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THE CHALLENGES OF SOLID WASTE MANAGEMENT FACING THE CITY OF KINSHASA: THE CASE OF KINSHASA LOCAL MUNICIPALITY

BY

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A Research report submitted to the Faculty of Engineering and the Built Environment, School of Architecture and Planning, University of the Witwatersrand, Johannesburg, in the fulfilment of the degree of Master of Science in Development Planning.

October, 2009

DECLARATION

I declare that this research report is my own, unaided work except where due reference is made. It is being submitted in partial fulfilment for the degree of Master of Science in Development Planning in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other University.

_____

(Signature of Candidate)

----------Day of ----------2009

DEDICATION

To my God Jehovah, creator of the whole universe; to my lord and saviour Jesus Christ

To my family for being there when I needed them most

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ABSTRACT

Solid waste management has become the real challenge in many cities in the world. The situation has become more critical in many local municipalities in Africa because of the rapid growing of urbanization, bad governance and the high incidence of poverty. To this end, the accumulation of solid waste has become a health hazard responsible for the occurrence of various kinds of diseases.

The purpose of this research is to identify the challenges of solid waste management in the city of Kinshasa. The case study of Kinshasa Local Municipality (KLM) which is part of the city of Kinshasa is the area affected mostly by waste challenges and is the focal point of the study. This municipality involves key stakeholders such as households, informal collectors, private sector, public sector and the international organization in the management of waste. The study has utilised the collection of data from secondary and primary sources. The primary sources entailed the interviews which were carried out based on questionnaire surveys administered to key stakeholders together with field observations. The secondary sources were documents including policy documents of the Congolese Government, legislations regarding solid waste management as well as relevant books and journals.

The research indicates that solid waste is a tragedy in Kinshasa Local Municipality as a result of mismanagement and lack of policies by the Congolese Government at all levels. Challenges identified include: unplanned growth and increasing pressure to provide services; lack of adequate authority to address people, infrastructure and resourcing problems; bureaucratic confusion and delays due to a multitude of agencies; lacking accountability; limited communication within the city administration and more importantly between the city administration and the various stakeholders; lacking of environmental education and awareness within local municipality; lacking skills of municipal workforces; financial constraints and gender related issues.

This research makes planning recommendations in terms of rational comprehensive planning, equity planning, communicative planning and advocacy planning in a complementary and integrative approach. Within these integrated forms of planning, there are further recommendations for: enforcing environmental legislation; reducing plastic production through principle ‘pollutant pay for pollution’; empowering women for their engagement in waste management; consolidating leadership in local municipality level, promoting decentralization and municipal finance systems; promoting educational awareness and community participation, and creating partnership between different stakeholders in solid waste management in the city of Kinshasa as a whole.

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ACRONYMS

ACP	Africa, Caribbean Pacific
ANR	Agence Nationale de Renseignement
BERCI	Bureau d'Etudes de Recherches et Consulting International
BUA	Brigade Urbaine D'Assainissement
CBD	Central Business District
CBOs	Community Based Organisations
CPK	City Province of Kinshasa
CUE	Co-ordination Urbaine d'Environement
DEAT	Department of Environmental Affairs and Tourism
DGM	Direction Generale de Migration
DRC	Democratic Republic of the Congo
DUUH	Division Urbaine d'Urbanisation et Habitat
EEA	European Environment Agency
EPA	Environment Protection Agency
EC	European Commission
EU	European Union
IP&WM	Integrated Pollution& Waste Management
ISWM	Integrated Solid Waste Management
KLM	Kinshasa Local Municipality
LSWMB	Local Solid Waste Management Board
METNC	Ministry of Environment, Tourism and Nature Conservation
MoPH	Ministry of Public Health
MPWTP	Ministry of Public Works & Town Planning
MSW	Municipal Solid Waste
NEMA	National Environment Management Act
NGOs	Non-government Organisations
NWMS	National Waste Management Strategy
OVD	Office de Voirie et de Drainage
PAUK	Programme d'Assainissement Urbain de Kinshasa
PNA	Programme National d'Assainissement

PNC	Police National Congolaise
PPPs	Public-Private Partnerships
MSWM	Municipal Solid Waste Management
SMMEs	Small Micro and Medium Enterprises
SNHR	Service National d' Hydraulique Rural
UN	United Nations
UNEDP	United Nations Environment Development Programme
US	United States
UNESCO	United Nations Educational, Scientific and Cultural Organisation
ZWIA	Zero Waste International Organisation
ZWS	Zero Waste System

CHAPTER ONE: THE CURRENT STATE OF SOLID WASTE MANAGEMENT IN AFRICAN CITIES

1.0 Background of Solid Waste Management in African Cities and in Kinshasa Local Municipality

One of the major concerns of many local authorities responsible for overseeing public health and sanitation in Africa is the management of solid waste (Mungai, 1998). In Kinshasa Local Municipality (KLM), Republic Democratic of the Congo; the combination of rapid urbanization, industrialization, lack of political involvement, poverty and uncontrolled growth of the population has made solid waste management to become an acute problem. Ironically, though solid waste management is an essential service, it is given low priority and has become a critical issue in urban planning (Mbande, 1998).

Usually, waste is more simply recognised than defined. According to Gourlay (1999), something can become waste when it is no longer useful to the owner or it is used and fails to fulfill its purpose. Solid waste is anything useless, unwanted, or discarded material that is not liquid or gas (Nkeku, 2007). A huge combination of substances including fine dust, cinder, metal, glass, paper and cardboard, textiles, ashes, putrescible vegetable materials and plastic embody solid waste. Further to this, Binzangi (2008) notes that the third world, having refused to become the "dustbin" of the western world; it lacks appropriate storage facilities, treatment technologies, and good methods of disposal for its waste.

Like other local municipalities of the City Province of Kinshasa/ Democratic Republic of the Congo such as Barumbu, Lingwala, Matonge, Gombe, etc. KLM is engulfed in filth of both conspicuous and inconspicuous places because it has serious problems with its solid waste management from generation, through storage, treatment to disposal. Every day, the City Province of Kinshasa (CPK) produces more than 5,000 m^3 of refuse (Kinshasa City Council, 2007). The annual generation of solid waste is estimated to be about 2 million m^3; out of which only 70% is re-used and the rest is eliminated in unacceptable conditions (Kinshasa City Council, 2007). Nkeku (2007) points out that Kinois householders (name of City

Province of Kinshasa's dwellers) drain off 29,1% of their domestic refuse by organised public services, 6,4% by incineration, 14,6% by burying, 6,2% by dumping on the streets, 6,6% by dumping in rivers, 21,6% by illegal dumping in public places, 11,6% by compost bin and 3,9% by other drain-off mechanisms. The situation in other African cities is similar. For instance, in Accra/Ghana, Songsore (1992) notes that only 11% of the 1.4 million residents benefit from home collection; while the remaining 89% dispose of their waste at community dumps, in open spaces, in water bodies, and in storm drainage channels. Kassim and Ali (2006) also observe that on average, city authorities in Tanzania collect only 24% of the refuse produced. Adedibu and Okekunle (1989) commented that Lagos/Nigeria is the dirtiest city in the world.

Household waste collection and street cleaning in CPK are restricted to wealthy neighbourhoods, while in the remaining areas household waste is dumped along roads, in illegal dumps and in storm water drains or it is buried in CPK; the situation is similar in KLM (Mbuyi, 1989). Wars, corruption, lootings, dictatorial leaders who care only for people from their own clan, the collapse of social and municipal services, lack of planning and policies as well as the stubborn habits of the city's swelling population have led to a management challenge so immense and smelly that nobody has the courage to tackle it in the country (Le Potential, 2007).

Meanwhile, the accumulating waste has become a health hazard responsible for the return of water-borne diseases like typhoid and cholera, for respiratory diseases and for water pollution and flooding (Meldrum, 2007). In addition to the poverty which assails KLM's dwellers, the municipality's inhabitants are always complaining of the huge garbage dumps and their detrimental effects. There is no single solution to the challenge of waste management in KLM. The waste management process is usually framed in terms of generation, storage, treatment, and disposal, with transportation inserted between stages as required. Hence, a combination of source reduction, recycling, incineration, and burring in landfills and conversion is currently the optimal way to manage solid w*a*ste.

As indicated in the figure 1 below, illegal dumping in KLM is a visible aspect of challenges facing the city in addressing solid waste issues.

Figure 1: Illegal Dumping in KLM on as reflected in Tembe na tembe Site, in the South-west of the Area, July 2009.



The frequent cases of epidemics in KLM are mainly consequences of waste which is not well managed. The prevalence of parasites like tetanus, malaria, hookworm, cholera and diarrhoea, in the City Province of Kinshasa is attributed to the unsanitary conditions and illegal dumping (Mbuyi, 1989). As a result, the urban environment has also steadily degenerated and suffers from diseases due to waste that is not efficiently managed. After years of neglect, CPK Africa's second largest and fastest growing metropolis, which used to be proudly called Kin la Belle ('Kinshasa the Beautiful') is now disparagingly referred to as Kin la Poubelle ('Kinshasa the Dustbin); what Binzangi (2008) calls *Poubellisation* means (Dustbin - isation) of the Kinshasa. It therefore becomes important for this study to examine the challenges of solid waste management in KLM. This research is therefore intended to provide insight to local communities, government officials, and business people and

international institutions and non-governmental organisations who might want to help resolve the solid waste management challenges in KLM.

1.1 Rationale of the Study

Numerous researches have been conducted on the state of solid waste in African cities in general and City Province of Kinshasa in particular; all have revealed the actual deplorable situation of solid waste and its consequences on urban dwellers (Adedibu and Okekunle, 1989; Asomani-Boateng and Haight, 1999; Songsore, 1992; Ogu, 2000; Kassim and Ali, 2006 etc.). The critical environmental degradation resulting from the solid waste problem in KLM has also been discussed by (Mbuyi, 1989; Kondani, 1999; Likengelo, 1998; Muzumbi, 2008; Mafwila, 1999; Binzangi, 2008 and Nkeku, 2007, etc.).

In the City Province of Kinshasa for instance, the researchers have described the state of the environment and its consequences on degradation of lives of urban dwellers (Muzumbi, 2008; Mafwila, 1999; Binzangi, 2008 and Nkeku, 2007, Mbuyi, 1989 etc.). For them, solid waste was just one aspect of their research which focused on land management and poverty in the city, respectively. Thus, they did not analyze critically solid waste issues in the area by examining the issues of solid waste management in third world countries such as waste cycle, institutional arrangement and planning approach for an integrated waste management in CPK in general and KLM in particular. This research, however, will not only analyze the challenges of solid waste management but also outline proposals of planning for an integrated solid waste management system in the study area.

Unlike the previous studies; this research will analyse both approaches: diagnostic and curative of solid waste in the case study. This is to say that while most of previous researches simply focused on what was happening in the area in terms of the increasing rate of solid waste, this research discusses in-depth the issues of solid waste, as well as propose the planning tools for an integrated solid waste management in municipality. In addition, French is the language mostly spoken in KLM and most of the researches done on the subject of solid waste are written in French; there is a dearth of material available to the English-speaking community. Hence, many sources that will be cited in this study would be from

publications and documents available only in French. This will provide a bridge of scholarship between these linguistic traditions.

1.2 Research Purpose and Objectives

The main concern of this study is to examine the challenges faced by the CPK in the area of solid waste management, using the case of KLM. In order to achieve the research goal, the following research objectives were identified:

- To review and define the challenges facing the municipality in solid waste management.
- To identify the problems/factors that led to poor management of solid waste in the City Province of Kinshasa through the analysis of case study.
- To determine the relevant stakeholders in solid waste management in the municipality.
- To record the problems and issues which are confronted by the stakeholders in terms of the provision of solid waste management services in the area.
- To assess solid waste planning and its impact on solid waste management in the study area.
- To evaluate the extent of community involvement in the planning of solid waste management in the study area.
- To investigate the effect of urbanization and conflicts on waste generation, composition and density and
- To explore planning interventions that can assist in addressing the challenges to solid waste management in the case study.

1.3 Hypothesis of the Research

This section gives a preliminary or tentative description of what the research outcome will be. By considering research background and the debates around solid waste management in African cities; the challenges of solid waste in KLM are hypothesised in the following:

- The local authority's strategies to address the issue of solid waste based on collection and recycling have failed to produce effective and favourable outcomes to the city's residents owing to the lack of technologies and financial resources.
- The poor management of solid waste in municipality owes a lot to the lack of sufficient political involvement; there is no allocation of specific funds for solid waste management. In other words, solid waste management is not a priority of the government.
- The lack of co-production or decentralisation of waste projects compounds the problem. Solid waste management is mostly centralised, and therefore there is less involvement of the local community and of private organizations.
- Lack of local environmental awareness and public participation further adds to the problem. In many African countries, the public is not given a chance to participate in the different projects concerning its development.
- Residents' wrong perceptions and unconcerned attitudes towards waste management might also be the cause of this problem.
- Rapid urbanization, resulting in conflicts and wars has made the solid waste situation worse than ever before.
- Lack of solid waste planning and enforcement of environment laws adds to the crisis.

1.4 Initial Preview of Literature: Current Arguments and Perspectives for the Generation of Solid Waste Management in Urban Areas in Africa

The literature on urban management reveals a number of arguments and perspectives regarding the challenges of generation and management of solid waste. While these arguments are diverse, they are intimately linked to one another. They are related to the issues such as urbanization or population increase, capacity building, governance, poverty, neo-liberalism, poor participation, public sector constraints etc. These views are all resulting from common factors such as: natural growth, poverty, lack of education and economic opportunities and adherence to practices that do not simply promote environmental sustainability.

