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Local Governance and Sustainability in Municipal Waste Management in the Mfoundi Division, Yaounde Cameroon

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ABSTRACT

Increasingly, sustainable waste management has emerged as a major concern both in terms of environmental protection and sustainable management of urban spaces. Over the years, it has been observed that, the volume of waste generated in urban spaces in Cameroon far exceeds the capacity of local councils to manage. Mfoundi council, like the majority councils in Cameroon, has outsourced the collection and disposal of solid waste to the private waste collection company. However, decline in waste collection rates, rising cost associated with solid waste retrieval and disposal; continue to exacerbate the challenge local councils experience with regards to urban waste disposal and management. From the foregoing, this study seeks to critically examine the sustainability of the policy, and practices of Municipal Solid Waste Management (MSWM) systems adopted in the Mfoundi Division. This study adopted a hybrid of qualitative and quantitative approaches using questionnaires, interviews and focused group discussion as main instruments of data collection. The non-probability purposive sampling was used due to time and cost constraints The findings of this study revealed that, the council waste management approach does not meet the demands of the population. Poor collection and transportation facilities, insufficient waste collection frequency, low levels of household awareness of good solid waste management practices; lack of awareness on waste reuse and recycling are some of the major challenges identified by the study. Thus, people have been left with little or no choice but to dump waste in open spaces, water bodies, drainage channels, deposit along roadsides and streets. The study recommends the following, adopting a community participative approach for efficient waste management, introduction of a waste reuse; recycling and reduction plan, intensive sensitization to educate the population on proper waste management practices (waste separation) via mass campaigns, finally the state should compel brewery and water companies to put in place an avenue to collect the plastic bottles sold to the population.

KEYWORDS: *Mfoundi Division, Yaoundé, local governance, urban waste management*

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INTRODUCTION

Over the years, there have been calls from various quarters for countries to implement robust and responsive local governance systems, which meet the developmental needs and aspirations of the local population. The overall objectives of community political system as pinpointed by Wollmann (2009: 20), Ugoo and Nwanne (2000:9) can be seen in two folds; one is that of providing goods and services and the other is to manage conflicts. In much the same way, Theodore and Benjamin (1996:8) endorse this view when they argue that, municipalities ought to scrupulously provide the facilities local population regularly depend on such as police and fire protection, street maintenance, water and sewer, recreation and solid waste collection.

In a study conducted by Inoko (2015:5), waste disposal management was identified as a core and fundamental activity of any local administrative units. To Rachel (2013:16) and Akaseng (2015:35) Local authorities have an obligation to provide adequate means of solid waste collection and disposal in any given community. Inya (2014:4) argues that, in recent years rapid urbanisation has become the most important trends in human settlements making waste disposal management an issue of paramount importance. Likewise, Manga (2007:19) notes that, population boom in cities has led to a situation whereby; households and businesses generate waste at greater rates than was previously the case. As a result, it becomes vital for authorities to establish a vigorous waste collection and disposal system for a clean environment.

Background to the study

In the past decades, Cameroon in general has been experiencing exponential growth in the generation of municipal solid waste due to rapid, unplanned and unmanaged urbanization; rising urban population numbers and increased economic activity (Ntobang and Fogwe 2019, Din-Louise 2015, Achakeng 2004). As can be observed, the problem of inefficient municipal solid waste management (MSWM) is endemic. This is easily identified by persistent heaps of uncollected waste found on street sides or

ubiquitous illegal dumps. The rate of waste generation in towns and cities in Cameroon far exceeds the capacity of local municipalities to deal with it due to inadequate financial resources, organizational capacity and technical expertise (McKay, 2015:93).

The ever-increasing volume of waste requires effective waste management systems such as waste storage, collection, transportation, treatment and disposal. Akum (2015:25) stipulates that, municipalities in Africa and Asia spend 20 to 50 percent of available funds on solid waste management, a high proportion of council budget in cities of developing countries are allocated for waste collection alone. Despite these huge resource allocations, 30 to 60 percent of all urban waste is left uncollected and less than 50 percent of the urban population in the cities in developing countries is served with waste management services (UNEP, 2009:10). These statistics represent the waste management situation of Ibadan in Nigeria, Abidjan in Cote d'Ivoire, Yaoundé in Cameroon (Monkam 2000:65).

The importance of a clean environment in the healthcare and sustainable development of any community cannot be overemphasised. Generally, the ultimate aim of environmental sanitation is to achieve a healthy, conducive and satisfying as well as aesthetically pleasing environment in which one can pursue different kinds of human activities (Inya, 2014:31). In developed countries, there has been serious awareness regarding waste management and local governments in countries such as the United States of America, Canada, and France just to name a few have developed new strategies and technologies for improving the waste management systems. Perhaps this can be likened to the fact that local governments in the countries just mentioned enjoy a considerable amount of autonomy from central governments (Rachel, 2013: 168). This situation is not the same in most developing countries in which the process of urbanisation is fairly recent (Akaseng, 2015:87).

In Cameroon, municipal solid waste management has been the subject of considerable amount of legislation. The most recent of this legislative act, is Law No.2019/024 of 24 December 2019 to institute the General Code of Regional and Local Authorities, which defines the responsibilities of local councils. Specifically, Section 157 highlights the following with regards to waste management:

- Councils are responsible for the cleaning of streets, roads, and council public area.
- Councils are responsible of industrial waste management, monitoring and control.
- Councils are in charge of the protection of ground water and surface water resources.
- Councils are responsible for local pre-collection and management of household waste.

Furthermore, there are other laws relating to environmental management, which include, the National Environmental Plan (seen in Law N° 96-12 of 5th August 1996) the national water code, and the joint ministerial ban on the importation, production and use of plastics put in place by the Ministry of Environment and Sustainable Development and Nature Protection and the Ministry of Commerce (Law No. 96/12, 1996; Law No. 98/15, 1998; MINEDED/MINCOMMERCE, 2012).

