

**Environmental Policy Processes Surrounding
South Africa's Plastic Bags Regulations:
Tensions, Debates and Responses in Waste Product Regulation**

Godwell Nhamo

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**Environmental policy processes surrounding South Africa's Plastic Bags
Regulations: Tensions, debates and responses in waste product regulation**

Thesis

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Doctor of Philosophy

at Rhodes University, Grahamstown, South Africa

By

GODWELL NHAMO

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ABSTRACT

This study was conducted in South Africa. South Africa is the first country within the Southern African Development Community to have regulated plastic shopping bags waste through the imposition of both a standard on thickness and a levy. Given this scenario, the Plastic Bags Regulations present an illustrative case for researching complexity, uncertainty and controversies surrounding a new trend in environmental policy making, namely waste product regulation. The thesis focuses on understanding and investigating *tensions*, *debates* and *responses* emerging from the policy process as *actors* and *actor-networks* put not only the Plastic Bags Regulations as *focal* actant (token) but also other actants and actant-networks as well. To this end, a research question that addressed environmental policies, tensions, debates and responses that informed the development of South Africa's Plastic Bags Regulations was spelt out. The research objectives included the need to: (1) analyse selected international environmental policy processes surrounding plastic shopping bags litter and waste regulation and how these influenced developments in South Africa; (2) identify actors, actants and actor/actant-networks that shaped and were being transformed by South Africa's Plastic Bags Regulations and explain the tensions, debates and responses arising in the policy processes; (3) identify environmental policy outputs and assess outcomes emerging from the formulation and implementation of South Africa's Plastic Bags Regulations; and (4) establish patterns in environmental policy process reforms around South Africa's Plastic Bags Regulations.

The language of actors (human), actants (non-human) and actor/actant-networks brings to the fore the aspects of *processes* and *relationships* that exist around them. As such, insights from the actor/actant-network theory (AANT) were drawn upon to inform the research. AANT enquiry framework collapses binaries such as nature/society, art/science, structure/agency and global/local historically associated with a particular type of social theory. AANT also denies that purely technical, scientific or social relations are possible (the notion of *quasi-objects* or *token*). Data sets were generated '*following*' the Plastic Bags Regulations as token actant with time frames ranging from *prior to*, *during* and *after* the formulation of the regulations. Similarly, data analysis drew insights from AANT's four moments of translation namely *problematization*, *interessement*, *enrolment* and *mobilisation*, with the intervention theory providing an evaluative perspective that complemented AANT.

The findings were that after the promulgation of the first draft of the Plastic Bags Regulations in May 2000, tensions emerged around the nature of regulation (whether *command and control* – preferred by government or *self regulation* – preferred by industry and labour). In this regard the

latter group raised concerns about jobs, income and equipment loss as well as the need to have a holistic approach to waste management rather than targeting a single product at a time whilst the former maintained that this would not be so. As such, education, awareness and stringent anti-litter penalties were proposed by industry and labour as *sustainable* responses to the problem of plastic shopping bags waste rather than regulation. These debates continued and resulted in minor amendments to the original regulations as finalised by Government in May 2002. However, industry and labour continued lobbying government resulting in the conclusion of the *Plastic Bags Agreement* in September 2002 and the ultimate *repulsion* of the May 2002 regulations in May 2003. As revealed by this research, these responses led to broader social responses and further tensions as demand for plastic shopping bags went down by about 80% although an estimated 1000 jobs were lost and a number of companies lost equipment and business (with some closing down) following the implementation of the regulations. During implementation, debates emerged around the need to promote locally made carry facilities with two alternatives in sight namely: the *Green Bag* and the *Biodegradable Plastic Bag*. Debates also took place regarding enforcement of the new law resulting in the amendments of various pieces of legislation including the Environmental Conservation Act, Environmental Management Act and the Revenue Laws Act. Overall, a 15-year policy reform cycle and sub-cycles was determined. The research also established that the government considered the regulations a success and was already implementing similar initiatives to regulate other waste products, among them, used tyres, used oil and glass, confirming the trend towards waste product regulation in South Africa.

