

## **Community Based Solid Waste Management in Sub-Saharan Africa. The Case of Buea – Cameroon-11480**

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### **ABSTRACT**

The challenge of local governments in developing countries to meet up with the responsibility and delivery of municipal solid waste services is due to a number of reasons such as lack of financial resources, scarcity of land, urban population growth and economies. This has resulted to a corresponding increase of solid waste and public health crisis.

This paper identifies different household management practices in the city of Buea and examines the extent to which nuclear waste substances are managed in the community. The outcome reveals that developing countries face different waste management needs unlike industrialized countries in the day-to-day safe handling and management of radioactive waste. It is worth noting that public perception regarding waste management is different and as a result, public opinion has greatly influenced utilization and progress of radioactive waste management.

### **INTRODUCTION**

Solid waste management has become a major concern in towns and cities in Africa. The limitation of local governments to meet up with the responsibility for the delivery of municipal services is due to a number of reasons, one of which is urban population growth arising from the migration of people from rural to urban areas. Thus towns find it difficult in providing infrastructure and services that can keep pace with the fast growing urban population which poses serious challenges to policy makers in the local government to make necessary adjustments in their service programmes (Doan, 1998).

Sub-Saharan Africa is a term used to describe the area of the African continent which lies south of the Sahara. The economic crisis plaguing Sub-Saharan Africa in the 80's resulted in increased hardship for most of the region's poor. Political, economic, environmental, social and technical factors have created a situation in which the challenges are numerous and diverse that problems cannot be solved by merely optimizing existing levels of services.

One of the most pressing problems facing municipalities is the inefficient and long-term disposal of solid waste. The majority of substances composing municipal solid waste – otherwise known as trash or garbage include paper, vegetable matter, plastics, metals, textiles, rubber, appliances, batteries and glass (USEPA, 2008). A typical solid waste management system in developing countries shows a good number of problems which include low collection coverage and irregular collection services, crude open dumping and burning without air and water pollution control, the breeding of flies and vermin, and the handling and

control of informal sector or scavenging activities. The rapid population growth over-whelms the capacity of most municipal authorities to provide even the most basic services.

In many cities in Africa and Cameroon in particular, private and public systems are able to collect between 30 to 50 percent of solid waste and in most cities, these solid wastes are disposed in ways that are detrimental to the environment and public health. Solid waste management is a complex task which depends upon organizational and cooperation between households, communities, private enterprises as it does upon recycling and disposal. A study of community waste issues explore in the context of their urban environment in Hanoi, Vietnam revealed that the success of sustainable urban social infrastructure programs lies in the involvement of local communities as major stakeholders and decision makers (David, 2003)

Although urbanization in developing countries has led to the accumulation of wealth, it has also been accompanied by an alarming growth in the incidence of poverty. The rapid rate of uncontrolled and unplanned urbanization in third world countries has brought environmental degradation. Social and economic changes that most African countries have witnessed since independence in the 60s have contributed to increase in waste generated per capita. (Kumuyi et al. 1999)

Until two decades ago, solid waste management policies and programs in most African cities were formulated and implemented by government agencies without significant public participation. Also, Socio-political changes across the continent and the founding of NGOs have enhanced the awareness of environmental issues among the public (UNEP, 2005)

Wastes generated in a community can be a valuable energy and material resource. Waste being a resource as well as a burden has generated some extremely creative and economically attractive waste-to-energy systems to utilize wastes while mitigating their environmental impact (Isaacson, 1991). Waste management is a common concern of all communities because all communities produce waste. Thus it is possible to make use of many of these wastes to make real profit in terms of the environment, economics, energy supply and conservation and material recovery.

**Table 1.** Per Capita Solid Waste Generation & Households with Garbage Collection in Selected African Cities (World Resources, 1998-99 P.278)

<b>Country</b>	<b>City Name</b>	<b>Per capita SW generation kg/day</b>	<b>Households with garbage collection</b>	<b>Population greater than 0.5 million</b>
Cameroon	Douala	0.7	60	1.1
	Yaounde	0.8	44	1.0
Congo. DR	Kinshasa	1.2	0	6.3
Egypt	Cairo	0.5	65	14.5
Ghana	Accra	0.4	60	1.7
Nigeria	Ibadan	1.1	40	2.2

**Table 2. Waste Governance in Selected African Cities**

<b>Country</b>	<b>City</b>	<b>Waste governance setting</b>
Nigeria	Ibadan	State run and privatized
Tanzania	Dares Salaam	State run and community based
South Africa	Johannesburg	Community based and privatized
Cameroon	Douala	Privatized
Ivory Coast	Abidjan	State run and privatized

