



SUSTAINABLE ENVIRONMENT

WASTE MANAGEMENT IN UGANDA AND OUTSIDE



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ABSTRACT

Solid waste management is increasingly becoming a great concern to most urban centers of most developing world including Uganda. The uncollected waste from households, manufacturing (plastic and metal), agricultural products, institutions (health and education) center, and market places, others are scattered in open spaces, along the roads, water sources and drainage systems. The study put emphasis on the various types of wastes, methods, community participation, challenges of SWM and outcomes of poor waste management to the environment, methods used in Uganda and outside and possible solutions to inefficient solid waste management.

The findings revealed that waste generated in Kampala city consisted mainly of organic material (92.1%), soft plastic (3.0%), hard plastic (1.8%), and paper (1.1%). The study basing on observation found that most residents stored refuse in plastic bags and some had none or no permanent facilities. The study also established that a good number of the community use illegal methods of disposal. These include dumping in open spaces, along the road and water resources. Among the challenges of waste management were inadequate coverage of collectors, Environmental issues due to disposal methods used and inefficient operations due to limited vehicles.

The study recommended the following: Pay-as-you-throw Policies: consumers pay for volume of garbage that they generate and nothing or a minimal fee for recycling. The goal is to provide a financial incentive for recycling while reducing waste. Extended Producer Responsibility: ensures that manufacturers are responsible for the safe disposal and recycling of their products post-consumption. Use of proper means such as covered dust bins should be preferred to plastic bags, since they add more problems to the environment. The central government needs to facilitate improvement of unplanned settlements (slum) for proper management of solid waste, increase funds on SWM, and purchase more Lorries.

1. CHAPTER ONE

1.1 Background of the study

Eight people died in low-lying slum communities in the outskirts of Kampala due to flash floods during the first rainy season of 2019 (Ssemugabo, et al., 2019). The flash floods were attributed to among others blockage of drainage channels with solid wastes (Ssemugabo, et al., 2019). Many of the households in slum communities have been reported to indiscriminately manage their waste (Ssemugabo, et al., 2019). The problem is likely to escalate with the estimated increase in population and consequently unplanned urbanization resulting in slum development in sub-Saharan Africa. (Ssemugabo, et al., 2019)

The generation of solid waste is indeed on the rise globally. Currently, cities around the world generate over 1.3 billion tonnes of waste annually, with this approximated to increase to 2.2 billion tonnes by 2025 (Ssemugabo, et al., 2019). This escalation in the amount of solid waste generated is projected to be much higher in developing countries due to rapid urbanization. Today, Uganda is rapidly growing with annual urbanization and population growth rates of 5.1% and 3.3%, respectively (UBOS, 2018). However, the existing infrastructure for services such as solid waste management does not cope with the increased urbanization and waste generation. Overall, approximately 28,000 tonnes of waste is collected in Kampala and delivered to the landfill every month, which accounts for only 40% of the total waste generated in the city (Komakech, et al., 2014). The remainder of the waste generated is indiscriminately disposed of resulting in environmental and public health problems such as blockage of drainage channels and consequently flash floods. Other environmental health challenges due to poor solid waste management include pollution (water and soil) resulting in spread of diarrheal diseases. (Ssemugabo, et al., 2019)

1.2 Statement of the problem

Out of the 1,619,900 people that live in Kampala, approximately 53.6% (868,266) live in crowded and informal slum settlements, most of which are located in low-lying zones and wetlands (United Nations, 2014). This has resulted in overcrowding and development of more informal settlements. Although solid waste collection is a core service that should function well at community level, it has turned out to be a major challenge that slum residents, city authorities, and leaders are all grappling with. Solid waste management involves control of waste generation, storage, collection,

transfer and transport, processing and disposal of solid waste basing on best practices of public health, economics, and environmental consideration. Lubaga division where Kasubi parish is located collects over 3,400 tonnes of solid waste per month (Ssemugabo, et al., 2019). However, a significant percentage of solid waste is dumped in unauthorized sites including drainage channels, along the road, rivers etc. Moreover, there are only a few designated communal garbage collection points. This is compounded by the fact that land lords are unwilling to give away a portion of their land for allocation to solid waste collection points, citing poor maintenance of waste collection sites. (Ssemugabo, et al., 2019)

