventions that relate to the institutional framework are discussed in Volume I Chapter 4 and described in more detail in Volume II Annex 2.

The enabling mechanisms are summarised under the following main headings:

Structure, Staff and Interrelations

- Local authorities to review their structures and procedures for waste collection in order to increase the collection rates (alternative structures may need to be considered – e.g. outsourcing)
- Declaration of Waste Control Areas or similar, to provide for the establishment of waste collection systems in prioritised areas.
- Establishment of institutional structures along the declaration of Waste Control Areas.
- The DPMO will co-ordinate the identification and piloting of the institutional arrangements for waste management in areas located in peri-urban and rural areas.
- Linkages between industry and the SEA, DPMO and MHUD at national and local level need to be initiated and developed.
- Public: Private: Community linkages for waste collection need to be investigated.

System tools (Equipment, Guidelines and Manuals)

- Codes of practice/ guidelines for separation collection, packaging, storage and transportation of health care risk waste and mining waste.
- Guidelines, Handbooks and Manuals on costing and budgeting for cost-recovery approaches towards waste collection.
- Guidelines, Handbooks and Manuals for the sub-contracting of waste collection services by local authorities.
- Standards for transfer stations.
- Guidelines, Handbooks and Manuals on cost effective community based waste collection approaches (technology and systems) in peri-urban and rural areas. Some material from the NSWMS Pilot Projects in Kwaluseni and Siphofaneni is available from SEA and considerable material available from international sources.

- Local authority by-laws on cost recovery for waste collection.

Skills Development and Awareness Raising
- Launch and implement public awareness campaigns on waste collection, payment for services, littering and a clean environment.
- Develop and implement training and coaching programmes for use towards local authorities and Waste Control Areas.
- Launch industry and commerce directed information and awareness campaigns related to hazardous waste. In-service training options need to be investigated.

Incentives
- Legal and regulatory instruments need to be formulated, officiated and enforced to ensure proper hazardous waste management.
- Work opportunities for residents and small (community based) contractors need to be fully investigated.

3.5 The Waste Treatment Strategy

Strategy Intervention Objective(s)

"To provide for the safe storage and treatment of waste with special reference to hazardous and health care risk waste and where feasible in accordance with international standards".

Strategy Intervention Approach

The strategy for treatment of hazardous waste is that of *separation of waste at source, which* must be implemented to ensure that hazardous waste is not mixed with general waste. The hazardous waste from commerce, industry, agriculture and mining must be treated in an environmentally sound way before disposal. Storage is the most viable solution in the short-term. When the requirements of the Basel Convention (the RSSW and the consignment note system) are implemented, certain fractions of the hazardous waste could be exported to a neighbouring SADC country or overseas, for recycling, treatment or disposal.. Hazardous waste that cannot be exported must be disposed of at one of the few *safe hazardous waste disposal* sites in Swaziland in the short to long-term. Depending on the property of the specific hazardous waste, some physical pre-treatment prior to disposal should be performed by the industry itself in the long-term. SEA is the main responsible body for hazardous waste, and must ensure that the proposed activities are implemented.

The strategy for *treatment of health care risk waste (including Veterinary Waste)* will depend on the analysis of the health care risk waste. The National Health Care Waste Plan will provide the background for a long-term solution to the treatment of HCRW in Swaziland. Source separation of risk waste from general waste within health care institutions will be ensured (See Section 3.5). The existing health care risk waste *treatment plants must be upgraded or closed*, and the *feasibility of one central treatment plant* for health care risk waste will be investigated. If appropriate,

a central treatment plant will be established in the long-term. In some areas, it will be necessary to establish *separate sections on specific landfills* for safe disposal of health care risk waste. As the responsible authority for health care risk waste, the MHSW will undertake the required actions.

Certain types of waste, other than hazardous waste and health care risk waste, could be considered as a potential fuel for electricity and heat generation. Reference is made to the "Swaziland National Energy Policy Project (SNEPP)". *Incineration* of large amounts of waste has not been practised in Swaziland. Incineration will reduce the volume and neutralise hazardous substances in the waste. However, before considering the introduction of incineration of general waste, thorough consultations must be held with all relevant institutions and stakeholders, including the NGOs, on the environmental benefits and disadvantages. SEA and MHUD will be responsible for this. However, even if deemed tentatively feasible, further detailed investigations (i.e. a feasibility study) need to be carried out before any decision can be taken. The amount and nature of combustible waste for incineration has to be estimated, as well as the availability of a suitable structure/organisation capable of operating an incineration facility.

In the interim (maybe 8 to 10 years), the treatment strategy will be to rely on safe disposal at upgraded landfill sites.

The priority initiatives formulated for the waste treatment strategy are outlined below and described in detail in Volume II Annex 2.

Priority initiatives

Waste Treatment

PRIORITY INITIATIVE/INTERVENTIONS
Short-term (Approval – 4 years after Cabinet approval) ➢ SEA will ensure that all legal instrument and guidelines are in place to provide for safe storage of hazardous waste until export for treatment can be initiated, in accordance with the requirements of the Basel Convention. ➢ SEA will monitor and enforce the export of hazardous waste for treatment in other countries to ensure that it is taking place in accordance with the Basel Convention. ➢ MHSW will compile guidelines for monitoring the safe disposal of health care risk waste from remote health care facilities and will implement the monitoring. ➢ MHSW will assess alternative technologies for treatment of health care risk waste. ➢ MHSW will compile and implement guidelines and standards for health care risk waste treatment. ➢ MHSW will evaluate existing combustion plants for hospital waste and abattoir waste and either upgrade or close the facilities.
Long-term (5 – 10 years after Cabinet approval) ➢ Physical pre-treatment of hazardous waste will be performed by the industry on-site. ➢ SEA and MHSW will commission a feasibility study for the establishment of one national treatment plant for health care risk waste.

- If feasible, a new central treatment plant will be established by the MHSW.
- Regulations will be developed to ensure delivery of health care risk waste to the new treatment plant.
- MHSW will ensure that existing combustion plants for hospital and abattoir waste are either upgraded to meet standards or closed.
- MHUD and SEA will initiate and manage consultations with all stakeholders regarding incineration of general waste with energy recovery with the purpose of reaching consensus.
- MHUD, DPMO and SEA will commission feasibility studies of incineration and other treatment technologies of general waste
- MHUD, DPMO and SEA will ensure that a decision to establish or reject an incineration plant is taken. Whatever decision is made, guidelines and standards for general waste incineration and/or other treatment technologies will be developed and implemented.

Proposed Capacitating Interventions

The following proposals outline the overall capacitating interventions required for the implementation of waste treatment in Swaziland. The specific capacitating interventions that relate to the institutional framework are discussed in Volume I Chapter 4 and described in more detail in Volume II Annex 2.

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The enabling mechanisms are summarised under the following main headings:

Structure, Staff and Interrelations

- Investigate the institutional arrangements (finance, ownership, management etc.) for a national disposal facility for hazardous and Health Care Risk Waste.
- Public: Private: Community linkages for waste treatment to be investigated.

System tools (Equipment, Guidelines and Manuals)

- Feasibility study on proposed national facilities.
- Legal instruments, regulations, standards and guidelines to ensure source separation and safe disposal of hazardous, health care risk waste and non-hazardous waste.
- Full ratification of the Basel Convention.
- Legal instruments related to the transport of hazardous waste.
- Incineration, autoclaving and/or steam sterilisation of health care risk waste.
- Establishment of a national hazardous waste disposal site.

Skills Development and Awareness Raising

- Information, training and awareness programmes in the management of health care risk waste and hazardous waste.
- Public awareness campaigns on hazardous/special waste to be designed and implemented.
- In-service training for employed persons who work or move in environments where there is a potential contact with hazardous waste substances.

Incentives

- If necessary, legal and regulatory instruments need to be formulated, officiated and enforced to ensure appropriate hazardous waste treatment.

3.6 The Waste Disposal and Remediation Strategy

Strategy Intervention Objective(s)

"to develop and implement a coherent solid waste management disposal and remediation system for general and hazardous wastes from all sources".

Strategy Intervention Approach

Waste disposal is the final stage in the application of the Waste Hierarchy.. The waste disposal strategy relies on the separation at source of recyclable materials and special waste (hazardous waste and health care risk waste) from the general waste stream. In the future only sanitary landfills, designated controlled local disposal facilities and rural homestead disposal pits will be permitted for general waste disposal.

3.6.1 Waste Disposal

General Waste

A number of problems have been noted with existing disposal sites, including poor operations, e.g. the Manzini and Matsapha disposal sites, excessive leachate, e.g. the Mbabane Sanitary Landfill, as well the non-existent mapping of the existing disposal sites. These must be urgently addressed. While the potential for the sharing of disposal facilities located within logistically feasible waste catchments must be investigated, e.g. Manzini/Matsapha and Mbabane, Piggs Peak and Bulembu, it is unlikely that this situation will be resolved during the short-term planning horizon. During this period, waste disposal at rural homesteads will be established and improved.

In the short-term, the *number of landfills* and designated controlled local *disposal facilities* will be *reduced* to ensure economically and environmentally viable waste disposal solutions. Wherever practicable, common landfill facilities will be shared by local authorities (including company towns) and private sector industries. This task will be the responsibility of the SEA and MHUD. Properly designed landfills are the preferred option for disposal.

In the long-term, incentives will be established to avoid illegal dumping and the proliferation of small uncontrolled disposal sites. The cost of these incentives, i.e. rewards for good behaviour, more than outweighs the cost of cleaning up. In parallel, guidance must be given to the responsible authorities to upgrade or close poor operations at existing disposal sites. SEA will be responsible for this.

Special Waste:

According to international classification, all of Swaziland's waste streams have a hazardous component. This component must not be mixed with the general waste stream.

Within the immediate planning horizon, hazardous waste generated in the industrial, commercial, agricultural and mining sectors should be *stored by the producers* at suitable premises in compliance with the minimum requirements, until a co-operative agreement can be reached between all the parties involved to investigate the siting of one hazardous waste disposal site in Swaziland. SEA will ensure that the necessary guidelines and initiatives are taken to that effect. In the short-term, when Swaziland meets the conditions of the Basel Convention, hazardous waste may be exported to internationally acceptable facilities for disposal while negotiations are underway for a long-term solution to hazardous waste disposal in Swaziland.

During the short-term, *one hazardous waste disposal site* will be established in Swaziland.

3.6.2 Remediation

In the short-term, SEA will ensure that the status of hazardous constituents in all waste disposal sites that received industrial and mining wastes, are assessed. Waste disposal in this context means the disposal of waste to land by a permitted process and includes waste rock dumps, tailings dams and other waste disposal facilities used by the mining industry. The environmental status of the waste disposal sites located in Swaziland must be assessed. Remedial measures are to be included and Minimum Requirements for Landfill are to be developed which will be in line with those adopted by other SADC countries.

During the long-term planning period, the asbestos mine dumps will be rehabilitated to reduce the risk of fibres being transported by water and wind. Coal mine overburden and duff dumps will be engineered to prevent acid mine drainage. However, the assessment and initiation of this process will start in the short-term. All the environmentally unacceptable disposal sites, along with abandoned facilities, will be systematically closed and rehabilitated, prioritising the most polluting site for earliest attention.

The priority initiatives formulated for the waste disposal and remediation strategy are outlined below and described in detail in Volume II Annex 2.

Priority initiatives

<u>Waste Disposal and Remediation</u>

Short-term (Approval – 4 years after Cabinet approval)

- DPMO, in collaboration with MHSW, will facilitate the improvement of waste disposal at rural homesteads.
- DPMO, in collaboration with the SEA, will ensure that locally controlled disposal facilities are established in densely populated and commercial peri-urban and rural areas.
- SEA will provide for storage of hazardous agricultural waste by the suppliers for return to the country of origin once the Basel Convention has accepted Swaziland.
- Where inadequate treatment facilities exist, Health Care Risk Wastes will be landfilled and an appropriate protocol developed by MHSW.
- SEA will assess the status of old abandoned mining waste disposal facilities with respect to environmental impacts and will initiate the appropriate remedial measures.. The assessment will include asbestos mine dumps, in order to reduce the risk of fibres being transported and broadcast by water and wind, and the coal mine overburden and duff dumps to prevent acid mine drainage.
- SEA will develop minimum requirements for the selection, design and operation of sanitary landfill facilities, storage facilities and designated controlled local disposal facilities.
- SEA will commission a report on the status of the waste disposal sites located in Swaziland and propose remedial measures to rehabilitate and restore the sites safely to the environment.
- SEA, supported by MHUD and DPMO, will facilitate the development of a regional approach to waste management facilities, which will result in the reduction of the number of landfills and designated controlled local disposal facilities in order to ensure economically and environmentally viable solutions.
- SEA will facilitate the export of hazardous wastes for treatment.
- SEA will assess the feasibility for one hazardous waste disposal site to be established in Swaziland. Hazardous waste will be disposed of in Swaziland in specially designed purpose-built, environmentally secure segregated cells at one designated disposal site.