**Source:** Onibokun, 1997

### **Overview of Cameroon**

Cameroon is located in Central Africa. Like most developing countries, it is facing high rates of urbanization estimated at about 4% annually, compared to annual population growth of about 2.7 % (World Bank, 2002). Rapid urbanization is occurring in a period that the country is experiencing socio-economic pressures couple with the fall in oil prices especially in the last two decades. The National Structural Adjustment Programs of the early nineties resulted in limited government financial resources. The outcome is evident in the fact that the government has drastically reduced its investments and subsidies in the urban sector (Manga, 2007). Unlike most developing countries, waste management services in Cameroon are limited to collection, transportation and final disposal at dumping site. The recycling of waste is insignificant and public participation in waste management is 40-50 % as the populace believes that it is the primary responsibility of the Council or private company to manage waste.



**Fig. 1** Map of Cameroon showing the international and provincial boundaries (Page, 2003).

Buea, the capital of South West Region and former capital of Southern Cameroon is located at the foot of Mount Cameroon and has a population of 200.000 inhabitants. It is one of the fastest growing towns in Cameroon at the moment and the only regional capital with a rural council and waste being managed by Council and not a private company (e.g. HYSACAM) unlike other regional capitals. It is the host of the lone Anglo-Saxon university in Cameroon and has so many tertiary institutions. Geometric population growth rate has led to high cost of housing and limited financial resources to manage waste.



negative environmental impacts with adverse environmental and health risks if waste are improperly disposed or stored.

## **Technology Options and Sustainability**

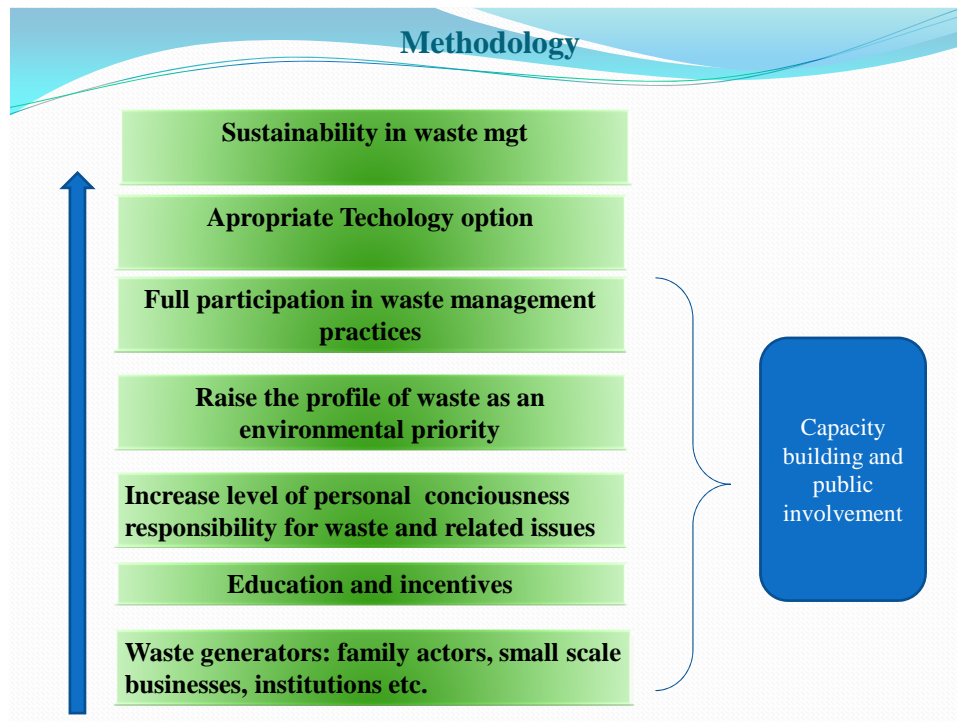
Waste management is not a purely technical issue. A consideration of other aspects will help in the selection of appropriate technology or the designing of a system. This aspects include; political, socio-economic and environmental factors. For a given system to be sustainable it must be appropriate to the local conditions in which it operates, from a technical, social, economic, financial, institutional and environmental perspective and capable to maintain itself over time without reducing the resources it needs. Sustainable technology for waste management can be interpreted in two ways. First, waste management technology choices can be restricted to technical requirements like waste quantities and composition, area characteristics, haul distances to the disposal site and operational cost. Second, it may be interpreted in a broader perspective including economic conditions, the cost of labour and capital, maintenance and repair capacity, and skill levels of existing staff (Arnold Van de Klundert et al, 1999).