1.3 Purpose of the study

Proper municipal solid waste management is very essential component of environment health which is very important as regards the improvement of health in any population. Improved environmental sanitation achieves individual and community health. The study will aim at exploring the solid waste management systems that are satisfactory for storage, collection and disposal of these solid wastes and the cleaning of streets and other public places so as to destruct the habitant to vectors of diseases to enhance health of human well-being. The study will further help the policy and decision makers to develop implement environmental policy which will involve people in Uganda, Kampala to participate in solid wastes collection, this is an essential component of both public and the aesthetic qualities of the environment in which people live.

The study will help to identify effects of uncontrolled wastes so that remedies may be evolved.

1.4 Objectives of the study

- To define different categories of wastes.
- To identify the physical composition of wastes produced in Uganda.
- To identify community participation in waste management
- To identify the solid management methods used by Kampala City Council Authority and some outside countries.
- To find out major effects of poor solid waste in the area understudy.
- To suggest strategies to improve waste management in Uganda.

1.5 Scope of the study

The study was conducted in Kampala central division it was concentrated on how solid wastes are collected, controlled, transported for disposal sites more over what impacts are apparently occurring from poor solid waste management. This study research was carried in Kampala and surrounding areas and the results represented the real situation of environmental sanitation of Kampala Central Division.

The study was concentrated and restricted to the challenges faced by the Division in solid waste management and considering methods in place in the whole exercise, community participation in waste management, the effects of poor solid waste management to the people and environment, the challenges faced by the Division in solid waste management and how solid waste is being managed in Uganda and some outside countries. The study also managed to come up with suggestions which could improve the solid waste management in Uganda.

2. CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Waste is an unavoidable by-product of most human activity. Economic development and rising living standards in the East African Region have led to increases in the quantity and complexity of generated waste, whilst industrial diversification and the provision of expanded health-care facilities have added substantial quantities of industrial hazardous waste and biomedical waste into the waste stream with potentially severe environmental and human health consequences. The Chapter discusses the generation, treatment, disposal and management of the growing volume of waste, which poses formidable challenges to Uganda and some outside countries.

2.2 TYPES OF WASTES

2.2.1 Liquid waste

Liquid waste refers to all grease, oil, sludge, wash water, waste detergents and dirty water that have been thrown away (SKIPS, 2019). They are hazardous and poisonous to our environment and are found in industries as well as households. Wastewater, as it is often called, is any waste that exists in liquid form.

2.2.2 Solid Waste

Solid waste is any garbage, sludge, and refuse found in industrial and commercial locations (SKIPS, 2019). The five major types of solid rubbish are;

- **Glass and Ceramics:** Numerous companies readily recycle ceramics and glass. The catch here is that you have to dispose of them correctly.
- **Plastic waste:** Plastic waste is any container, jar, bottle, and bag that is found in companies and houses. Plastics are non-biodegradable, and most of them cannot be recycled. Do not mix plastic rubbish with regular waste. Instead, sort them out before throwing them away.
- **Paper rubbish:** This refers to all newspapers, packaging materials, cardboards, and other paper products. Paper is recyclable.
- **Metals and Tins:** These can easily be found in homes because food containers and household materials are made from them. Most metals are recyclable.

2.2.3 Organic Waste

Organic waste refers to rotten meat, garden and food waste. This type of rubbish is commonly found in homes. With time, they decompose and turn into manure by the action of microorganisms on them. .