In addition to the above-mentioned decree are national and local policies that define waste management responsibilities and procedures in Cameroon. The Ministry of Decentralisation and Local Development, under whose jurisdiction councils are found, is charged with the responsibility to ensuring good sanitation and waste management among other duties (Decree No. 98/147 of 17 July 1998). The Ministry of Urban Affaires according to Decree No. 98/153 of 24 July, Section 22-25 assigns the Ministry with the responsibilities of general cleanliness and drainage, solid waste management, hygiene and sanitation of the cities. Precisely, Section 24 assigns the Ministry with the responsibilities of elaborating plans for evacuation and treatment of solid waste, carrying out research on improving and coordination of collection, transportation and sensitising the public on the practice on pre-collection of wastes. Municipal solid waste management in Cameroon cities including waste collection, and transportation is the statutory responsibility of the council (Law No. 96/12, 1996).

Contrary to Law No 96/12 of 5th August, 1996 relating to environmental management, which provides that; «waste shall be treated in an ecologically rational manner to curb harmful effects on human health, natural resources, the fauna and flora and on the quality of the environment in general», towns and cities in Cameroon still exhibit the burdens of waste management which characterises so many African cities. Akaseng's (2015:22) theses reveals that, several factors including inadequate financial resources, low levels of enforcement of regulations and poor governance are factors that enhance poor solid waste management in Cameroon.

On the other hand, the main laws governing local government in Cameroon are; Law No. 2004/17 of 22nd July 2004 on the Orientation of Decentralisation, Law No. 2004/18 of 22nd July 2004 to lay down the rules Applicable to Councils and Law No. 2004/19 of 22nd July 2004 to lay down the rules Applicable to Regions. Equally, in 2019, Law No.2019/024 of 24 December 2019 to institute The General Code Of Regional And Local Authorities was adopted by the parliament. This is probably one of the most important pieces of legislation on decentralization after the 2004 Orientation on Decentralization.

The failure by cities in Cameroon especially Yaoundé to comply with these laws has important health repercussions which are wide ranging from malaria caused by mosquitoes as a result of littered infested neighborhoods, streets and public spaces to typhoid resulting from leachate contaminated water and lungs problems issuant of smoke from open air combustion of refuse as common place waste disposal practices in cities (Ntabong and Fogwe, 2019:36). This study considers that, local government authorities who are responsible for the wellbeing of the population cannot continue to be indifferent in the wake of these problems that has greatly contributed to the failure of some Millennium Development Goals (MDGs) and seem to give no chance to Sustainable Development Goals to sensibly forge ahead with sustainable urbanisation in Cameroon. The national average daily total waste generation is estimated at 12000 tonnes in major cities in the towns of Yaoundé, Douala and Baffoussam (Clement, 2011:13). The organic waste component though declining is far greater than the inorganic waste material fraction which is promoted by changes of lifestyles and consumption patterns (Achankeng 2005: 17).

As in most cities in the developing world, waste management in Yaoundé and other Cameroonian cities lags behind waste

generation. Consequently, waste is often found littering roadsides, markets, street corners, clogging drainage channels and posing health and environmental threats to urban dwellers. Regional Capital cities and particularly the capital cities of Yaoundé and Douala, vividly exemplify most of these problems (Inokoh, 2015:6).

Scholars like Balgah (2002:4) and Achankeng (2005:13) have advanced reasons for the inadequacy of municipal solid waste management in Cameroon. Among some of the problems identified can be found inappropriate construction of houses in urban spaces, inadequate drainage systems, irresponsible waste disposal practices, poorly organised and inadequate waste retrieval practices, poor urban planning which render accessibility of garbage collection trucks into urban neighbourhoods difficult. Particularly, the weak enforcement capacity of urban waste disposal regulations coupled with outdated waste management technology and equipment have rendered the governance of urban waste management in Cameroonian cities problematic and difficult. Furthermore, there is acute shortage of human resources for various tasks associated with urban waste retrieval process which is exacerbated by insufficient funds to acquire modern equipment and streamline waste service delivery (Achankeng, 2005:47)

The rapid growth of towns in Cameroon as posited by Ntobang and Fogwe (2019:19) has generated a host of management problems most important of which are environmental and health related including housing, water supply, air, water pollution and most especially solid waste management. Domestic, industrial and other wastes are directly linked to environmental pollution which have become perennial problems in the country. The quality and quantity of goods and services produced in cities have generated problems of environmental pollution resulting from the disposal of human and industrial waste (Akaseng, 2015:9).

The town of Yaoundé situated in the Mfoundi Division faces a number of waste disposal challenges. Most houses do not meet safe living standards due to inadequate external and internal facilities. The inhabitants generate a lot of wastes effluents, fumes, air laden with particles of noxious fumes and dangerous gasses in the process of various human activities. A stroll along the streets reveals the unhealthy conditions of the environment. Observations by the researcher revealed that, street canals and gutters in many neighbourhoods of Yaoundé are clogged with refuse, human sewage is littered everywhere, garbage tins are saturated and seldom emptied on time.

Furthermore, it was also observed that, many people undertake a lot of activities within the town without due considerations of the impact such projects will have on the environment. In fact, looking at the streets and neighbourhoods in Yaoundé could give one the impression that, the cleanliness and beauty of the town have been neglected or relegated to the background. It is very common to find high waste piles on streets and heaps of dirt dumped on inappropriate space such as around sanitary institutions and homes as well as schools.

The poor state of waste disposal management in Cameroon in general and in the Mfoundi council in particular is a call for concern. Initially, local government units such as councils and region as we have in Cameroon were established to satisfy the needs of the inhabitants of the area of jurisdiction (seen in Law N° 017 of 22 July 2004 on the Orientation of Decentralization). Local collectivities are charged with local development and service delivery. Waste management figures among the Sustainable Development Goals (SDGs) and also fulfils the commitment of councils regarding service delivery.

As Nguasong et al. (2000:54) emphasise, local government bodies exist in the public interest and functions as a complimentary arm of government. They further stress that, local bodies ought to ensure public health and hygiene of the population as well as take measures to ensure that houses are built according to existing housing regulations; street mapping, and waste management systems. Although the function of waste management has been outsourced to HYSACAM (the lone hygiene and sanitation company in the country since 1998) the sanatory conditions of the council still leaves much to be desired. The performance of HYSACAM with regards to urban waste management has been the focus of vigorous criticism. From preliminary observations, and based on the strong views expressed by local government officials with regards to waste management, HYSACAM seems to be overwhelmed with the tasks and responsibilities linked with urban hygiene and sanitation. The foregoing observation reinforces the argument that local councils must move from the periphery of urban waste management to the center. Another view which has emerged in the debate on waste management and disposable focuses on the proposition of opening up the sector to other competitors. This view seems to garner momentum due to the questionable if not abysmal performance of HYSACAM with regards to waste disposal and management.

