WASTE MANAGEMENT

1. General

The inadequacy, out datedness and lack of systematisation of information on solid waste in Mozambique constitute a serious problem for broader understanding of the situation of waste, as well as for the services linked with the matter, so as to allow the establishment of policies for developing this area, and to direct the activity of the government or private bodies that deal with the question.

Some of the first initiatives to produce consistent summary information on solid wastes in the country began with the diagnosis of solid wastes drawn up by MICOA in 2003. In this area, it should be noted that the records of systematic information by some municipalities began to improve significantly as from 2000.

As from this period, there also occurred, albeit infrequently, research work to obtain information on solid waste. Among this research is the work done by AGRESU in 2004 in Maputo city and by MICOA in 2003.

All the government bodies identified that have an interface with urban waste management were consulted.

There are several central government bodies that operate in the area of solid waste, particularly by supporting municipalities with investments in the area.

Coordination between these institutions already takes place, based on the creation of the national sanitation information and communication network (RICAS), with its headquarters in the Ministry of Health (MISAU).

At municipal level there has been a substantial change. Diagnoses of the solid waste situation are being undertaken in many urban centres, focused particularly on the technological, social and economic questions. These diagnoses have been made, in many cases, with the technical and financial support of MICOA, CDS-ZU and NGOs.

Given the scarcity of information on the management of urban solid waste, the present draft report on the area intends to be a contribution as a source of didactic information, a vehicle of general information on the country and particularly on the municipalities, directed to interventions based on partnerships between institutions linked to the coordination and management of Urban Solid Waste.

Alongside the problems related with solid waste, there are other environmental problems that affect Mozambican urban centres which also deserve reference and other approaches, namely:

a) Degradation of the sanitation and drainage systems;
b) Defective supply of clean drinking water;

c) Soil erosion and deforestation;
d) Poor institutional and coordination capacity;
e) Disorderly occupation of space;
f) Mismanagement of green spaces (parks and gardens);
g) Impact of cyclones and/or strong winds.

Urban classification

Mozambican cities are divided into four categories, namely A, B, C and D. This classification is based on the degree of development attained by the country's urban centres, particularly the complexity of their political, economic, social and cultural life, their population density, the number and type of industries, trade, and health, education, cultural and sporting activities.

The capital of the country is classified as a level A city. The cities of Matola, Beira and Nampula are classified as level B. They are provincial capitals and have a preponderant role in internal regional development and in programmes of international cooperation. Level C is allocated to the other provincial capitals, and to cities whose national and universal historic-cultural dimension, and their economic and communications importance, gives them a national and regional cooperation interest. The remaining urban centres of the county are classified as level D, where their degree of development characterises them as cities and they play a significant role in local development. The summary classification of Mozambican cities and towns can be seen in the following table:

Level A	Level B	Level C	Level D
Maputo	Beira	Chimoio	Angoche
	Nampula	Nacala	Cuamba
	Matola	Quelimane	Chibuto
		Inhambane	Chokwe
		Lichinga	Dondo
		Pemba	Gurue
		Tete	Manica
		Xai-Xai	Maxixe
		Mozambique Island	Mocuba
			Montepuez

Source: Classification of cities and towns, INPF, 1998

a) Defective system for Management of Urban Solid Waste (USW)

Most cities in the country suffer from inadequacies in the collection, transport, treatment and final deposit of USW.

2. Management of urban solid waste in Mozambique

General Considerations

Currently, the management of USW is one of the emerging problems in Mozambican municipalities which mainly affects the most vulnerable strata of the population.

Management of USW is a complex and multi-sector activity. It is one of the attributes of the Municipal Councils under Article 25, line c) of Law 11/96 of 2 May.

In the suburban and peri-urban neighbourhoods, the problems of urban management are at their most significant. The wastes are essentially of organic origin, and are generally treated by the producers themselves, because the municipal authorities have no capacity to cover this area.

Worsening this situation is the disorderly occupation of space, which makes access difficult. On the other hand, there is a lack of space to resort to traditional waste management measures such as burning and burying.

There are various sources of waste production: domestic activities, trade, agricultural and livestock activities, hospitals, workshops, the transport and communication sector, the building industry, tourism and recreational practices, industry and informal activities.

All the cities in the country suffer from inadequacies in the collection, deposit and treatment of USW, and Maputo and Beira are the most notorious cases.

In general, the final destination of the waste is open air rubbish tips on the outskirts of the cities. The location of these rubbish dumps often does not respect basic criteria – such as that they should be in areas of low population density, that the aquifer should not be near the surface, the soil should not be very permeable, and should not be subject to erosion.