1.4.1 Urbanization and Population Growth

Some scholars have argued that the extent and nature of urbanization and natural population growth in African countries have major implications for solid waste management. Thomas-Hope (1998:2) has noted "that 30-50% of the inhabitants in the developing world are urban dwellers and they produce a 75% unreasonably high volume of solid waste. The situation is compounded by the unplanned and spontaneous communities divided into the poor and the wealthy". While wealthy areas are characterized by the inadequacy of collection services, the poor areas are characterized by a complete lack of collection services, leading to illegal dumping and littering, as well as illegal disposal of domestic waste on street corners and open areas. What is disturbing is that although the third world countries' urbanism process and growth rate are relatively higher compared to those developed countries; developing countries do not plan much for their future; most of them are just limited on management of present issues while they focus less on the future.

1.4.2 Inappropriate Technologies for Waste Collection and Removal

Another argument by Thomas-Hope (1998:6) reveals that "successful solid waste management is dependent only in part upon the technology required for each stage in the circle and the economic and financial capabilities to implement them". However, many African countries do not have appropriate technologies to deal with their solid waste. The standard primary storage bags or bins that are provided by local authorities in some African countries are often used for other purposes, such as clothing or water/traditional beer storage. Moreover, some local municipalities rely on householders' supports to buy their own solid waste containers. Those who cannot buy bins tend to use alternative waste containers such as 5-10 grocery plastic bags or others. The consequence here is that the waste which is not collected due to lack of standardized bins become illegally dumped in open spaces or streets corners.

Getting appropriate solid waste technologies might not be necessary a solution for solid waste management in developing countries. Most African countries have imported diverse

technologies which have not been adapted with local realities; and appropriate technologies must also be accompanied by appropriate policies.

1.4.3 Lack of Waste Planning and Collection Co-ordination

From the fieldwork, it was observed that in KLM/Democratic Republic of the Congo solid waste management is not well co-ordinated. Every solid waste stakeholder is operating independently. The interview with the Chief Clerk Mr Norbert Kima Watete of Kinshasa Local Municipality on 14 July 2009 in his office located in KLM headquarter has reported that: '… *ici c'est un laissez-passer et laissez-faire* (everyone can do what he(she) wants). The major challenges of solid waste in my area are the lack of common programme to curb waste. The inexistence of liable programme from city council which we have inherited in municipal level present real challenges to the solid waste management; several programmes are undertaken separately as consequences some areas are neglected and solid waste persist' . There is no integrated solid waste management through different levels of government. Moreover, there is a serious problem of planning for solid waste in African countries.

A successful integrated planning requires a strong bureaucracy which can efficiently co-ordinate the actions of all stakeholders involved on a project. Some proper state in developing countries such as South Africa is facing challenges to embark efficiently the solid waste planning process. However, a state such as Democratic Republic of the Congo which has recently came out from political conflicts; where state institutions at both spheres of government are still weak is far to success the partnership. This requires more efforts and political determination.

1.4.4 Need of Environmental Awareness and Education

This neglect is exacerbated by the fact that there is no importance placed on both official and casual environmental education that integrates domestic sold waste management in many African countries. Mbande (1998) has noted that the proliferation of unofficial business dealers even next to schools and community places also contributes to untidy conditions as pupils buy food and throw away the wrappings anywhere. Thomas-Hope (1998:2) has also

observed that “there are usually no well-developed enforcement mechanisms that would effectively coerce the mass of the population to comply with the stringent regulatory and legal frameworks required for effective management of waste” in many developing countries. There are few African schools which have solid waste management as part of their syllabus from the lower classes to matrix level.

In this point, environmental awareness is not only government’s responsibility. This has demonstrated the failures of civil society in African countries. The non-government organizations, community based organizations; churches, universities and schools have all this responsibility for environmental education.

1.4.5 Inapplicability of Law and by-laws Enforcement

Furthermore, there are usually no well-developed enforcement mechanisms that would effectively coerce the mass of the population to comply with the stringent regulatory and legal frameworks required for effective management of solid waste. Blight (1998) has observed that one of the problems facing African cities is the lack of legal enforcement of littering by-laws and liability for paying for services. There is regularly no application of official law or ordinances regulating illegal dumping. This makes it tolerable for people to waste or unlawfully dispose of waste even if there is standard collection. In Kinshasa, there is illegal dumping in the corners, the streets and public places.

The issue of law enforcement in many African cities is very critical; for most times the first contravening issue is the government board. Either the government abuses power or does not hold promises which can result for local community not to comply. For instance, in KLM local authority prohibits illegal dumping while it does not provide local community with dustbins or containers.

1.4.6 Challenges Relating to Specific Budget and Solid Waste are not a Priority

The lack of ecological and solid waste education relating to the use of infrastructure and the danger of illegal dumping and littering contributes to the perception among the communities that solid waste management is not a priority in their areas. There are few African countries

which allocate money in their annual budget to solid waste management. In the Democratic Republic of the Congo, there is no a specific budget allocated for solid waste management. However, the National Government through Ministry of Environment and Tourism allocate an insignificant amount of money for environment and tourism in general with very little interest accorded to solid waste management. The inconvenience of this lacuna is that limited pressure is put on local authorities on matters relating to the environment in general and to solid waste in particular.

1.4.7 Shortage of Liable Infrastructures

One of the biggest challenges in African countries regarding solid waste management is inappropriate infrastructure. The roads through many sections of the cities are inaccessible, leading to an inadequately managed sewage and waste disposal systems. Generally in African cities, there is a problem with tarmacadam roads, which tend to have lots of potholes (Blight 1998; Mbande, 1998). Consequently, traffic congestion is rife as vehicles have to go round or through potholes to get to their destinations. Because of the poor state of the roads, there are a limited number of public buses. The roads are mostly plied by private mini-buses providing much of the transportation needs. As indicated in the figure 2 below, many infrastructures in KLM are divested due to overloading of the drainage system which causes several health risks.

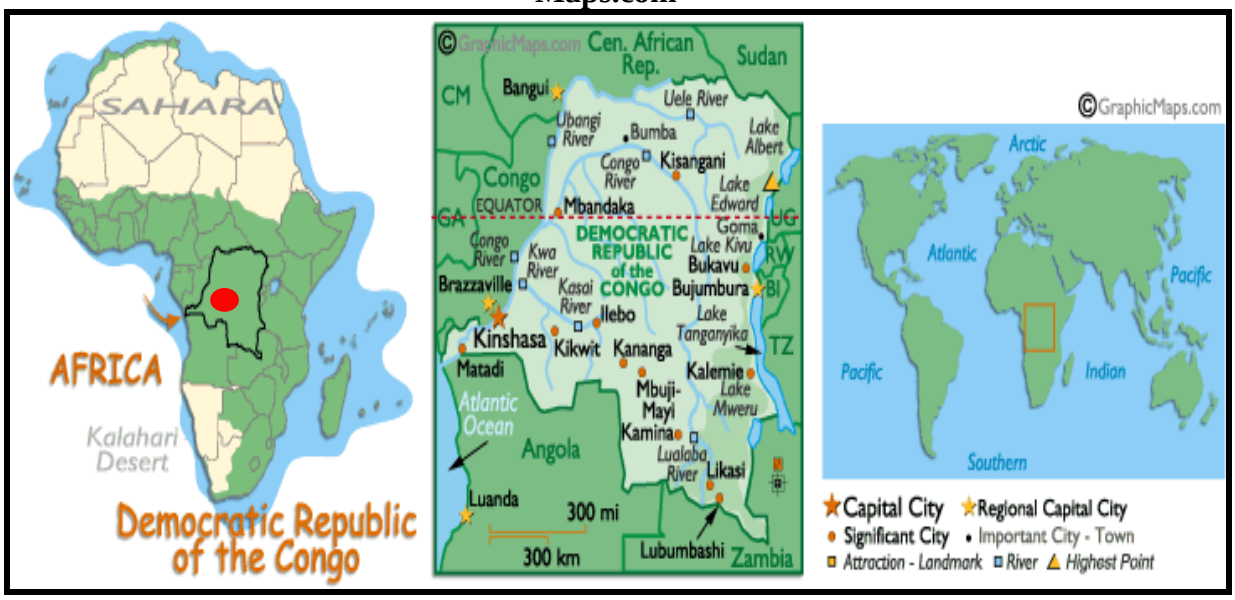
Figure 2: Divested Infrastructure in Kasavubu corner Victoire Street, in KLM July 2009



1.5 Research Methods Adopted in the Study

In this study, KLM was chosen as a representative example of the current and future urbanization trend and solid waste challenges in the City Province of Kinshasa. Municipality is one of 24 local municipalities in the City Province of Kinshasa (CPK). It is situated in the north part of the CPK and bordered to the south by Gombe headquarters, an administrative area of the city of Kinshasa and 30 June Boulevard. Local municipality has existed since the founding of Leopoldville (former name of the city of Kinshasa) and has existed since the foundation of the capital city. The area became alongside with Lingwala and Burumbu local municipalities the developed indigenous city of the early 20th century (Kinshasa City Council, 2007). Since 1940s, it has linked up to historic heart of Leopoldville today located at Kintambo local municipality. In 1966, KLM gave her name to whole the city region which is city province of Kinshasa.

Figure 3: Map showing Location of KLM within the World, July 2009, Graphic Maps.com



Source: Graphic Maps.com, accessed on July 2009

Today, the KLM is an eventful area and the shelter of several of the city's headquarters and facilities, including the Congolese great market (the equivalent of the Johannesburg CBD), the *Somba Zikita* market, Congo's biggest stadium (*Stade des Martyrs*) and the first zoo of the city. The office of the KLM is located at the corner of Kasa-vubu and Kabambare streets.

It occupies an area of 289Km², with a density of 57 441, 46 Hab. /km² and an estimated population of about 94,878 in 2004 (Kinshasa City Council, 2007). Municipality is currently managed by Burgomaster Paul Gérard Sapu Kalimasi, Deputy Burgomaster Erick Mbala Kabeya and a General Secretary Mawete. The Kinshasa Local Municipality has seven neighbourhoods, which include: Aketi, Boyoma, Djalo, Madimba, Mongala and Ngbaka.

Table 1: Estimated Population of Kinshasa Local Municipality, July 2009

Estimated Population of Kinshasa Local Municipality				
1967	**1970**	**1984**	**2003**	**2004**
56,640	73,826	74,708	159,430	164,857

Source: Kinshasa City Council, 2007

The choice of this municipality was influenced by the fact that; it is said to be the most densely populated area in the CPK, with more than 80% of its population running their own businesses or working in government offices. Municipality is the centre of City's commercial activities. Transport and crime remain a great challenge in KLM as many people like to stay around their work places or businesses. The KLM enjoys one of the highest standards of living in the CPK. It is the first municipality most concerned with solid waste increase as a result of the high concentration of population because of concentration of the city's main activities including: administration, facilities, commercial, houses and population, and is visibly more concerned with solid waste than other municipalities in the region.

The population in the KLM has almost doubled within the last two decades, moving from an estimated population of 74,708 in 1984 to almost 164, 857 in 2004 (Kinshasa City Council, 2007). This rapid and unmatched urbanization rate has a visible effect on the accumulation of solid waste and degeneration of the environment, for which reasons KLM should be classified amongst the first dirtiest local municipality in the world. These considerations have motivated the researcher's interest in studying solid waste in KLM.

1.5.1 In-Depth Interviews

The collection of data was done in the field (KLM) so that the researcher could update and know exactly what was happening on the ground through different stakeholders involved in solid waste management. These stakeholders include the Government service utilities or /and agencies, informal collectors or waste workers, private sectors, households and international organisations. The study has involved only the key stakeholders as a way of limiting the scope but reaching out to important informers. The sampling process was done randomly for the most part. The interviews with households were conducted at the municipal offices and were limited to the first two men and women who came complaining to the local authorities on the solid waste services in the area. The public officials interviewed were selected according to the roles they played in solid waste management; while the waste pickers and households interviewed were randomly chosen in the streets while on duty.

A total of 20 in-depth (see appendix one, two, three, four and five), semi-structured interviews were conducted amongst five big solid waste stakeholders in which four people were selected from government agencies, four from private sector waste pickers, four from informal solid waste collectors and the other four from householders. Sampling from different stakeholders in terms of size has given a perception of different experience from different participants. In addition, it also has the advantage of giving the researcher access to different views from stakeholders interviewed in different places within the KLM. In addition, informal discussions were undertaken with local residents who did not feel confident to fill questionnaire. This has focused mainly on women.

Although this sample is convenient for the research in terms of availability or accessibility of key stakeholders and time, any generalisation based on these participants is extremely risky because it might not be statistically representative, but certainly informationally valid. These ones were chosen because not only can they be considered as representing major stakeholders, but also can rightly be said to know better about solid waste in the study area than other stakeholders. The interviews were focused and semi-structured, based on open-ended questions, and also a checklist was used to point to the relevant aspects of solid waste

management in the area. The checklist as a guideline for interviews was improved during the field trip according to new reality on the ground.

Observation also has played an important role in this study. It has given the researcher a clear view of the problem on the terrain. Because of this, the researcher relied much on this method to yield valuable information on the physical environment of the area as evident in the photographs included in this work. A site visit was undertaken through half of the streets through case study KLM to see exactly what was happening on the ground. This exploration provided a first-hand experience of the solid waste generation, illegal dumping incidents, the state of environmental degradation and risks. Also, the ongoing mechanisms or activities to contain the situation from collection to disposal of solid waste as well as the recycling centres and the landfill temporary sites in the case study were explored.

1.5.2 Review of Secondary Sources

The Arm Chair Approach was used in the review of secondary sources. Relevant documentation in this case refers to all written papers, published or unpublished, from various sources including Congolese policies and legislation documents related to solid waste management. The documentation consulted for this study was mainly policy documents of the Congolese government, such as White Papers (on environmental management, environmental protection; Congolese Constitution, Acts and Ordinances), provincial legislations and gazette documents that govern solid waste management in KLM. Tenders and contracts documents as well as by-law and local authority reports on solid waste were also helpful in getting the researcher to see how the KLM and the CPK were complying with policies and legal documents regarding solid waste management. These were very important to test and/or compare written information with what is really happening on the terrain as experienced by interviews and simple field observation.