Long-term (5 – 10 years after Cabinet approval)

- SEA, MHUD and DPMO will ensure the establishment of incentives to avoid illegal dumping and the proliferation of small uncontrolled disposal sites.
- If incineration is the chosen option, the ash will require hazardous waste landfill and could be integrated with the hazardous waste disposal facility mentioned above. If autoclaving is chosen, then the resultant pulverised or ground and unrecognisable sterile material would be acceptable to a general waste landfill.
- SEA will ensure the systematic rehabilitation of all the closed and abandoned mining disposal facilities.

Proposed Capacitating Interventions

The following proposals outline the overall capacitating interventions required for the implementation of waste disposal and remediation in Swaziland. The specific capacitating interventions that relate to the institutional framework are discussed in Volume I Chapter 4 and described in more detail in Volume II Annex 2..

The enabling mechanisms are summarised under the following main headings:

Structure, staff and Interrelations

- Investigate the institutional arrangements (finance, ownership, management etc.) for a national disposal facility(ies) for hazardous and Health Care Risk Waste.
- Investigate possible financial instruments linked to the operation and management of disposal sites.
- Public : Private : Community linkages and partnerships for the planning and operation of waste disposal sites.

System tools (Equipment, Guidelines and Manuals)

- SEA will, through the WMC, collaborate with the private sector for the design and implementation of safe storage of hazardous waste.
- Guidelines for waste disposal in rural and peri urban areas.
- Disposal Protocol stipulating minimum requirements for landfilling of hazardous and health care risk waste.
- A licensing system for disposal sites.
- Equipment and clothing for staff at disposal sites.

Skills Development and Awareness Raising

- Development and implementation of training courses for Rural Health Motivators and other "extension and/or community based" workers on appropriate disposal techniques.
- Training programmes and supporting facilitation strategies for staff at disposal sites. This could be supported by an accreditation system to be required for staff working at disposal sites.
- Public awareness programmes about the risks associated with disposal sites and illegal dumping.

Incentives

- Incentives to avoid illegal dumping.
- If necessary, legal and regulatory instruments need to be formulated, officiated and enforced to ensure appropriate hazardous waste treatment.

4. Institutional Framework for Waste Management

4.1 Background

The assessment of the current institutional framework (See section 2.2.) for waste management provided useful information on the challenges that will be expected when implementing the NSWMS. While new and appropriate institutional opportunities also emerged from the exercise, the assessment revealed that there are many institutional and capacity issues that cannot easily be addressed. The institutional framework proposed below has taken this into account, but has moreover been balanced with the institutional requirements introduced by the priority initiatives, outlined in the NSWMS.

4.2 Institutional Portfolios, Responsibilities and Inter-linkages

The resource scarce institutional environment and the existing NSWMS related institutional capacity shortcomings make a realistic allocation of institutional portfolios and responsibilities a difficult exercise. Moreover, the current institutional framework is not uniformly capacitated to assume additional/amended waste management responsibilities, and towards implementing a Strategy that takes a national mandate and coverage. The main associated problems have been summarised in Section 2.1.3.

The allocation of institutional portfolios and responsibilities has however taken a realistic point of departure by working within the existing institutional portfolios and resources. A strong reference has been made to the existing resource availability. In this context, the current national priorities on public funds in Swaziland do not justify significant investments into waste management, and innovative thinking is required to identify and develop workable solutions.

It is acknowledged that the allocation of institutional portfolios and responsibilities must, for National Government Agencies, be seen in view of their **existing portfolios, as outlined in current legislation,** and that this legislation may not be appropriate and specific on waste management issues. However, it is considered important that Ministries assigned waste management responsibilities in the Environment Management Act 2002, Waste Regulations 2000, the EIA Regulations and the NSWMS must table this issue before the Strategic and Action Planning processes of the Public Sector Management Programme (PSMP). This should be done to ensure that waste management responsibilities are taken into account in terms of organisational design and staffing.

In addition to the existing legislative framework, the proposed allocation of portfolios and responsibilities for waste management has been guided by the following:

"Institutional inter-linkages" – a key implementing mechanism
Institutional inter-linkages are considered an important mechanism to establish an efficient and cost-effective waste management system in a resource scarce environment. Moreover, the existing institutional arrangement may in some cases imply that a waste management responsibility can only be professionally addressed through a co-operation arrangement between the agency holding a formal authority (e.g. the DPMO in case of peri urban and rural areas) and one holding the required technical expertise (e.g. the MHUD for waste system relevant to peri urban and rural areas). This approach prevents the development of expensive "double" capacity within government.
Since the changing of Ministerial and wider institutional portfolios and mandates may take time to effect, the utilisation of inter-institutional linkages may constitute a practical transitional instrument to ensure progress on NSWMS implementation.

The specific need and opportunities for such linkages are difficult to predict and describe and they may be of a less formal nature (Memorandum of Understanding). . At the government level, both formal and informal Co-operative Government Agreements between two or more Ministries could be established and at the local level linkages between urban local government structures and company towns and between City Councils and the surrounding peri-urban areas are possible. Inter-industrial linkages and co-operation agreements may also be an area that could be investigated.

Division of responsibilities within and between levels
The division of waste management responsibilities, both within and between different levels of administration and types of government, will be expected to change over time. This will be an outcome of both increased local capacity and of new more decentralised oriented legislation, for example in the context of local authorities. There is currently limited capacity available at decentralised levels (e.g. with most Town Councils and Town Boards) to undertake waste management responsibilities and MHUD and other national agencies would need to assume substantial capacity development and support services for an initial period of 3-5 years.

4.3 The Proposed Institutional Framework

See 4.5 for schematic representation and description.

4.4 A "Developing Institutional Framework" Approach

This approach acknowledges that it may not be possible to immediately implement the proposed institutional framework in totality because of resource and other constraints. It also acknowledges that over time the proposed institutional framework may need further amendments based on experience. This approach also indicates that an active development effort is required to facilitate the changes, but that the most appropriate structures will only evolve over time, based on experience and opportunities.

The rationale behind this approach finds its justification in the following:

- Several of the institutional responsibilities required to implement the NSWMS and current waste legislation are presently not sufficiently explicit in ministerial portfolios. A change or amendment to ministerial portfolios takes time and depends on the outcome of other national structural adjustment and policy processes.
- The institutional capacity, including the quality and quantity of staff, skills; system tools (e.g. equipment and procedures); partnerships and relations, takes time to implement and the precise requirements and suitable approaches to be taken cannot easily be predicted.
- The NSWMS has been formulated on the notion that from the outset it must be practical and easy to implement, while maintaining a vision towards the future. This notion is also applicable to the design of the institutional arrangements.

The proposed "developing" approach therefore acknowledges the need to commence the implementation of the NSWMS with immediate effect. If conceived correctly, the mode of implementation would ensure both a gradual development and required adjustments in the institutional framework. The strength of a developing institutional framework approach is that while it takes as a starting point a general structure; it gradually but strategically develops into a final structure, which is based on the availability of opportunities; requirements and financial resources.

4.4.1 Criteria applied for institutional framework design

The preparatory investigation for the NSWMS suggests that three criteria should be allowed to guide the initial design of the institutional framework:

- It must be an enabling institutional framework;
- It must be an affordable, efficient and effective institutional framework;
- It must be a logical and simple institutional framework.

An Enabling Institutional Framework:
An enabling institutional framework will ensure that the implementation of the NSWMS can be initiated and that it can be sustained through a continuous development of institutional capacity, both within and between different levels and types of government, parastatal and private structures. An enabling institutional framework will make provision for the allocated responsibilities and capacity development (both in terms of the "reception" and "provision") and that support structures are established to assist institutions allocated waste management responsibilities.

An Affordable Institutional Framework:

An affordable institutional framework provides for selected elements of the NSWMS to be initiated from the outset within the existing institutional resources and capacities and, in as far as possible, within the current allocation of institutional mandates and portfolios. With regard to affordability, the NSWMS would for example, advocate solutions for improved waste management through institutional co-operation agreements, strategic alliances and partnerships, thus supporting and complementing other National initiatives to improve the effectiveness and efficiency of public services. In principle, the NSWMS should only require additional resources where they cannot be made available through co-operative and similar arrangements. The interpretation of this approach should however not preclude from the fact that the full implementation of the Strategy will require institutional alignments, complementary staff and new responsibilities.

A Logical and Simple Institutional Framework:
A logical and simple institutional framework would seek to keep the institutional framework simple. It would strive towards logical so-called "one-stop" operations and in this context it would acknowledge existing formal institutional "linkages" and "responsibilities". However, this framework would be of an "administrative" and "authority" (e.g. DPMO) nature and would not necessarily reflect technical expertise in for example, waste management (e.g. MHUD). This system can be applied by operating an institutional framework that divides responsibilities along Waste Streams or along the different stages of the Waste Cycle. In view of the need to develop waste management capacity throughout the institutional framework, it may also prove useful to divide responsibilities along levels e.g. National, Local, Enterprise and Citizen level.

The system outlined above, has been selected in order to facilitate the implementation of the NSWMS. Once implemented and while developing the institutional framework, the NSWMS will require ongoing adjustments in the institutional framework.

4.4.2 Overview of allocated responsibilities

The considerations and criteria outlined above are transformed into the following proposal for an institutional framework with a related allocation of roles and responsibilities.

1. National level agencies will assume all major legal, technical, administrative, financial and training and awareness responsibilities for the implementation of the NSWMS. Many of these responsibilities will have to be extended to locally based institutions, organisations and enterprises through the provision of capacity building services and general support.

2. National agencies will be expected to develop inter-linkages order to ensure the broadest possible national and professional coverage and support of NSWMS initiatives. Local authorities will have to look for opportunities to share

facilities, resources and responsibilities. This will require an active pursuance of co-operative government opportunities and agreements, general public-public partnerships and private-public partnerships with for example, a range of federations and associations. Referring to (1) above, national support and capacity development would have to be extended to the local level to ensure similar inter-institutional agreements and linkages are established at the local level.

3. A simple national institutional framework has been proposed, which would divide the portfolios, roles and responsibilities along the main waste streams and to a large extent also along the source of waste. This framework is as follows:

    - ***The Swaziland Environmental Authority (SEA)*** will be the national one-stop agency for all knowledge and matters pertaining to hazardous industrial waste from both large and small enterprises, and in all economic sectors (industry, commerce, agriculture, mining etc).

    - ***The Ministry of Housing and Urban Development (MHUD)*** will be the national one-stop agency for knowledge and matters pertaining to general waste from urban, peri-urban and/or rural areas, industry, commerce, health institutions and agriculture.

    - ***The Ministry of Health and Social Welfare (MHSW)*** will be the national one-stop agency for knowledge and matters pertaining Health Care Risk Waste. It is also recognised that MHSW is a partner in all waste streams, as waste constitutes a health problem.

This institutional framework acknowledges three main waste streams: *"General Waste"* (GENW), *"Hazardous Waste"* (HAZW) and *"Health Care Risk Waste"* (HCRW) and assumes the "conventional" institutional arrangements.
This framework avoids a potential conflict of interest for some line ministries in promoting their sector (e.g. industry and agriculture) and highlights SEA´s role as a regulatory body. To ensure proper waste management in company towns, it is also proposed that they be declared as Waste Control Areas, for which MHUD has the responsibility.

Under this scenario, hazardous waste from *agriculture* (both processing and primary production) will be managed by SEA and not by MOAC. Non-hazardous agricultural waste linked to primary agricultural production, is considered organic resource material and will be managed by MOAC and other agencies (e.g. MNRE).. Awareness and training programmes for improved agricultural waste management practices may however still be facilitated and organised through the MOAC Extension Service.

The MEE will not have any major waste management responsibilities. SEA and MHUD will manage hazardous and general industrial waste, respectively. However, the MEE is still considered to be a key institutional entity for the implementation of the Strategy, as it is expected to play a major supporting role in the establishment of a Waste Minimisation Centre and in the general dissemination of waste management requirements to the industrial and commercial sector.

Mining waste warrants special attention. It is proposed that, where necessary, mines will be declared as Waste Control Areas. Under this arrangement, hazardous waste fractions would be managed by the SEA and non-hazardous substances by the MHUD. Mining residuals (e.g. crushed material and soil) will be addressed in terms of the EIA requirements.

The background investigations for the NSWMS identified significant institutional challenges in allocating waste management responsibilities for *peri-urban and rural areas*. The general authority to manage land and to introduce cost recovery approaches follows traditional structures (i.e. the Thinkhunla system) and not the national and local government structures regulating formal urban and industrial areas. The Deputy Prime Minister's Office (DPMO) provides the link between the "Government" and the "Thinkhundla" structures and hence also the link to the introduction of improved waste management in rural and peri-urban areas. The Waste Regulations 2000 provide the option of declaring such areas as Waste Control Areas in order to provide for sound waste management practices. In view of this, the **DPMO has been allocated the responsibility for waste management in peri-urban and rural areas.**

The DPMO will not be expected to develop any in-depth technical waste management expertise; but would however be expected to operate a "liaison function" on waste management. The main purpose of this liaison function would be to ensure that technical knowledge and expertise, relevant to rural and peri-urban areas, is made available by the waste stream specific knowledge centres operated by MHUD, SEA and MHSW.