It is against this background that, this study set forth to investigate solid waste disposal management in Cameroon with emphasis on Yaoundé in a bid to examine measures put in place to enhance sustainability in waste collection and disposals. This study probes into who can be held accountable for the missing links observed in the city's waste management and disposal. This is against the backdrop of transferred competences stipulated in the various Laws on Decentralisation charging new roles to municipal councils or the City Council authorities on the matter. It is envisaged that; the study will reveal the state of environmental health and hence pave the way for more suitable ways to deal with community waste.

STATEMENT OF THE PROBLEM

Increasingly, sustainability in waste management has emerged as a major concern both in terms of environmental protection and assurance of healthy environments in urban spaces. In fact, the importance of waste management has been highlighted by Goal 11 of the Sustainable Development Goals (that is making cities inclusive, resilient and sustainable). Hence, the overall research problem addressed in this study is that poor management of waste in the Mfoundi Urban Council has resulted in indiscriminate disposal of waste into open spaces, water surfaces and streets just to name a few.

According to Ntoban and Fogwe (2019:31), Yaoundé like most cities in Cameroon has only 20% of its waste collected daily albeit established policies and responsibilities assigned to municipal and city council authorities as per the provisions of the laws of decentralisation in Cameroon. Consequently, huge mounds of refuse are very visible along

street sides, streams, culverts and very close to dwellings. Waste disposal strategies leaves much to be desired thus constituting significant health and environmental nuisance. The devastating effect of this poor waste disposal in Yaoundé has included, degraded aesthetics, environmental pollution and major risks to public health for cities and inhabitants (Ntoban and Fogwe, 2019:46).

A survey carried out by Clement Anguh (2011:86), on environmental problems in Cameroon ranked municipal waste management and drainage as Yaoundé's most pressing problems. Similarly, the Ministry of Urban Development (2011:14) in its domestic reports on environmental problems identified waste management as a core cause of air, water and land pollution in Cameroon (MINDU, 2011). Ymele (2012:37) researching on environmental problems identified waste disposal management as one of the major challenges faced by municipalities in Cameroon. Thus, we realise that, the problem of municipal waste management is endemic, real and requires urgent attention. Recent cholera epidemics in several cities in Cameroon notably Yaoundé, Maroua, Limbe, Buea among others also demonstrates that research on waste management is of high priority as poor disposal and poor sanitation serve as vectors for cholera transmission.

The present situation of direct dumping of wastes in inappropriate places and without proper inspection is a call for concern. Inhabitants in Yaoundé do not know where to dispose of their refuse, homes are usually saturated with waste, there is no proper mechanism for the collection and possibly recycling of these wastes. As a results of a poor waste collection scheme, people find themselves dumping wastes where they are not supposed to for instance by the road sides, bushy areas, farm lands and streams. Again, a disturbing factor to be noted here is also the poor waste management habits of inhabitants and an urban culture of littering which augments the problem of waste management and disposal. From physical observation, it is easy to realize that gutters in major neighborhoods in Yaoundé have been blocked which hinders run off from rainfall thereby causing floods as is usually the case in Poste Centrale and Avenue Kennedy neighborhoods in Yaoundé (that is in Yaoundé I council area). Precisely due to unsanitary waste disposal methods, Rachel (2013:8) argues that the prevalence of Dengue fever in Mfoundi municipality can be attributed to the issue of waste.

It has been observed that, increasing waste generation which has been attributed to fast population growth is posing a burden on council authorities probably due to high costs associated with waste management. In the words of Inokoh Biliet (2015) who conducted a study on how to improve Municipal Solid Waste Collection in Buea, Cameroon is faced with the challenges of providing an efficient waste management system. According to Biliet (2015:57), the challenges associated with waste management in Buea for instance, include inadequate management, limited technology, insufficient qualified, trained personnel in the field of waste management, shortage of collection and sorting machinery and insufficient funding, among other factors; it can be concluded that the challenges faced by Buea Council in solid waste management can be likened to those of Mfoundi Council despite the fact that demographic factors between Buea and Mfoundi councils may differ.

Currently, the situation of municipal solid waste management for the city of Yaoundé remains wanting. It has been observed that the population (households) in various neighbourhoods have serious difficulties in handling the waste generated. Also, at the level of various markets the situation is even worst as goods are sold alongside piles of dirt. We find waste dumped so haphazardly on streets and roads in such a way it obstructs movement and circulation of people and vehicles. We find even hospitals such as Hospital Central surrounded by mountains of refuge. This to us is a call for concern, because the beauty and aesthetic of the city is negatively affected, it tarnishes the image of the town of Yaoundé as the capital city of Cameroon, and again poor waste disposal is a source of environmental pollution leading to health problems.

Unprecedented urbanisation and economic growth accompanied by heterogeneous population and dynamic lifestyles have caused increases in the volume of waste generated. Unfortunately, the current municipal waste management system is unable to cope with these changes, and the rate of waste collection and disposal continues to lag behind waste generation. The consequence are heaps of waste at roads sides and gutters, valleys, streams and rivers that spoils urban aesthetics, harm the environment and endanger public health (Akum, 2015:89).

To handle the waste disposal equation, some municipalities such as the Mfoundi council has outsourced municipal solid waste management function to the private sanitation company known by its French accronym as HYSACAM (Hygiene et Salubrite du Cameroun), Cameroon Hygiene and Sanitation. However, the sanitary state of the city council remains poor. Untimely waste collection, saturated waste bins, litter, waste dumps and clogged streams still persist. Illegal waste disposal sites are created daily, streets and open spaces are used as dump sites. Such incivility has become endemic because some homes are very distant from the nearest public trash can (Fombe, 2005:15).