In conjunction with these sources, a comparative analysis of the solid waste management strategies in Democratic Republic of the Congo on the one hand and that of South Africa and Kenya on the other hand, was undertaken to provide some comparative experiences for the challenges facing the KLM within CPK. This comparison is justified by the fact that solid

waste challenges are not only a Congolese or KLM's phenomenon; but many other local municipalities throughout the world in general and in African cities in particular are also face solid waste management problems. However, some of them have succeeded in overcoming the challenges.

1.6 Limitations of the Study

There are many different sources of solid waste, including household, agricultural, natural and industrial sources. This study has focused on domestic or household solid waste and has analysed its different activities, from generation to disposal. The industrial, agricultural and natural waste were out of this scope and will only be addressed in this study when they touch on any aspect of the above mentioned activities. The researcher is aware of the relevance of these issues, but due to the constraints of time they have not been looked into and are thus considered as out of the scope of this research. Two of the most significant factors that limited the scope of this research were time and money. The time that was allocated to the researcher was not enough to allow for an extensive study of all aspects of the challenges facing KLM in terms of solid waste management as well as that the degree is being completed in another country far from the case study; this requires more expenses for travel and living costs. In addition, there is no solid waste statistics information for KLM; most data analysed are from CPK which reflect all local municipalities with the City Province of Kinshasa.

1.7 Synopsis of this Research

In summary, this research is structured into five chapters, with chapter one being the introduction which provides an overview of the scenario of solid waste in an African context. Chapter two discusses the literature review. It examines the different arguments to the challenges of solid waste management. These are related to urbanization or population increase, capacity, governance, poverty, Neo-liberalism, poor participation and budgeting contrasts as well, before theorising the concept of "Solid Waste".

In Chapter three, the case study is presented in detail. The location and historical background of KLM and the CPK itself, population statistics of Kinshasa, and political crises and wars in the Democratic Republic of the Congo are analysed as one of the factors emerging solid waste challenges in Congo. Chapter four presents the results of this study and analyses them. The main challenges of solid waste management are outlined. The relevant stakeholders in solid waste management are identified. The resources and management methods of solid waste management in Kinshasa are presented and analysed as well as the results from questionnaires and interviews, and the photographs with people. Chapter five presents the conclusions drawn from this study and the urban planning recommendations. It identifies the challenges of solid waste management and proposes planning mechanism for integrated solid waste management in the KLM.

CHAPTER TWO: CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW FOR SOLID WASTE MANAGEMENT

2.0 Introduction

Much research has been conducted on solid waste management in CPK/DRC. The researches have various points of view according to the period and the context of their studies (Mbuyi, 1989; Asomani-Boateng and Haight 1989; Songsore, 1992; Kassim and Ali, 2006; Thomas-Hope, 1998; Mbande, 1998; Mungai, 1998; Adedibu and Okekunle, 1989; Nkeku, 2007; EPA, 1997; EEA, 1999, Kondani, 1999, Likengelo, 1998, Muzumbi, 2008, Mafwila, 1999, etc.).

This chapter discusses the waste management issues within third world context. The different views and concepts of solid waste management are detailed. This will raise awareness of multiple environmental issues such as health hazard, flooding, etc. The first section conceptualises and defines the different concepts and notions in which enclose solid waste. The second section discusses the different opinions around municipal solid waste management by considering the diverse approaches. This chapter is concluded with a summary that gives the general observations reflective chapter's discussions.

2.1 Conceptual Framework of Solid Waste

2.1.1 Overview on Solid Waste

The need for solid waste management is not only the concern of modern cities; it has existed for centuries in history of humankind. However, the first mention of solid waste management appears in the Bible in the ancient book of Deuteronomy (23: 12-13) where Moses prescribes that "wastes was buried", which is today landfill method. Since then, the method of disposing of major portions of the world's wastes has not changed much. Humans are by their very nature careless with solid waste even though the issues nowadays are far more complex and critical than ever before. This complexity arises not only because of the amount of residuals

solid waste generated by modern communities, but also because of differences in the composition of solid wastes.

As defined in the introduction section; waste is a residue resulting from human biological processes, manufacturing, materials processing, consumption of goods, or any other human activity (EPA, 1997). There are many types and natures of waste; however, this study focuses on household or domestic solid waste. There is no single definition for household refuse; it varies from place to place. The United States Environmental Protection Agency (EPA) 1997 defined household solid waste as solid waste composed of garbage and rubbish, which normally originates in a private home or apartment houses….may contain a significant amount of toxic or hazardous waste. For European Environment Agency (EEA), household solid waste is the solid waste composed of garbage and rubbish, which normally originates from houses (EPA, 1997). In fact, household waste contains not only precious and often reusable materials, such as glass, metals, paper plastic and food waste, ashes, food waste with high nutrient content; but also an ever-increasing amount of hazardous waste such as mercury from batteries, cadmium from fluorescent tubes, toxic chemicals from solvents and disinfectants (Weingartner et al. 2004).

This depend also on composition of solid waste; generally, solid waste in many African cities contains few toxically substance compared to developed countries. This consists of organic fraction including raw kitchen waste generated in the preparation and consumption of food: food leftovers, rotten fruit, vegetables, leaves, crop residues and animal excreta and bones which have few toxically material and can be easily reused.

2.1.2 Nature of Waste

Waste has diverse natures including: solid waste, liquid waste and gaseous waste.

a. Solid waste - is any ineffective, unwanted, or discarded material that is not liquid or gas (Nkeku, 2007). It is any discarded material that is abandoned by being disposed of, burned or incinerated and recycled. Within solid waste, there is hazardous waste which is a solid waste, because of its quantity, concentration, or physical, chemical, or

infectious characteristics may pose a substantial present or potential hazard to human health or the environment when improperly treated, stored or disposed of, or otherwise mismanaged; or cause or contribute to an increase in mortality, or an increase in irreversible or incapacitating illness (EPA, 1997).

b. Liquid waste - is a bulk of liquid or sewage that may have been composed of domestic wastewaters or industrial discharges. This wastewater consists of:

- Household water, including latrines, gutters, pits water, etc.
- Industrial water which include industrial effluent water;
- Rain and used water, including rain water spoiled by physical activities.

c. Gaseous waste - is uncontained airborne emissions and effluents that may consist of particulate matter, dust, fumes, gas, mist, smoke, vapor, or any combination This include wood residue resulting from incineration; rubber scrap, gas carbon, oxide nitrogen ammoniac, etc. (Muzumbi, 2008).

2.1.3 Sources and Type of Solid Waste

As indicated in the previous section, the focus of this study was on household solid waste. The household solid waste sources, types and generators is regrouped and presented in the table below.

Table 2: Sources and Types of Solid Waste

Source	Typical waste generators	Types of solid wastes
Residential	Single and multifamily dwellings	Food wastes, paper, cardboard, plastics, textiles, leather, yard wastes, wood, glass, metals, ashes, special wastes (e.g. bulky items, consumer electronics, white goods, batteries, oil, tires), and household hazardous wastes.
Industrial	Light and heavy	Housekeeping wastes, packaging, food

	manufacturing, fabrication, construction sites, power and chemical plants	wastes, construction and demolition materials, hazardous wastes, ashes, special wastes.
Commercial	Stores, hotels, restaurants, markets, office buildings, etc.	Paper, cardboard, plastics, wood, food wastes, glass, metals, special wastes, hazardous wastes
Institutional	Schools, hospitals, prisons, government centres	Same as commercial
Construction And demolition	New construction sites, road repair, renovation sites, demolition of buildings	Wood, steel, concrete, dirt, etc.
Municipal services	Street cleaning, landscaping, parks, beaches, other recreational areas, water and wastewater treatment plants	Street sweepings, landscape and tree trimmings, general wastes from parks, beaches, and other recreational area, sludge
Process	Heavy and light manufacturing, refineries, chemical plants, power plants, mineral extraction and processing	Industrial process wastes, scrap materials, off specification products, slag, tailings
Agriculture	Crops, orchards, vineyards, dairies, feedlots, farms	Spoiled food wastes, agricultural wastes, hazardous wastes (e.g. pesticides)

Source: World Bank (1999)

2.1.4 Hierarchy of Solid Waste

a. Solid Waste Minimization or Reduction

Since waste is produced by a range of materials that at some stage becomes redundant to human need; the reduction of waste produced in the first instance should be a priority. Accordingly, Bilitewski et al., (1994) have noted that the concept of waste avoidance encompasses all manufacturing aspects such that the waste is not created or is kept to a

minimum level by the waste producer. Waste avoidance is closely tied to the producer as well as the consumer, and both of these groups have a tremendous influence on waste production and waste avoidance.

Waste reduction may be achieved by effecting changes in the packaging and other waste producing aspects of modern consumer goods, reusing or recycling of redundant material, either at domestic or commercial levels of operation; and replacing non-perishable materials with types that are biodegradable and therefore produce only a short-term disposal problem (Thomas-Hope, 1998). Further, waste minimization has a dual meaning because it refers to measures taken to prevent the generation of wastes in quantity and toxicity level. The players who can be involved in waste generation are the same who will contribute to waste minimization and they include: product manufacturers and industries, consumers, service sector, retail and regulators who play a big role when it comes to waste generation and minimization.

b. Solid Waste Reuse and Recycling

Reuse and recycle are the concepts which can be understood as one strategy for minimizing waste production on one hand, and waste as resource on the other hand. Waste reuse means to find a new use for components that would be part of the municipal solid waste, without the need for reprocessing them (Thomas-Hope, 1998). These products can be either used for their original purpose or for a different one. Some examples of reuse are selling or donation of used clothes, using empty glass containers for candy storage, turn empty jars into containers for leftover food, use of refillable pens, among others. Reuse of junked articles is traditional among the poor people in KLM. In KLM, recycling is not largely developed, but the reuse of bottles for fabrication of traditional medicine is a current practice.

In addition, recycling has also been a long-standing practice at the household level, using basic technology, and often based on highly creative ideas. The commercialization of recycling and recycled items nowadays is currently being encouraged throughout the world (ibid) as recycling strategy. Although, in the KLM, recycling company such as: the steel companies are not yet largely developed. Local communities' organizations are not focused

on recycling activities, but lastly they are assisted by seaward wind of people buying metal scraps for exportation purpose. In the poor communities of the cities in the Developing world, most of the waste is low-grade, comprising miscellaneous tins, bottles, paper wrapping, ashes and food refuse. In such neighborhoods, little is junked that can be further utilized, with the exception of vegetable waste, which can be used for composting (Bilitewski et al., 1994). Much of the collection of materials for reuse and recycling is from higher income communities and commercial areas (Thomas-Hope, 1998). In KLM /DRC, there have emerged recently competitions for potential collection of garbage between the informal collectors which collect waste for their livelihoods and the formal collectors who are working for European Union which are active in the case study.

c. Solid Waste Collection

In many cities in Africa, it is not uncommon for commercial enterprises, industries and hospitals to make private arrangements for the collection and disposal for their waste. Consequently, there is an increasing inappropriate and illegal dumping practice which serves to undermine the objectives of a rational system of waste disposal.

Waste collection is one of important stages involved in integrated waste management systems; it starts when containers are filled with refuse and ends when it is loaded into the collection vehicles or trolleys in KLM (Bilitewski et al., 1994). Bilitewski et al. (1994: 64-66) have developed many different collection systems that can be used including:

- Simple empty method - where standardized portable containers filled with waste are mechanically emptied into collection vehicles or trolley disposed for collection and they are then returned.

- Exchange method - where full containers are replaced by similar empty containers; curbside collection, is very common for collection of refuses in general, and it is based on picking up paper or plastic bags filled with waste, with no necessity of emptying or returning containers.

- Non-systematic collection - usually used for collection of bulky waste of various nature, shapes, and sizes; it can be loaded into the truck either using the containers.

- Vacuum waste collection - it uses a completely vacuum system for waste collection; in residential areas, the waste is thrown into a normal inlet, either indoors or outdoors. In the stationary vacuum system a series of collection points are linked together by pipes, which transport the waste to a central collection station.

- Informal collectors - is a practice of many urban areas in developing countries and also the main method in Kinshasa, the individual collect recyclable refuse from the streets, in commercial and residential areas and also from within landfill areas. These people are usually very poor and collecting in exchange for money and selling the recyclable for earning some income.
  This numbering is really messed up.

d. Solid Waste Treatment and Disposal

Waste treatment and disposal seem to be the last step of solid waste management activities, after collection the waste needs to be treated and safely disposed. Biological treatment 'composting', thermal treatments 'incineration or combusting' and landfill are the main groups of technologies that are used for solid waste treatment and disposal (Bilitewski et al., 1994). Since then, landfill was actually used as a common method or technology solution regarding final waste disposal, but today in developed countries there is common acceptance of use of composting method which has a smaller negative impact on the environment. The trend in developed countries today is to reduce the use of landfill which causes the enormous negative impact on environment and replace them by composting method.

- Methods of Waste Treatment and Disposal

    - Composting

Diaz et al., (1994:103) have defined composting as "the biological decomposition of the biodegradable organic fraction of municipality solid waste under controlled condition to a

state sufficiently stable for nuisance-free storage and handling and for safe use in land application". Composting is today used beyond municipal solid waste; it is often used even for household refuse. Furthermore, the idea of composting is not new. In nature composting has always occurred naturally. When leaves fall from the trees and pile up on the forest floor, they begin to decay due to the microorganisms that start eating the organic material. At the end of the process, the rotted leaves are incorporated to the soil, and the living roots complete the recycling cycle by reusing nutrients from the decomposed leaves (Weingeartner, et al. 2004). Moreover, the main fears that householders usually have about composting have to do with the presence of offensive ordours, the attraction of pests such as mosquitoes and the additional burden involved in separating garbage and managing the compost.