An appropriate technology is the simplest level of technology that can effectively achieve the intended purpose in a particular location. In poor third world cities, too often authorities seek to imitate the technology and equipment used in developed countries. This is misguided and often led to corruption. Households in many developing countries and cities like Buea do not sort their garbage as in industrialized countries and thus the adoption of technology will simply collect and dispose all wastes without recovery of reusable and recyclables (Hari S., [www.gdrc.org](http://www.gdrc.org)).

## **METHODOLOGY**

The study consists of solid waste produced by household sector and examines management practices in households and community level. This study is based on the primary data survey in 2010. A total of 80 households were interviewed with the help of questionnaires in the geographical area of Buea. These questions were related to waste disposal methods, composition of solid waste, public attitude and awareness about clean environment. Questionnaire structure was designed and citizens were interviewed in three different zones (high, middle and low income zones). For each zone, homes with at least two members were chosen by random selection and interviews conducted among adults aged 18+ face to face at respondents' own home throughout the city.

Consultations of articles, official reports and literatures were made to obtain background information. Further interviews were carried out especially at the level of the council (sanitation department), the regional delegation of Environment and Nature Protection and key stakeholders in various sectors with activities directly associated with waste management. The study was also supported by a seminar on municipal solid waste management to investigate community's interest on waste management issues. Waste analysis was carried out and a scale balance was used to measure quantity of waste generated by households per day. The behavior of people at communal bin and city dumpsite was monitored closely. This study adapts a bottom up approach to show a paradigm shift.



**Fig. 4** – Bottom-Up approach (Asi, 2010)

Different habitat scales were identified in Buea including household level, quarter level and city level.

**Table 3.** Showing Waste Management Activities at Each Habitat Scale in Buea (Asi, 2010)

Habitat Scale	Collection & Disposal System	Resource Recovery System
Household or premise level	Storage at Source(E)	Prevention(E) Separation(E) Reuse at source(E)
Quarter or Neighborhood Level	Primary collection(E) Temporal storage(E)	Primary collection(E) Sorting & pre-treatment(N/E) Reuse(E) Recycling(N/E) Composting(E)
City level	Secondary collection(E) Transfer storage(N/E) Tertiary collection(N/E) Final disposal(E) and treatment(N/E)	Sorting(N/E) and pre-treatment(N/E) Secondary collection(N/E) Reuse(E) Recycling(N/E) Composting(E)

**E – Evident    N/E – Not Evident**

A typical waste management system in a developing country like Cameroon and Buea city in particular can be described by the following elements:

- Household waste generation
- Reuse and composting on household level
- Primary waste collection and transport to communal bin
- Secondary collection and transportation to waste disposal site
- Waste disposal in open field (open dumping).

## **RESULTS**

### **Level of Education of the Most Educated Member of Household**

6.25% of sampled population did only primary education, 22.5% ended education at the level of secondary and high school, 5% attended technical or professional education and 62.5% have been to the University. The vast majority of 62.5% is an indication that Buea is an academic center thus the spread of environmental information on written form (posters & flyers) and the media will be a successful approach. It is also a sign that Cameroon is one of the most literate countries in Africa.

### **Awareness of Type of Container Used for Storing Waste at Home**

53.75% of the sampled population stated they used plastic bins for storing waste at home, 42.5% used bags (mucuta), and 2.5% made use of metallic containers and 1.25% other items. Plastic bins are easily handle and at the end-of-life, can easily be melted and use for other purposes. Bags (mucuta) enhance the service of private individuals who do primary collection. Plastic bin and bags are affordable and multipurpose.

### **Public Awareness of Type of Waste Reused by Household**

6.25% of sampled population indicated that they reused glass bottles, 63.75% stated that they reuse plastic bottles and containers, 2.5% reused compostable, 1.25% metal cans and 26.25% others. Plastic especially bottles and containers are multipurpose.

### **Public Concern Regarding Safe Disposal of Waste to the Environment**

81.25% acknowledged the fact that they are concerned about safe disposal of waste to the environment, 11.25% had no concern about safe disposal of waste and 7.5% were unsure. The vast majority (81.25%) shows the level of environmental awareness (consciousness). However, it is unfortunate that because communal containers were far away from most homes and primary collection service very poor, most homes were obliged to dump waste in nearby streams or at street corners.

### **Availability of Information About Solid Waste Management System**

13.75% had available information about waste resource recovery, risks associated with improper waste handling, 65% had no information and 21.25% acknowledged their ignorance. This results indicate that the Council does very little to provide information to homes concerning waste management. It is also a sign that environmental campaign in the city of Buea by the Council and all stakeholders on waste issues is low.