From these research findings, a series of conceptual frameworks were drawn up to clarify the nature of tensions, debates and responses surrounding certain lead actors, actants and actor/actant-networks. Some of the conceptual frameworks that emerged around the actors and actor-networks include *Organised Government*, *Organised Industry* and *Organised Labour*. Conceptual frameworks that emerged around key actants and actant-networks include the *Integrated Pollution and Waste Management*, *Plastic Bags Regulations* as well as the discourses surrounding the *Green bag* and *biodegradable plastic bags*. The thesis concludes by reflecting on how the above and the *grand* actor/actant-network conceptual frameworks emerging from this research might be adopted with varying degrees of flexibility to research environmental and waste management policy processes in different waste product regulation set-ups.

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LIST OF ACRONYMS

AANT	Actor/actant-network theory
ACCI	Australian Chamber of Commerce and Industry
ACR	Australian Council of Recyclers
AMRC	Association of Municipal Recycling Coordinators
ANZECC	Australian and New Zealand Environment and Conservation Council
ARA	Australian Retailers Association
CAIA	Chemical and Allied Industries Association
CBOs	Community based organisations
CONEPP	Consultative National Environmental Policy Process
DEAT	Department of Environmental Affairs and Tourism
DEFRA	Department of Environment, Food and Rural Affairs
DEH	Department of the Environment and Heritage
DEHLG	Department of Environment, Heritage and Local Government
DELG	Department of Environment and Local Government
DG	Director –General
DPLD	Department of Provincial and Local Government
DTI	Department of Trade and Industry
DWAF	Department of Water Affairs and Forestry
EJNF	Environment Justice Network Forum
EPA	Environment Protection Agency
EPHC	Environment Protection and Heritage Council
EU	European Union
GEAR	Growth, Employment and Redistribution
HDPE	High-density polyethylene
IP & WM	Integrated Pollution and Waste Management
ISO	International Standards Organisation
LDPE	Low-density polyethylene
MINMEC	Committee of Ministers and Members of the Executive Councils
Nedlac	National Economic Development and Labour Council
NEMA	National Environment Management Act
NEPAD	New Economic Partnership for Africa's Development
NEPC	National Environment Protection Council
NGOs	Non governmental organisations

NPBWG	National Plastic Bags Working Group
NWMS	National Waste Management Strategy
PCSA	Packaging Council of South Africa
PET	Polyethylen-terephthalat
PFSA	Plastics Federation of South Africa
PIFA	Packaging and Industrial Films Association
PMG	Parliamentary Monitoring Group
PREO	Plastic Recycling Employers Organisation
RISDP	Regional Indicative Strategic Development Plan
RoZ	Republic of Zimbabwe
RSA	Republic of South Africa
RTE	Real time evaluation
SADC	Southern African Development Community
SARS	South African Revenue Services
STANSA	Standards South Africa
UN	United Nations
UNCED	United Nations Commission on Environment and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
WCED	World Commission on Environment and Development
WSSD	World Summit on Sustainable Development
ZWNZT	Zero Waste New Zealand Trust

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DEDICATION

To my dear wife Senia Nhamo and lovely child Anesu Tadiwanashe Nhamo.

CHAPTER ONE

INTRODUCTION AND CONTEXT OF THE STUDY

1.0 INTRODUCTION

This chapter provides the context in which the research was undertaken. Background information is presented articulating the research problem. The chapter starts by locating the study area and its historical context. This is followed by sections covering sustainability in South Africa's waste management, issues around integrated solid waste management, plastics and the environment, plastic recycling in South Africa as well as the justification of the study. The last part presents the research focus (i.e., the questions, goal and objectives) and thesis outline.