- Incineration

The incineration or energy combustion process with energy recovery consists of the thermal treatment of wastes converting them into a form of energy (Brunner et al., 1994). The waste is destroyed through the use of high temperature, generating energy, gases and solid residuals. The emitted gases and the residuals need proper treatment to avoid pollution and contamination of the environment. In the KLM where a large part of the country is covered with equator forest, the incineration is used also for agriculture purpose to make land more fertile.

- Landfill

Landfill is the oldest but commonly used in suburb areas of the KLM as waste disposal method. It is based on the disposal of compacted waste layers in the surface soils of the earth. The landfill applies a simple technology in which the waste is buried between layers of soil or another covering material. It presents today a huge negative impact on the environment including leachate, the water that has been in contact with waste. There are generated by infiltration of precipitation, moisture from the deposited waste and other forms of water infiltration. Landfill gases are produced by the anaerobic decomposition of the biodegradable fraction of organic matter inside the landfills. Furthermore, methane and carbon dioxide gases are also generated by landfill method (Bilitewski et al. 1994).

These gases can be responsible for explosion and fire hazards, vegetation stress and noxious odours; health consideration, leachate contaminated soil. The groundwater methane and toxic gases polluting the air and proliferation of rats, mosquitoes and other diseases vectors are some of the health concerns involved in landfilling (Johannessen, 1999). Kinshasa local municipality has revealed a gap between landfill and open dumps, the first is the place especially designed for waste disposal, with mechanisms to avoid contamination and minimize health hazards, and the second refers to areas in which the waste is deposited without any protection for the environment and public health.

Table 3: Comparison of Typical Solid Waste Management Practices

Activity	Low income	Middle income	High income
Source reduction	No organized programmes, but reuse and low per capita waste generation rates are common.	Some discussion of source reduction, but rarely incorporated in to any organized programme.	Organized education programmes are beginning to emphasize source reduction and reuse of materials.
Collection	Sporadic and inefficient. Service is limited to high visibility areas, the wealthy, and businesses willing to pay.	Improved service and increased collection from residential areas. Larger vehicle fleet and more mechanization.	Collection rate greater than 90 per cent. Compactor trucks and highly machined vehicles are common.
Recycling	Most recycling is through the informal sector and waste picking. Mainly localized markets and imports of materials for	Informal sector still involved some high technology sorting and processing facilities. Materials are often	Recyclable material collection services and high technology

	recycling.	imported for recycling.	sorting and processing facilities. Increasing attention towards long-term markets.
Composting	Rarely undertaken formally even though the waste stream has a high percentage of organic material.	Large composting plants are generally unsuccessful; some small-scale composting projects are more sustainable.	Becoming more popular at both backyard and large-scale facilities. Waste stream has a smaller portion of compostable than low and middle-income countries.
Incineration	Not common or successful because of high capital and operation costs, high moisture content in the waste, and high percentage of inert.	Some incinerators are used, but experiencing financial and operational difficulties; not as common as high-income countries.	Prevalent in areas with high land costs. Most incinerators have some form of environmental controls and some type of energy recovery system.
Landfilling	Low-technology sites usually open dumping of wastes.	Some controlled and sanitary landfills with some environmental controls. Open dumping is	Sanitary landfills with a combination of liners, leak

		still common.	detection, leachate collection system, and gas collection and treatment systems.
Costs	Collection costs represent 80 to 90 per cent of the municipal solid waste management budget. Waste fees are regulated by some local governments, but the fee collection system is very inefficient.	Collection costs represent 50 to 80 per cent of the municipal solid waste management budget. Waste fees are regulated by some local and national governments, more innovation in fee collection.	Collection costs can represent less than 10 per cent of the budget. Large budget allocations to intermediate waste treatment facilities. Upfront community participation reduces costs and increases options available to waste planners (e.g. recycling and composting).

Source: World Bank (1999)

e. Indigenous Solid Waste Management Practices

There is an increasing awareness on the roles of the indigenous people and their practices on environmental management including solid waste. The indigenous knowledge practices as a type of a practice of the native-born people of any particular area is largely acknowledged by International Organisations such as UNESCO and World Bank as response to environmental

challenges as well as the indispensable practices for sustainable environment. Solid waste management is an environmental domain which has not much developed. Although, there is a change on waste management conceptualisation and technology used; but nothing has changed in practices between local and modern practices. Izugbara and Umoh (2005: 90) have identified some indigenous waste management practices within the Ngwa in Nigeria including:

- Burying

The indigenous Ngwa in Nigeria buried their waste items such as pieces of steel from broken hoes, knives, farming implements, clay pots, animal bones, etc. which are dumped into pit latrines, which are covered up when they fill up. Such items eventually decompose, gradually adding to the iron, nitrogen, phosphorus, calcium, etc.

- Composting

Ngwa composting practice encompasses burying easily degradable waste items in low pits around the farmhouse. Among items include those generated during the processing of food and agricultural produce and animal remains are the commonly composted items. When the waste pits are full with wastes, they are covered with soil, then after decomposition, the pits are dug open and the rich humus soil from them used as fertilizers in surrounding household farms and home gardens for vegetables orange, raffia palm, coconut, banana, and plantain production.

- Burning

Frequently burnt waste items practice among Ngwa comprises rags and fibre sacks which usually carry out under economically valued trees around the indigenous community. This allows the smoke from the fire to kill or drive away pests in such trees. Burning is also carried out near home gardens which allow the smoke from the fire to kill or drive away pests in such trees. Also the pungent leaves are added to the fire to drive away fleas, flies, mosquitoes, and dangerous animals such as snakes and scorpions. Wood and fuel ashes for instance are used in the rural areas of the DRC for fabrication of soap.

- Conversion

The Ngwa conversion is reuse practice. For instances bottles are used in storing drinks, oil, and local remedies and to decorate graves, preserve seeds, store beads, hooks, trinkets, etc. Bottles are also ground into fine sand to be used in smoothing the walls of building and fences thereby preventing climbing and crawling animals in surrounding bushes from gaining entry into houses and rooms.

- Baiting

Ngwa used waste food as baits for household and home garden rodents and pests. Waste from food and produce processing and post-harvest activities are also deposited in surrounding bushes as manure or baits for snails, rodents, and even birds.

- Mulching, scarecrows and animal bedding

Ngwa use old clothes, rags, and fibre sacks are converting into scarecrows which are hung in farms and economic trees to ward off birds and other destructive pests. They are also useful as beddings and sleeping mats for livestock and domestic animals.

- Recycling

The Ngwa use old iron blades, bars, and bits are also often returned to local blacksmiths who forge them into hunting daggers, bullets, spears, and arrows, garden diggers, iron-tipped pegs, hooks, traps, kitchen and carving knives, etc. for those other purposes.

These indigenous solid waste techniques and practices offer to some extent solutions for meeting the challenges and addressing the limitations of current waste management in urban areas, mainly if they are supported by suitable inputs from modern technology.

f. The Concept of Zero Waste

- Overview

There is an increasing restriction of the environmental resources currently confronted by population. However, the society and industrial systems need to start to mimic nature and shift from being mainly linear to being cyclical (Palmer, 2005). Accordingly, Palmer (2005) notes that each material must be used as economically as likely and must be chosen so that it may either return safely to a cycle within the environment or remain workable in the industrial cycle.

In this context that has been emerged in the mid 1970 by Ph.D Chemist Paul Palmer the concept of "Zero Waste" derived from the name of a company called "Zero Waste Systems" (ZWS). It is a philosophy that supports the reshape of resource life cycles so that all products are reused (Winter, 2007). The core constituent to zero waste is recycling which is currently supported by the enactment of government laws to enforce waste hierarchies of reduce, reuse and recycling. Zero waste represents an economical alternative to waste systems, where new resources are continually required to replenish wasted raw materials (ibid). It can also represent an environmental alternative to waste since waste represents a significant amount of pollution in the world.

Zero Waste is the greatest and most cost efficient strategy that local governments can contribute to create green jobs, protect health, reduce climate change, and promote local sustainability (ibid). Although, Zero Waste is today interpreted according to the countries or the areas; there is only peer-reviewed globally accepted definition of Zero Waste which is adopted by the Zero Waste International Alliance (ZWIA):

"*Zero Waste is a goal that is ethical, economical, efficient and visionary, to guide people in changing their lifestyles and practices to emulate sustainable natural cycles, where all discarded materials are designed to become resources for others to use. Zero Waste means designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn*

or bury them. Implementing Zero Waste will eliminate all discharges to land, water or air that are a threat to planetary, human, animal or plant health (ZWIA, 2009 no p n).

This means that if a product can't be reused, repaired, rebuilt, refurbished, refinished, resold, recycled or composted, then it should be restricted, redesigned, or removed from production (Palmer, 2005); Zero Waste promotes not only reuse and recycling, but also prevention - designs that consider the entire product life cycle; it strongly supports sustainability by protecting the environment, reducing costs and producing additional jobs in the management and handling of wastes back into the industrial cycle.

- Goals of Zero Waste

According to the Zero Waste International Alliance (ZWIA) (2009), the concept has three gaols including:

  - Producer responsibility at the front end of the problem: industrial production and design.
  - Community responsibility at the back end of the problem: consumption, discard use and disposal.
  - Political responsibility to bring both community and industrial responsibility together in a harmonious whole.

Therefore, Zero waste is an internationally acknowledged strategy which embark all together the communities, governments, private businesses, NGOs and government and international agencies towards a most effective and sustainable development and an efficient environmental management for the wellbeing of all residents.

2.2 Debates around the Issues of Municipal Solid Waste Management in Africa

This section discusses the main opinions and views in regards to the issues of solid waste management within a third world context. The arguments are briefly presented and grouped into different approaches.

2.2.1 Urbanization and Solid Waste Management

There are scholars that argue that rapid urbanization even faster than municipality's revenues has made many African local municipalities unable to manage their solid wastes. Mbande, (1998) for instance argue that overpopulation in African cities due to people in search of better live and job opportunities generate increasing quantities of waste, and spatial growth compounds the difficulties of transporting the waste out of City area, and encroaches on disposal facilities.

The logic goes that as long as there is increased concentration of people to urban areas, this will result to an increasing, even higher waste generation because everyday activities of people tend to consume resources and produce more solid waste. As people urbanize, they also usually tend to transform their lifestyles to adopt a casual lifestyles which has an impact on solid waste management and it leads to increase amounts of solid waste generated. The high generation of solid waste has given most municipalities no option but to try and address these challenges (Angwenyi, 2002). This is supported by the well known trend that urban population are surging at the expense of rural areas.

The urbanization has resulted in the shaping of unlawful communities in terms of slums. The formation of these shacks is characterised by their dependence on already existing service delivery structures such as local authority. The incapability of this additional population which are mostly poor people to make a payment to the local authority's taxes base adds a burden on existing local municipalities with already limited resources (Mbande, 1998). Local municipalities tend not to provide services resulting to illegal dumping of domestic solid waste on street corners and open areas mainly thrown by poor people. The spontaneity in the formation of these unplanned dwellers due to poor population in the areas is such that shacks are built close to one another, thus this hinders access by solid waste vehicles and workers and also leaves tiny or no space for removal or refuse bags or bins. These conditions do not enable to solid waste workers to perform their duties.

Mungai (1998) has noted that overpopulation also results in either the tenant system or backyard shacks in formal areas. This results in extended families, thus increasing the number of people per site which in turn results in increased solid waste generation. The

increase solid waste generated exerts more pressure on planned and budgeted municipal solid waste management. The objective of many municipalities, therefore, has been and still is to adopt a variety of strategies to manage their solid waste in sustainable manner. The urbanization process is not only an African phenomenon; this trend has remarkably occurred in the post World War II with an increasing number of people living in the urban areas through the whole continent. Generally, this phenomenon is associated to industrialization and development. The trend has exacerbated in many African countries because of post independence political instabilities and conflicts; however this has negative impacts on waste management because of lack of political involvement and appropriate policies.

2.2.2 Management of Solid Waste and Urban Sustainability

The main problem of many African countries is their inability to create strong institutions which can manage efficiently their resources and deliver the services such as solid waste in a sustainable way. Korten (1996) has pointed out that increasing the revenue for waste management is particularly difficult in these countries because of its high levels of poverty. Huge portions of the population are miserable and survive in critical conditions. The majority of them cannot afford to pay for the basic services such as solid waste, water and electricity. They still struggle to get elementary or basic needs. Waste management is elsewhere in the file of their priorities; the institutions in the majority of these countries are also collapsing and it is producing political crisis, conflicts and wars.

Ogu (2000) has commented that solid waste management involves the functional and systemic activities which include: the cleaning, collection, transfer recycling, transportation and disposal. It is the purposeful systematic control of the functional elements of generation onside storage, collection, transfer and transport, processing and recovery, and disposal of solid waste. Blight and Mbande (1994) observed that solid waste management is not considered a priority in developing areas, therefore increasing the revenue for waste management is particularly difficult in these areas. In KLM for example where the majority of population survives on less than one dollar a day; their first priority is food, clothes, and housing themselves rather than environmental protection.

The UN (1996) has reported that large amount of solid waste generated in major areas in developing countries are never collected, and if collected, never disposed of properly. Solid waste management is a critical issue in third world marked by lack of resources, infrastructures and technologies. Schwart et al., (1999) has mentioned that solid waste management is a critical component of providing basic sanitation services and reducing environmental health threats to communities. With the increasing solid waste on the one hand and the limitation of municipal resources on the other hand, the municipalities in developing countries are finding it difficult to manage their solid waste in sustainable way.