When decomposing, organic waste produces methane, so, it must not be thrown away with regular waste. (SKIPS, 2019)

2.2.4 Recyclable Waste

All discarded items like metals, furniture, organic waste that can be recycled fall under this category (SKIPS, 2019). Not all items are recyclable, so you have to be careful when putting things into the recycle bin. If you are not sure whether an item is recyclable or not, then check the item's packaging. (SKIPS, 2019)

2.2.5 Hazardous Waste

Hazardous waste includes flammable, corrosive, toxic and reactive materials. In a nutshell, they are wastes that pose a significant or potential threat to our environment. (SKIPS, 2019)

2.3 PHYSICAL COMPOSITION OF MUNICIPAL WASTES PRODUCED IN KAMPALA

The (2014) study established that on average, about 28,000 tons of municipal waste from Kampala was disposed of in the landfill every month. This waste consisted on average (by weight) of 92.1% organic material, 1.8% hard plastic, 0.1% metals, 1.3% papers, 3.0% soft plastic, 0.6% glass, 0.5% textile and leather, and 0.6% others (Komakech, et al., 2014).

Basing on observation, most people use temporary facilities like plastic bags and some few dust bins to store these wastes at household level before disposing them off. Some also use facilities like cut jerrycans, sacks to collect and dispose of the wastes which in most is disposed along the road, drainage systems and water channels.

Another important finding of the (2014) study is that hazardous wastes (represented by dry-cell batteries) were hardly found at all in the municipal waste analyzed. This was probably because they were mainly disposed of in pit latrines, owing to a widespread myth that this increases the service lives of the latrines through lowering the sludge levels. This had major implications for the

chemical quality of the fecal sludge found in the latrines, which is a large potential source of plant nutrients in Uganda (Komakech, et al., 2014). Medical wastes were also not found in the municipal waste analyzed, reflecting the success of programs to educate waste collectors about the types of waste they should bring to the landfill. (Komakech, et al., 2014)

2.4 WASTE MANAGEMENT

Waste management refers to the various schemes to manage and dispose of wastes. It can be by discarding, destroying, processing, recycling, reusing, or controlling wastes. The prime objective of waste management is to reduce the amount of unusable materials and to avert potential health and environmental hazards

According to Wikipedia, Waste management or Waste disposal is all the activities and actions required to manage waste from its inception to its final disposal (Wikipedia, n.d.). This includes amongst other things, collection, transport, treatment and disposal of waste together with monitoring and regulation. It also encompasses the legal and regulatory framework that relates to waste management encompassing guidance on recycling etc. (Wikipedia, n.d.).

2.5 METHODS OF WASTE MANAGEMENT

The most common way to deal with waste is by observing the 3RS/ these also pass as the types of waste management;

- Reduce: Involves limiting the rate of improper disposal of waste.
- Reuse: The process of taking useful discarded items for a specific next use.
- Recycle: Recycling refers to the reuse or recovery of materials that would normally be considered as waste. There are a few different methods of recycling such as: physical reprocessing, biological reprocessing, and energy recovery. Recycling is good for the environment. It supports zero waste strategies and sustainability targets, reducing the amount of unrecoverable waste that is disposed of in landfill. Some of the examples of solid waste that can be recycled include: Paper and card, including mail, newspapers and magazines.

2.5.1 Other forms of waste management

- **Incineration and Destruction:** Another way of disposing of hazardous waste is to destroy or incinerate them. Incineration reduces the amount of hazardous waste and can also generate energy for use in the process.
- **Pyrolysis:** Pyrolysis, in a very high-temperature and under inert conditions, is an excellent way to dispose of hazardous waste. This process is used to avoid the dangers of combustion and is preferable when dealing with organic waste and pesticides.
- **Disposing in a landfill:** A landfill is a disposal facility where rubbish is placed in. Land treatment facilities are not landfills.
- **Composting** is an easy and natural bio-degradation process that takes organic wastes i.e. remains of plants and garden and kitchen waste and turns into nutrient-rich food for your plants. Composting, normally used for organic farming, occurs by allowing organic materials to sit in one place for months until microbes decompose it.