1.2 STUDY AREA AND HISTORICAL CONTEXT

South Africa is the last country to have gained independence on the African continent in 1994. Today, it stands as one of the backbones of the African economy having taken a lead role in the development of the New Economic Partnership for Africa's Development (NEPAD, 2002). The country is also a member to a number of regional and transnational trading blocks, among them, the 14 member states Southern African Development Community. The following paragraphs focus on South Africa's land resources, population and the footprints of urban apartheid.

1.2.1 Government system and land resources

South Africa has a complex government system that includes the national legislature (parliament), executive authority (president, cabinet and deputy ministers), justice system, national departments, state institutions supporting constitutional democracy, traditional leadership, provincial and local governments, co-operative governance, public administration and security services (<http://www.info.gov.za/aboutgovt/index.htm>, 17 January 2005). However, for the purposes of this study, brief descriptions will be undertaken for selected structures, particularly the national, provincial and local governments as well as the national departments. Both the national and provincial governments are run along the lines of portfolios and portfolio committees (RSA, 1996a). The national legislature comprises bodies such as the National Assembly, National Council of Provinces and parliamentary portfolio committees (<http://www.info.gov.za/aboutgovt/index.htm>, 17 January 2005). Up to 37 national departments were in existence by the time of completing this write-up (*ibid*). The provincial governments are lead by premiers and various Members of the Executive Council for different portfolios, including that for Environment and Nature Conservation (RSA, 1996a).

The provinces are further divided into local government jurisdictions, both urban and rural. The mayor and deputies as well as town clerks and ward councillors head the local governments falling within the category 'urban' while those that are 'rural' fall under council and traditional leadership (DPLD, 1998). Before December 2000, the local government sector comprised about 843 municipalities (Department of Labour, 2002) and this number was reduced to 284 following the amalgamation of municipalities into four major structures. The new structures include metros, local municipalities, district municipalities and district management areas (RSA, 1998a). The first three structures resemble features aligned towards the 'urban' set up whereas the last set is more 'rural'. Metro Councils should have more than 500,000 voters and are organised around sub-councils (Paralegal Advice Organisation, 2004). Six such metros existed as of December 2004: Johannesburg, Cape Town, Durban, Pretoria, Nelson Mandela (formerly Port Elizabeth) and East Rand (*ibid*).

In terms of environmental and waste management, the full administrative structure involves, at the national level, the Parliamentary Portfolio Committee for Environmental Affairs and Tourism, the Minister of Environmental Affairs and Tourism plus the Deputy, Committee of Ministers and Members of the Executive Councils (MINMEC) for Environment and Nature Conservation as well as the Director General (DG) and the Deputy DG of the Department of Environmental Affairs and Tourism (DEAT). Under the DG comes a number of branches or programmes, chief directorates and various directorates including the branch for Environmental Quality and Protection (Matjila & Joubert, 2004; DEAT, 2004). The branch for Environmental Quality and Protection has two chief directorates: (1) Regulatory Services (made up of four directorates namely Enforcement, Compliance Monitoring, Authorisations and Environmental Impact Management) and (2) Pollution and Waste Management (made up of another four directorates namely Chemicals Management, Environmental Economics, Air Quality and Waste Management) (*ibid*). At provincial level the Members of the Executive Councils for Environment and Nature Conservation head environmental affairs (including waste management) with input from the Provincial Portfolio Committees responsible for environment. At the local government level, environmental and waste management responsibilities are shared between departments of Environmental Health, City Engineers (including Town Planning) and Parks and Recreation (DPLD, 1998). These departments are assisted at the council level by Portfolio Committees for the Environment, ward councillors and ward development committees.