Although, many African constitutions and environmental legislations clearly declare local municipality's responsibility to manage solid waste; however, KLM (and many other CPK's municipalities) have met challenges in their effort to do so. Municipality struggles from a lack of citizen awareness and motivation, financial resources, equipment, skilled personnel, and institutional capacity. The large scale of KLM's dumpsites has several health and environmental implications including groundwater contamination, the spread of disease, air pollution, and the release of methane gas. Furthermore, management is about planning, coordinating and implementing. Many local municipalities in Africa lack institutional capacities to coordinate the actions and to manage the stakeholders for sustainable solid waste management. In KLM for example, centralisation of solid waste, lack of powers and responsibilities as well as insufficient financial resources and qualified personal in the local municipalities are the causes of persisting solid waste challenges.

2.2.3 Urban Governance and Solid Waste Management

There is an argument that good governance is a prerequisite to sustainable solid waste management. African countries lack the strong institutions to solve urban problems; while good governance is very crucial for an efficient and sustainable solid waste management (World Bank, 2002). It is resulted from participative and collaborative planning approach which involves stakeholders in the management of their development projects. Governance is the manner in which traditional and institutional authorities in a country are exercised for the common good (ibid). This includes: the process by which those in authorities are selected, monitored and replaced; the capacity of the government to effectively manage its resources

and implement sound policies; and the respect of citizens and the state for the institutions that govern economic and social interactions among them.

Hordijik (1999) has reported that governance comprises of mechanisms, processes and institutions through which citizens and groups articulate their interests, enhance their local resource base , exercise their rights, meet their obligations, mediate their differences and become more self reliant. Most governments in developing countries take reactive rather than pro-active decisions, thus explicitly show lack of co-operation between government and civil society in urban management process.

Good governance is a product of the quality of decisions and actions by public officials and enhances the trust of the public in the policy and its leaders (Harvey, 1989). It signifies the importance of a nexus between the state and the civil society and between the state and the market; however, there is no bottom up and participatory process which involve all society's stakeholders in solid waste management (Mbuyi 1989). Moreover, political instability, dictatorship regimes, wars and economic crisis in Africa have contributed to increasing solid waste; the instable fragile institutions cannot manage solid waste properly. Hordijik (1999) has observed that inadequate management by municipality governments translate into a lack of effective institution and few channels for popular participation. Thus unsupportive legal regulatory frameworks can also constrain sustainable solid waste management in developing countries.

The prerequisites of urban governance include the decentralization, local government reform, and the involvement of civil society in local governance. There are far to be implemented in many African cities characterised by totalitarian regimes. However, in KLM solid waste management is centralised at City Council level; it is still far to think about governance environmental. Further, the new urban governance would like the involvement of all stakeholders such as: private sectors, local communities, Non-governmental Organizations (NGOs), Community-based Organizations (CBOS) and others organizations of civil society in management of the city affairs. There is a need for African countries to embark on new urban management which will involve all society's stakeholders. These exclusion has been

the characteristics of many African cities especially disadvantaged where groups are marginalised and do not participate in the decisions-making of their development processes.

2.2.4 Urban Poverty and Solid Waste Management

Another view states that planning should be a crucial tool for urban management in Africa. It is recognized and broadly known that the composition and the amount of refuse waste generated by a neighbourhood depend on its civilization and the daily capital income. Accordingly, Mbuyi (1989) has noted the inequality in management of solid waste in Kinshasa; while the wealthy communities throw away societies, whereas poor neighbourhoods have less to throw away and are more ingenious in reusing, recycling and refurbishing articles that a wealthier community would throw away. Poverty in all forms is one of the greatest challenges to sustainable development, and urban poverty and environmental conditions are inter-related.

Furthermore, Korten (1996) has pointed out that increasing the revenue for waste management is particularly difficult in these countries because of its high levels of poverty; large portion of the population survives on less than one dollar a day. Most of them cannot afford to pay for the basic services. They battle to feed, clothe, and house themselves. Waste management is out of the list of their priorities. The poor are constrained to live in unsafe conditions, marginalized by non access to basic social services and environmentally sensitive areas where they are exposed to all kinds of diseases.

Poverty means dirty, unsafe and degraded environment; usually waste generation and collection is related to level of income; richer areas of cities have had good or at least satisfactory waste collection system, but in most cases the same does not happen in low-income areas. Accordingly, Angwenyi (2002) has reported that there is also transfer of costs to their areas from high-income areas and location of disposal sites in most urban areas are settled by poor people; because they cannot pay for better services, they have to remain in unsanitary conditions. Urban poverty and environmental conditions are very inter-related; the poor people are constrained to live in marginal conditions because they are poor. This

marginalization of the poor has made them lose confidence in themselves and they are forced to degrade their environment.

Thomas-Hope (1998) has reported that in every urban area in developing countries, a large proportion of the population lives in houses and neigbourhoods with little or no provision of infrastructure, basic services and facilities which are crucial to health in the urban environment, leading to deteriorating quality of life. Poverty does not really means waste, the wealthy areas generate more waste than it is generated in poor areas, the problem is that the collection system does not exist, if it exists for some African cities it is not as regular like it is in wealthy areas.

In KLM for instance, Mbuyi (1989) noted that the rich areas produce more solid waste because they have much to throw away, while poor areas which produce little solid waste remains very dirty because of irregularity or none collection operations. The poor people are very neglected by leaders in developing countries. Besides living in unsanitary environments, poor people are also marginalised in environmental decision-making. However, most of the decisions are made without their approval and in a lot of cases these decisions are harmful to their well being; whatever they say is generally never taken seriously.

2.2.5 Privatization of Urban Solid Waste Management

On the dominant view is that the privatization of urban basic services has not been the solution in Africa, because of increasing poverty intensity and lack of strong institutions and policies which can regulate the relationships between state and private sectors (Kassim and Ali, 2006). Cointreau-Levine (1994) has argued that one of the proven ways of obtaining gains in solid waste is trough the private sector involvement. However, public sector in Africa is manifestly inefficient and inadequate, corrupt and lack capacity to manage their solid waste although traditionally, it has the responsibility to deliver urban basic services. In many developing countries the private sector has stepped in to fill the gap in service provision. Usually local governments are responsible for solid waste management. Due to inefficiency and inadequate capacity in the local government, in many developing countries the private sector has stepped in to fill the gap in service provision.

Moreover, Kassim and Ali (2006) have reported that the private sector was targeted for investigation as a possible solution to the city's solid waste management problems; the private sector plays a crucial role in technologies and skills, mobilization of investment and introduction of new ideas. However, this requires transparency, competition and accountability to be present. The private sector improves efficiency of services and lower costs. It introduces the commercial principles such as limited and well-focused performance objectives, financial and managerial autonomy, a hard budget, and clear accountability to both customers and providers of capital. Angwenyi (2002) has commented that privatization of waste management was not the solution in Nairobi, however, because of growing poverty levels making many Nairobi residents to be unable to afford charges of private companies. The private sector was more after business, however, and was not particularly environmentally proactive. Those who were unable to afford the charges of the private waste management had to opt for community- organized waste management. In third world countries privatization of basic services is a critical issue, because of growing poverty levels making many municipalities to be unable of afford charges of the private companies.

Diaz (2000) has noted that besides poverty, privatization has not worked in developing countries because of government's policies and sprawling poverty levels where only a given class of higher income earners can afford to pay the costs of services. To be effective, privatization of social basic services must be accompanied by strong states which have the clear rules enforceable to everyone in the society, unfortunately most of African states are very weak and unable to gain from privatization. South Africa is one exceptional example of private sector successful in Africa.

Local municipality has responsibility for provision of basic services as enshrined in many African constitutions; privatisation of basic services is difficult to success in African cities characterised by the urban disparities and a higher rate of poverty and unemployment.

2.2.6 Public Participation and Urban Solid Waste Management

Many local projects in Africa countries collapse because of exclusion of local communities in project process; there is confusion between participation and consultation in several African urban areas. In many cases, local communities are consulted or informed about projects, but do not participate. Sanoff (2000) has commented that public participation has unlike meanings for diverse people and even dissimilar meanings for the similar people according to the circumstances. Different users prefer to participate in different ways according to the situation as well. In sustainable development, everyone is a user and provider of information considered in the broad sense. Among the purposes for public participation are exchange of information, conflict resolution, networking, supplementation of planning and design, more user satisfaction, better maintained physical environment, promoting sense of community and increase awareness about a certain problem (ibid).

Further, World Bank (2002) has stated that public participation is a process through which stakeholders influence and share control over development initiatives and the decisions and resources that affect them. It is a voluntary process in which people, including marginal groups, come together with project authorities to share, negotiate and control the decision-making process in project design and management. Participation goes beyond consultation with a greater degree of involvement, but it is based on two-side flow of arguments and idea.

Khumalo (2002) has added that in reality poor people do not merely volunteer to participate, there have to be incentives; thus the incentives had to be provided before the public would participate in an improved environmental management of solid waste service. According to principle 10 of the Rio Declaration on Environmental and development, environmental issues are best handled with the participation of all concerned and affected citizens. One of the causes of failure of government policies is exclusion of citizen in policy formulation and its implementation. Public participation in decisions about development is fundamental in achieving lasting and possible solutions.

Korten (1996) has noted that public participation or consultation is a universal way to recognize and understand different publics, offer them with pertinent and understandable

information and work with them, to resolve their concerns about a proposed project, program or policy. Thus, when people get involved in different community initiatives, they understand the projects better and during this, tend to mind and keep their environments. Public participation has certainly not been effective in developing world because their governance is one where decisions are forced on people rather than being made with the public.

Schwartz et al. (1999) has argued that the public is one of the resources of the nation in terms of formulating and implementing environmental laws and policies. They know very well their environment, because the public works, plays and travels in the environment, each has a personal stake in its beauty, health and permanence, and also they are the generators of solid waste, therefore, they have the responsibility to manage it. This lack of confidence has made difficult partnership between the stakeholders involved in solid waste management in Africa. Loss of confidence between rulers and ruled or leaders and citizens in African countries because of fallacious promises have led to lack of policy support and public participation in policy process.

Solid waste management in KLM necessitates a large public participation and continuing involvement of local community in all phases and processes of the environmental project. Several environmental projects such as solid waste in KLM are centralized either at City Council or service utilities level without local involvement; this make difficult a project to succeed.

2.2.7 Public-Private Partnership in Solid Waste Management

Wolf et al. (1999) has noted that poor management of urban basic services, lack of financial resources, lack of skilled personnel and appropriate technologies by local government in developing countries. The involvement of private sector in environmental problems, rising poverty levels; private sector involvement which is profit driven has forced local government to form a partnership in order to deliver efficiently the services. Partnership stimulate an active participation of all stakeholders, their interest must be put together towards sustainable development; however African cities lack integrated planning for solid waste which involves

all stakeholders involved in solid waste management; if there is somewhere, the texts governing their relationships are not very clearly determined and precise.

The traditional view on service delivery has been that the public sector is the best positioned to provide public services, however, the latter half of the 20th century saw a rethinking of this belief. The private sector became involved in the delivery of services that were previously viewed as the duty of the public sector. One of the ways in which the local governments engage in partnerships with the private sector is through public-private partnerships (PPPs) (Wolf et al., 1999)). Through PPPs private sector entities invest in public services. NGOs and CBOs can also drastically decrease the cost of rendering services, through multiple networks of provision involving active participation of the users.

PPPs are a UN agenda that was put forward as one of the recommendations for agenda 21. Because the local governments are running out of the resources, the private sector has the resources and is willing to engage itself in service delivery. The community is the recipient, and is interested in conserving its environment, the UN through agenda 21 came up with how best these stakeholders can be brought together to promote sustainable development. Accordingly Korten (1996) has argued that for PPPs to work, the interests of all stakeholders must be put together to work towards a common goal-sustainable development. There should be active participation by all stakeholders. This has, however, never been the case in many developing countries because of bad governance systems and lack of adequate resources.

In spite of all the strategies and arguments suggested above for sustainable solid waste management; the situation in developing countries remains shaky and nothing has improved. The issues like privatization are unsuccessful in developing world because of weakness of local institutions in many African countries where environmental regulations are not well enforced and high levels of official corruption. In KLM, Public-private partnerships is far to be successful because of lack of local institutional capacities and appropriate environmental policies which can guide the relationships between stakeholders. However, there is also in PPPs the loss of public control that occurs when a private sector company is involved in financing, building or delivering public services.

2.2.8 Afro-Pessimism and Solid Waste Management

Solid waste management has much succeeded in the developed world. African countries, however, presents a scenario where social, economic and political problems on one hand; and mismanagement, lack of technologies, lack of infrastructure and resources on the other hand is a challenging task for municipalities solid waste management, and have reduced hope to have an environmental clean and safe society. Most local municipalities in Africa such as KLM where the majority of people lives under 1US $ a day; the environmental issues are not really their concern. Therefore, it is often said that African countries require a special and exceptional solution for their environmental problems. Policies successfully implemented in other developed world, may not be equally successful in Africa as a whole (Asiedu, 2002).

However, Rodriguez-Pose and Tijmstra (2007:517) have argued 'that… Africa is in many ways not that different from other developing world', it is the same saying that the solution for developing world is not different from other developed countries. Further, the experience of solid waste management in other African countries is very successful and encouraging such as South Africa, Botswana etc. Many African countries are experiencing some important changes in the way of dealing with their solid waste in spite of their problems. Further, Meldrum (2007) has reported that due to the hard working nature of the people in Democratic Republic of the Congo, the country could have one of the best recycling systems in the world. However, without the existing informal recycling system already in place, the waste management situation in KLM would be truly appalling.

The imported technologies and strategies may not be a response to solid waste management in African cities; the African leaders must also exploit the African indigenous knowledge that are largely neglected to manage their solid waste problems. Solid waste challenges in African cities can be addressed without any external interventions.