In most Mozambican cities, USW is not collected in the suburban areas. On the contrary, they are deliberately deposited in inhabited suburban areas, or used to fill in holes, particularly those caused by rain water erosion. In general, there is no special treatment of hospital waste, including syringes, dressings, bandages, laboratory and anatomical wastes.

Suburban communities adopt an “informal” USW management system (recycling, burying and burning rubbish). However, this system is not ideal, given that the neighbourhoods are growing, and there is no space, inside or outside the yards, for this type of treatment. Apart from this, the system does not envisage special treatment for the toxic and non-biodegradable components, which can cause other environmental problems. From the health point of view, USW must be regarded as potential vectors for the transmission of infectious and parasitic diseases.

The production of USW is increasing from year to year. This phenomenon results from the following factors:

- Increase in population;
- Market liberalisation;
- Extremely aggressive marketing and advertising strategies;
- Appearance of products with a short life span.

This situation, linked to the defects in the USW management system, has as its consequences:

- Reduction in the useful space available;
- Direct threats to health from pathogens;
- Indirect damage to health from pollution of the air, of ground water, etc.

In Mozambique, the collection and treatment of USW is the responsibility of the municipal authorities.

All the cities in the country suffer from inadequacies in the collection, transport, treatment and final deposit of USW. In our country, the final destination of urban waste is open air rubbish dumps on the outskirts of the cities. The location of these dumps often does not respect basic criteria – such as that they should be in areas of low population density, the depth of the aquifer, or that the soil should not be very permeable, and should not be subject to erosion.

The town of Songo in Tete province is the only one in the country with a system for the final deposit of waste that is in accordance with some environmentally acceptable technical norms.

In the case of special wastes, it is important to note the existence of a landfill for dangerous waste in Maputo province.

The management of Urban Solid Waste involves various stages from production, treatment, transport, and collection to deposit. At each of these stages, the reuse of waste may occur, as a source of generating income, and in other cases of energy.

In past decades, it was thought that solid wastes were materials that were no longer useful, and that it was urgent to eliminate them through various methods, such as dumping them on rubbish tips, incinerating them, or burying them, among other practices.

The current behaviour of society towards solid waste, as well as the work of some authors, show that, unlike what was believed in the past, they are still a valuable resource.

2.1 Production

Official estimates point to a variation in the annual production of USW in the country's main urban areas.

The data, in general, show an increase in recent years. For example, an inquiry made in the Maputo City Municipal Waste Services indicated a daily production of around 800 tonnes of waste

Production of USW in some Mozambican cities

Cities	Production (tonnes/year)
Maputo	1,135,000
Matola	110,000
Xai-Xai	17,163
Inhambane	52,370
Vilanculos	3,650
Beira	62,065
Nampula	191,625
Mozambique Island	7,200
Nacala	33,127
Quelimane	4,500
Mocuba	750
Pemba	6,300
Montepuez	6,500
Mocimboa da Praia	2,160

2.2 Characterisation

As for the composition of waste, in terms of major groups of components, one notes the presence currently of:

a) 60% easily fermentable material (organic material). These are mixed with agricultural rubbish, rubbish from the public highway, industrial and commercial waste, health waste and rubble;
b) 25% material that can potentially be recycled;
c) 15% other.

These percentages could undergo evolution over time, if one considers the alterations in the living standards of the population.

2.3 Collection

The collection of USW by the municipal services has not been very good. The Maputo City municipality, for example, collects about 40-45% of the total daily USW produced. This covers basically the urban area, and part of the suburban area, but does not include the peri-urban area. These wastes are collected in containers of 1 m^3, 6 m^3, 10 m^3, and 16 m^3, depending on the area and number of inhabitants.

The experience of Beira, in the centre of the country, shows that containers can have a volume of approximately 60 litres, and can be made locally of galvanised sheet metal.

2.4 Transport

The vehicles used to collect USW include open tippers, compacting vehicles, to load and unload large volume containers, and tractors in the municipal districts.

Observing this fact on the ground, it may be concluded that the use of compacting trucks with a hydraulic system as a means to collect and transport USW does not seem technically appropriate for certain areas of our cities due to the different perceptions and socio-economic capacities of city residents who mix together all kinds of waste in the same container, including glass, paper, organic material, and waste of varying density, including rubble.

2.5 Treatment

Mixing different kinds of solid waste in the same recipient makes recycling difficult, although it is recognised that some people do informal recycling of recipients, selecting plastic, glass and metal, often for their own use or for informal sale. This practice also takes place on the Maputo City municipal rubbish dump, with obvious risks for the people collecting waste there.