We are particularly interested in Yaoundé as case study because of its special status as the seat of government, diplomatic missions and international meetings and organisations. This makes it, an imperative on the government to give special attention to the city's aesthetics and prestige by focusing on its cleanliness. The increasing awareness by the people, interest groups, the government and donors of the need for a clean environment, together with economic interest prompted the researcher to undertake this study. this increasing waste in an environmentally effective, technologically feasible, economically affordable and socially acceptable manner

Objective and research question

This study attempts to assess the role of local governance in the waste collection and disposal scheme of the Mfoundi Division and identify existing challenges. To this effect the main objective was to critically examine the sustainability of the policy, and practices of Municipal Solid Waste Management (MSWM) systems adopted in the Mfoundi Division. Thus, the main question raised here was, how sustainable are the municipal solid waste management systems in the Mfoundi Division.

Scope of the Study

The study spans through a 15 years period from 2004 to 2019. We have adopted the year 2004 as the base year because it marked the beginning of the implementation of the national decentralization policy which signalled renewed

interest of the state to enhance local development through viable local councils. Also, it was in 2004 that the laws on the orientation of decentralization in Cameroon were adopted, laying the framework for full implementation of decentralization in the country. We also believe that 15 years is adequate time to measure the progress of councils considering the fact that leadership of these councils must have changed at least twice, hence providing the opportunity for us to observe council service provision from the perspective of different actors and leaders.

Geographically, this research was conducted in the Capital city of Cameroon, that is Yaoundé found in the Centre Region. The selection of this town was motivated by the very dirty nature of majority of its neighbourhoods. It has been observed that the population (households) in various neighbourhoods have serious difficulties in handling the waste generated. Also, at the level of various markets the situation is even worst as goods are sold alongside piles of dirt. We find waste dumped so haphazardly on streets and roads in such a way it obstructs movement and circulation of people and vehicles. We find even hospitals such as Hospital Central surrounded by mountains of refuge.

This to us is a call for concern, because the beauty and aesthetic of the city is negatively affected, it tarnishes the image of the town of Yaoundé as the capital city of Cameroon and as the seat of national. international as well as well diplomatic institutions, and again poor waste disposal is a source of environmental pollution leading to health problems. Yaoundé is chosen here because it is reminiscent of Cameroon's cities and administrative units in terms of population, size, growth rate and efforts put in place by the related authorities.

Most specifically, the study focused essentially on councils in the Mfoundi Division which are actually seven in number. Though the study is intended to capture the situation of all these councils, the focus shall be on five of them; they include:

- Yaoundé I (Nlongkak), (Etoudi)
- Yaoundé II (Tsinga)
- Yaoundé V (Essos)
- Yaoundé VI (Biyem-Assi)
- Yaoundé VII (Nkolbisson)

Due to logistic, time and financial considerations, five out of the seven sub-divisional councils have been selected. We think that, these councils will be representative enough of the Mfoundi Division and will avail us with information that will enable us have a holistic picture of waste disposal management of councils in Yaoundé in particular and other urban areas in Cameroon. The results of the findings could serve as a baseline for carrying out further studies of other councils in the country.

Methodology

This study adopted a hybrid of qualitative and quantitative approaches using questionnaires, interviews and focused group discussion as main instruments of data collection. The non-probability purposive sampling was used due to time and cost constraints.

A total number of 250 questionnaires were administered to the sample population of the study. Households were selected by a systematic random technique from Five sub-divisions in Yaoundé City Council. Household size (number of people living in the house at the time of the study and making use of the waste bin) was used in this study as a requirement for determining waste generation patterns. The questionnaires were administered directly to assist those surveyed with little or no education and to build a relationship of trust. Questionnaires rely on self-reported data which assumes that the information provided by the respondent is accurate for their solid waste practices and concerns.

The consultative interview targeted main respondents namely; the waste management company HYSACAM, Ministry of Urban Development, the Ministry of Environment, Yaoundé City Council, Sub-divisional councils and other stakeholders in waste management.

Table 1: Interviews conducted with the main stake holders

Institutions	Position of Respondent	Location	Date of interview
Yaoundé 3 Council	Architect, and Town Planning Expert	Yaoundé	21st August, 2020
Self Employed	Environmental Activist	Yaoundé	22nd August, 2020
Hygiene and Sanitation Company (HYSACAM)	Head of Service in charge of Waste Collection, treatment and reuse	Nkolfoulou, Soa	24th August, 2020
Hygiene and Sanitation Company (HYSACAM)	Driver of waste collection trucks	Yaoundé	24th August, 2020
Green World	CEO	Yaoundé	24th August, 2020
Woubeng VF Engineering	Technical Director	Yaoundé	25th August, 2020
Yaoundé II Council	Head of Service of Hygiene and Environment	Yaoundé	27th August, 2020
Yaoundé Urban Council	Head of Service Environment and Hygiene	Yaoundé	31st August, 2020
Ministry of Habitat and Urban Development	Sub Director in charge of Town Planning	Yaoundé	10th September 2020
Ministry of Environment	Technical Director in Charge of Nature Protection	Yaoundé	21st September 2020
Yaoundé 4 Council	Head of Service Hygiene and Environment	Yaoundé	1st October 2020
Community leader	Quarter head	Yaoundé	13th October 2020

Source: field investigations (2020)

For the purpose of this study, three FGDs were organised:

- One with a group of women at the Biyeamassi neighbourhood located within Yaounde VI council on 30th August 2020.
- One with a group of Youths at Tsinga located within the Yaounde II council on 8th September 2020.
- One with traders at Mendong Market located within the Yaounde VI council on 26th September 2020.

Findings

Waste Management In The Mfoundi Division

In this section we present data on waste management practices within five subdivisions (area of study) in the Mfoundi council. In the first part we present findings on how the respondents handle waste generated by their respective household while the second part focuses on the waste management approach put in place by the local authorities.

1.1. Focused Group Discussion Analysis on Waste Management in the Mfoundi Council

In the course of this research, Focused Group Discussions (FGD) were orgnised for a an indebt and comprehensive understanding of the waste management approach and challenges encountered by the population of the Mfoundi Council. In total, three FGD were orgnanised by the researcher, one with women, one with the youths and another with market vendors in one of the selected markets for the study. Questions raised by the researcher in the course of this FGD aimed at eliciting response on the waste management practices of the inhabitants. We essentially focused on; household and market waste generation, waste storage prior to disposal, waste separation; recycling and reuse.