Most developing countries, Uganda inclusive have solid waste management problems different from those found in fully industrialized countries. Indeed the very composition of the waste is different from that of “developed” nations. Although developing countries solid waste generate average only 0.4 to 0.6kg/person/day as opposed to 0.7 to 0.8kg/per person per day in fully industrialized countries. Before one can examine individual problems in solid waste management, it is important to understand the political and economic framework in which governments must frequently work in developing countries.

2.6 COMMUNITY PARTICIPATION IN WASTE MANAGEMENT

Community participation as the sociological process by which residents organize themselves and become involved at the level of a living area or a neighborhood, to improve the conditions of daily life (water, sanitation, health, education, etc.) (Subash, pp. 1-3). It comprises various degrees of individual or collective involvement (financial and/or physical contributions, social and/or political commitment) at different stages of a project. Since it implies that residents set up management committees in charge of equipment.

For instance, to keep any solid waste management systems running, at a minimum participation of the community required in putting the garbage at the street in a proper way at the right time (Subash, pp. 1-3). At the individual level, residents are responsible as users. This involves actions

like storing waste in a proper way in a bag or bin, separate recyclable or organic materials from other waste, offering waste at the right place at the proper time for collection, and cleaning the area around the house (Subash, pp. 1-3).

Apart from individual responsibility, people can be collectively responsible in more or less organized activities, like meetings, clean-up campaigns, and awareness-raising activities (Subash, pp. 1-3). Furthermore, community participation may involve making material, financial or physical contributions to activities of solid waste management, for instance working as cart operator or sweeper, and paying fees for waste collection.

A step further is actively participating in formulating the project, meaning participation in meetings and expressing opinions and ideas about the objectives and activities of the project, and closely following the project and its progress (Subash, pp. 1-3). The highest level of community participation is community management and this may entail becoming a member of committees, being involved in controlling the project, being accountable to other community members about decisions taken. Often community management is carried out by a smaller group within the community, through for example a newly established committee or an existing community-based organization. (Subash, pp. 1-3)

2.7 CHALLENGES OF SOLID WASTE MANAGEMENT

2.7.1 Inadequate coverage

Solid waste collection schemes of urban towns in the developing countries generally serve only a limited part of urban population. The majority of the people in slum areas remain without waste collection services, these are usually the low income earners living in poor conditions in pen-urban areas. One of the main causes of inadequate collection services is lack of financial resources to cope with the increasing amount of generated waste produced (Faustine, 2017).

2.7.2 Environmental issues

The decomposition of waste into constituent chemical is a common source of local environmental pollution (Contreau & Levine, 1996). This problem is especially acute in developing nations which very few existing landfills would meet acceptable environmental standards, due to limited budget. The problem is again compounded by the issues associated with rapid urbanization. As land becomes scarce, human settlements encroach upon landfill space, and local governments in some

cases encourage new development directly on top of operating or recently closed landfills (Contreau & Levine, 1996). A major environmental concern is gas release by decomposing garbage. Methane is a by-product of anaerobic respiration of bacteria, and these bacteria thrive in landfills with high amounts of moisture. Methane concentrations can reach up to 50% of use composition of land fill gas of maximum anaerobic decomposition. (Contreau & Levine, 1996)

2.7.3 Operational inefficiencies

Operational inefficiencies are due to inefficient institutional structures, inefficient organizational procedures or deficient management capacity of the institutions involved as well as the use of inappropriate technologies (Faustine, 2017).