South Africa is divided into nine administrative provinces that cover land area ranging from about 17,000 square kilometres (1.4% of national) for Gauteng to about 362,000 square kilometres (29.7% of national) for the Northern Cape (Statistics South Africa, 2001). The other seven provinces are the Eastern Cape, Free State, Kwazulu-Natal, Limpopo, Mpumalanga, North West, and Western Cape. Overall, the country's total surface area is estimated at 1.22 million square kilometres (*ibid*), making it the second largest country in southern Africa after the Democratic Republic of Congo with about 2.35 million square kilometres of land area (Mapquest, 2004).

1.2.2 Population numbers

The 2001 census estimates South Africa's total population at 44.8 million (Statistics South Africa, 2004). The Northern Cape Province, which is the largest in terms of area, hosts only 1.8% of the national population, with Gauteng having the second largest (19.7%) after Kwazulu-Natal with 21%. One other striking aspect of the South African population concerns the large numbers of those aged 20 years and above who have never been to school. About 4.6 million (10.3%) in this age group never went to school. If the figure is added to those 20 years and above who only managed some kind of primary education (12.7%), the figure goes up to 23% of the total population having only reached primary education (*ibid*). This figure has strong bearing on the study in terms of linking the grassroots to participation during environmental and waste management policy processes. Usually, these people are disempowered and have little to contribute during such debates, particularly where policies are put in government gazettes for comments before being passed (Christopher, 2001).

Language is another issue. There are 11 major languages spoken in South Africa with Zulu having the largest share at 23.8%, followed by Xhosa with 17.6% (Statistics South Africa, 2001). The least spoken language is Ndebele (1.6%) followed by Venda (2.3%). The other languages spoken include Afrikaans (13.3%), Pedi (9.4%), English and Tswana (8.2% apiece), Sotho (7.9%), Tsongo (4.4%), Swati (2.7%) and other (0.5%). Language stands out as a barrier to effective communication and public participation in social policy. People participate actively if they understand what is being communicated to them (Maibach, Rothschild, & Novelli, 2002). For South Africa, this might imply translating discussion documents into the 11 major languages identified.

In terms of employment, only 33.7% of the economically productive (15-65 age group) are formally employed (Statistics South Africa, 2001). Household size averages 3.8 people although

this differs significantly across population groups ranging from the smallest found in white population (2.8 people), black (3.9), Indian (4.0) and Coloured (4.3). Issues of both employment and household size impact on service delivery in the country, particularly given that the preferred future is based on the commercialisation of municipal service delivery (Qotole, Xali, & Barchiesi, 2003; DPLD, 2000).

1.2.3 Apartheid footprints in urban development and waste management

In his book 'The atlas of changing South Africa', Christopher (2001) sees apartheid as the battle to control space and specific places. He claims that South Africa was partitioned into discrete, legally defined groups. Segregation operated from what he terms 'petty apartheid' exemplified by different entrances to buildings and residential areas, to 'grand apartheid' that involved separating nation-states. In this regard, three typologies of apartheid are identified: state, urban and personal. The focus of this research will, for now restrict the discussion to a more in depth perspective on urban apartheid.

During the late 1940s, the ruling National Party concentrated on implementing residential segregation in urban areas. As such, political debate in the 1960s was essentially urban based as frantic legalised efforts were made to restrict the black majority populace from getting into cities (Christopher, 2001). This was enforced through two major acts: the Population Registration Act, and the Group Areas Act, both passed in 1950. The Population Registration Act established three core groups namely: White (European), African (Bantu or Black) and Coloured. The Coloured group was further subdivided into Cape Malay, Griqua, Indian, Chinese and Cape Coloureds. Urban land uses and space were also zoned following these population groups with the black majority put into zones as far away as possible from the central business districts and/ or at times closest to their work places where environmental pollution (including waste) was high. Townships were created with the remaining unemployed blacks forced to go to homelands such as Boputhatswana, Ciskei, and Transkei. This was done through a number of additional acts that included among them (*ibid*): the Abolition of Passes Act (1951), Native Resettlement Act (1954), Natives (Urban Areas) Amendment Act (1955), Bantu Laws Amendment Act (1965) and the 1984 Black Communities Development Act. This resulted in great anger and disappointment from within the previously disadvantaged communities leading to armed resistance and ultimately an independent and democratic South Africa in 1994 (RSA, 1996a).