A. Waste generation

Table 2: Composition of household and market wastes in Yaoundé

Categories	Food Waste	Garden waste	Plastics	Metals	papers	Glass	textiles
Sub-category	Food remnants	Fresh leaves Decaying leaves Vegetable Other garden waste	Plastic bottles and Packaging Buckets	Cans and bottles Metal and aluminon items	New papers Magazines Office papers Junk mail Envelopes cartons	Glass bottles and jars	Clothes and shoes

Source: developed from FGD, 2020.

Table 2 shows that the production of solid waste in Yaoundé is complex and diverse. Most participants in the FGD admitted that they produced both organic and inorganic waste which they often stock all in common recipient prior to disposal.

B. Waste Storage

The most widely waste storage methods the household are closed containers with lid. The second method is the use of plastic bags and market bags commonly called in local palangs 'sags a moto'. A participant observed that she most preferably makes use of bag of rice to store waste, that is when she buys a bag of rice in the market after consuming the rice, the bag is now reused to keep waste prior to disposal. Another participant said, she uses old household buckets as waste storage recipients, other said they prefer cartons especially for nonperishable waste such as papers, glass, plastic bottles. These revelations actually corroborate what we observed on the field especially in the course of moving around to distribute questionnaires.

Usually, a corner of the house both indoor and outdoor is reserved to pack or gather up the waste while waiting for it to be disposed. We did observe that, in some compounds bags and buckets of waste were piled up; and in some places very unpleasant to see as most often waste was decaying with maggots all over. one participant in the FGD said, waste is sometimes piled up for weeks before the waste collection truck will pass by to pick up the waste.

C. Waste separation, recycling, reuse and Composting

In the course of the FGD we also investigated to know if the population was aware of sustainable waste disposal management practices. Only a few participants of the community whom we identified as small-scale farmers said they were practicing composting and recycling as such carried out waste separation, some said they recycle their yard waste and their food waste. The practice involves using domestic waste such as food for animal feed and yard waste for manure.

This shows that there is some knowledge about proper waste management methods as we did observe that some communities in Tsinga for instance recycle their garden waste and their food item. This attitude indicates a glimpse of hope because such behavior can encourage sensitization and benefit future programs on recycling and other waste reduction strategy. Source separation of waste from the beginning of the chain or life cycle is important when consideration is given to the quality of the final recycled or composted product.

On the other hand, any in the private sector knew nothing of the initiatives and platforms government had set up to support sustainable solid waste management. Coupled with this, most stakeholders were unaware of the potential economic and environmental benefits of recycling and selling waste, or even the potential to create a business out of it. One participant said: "What the government should be doing is mass communication awareness campaigns like those they host for HIV and other health related issues… if role players are sensitized and their capacity built … they can grow".

At the household level, there is little knowledge on how to deal with municipal solid waste and the role the private sector can play is not well understood. A participant commented: "People are not aware of how they should manage their waste…everything hazardous and non-hazardous are mixed and dumped in one bin" adding "we could institute programs in our schools to teach kids … on waste management. It becomes very difficult to change these habits when the people are adults…." At the household level, there is also negative perception of waste pickers and

recycled products are viewed as being of lower quality. One participant pointed out that: "This job is often looked down on by others… people see those who search trash bins as mad or not normal. When I started this job most of the people in my neighbourhood thought I had gone crazy. It is only now they are beginning to realize I was just looking for a means to survive" and adds "Sometimes we get mob justice from the public who consider us as thieves… you could pick up something and when the owner sees you, they may call you a thief and you could be beaten to death".

The ability of the private sector (both formal and informal) to run an efficient and financially viable solid waste management business is hindered by the lack of solid waste separation at source. Waste pickers would far rather buy sorted waste directly from households but with no legal requirements or economic incentives for households to categorize, sort or segregate their waste, this is not possible (a participant). Interestingly, another participant said "Imagine what will happen when members of households are aware that they can sell their waste and make some money."

D. Waste Disposal

As concerns waste disposal, majority of the respondents complained of the fact that, they did not enjoy HYSACAM's waste collection services, others, whereas affirmed that the waste management company regularly move around to pick up their waste. Two ladies during the FGD, noted that they use to enjoy HYSACAMS waste pick up services, but for close to a year their trucks were no longer covering their neighborhood. To cope with their absence, most household have resorted to other waste disposal options like burning, dump in the river, dump in nearby farms, dump by the road side, in abandoned buildings and even in even pitholes.

Generally, information from interviews and observation suggest that, illegal dumping is common in all the sampled quarters. However, the tendency to dump illegally is lower in a few quarters such as Bastos and Cite Vert where collection facilities (public waste bins or skips and itinerant waste collection services) are better delivered. The Yaoundé City Council sources also identified and documented 177 prominent heaps of illegal dumps of various sizes in the city in 2002 (Communaute Urbaine de Yaoundé 2020). This shows that, no part of the city is spared of illegal dumps. Sometimes waste generators simply dispose of their waste in runoff produced during heavy rains. This waste ends up blocking drains and stream channels and cause floods such as the serious floods that occurred in Yaoundé in 2000 (Achakeng, 2004: 273).

Figure 1: Picture of poor waste disposal practices by inhabitants in Yaoundé

Source: field study, 2020

1.2. Interview analysis on Waste Management Practices in the Mfoundi

Structure of Waste Management in the Mfoundi Council

In a series of interviews conducted with the respective Head of Services of the various subdivisional councils, we were able to establish the waste management system in the municipality. To begin with, the head of service of Hygiene and and Environment of the Mfoundi City Council informed us that, waste management activities in the Mfoundi Council is principally governed by Cameroon Law on Environmental Management that is Law No. 96/12 of 5th August 1996 (interview conducted on 27th August, 2020). He further stipulated that; waste management remains the sole responsibility of the city council who together with the support of the urban sub divisional councils:

- Mobilises and coordinates financial and human resources for MSWM
- Settles disputes between HYSACAM and other service providers
- Locates public bins
- Validates contracts executed
- Sensitises and runs campaigns

1.3. Mfoundi Council's Waste Management Approach

Waste management within the Mfoundi council is the major responsibility of the City council and the Seven subdivisional council that makes up the Yaoundé City Council. Each council has a Hygiene and Environment Unit or service to ensure the cleanliness of its constituency. Due to the inability of councils within the Mfoundi to efficiently render effective and responsive waste management services to the population, the government hired a private waste collection company HYSACAM to play this role.