The DPMO would be expected to acquire a minimum waste management expertise in order to operate the liaison function. It will however be a major responsibility for the DPMO to ensure that sufficient funding mechanisms are established to finance waste management operations in rural and peri-urban areas and to ensure that the required implementing mechanisms are also put in place. In order to assume the proposed responsibility, it is envisaged that the DPMO will enter into several Co-operative Government Agreements. For matters pertaining to household waste, an agreement will be required with MHUD and for hazardous waste through a similar agreement with SEA.

A spirit of *"doing things"* needs to be established. The NSWMS will only gain momentum, provided each of the national level agencies is willing to assume responsibility and put in an extra effort by taking the lead to work by example. This

is where the Swaziland Environmental Authority (SEA) is important. The SEA is the custodian and main promulgator and enabling actor for the Strategy. The SEA is a regulatory and support agency to the ministries mentioned above and a general national resource capacity for waste management in Swaziland. In this context, the SEA should be expected to play a major role in legislative processes and the design and implementation of key waste management tools, including those associated with monitoring and enforcement. The role for SEA during the first 3-5 years is considered crucial to the success of the Strategy

The Ministry of Finance (MOF) and the Ministry of Economic Planning and Development (MEPD) will play a central role in identifying, designing, approving and implementing economic instruments to support specific waste management initiatives. Economic instruments may be of a different nature and could include possible taxes on plastic bags, import duties and levies on waste and waste generating packaging, raw materials, as well as the introduction of incentives for the general public and industry. The MEPD and the MOF also holds a key responsibility to ensure that budget provisions are made to support legally founded responsibilities for waste management.

Locally based organisations, including local authorities, company towns, enterprises and NGOs, are central to the implementation of, and compliance to waste management policies and initiatives. At this stage however they are considered a "weak link" in the waste management chain, as they require substantial support and capacity development in order to meet the new waste requirements. As a result, locally based organisations will only in the longer-term be in a position to assume decentralised waste management responsibilities.

The proposed allocation of responsibilities to SEA, MHUD and MHSW may however not be fully consistent with the strategy developed by the *Public Sector Management Programme*, where a major aim is to devolve national government responsibilities. This issue needs to be resolved with the PSMP, as major national "enabling capacity" needs to be put in place for an initial period of 3-5 years to take the NSWMS from paper to implementation.

An overview of the proposed institutional arrangements is illustrated underneath. The proposed waste management portfolios, roles and responsibilities have been outlined for each of the main relevant agencies at national and local level in Volume II Annex 1. The following abbreviations have been used in the text and are defined in Volume II Annex 3:

GENW:	General Waste
HHW:	Household Waste (domestic waste)
HCW:	Health Care Waste (General and Health Care Risk Waste)
HCRW:	Health Care Risk Waste (Hazardous only)
ICW:	Industrial, Commercial and Primary Production Waste, i.e. General and Hazardous Waste
HAZW:	Hazardous Waste
NHAZW:	Non Hazardous Waste (General Waste)

4.5 National Level Agencies

The Institutional framework proposed under this section is the preferred option of the three possible alternatives considered.

The proposed portfolio and responsibilities for SEA, covers all waste streams and includes both the hazardous and non-hazardous components.

The allocated responsibilities for MHUD and MHSW cover only the specific waste stream for which they are responsible, unless specifically indicated.

The allocation of the portfolio for the DPMO is based on their link to rural and peri-urban areas. It should be noted that in many instances the DPMO would only be able to meet its responsibilities if strategic alliances, partnerships and/or Co-operative Government Agreements are established and formalised.

Overview of institutional arrangements for waste management in Swaziland

SEA

Custodian of Waste Strategy

Crosscutting institutional stakeholders

MOF (waste related economic instruments and budget provisions)
MEPD (waste related investments and coordination)

Policy and Enabling NSWM Strategy Authorities

MHUD

General Waste

MHSW

Health Care Risk Waste

SEA

Hazardous Waste

DPMO

Peri-Urban and Rural Areas

Main Coverage and Strategic Partners

- Local authorities
- Peri Urban and Rural Areas (DPMO)
- Waste Control Areas
- Company Towns (residential)
- Industry and commerce
- SME´s

- SEA
- MEE
- MHSW

- Hospitals
- Private; public, urban and rural clinics and health care facilities
- Company Towns (Clinics)
- Veterinarians

- SEA
- MHUD
- MEE
- SEA

- Industry and Commerce
- SME´s
- Commercial farmers
- Farm chemical suppliers
- Mining Operators
- Chemical suppliers

- MHSW
- MEE
- MNRE
- MOAC
- MHUD
- Federations and Associations

- Peri-Urban and Rural areas
- Commercial Areas in peri-urban and rural areas
- Waste Control Areas
- Regional Adm.
- Traditional leaders

- MHSW
- SEAs
- MHUD

4.5.1 Swaziland Environmental Authority (SEA)

SEA is the national custodian of the NSWMS and will therefore assume the overall co-ordinating responsibility for implementation at all levels. SEA´s co-ordinating role is as a national overseer, facilitator and professionally guiding body. The enabling responsibility of SEA towards other line ministries and national stakeholders, is comprehensive and SEA is expected to play a lead role in assuring co-ordination of, and in promoting affordable and creative technical, administrative and managerial approaches that will enable implementation of the Strategy. SEA is specifically responsible for all Hazardous Waste Management and the operation of the WIS and RSSW. The overall responsibilities for SEA are derived from the Environmental Management Act of 2002 and the Waste Regulations 2000 and the EIA Regulations.

Legal Responsibilities

SEA must ensure that the waste regulations are updated regularly and aligned with the NSWMS and the current environmental legislation. The responsibility is extended to include technical support to other ministries and local government that have legislative authority.

Financial and Administrative Responsibilities.

SEA is responsible for securing its own budget and, with reference to legislation, for monitoring and providing technical support to other ministries and local authorities to ensure that adequate budget provisions are provided to implement the NSWMS. This responsibility is extended to include the identification and negotiation of financial incentive packages related to improved general and hazardous waste management.

Technical Responsibilities

In the early years of NSWMS implementation, SEA must assume an overall technical responsibility. This includes the implementation of important feasibility studies, identification of affordable and appropriate waste management solutions at all levels and for all waste streams, the development of a number of guidelines and handbooks and the development of monitoring and enforcement instruments.

Co-ordinating Responsibilities

SEA is expected to assume responsibility for the co-ordination and promulgation of cooperative government agreements and strategic public:private:civil society agreements, in order to support the effective allocation of responsibilities and utilisation of waste management resources.

Capacity Building, Training and Awareness Responsibilities.)

SEA must be prepared to assume the major overall enabling responsibility to support the implementation of the Strategy. This includes a variety of both executive and support functions at several levels related to awareness raising and training.

Reference is made to Volume II Annex 2 for a specification of the responsibilities linked to the proposed general portfolio.

4.5.2 Ministry of Housing and Urban Development (MHUD)

The MHUD is the principal national agency responsible for General Waste (GENW) from all sources. The Ministry will be the implementing agency for the GENW component of the NSWMS. MHUD is responsible for the provision of technical knowledge and capacity development support to local authorities and, through a Memorandum of Understanding, with the DPMO, and Waste Control Areas in rural and peri-urban areas. The MHUD undertakes their duties on waste management in accordance with the Environment Management Act of 2002, the Waste Regulations 2000 and the EIA Regulations.

Legal Responsibilities

MHUD is responsible for general waste and must ensure that relevant national and local waste legislation is updated regularly and is aligned with NSWMS, the Environmental Environment Act of 2002 and Waste Regulations 2000, and that the required complementary legislation is being developed and implemented.

Financial and Administrative Responsibilities

MHUD is responsible for securing its own budget and for providing support to local authorities to develop and subsequently secure adequate budget provisions to implement planned and approved GENW interventions.

Technical Responsibilities

During the early years of NSWMS implementation ,MHUD must assume a responsibility for technical knowledge for GENW management. This includes the development of technical knowledge relevant to different socio-economic environments in Swaziland. A number of enabling technical guidelines, manuals, handbooks and monitoring and enforcement instruments need to be sourced and/or developed.

Coordinating Responsibilities

MHUD is expected to assume responsibility for ensuring that co-operative government agreements and strategic public:private:civil society agreements are entered into. This will support the effective allocation and utilisation of responsibilities to meet the comprehensive capacity requirements of local authorities in peri-urban and rural areas.

Capacity Building, Training and Awareness Responsibilities. (towards others)

MHUD must be prepared to assume the national enabling responsibility to support the implementation of GENW management. This includes a variety of both executive and support functions at several levels related to awareness raising and training.

Reference is made to Volume II, Annex 2 for a specification of responsibilities linked to the proposed portfolio.

4.5.3 Ministry of Health and Social Welfare (MHSW)

The Ministry of Health and Social Welfare (MHSW) is the principal agency for Health Care Risk Waste (HCRW). The Ministry will be the implementing agency for the HCRW component of the NSWMS. MHSW is responsible for the provision of technical knowledge and capacity development support to public and private hospitals, clinics and other health facilities in both rural and urban areas. The MHSW undertake their duties on waste management in accordance with the Environment Management Act of 2002, the Waste Regulations 2000 and the EIA Regulations and complementary legislation.

Legal Responsibilities

MHSW is responsible for and must ensure that national and local HCRW waste legislation is updated regularly and is aligned with the NSWMS, the Environment Management Act of 2002 and Waste Regulations 2000 and that the required complementary legislation is being developed and implemented.

Financial and Administrative Responsibilities

MHSW is responsible for securing its own budget and for providing support to hospitals, clinics and other medical institutions in to develop and subsequently secure adequate budget provisions to implement planned and approved HCRW interventions.

Technical Responsibilities

During the early years of NSWMS implementation, MHSW must assume a responsibility for technical knowledge for HCRW management. This includes the development of technical knowledge relevant to the socio-economic environments in Swaziland. A number of enabling technical guidelines, manuals, handbooks and monitoring and enforcement instruments need to be sourced and/or developed.

Co-ordinating Responsibilities

MHSW is expected to assume responsibility for ensuring that co-operative government agreements and strategic public:private:civic society agreements for HCRW are entered into in order to meet the comprehensive capacity requirements of hospitals, clinics and medical institutions**.**

Capacity Building, Training and Awareness Responsibilities. (towards others)

MHSW must be prepared to assume the national enabling responsibility to support the implementation of HCRW management. This includes a variety of both executive and support functions at several levels related to awareness raising and training.

Reference is made to Volume II Annex 2 for a specification of responsibilities linked to the proposed portfolio.

4.5.4 The Deputy Prime Minister's Office (DPMO) and Regional Administration Offices

The Deputy Prime Minister´s Office, through the Regional Administration Offices, constitutes the official link between Government, the Thinkhundla and traditional authorities. The DPMO is therefore an important roleplayer for the introduction of improved waste management practices in rural and peri-urban areas located on Swazi Nation Land. It was not intended that the DPMO would implement service provision or possess any "technical" expertise of its own (e.g. on waste management). However, in order to ensure that appropriate waste management knowledge and systems are made available to the rural and peri-urban areas, the NSWMS proposes that the DPMO establish a waste management liaison capacity. The main function of the liaison capacity will be to ensure that relevant expertise is available from the waste stream knowledge centres at MHUD (for general waste); from SEA (for hazardous waste) and from MHSW (for health care risk waste). Moreover, the DPMO will assume the responsibility to identify and develop approaches to finance waste management in such areas and it will also liaise with local authorities and other agencies to explore possible national and local co-operation arrangements related to waste management.

Legal Responsibilities

DPMO (supported by the MHUD and SEA) is responsible for ensuring that existing legislation pertaining to peri-urban and rural areas is aligned with the NSWMS and that the required complementary legislation is co-ordinated with the Strategy, implemented and updated regularly.

Financial and Administrative Responsibilities

DPMO is responsible for securing its own budget and for facilitating budget provisions for waste interventions in peri-urban and rural areas and for providing support to communities in such areas in order for them to establish appropriate and sustainable waste management systems and practices.

Technical Responsibilities

The DPMO must, through co-operative agreements with other line ministries, ensure that technical expertise and knowledge relevant to peri-urban and rural areas is available. A number of enabling technical guidelines, manual, handbooks, monitoring and enforcement instruments need to be sourced or developed.

Co-ordinating Responsibilities

DPMO is expected to assume responsibility for ensuring that co-operative government agreements and strategic public:private:civil society agreements are entered into. This will support the allocated responsibilities in order to meet the comprehensive capacity requirements of waste authorities and communities in peri-urban and rural areas.

Capacity Building, Training and Awareness Responsibilities. (towards others)

DPMO must be prepared to assume the national capacity development responsibility to support the implementation of improved waste management in peri-urban and rural areas. This includes a variety of both executive and support functions at several levels related to awareness raising and training.

4.5.5 Ministry of Economic Planning and Development (MEPD)

MEPD is the Ministry responsible forNational Economic Planning, National Population issues, Co- ordination of Technical Co-operation Programmes and the Co-ordination of co-operation with the Donor community. In the context of waste management, the MEPD will co-ordinate the plans (in particular physical investments plans, including National and/or Regional Treatment Facilities and Landfill establishment) submitted by individual Ministries in order to avoid duplication and irrational expenditures of public funds. The MEPD is also an important roleplayer to ensure that sufficient funding is provided to meet the objectives of the NSWMS, once approved by Cabinet. MEPD will also assist and co-ordinate requests for donor assistance to implement the NSWMS.