The footprints of apartheid in as far as waste management is concerned is best summarised by Qotole, Xali and Barchiesi's (2003: 1) quote below. They write:

The collection of household refuse – or the lack of it – is one of the most powerful visual benchmarks of inequality in South Africa. Although the situation has improved somewhat since 1994, formerly whites-only suburbs are still kept immaculately clean with regular door-to-door refuse collection and teams of street sweepers, while most black township and rural area residents are forced to dump their refuse in open spaces or in unsealed communal skips.

The work of these authors is based on two case studies on the Billy Hattingh micro-enterprise refuse collection programme in Khayelitsha (Cape Town) and the corporatised refuse collection service ‘Pikitup’ in Johannesburg. Johannesburg and Cape Town are the largest and second largest metropolitan centres in South Africa respectively. Some of the major findings from the studies were that the whole policy shift to commercialising waste removal lacked proper public consultation, with the voices of concerned grassroots silenced. It also resulted in the loss of public sector human skills base and in some cases unemployment.

Statistics South Africa (2001), established that out of about 11.2 million households in South Africa, about a million of them (9%) did not have any form of refuse disposal facility. About 6.2 million households (55%), enjoyed a weekly refuse removal service from local authorities. Other services provided (or lack thereof) and their distribution by population groups is shown in table 1.1.

Table 1.1: Refuse removal services by household and population group

Service	Number of households					
	Black African	Coloured	Indian/Asian	White	Total	% of total
Weekly from local authority	3,909,787	746,509	273,744	1,280,176	6,210,215	55
Less often by local authority	147,972	11,984	1,376	10,694	172,027	2
Communal refuse dump	167,045	17,354	781	10,499	195,679	2
Own refuse dump	3,447,516	100,018	5,934	101,574	3,655,043	33
No facility at all	952,730	12,171	1,094	6,747	972,741	9
<i>Total</i>	<i>8,625,050</i>	<i>88,036</i>	<i>282,930</i>	<i>1,409,689</i>	<i>11,205,705</i>	<i>100</i>

Source: Compiled from Statistics South Africa (2001: 106)

Table 1.1 raises interesting facts about the biased services concerning refuse removal across South Africa. An estimated 90.8% of white households enjoyed weekly refuse removal services from local authorities as of 2001 (Statistics South Africa, 2001). This figure is in sharp contrast to only 45.3% coverage of the same facility in black households. On the other end of scale, only half a percent of white households did not have any form of refuse removal service compared to 11% of black households, a figure that reduces slightly to 9% if all the previously disadvantaged

communities' households are included in the analysis. This picture presents a big challenge for South Africa's future environmental and waste management policy. Findings from this research revealed that the use of authorised open refuse dumping and communal skips is still common practice in Grahamstown (Eastern Cape Province) and other areas (see section 5.7.5).

1.3 SUSTAINABILITY IN SOUTH AFRICA'S WASTE MANAGEMENT POLICIES

Sustainability of development, and particularly environmental and waste management policies and policy processes in South Africa is framed around the involvement of actors and takes into consideration their diverse interests (UNDP South Africa, 2003). In this regard, actors from the state, private and collective sectors are identified as key to achieve development that is sustainable in waste management (DEAT, 2000i). This is what Pape and McDonald (2002), refer to as the stakeholder governance model. The state has jurisdiction over the (in) justices in social policy aspects and needs to play a delicate act of balancing interests from the private and collective actors. The private sector's interests are concerned with profit and the need to have a predictable political and regulatory framework (UNDP South Africa, 2003). However, of late, industry has been buying in to the concept of good environmental stewardship. The sponsoring of this research by Nampak bears witness to this claim¹. The collective sector (NGOs, CBOs, labour, general public, etc) is located on the ground where waste management related problems are experienced and these groups often have understandings that are needed to seek and implement solutions and monitor policies. Civil society, as it is commonly known, has become a key partner in the development process as it provides alternative and complementary channels for mobilising human and financial resources.

