Botswana's environmental policy on recycling

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Abstract

Recycling operations have become one of the primary strategies for waste management, worldwide. Especially, recycling operations are viewed as among the most effective techniques for reducing the amount of municipal solid waste disposed at landfill sites. Botswana's environmental policy on recycling stipulates, among others, that all waste management authorities should provide information on the classification and quantities of controlled waste targeted for recycling. This paper, therefore, examines the extent to which recycling operations in Botswana have either been conducted in compliance with or in violation of some major environmental requirements as enunciated on statutory guidelines. Compatibility between environmental policies on recycling and actual practice is evaluated focusing on two companies (Dumatau trading and Botswana Tissue) involved in recycling operation. Data from the two companies is complemented by one collected from the Gaborone landfill site. Finally, this study discusses on the role played by various stakeholders in policy formulation and implementation with particular emphasis being placed on a select number of non-governmental organisations (NGO).

Keywords: Recycling; Policy; Botswana

1. Introduction

The ever-increasing volumes of waste produced by modern societies have necessitated the introduction of several waste management systems to minimise the ensuing negative impact of those activities on the ecosystem. In spite of the existence of numerous techniques

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of waste management, the landfill system remains the principal method, for disposing waste in many countries, including the developed nations. Estimates in the UK, for example, indicates that about 120 million tonnes of controlled waste is deposited with landfills sites each year. This include 90% of household waste, 85% of commercial waste, 63% of the waste from construction and demolition, and 73% of industrial waste (Williams, 1998). Available evidence also indicates that many landfill sites in the UK are approximately located in terms of ecological and hydrogeological factors conditions. As a direct result, many sites benefit from natural clay lining which helps contain the potentially polluting liquids formed within the landfill, thus, considerably reducing the engineering costs in most sites in the UK. It is also noted that, many sites employ old quarries as a measure to increase land reclamation process (Guidance note S2 5.02, 1996). However, operators are still required to comply with relevant UK environmental law. All the above observations are believed to influence relatively high use of landfill method in the UK.

The landfill method may look attractive in the UK context. Nevertheless, the situation is different in other European countries, including Germany, Sweden, and Denmark. The use of alternative methods, including recycling and waste-to-energy schemes are receiving positive attention in these countries. This is due to the growing shortage of landfill space and as a measure to reduce the environmental impact associated with landfill sites, including methane leakage, and groundwater contamination. However, it should be stressed that success of schemes, such as recycling and waste-to-energy depends on strong environmental policies that support a sound approach towards integrated waste management system.

For example, in Germany, the legislation makes the recovery of energy from waste-to-energy facilities a legal obligation in situations where there is an on-site use for heat or steam or where electricity generation would be more than 0.5 Mwe (Jahnke, 1992).

It should be stressed that the problem of shortage of land reserved for landfill sites is not only an acute concern in most developed countries, but it is also a major concern in some of the developing countries particularly in countries with fast growing economies, such as Botswana. For example, in Botswana, waste management authorities have announced the construction of a regional landfill site located approximately 35 km west of Gaborone, the country's largest city. The choice of the location is driven by shortage of land reserved for landfill sites. The location of the proposed landfill site contrasts with the existing landfill site that is located approximately 4 km from the city centre. The distance of 35 km mentioned above supports the fact that there is a growing shortage of landfill sites close to area of solid waste generation in most parts of the world.

It should also be noted that the location of the proposed regional landfill site is driven by the fact that the existing landfill site commissioned in 1993, is due for closure 2 years before its design life span. The early closure is due to the fact that from 2001, this site started to receive municipal solid waste from Tlokweng and Mogoditshane Villages. These villages are the only villages close to the Gaborone city with population of 21 000 and 32 000 people, respectively (Government Statistics, 2001). All these lead to the conclusion that waste from these two areas has resulted in a significant increase in the volume of municipal solid waste deposited at Gaborone landfill site, since 2001. It should be further highlighted that prior to 2001, many waste management authorities, including Tlokweng and Mogoditshane were using barrow pits which are created during road construction for mining soil. The legislation now allows only construction and demolition waste to be deposited using barrow pits as

a way of increasing land reclamation. As a direct result, waste from these two areas is deposited at Gaborone landfill site.

Estimates indicate that each person, worldwide, is expected to generate 900 kg of waste per year. However, recent increases in environmental awareness and recycling schemes have resulted in an observed rate of waste generation at just over 750 kg per person per year (Swithenbank et al., 1999). Although the relative closeness of the existing landfill site to source of waste appears economical viable in terms of collection and transportation costs, its location is also believed to pose negative environmental impacts, including noise pollution and objectionable odour particularly to the neighbourhood. Regarding transportation and collection costs the present investigation revealed that a 19 m^3 refuse compactor used by the Gaborone waste authority covers approximately 1700 km per month and uses 1300 l of diesel fuel. Based on these values, it is clear that the use of the proposed landfill sites will increase the transportation and collection cost.