Legal Responsibilities

The legal responsibility of MEPD is guided by the relevant legislation and the responsibilities towards the NSWMS stand guided by that. MEPD must ensure that budgeting for waste management by public stakeholders is in accordance with the approved legislation, currently the Environment Management Act 2002, the Waste Regulations 2000 and the EIA Regulations.

Financial and Administrative Responsibilities

MEPD is to co-ordinate and promote adequate budgetary provisions to line ministries to support their legislative responsibilities. MEPD will also assist waste management agencies to source and secure financial and technical support from the international donor community that is required to implement the NSWMS. MEPD may also assist SEA in the preparation of national guidelines for budgeting of waste management initiatives.

Technical Responsibilities

MEPD has no direct technical responsibility related to waste management apart from the review of investment and other proposals, for example for regional disposal sites and national incineration plants. However, MEPD may require waste management stakeholders to undertake the necessary feasibility studies prior to proposing investments into waste management infrastructure and equipment.

Co-ordinating Responsibilities

MEPD will co-ordinate budget proposals for waste related infrastructural investment in order to ensure that this is planned rationally, as seen from a national perspective. MEPD will co-ordinate with the SEA regarding their minimum requirements to National Solid Waste Management Planning and Budgeting.

Capacity Building, Training and Awareness Responsibilities

MEPD will provide assistance to line ministries when budgeting and preparing proposals for waste management investments.

Reference is made to Volume II Annex 2 for a specification of responsibilities linked to the proposed portfolio.

4.5.6 Ministry of Finance (MoF)

The MoF is the Ministry responsible for all public finance and hence also for the national fiscus. As such, MoF is the "one-stop agency" in ensuring that funding is being provided to implement the NSWMS. MoF will also be instrumental in the research required before the introduction of economic instruments related to waste management.

MoF's responsibilities related to solid waste management is seen as follows:

Legal Responsibilities

The legal responsibility of MoF is guided by the relevant legislation and the responsibilities towards the NSWMS stand guided by that. MoF is responsible for ensuring that sufficient budget is being provided to implement the approved plans, as submitted by the SEA and Line Ministries. MoF will also ensure the drafting of appropriate legislation in support of the introduction of economic instruments.

Financial and Administrative Responsibilities

MoF is responsible for ensuring that economic instrument (levies and taxes), targeted at both citizens, enterprises, the public sector and local authorities, are being researched subsequently presented to the legislative authorities for approval. MoF will also administer income derived from the introduction of economic instruments. MoF is responsible for the provision of sufficient funding to support the MEPD approved plans (i.e. on waste management)

Technical Responsibilities

MoF (in consultation with the SEA) is responsible for feasibility studies linked to the introduction of economic instruments required for the implementation of the NSWMS.

Co-ordinating Responsibilities

MoF will co-ordinate with SEA on the design and implementation of feasibility studies related to the introduction of economic instruments and for the final approval of budget provisions made for waste management in the fiscus.

Capacity Building, Training and Awareness Responsibilities.

MoF has no capacity building responsibilities related to the NSWMS.

Reference is made to Volume II Annex 2 for a specification of responsibilities linked to the proposed portfolio.

4.5.7 Ministry of Enterprise and Employment (MEE)

The Ministry of Enterprise and Employment constitutes a key link between the NSWMS and the commercial and industrial sector in Swaziland. The MEE is particularly involved in promotional activities to attract investors into Swaziland and may therefore have a conflict of interest in also advocating and enforcing the most appropriate waste management practices. As a result, waste management responsibilities have not been allocated to MEE. The MEE will be instrumental in forging and formalising co-operative linkages between government and private sector agencies at different levels and, together with the SEA, in the establishment of a Cleaner Production/Waste Minimisation Centre.

4.5.8 The Ministry of Agriculture and Co-operatives (MOAC)

The Ministry of Agriculture and Co-operatives is responsible for agricultural operations, including agricultural extension services in Swaziland. With the exception of organic “residuals” (not considered a waste in this context), waste from primary production mainly derives from the utilisation of agro-chemicals. This waste fraction will however be handled as hazardous waste by the SEA. However, the MOAC Extension Service offers an opportunity to extend waste related training and awareness to farming communities and rural areas.

4.5.9 The Ministry of Natural Resources and Energy (MNRE)

The MNRE is the national authority for mining concessions and operations in Swaziland. However, in the context of waste management, mining operations could be considered equal to enterprises and the hazardous component of the mining waste stream will therefore be handled by SEA. In order to provide fully for this, to declaration of mines as Waste Control Areas should be considered. The MNRE is currently the agency administrating and setting requirements for EIAs for proposed mining operations. This offers an opportunity in a waste management context to address the rehabilitation of former mining sites.

4.5.10 Public Sector Management Programme (PSMP)

The main purpose of the Public Sector Management Programme is to raise the standards of service delivery and to realise greater efficiency and cost effectiveness of the public service in Swaziland. The objectives of the PSMP include: - the development of clear and appropriate ministerial missions, objectives, strategies, structures and staffing levels and thereby improve the performance and productivity of the public service for effective and efficient delivery of services.

The PSMP is currently completing the remaining management audits of all ministries. Thereafter, a strategic planning and action planning process will commence for all

ministries. The PSMP programme will therefore have implications for the implementation of the recommended NSWMS related institutional arrangements, both within and between Ministries at National level.

It is important that the SEA, MHUD, MHSW and other national public agencies allocated solid waste related responsibilities, present their institutional and staff requirements as an input to the PSMP strategic and action planning processes.

4.6 Associations, Federations, Professional Bodies and NGOs

Stakeholder associations, federations, representative and professional bodies, NGOs and a range of Civil Society organisations, all constitute an important resource base and asset for the refinement and implementation of the NSWMS. The bodies and organisations are important access channels for both "outreach" promotional issues towards different constituencies, as well as a means to "capture challenges, obstacles and opportunities" for Strategy implementation. Their involvement would therefore be broad and should be expected to include: - policy development; waste action planning; identification of economic instruments including incentives; awareness raising and training and involvement in general partnerships for improved waste management.

The following bodies are considered to be of particular importance:

- Swaziland Chamber of Commerce and Industry
- Swaziland Federation of Employers
- Small Enterprise Development Company (SEDCO)
- Swaziland Commercial Amadoda
- Swaziland National Association of Local Authorities (SNALA)
- Local Authority Management Association of Swaziland (LAMAS)
- Public Enterprises and the Public Enterprise Unit.

Other relevant bodies include:

- Swaziland Association of Architects, Engineers and Surveyors
- The Building Contractors Association
- Hotel and Tourism Association
- Medical and Dental Council
- Swaziland Sugar Association
- Swaziland Water Services Corporation
- Swaziland Investment Promotion Authority (SIPA)
- Swaziland Industrial Development Company (SIDC).

There are about 100 registered NGOs and CBOs in Swaziland. However, only a few of them are environmentally focused. As the waste agenda is crosscutting, the access provided by NGOs and CBOs to many constituencies, communities and stakeholders, should be considered as an asset to the implementation of key awareness and

sensitisation campaigns for selected components of the Strategy. The same approach is applicable with respect to church organisations and the education system.

It is the responsibility of MHUD, MEE, MHSW and the SEA to map out a strategy on how to optimise the involvement of the above-mentioned organisations and bodies.

4.7 Local Level Agencies

There are large differences in the planning, management, implementation and financial capacities of local level agencies, in particular among the three types of local authorities. Local level agencies moreover differ in terms of their technical and financial degree of autonomy from central government. At this point in time, they cannot therefore realistically be considered under the same set of institutional portfolios and associated responsibilities. Although the Solid Waste Strategy is planned to gradually shift from an emphasis on national facilitation towards local level implementation, this shift cannot be expected to happen immediately.

4.7.1 City Councils

Mbabane and Manzini City Councils (CCs) currently have the highest degree of local authority autonomy and are being pressurised by Government to cover their own cost of service delivery. The City Councils are therefore expected to operate and finance their own waste management operations, on a cost-recovery basis. There is presently, a large scope for improvements in waste management in almost all aspects. This performance gap will not be bridged without substantial technical support from MHUD (GENW) and SEA (HAZW). The overall waste management responsibilities of the City Councils are outlined in the Urban Development Act, in the Waste Regulations 2000 and in the Environment Management Act 2002. The NSWMS allocates the following proposed portfolio and responsibilities:

Legal Responsibilities

City Councils will be responsible for the development of by-laws that support the implementation of the national waste policy, strategy and legislation pertaining to GENW and HAZW. City Councils will also have legal responsibilities associated with the monitoring and enforcement of both national and local legislation on solid waste management within their area of jurisdiction.

Financial and Administrative Responsibilities.

The City Councils have a major responsibility to introduce the "Polluter Pays Principle", for example through the introduction of cost recovery approaches for waste management services. City Councils are also responsible for making sufficient budgetary provisions to support their legislative obligations in relation to waste management. Where necessary, the CC´s will be responsible for ensuring financing for NSWMS required investments. The City Councils must however seek cost-effective waste management solutions through Co-operative Government Agreements with other local authorities and other communities, and by the application of affordable waste management approaches.

Technical Responsibilities

The City Councils will be responsible for the planning and implementation of the waste management system within their area of jurisdiction. To this effect, the CCs will be instrumental in the identification and implementation of new, affordable and efficient technical and managerial approaches towards waste management and play a lead role to develop and effectuate plans to replace all existing outdated systems.

Coordinating Responsibilities

In order to undertake their portfolio and associated responsibilities, the City Councils will co-ordinate with MHUD, MHSW and the SEA and locally with communities, NGOs and CBOs and contractors.

Capacity Building, Training and Awareness Responsibilities (towards others)

The City Councils will play a lead role in ensuring that urban citizens in both formal and informal areas are sensitised to improved waste management practices, and in particular the role to be played by citizens living in different types of residential areas. The City Councils, in conjunction with SEA (MEE), will play a similar role towards businesses and enterprises located within the urban boundaries. The City Councils will furthermore be instrumental in capacitating its own staff and Councillors, the staff of employed contractors, NGOs etc. to work as agents of change.

Reference is made to Volume II Annex 2 for a specification of responsibilities linked to the proposed portfolio

4.7.2 Town Councils (TCs) and Town Boards (TBs)

Town Councils (TCs) and Town Boards (TBs) are generally allocated the same waste management portfolios and responsibilities. The major difference between the two

types of local authorities lies in the extent to which they need support from national level agencies and the level of political and financial autonomy.
Town Councils currently have some degree of political and financial autonomy and the forthcoming new Urban Government legislation is expected to provide for further autonomy. The Town Councils however generally have limited technical capacity and waste management services are generally confined to waste collection of household waste, with limited cost-recovery. With only a few exceptions, waste collected by the TCs, and/or TC employed Contractors, is disposed of at uncontrolled disposal sites. Large amounts of waste are still not being collected and any waste management services beyond “collection” is deemed to be a challenge to the Councils.

Town Boards have a limited degree of political and financial autonomy. The management and administration of the Town Boards is currently mainly undertaken through an office of the MHUD. Some of the Town Boards make use of Contractors (MHUD contracted) for waste collection, although others do not undertake any collection. No other waste management services are undertaken.

For the implementation of the National Solid Waste Management Strategy, both Town Councils and Town Boards would, in the short to medium term, have to rely on MHUD (GENW), the SEA (HAZW), the MHSW (HCRW) for technical knowledge on new methods and approaches and general capacity development. The overall waste management responsibilities of the City Councils are outlined in the Urban Development Act and in the Waste Regulations 2000.

The NSWMS allocates the following proposed portfolio and responsibilities:

Legal Responsibilities
With assistance provided by and through national level agencies, Town Councils and Town Boards will be responsible for the development of by-laws that support the implementation of the national waste policy, strategy and legislation pertaining to GENW, HAZW and HCRW. TCs and TBs will also have legal responsibilities associated with the monitoring and enforcement of both national and local legislation on waste management.

Financial and Administrative Responsibilities.
The TCs and TBs will be responsible for the introduction of the "Polluter Pays Principle" within their areas of jurisdiction. Where necessary, the T´s and TBs (with the support of MHUD) will be responsible for ensuring financing for NSWMS required investments. The TCs and TBs will be responsible for the introduction of cost-effective waste management solutions, where applicable, through Co-operative Government Agreements with other local authorities and also communities and by the application of affordable waste management approaches.

Technical Responsibilities
The TCs and TBs will be responsible for the efficient and effective planning and implementation of waste management within their area of jurisdiction. To this effect, the Councils and Boards will receive support from MHUD, SEA and MHSW to identify and implement new, affordable and efficient technical and managerial approaches towards waste management and play a lead role to develop and effect plans to replace all existing outdated systems

Coordinating Responsibilities
In order to undertake their portfolio and associated responsibilities, the Town Councils and Town Boards will co-ordinate with MHUD, MHSW and the SEA and locally with communities, NGOs, CBOs and contractors.