Waste management in the Mfoundi is mainly executed by the company, Hygiène et Salubrité du Cameroun (HYSACAM), through a contract signed by mutual agreement between it, the Yaoundé City Councils and the Government of Cameroon. This contract (No. 165/GG/68-99) stipulates a daily manual and mechanical sweeping of some streets, avenues and boulevards (369kms); public places and the markets in Yaoundé City area every working day. It includes a daily or once-in-two days collection and treatment of solid waste from households, public roads, paths, markets; public institutions such as schools, hospitals, small businesses, artisans and offices. The contract excludes wastes from exploitation of public works, factories and industries, construction and demolition, commercial, slaughter, anatomic or infectious wastes from hospitals and clinics i.e. hazardous waste (Communauté Urbaine de Yaoundé *et al.* 1998). The company is responsible for collecting and transporting waste brought to the official collection point for disposal and treatment.

1.3.1. Collection, Transportation and Disposal of Waste within the Mfoundi Division

As earlier indicated, waste management contract in Cameroon was awarded to HYSACAM. The state through the Ministry of Finance and the Ministry of Public Contracts finances HYSACAM's activities at 85% while the local councils in the Mfoundi provide 15% of the funds for HYSACAM to carry to its activities. The company has been in active service in Yaoundé since 1969. It has about 1500 employee throughout the national territory.

According to the Yaoundé City Council, the contract with HYSACAM stipulates that, HYSACAM is to dispose at least 2000tones of waste from the street of Yaoundé per day. However, the company has not been able to meet this target, based on statistics which reveal that so far HYSACAM collects only about 1000tones per day (Mr Mahou, Head of Service Environment and Hygiene Yaoundé city council, August 2020). As per the contract arrived at with the government, it is HYSACAM that determines the mode of operation for the collection and disposal of waste, the timing for intervention in various neighborhoods within the Mfoundi and the disposal strategy.

In executing their services their equipment's include brooms, wheelbarrows, rakes, mobile dustbins and truck for collection of waste from points at particular routes in the town. Below are pictures of some waste management Practices in the Mfoundi Municipality.

Figure 2 shows a series of pictures with blocked drainages filled with poorly discarded waste, an open dump in a residential area and waste piling up days before collection in Yaoundé. The implications of these practice are the increased presence of mosquitoes and the presence of odour due to these poorly discarded wastes. This shows that the current practices in the Mfoundi Council are not sustainable and require a proper strategy in other to better serve the community in terms of waste management.

Figure 2 Picture of Unsustainable waste management practices in Yaoundé

Source: field study, 2020.

1.3.2. Waste Collection Method in the Mfoundi Municipality

According Mr Noutat the Chief of Service of waste Disposal at HYSACAM Yaoundé, HYSACAM has three approaches for the collection of waste in Yaoundé, namely pre-collection, door-to-door (itinerant waste collection van system) and fixed-point collection.

Pre-collection

Pre-collection involves the movement of waste from the points of generation (the home) to municipal collection bins. Private operators through tricycles, wheelbarrows, move as much as 80% of household waste to public bins. This can be enhanced through the efforts of municipal authorities and community initiatives. In Yaoundé, a mandatory clean-up exercise under the auspices of the Municipal Council and representatives of Decentralization is organized once every month. On this day, residents are required to clean their neighborhoods, and clear up unauthorized waste dumps in order to protect public health. The role of community leaders is often key to the success of such events as they would ensure maximum public participation in the exercise. Private companies with residential areas take responsibility for waste management in those areas.

Door-to-door collection

Door-to-door collection methods consist of mobile waste collection trucks (open or compaction), which give out peculiar hooting signals inviting residents to bring out their waste, which is loaded directly into the trucks for transportation. For efficiency, pickup days are fixed, however, truck breakdowns can sometimes seriously disrupt services. In this system, waste is usually stored at the points of generation for a very limited period and once loaded into the trucks are immediately taken off to the disposal site. This method relies on good roads and is a method of choice in markets and during the clean-up campaigns, but is not that common for residential areas otherwise.

Fixed point collection

Fixed point collection consists of sitting large communal bins in designated locations for scheduled pickups. The choice of skip type, size, location and frequency of pickups is determined by the rate of waste generated, access and activities carried out in the area. This is the most widely used collection system in Mfoundi which inevitably depends on the participation rate of the residents in the community. These fixed collection points are located in areas where they can be easily accessed by the collection trucks. Due to rapid urbanization and sprawling these collection points need to be increased in other to accommodate more neighbourhoods that are not served.

In contrast to door-to-door collection, waste is stored for a longer period of time, along the road; providing habitats for rats, vermin and also exposing the waste to the population. Scavengers usually visit curb side dumps to recover materials that they can sell to market. Municipal waste collection from these sites will vary, with smaller portable bins emptied on the same schedule as door-to-door collection, whilst the heavier skips maintain a separate pickup schedule (a decision based on the, type of transportation vehicle available and the access arrangements.

Market Cleaning

Markets in the Mfoundi have been observed to be the dirtiest places in towns. In an interview conducted with Mr Salome, Chief of Service Hygiene and Sanitation, Yaoundé II Council on 28th August 2020, we were informed that, the hygiene and sanitation of markets in the Mfoundi is the sole responsibility of the Yaoundé City Council. That is, the sub divisional council do not have a say in the management of market waste within their municipalities. The main city council have outsourced the clean-up of these markets to HYSACAM. But because, the waste collection company seldom move around to pickup waste in these markets, vendors have organised themselves to ensure the cleanliness of the market. Usually, each vendor pays a fee to assigned individuals usually children to collect waste generated by each store in the market, often at the end of the day. These wastes are then taken to the nearest public waste collection bin around the market and where waste bins are absence the waste are simply dumped along the road.