With reference to the newly proposed regional landfill site and the recent increase in environmental awareness and recycling programmes, the challenge to waste management authorities is to ensure that the two issues of recycling and environmental awareness programmes are given positive support to facilitate a proportionate volume of waste deposited with the proposed landfill site. The approach would also ensure extended life span of the landfill site. All these could be achieved through effective implementation of recycling waste management policy plan by waste management authorities.

This paper examines the Botswana government's environmental recycling waste management policy plan and their implementation strategies. The paper also considers the role of non-governmental organisations (NGOs) and other stakeholders towards the rapid development of recycling programmes in Botswana.

2. Environmental policy in Botswana

The environmental protection system in Botswana is still at its infancy stage. In 1997, the introduction of the first Guidelines for the Disposal of Waste using the Landfill method was introduced. The 1998 "Botswana's Strategy for Waste Management" introduced the concept of "waste management hierarchy" and created the Department of Sanitation and Waste Management (DSWM) within the Ministry of Local Government, Lands and Housing to provide policy direction for effective development and management of waste. The first Waste Management Act was introduced in 1998, bringing together the DSWM and the waste regulation functions, which are carried out by local authorities.

The main vision of the waste management authority is to minimise waste, prevent pollution, and promote efficiency in waste management and encourage recycling and reuse programmes to ensure sustainable local economy. The vision focuses on developing a sustainable community. On the basis of the above, the solid waste hierarchy, with its associated goals of protecting the air, land, water, and other natural resources and public health is central to attaining the objectives of sustainability and solid waste management.

To bring the vision closer to reality, the waste management authority is working towards three specific goals, which represent elements of the vision of sustainability. These are as follows:

- To manage waste in a manner that will best protect the environment and public health as well as conserve natural resources.
- To manage waste in an integrated manner which is in accord with the hierarchical structure of reducing the volume of waste channelled towards landfill sites, and whose principal focus is maximising recycling, reuse and source separation of recyclable waste.
- To manage waste in a cost-effective manner that maximises environmental benefits and minimise long-term financial liability for taxpayers.
- To achieve the above set goals, government has promulgated environmental policies, which are organised around three goals and put more emphasis on the following issues with regard to waste recycling.
- That each local authority shall prepare, as part of its local management plan, a waste recycling plan with respect to controlled waste in its catchment area. The plan is expected to include the following information:
  i. Classification and quantity of controlled waste that could be recycled and would not be included in the waste collection and disposal chain of the area in question.
  ii. Implications that the recycling plan would have on the waste management service provided by the local authority.
  iii. Technical, organisation and financial initiatives the local authority will provide to encourage recycling.
  iv. Estimated costs or savings attributable to the methods of dealing with waste in the manner provided by the plan.
  v. Possibility of returning waste materials to the manufacturing stream in order to control pollution, conserve resources and prevent harm to human, animal or plant life (Act, 1998).

The Waste Management Act of 1998, requires local authorities to complete and submit a recycling plan to the Director of DSWM for approval. Following approval, and also as a means to stimulate rapid development of recycling industry in the country, it becomes the prerogative of individual local authorities to ensure adequate publicity and effective implementation of the plan in their respective areas. The Act (1998) further states that a local authority may make arrangements with any waste management industry in the private sector to carry out recycling process, develop waste-to-energy systems, to collect and dispose of controlled waste or to either collect or dispose of such waste.

While the government has formulated a relatively well-balanced mix of specific goals to stimulate rapid development of the recycling industry and to reduce the volume of municipal solid waste disposed at landfill sites, there are serious challenges, facing the introduction of recycling plans in Botswana. The major challenge appears to stem from the fact that many landfill sites in Botswana are not equipped with landfill weigh bridges particularly those which are located in district councils, including Molepolole village town with an estimated population of 62 000 (Government Statistics, 2001). It should be stressed that in the village towns, it is also forecast that only 60% of the household receive a collection service, while in small villages with an estimated population of about 6000, the value falls to about 7%. In a situation where the population is below 6000, there is no collection service (Botswana Strategy for Waste Management, 1998).