Capacity Building, Training and Awareness Responsibilities. (towards others)
The Town Councils and Town Boards will play a lead role to ensure that urban citizens in both formal and informal areas are sensitised to improved waste management practices and in particular the role to be played by citizens living in different types or residential areas. The Town Councils and, to a lesser extent the Town Boards, will, in conjunction with SEA and MHUD, play a similar role towards businesses and enterprises located within the urban boundaries. Capacity Building towards Town Councils and Town Boards will to a large extent be provided by and through national level agencies.

4.7.3 Company Towns (CTs)

The terminology "Company Towns (CTs)" does not sufficiently describe the diverse nature of these structures. Most company towns have industrial, commercial, residential and medical facilities that resemble both a formal urban settlement and an industrial site/estate environment. This, together with the degree of autonomy of company towns, makes it difficult to outline a simple institutional arrangement for them. It is therefore proposed that waste management for CTs be addressed through the declaration of "*Waste Control Areas*". To support this approach, it is proposed that the national authorities responsible for the respective waste streams will develop integrated multi-waste stream minimum standards and supporting guidelines. The guidelines would specify the roles and responsibilities pertaining to the CTs with respect to planning, enforcement, management, implementation, awareness and capacity development. The SEA could operate as a "one-stop" approval agency for waste issues pertaining to CTs. This would require SEA to formalise co-ordinating structures with the MHUD and MHSW to ensure that matters pertaining to GENW and HCRW are

professionally attended to and managed. Consequently, no specific portfolio has been outlined for the Company Towns.

4.8 Regional Administrations (peri-urban and rural areas)

The Regional Administrations under the DPMO are central to improved waste management practices in peri-urban and rural areas, which are located on Swazi Nation Land. The Regional Administration Offices currently have a limited managerial, technical and administrative capacity and cannot be expected to be instrumental on waste management issues. They should meanwhile facilitate the involvement of traditional authorities and, through their community development workers, play a main role in the implementation of awareness and community training programmes. The latter may be extended to include limited waste management and enforcement responsibilities. The declaration of Waste Control Areas should be applied widely. The proposed portfolio and related responsibilities has been described in Section 4.5.4. and in Volume II Annex 2 of the NSWMS.

4.9 Enterprise Level

The enterprise (private, public and parastatal) level is considered crucial to the implementation of the NSWMS, in terms of general waste, hazardous waste, recycling and the introduction of cleaner technology measures. The Strategy envisages the involvement of enterprises in several ways:

- The enterprise must comply with minimum waste standards set by legislation.
- The organisational policy of an enterprise will set standards for its own waste management practices that are based on national legislation, on which employees will be trained..
- Product and purchasing policies may be adjusted to support the recommendations made.
- The enterprise should report to the WIS and RSSW, as required.
- The enterprise should generally play a major role in waste based awareness campaigns towards its employees.

The engagement of enterprises is a major responsibility of SEA, MHUD, MEE, MHSW, as well as representative bodies, federations and associations. It is proposed that SEA play a co-ordinating role to develop an approach towards the engagement of enterprises in all relevant aspects of the NSWMS.

4.10 Citizens

Citizens, as members of families, communities or a workplace, or attending education at any level, should be considered the backbone to the implementation of the Strategy. Through the interaction at different levels of society, sound environmental behavioural patterns can be disseminated. As encountered internationally, attitudinal change linked to waste management is complex and can only be accomplished through persistent and

well thought out programmes pursued through influential channels. Such programmes may be of an awareness nature, but they may also be through providing economic and other incentives (for example linked to recycling). It is envisaged that for the first 10 years, extensive behavioural change approaches would have to be developed by the SEA, MHUD, MEE and MHSW, in conjunction with other agencies such as the Ministry of Education and the DPMO. The implementation of the programmes should be undertaken by the agencies best placed to reach the different rural, peri urban and urban target groups and citizens at different stages of life.

4.11 Capacity Development Strategy/Plan

The implementation of the NSWMS and the associated-proposed allocation of institutional roles and responsibilities will induce a number of institutional capacity gaps. These gaps will be of a diverse nature linked to organisational structures; skills and knowledge deficiencies; equipment, procedures and systems, legal issues, as well as relations between institutions and individuals.

Major institutional performance challenges are expected to emerge in relation to the proposed portfolio for the SEA, MHUD, MHSW and the DPMO. For these agencies, their responsibilities in respect of overall and hazardous waste (SEA), general waste (MHUD and DPMO) and Health Care Risk Waste (MHSW), is new or substantially additional to their current responsibilities and cannot easily be absorbed within their existing capacity and structure. Capacity requirements at the implementing level (e.g. local authorities, medical institutions and enterprises) are apparent.

Moreover, the institutional alignment and capacity building requirements imply additional financial requirement than that required to operate and manage established waste management systems. This places an additional "burden" during the initial years of strategy implementation, which will have to be planned for. As a result, a Capacity Development Strategy/Plan is needed as a key implementing instrument for the NSWMS.

The first draft of this strategy/plan is enclosed in Volume II Annex 2. More detailed Ministry or institution level plans will be required, which may need adjustment following the outcome of the strategic and action planning processes of the Public Sector Management Programme.

The capacity development interventions proposed for the major national and local agencies can be summarised under three headings:

- Structure, Staff and Interrelations;
- System Tools (Equipment, Guidelines and Manuals);
- Skills Development and Awareness.

This has been further detailed in **Volume II Annex 2** according to the following nature of responsibility:

- Legal;
- Financial and Administrative;
- Technical;
- Co-ordinating;
- Capacity Development (towards other agencies).

4.11.1 Swaziland Environmental Authority (SEA)

Structure, Staff and Interrelations

1. Based on the approved NSWMS and the associated outlined responsibilities, SEA will review its organisational arrangement, including the allocation of waste management responsibilities to functional units and individual positions.
2. The staff requirements estimated in the NSWMS will be reviewed, and plans to professionally upgrade existing staff and for the filling of vacancies prepared.
3. SEA will identify the options and requirements for Co-operative Government Agreements and inter-ministerial bodies.
4. Co-ordinating structures will be developed, or existing structures strengthened, to monitor and support the implementation of the NSWMS by other agencies at both national and local level.
5. SEA will head an initiative to link-up Swaziland with international organisations and bodies.

System tools(Equipment, Guidelines and Manuals)

6. SEA will need a range of enabling guidelines, manuals and handbooks related to key waste management issues for its own use and for other agencies.
7. SEA will need to procure and maintain sufficient Information Technology equipment for all staff assigned waste management responsibilities in order to facilitate communication through the internet and to obtain additional experience and knowledge.
8. SEA will develop and maintain the web page that has been implemented . This web page will contain relevant waste management documents and articles, information on the status quo of the waste situation in Swaziland as well as information on training and awareness material.

Skills Development and Awareness

9. The NSWMS induces a range of skills and awareness needs within SEA. These relate to the legal, financial, technical, co-ordinating and capacity development responsibilities assigned to SEA.
10. On the basis of the recommendations provided in the NSWMS, SEA will develop an in-house skills and knowledge development plan. This plan will address all levels of staff and integrate with the overall responsibilities outlined above. The plan will specifically focus on the HAZW, WIS and RSSW responsibilities assigned to SEA.

11. A strategy for capacity development at SEA will be implemented. This strategy must acknowledge that SEA staff cannot attend long-term training programmes, as this is both expensive and may compromise NSWMS implementation.
12. SEA will utilise the substantial capacity development documentation developed under the NSWMS Project, and advise other waste management stakeholders on of its use. . This document contains technical, financial and training and development packages.

4.11.2 Ministry of Housing and Urban Development (MHUD)

Structure, Staff and Interrelations

1. Based on the approved NSWMS and the associated outlined responsibilities, MHUD will review its organisational arrangements, including the allocation of waste management responsibilities to functional units and individual positions.
2. The staff requirements estimated in the NSWMS will be reviewed, and plans to professionally upgrade existing staff and for the filling of vacancies prepared.
3. MHUD will identify the options and requirements for national and local Co-operative Government Agreements and inter-ministerial bodies related to improved and effective GENW management.
4. MHUD will facilitate the establishment of co-ordinating structures, where possible using existing structures, to monitor and support the implementation of the NSWMS by other agencies at both national and local level.
5. MHUD and SEA will co-operate to link-up Swaziland with international organisations and bodies.

System tools(Equipment, Guidelines and Manuals)

6. MHUD will develop a range of enabling guidelines, manuals and handbooks related to GENW management issues for its own use and for use by other agencies.
7. MHUD will procure and maintain sufficient Information Technology equipment for relevant units and staff assigned in order to facilitate communication through the internet and to obtain additional information related to GENW.

Skills Development and Awareness

8. In order to address the capacity gaps induced by the NSWMS, MHUD will develop and implement a detailed in-house skills and knowledge development plan. The plan will address all levels of staff and integrate with the overall responsibilities for GENW management, as outlined above.
9. A strategy for capacity development at MHUD will be implemented. This strategy will be developed for the implementation of action plans for capacity development.

10. MHUD will utilise the substantial capacity development documentation developed under the NSWMS Project and advise other waste management stakeholders on of its use. . This document contains technical, financial and training and development packages.

4.11.3 Ministry of Health and Social Welfare (MHSW)

Structure, Staff and Interrelations

1. Based on the approved NSWMS and the associated outlined responsibilities, MHSW will review its organisational arrangements, including the allocation of health care risk waste management responsibilities to functional units and individual positions.
2. The staff requirements estimated in the NSWMS will be reviewed, and plans to professionally upgrade existing staff and for the filling of vacancies prepared.
3. MHSW will identify the options and requirements for national and local Co-operative Government Agreements and inter-ministerial bodies related to improved and effective HCRW management.
4. MHSW will facilitate the establishment of co-ordinating structures, where possible by using existing structures, to monitor and support the implementation of the NSWMS.
5. MHSW and SEA will co-operate to link-up Swaziland with international organisations and bodies.

System tools(Equipment, Guidelines and Manuals)

6. MHSW will develop a range of enabling guidelines, manuals and handbooks related to HCRW management issues for its own use and for use by other agencies.
7. MHSW will procure and maintain sufficient Information Technology equipment for relevant units and staff assigned waste management responsibilities in order to facilitate communication through the internet and to obtain additional information and knowledge on HCRW management. .

Skills Development and Awareness

8. In order to address the capacity gaps induced by the NSWMS, MHSW will develop a detailed in-house skills and knowledge development plan. The plan will address all levels of staff and integrate with to the overall responsibilities for HCRW management, as outlined above. A strategy and action plan for MHSW capacity development will be implemented and revised regularly.
9. MHSW will utilise the substantial capacity development documentation developed under the NSWMS Project and advise other waste management stakeholders on of its use. . This document contains technical, financial and training and development packages.

4.11.4 Deputy Prime Ministers Office (DPMO)

Structure, Staff and Interrelations

1. Based on the approved NSWMS and the associated outlined responsibilities, DPMO will review its organisational arrangements, including the allocation of waste management responsibilities to functional units and individual positions.
2. The staff requirements estimated in the NSWMS will be reviewed, and plans to professionally upgrade existing staff and for the filling of vacancies prepared.
3. DPMO will identify the options and requirements for national and local Co-operative Government Agreements and inter-ministerial bodies related to improved and effective waste management in peri-urban and rural areas.
4. DPMO will facilitate the establishment of co-ordinating structures, if possible by using existing structures, to monitor and support the implementation of the NSWMS by other agencies at both national and local level.

System tools(Equipment, Guidelines and Manuals)

5. DPMO will develop enabling guidelines and manuals related to GENW management issues, for its own use and for use by other agencies.

Skills Development and Awareness

6. In order to address the capacity gaps induced by the NSWMS, DPMO will develop a skills and knowledge development plan. The plan will address all levels of staff and integrate with the overall responsibilities for GENW management, as outlined above.
7. A strategy for DPMO capacity development will be implemented.
8. DPMO will utilise the substantial capacity development documentation developed under the NSWMS Project and advise other waste management stakeholders on its use. . This document contains technical, financial and training and development packages.

4.11.5 Ministry of Economic Planning and Development (MEPD)

Structure, Staff and Interrelations

1. MEPD will designate responsibilities for waste management to a specific functional unit and officer.
2. A budget planning process will be agreed with the SEA and other line ministries, where required.
3. SEA will review the rejected and approved plan proposals from MEPD before they are sent to MOF for approval.

System tools(Equipment, Guidelines and Manuals)

4. MEPD will agree with SEA on budget guidelines for waste management to be issued to line ministries.

Skills Development and Awareness

5. Relevant MEPD staff will be sensitised to, and trained in the legal framework and regulations for waste management (i.e. Waste Regulations 2000, Environment Management Act 2002 and EIA Regulations), as well as the implications of the NSWMS.
6. Relevant MEPD staff will be trained to meet their legal, financial, technical, co-ordinating and capacity development responsibilities.

4.11.6 Ministry of Finance (MoF)

Structure, Staff and Interrelations

1. MoF will designate responsibilities for waste management to a specific functional unit and officer.
2. A budget planning process will be co-ordinated and agreed upon with MEPD and the SEA, and other line ministries, where required.