1.3.3. Waste Disposal in Yaounde

Disposal is the end point in the life cycle or chain in solid waste management and usually poses the main challenge due to its long-term effect on the surrounding environment. After collection the waste in Yaoundé is transported to a dump site situated at Nkolfoulou at the outskirts of the town. This is the main and only municipal dumpsite for the whole Division. It is an open dumpsite and there is no form of recycling practiced except for organized action by scavengers picking up valuable items. When a section of the dump site is full it is covered with late rite to allow for the process of natural decomposition. It should be noted that this is not a landfill but an open dump site which is filled with soil for natural decomposition to take place.

1.3.3.1. The Official Landfill for Yaoundé

The official landfill is located at Nkolfoulou Village (Soa sub division, Mefu & Afamba division), 25 km from the city centre in the north-eastern part of Yaoundé. The 56-hectare piece of land sited in the Valley of the Foulou River was acquired through negotiations between the village people of Nkolfoulou and the Yaoundé City Council (YCC) in the late 1980s and came into use in 1990. It replaced the old sites at Ngousso and Nkoléwoé (Interview with the director of exploitation at HYSACAM Yaoundé**,** Yaoundé August, 2020). The facility is a state utility, managed by HYSACAM. The major attractions of this site were its isolation (2 km away from nearest residential areas), the large size (allowing use for at least 20 years), the gentle slope (permitting natural flow of leachate) and sufficient clean fill lateritic soils (to cover waste)

Nkolfoulou sanitary landfill receives 700-800 tonnes of mixed solid waste every day (the weigh bridge operator, August 2020). In addition to the waste that HYSACAM collects and transports to this landfill, waste is also received from the other partners.. In principle, construction and demolition waste (DW), hospital hazardous waste, radioactive, toxic, explosive, corrosive and bulky wastes such as vehicle bodies are excluded. In practice, many of these unwanted wastes enter the landfill unnoticed or mixed in conventional MSW from households, offices, hospitals and other authorised sources. Some of these dangerous substances come from white and brown goods, fertilisers, pesticides, insecticides, weed killers, rat poisons, batteries, paint and thinners, solvents, kerosene, motor oil, brake and

transmission fluids, coolants, cosmetics, lamps, thermometers, glues and plastics. In the long run the landfill becomes toxic with chemicals such as mercury, lead, cadmium and phenols. These are hazardous especially when carried along in leachates.

Nkolfoulou facility has 11 workers including one environmental engineer who is in charge of the landfilling operations and one person at the head of the personnel and deals with legal issues at the landfill including environmental management. The workers operate and maintain the machines, control waste vehicles, inspect compactness and clean the office environment. The equipment includes a 48-ton caterpillar compactor, a 25-ton bulldozer caterpillar and an 18-ton front-end loader. There is a weighbridge assisted with a personal computer. An independent water supply facility exists on the site. There are two houses at the landfill, one for administrative purposes and the other for storing equipment.

Incoming waste is inspected at the gate and brought to the weighbridge before it is taken to the tipping cell. When the waste is newly tipped scavengers rummage in it after which the bulldozer levels up by pushing the waste toward the front overlooking the valley. After this process clean fill is spread over the waste and trampled upon by the compactor and waste vans alike. The tipper truck returns through the weighbridge again for the empty vehicle's weight to be registered and subtracted for the former (weight with waste load).

Discussion

Based on findings, Yaoundé generates about 2000 tons of solid waste daily, three-quarter of which is biodegradable. However, the management of this waste remains a problem as only small areas of the city are served with about 40-50% of waste collected and disposed of at the landfill. The rest is illegally disposed of. The problem is known. Waste producers, formal and informal groups, the waste management company-HYSACAM together with the government through the city councils and external support agencies are all involved in trying various strategies to solve the problem, though waste management in the town remains very unsustainable.

The continuous heavy financial assistance by the government to safeguard the national capital's prestige cannot go on forever. What emerges clearly from the study is that there is a shortage of equipment, a lack of a clear role, rules of the stakeholders and poor coordination between the generators and the service deliverers. While increase in the use of machines is desirable, it is limited by access roads and other problems linked to adaptability such as climate. Thus, increasing efforts must be made to involve waste generators in the management of the waste that they generate including the treatment, which for now has been given very little attention.

As has been revealed by other studies (Din-Louise: 2015, Marthan: 2014, Manga: 2007), Cameroonian government has created a legislative and statutory framework to govern solid waste, however, the regulatory framework is complex, centralized and top-down and there is no clear policy on recycling. The present study reveals that, while the present policy framework sets out strategies to protect environmental resources and promote materials conservation through safe disposal and materials recovery respectively, poor waste collection and indiscriminate as well as improper disposal dominate local Municipal Council practices.

The present research just as that of Ntoban and Fogwe (2019), concludes that, municipal waste management in Cameroon in general and in the Mfoundi in particular has been neglected. Uncollected and illegally or improperly disposed of wastes is very common and a pose serious risks to public health and the environment. It is believed that, the prevalence of parasites, tetanus, malaria, hookworm, cholera and diarrhoea in most neighborhood in the Mfoundi is attributed to unsanitary conditions caused by waste being simply strewn along the streets, in water bodies and gutters and other habited areas (Achankeng, 2009). Incidents of flash floods, water pollution and littered landscapes in the city have been attributed to poor waste management practices.

The beautiful laws and decrees on the environment and organisation of the council structures and functions suggest that the central government at the top understands the prominent role councils at the base can play in improving the general economic, environmental, social and cultural life of its populations and especially solid waste management. For now, there is no efficient mechanism for enforcing the laws in place. The administrative structure and roles are too interconnected yet effective coordination is not in place. The top has theoretically passed down autonomy to the councils at the base but is still holding firm onto the process of passing down the necessary financial and empowerment that the councils need to function effectively. Schubeler (1996) on decentralisation and distribution of responsibilities observes that: "Problems arise when certain functions are centralised, while responsibilities for operation and maintenance remain at the local government level" (p. 30).

Conclusion

This study set forth to investigate local governance and sustainability in urban waste management in Cameroon, specifically in the Mfoundi Urban Council. The main objective of this research was to critically examine the sustainability of the policy, and practices of Municipal Solid Waste Management (MSWM) systems adopted in the Mfoundi Division. Our investigation revealed that, over the years, the Mfoundi municipality has experienced exponential growth in the generation of municipal solid waste due to rapid, unplanned and unmanaged urbanization; rising urban population numbers and increased economic activity. According to Mckay *et al, (2015 :93)* Cameroon generates approximately 6 million tons of municipal solid waste per annum, making solid waste a significant environmental and public health hazard. In Yaoundé in particular, the rate of waste generation far exceeds the capacity of local municipalities to deal with it.