The above observations manifest that it is difficult for many local authorities to prepare reliable data with regard to the classification and quantities of recyclable materials found in municipal solid waste stream. As a result, the government ambition to implement recycling plans is still a far cry. This observation is reinforced by observations from interviews with waste management personnel at local authority level, which revealed that nothing is in place to prepare the recycling plan. The interviews also revealed that other problems, including shortage of qualified personnel and budgetory constraints appears to contribute to the delay in introduction and implementation of the required recycling plan (D.M. Olerilwe).[1] Despite the above obstacles, there are recycling programmes, which are carried out by private organisations as described in Section 3, below.

3. Current status of recycling activities in Botswana

Available evidence reveals that there are no recycling plans in Botswana. Most of local recycling companies are only involved in collection of recycling materials, which are later exported to other countries, including South Africa and Zimbabwe. The major recycling programme includes collection of metal scraps from motor vehicles, metal scraps from beverage and preserved cans, and waste paper. Collection of scrap metals from motor vehicles, beverage and preserved cans and waste paper appears to have been running for more than 20 years. In fact, in 1983, a company based in Gaborone knows as Pyramid Holdings, started waste paper collection in Gaborone city, Francistown city and Lobatse town. However, there is no reliable data relating to waste paper collected during the first 14 years. In fact, the first government report on recycling of paper was in 1998. The report revealed that the level of recycling of paper was estimated to be 5600 tonnes (Waste Management Report, 1998).

The success that collections of beverage and preserved cans, and metal scraps from vehicles have attained appears to be relatively better when compared to the collection of waste paper. The success appears to stem from the fact that the two streams are receiving positive support from the public and other stakeholders. For example, Collect-A-Can, a local company based in Gaborone city encourages private entrepreneurs, charity groups, public schools and environmental associations to collect cans for which the company is paying "utility's avoided cost". In this context, the utility's avoided cost refers to the overall disposal cost which local authority would pay if it were to use another alternative method, such as landfill method. The company then export all the collected cans to South Africa for complete recycling processing because of the reasons mentioned earlier in the first paragraph of Section 3.

The data in Fig. 1 shows the quantity of the projected, generated and recovered beverage and preserved metal cans from 1996 to 2005. It should be noted that the data from 2004 to 2005 as shown in Fig. 1 is a predicted data. Considering this data, it can be seen that the recovery rate remains nearly constant particularly from the year 2001. All these lead to the conclusion that the recycling industry is relatively slow in terms of development. The results also reinforce failure to develop and implement recycling goals. The authors believe

[1] D.M. Olerilwe, Gaborone Landfill Site Manager.

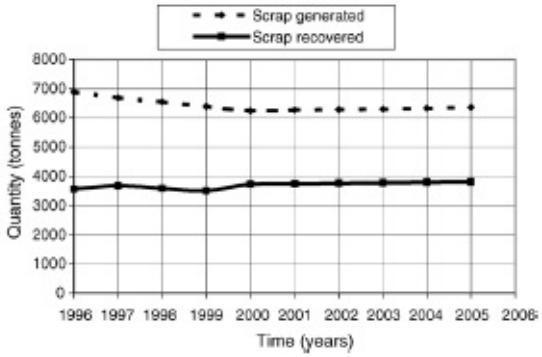

Fig. 1. Generated and recovered can scrap. Source: Government of Botswana (1996) Report No. NCS/GTZ 6/96.

that the introduction and implementation of recycling plans would increase the recovery rate.

Recycling of scrap metals from vehicles is also an area, which has recovery potential when compared with cans collection activities. The data in Fig. 2 shows an increased quantity with time, although there are variations, which may be linked to a number of road accidents. This assumption is based on the fact that there has been significant increase in rood vehicles in our roads for the past 10 years. In fact, estimates indicate that in 1996, 107 000 vehicles were registered in Botswana. The value is expected to increase by 26% by the end of 2004 (Government Report No. NCS/GTZ 6/96). It should be noted that scrap metal from vehicles originate from car breakers who often buy car wrecks and remove valuable parts to sell as spares. It is also noted that some scrap collectors and dealers collect and trade the different metals particularly the Al, Cu, Pb and Zn components. However, the data for these metals is not traceable.

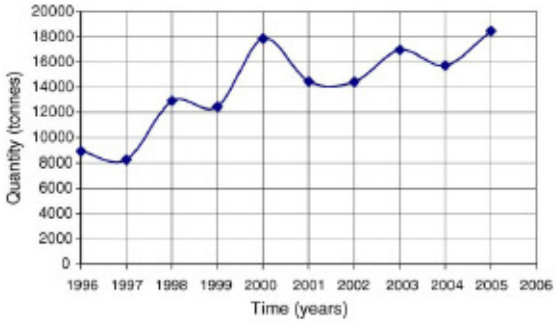

Fig. 2. Scrap metal from vehicles. Source: Government of Botswana (1996) Report No. NCS/GTZ 6/96.