System tools(Equipment, Guidelines and Manuals)

3. MoF will agree with MEPD and SEA on budget guidelines for waste management to be issued to line ministries.

Skills Development and Awareness

4. Relevant MoF staff will be sensitised to, and trained in the legal framework and regulations on waste management (i.e. Waste Regulations 2000. Environment Management Act 2002) and the implications of the NSWMS.
5. Relevant MoF staff will be trained to meet their legal, financial, technical, coordinating and capacity development responsibilities

4.11.7 City Councils (CC)

Structure, Staff and Interrelations

1. Based on the approved NSWMS and the associated outlined responsibilities, the City Councils will review their organisational arrangements, including the allocation of waste management responsibilities to functional units and individual positions.
2. The staff requirements for CCs estimated in the NSWMS will be reviewed, and plans to professionally upgrade existing staff and for the filling of vacancies prepared.
3. The CCs will identify the options and requirements for national and local Co-operative Government Agreements and inter-municipal bodies related to improved and cost-effective waste management.
4. The CCs will convene their own structures and participate in structures convened by national agencies to review and recommend on CC and national waste management issues.
5. The CCs will enter into agreements with the SEA, MHUD and MHSW to acquire relevant waste management knowledge from their resource library facilities.

System tools(Equipment, Guidelines and Manuals)

6. Based on national Guidelines, Handbooks and Manuals issued by SEA, MHUD and MHSW, CCs will develop a range of in-house guidelines and procedures to comply with national requirements on waste management.
7. The CCs will source information about new/appropriate waste management technology and subsequently review and make plans for required changes.
8. Training Manuals and Awareness Raising programmes and packages on waste management will be developed and implemented.

Skills Development and Awareness

9. In order to address the capacity gaps induced by the NSWMS and WR2000, CCs will develop a detailed in-house skills and knowledge development plan. The plan will address all relevant levels of staff and councillors and integrate with the overall CC responsibilities for waste management, as outlined above.
10. CCs will prepare a supporting strategy and implementation plan and approach.
11. CCs will utilise the substantial capacity development documentation developed under the NSWMS Project and advise other waste management stakeholders on its use. . This document contains technical, financial and training and development packages.

4.11.8 Town Councils and Town Boards

Structure, Staff and Interrelations

1. Based on the approved NSWMS and the associated outlined responsibilities, MHUD will assist the Town Councils and the Town Boards to review its organisational arrangements, including the allocation of waste management responsibilities
2. The staff requirements for TCs and TBs estimated in the NSWMS will be reviewed, and plans to professionally upgrade existing staff and for the filling of vacancies prepared.
3. The TCs and TBs will identify the options and requirements for national and local Co-operative Government Agreements and inter-municipal bodies related to improved and cost-effective waste management.
4. The Towns Boards and Town Councils will, where applicable, convene their own or participate in structures convened by national agencies to review and recommend on TC and TB waste management issues.
5. The TCs and TBs will enter into agreements with the SEA, MHUD and MHSW to acquire relevant waste management knowledge and support.

System tools(Equipment, Guidelines and Manuals)

6. TCs and TBs will receive Guidelines, Handbooks and Manuals issued from SEA, MHUD and MHSW for their direct use or develop a range of in-house

guidelines and procedures to comply with national requirements on waste management.

7. The TCs and TBs will source information about new/appropriate waste management technology from national agencies and subsequently review and make plans for the required changes.
8. Training Manuals and Awareness Raising programmes and packages on waste management will be developed and implemented.

Skills Development and Awareness

9. In order to address the capacity gaps induced by the NSWMS and WR2000, MHUD will assist the TCs and TBs to develop detailed in-house skills and knowledge development plans. The plans will address all relevant levels of staff, councillors and contractors and integrate with the overall TC and TB responsibilities for waste management, as outlined above.
10. The TCs and TBs will prepare a supporting strategy and implementation plan and approach.
11. TCs and TBs will utilise the substantial capacity development documentation developed under the NSWMS Project and advise other waste management stakeholders on its use. . This document contains technical, financial and training and development packages.

Capacity development requirements will be addressed through a phased approach and linked to the implementation of agreed priority initiatives for the Solid Waste Strategy.

5. Enabling and Sustaining the Strategy

5.1 Introduction

During the development of the NSWMS, two concerns emerged. One was the realisation that there are factors outside the immediate sphere of influence of the strategy makers and implementers, which nevertheless will have a strong impact on the likelihood of success for the strategy. If such factors are absolutely critical for success or failure they are termed *"killer assumptions"*. However, if they are very significant, but not a question of "either/or", then we might define them as *enabling* (or disabling) factors.

The other concern was that of *sustainability*. Establishing all the elements necessary to implement the strategy is one thing but for the strategy to evolve into a steady state, where initiatives embarked upon during the strategy period can be sustained and even further developed in the long run, requires a broader perspective. The implementation of the pilot project under the NSWMS Project provided indicators on this. Sustainability, in this context, may be defined as the continuation of the benefits of implementing the strategy once it is up and running.

This chapter provides a preliminary attempt to review the situation with these two concerns in mind.

The type of instruments (physical as well as procedural) and skills (know-how) required for implementation of the NSWMS are implied in Chapter 3 and 4 of this document, and described in more detail in the "Priority Initiatives" in Volume II Annex 2. Identifiable problems of how to enable and sustain these factors will be addressed under the heading: ***Technical Assumptions***.

The institutional framework and the portfolio and roles designated to the various actors, their internal organisation and staffing, and their mutual relations and designated interaction patterns, are likewise implied in the strategy, and more specifically in chapter 4 in this document on the institutional set-up. Identifiable problems of how to enable and sustain these factors will be done under the heading: ***Institutional Assumptions.***

A number of motivating factors and assumptions are also implicit in the strategy. They include such topics as "willingness to pay" by beneficiaries, "ability to pay" by polluters, effectiveness of sanctions and enforcement, performance criteria in the public sector, price-elasticities and consumer behaviour, and most basically: the priority given to solid waste problems by the public. Identifiable problems of how to enable and sustain these factors will be done under the heading***: Socio-economic Assumptions***.

However, only a limited proportion of the cost of implementing the Strategy is likely to be financed directly, either by beneficiaries or polluters. Therefore ultimately both the cost of establishing the strategy and that of sustaining it, will depend on the will of the relevant political decision-makers to provide the necessary financial resources. A discussion on the prospects for the ***Politico-financial Sustainability*** of the Strategy will however be premature at this point in time. The first attempt at estimating the cost of the resources required to implement the Strategy should only be taken as an indication as an estimate, and the high-level discussions of "value for money", and of prioritising human resources, are yet to begin. This issue will therefore only be briefly discussed.

The headings highlighted above, may serve as useful points of departure for highlighting the factors required to implement and sustain the Strategy. However, as will be seen below, they cannot be assessed in isolation from each other. In most cases they are interlinked in a way that a "weakness" in one factor is often compensated for an increased quality and/or quantity of another.

5.2 Technical Assumptions

The proposed priority initiatives detailed in Chapter 3 of this document and in Volume II Annex 2, a comprehensive list of issues such as legal instruments, procedural guidelines, planning mechanisms, monitoring systems, manuals, formats. Most of them ultimately aim at the intervention levels of collection and transport, treatment, and disposal and remediation. Comparatively few are aimed at prevention and recycling.

A number of the proposed new/improved instruments or tools for better waste management will require specialist knowledge to develop. ,This knowledge may currently not be available in Swaziland. The Strategy therefore also foresees the need for specialist consultancy assistance for this development work during a developmental (establishment) period to assist in developing and adapting such instruments to local conditions. However, the Strategy does not specify similar assistance requirements to maintain and further develop waste management practices and systems in the long-term.. It has been assumed that after the implementation of most of the waste instruments or system tools, the level of knowledge in the ministries will only require limited upgrading with regards to the management of general and special wastes. This is still a matter for discussion on whether this is a correct assumption and the continued updating of waste management practices can be ensured through the proposed participation in conferences held internationally and in Swaziland.

However, there seems to be a lack of basic knowledge in the public sector with regard to industrial hazardous wastes. It would appear that the acquisition of the requisite knowledge in this field is only attainable through new recruitment at ministerial level. At the operational level, the required knowledge may be instituted either by training or through contracting of the required services.

Advanced skills in economics required to be pursued and the level of ambition behind the proposed waste prevention and recycling initiatives may also need review. The current analytical capacity within Government in the field of economic policy instruments is limited. The Government has a number of highly qualified professionals, but not in sufficient numbers for sustained policy research. The Finance Ministry has an Economic Review and Forecasting Committee, and the Central Bank a Research Department, but neither have been established to function as a think-tanks for other agencies at this point in time. Ongoing activities are mainly concerned with collecting and aggregating statistics.

5.3 Institutional Assumptions

The proposed waste strategy builds on existing institutions, but does in some cases propose a greatly expanded portfolio and jurisdiction for these institutions. This includes the MHUD, , SEA, as well as the DPMO. The MHUD already has in principle the mandate to declare urbanised settlements for "urban areas". This would establish an institutional framework and also introduce taxation as a means to cover associated "mandatory" service provision, including waste management services. However, vested interests relating to the conversion of Swazi Nation Land into formal urban land have in many cases been so strong, that this mandate has never been applied.

The Strategy proposes to make use of the provision made in Waste Regulations 2000 and the Environment Management Act 2002 to declare any settlement a "Waste Control Area", when appropriate. The Strategy suggests that it may be "appropriate". for selected peri-urban areas, Company Towns, and even certain industrial enterprises or mining enterprises. While the responsibility for waste control areas will have to be agreed for each case, MHUD will be the agency that has the technical knowledge required to advise, monitor and enforce these areas. However, MHUD does not currently have sufficient manpower to address these issues. With its current jurisdiction the Ministry (MHUD) would have to establish one new position to sustain the increased responsibilities of the strategy. If the geographical scope were to expand, then the number of staff would be need to be increased accordingly.

It is SEA, however, which has to sustain the greatest workload of recurrent responsibilities from the implementation of the Strategy. The NSWMS estimates this workload to be equivalent to three permanent positions. In view of the discussion in the preceding section, it would therefore be appropriate to recruit two waste management experts with at least one being specialised in hazardous industrial waste, and one environmental economist.

A rather conservative estimation of the civil service and urban local government human resources needed to sustain the added recurrent responsibilities amounts to a total of 11 positions. However, there is at the same time a conspicuous scope for increasing the efficiency of Swaziland's public administration. Therefore, the added administrative burden of the NSWMS could be sustained by exploring the potential for greater

efficiency. One specific strategic tool proposed for this in the Strategy is to apply "co-operative government", inter-municipal co-operation and local level co-operation approaches. Another approach proposed is to have the proposed new waste management portfolios reviewed within the context of the Public Sector Management Programme.

While it may be possible for SEA to enlist the required staff for a few years, it is unlikely that the terms of employment offered would be sufficient to retain them in the long-term. There is the risk that substantial government resources used for appointed staff to obtain additional waste related qualifications may be lost if/when they leave other employment opportunities. It would therefore be a great boost to the sustainability of the Strategy if SEA were to attain the Authority Status, which is proposed in the Environment Management Act.

The last major institutional factor, which would have a significant impact on the achievements of the Strategy, is Swaziland's institutionalised co-operation with its neighbours on the subject of transboundary movement of solid waste, as manifested in the Basel Convention. Unless Swaziland can, and will conform to the terms of this convention, several aspects of the proposed strategy will not be implementable.

5.4 Socio-economic Assumptions

Motivational aspects of the strategy are yet to be fully developed. A crucial factor, which will have to be considered if many of the proposed regulations and by-laws are to be implemented and sustained, is that of enforcement capacity. This pertains to legal sanctions, as well as to inspection and enforcement by institutions and staff designated with this responsibility. This is a "killer assumption" for the application of the "polluter pays" principle. This impacts on many of the envisioned regulations and by-laws that will be rendered obsolete even before implementation, as well as cost-recovery for collection and treatment services, which will not function fully if a requisite enforcement capacity is not put in place. The higher the ambition with regards to effectiveness and cost-recovery, the greater emphasis must be placed on enforcement capacity, until such times that the values of a clean environment have been internalised in most parts of the public.

With regard to the design of overall incentive structures to change wasteful consumer behaviour, in particular packaging waste, the current administrative arrangement is either rudimentary, or entirely lacking. Strategising of these issues should probably include investigating the potential for designing adequate price-incentives through legal means, such as obligatory deposits.

Most of the strategy interventions proposed for recycling, essentially relies on making waste related or waste derived businesses and self-employment opportunities visible.

If advantage is to be taken of these opportunities, support services for the preparation of business feasibility studies and business planning need to be made available. Moreover, at a national level, studies need to be undertaken in order to assess the feasibility of legislation and incentive schemes linked to recycling and waste minimisation. Unfortunately, there is a shortage of the necessary institutions and skills, at both the individual private entrepreneurs, as well as the public investors in projects and programmes. There is therefore a need to develop the capacity for economical appraisal, including skills such as market surveying, assessment of price-elasticities, and calculation of rates of return. A consideration could be given to establishing this capacity through the proposed Cleaner Technology/Waste Minimisation Centre and/or with UNISWA. Small business support agencies and representative bodies may be another option.