With regard to the technical system, often the ‘conventional’ collection approach as developed and used in the industrialized countries is applied in the developing countries the need vehicles are sophisticated , expensive and difficult to operate and maintain, thereby often inadequate for the conditions in developing countries (Faustine, 2017). After a short period (time) of operation, usually only small part of the vehicle fleet remains in operation. Transport also relies on operational vehicles and frequent breakdown coupled with part shortages can immobilize collection vehicles for extended period of time. (Faustine, 2017)

2.8 OUTCOME OF POOR WASTE DISPOSAL (HOW OUR TRASH IMPACTS THE ENVIRONMENT)

Downs & Acavedo (2019) say that the waste humans generate has been detrimental to our environment for quite some time now. Humans are producing too much waste and cannot deal with it in a sustainable way. Waste that is not biodegradable and cannot be properly recycled is filling our water bodies and landfills. Let’s take plastic waste as an example. A recent study (Geyer, Jambeck, & Law, 2017) found that of the 6.3 billion metric tons of plastic waste that has been produced, only 9% of that plastic waste had been recycled. In 2017, for instance, the Environmental Protection Agency calculated that the total generation of municipal solid waste in the United States just that year was 267.8 million tons. Compared with 2015 levels, it was a 5.7 million increase. All together, the amount of waste generated affects the environment in multiple ways: its contribution to the worsening climate crisis, its negative impact on wildlife and the natural environment, and its detriment to our very own public health (Downs & Acevedo, 2019).

2.8.1 Climate Change

The way we dispose of waste is troubling. What we have failed to do is to put into action the ideas we believe will help us mitigate or adapt to climate change (Downs & Acevedo, 2019). The trash that is dumped in landfills releases methane gas. The burning of large, open piles of trash in various parts of the world produces dangerous levels of carbon dioxide, and a greenhouse gas that is heating up our planet. Researchers have calculated that approximately 40% of the world's trash is burned in this fashion, posing large-scale risks to both our atmosphere and the people that live near these burning sites. (Downs & Acevedo, 2019)

2.8.2 Wildlife

Ecosystems vary widely from location to location. However, one of the most outside consequences of our global waste problem manifests itself in relation to our marine life and waterways (Downs & Acevedo, 2019). Simply put, it affects the people who depend on the ocean for their livelihoods. They cannot distinguish between what is or isn't food (Downs & Acevedo, 2019). They consume the trash, which results in death because the aquatic animal could not process it. This affects fish, seals, turtles, whales, and many other aquatic animals, as scientists have also found many plastic fragments in over a thousand species. Due to ingestion of trash or plastics, starvation is usually the next step because some species do not have high acidic levels in their stomach to break down the object that they ingested (Downs & Acevedo, 2019). When it comes to biodiversity, our waste problem is severely plaguing the health of the world's species. (Downs & Acevedo, 2019)

2.8.3 Public Health

Human health is at risk through our failure to act. We keep producing large amounts of trash, we do not dispose of it correctly, and in the end that will be our downfall as it is for the environment and wildlife in the ecosystems we all share (Downs & Acevedo, 2019). We cannot avoid or promote longevity with how we treat our Earth. The more emissions that we produce due to how much trash we generate, affects us long term. One can develop diseases such as asthma, birth defects, cancer, infectious diseases, low birth weight, and preterm delivery and so many others. (Downs & Acevedo, 2019)

2.9 HOW UGANDA AND OTHER COUNTRIES MANAGE WASTE DISPOSAL.

Kampala is the capital city of Uganda and is situated within the Greater Kampala Metropolitan Area (GKMA). The city is administered on behalf of the Central Government by the Kampala

Capital City Authority (KCCA), a legal corporate entity established by the Ugandan Parliament (Aryampa, Maheshwari, Sabiiti, Bateganya, & Bukenya, 2019). KCCA is responsible for the collection, transportation, treatment and safe disposal of the waste generated within the city as mandated by the Public Health Act Cap 281 and the Local Governments Act (Aryampa, Maheshwari, Sabiiti, Bateganya, & Bukenya, 2019). In conducting its duties, KCCA is mandated by the Kampala City Council Solid Waste Management Ordinance of 2000 to ensure that solid waste is collected and conveyed to treatment installations in a manner that satisfies both public health and environmental conservation requirements (Aryampa, Maheshwari, Sabiiti, Bateganya, & Bukenya, 2019).