2.2.9 Public Sector Capacities and Financial Constrains

Many waste management initiatives in KLM have stressed technology at the cost of management support systems due to institutional weakness and unfortunately the

involvement of politics. This has regrettably been due to a lack of appropriate policy related to efficient waste management strategies and a lack of understanding in implementing programmes (Muzumbi, 2008). However, an acceptable level of service for waste management depends critically on well planned management, operating within an adequate institutional arrangement and capable of generating the financial resources required to meet operating maintenance and investment costs (Hordijik, 1999). Hordijik (1999) notes that among the common weaknesses in existing institutional systems in African public sector are the lack of incentives to do a good job and corruption, untrained staff and poor pay scales. In addition, there is inadequate supervision of workers and inadequate maintenance of facilities; supervisors in Africa often have no means of moving about within their service area, so that effective supervision is very difficult.

Financial constraints are also main issues in third world countries. Accordingly Wolf et al. (1999) notes that the provision of adequate funding for solid waste management on an ongoing basis is a major problem in many African cities; as the proportion of total city budget which is spent on cleansing may be quite large, this implies an effort to improve the overall municipal administration system. However, the money for running the service most commonly comes from the general municipal revenue (Muzumbi, 2008). Direct user charges for refuse services are relatively uncommon, and where they do exist, collection rates are often very low. Although, finance is a real constraint for many local municipalities in the third world countries; public services in most African countries are generally refuge of all forms of incompetency recruited from politicians' relatives and family members once you are in power, corruption and inefficacity are current in the public sector. As a consequence, many local municipalise or institutions spend enormous money to pay for consulting companies while their employed are free at their offices.

2.2.10 Roles of Planning and Local Government within Waste Management

Kinshasa Local Municipality as other local authorities within CPK has a number of responsibilities with respect to waste management. These are related to the delivery of services for the collection of municipal waste; making arrangements for disposal of waste; for making land use provision for the management of all waste streams produced within its area;

and the determination of planning applications for new waste facilities. The different roles of local authorities are not clear and often misunderstood by the public officials and local communities because of inappropriate waste management policies.

The aim of the Government policy on waste is to protect human health and the environment by producing less waste and by using it as a resource wherever possible. Through more sustainable waste management, moving the management of waste up the 'waste hierarchy' - reduction, re-use, recycling and composting, use of waste as a source of energy and only disposing as a last resort - the Government aims to break the link between economic growth and the environmental impact of waste (Thomas-Hope, 1998).

Thomas-Hope (1998) notes that a local government's main responsibilities in managing community waste are to:

a. Arrange for waste to be collected regularly from households; and
b. Store, recycle, or dispose of waste properly.

Other roles include educating and informing their communities of ways they can help manage waste. Kinshasa Local municipality can improve the quality of its waste management services, and cut its costs, by developing waste plans which could allow it to share staff, equipment, and facilities with others local municipalities within City of Kinshasa.

Many local municipalities are struggling to achieve an adequate quality and coverage of their waste services due to budget constraints, lack of cooperation of generators, conflicts between different stakeholders, and the difficulty of managing transport fleets and identifying and managing disposal sites (Wolf et al. 1999). Better solid waste management is important because uncollected waste is an eyesore, blocks drains and is a public health risk. Asomani and Boateng (1999) notes that planning sustainable solid waste management can be complex, but a logical approach and carefully considering the various stakeholders and options will increase the chances of developing an efficient, effective and successful system.

Although, planning seem to be a vital tool for KLM's environmental challenges; a successful integrated planning requires a strong bureaucracy with strong institutions which many municipality within third world lack. Planning encompasses an effective co-ordination of the actions of all stakeholders involved on the projects. Even, some proper governments in developing countries are facing challenges to embark efficiently the process. However, a state such as Democratic Republic of the Congo which has recently came out from political conflicts; where state institutions at both spheres of government are still weak is far to succeed in the partnership. There is a need to strengthen and empower local institutions; this requires more efforts and political determination.

2.3 Conclusion on the Views

Generation and management of solid waste have linked to human history. Human beings are naturally clean and since the beginning the communities are engaged on the protection of their environments. However, the ways they are approaching to manage their environment differ from a country to another depending on local realities. Although, World's current solid waste management is dominated by neo-liberalism philosophy, characterized by efficiency, market lead and privatization which are largely developed in western countries. However, the western approaches seem not be appropriated to some third world countries realities. African history is all of experiments and desertion with many issues apparently unanswered including financial and institutional constraints.

Third world governments are copying ill adapted universal approaches and technologies while rejected indigenous practices. They are not sufficiently exploring and using local inventiveness and strategies, which might go along to recover solid waste management. Imported solid waste management strategies have not effectively solved the problem in many third world countries. Local and adapted techniques involving collaboration with the stakeholders and coordinated by the government would be crucial, informal collectors and the use of indigenous knowledge may respond to the actual solid waste management in African cities. Decentralized participatory management with reciprocal esteem and close collaboration is important.

The African cities in general and KLM in particular; though poor, should develop its own solid waste strategies to their problems in the management of municipal solid waste. Although, there some similarities in solid waste generation; the composition of solid waste developing countries is different from western countries. However, this must influence the correct choices instruments in importing solid waste handling equipment among developing counties. Instead of importing the expensive compactor trucks which are not adapted to local realities. Local municipalities in African with insufficient financial resources may needs no compaction but just needs hauling trucks which might be cheaper and large public participation. Other solid waste management issues that need be taken into consideration include decentralization of basic service such solid waste through subdivision of urban areas into small units in order to enhance management and service provision.

Community involvement through neighbourhood groups of people from middle and higher income groups, informal collectors and private sector can provide the needed solution in mobilization of community-based efforts. Clean neighbourhood groups can mobilize financial resources and engage private groups or hire private trucks to occasionally collect and dispose solid waste from their neighbourhoods. The case of informal collectors in KLM is illustrative which may be combined by the use of indigenous waste management may also be a solution for waste management in many developing cities including KLM.

Other measures include cultivation of a sense of clean environment through clean community awareness programmes. These can go a long way in sensitising people to keep the environment clean. Regular activities such as clean up of the neighbourhoods, schools, parks and roadsides can be effective in changing the “Kinois” attitudes even among the poor communities. In general, the proper management of municipal solid waste is determined by the attitudes of people towards waste, such as the ability to refrain from indiscriminate dumping. Socio-economic characteristics may determine attitudes such as the ability/willingness to recycle solid waste; which however, may be positively influenced by awareness-building campaigns and educational measures to keep city clean and safe.

CHAPTER THREE: THE CASE STUDY: KINSHASA LOCAL MUNICIPALITY/ KINSHASA

3.0 Introduction

This chapter outlines the case of the Kinshasa Local Municipality (KLM) case study used in this research. KLM is out of 24 local municipalities which compose the City Province of Kinshasa (CPK). Prior to analysing the case study, this chapter briefly outlines an overview on CPK such as: a brief history, geographical perspectives, demographic perspectives and evolution of spatial planning development.

3.1 Overview of the City Province of Kinshasa (CPK)

3.1.1 Geographic Aspects

Kinshasa is a city province and capital of the Democratic Republic of the Congo (DRC) located in west along the south bank of the Congo River the second longest river in Africa after the Nile. It is directly opposite to the city of Brazzaville, capital of the Republic of the Congo making them the closest capital cities in the world**.** The city is bordered to the east by Bandundu province, to the west and the north by the Congo Brazzaville and Congo River, and to the south with Bas-Congo Province.

City Province of Kinshasa is located at latitude 4◦C 18'E and longitude 15◦C 18'E. The city is characterised by tropical hot and humid season with a dry season that extends for four months, from the end of May to the beginning of September. It rains yearly for more than 100 days in such a way that there are four main streams that cross the city to the river Congo which include: N'sele, N'djili, Kalamu and Makelele.

Table 4: Average Temperature and Rainfall

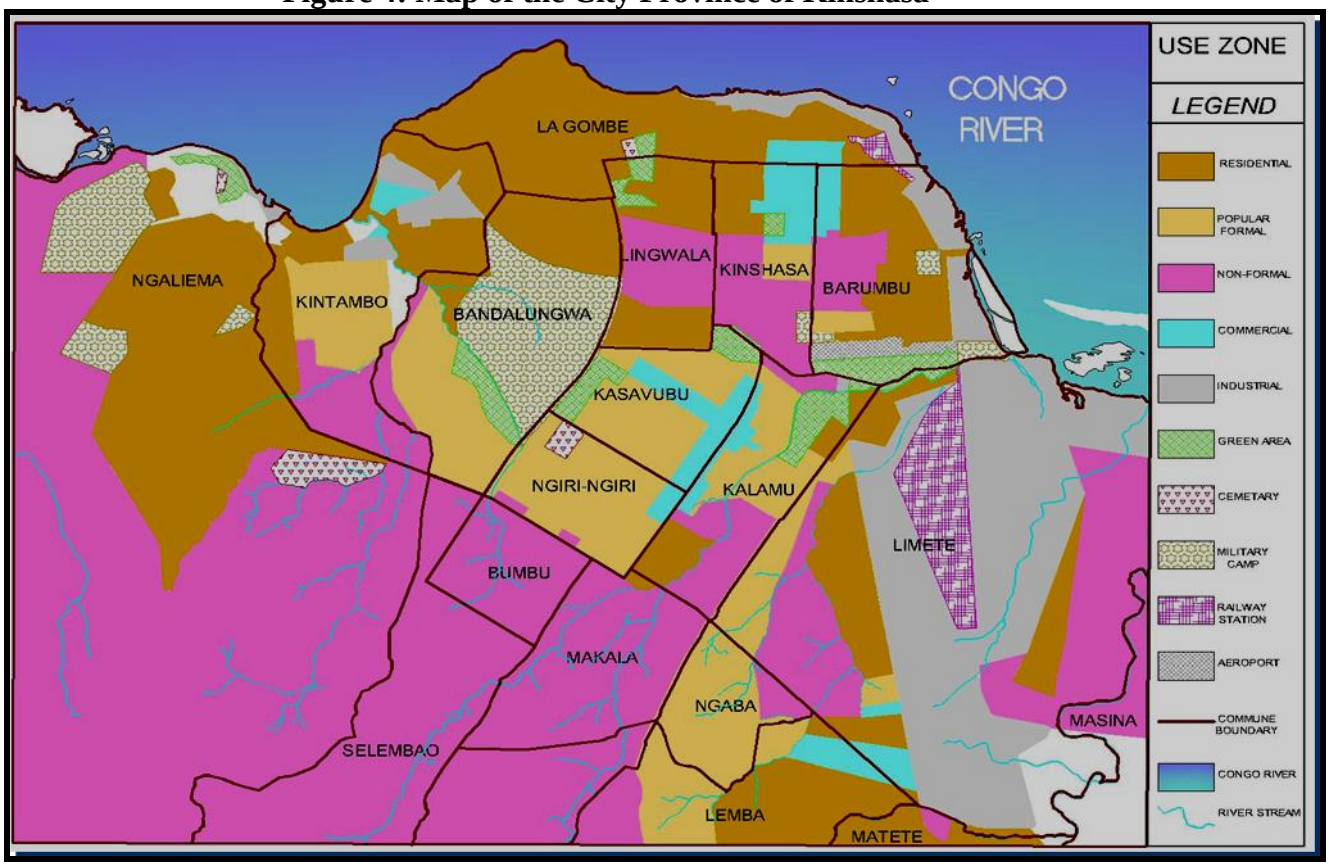
	January	February	March	April	May	June	July	August	September	October	November	December
Min. (°C)	21	22	22	22	22	19	18	18	20	21	22	21
Max. (°Cc)	31	31	32	32	31	29	27	29	31	31	31	30
Rain (mm)	135	145	196	196	159	8	3	3	30	129	222	142

Source: BBC Congolese Weather Service, 2009

The average daily temperature varies between 18◦Cto 32◦C. The high temperature makes decomposition of waste rapid; combined with high rainfall increase the process of leaching, a pollution danger to ground water. There are many cases of flooding in the city, every time there is a big rain. Kinshasa's space covers 9,965 km² of which only 590 km² is urbanized while the rest spaces are peri-urban. Agriculture occupies 94, 07% of the urban space (Mabele, 2004). The business district covers only 150 km² which represents only a population of 100,000 to 200,000 people and the industrial area covers only 1,800 km² or 3, 05% while the norm is about 80 to 100 km² for a city of 100, 000 inhabitants (ibid).

Figure 5 below indicates the 24 local municipalities which comprise the city region; it indicates the residential and industrial areas. The map demonstrates the popular areas and open space areas where development is planned.

Figure 4: Map of the City Province of Kinshasa



Source: Kinshasa City Council, 2007

3.1.2 Historical Aspects

The CPK ‘formerly Leopold’ is established in 1881 by the explorer Henry M. Stanley and led by King Leopold II King of Belgians; as the starting point to link the inland of the Belgian Congo to the Matadi port. This happened when the railways were completed from Matadi to the city in 1898. Further, in 1919, the city was ranked as the Middle Congo’s district capital; and then it became an urban district in 1923 and was promoted to the position of the capital city of Belgians Congo the same year although the decision took effect only in October 1929, Congolese Ministry of Public Works, Town Planning (MPWTP) and habitat as quoted by (Mabele, 2004). The Leopoldville was changed to Kinshasa in 1966, which is the name of the early village occupied area and became the headquarters of politico-administrative institutions of the (DRC) with equal status to province, having 4 districts, 24 local municipalities and 318 neighborhoods.

The city is situated at the heart of Africa, DRC has borders with Uganda, Rwanda, Burundi, and Tanzania to the east; the Republic of the Congo to the west; Central African Republic and Sudan to the north and Zambia and Angola to the south. The country enjoys access to the ocean through a narrow forty kilometer stretch; following the Congo River into the Gulf of Guinea (Mavinga, 1999). It ties with Johannesburg for the status of the second largest city in sub-Saharan Africa and the third largest in the whole continent after Lagos and Cairo, and it is the second largest French-speaking city in the world, after Paris (Meldrum, 2007).