The socio-economic and politico-financial assumptions are important as the Strategy requires substantial investment in equipment and infrastructure. Some of these investments will be made by local urban governments, and possibly by private contractors. Investment into the required infrastructure would be facilitated if the Government developed financing instruments that allowed waste operators (private waste contractors as well as Local Authorities) to depreciate their investments over an appropriately long period of time.

More importantly, is the issue of cost-recovery for waste services in settlements located on Swazi Nation Land (i.e. most rural and peri-urban areas). The Strategy approaches waste management from a National perspective, and assumes that the responsible authorities will address the required financial arrangements. The traditional local authorities (Thinkhudlas) have limited means to enforce cost-recovery for services. Enabling, and sustaining, initiatives in these areas is therefore dependent on the ability and willingness of the national institutions that have the legal responsibility for these areas, to provide financial support.

5.5 Highlighting of "killer assumptions"

Four crucial assumptions that will impact on the implementation of the Strategy have been identified. They are as follows:

1) The introduction of the "Polluter Pays Principle";
2) Appropriately increased staffing of SEA and MHUD;
3) Effective participation in the Basel Convention;
4) Availability of resources, especially for services on peri-urban and rural areas.

6. Cost Estimates of Required Resources

6.1 Introduction

The purpose of costing the Strategy is to provide the decision-makers with an order of magnitude estimate of resources required to implement the various proposed initiatives.

The costing was based on the detailed descriptions of the individual proposed initiatives presented in Volume II Annex 2. Seven initiatives were identified namely Waste Management Planning, Waste Information System, Minimisation, Recycling, Collection and Transportation, Treatment, and Disposal.

The costing was done for three different timeframes e.g. Approval – 2 years after approval**,** 2 – 4 years after approval and 5 – 10 years after approval. An overview of the costs for the initiatives, broken down into activities, is provided in table 6.1. In the table, the first two costing timeframes are joined into one implementation period called **From approval – 4 years after approval.**

Detailed costing for each individual initiative is provided in the tables in Volume II, Annex 2. A total of 14 activities within each initiative were separately costed. . A table for each activity is attached to the descriptions of the relevant initiative. The costings have been **aggregated** in the following two ways:

- For each priority initiative **according to roleplayer**, highlighting the relative importance of staff-time and capital inputs.
- For each priority initiative **according to timing,** . highlighting the relative weight of the various initiatives in terms of demands on resources.

An important **distinction between *"establishment"* and *"recurrent costs"*** has been applied. The *establishment costs* signifies both investments in terms of capital and "one-of-its-kind" costs, in terms of labour, while *recurrent costs* signifies depreciation or replacement costs in terms of capital, and operation and administration costs, in terms of labour.

The principles of estimating the various cost-elements are briefly discussed in Section 6.1.1.

6.1.1 Costing

Since most of the equipment and hardware are unique and non-repetitive cost items, the assumptions for their costing are indicated in referenced footnotes.

In contrast, costing of the estimated required human resources has been more standardised. The respective "initiative matrices" will only reflect the estimated labour

requirement in quantitative terms. The type of work involved is explained in Volume II Annex 2.
The unit used for estimation is work month (wm), or fractions thereof. Relevant specialists have estimated the required time-inputs in terms of dedicated work months at the equivalent of 22 work days per work month.

These task estimates assume exclusive dedication to the given task at an optimal level of appropriate professional competency. (i.e. assumes that neither under- or over-qualified staff is utilised). The estimation of required work inputs are also assumed to be a composite of gross requirement (the estimate is not limited to the main "task-handler"), as well as the time of others associated with the given activity. For example: if the general (recurrent) administration of a particular responsibility within an agency is estimated at 3 work months, then this estimate also includes the time of colleagues in meetings, supervision and direction by the director, assistance by receptionists, clerks or secretaries.

However, not all months are equal duration. Some are shorter than others, some are holiday months, and in the case of each individual staff member the amount of work undertaken in any given month may vary and be dependent on sick leave, training activities, social obligations or other "inefficiencies".

Before such input estimates are translated into cost equivalents, they are first multiplied with a factor which aims to take into account "inefficiencies". In a recent DFID sponsored study on SEA's organisational development, the effective number of working days per month, allowing for such non-productive work activities, was calculated to be 17.1 days. The present costing exercise assumes that this figure is also applicable for other public agencies. Thus, the estimated required personnel input was multiplied by an efficient co-efficient of 1.29 (22 divided by 17.1), before it was costed.

The average personnel cost (salaries and benefits, such as housing allowance, insurance, and retirement funds) for each staff member, calculated form the central public administration cost in Swaziland for the financial year 2000/2001, is estimated to be E. 33.700 a year, or E. 2.800 a month. However, the average varies considerably between ministries, and , as well as within the different agencies within the same ministry (This is dependent on the structure of the established posts, which may vary from that of a very flat pyramid, to that of a obelisk).

For agencies most relevant for the implementation of a National Solid Waste Strategy, the average annual personnel cost ranges from E 60.000 a year for SEA or MHUD's Office for Housing & Human Settlements, to E 22.500 for the staff in Agricultural Production and Extension Services under the Ministry of Agriculture and Co-operatives.

However, a more important distinction is the different levels of staff needed for establishing, or creating, system tools, for using them in every day operation, administration and conduct of behaviour. For the first tasks mentioned above, it would typically be grade 10 – 11 staff member, while it is assumed that the administrative tasks will be "business as usual".

In this costing exercise, human resources used for "establishment of system tools" have been costed at E. 5.000 per work month. "Recurrent costs" will be costed at the average personnel cost of the particular ministry or agency in question.

In both cases however, exceptions have been made that are contingent on specifications by the subject matter specialists with regard to aspects of seniority or grades. In all cases the calculations are rounded to the nearest thousand.
Consultancy work is specified in work units rather than contract costs, for which either "regional" or "national" rates are applied. Regional rates have been estimated at E.3.000 per work month, and national at E. 2.000 per work month. Since these rates are related directly to specific effort, and not to availability, the time estimate is not multiplied by the "efficiency factor" mentioned above.

6.2 Observations

Due cognisance needs to be taken of the following important observations:

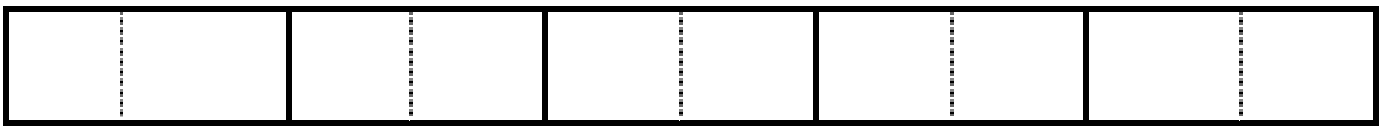
- The estimated cost of the total resources required to implement the Strategy over a 12 year period, amounts to more than E. 43 million. In addition, the implementation of the strategy will eventually require a level of additional recurrent costs amounting to at least[7] E. 6 million annually.

[7] This estimation is on the low side because of two biases: Firstly, some of the priority initiatives have been too tentative for an estimation to be made of their exact consequences, in terms of daily operation and administration. Secondly, some of the initiatives have been scheduled late in the time horizon and the consequences, in terms of operational costs, may not be manifested.

- In terms of establishment costs , the priority initiatives have been ranked as follows:
    1. Collection and Transportation initiatives (nearly E. 19 million).
    2. Disposal and Remediation initiatives (more than E. 14 million).

Table 6.1. PRELIMINARY COSTING OF ESTIMATED REQUIRED RESOURCES FOR **THE DRAFT NATIONAL SOLID WASTE STRATEGY**

STRATEGIC INITIATIVES		**IMMEDIATE TERM 2001 – 2002**		**SHORT TERM 2003 - 2005**		**LONG TERM 2006 –2012**		*TOTAL COSTS*	
Initiatives	**Activities**	**Establish-ment costs**	**Add.Recur-rent annual costs**	**Establish-ment costs**	**Add.Recur-rent annual Costs**	**Establish-ment costs**	**Add.Recur-rent Annual Costs**	**Establish-ment costs**	**Add.Recur-rent Annual Costs**
Planning	**1. Establish Integrated S.W.Mgmt Planning**	68.000		291.000	17.000	107.000	17.000		17.000
Waste Information System	**1. WIS & RSSW**	60.000	3.000	60.000	58.000	101.000	92.000	221.000	92.000
Prevention	**1.Establishment of incentives** **2. Cleaner Production Center etc.**			58.000 131.000	307.000	96.000	307.000	154.000 131.000	307.000
Recycling Of	**hazardous, organic, paper & packaging**	75.000	133.000	50.000	159.000	65.000	207.000	190.000	207.000
Collection & Transportation	**1 Guidelines f. health care risk w.** **2. Dev. System f. coll. of Ag. waste.** **3. Guide lines f. mining w.** **4. Establish codes of practice f. transport of hazardous w** **5. Increase collec cover & effect. f. general w.**	61.000 68.000 25.000 241.000		42.000 5.866.000	20.000 14.000 9.000 983.000	12680.000	20.000 14.000 9.000 12.000 3.043.000	61.000 68.000 25.000 42.000 18787.000	20.000 14.000 9.000 12.000 3.043.000
Treatment	**1.Health care risks** **2.Hazardous waste** **3.General waste**			214.000		8.346.000 342.000	770.000 11.000	8559.000 342.000	770.000 11.000
Disposal	**Dev. & impl.of waste mgmt. system**	161.000	9.000	14228.000	1197.000		1512.000	14389.000	1.512.000
Total ***Costs***		759.000	145.000	20940.000	2764.000	21736.000	6014.000	43436.000	6014.000



3. Treatment initiatives (nearly E. 9 million).
4. Overall management initiatives (Planning, WIS and RSSW total less than E.700.000).
5. Prevention initiatives (less than E. 300.000).
6. Recycling initiatives (less than E. 200.000).

- Of the total establishment costs (about E. 43 million), capital investment accounts for nearly 92%. Virtually all the required capital (99.8%) is to be invested in only three types of priority initiatives. They are:
  - "Collection and transportation" with investments of nearly E. 18 millions in skips, transfer stations, and vehicles for collection and haulage.
  - "Disposal and Remediation" with an investment of about E. 14 million in a centralised landfill.
  - "Treatment" with an investment of about E. 8 million for construction of a centralised treatment plant.

- Almost a total of 26 work years will be needed from the civil service over the Strategy horizon of 12 years, for establishing the required waste management system in terms of legislation, regulations, guidelines, by-laws, manuals, design of formats, etc. This estimation of workload does not include the requirements for consultancy assistance. Once up and running, the effective and sustainable implementation of Strategy is expected to require at least 11 work years annually for public administration and operation,

- The required additional workload is however not evenly distributed amongst the involved institutions. Not surprisingly it is the SEA, as the central co-ordinating and facilitating agency, which is expected to carry most of the responsibilities. With an estimate of more than 68 work months, SEA's workload for just establishing the waste management system, exceeds the total required input of MHUD, MOAC, MEE and MNRE.

However the DPMO almost equals the SEA in terms of magnitude of waste management tasks (62 work months). This is a consequence of its involvement in many sectors, and the responsibility of creating new waste management systems in many peri-urban settlements, and scattered economic nodes in the regular rural areas.

MHSW is tasked with an establishment input of 51 work months.. The bulk of this work reflects in particular MHSW's central responsibility with regards to establishing a Health Care Risk Waste Management System.

- Whereas the establishment of a waste management system requires a number of "one-time-efforts", it also requires a significant amount of daily work inputs in terms of administration and operation to sustain it. In the cases of

most of the involved or designated ministries however, the required "recurrent" work input per year can be estimated to be less than half a year. Thus in the case of the larger ministries, this additional burden should be absorbable through efficiency increases.

However, in the case of SEA, the additional recurrent workload is estimated to require about three additional positions. There is therefore a case to establish a regular "Solid Waste Office or Section" in the SEA. MHUD is also tasked with several recurrent responsibilities and would require one additional position.

6.3 Summary of individual initiatives

The various individual initiatives are costed in Tables 3.1 – 3.7 in Volume II Annex 2.

The cost estimate includes:

a) The estimation of the required staff input;
b) The cost estimate of the required capital input, and;
c) The cost estimate of the total resource requirement.

Integrated solid waste management planning initiatives
The resources for this initiative are mainly those of labour based at the central ministries, and some local institutions. The total required work input to establish and implement the planning system is estimated to be about seven and a half work years, valued at less than half a million Emalangeni.

WIS and RSSW Initiative
These initiatives require almost exclusively labour, apart from maintaining the computer system. Approximately 1 work year is required for its establishment and consolidation , valued at less than E. 200.000. However, as would be expected for this initiative, the annual recurrent manpower resources for its administration and operation are bigger and estimated to be 1.66 work year.

Prevention Initiatives
These initiatives comprise activities related to the establishment of overall incentive structures for waste generators, and for establishing a Waste Minimisation Centre (WMC). In total the cost of these establishment activities are estimated to be about E. 300.000. Apart from SEA, only MoF, MOAC and MEE are envisioned to be involved in the consideration and re-designing of incentive structures. Less than four work years are required for these activities. However the daily operation of the WMC would require more than two and a half work years on an annual basis, which will be the exclusive responsibility of the Swaziland Chamber of Commerce and Industry (SCCI). As a whole, this initiative is not very capital intensive (19 %), but this assumes that the SCCI is able to rent office space, rather than investing in a new building.