2.9.1 Landfill

The Kiteezi Landfill is the only sanitary landfill in Uganda and is currently managed by KCCA (Aryampa, Maheshwari, Sabiiti, Bateganya, & Bukenya, 2019, p. Chapter 2). Waste from Kampala city and the nearby peri-urban areas in Wakiso district is disposed of at the landfill free of charge. The landfill location receives two seasons of rainfall (March to May and September to November) and has two dry seasons (December to February and June to August) (Aryampa, Maheshwari, Sabiiti, Bateganya, & Bukenya, 2019, p. Chapter 2).



Image src: (Komakech, et al., 2014)

2.9.2 Resource recovery (recycling and re use)

This reduces the amount of garbage on the dumping sites since the scavengers scramble to get resource out of garbage. At the same time the activity of recycling creates further economic benefits such as employment creation and income generation.

2.9.3 Combustion

This takes two forms that is open burning and incineration. Bamukwasha (1998) states that burning of solid waste in Kampala was done at house hold level in small scale as a way of reducing the amount of garbage produced.

2.10 HOW OTHER COUNTRIES ARE MANAGING WASTES

2.10.1 Sweden: from waste to energy

The Scandinavian country is one of the European territories with the greatest culture of environmental protection, and therefore has one of the most successful recycling rates. The success of the Swedish waste management system lies in raising citizens' awareness to do the first step: separation. The Swedes separate their waste into different colored bags, depending on the type of waste, and the recycling plants separate it into recyclable and non-recyclable elements.

The waste that cannot be recycled is burned in plants that transform their combustion into energy (a process known as “waste to energy”) to provide electricity for 250,000 homes in the country. Recyclable elements follow the normal process that converts them into new materials.

The process has been so successful that the trash Swedes generate is not sufficient to supply all of the plants. The country has to import trash from neighboring countries like Germany or the U.K. to keep them fully operational and generate energy in a more sustainable way than the combustion of fossil fuels.

2.10.2 Japan: the path to zero waste

Together with Sweden, Japan is one of the countries that takes recycling the most seriously. One of the examples of the Japanese model's success is the town of Kamikatsu. Kamikatsu, a small town situated approximately 40 kilometres from Tokushima city in the mountains of Shikoku island in Japan (Henam & Sambyal, 2019), a small town in the mountains with difficult access to the system available in large cities. That's why the families are the ones in charge of separating the waste into 34 categories, which they subsequently transfer to recycling centers. In 2020, the town aims to recycle 100 percent of its waste; it currently recycles 90 percent.

In addition, Japan has a high metal recycling rate. The medals for the Tokyo Olympic Games are a good example of this, as they will be made of recycled metals.

2.10.3 Put The Plastic for Recycling and Get a Reward - Columbia's Recycling Solution

Colombia's municipalities produce around 28,800 tons of solid waste per day, with 10,000 tons of this waste being generated by the main cities of Bogotá, Cali, Medellin and Barranquilla (Bhatia, 2021). To overcome their serious waste problem, Colombia came up with the idea of ECOBOT, A recycling initiative that promotes the culture of recycling across the country. Not by simply telling its citizens about the virtues of recycling, but by actually incentivizing and giving rewards for every recycled item. ECOBOT is basically Reverse Vending Machine which is located in shopping malls, institutions, and public spaces and encourages the process of recycling the PET bottles. (Bhatia, 2021)

How the machine works.

Every time you deposit a transparent plastic bottles (PET) or the caps, you receive a coupon offered by associated companies called Eco partners. From restaurant coupons to movie tickets to shopping dollars this machine covers it all. As for all the plastic that is collected, they are just sent to recycling plants instead of landfills. (Bhatia, 2021)

2.10.4 Sweden Is Showing the World How to Really Take Out the Trash

It sounds incredible, but Sweden has run out of trash and is actually asking other countries for their garbage so as it can keep its recycling plants running (Bhatia, 2021).

Less than one percent of Sweden's household waste goes into the landfill dump; the rest is recycled in different ways (Bhatia, 2021). The 32 waste management plants in Sweden today produce heat for 810,000 Swedish households and electricity for about 250,000 private houses (Bhatia, 2021).