3.1.3 Political and Administrative Aspects

In 30 June 1960, the country was granted its independence from Belgium then, post-independence name was the Republic of the Congo until August 1, 1964, when its name was changed to Democratic Republic of the Congo (to distinguish it from the neighboring Republic of the Congo). On October 27, 1971, then-President Mobutu, the dictator renamed the country Zaire, from a Portuguese mispronunciation of the Kikongo word nzere or nzadi, which translates to "the river that swallows all rivers" (Mabele, 2004). The dictatorship regime was introduced in 1965 when late President Mobutu took power. This economic decline coupled with the decay of supervisory bodies demanded new ways of survival for the population. The collapse of Soviet Union and democratic process in 1990 has changed the mind of many people which will hold government responsible of their problems. In Democratic Republic of Congo and especially in City of Kinshasa it has as consequences the two greatest looting of 1991 and 1993.

Further, the civil war of 1996 and 1997 which took the Laurent Desire Kabila's regime to power, has contributed to further deterioration of the economic fibber. The new authorities did not learn from their previous counterparts. On the contrary, they worsened the situation in trying to exclude political opposition and other Congolese leaders from the management of common interests. With lack of management expertise and political experience, these new bosses have embarked on policies that furthered the decline of economic activities and as a consequence, created another civil war and ethnic conflicts. The consequences of these are that there has been influx of population into the City. These people have left their home villages and come to refuge in the city where they are expect to be safe and secured and to

benefit from government's basic social services absent in rural areas. However, the inability of the city to absorb and to cope with the new urbanism phenomenon, and since the household has increased exponentially, from three or four people per household to ten up to fifteen people per household. As a direct and visible consequence solid waste are dumped everywhere on the streets.

The assassination of Laurent Desire Kabila gave rise to a government of national unity and reconciliation issued from inclusive and global agreement of Sun City with a president and four vice-presidents. The presidential political space with each vice-president is coordinating and supervising a particular commission. It ranges from political, development and reconstruction, social and cultural, to economic and financial, there is an awful need to rethink about solid waste dynamics and potential within the city and try to enhance its environment through the appropriate and practical and integrated planning to curb solid waste issues in the city of estimated 11 million populations (Meldrum, 2007). Little attention has been given to environmental issues, while government's priority focuses on security and reconciliation.

The 2006 elections which brought back Joseph Kabila to power, and in which Congolese people have built their hope, was sold to despair because of multiple alliances which have lead to bad governance and corruption on one hand, and emergence of a new rebellion of Laurent Kunda who was arrested in February 2008 in Gisenyi (Rwanda) and look after by Kagame his godfather. All those security issues have been the focus of government's attention rather than environmental issues or solid waste management which has become a disaster in Kinshasa. These maps below show Congo within the world and African continent.

Table 5: Political Analysis of City Province of Kinshasa

City Province	Kinshasa
Capital (CBD)	Gombe
Premier	Jean Kimbuta
Spoken Language	Lingala
Area	9 965 km²
Estimated Population	11.000.000 (2008)
Density	752,63 hab. /km²
Number of Deputy	59

Source: Kinshasa City Council, 2007

3.1.4 Demographic Aspects

The demographic situation of CPK has changed dramatically over the time; Mabele (2004) states that, Kinshasa is one of the African cities with a high rate of population growth. Although rural exodus was seen then as one of factors of urbanization in the city, the two greatest lootings, political instability, ethnic conflicts, and wars are a major factor which has brought millions of Congolese into Kinshasa for search of peace and to benefit from social basic services which were inexistent in the rural areas (Kinshasa City Council, 2007). After independence from the Belgium in 1960, the city started to experience an influx of migrants from small towns and villages of the country, a trend that was strictly banned by former colonial authorities. Even since, urbanization issue became dramatic as the population growth increased due to both high rate and migration factors. Specially, the 1958 up to 1959 crisis for independence struggle and the civil war of 1960 up to 1965 resulted in a massive influx of population to Kinshasa considered as refuge and secured area, and a safe place rather than the rural areas where robbers were furious and no law was being imposed (ibid).

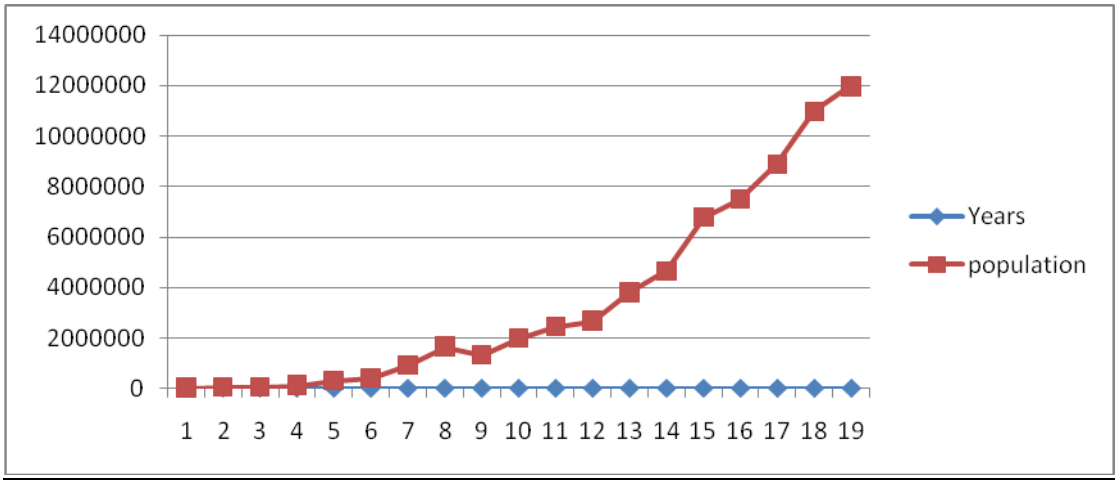
Table 6: Estimated Population Growth of the City Province of Kinshasa

Estimated Population Growth of the City Province of Kinshasa			
Years	**Population**	**Years**	**Population**
1920	1600	**1974**	1 990 700
1936	40300	**1976**	2 443 900
1938	35900	**1984**	2 664 309
1947	126100	**1991**	3 804 000
1957	299800	**1994**	4 655 313
1959	402500	**2003**	6 786 000
1967	901520	**2005**	7 500 000
1968	1652500	**2006**	8 900 000
1970	1323039	**2008**	11 000 000
		2015	12 000 000

Source: Kinshasa City Council, 2007

The above table interprets and analyse the data as provided by different censuses and different authors including: Kinshasa City Council 2007, Cheema 1993, Meldrum 2007, Likengelo 1998, Mafwila 1999 and Muzumbi, 2008. Meldrum (2007) reported that Kinshasa is now a bustling city with a population of about 8.9 million in 2006; although some estimation put the population nearer 11 million in 2008. The above data shows the exponentially increasing of the population in the city of Kinshasa, while its housing capacity is almost the same since 1985.

Figure 5: Graphic Indicating Population Growth in the City of Kinshasa



Source: Kinshasa City Council, 2007

Consequently, this overpopulation in the CPK is raising many challenges for local municipality to deal with issues such as solid waste which became a more perceptible effect of crisis and deficiency in the area. However, for the abovementioned reasons, government's focus was on peace and security rather than development and environmental issues which must constitute today as Congolese's humanitarian disaster.

3.1.5 Spatial Planning Aspects

King Leopold II, King of Belgians who conquered Congo for the first time in 1847 up to 1908, considered it as his own private company, where he was having ownership rights to do all what he wants. In 1885, he confirmed it at The Berlin International Conference held to share African continent. In 1900, he subdivided the city of Kinshasa 'formerly Leopoldville' into two areas including: the developed area where the Europeans colonialists and Missionaries lived on one hand, and where indigenous Black Africans and citizens lived on the other hand (Kinshasa City Council, 2007).

Congolese Ministry of public Works and Town Planning quoted by Mabele (2004) reported that Kinshasa was occupied by constellation of small villages. Starting in 1890 to 1911, there was the construction of a river port and the railway that tied Kinshasa with Matadi harbor. From 1911 up to 129, the administrative neighborhoods (Gombe Local Municipality in northern part of KLM) was built, the city was promoted to the rank of the capital city of the Belgian Congo in October 1929, and finally, the development of housing and industry was constructed around the port and rail station.

From 1929 up to 1945, the construction of the old neighbourhoods of Lingwala and an industrial area in Gombe; the construction of Ndolo airport and the extension of an industrial neighbourhoods until near the river port of Funa; the reinforcement of the business district, the extension of the city towards the south-east; and the construction of N'djili airport, took place (Kinshasa City Council, 2007). Starting from 1945 up to 1960, there have been constructions of planned neighbourhoods of Bandal, Yolo, Matete, Lemba, the industrial area of Limete, extra-customary of N'djili and the University of Kinshasa in the south. From 1960

to 1985, there has been extension of spaces between neighbourhoods. The city has experienced also peripheral extensions on the valley sites (ibid). From 1985 up to 1999, there have been east extensions of neighbourhoods beyond the N'djili airport, south extensions on the Mont-Amba valleys, and west extensions following the Matadi route towards Kimbondo (Kinshasa City Council, 2007); however, abovementioned extensions are not responding to urbanism norms.

In fact, in 1960, after independence occurred enormous changes occurred when Democratic Republic of the Congo acquired freedom. The fundamental law set up new political and administrative laws of the country and at the same time, retained some legislative and regulatory arrangements of the colonial epoch including the decree of June 20th 1957 on urbanism, the decree of October 13th 1957 on the organization of cities (Mavinga, 1999). Residential neighbourhoods that were previously occupied by European became gradually occupied by new political elites (Kinshasa City Council, 2007). In post-independence era, most of measures that were imposed by the colonial administration to restrict freedom of movement and establishment of so-called "indigenous" people disappeared, which resulted in exodus of young rural people previously limited access to urban centres due to colonial policy in search of better life.

In 1965, Mobutu took power by coup d'état and included planning as one of his aspects of urban policy. In his speech of December 12th 1965, stated that the immense increase in population into Kinshasa created a lot of urban challenges. Although, through Mobutu's different speeches, he stated his priority in planning to respond to urban challenges; however only in1988 that he established a department of Urbanism and Habitat which started dealing effectively with urbanism issues in Congo 'former Zaire' cities, and Kinshasa in particular.

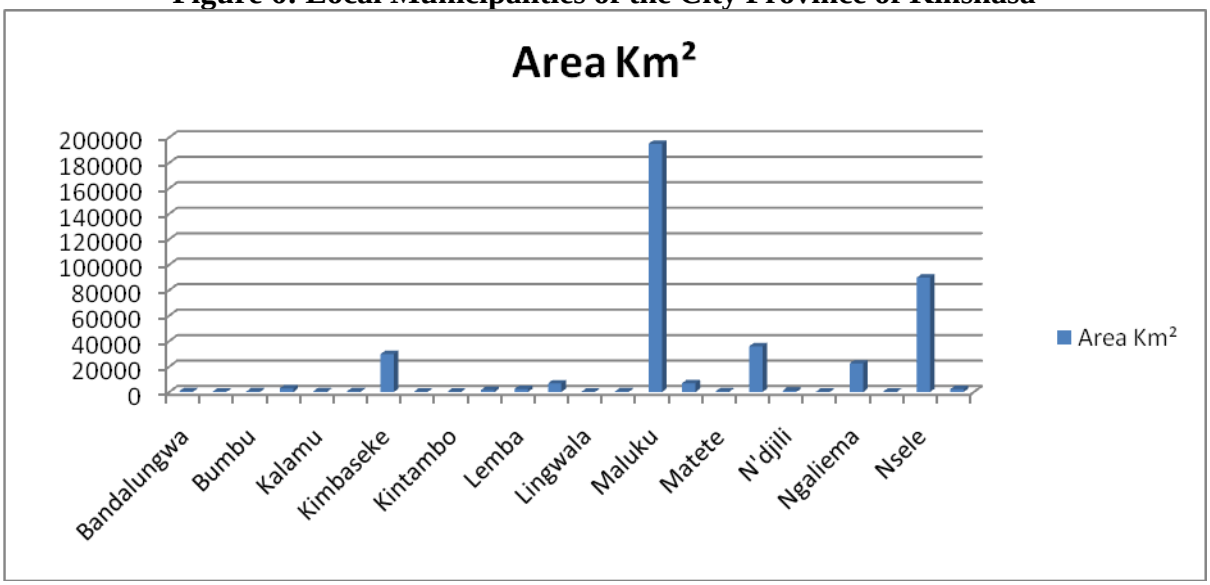
Kinshasa Province City is divided into four urban districts municipalities which include: Funa, Tsangu, Mont-Amba and Lukunga. They consist of 24 "*Communes*" local municipalities; each having 8 communes under its supervision. The case study area Kinshasa local municipality is one of 24 municipalities which compose city of Kinshasa

Table 7: Local Municipalities of the CPK

Local Municipalities	Area Km²	Local Municipalities	Area Km²
Bandalungwa	6,82	Lingwala	2,88
Barumbu	4,72	Makala	5,60
Bumbu	5,30	Maluku	1,948,80
Gombe	29,33	Masina	69,73
Kalamu	6,64	Matete	4,88
Kasa-Vubu	5,04	Mont-Ngafula	3,58,92
Kimbaseke	2,97,78	N'djili	11,40
Kinshasa	2,67	Ngaba	4,00
Kintambo	2,72	Ngaliema	2,24,20
Kisenso	16,60	Ngiri-ngiri	3,40
Lemba	23,70	Nsele	8,98,79
Limite	67,60	Selembao	23,18

Source: Kinshasa City Council, 2007

Figure 6: Local Municipalities of the City Province of Kinshasa



Source: Kinshasa City Council, 2007

3.2 Description of Case Study: Kinshasa Local Municipality (KLM)

3.2.1 Locality Aspects

Kinshasa Local Municipality case study is one of 24 municipalities within the City Province of Kinshasa situated to the north of the CPK in the Democratic Republic of Congo. It is located in the heart of the City province of Kinshasa. It accounts an approximately 2.98 Km² area. Municipality is bordered to the north by Gombe municipality; to the south by Kalamu and Kasa-Vubu local municipalities; to the east by Barumbu local municipality and to the west with Lingwala local municipality.