Recycling Initiatives
This initiative does have some overlap with the waste minimisation initiative, as the Strategy proposes that the scope of the WMC be expanded to include recycling issues. The cost of the recycling initiative is estimated to be about E. 200.000 for human resources only. It is expected that the capital inputs required for storage and transportation will be carried by the private sector. Administrating the initiative would require a shared effort on an annual basis by SEA and SCCI amounting to about two work years.

Collection and Transportation Initiatives
This initiative comprises a number of separate activities comprising: a) Guidelines for health care risk waste, b) development of system for collection of agricultural waste, c) guidelines for mining waste, d) establishment of codes of practices for transportation of hazardous waste, and e) increased coverage and effectiveness of collection of general waste.

Although the establishment of this initiative is labour intensive (more than 11 work years) the cost of the labour is low compared with that needed for investment in transport and collection infrastructure. Thus of an estimated total cost of about E. 20 million, of which 95% is needed for equipment and infrastructure.

Treatment Initiatives
These initiatives comprise a) Health Care Risks, b) hazardous, and c) general waste. More resources are however required for the treatment of Health Care Risks, representing nearly 99 % of the total establishment costs about E.8.6 million. The construction or establishment of a centralised treatment plant constitutes about 90 % of the resource cost estimation.

Disposal and Remediation Initiatives
This initiative includes the development and implementation of a waste management system comprising of four types of waste disposal sites:
a) Sanitary landfills, b) Local Controlled Disposal facilities, c) hazardous waste disposal sites, and c) homestead pits. The establishment of the system is estimated to require about two work years. This represents less than 3 % of the total establishment costs, which is totally dominated by the required investment to establish a centralised landfill site, estimated to cost about E. 14 million. Administering and operating the disposal initiative is estimated to be a total of 4.5 work years, of which 2/3 is carried by local authorities.

7. Way forward

The implementation process has already been initiated during the Pilot Project Phase, even though various immediate initiatives have been identified.

These initiatives were completed by the end of December 2002. The further implementation of the strategy will relate to the short-term initiatves (Approval – 4 years after approval), and the long-term initiatives (5 – 10 years after approval) . This will however be dependent on the resource base made available by government, as well as the extent to which the various institutions commit themselves to the implementation of the Strategy. For the implementation of the Strategy to be successful, the following issues need to be addressed:

- The relevant institutions to develop action plans related to their mandates that have been agreed upon. Priority should be given in these action plans to the priority initiatives, as identified in the Strategy. These action plans should however also cover all applicable aspects of the waste management system, from planning to disposal and remediation.
- Action plans for the relevant institutions must also cover the Capacity Building aspects, as defined in the Capacity Development Plan. Capacity needs to be developed as quickly as possible in the various government institutions in order to enable them to undertake the functions allocated to them in the Strategy.
- The SEA, as the regulatory and co-ordinating body, should make provision in it's structure and budget to accommodate the co-ordinating and monitoring function. This function will also require Board of SEA to assist in this regard. This should be accommodated in the SEA action plan.
- Consultations and negotiations with the various government and other institutions will continue, in order to resolve any outstanding issues related to allocated roles and responsibilities.
- Special attention should be given by the SEA to the signing of the Basel Convention to enable the country to deal with the treatment of the hazardous wastes, where necessary.
- The possibility of introducing economic incentives and other funding mechanisms to be investigated in collaboration with the Ministry of Finance.
- Provision to be made for the implementation of the Strategy, to be supported by strong enforcement.
- The necessary amendments to the regulations, required to support the implementation of the Strategy, to be completed as soon as possible.
- The necessary tools (e.g. licences, authorisations, and guidelines) to enforce the regulations to be developed by the relevant authorities.
- The Capacity Building plan to be implemented in all relevant institutions to ensure the development of the necessary skills for implementing the strategy.

8. Definition of Terms:

Agricultural Sources	These are defined as pertaining to all activities in the agricultural sector and industry based on products from agricultural products is an industrial source.
Action Planning	This is the process that defines: targets, methods, tasks, responsibilities, timeframes, control procedures and the results expected for a specific activity or range of activities.
Body Cooperate	This includes a company, firm, partnership, municipal corporation, or any other legal persona.
Buntfu and Sustainable Use	All interactions with the environment should be characterised by *buntfu* means that use of the environment should be sustainable and relate to other people in a humane, considerate and respectful manner for the benefit of all of Swaziland's inhabitants, both present and future (NEP - Principle No. 2).
Cleaner Production	The continuous application of an integrated preventive environmental strategy to processes, products and services in order to increase eco-efficiency and reduce risk to human beings and the environment.
Commercial Source	These are defined as premises used wholly or mainly for the purposes of trade or business or for sport, recreation or entertainment.
Community Management Principle	The principle of encouraging partnerships between communities and the Government for resolving environmental problems in managing natural resources and maintaining the quality of the environment in which they live (NEP - Principle No. 6).
Contaminant	This term includes any substance, solid, liquid, gaseous, micro-organism, noise, vibration, heat, radiation or any energy, or thing, or combination of them that has the potential to have adverse effect, or any thing deemed to be a contaminant under the regulations in the EMA.
Co-operative Government Agreement	Such an agreement is concluded between two or more government institutions on a specific activity or programme and specifies the roles and responsibilities for each of the participants in the agreement.
Coordinating structures	These type of structures are put in place between two or more parties which could include both government as well as non-government institutions. The structures could be forums , committees, Task Teams or any other form of structure that would enable all the participating parties to communicate and operate effectively.
Duty of Care	This principle requires that any entity that generates, transports, treats or disposes of waste must ensure that there is no unauthorised transfer or escape of waste from control.

Environmental Responsibility	The principle that the people of Swaziland (individually and collectively) bear the responsibility of safeguarding the natural environment for both present and future generations (NEP – Principle No. 1).
Environmental Rights	The principle that every inhabitant of Swaziland is entitled to live in an environment that is conducive to health and wellbeing; have access to the natural environment on an equitable and sustainable basis and have access to the means of enforcing these rights. (NEP - Principle No. 3).
General Waste	Due to its composition and characteristics *general waste* does not pose a significant threat to public health or the environment, if managed properly. However, it should be noted that general waste will, when treated and disposed of, produce leachate, landfill gas, residual waste and flue gas when incinerated. These substances will not cause a public nuisance if managed properly.
Generator	This is any entity, which produces waste. In this strategy, generators (or sources of waste) are divided into households, commerce, industry, agriculture, mining, health care and waste treatment facilities.
Global and Regional Responsibility	The principle that Swaziland will support international efforts to improve the protection of the global environment; will take reasonable measures to ensure that activities within Swaziland, or subject to its control, do not cause damage beyond its borders and will co-operate with other states in the region on transboundary environmental issues (NEP - Principle 11).
Good Housekeeping	This term is used in waste minimization specifically in industry where an effort is made to minimize the waste generated by internal recycling and reuse eg waste water.
Hazardous Waste	Any waste defined as hazardous by the Minister of MTEC (Waste Regulations 2000 - Section 47)
Hazardous Waste Disposal facility	A specially selected, designed and constructed landfill site, incinerator or any other facility at which hazardous waste is permanently disposed of.
Health Care Waste Sources	These are defined as health care facilities such as clinics, health centres, hospitals, doctors' consulting rooms, traditional healers, health care or biological research laboratories, nursing homes, pharmacies and veterinarians.
Health Care Risk Waste	This is the infectious or hazardous part of the Health Care Waste.
Health Care Waste	This is defined as any type of waste generated from health care waste sources.
Holder of waste	This means a person in possession of the waste, or a person who has carried out pre-processing, mixing or other operations that changed the nature or composition of the waste.
Household Sources	These are defined as a) A home, a building or self-sustained part of a building used wholly for the purposes of living accommodation, b) premises forming part of a university school or educational

	establishment c) premises forming part of a residential home, hospital or nursing home. Litter is also included under this definition.
Import, Export and Trade in Waste	No person shall import, export or trade in waste without written permission of the SEA. And no person shall import hazardous waste into Swaziland.
Incineration	The thermal destruction of waste in specially constructed incineration plants.
Industrial Sources	These are defined as a factory or premises used for the purposes of provision of public services (by land, water air; gas-, water-, and electricity, postal or telecommunication services*)*. The definition also includes construction and demolition activities.
Informal Areas in Urban Areas.	These are ares within the boundries of a local authority that has developed without formal approval and planning. No formal infrastructure exists in the area and the area is normally not serviced as part of the normal services of the local authority.
Leachate	This is the liquid formed when waste comes into contact with water (or another liquid). Potentially hazardous chemicals from the waste dissolved in the water and could pose a serious risk to the environment
Litter	This is defined in the Environmental Management Act as any waste that is discarded in any public place or vacant land, other than in a designated waste receptacle.
Local Authority	This means a municipal council or a town council established under part II of the Urban Government Act 1969 and in relation to a company town, means the company that controls the town.
Local Controlled Disposal Facility	This means a site designated for the disposal of waste in a waste control area in accordance with regulation 12 in Waste Regulations 2000.
Mining Waste Sources	These are defined as being derived from all activities based on mining.
Municipal Solid Waste	This is defined as any non-infectious and non-hazardous part of the waste generated in normal households, offices and other institutions e.g. hospitals etc.
Peri-urban Areas	These are defined as the areas with or without development plans immediately outside the urban boundaries
Pit Disposal	Pit disposal is used by households in rural areas where communal facilities are not available. Pits are dug in the soil and the household waste is thrown into the pit and burnt. Once the pit is almost filled the pit is closed with soil and a new pilt is dug.
Polluter Pays Principle	The principle that the cost of pollution and environmental degradation should, wherever reasonably practical, and with regard to the public interest, be borne by the polluter or person who caused the pollution or degradation, (NEP –Principle No. 9).
Precautionary Approach	The principle that the Government and other responsible parties will take all reasonable measures to prevent damage, even in the absence

	of full scientific certainty as to the damages and causes (NEP – Principle No. 8).
Preventive Action	Wherever possible all must take proactive measures to avoid and prevent environmental harm occurring (NEP - Principle No.7)
Product Stewardship	This term is used for industry when they have to take responsibility for the full lifecycle of their products. This would also require from a particular industry that they will take back the particular product at the end of it's lifespan.
Proximity Principle	The principle that wherever reasonably practicable, pollution should be rectified and waste should be treated or disposed of, at or near the source (NEP – Principle No. 10)
Public Awareness and Participation	The principle that the public are given appropriate access to information on the environment as held by public authorities, that information on the environment is widely available and that education on environmental issues is promoted (NEP - Principle No. 5)
Rural Areas	These are defined as the areas outside the urban boundaries and beyond the peri-urban areas.
SEA Waste Management Resource Library	This is a resource facility which would form part of the existing library in the SEA but would constitute a specific section in the library committed to waste management. This facility would be available for public use.
Special Waste	This is defined in Waste Regulations 2000 as being hazardous and health care risk waste - with the potential, even in low concentrations, to have a significant adverse effect on public health and/or the environment. (for Clinical Waste refer to the term Health Care Waste)
Strategy	The term is used in this document to mean a broad course of action (initiatives) designed to make the best use of resources and opportunities. The strategy should offer the best prospect of achieving the defined objectives.
Sustainable Development	The principle that environmental protection and socio-economic development are interdependent and indivisible. Integration of environmental protection into the process of social and economic development is essential to achieve equity-led growth and sustainable development (NEP - Principle No. 4)
Transporter	Means the person carrying the waste from its source to the treatment plant, recycling facility, incinerator or other treatment plant and the disposal site.
Urban Areas (Formal)	These areas are defined as the settlements (residential, commercial and industrial) within the urban boundaries that have been planned and have registered boundaries between adjoining properties
Urban Areas (Informal)	These areas are defined as the settlements, mainly residential and commercial to a lesser extent, within the urban boundaries that were not planned and, where the development and construction was not controlled.

Waste	This means any substance or thing that the holder discards, or intends to, or is required to discard or dispose of, irrespective of its value to anyone, and any substance or thing deemed by a regulation to be waste.
Waste Control Area	These areas are designated as such by the Minister in accordance with regulation 12 (1) in the Waste Regulations 2000
Waste Disposal Facility	This means a landfill site, incinerator or any other facility at which waste is permanently disposed of.
Waste Minimisation Centre	This is a facility normally established and managed by industry with support from government. The purpose of this centre is to promote waste prevention and recycling and to act as a source of information exchange, education and awareness.
Waste Related Information	This information details the waste stream generated, transported and disposed of by the information supplier
Waste Regulation Authority	This means a) in respect of an urban area, the local authority responsible for that area; b) in respect of a waste control area, the Office of the Deputy Prime Minister, or the body which is responsible for the management of waste in a waste control area which has been delegated under Regulation 12 (2) in the Waste Regulations 2000 and, in any other area, the Office of the Deputy Prime Minister