As a result, the researcher found out that poor waste collection and indiscriminate as well as improper disposal dominate municipal council practices despite the regulations and policies in place. Most inhabitants have resorted to dumping their waste in open spaces, water bodies, drainage channels, deposit along roadsides and streets as well as abandoned buildings. The council waste management policy is guided by a series of legal dispositions put in place by the government as highlighted. In implementing this legislation, the respective councils investigated have outsourced the

waste management service to HYSACAM. This enterprise has been in Cameroon since 1969 and is responsible for the collection, transportation and disposal of waste.

Recommendations

For proper and sustainable management of waste in the Mfoundi Division, the following should be considered:

Increasing public sensitization on waste management

Waste management should equally be mainstreamed through education and public sensitization systems. Literature has a supportive role for public education in successful solid waste management programs. In order to raise public awareness and encourage behavioral change and thereby gain public participation public campaigns should be part of the strategy including punitive methods for violators of the program. The development of effective public education campaigns is a step in realizing the cultural transformation that is necessary for solid waste management reform in Cameroon.

In this regard, the Yaoundé City Council should collaborate with on-governmental organizations to transmit the message to the local population. The ultimate goal should be to encourage public participation in source separation programs. Also, programs educating the population about source separation. In focus group discussion inhabitants indicated their willingness to participate waste separation and recycling and waste reuse programs. Also, a number of people were willing to participate in a program that paid for each bottle they returned; this shows that incentives would have to be given to motivate the public to participate in a program of that nature. Interestingly, all the population was interested in more information on composting, reuse and recycling with this enthusiasm to learn it is but important to introduce these programs.

Awareness raising and training on waste reuse, recycling and waste sorting at source

A large-scale awareness campaign to increase public understanding of the sector, facilitate the uptake of government loans (to invest in solid waste management businesses). The awareness campaign will help households understand the valuable role waste pickers play in the recovery of recyclables, see solid waste as valuable, separate waste at source and sell. In the course of this study, we realized that, people are not aware of how they should manage their waste, everything hazardous and non-hazardous are mixed and dumped in one bin. Thus; organising mass communication awareness campaigns like those they host for HIV and other health related issues will be useful, if role players are sensitized and their capacity built they can grow MSW management.

With education and environmental awareness-raising programmes, waste generators' interest and support would be kindled. Interest, either at individual or collective level, is the key to participation and progress in waste management. Instituting programs in schools to teach kids on waste management will go a long way to inculcate better waste management habits in the upcoming youths. It becomes very difficult to change littering habits for instance when the people are adults

Extend waste service coverage and Increase the number of public waste bins and skips

Public skip and bins are the meeting point of the waste generators and the official waste managers and have a direct relationship to the quantities of waste collected in an area of the city. Analyses made in this thesis demonstrate that public skips are not only grossly insufficient but are also poorly distributed. I recommend an increase in their number and a fair spatial distribution based on needs.

Implementing waste management legislation

At the national level there is no legislation in place which details waste policies, let alone that which creates a uniform reporting mechanism that could enable annual, nation-wide, and publicly available summaries of MSWM in the country. The formulation and implementation of waste management legislation should be limited to fewer agencies whose roles are well defined. Institutional strengthening and cooperation (lateral and vertical) between these agencies should be enhanced with the aim of reducing excessive bureaucratic requirements and introducing transparency and accountability will have to be encouraged (e.g. Wilson et al., 2005). Ensuring financial autonomy of Municipal Councils will provide them with more financial resources and greater control.

Promote public participation

There should be an increase public participation in effective waste management through genuine decentralization of Council control and the empowerment of the electorate. Also, public education and awareness (Wilson et al., 2005; Olley et al., 2006) related to neighborhood services and issues must be increased. However, while the civil society can take an active role in awareness raising campaigns, ultimate success would depend on the full backing of the key-decision makers so that the stakeholders would feel ownership of the project outcomes.

Enhancing private-public partnership

Strengthening of private–public partnerships in waste management is vital. Such successful partnerships can be forged in the areas of materials recovery and community composting (e.g. Ahmed and Ali, 2004). Such partnerships should in turn encourage private investment in the delivery of waste related recycling and recovery facilities. For such partnerships to be established, there is a need for major participative consultation through facilitated workshops involving all key stakeholders [municipal councilors, government agencies, waste contractors and representatives of community groups] (Wilson et al., 2005; Henry et al., 2006) during which all perspectives regarding sustainable waste management can be developed, consensus built and policies and services implemented.

Developing and implementing an animal feed program

An animal feed program which can be derived from food waste should be introduced. In this regard 52.3% of the community acknowledged that they either grow crops or rear animals. This means that introducing animal feed program from food waste will be important. According Post (2007) promoting animal feeding program is a preferred method of managing food waste and that composting has it disadvantages for the following reasons: a community composting program should be introduced in which a central location chosen for materials can be processed. Also, the

community has to put in place ways to sustainably manage the program.

Putting a place a robust policy on recycling

Another waste reduction strategy is to encourage recyclable production of goods to allow access to recyclable products. More eco-friendly articles which will facilitate the reduction of the amount of waste generated. Because these materials will be easily eliminated from the waste streams by recycling them each time they are used to produce other goods.

Furthermore, companies starting up on eco-friendly solutions like recycling of plastics and other materials should be given incentives by the government of Cameroon. Loans and grants should be made available to encourage such initiatives and this will be very important to develop the green economy in the country. Instead of starting waste management from generation, a new Model is proposed to government starting from the Production of goods and services that will facilitate the actual disposal process.

Projections for Improved waste management service

Projected increases in quantities of each waste stream should also be estimated in order to plan for future provision of facilities. Knowledge of the composition of the waste stream is also necessary to judge whether landfilling is the best disposal option or whether some form of the pretreatment of a particular waste will be needed before it can be accepted in a municipal landfill.

Projection in population increase, town expansion as well as waste increase should also be made to better anticipate on whether to create another landfill and also deciding on its location.

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