2.6. Final deposit

The final destination of USW in Mozambique consists of simple open air rubbish dumps and the controlled landfill. In these places, waste is burnt, buried and compacted, causing a certain concern in society because:

a) The rubbish dumps are located in the centre of residential areas, and the USW is transported there along public roads, used by large amounts of traffic;
b) There are no studies on the types of soil under these rubbish dumps, which may sometimes be susceptible to leaching and to pollution of ground water;
c) At the same time, air pollution may occur, caused by the fumes, bad smells, and potentially toxic particles, since the USW is not subject to prior sorting, and is burnt from time to time;
d) They are not easily accessible to the USW workers, which means that the waste may be deposited at the entrance and beside the roads;
e) Although no conclusive studies have been made into the impact of these rubbish dumps on public health, one cannot ignore the potential danger they pose, because no specific treatment is given to the USW.

2.6 Recycling of urban solid waste in Mozambique

Recycling is the result of a series of activities through which material that would otherwise become useless waste is used again. This material is collected, separated and processed so that it may be re-used as raw material.

The main advantages of recycling are: it reduces the amount of waste to be buried, and thus increases the useful life of landfills; it saves energy in productive processes; it reduces air and water pollution; it creates jobs and above all occupies the participants, a significant number of whom are unemployed youths. It thus reduces the levels of crime and drug consumption.

In Mozambique, mixing different types of solid waste in the same recipient makes recycling or re-use difficult, although it is recognised that some people do informal recycling of recipients, selecting plastic, glass and metal. This occurs mainly at the rubbish dumps and in some areas where solid waste is concentrated in the main urban centres, and particularly in Maputo.

Recycling is most significant in the cities of Maputo and Matola, because of the amount of waste produced and the ease of finding a market for recycled produce, either through export to neighbouring South Africa, or through sale to interested persons.

The value of materials that can by recycled is unquestionable, but the capacity of Mozambican industry to absorb these materials means that this is still a limited market, where few can really make a profit.

Currently in Mozambique, there are no organised forms of making use of materials that can be recycled from USW.

The re-use of glass bottles, plastic, metal and other materials occurs above all at individual level or in the informal sector.

There are some industries with a recycling capacity which are paralysed, such as Vidreira (glass) and Fapacar (paper).

There are also companies that wish to be involved in recycling activities such as MOZA WASTE PAPER (paper) and NEOQUIMICA (glass). One of the companies that recycles paper is RECLAM (the Reclamation Group Ltd), based in Matola. This is a company that buys paper and iron. There are also other companies that buy paper and iron to resell them later to RECLAM.

The National Integrated Urban Solid Waste Management Strategy, drawn up by MICOA, advocates as one of its activities the recycling of solid wastes and encourages the development of markets in recycled materials, as well as promoting the recycling industry itself.

Due to the mixing together of various wastes, care should be taken in collecting plastic from the rubbish dumps and other places of accumulation, in order to avoid the contamination of the plastic by dangerous wastes.

Recycling in Mozambique could encourage the development of greater environmental awareness and community participation.

Municipalities with Exemplary Management of Urban Solid Waste

3. Challenges facing MICOA in the area of usw

- Promote the adoption of strategies, norms and action programmes oriented towards the management of Urban Solid Waste;
- Promote and support the drafting of Municipal Urban Solid Waste Management Plans;
- Stimulate civil society intervention in the management of urban solid waste.

4. Activities undertaken

1. Drafting the National Integrated Urban Solid Waste Management Strategy;
2. Drafting the Waste Management Regulations;
3. Drafting the Manual for Integrated Urban Solid Waste Management in Mozambique;
4. Drafting the Technical Directive for Establishing and Operating Landfills in Mozambique;
5. Drafting the Municipal Integrated Urban Solid Waste Management Plans for the municipalities of Nampula, Nacala, Mozambique Island, Pemba, Montepuez, Quelimane and Mocuba.

6. Main strong points for the development of the sector

- Capacity building of the Municipal Councils and arranging partnerships so as to endow them with resources (trucks, tractors etc), for improved management of waste;
- Design programmes to remove waste from the entire urban area, based on the type and volume of rubbish;
- Promote collaboration of the community, based on making people aware of good practices for the household management of USW;
- Institute penalties for offenders based on existing legislation;
- Organise food-for-work type campaigns as far as possible, in order to collect the current rubbish, with priority for critical places;
- Collect accumulated rubbish at the sites of concentration on fixed days;
- Strict control of the functioning and management of the rubbish dump;
- Stress the use of adequate practices (landfill and burning);
- Quantify the type of rubbish produced in the main urban centres so as to recommend the adoption of new forms of treating and eliminating waste. The population census can be a basis for estimating the amount of waste produced per municipality.