The country has adopted a recycling policy which funnels all the energy generated by burning waste into the national heating network. This provides an efficient way to heat homes through the freezing Swedish winter. (Bhatia, 2021)

2.10.5 In Indonesia, People Can Trade Trash for Free Health Care

Malang, a city in Indonesia, generated more than 55,000 tons of waste every day (Bhatia, 2021). It was also a city where a majority of people did not have health insurance (Bhatia, 2021). These two issues may seem unconnected, but Dr. Gamala Albinsaid, a healthcare entrepreneur and CEO of health company Indonesia Medika saw this as a huge social opportunity (Bhatia, 2021). He

created Garbage Clinical Insurance which let people trade garbage for medical services and medicines.

This scheme aims to tackle both poverty and waste in Indonesia, a country where more than 10% live below the poverty line. The scheme inspires low-income households to recycle their trash because by doing so they will be able to finance their health micro-insurance. The clinic takes in the trash from people and sells it to recyclers for recycling. The money collected from recyclers is then spent on giving people basic health insurance. (Bhatia, 2021)

2.10.6 Semakau Landfill: Not Just a ‘Rubbish Island’

The word ‘landfill’ immediately brings to mind an image of a smelly mountain of rubbish, because that’s what it usually is. The Semakau landfill is a bio-diversity hotspot that is home to flourishing mangroves, rich coral reefs and a capital of birds and marine life (Bhatia, 2021). It’s Singapore’s first offshore landfill, and now the only remaining landfill in the city-state. (Bhatia, 2021)

2.11 CONCLUSION

The largest percentage of solid waste generated in Kampala central division is biodegradable/organic material with 92.1% composition then soft plastic (3.0%), hard plastic (1.8%), and paper (1.1%). The most common facilities used to store refuse at household are temporary facilities like plastic bags and few in dust bins. Some unofficial devices are also used such as broken jerry cans and any other available at that times open dumping is the common method used from house hold level to the main disposal site. Only few people dispose of refuse in few available skips in planned areas.

2.12 RECOMMENDATIONS

- **Pay-as-you-throw Policies:**

Consumers pay for volume of garbage that they generate and nothing or a minimal fee for recycling. The goal is to provide a financial incentive for recycling while reducing waste.

- **Extended Producer Responsibility:**

Ensures that manufacturers are responsible for the safe disposal and recycling of their products post-consumption.

- **Households:**

There is the need to improve the type of facilities used in relation to the nature and volume produced. Covered dust bins should be preferred to plastic bags, since they add more problems to the environment. The collection of refuse in central open sites with household surroundings (in slums) or along the road should be discouraged. Instead division facilities should be available within reach and well monitored and treated by the authority concerned. Excellent opportunities exists for the communities to make their premises clean. Everybody would like to live in a well-managed environment. Then there is a need for individuals to manage their solid waste at their homes before criticizing authority for poor sanitations. Addition to this, health workers should carry out

- **Central Government:**

Policies on waste management should be reviewed to consider local participation through continuous consultation and must involve some economic incentive for continuity. There is need also to ensure depiction of the solid management policies in place. All necessities for the implementation of the policies should be provided in time. The budget allocated for environmental management sometimes is minimal and therefore become difficult to prioritize it at ground level. Specific funds need to be allocated for solid waste depending on the type, volume and area should get special attention due to the inability of people to pay and poor inaccessibility to those areas. There is a need to also support the waste recycling industries as this will boost waste picking and sorting among the communities, which will then act as a source of income and employment at the same time reduce the burden of solid waste.

2.13 ACRONYMS

1. SWM.....Solid Waste Management
2. GKMA.....Greater Kampala Metropolitan Area
3. KCCA.....Kampala Capital City Authority
4. ECOBOT.....Ecological Robot
5. PET.....Polyethylene terephthalate
6. CEO.....Chief Executive Officer

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