In Botswana, unlike in many other countries, including the UK, waste from construction and demolition is not recycled. A relatively high proportion is illegal dumped in the outskirt of the cities and towns. The recycling of waste paper, unlike the recycling of cans and metal scraps from motor vehicles, have not been receiving positive support during the past 14 years as mentioned earlier. This is indicated by insignificant numbers of small companies involved in the collection activities as indicated in Section 4. It should be explained at the onset that the present investigation is focusing on the status of recycling of waste paper in Botswana due to relatively low take-off despite high volume of waste paper found in municipal solid waste stream.

To assess the status of recycling of waste paper in Botswana two private companies, which are involved in collection and recycling relatively small quantities of packaging materials were selected as case studies for the present study. The companies in question include, the Dumatau Trading Company formally known as Pyramid Holdings and the Botswana Tissue. The two are located in Gaborone city. Data from the two companies is complemented by the data collected from the Gaborone landfill site. The data collected from the existing landfill site is meant to highlight the level of recyclable materials deposited at it.

3.1. Levels of recyclable waste removed from Gaborone landfill site

It should be noted that before September 2002, there was no record on the composition of the waste deposited at Gaborone landfill site. In fact, the only available data was on the quantity of waste deposited rather than on the composition. Despite the availability of data on the quantity, the data were estimates based on a one-month record. For example, in 1996, the total amount of waste deposited at Gaborone landfill site was estimated at 151 000 tonnes/year (Botswana's Strategy for Waste Management, 1998). This data was based on May 1996, record only. As has been pointed out in Section 2, the first significant move came in September 2002, when the recording of the composition of recyclable materials removed from municipal solid waste stream by few individuals was initiated. The recording did not continue to the next month because of the reason already stated above. As a result, Fig. 3 shows quantity of recyclable materials removed from municipal solid waste stream at Gaborone landfill site in September 2002.

The recyclable materials removed from municipal solid waste stream at Gaborone landfill sites is done by individuals. Fig. 3 shows that waste paper; aluminium cans, and scrap metal are subject to a relatively high proportion of removal rate. The present investigation revealed that tyres, which originate mostly from tyre services companies, are transported to Zimbabwe by few individuals for reuse. The removal of relatively high volume of waste paper appears to be driven by the payment made by the recycling companies in South Africa (SA). Depending upon the quality of waste paper, payments are made as given in Table 1.

Although the data presented in Fig. 3 was only available for Gaborone landfill site, it can be assumed that such data reflect the practical situation found in the rest of the landfill sites in Botswana particularly in cities and towns. Based on this assumption and particularly on the results in Fig. 3, it may be concluded that there is a considerable amount of recyclable waste deposited in landfill sites in Botswana. In fact, the total amount of recyclable materials removed few individuals from municipal solid waste stream at Gaborone landfill site during September 2002, alone was approximately 53 tonnes. This suggests that if waste

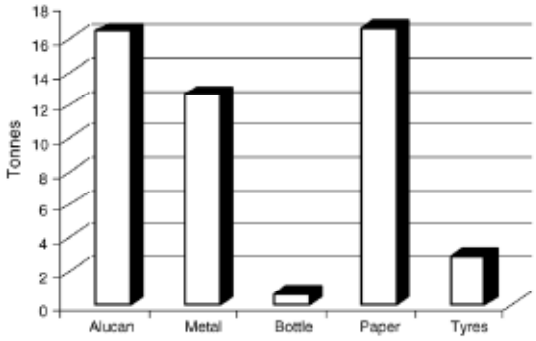

Fig. 3. Quantity of recyclable materials removed from municipal solid waste at Gaborone landfill site during September 2002.

management authorities could comply with the required recycling plans and develop proper guidance notes on removal of recyclable materials at landfill sites, the approach could boost the development of recycling industry on a large-scale in Botswana. Sections 3.1.1 and 3.1.2 focus on two companies, which are involved in the collection of waste paper as mentioned earlier.

3.1.1. Dumatau Trading Company (Pty) Ltd.

This section considers the situation at Dumatau Trading Company. This company is located in Gaborone city and started collecting recyclable materials in 2000. It should be stressed that Pyramid Holdings, a company based in Gaborone that is currently involved in the manufacturing of paper bags, was also involved in the collection of recycled paper. However, since 2000, its license for recycling activities was sold to a company called Dumatau Trading Company. As a result, no data is available on the quantity of waste paper collected before 2000.