Despite significant achievements in policy development in South Africa (UNDP South Africa, 2003), growing unemployment, income poverty and inequality and the shortfalls in service delivery systems have fuelled criticisms about the effectiveness of the Government policies to transform the conditions of the previously disadvantaged poor. Policy failure at implementation level is blamed on a number of aspects, particularly the absence of high-level policy skills and middle-level governance and management skills. The implementation gap has also been associated with high volumes of official policy documents and legislation prepared since the birth of a democratic South Africa in 1994 (*ibid*). In terms of waste management, several policies and associated documents were prepared that confirm the heavy implementation load discussed

¹ Nampak sponsored this three-year industry-environment interface research to have insights into sustainable development and zero waste policy in South Africa.

above. For example, the following documents were prepared during a three-year period covering 1998 to 2000:

- National Environmental Management Act (RSA, 1998b)
- National Environmental Management Policy (DEAT, 1999a)
- National Waste Management Strategy and Action Plans (DEAT, 1999d)
- White Paper on Integrated Pollution and Waste Management (DEAT, 2000i)
- Draft Plastic Bag Regulations (DEAT, 2000a)

There was also a series of starter documents that accompanied the White Paper on Integrated Pollution and Waste Management that include:

- Starter document for general waste collection: Guideline document for waste collection in high density unserved areas (DEAT, 2000d)
- Legal Framework Document for Integrated National Waste Management Planning (DEAT, 2000b)
- Starter Document for Integrated National Waste Management Planning: Review of Current Legislation (DEAT, 2000c)
- Starter Document for Guidelines for the Compilation of Integrated National Waste Management Plans
- Starter Document for General Waste Collection: Guideline Document for Waste Collection in High Density Unserved Areas - Reference Document (DEAT, 2000e)
- Starter Document for Waste Recycling: Legal Framework Document for recycling (DEAT, 2000h)
- Starter Document for Waste Recycling: Background Document of Post Consumer Recycling in South Africa and Internationally (DEAT, 2000g)

One aspect that stands out clearly in terms of policy processes, is the acknowledged involvement of civil society (including those from the grassroots) during the drafting of these core waste management documents (DEAT, 2000i; DEAT, 1999a; DEAT, 1999d). However, the high profile environmental and waste management policy reform was not matched with a deliberate effort to build the human resource base, especially at local government level where much of waste management policy implementation takes place (UNDP South Africa, 2003).

All capacity-building initiatives were directed at the national and provincial government levels (UNDP South Africa, 2003). Even so, the programmes at provincial level were largely *ad hoc* leading to some poor provinces such as Eastern Cape and North West being unable to develop and implement appropriate strategies to capacitate their middle management staff. A focus that places policy failure on implementation aligns itself to the traditional top-down, rational approach in social policy (Keeley & Scoones, 2003; Lane, 1990). This approach views policy as following neatly laid down procedures and discrete stages from agenda setting, decision-making,

formulation, implementation and ultimately evaluation (*ibid*). In this regard, any failure in social policy is blamed on poor management (Hill & Hupe, 2002). This is contrary to one of the cornerstones of this work that looked at environmental and waste management policy around the Plastic Bags Regulations as a process shaped by a series of linked and cyclical stages that cover the entire policy cycle (Rist, 2000; Parsons, 1995) from agenda setting decision-making through formulation, to implementation and evaluation. In this regard, what happens during agenda setting has bearing on any other stage in the policy process and vice versa.