## **Willingness to Contribute to Proper Waste Management**

38.75% of respondents acknowledged the willingness to contribute by transporting their garbage to the communal container, 52.5% majority indicated willingness to contribute by paying for an amount agreed upon by the community for solid waste collection services, 1.25% willing to dispose their waste and that of their neighbor to the communal container, 2.5% willing to separate recyclables, 1.25% willing to separate organic waste and 3.75% showed no interest. Although the Council attributes inefficient management of waste to limited financial resources, the results of this research is rove that the populace would prefer to pay for waste management services than live in a dirty environment. This is also a call for private individuals and NGOs to indulge in door to door primary collection services which the council cannot provide.

## **Public Opinion About the Current Communal Waste Container**

A vast majority of respondents (65%) indicated that containers were far away from their homes, 5% noted that communal containers were too small, 3.75% were dissatisfied, complaining that containers produced unpleasant odours and aesthetically unappealing. 1.25% saw nothing wrong with containers, 5% had no access to containers and 17.5% were unaware of the existence of communal containers. The number of communal containers in Buea were few and far away from most homes thus reluctance for homes to disposed of waste properly which most times is done by children. In some quarters, there were no containers and indigence attributed this neglect to the fact that the council did it intentional because they were not loyal to the ruling political party. One could get a similar experience in other part of the nation because of people not being loyal to the ruling party.

## **Public Rating of The Provision of Solid Waste Management Services by the Council**

Respondents rated the council as follows; excellent (2.5%), very good (2.5%), good (18.75%), average (17.5%), poor (51.25%), Very poor (5%), neutral (2.5%).The poor rating is evidence that Buea council lack the expertise and resources for proper municipal solid waste management. Only one truck to collect waste in a fast growing city of 200.000 inhabitants and most times, lack of fuel and equipment to get the job done hampers service. This calls for privatization of waste management sector in Buea like in neighboring cities such as Limbe and Douala where a hygiene and sanitation company (HYSACAM) operates. It also calls for government to subsidize local councils especially on waste management issues.

## **DISCUSSION**

In Zone A consisting of the government residential area (GRA) and federal quarters, houses are owned by the government and reserved for government officials. Households in this zone have resorted to pit dumping in the backyard. It was a paradox and our research expectations were dashed because we anticipated best waste management practices. In this Zone one would hardly find a communal container and most of the respondents were surprise that there exist communal containers in the city. Interestingly enough, one would not find waste at street corners in this zone and citizens were satisfied with their waste management practices.

In Zone B (middle income), primary collection was evident. Private individuals collected waste from homes on request for a token of money. Communal containers were far away from homes and many homes disposed of their waste in nearby streams. Areas like Molyko where the University of Buea is located is worst hit. High population density and irregular collection

of waste makes the environment aesthetically unappealing. Quarter like Great Soppo is neglected coupled with the fact that there are no communal containers and the council has made no effort to treat the former city waste dumping site in this quarter. This has caused some to abandon their homes because of odour and flies attracted by waste heaps. Many in this quarter complain of neglect because of their affiliation to the opposition political party.

In Zone C (low income) like Mile 16 and Muea, waste management is a challenge. Stream and street dumping is rampant and communal containers are not present. Some complain of neglect because of their affiliation to the opposition party. Many households in Buea municipality are willing to pay an agreed some of money for waste collection although inhabitants know that it is the primary responsibility of the council to collect household solid waste once it is brought outside.

Public awareness and attitudes to waste can affect the population's willingness to cooperate and participate in adequate waste management practices. Participation of the population can be done in many ways; carrying waste to a shared container, paying for waste management services, segregating waste to enhance recycling and carrying continuous education and awareness campaigns on radio and in schools.. A major opportunity for implementation of such waste policy is the heavily indebted poor countries (HIPC) program dedicated to urban planning and good governance. Most of the stakeholders, municipalities, the official waste collection company and households acknowledge the need for better monitoring and regulation of MSW management (Sotamenou et al.2008).

## **CONCLUSION**

The effective management of both municipal and radioactive wastes from hospitals and medical research centers is a huge challenge to the Buea council with limited financial resource. Public confidence and transparency are vital to any decision a country takes on where to finally dispose of its wastes. Municipal and radioactive waste management policies and strategies serving as a national commitment to address waste crisis should be carried out in a coordinated and cooperative manner. Political compromises will lead to neglect of proper waste management thus Mayors and counselors in local communities and urban areas should exercise political neutrality. Government subsidies and privatization of waste manage services in developing countries will lead to effective and efficient management of waste. General environmental awareness and information on health risks due to deficient solid waste management are important factors which need to be continuously communicated to all sectors of the population. For technology to be appropriate , it should be designed with special consideration to the environmental, ethical, cultural, social, political, and economical aspects of the community it is intended for.

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