The data was collected through questionnaires and formal interviews. The investigation revealed that Dumatau Trading Company also collects waste material, including paper, clear plastic and polystyrene. However, all the collected materials are transported to Zimbabwe and the Republic of South Africa for recycling processes for the reason mentioned

Table 1
The price of waste papers in South Africa

Paper type	Description	Cost/tonne in SA currency
White	Pure white paper, mainly production waste	R 800/tonne to R 1000/tonne
Super mix	White, pastel coloured paper from offices	R 650/tonne
Econo mix	Newsprint and magazines	R 200/tonne
Mixed paper	Papers too difficult to sort	R 100/tonne

Source: Government of Botswana (1998) Report No. 30.

earlier. The investigation revealed that in 2001 and 2002, the company collected 4880 and 5400 tonnes of recyclable waste, respectively. It should be noted that, since, there is no system in place to support the recycling programmes, the quantity of waste papers collected by recycling companies is likely to vary from time to time. This brings several questions, including the procedures for enforcing the overall policy goals.

3.1.2. Botswana Tissue Company (Pty) Ltd.

Botswana Tissue Company also located in the same city, started operating in 2000. Its activities include collection of recyclable materials, including paper/cardboard and clear plastics. Like Dumatau Trading Company, this company also transports all its recyclable material to South Africa. However, a relatively small proportion of it is processed into raw material for tissue. The processed tissue raw material is then transported back into the country and used by Botswana Tissue Company for manufacturing soft paper.

Though the company started collecting recyclable material in 2000, the investigation revealed that during the same years, the company collected only 400 tonnes of waste. However, in 2001, the company collected approximately 5000 tonnes of recyclable waste. Based on the data from the above two companies and particularly on the fact that the recycling policy goals have not been introduced and implemented, the present approach on removing recyclable materials from municipal solid waste stream is unlikely to bring the rapid development of recycling industry in Botswana. Despite the failure to comply with Waste Management Act of 1998, some non-governmental organisations are actively involved in environmental issues. This is covered in Section 4.

4. The role of non-governmental organisation

Several non-governmental organisations (NGOs), including Forestry Association of Botswana, Environmental Heritage Foundation of Botswana, Permacuture Trust of Botswana, Somarelang Tikologo (Environment Watch Botswana), among others, are involved with environmental issues in the country. Although most of the NGOs are actively involved in issues of concerns to the environment and utilisation of natural resources in a sustainable manner, it should be stressed from out set that Environment Watch Botswana is the only NGO which is effectively involved in waste management issues, including recycling operations. As a result, Environment Watch Botswana was selected as part of the case study of the present investigation. Since its founding in 1993, the Environment Watch Botswana has been operating a recycling drop-off centre at its office in Gaborone. Labelled containers for glass, paper, plastics and cans are provided for the public to drop-in their recyclables, which are then collected by the respective recycling companies. The main obstacle to the utilisation of such facilities appears to be the long distance involved between the communities and the said facilities. However, the organisation also intends to introduce these facilities in shopping centres.[2] It is expected that such an approach can increase the amount of recyclable materials removed from municipal solid waste stream and encour-

[2] L.L. Kemoeng, Manager Environment watch Botswana.

ages separation at source. Thus, such an approach may boost the economic base for the development of large-scale recycling operations in Botswana.

Aiming largely at stimulating levels of recycling in Botswana, this organisation is operating a "green shop" which sells products manufactured from waste materials particularly plastics. The objective is to create a stable market for small groups and individuals who are currently involved in recycling/reuse activities. The approach appears to benefit both the environment and the individuals particularly those who are involved in recycling operations.

5. Conclusion and recommendations

This paper has examined the level of recycling operations in Botswana. In particular, the study identified the main obstacles to the rapid development of this industry that result in low level of recycling activities in Botswana. It can be concluded, on the basis of the fact that the proposed regional landfill site will be located approximately 35 km from Gaborone city that the use of regional landfill site will still place huge budgetary constraints on local authorities.

The main hardest will present themselves in the form of significant use of fuel energy and generation of pollutants derived from the combustion of diesel fuel.

Therefore, to reduce the use of fuel energy and the environmental burden, it is proposed that waste management authorities should consider involving the following three related actions:

i. Segregation of waste at waste depots and trade premises.
ii. Balling of recyclable materials at waste depots and trade premises.
iii. Compacting of non-recyclable materials and transport to the regional site.

Such an approach is expected to reduce the environmental impact of waste disposal using the proposed regional landfill site. It can also be concluded that the proposed approach will stimulate rapid development of recycling industry in Botswana.

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