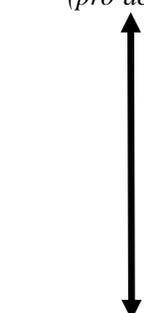
With regard to macroeconomic policy and waste management, the 1996 Growth, Employment and Redistribution (GEAR) stands out as the central policy (UNDP South Africa, 2003). GEAR aimed to reduce the budget deficit from about 5% to below 3% by 2000. This resulted in severe restrictions on expenditure (as rightfully pointed out by respondents from local authorities during field work), particularly on local government service delivery, including waste management. This resulted in new models based on municipal services cost recovery (Pape & McDonald, 2002) and public-private partnerships (DPLD, 2000) being established. Since then there has been antagonism in policy matters, especially between government and civil society on matters relating to privatisation, partnerships and service delivery (UNDP South Africa, 2003).

1.4 INTEGRATED MUNICIPAL SOLID WASTE MANAGEMENT

A number of nouns (Lombard, 1994) are commonly used to in terms of municipal solid waste (MSW). These include by-product, cuttings, debris, dung, carcass, garbage, litter, refuse, residue, rubbish, rubble, scrap, sewage and tailing. Whatever we may wish to call it, waste is characteristically a human concept, as this does not exist in a typical ecosystem. The nouns trash, garbage, refuse and rubbish (McKinney, 1996) are often used as synonyms although technical explanations may be attached to each one of them. Trash refers to typically 'dry' and non-edible waste products, for example, paper and board, plastic, glass and metal. Garbage refers to rather 'wet' matter, such as food remains, yard waste and carcass. Refuse captures both trash and garbage whilst rubbish incorporates refuse as well as construction and demolition debris. Waste may also be classified as hazardous and non-hazardous or into solid, liquid and gas (Tchobanoglous, Theisen, & Vigil, 1993). In South Africa, waste is classified into two main groups: general and hazardous (DEAT, 2000i). From the two groups, waste is further divided according to its source of origin into: domestic, commercial or industrial. General waste, which is of relevance to this study, is further sub-divided into paper, metals, glass, plastic, organic and inert materials.

The subject of waste management therefore brings together a host of aspects and disciplines that aim at improving the delivery of the services so as to promote good environmental stewardship. Much of solid waste handled by municipalities is packaging (paper, glass, plastic and metal) and as such the management style should follow an integrated approach. Integrated solid waste management refers to the control of the generation, storage, collection, processing and ultimate disposal of solid wastes in a way that is in agreement with best principles of good environmental stewardship. The practices therefore cover a range of aspects from public health, environmental science and education, engineering, economics, finance, planning and many more. The commonly used methods of disposal at the turn of the 20th Century were: dumping on land, dumping into water bodies, trenching, feeding to animals and incineration. Sanitary landfilling came into being in the early 1930s and until recently it has been the major waste management system in place internationally (EPA, 2000a) and in southern Africa. Modern waste management strategies emphasise pro-active (preventive) rather than re-active (end-of-pipe treatment and disposal) measures. In this regard a waste management ladder can be drawn (figure 1.1) that aims at achieving zero waste.

Figure 1.1: Waste management ladder

<i>Management parameter</i>	<i>Categories</i>	<i>Priority/Level of pollution</i>
<i>Zero Waste</i>	No waste at all	Most preferred option <i>(pro-active)</i>  Least preferred option <i>(re-active)</i>
<i>Cleaner production</i>	Refuse/Prevent	
	Reduce/Minimise	
<i>Recycling</i>	Re-use	
	Recover	
	Compost	
<i>Treatment</i>	Incineration for energy	
	Physical	
	Chemical	
<i>Disposal</i>	Landfill	
	Open burning and dumping	

Source: Modified after CEC (1994), DEAT (1999c) and DEHLG (2004)

In zero waste, the primary responsibility for negative product impact on the environment is placed on both *manufacturers* and *consumers* (Earthlife Africa, 2002). Emphasis is also placed on educating the public as well as developing strategies that may influence and enhance public