The figure 8 below indicates the head office of KLM which located to the corner Kabambare and Kasa-vubu Avenues. This illustrated build of one floor with less than 20 offices accommodates all local departments and special detached services such as: Migration General Direction (DGM), Police Services and National Investigation Agency (ANR)

Figure 7: Head Office of KLM



Source: BERCI, 2005

The KLM is very a poor local municipality within city province of Kinshasa in terms of water resources such as streams and watercourses. Although, KLM has only the Bitshakutshaku

River and Cabu channel which are flowing to the Kalamu River. However, the area is marshy the crossing corridor for several river from others local municipalities flowing into the Congo River (Muzumbi, 2008). KLM was built in coastal area making it floodplain and clay soil because of gutters and water corridors. There are several cases of flooding in the area, every time when there is a big rain. The average daily temperature varies between 25◦Cto 45◦C which make breakdown of waste rapid; combined with high rainfall increase the process of leaching, a pollution danger to ground water.

3.2.2 Historical Aspects of KLM

Kinshasa Local Municipality is out of 11first urban areas created by colonial authorities in 1957 three years before Congolese independence by decree of General Governor n° 21/429 of 12/10/1957 related to names and area limits of CPK formerly Leopoldville (Mavinga, 1999). However, the municipality since then is inhabited by Black Indigenous and considered as "indigenous city". In her existence since the founding of Leopoldville former name of CPK, the KLM became with Barumbu municipality and Lingwala municipality part of the city developed indigenous beginning of the twentieth century. The area was once the 1940s linked to the historic heart of City Province of Kinshasa, now situated at Kintambo, from the *Boulevard du 30 Juin*. He gave his name to the whole city in 1966.

3.2.3. Demographic Aspects

The table 8 below breaks down demographic perspectives of municipality. The Kinshasa local Municipality consists of 7 wards including: Aketi, Boyoma, Mabimba, Mongala, Djalo, Pende and Ngbaka. Local municipality accounts 44 streets and 9 avenues.

Table 8: Demographic Aspects

Municipality	Kinshasa
Burgomaster	SAPU KALIMASI
Spoken Language	Lingala
Area	2,67/km²
Estimated Population	84.558 (2004)
Density	28.186/km²
Number of Households	4.000 (approximately)

Source: Kinshasa City Council, 2007

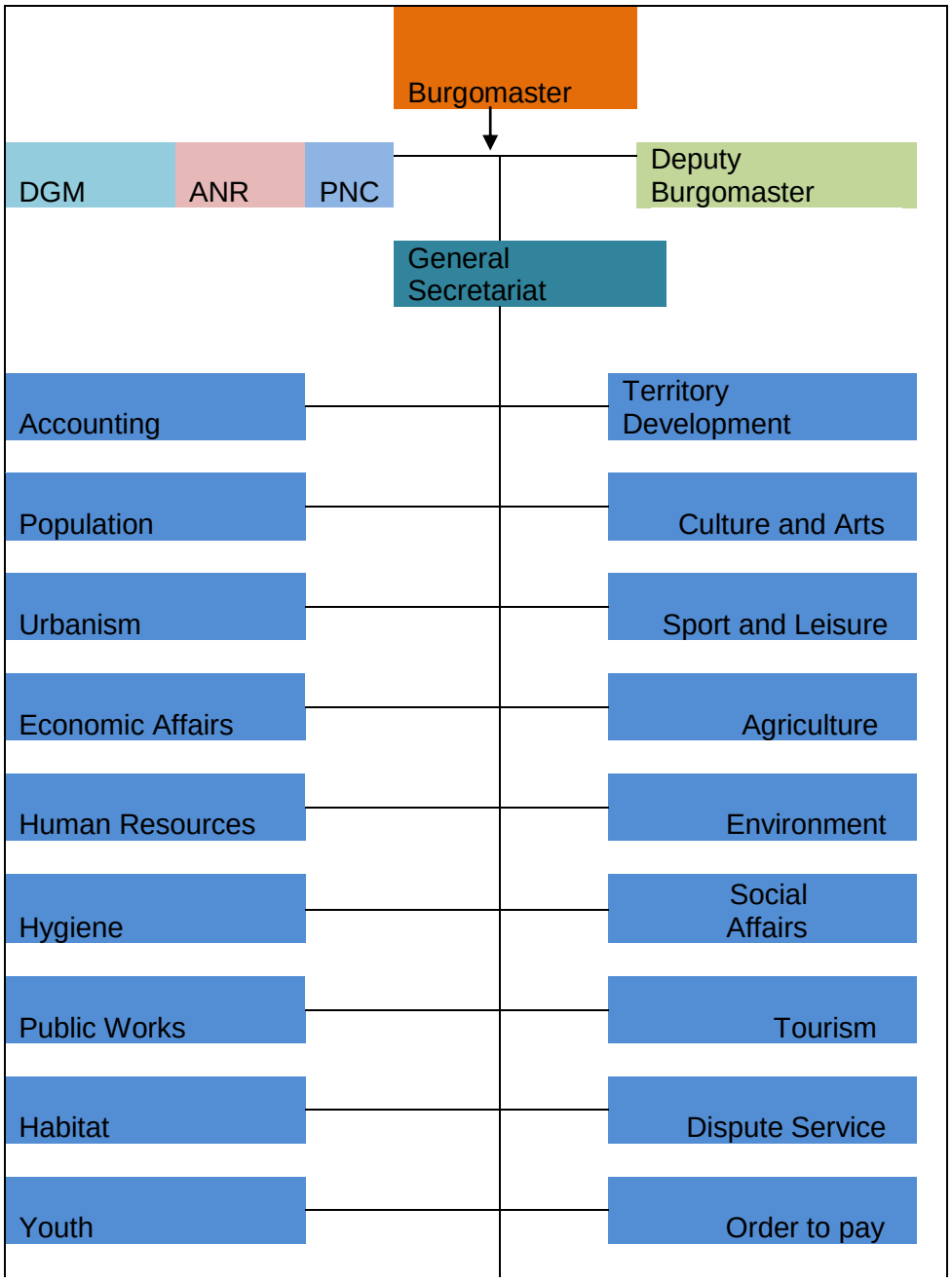
In 2004, Kinshasa accounted approximately 84.558 people which consist of 75.502 and 9.056 foreigners (ibid). Kinshasa Local Municipality is the fastest growing and busiest area within the City province of Kinshasa because of its geographic and strategic position in the CPK. Every day; about half of population of City province of Kinshasa frequent KLM area for diverse raisons; this make it the dirtiest area with higher crime level, noise and dust pollution and traffic congestion. The people arrive in the KLM early in the morning about 6hoo and at 6hoo pm. After work hours, the area remains empty covered by the "*Chegues*" (Homeless).

3.2.4 Politico-Administrative Aspects

As indicated in the above section, the CPK comprises 24 local municipalities. Every local municipality is managed by a Burgomaster which is assisted by a Deputy Burgomaster and special services such as: National Police Service (PNC), Migration Service (DGM) and Investigation Service (ANR). Each local municipality has its decentralised entities called *quartier* (ward). The twenty four local municipalities within the city province of Kinshasa have the same organisational structures which include 21 units. As indicated in the organogramme below; Kinshasa Local municipality as other local municipalities has also twenty-one (21) units which encompass: accounting, marital status, population, culture and arts, economic affairs services, agriculture and development, human resources, environmental services, social affairs service, hygiene, community development, urbanism, sport and leisure, budget and control, order to pay, youth, dispute service, habitat, tourism, public works and territory development.

The above services will not wholly discus here, only those which are the most concerned with solid waste management at municipality level. This include: environment, hygiene, urbanism, budget and control service. It is in then on the basis of these elements that each of this department will be discussed separately in order to understand their roles in dealing with solid waste management at municipal level

Figure 8: Organogramme of Kinshasa Local Municipality



Budget & Control	Marital Status
Public Works	

a. Environment Unit

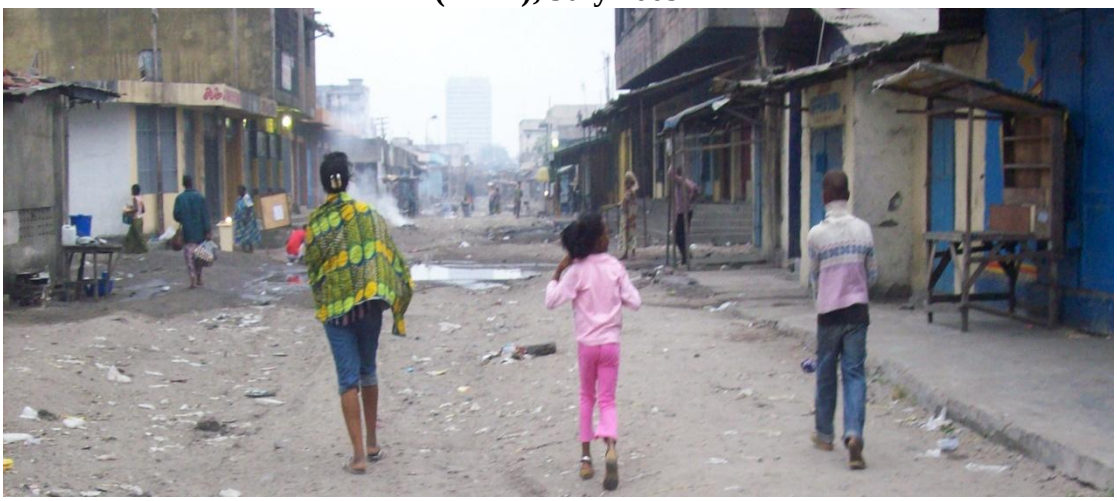
This unit is called a technical service of the environment. It has three services which are the conservation of the nature, maintenance of the city, cleaning up of the area, gutter, waste management, maintenance of the toilets; and continuous surveillance and control of places such as shops, drinks stores, cold rooms, terraces, hotels, bakeries etc… the surveillance is limited only to the recording of the facts at the division level. For the cleaning, the unit has to control the different establishments that are there. However, the effective collections of solid waste in done at council level especially by National Programme of Cleaning (PNA) '*Programme National d'assainissement'*. The centralization of solid waste in Kinshasa is one of the causes of continuous challenges of solid waste in Kinshasa.

b. Urbanism and Habitat Unit

Urbanism unit at municipality is the eye of the urban division of urbanism. It attends to the urbanism norms at the municipality level to avoid anarchical constructions. Its functions range from demarcation of lots, demolitions, construction, verification of additions of spaces, protection of the sites, green spaces or park of attraction. It is the unit within municipality level which play the planning roles. It is the unit which make the propositions for urbanism policy; unfortunately, their propositions are not put in consideration at the ministry of urbanism and habitat at national level.

The figure 10 below indicates one of mostly used solid waste management strategy in KLM. The solid waste is being burned in Greater Market (Kato) one of the areas confronted by solid waste challenges in the KLM.

Figure 9: Pollution of Solid Waste in Great market (Kato); corner Plateau and Mbomu (KLM); July 2009



c. Hygiene and Safety Unit

This unit is also important within the municipality. It deals with people living in the municipality. It promotes people's access to adequate, safe, appropriate and affordable water and sanitation services use water wisely and practise safe sanitation. It controls Water supply and ensures sanitation services are sustainable and are provided by effective and efficient institutions that are accountable and responsive to those whom they serve. Water is used effectively, efficiently and sustainably in order to reduce poverty, improve human health and promote economic development. Water and wastewater are managed in an environmentally responsible and sustainable manner.

d. Budget and Control Unit

Budget and control is actually the key unit within the municipality, because it is the finance unit of the municipality. It is the unit that receives payments from different taxes, charges and fees at the municipality level. Budget is the core of the municipality and local authority. The functioning of municipality depends on how this unit is managed. This Unit is subdivided into two units which include: finance and budget. The finance sub-unit is composed of the delegated officials entitled to make payment, a bookkeeper, who is a *cahier*, an assistant bookkeeper, an assistant tax-controller, two tax-controllers; however, the budget sub-unit comprises the authorized agent who is the controller of the expenditure and three auditors.

Regarding the expenses executed, the authorized agent who controls the expenditure is the key person he (she) is the chief of tax revenue and expenditure, executes and makes the follow-up after each quarter, and furthermore makes the assessment in statistics terms, makes the reports that is handed to his or her hierarchy for decision to be made. Therefore he or she is the controller. When the local authority wants to make any expenses, it must apply to the authorized agent and it is then up to him or her to decide. If the authorized person is absent, the local authority who is the main person is entitled to make a direct expenditure and can ask the bookkeeper to make a direct expenditure that the latter will have to justify to the authorized person before 48 hours, otherwise it is considered as wastage. It is bookkeeper who must bring justifications because of his cashier status.

The discussions with local authorities within the Kinshasa Local municipalities have revealed that the entity has elaborated several development programmes and importantly willing to undertake its development process. However, KLM is confronting by enormous funding challenges. According to the Constitution of the Democratic Republic of the Congo dated 18 February in its articles 229 and the Law no 08/012 dated 31 July 2008 acknowledge that the DRC is decentralised state; however, the provinces and local municipalities have full administrative and financial autonomy.

The main KLM's budget revenue is briefly discussed below including patent, taxes and retrocession:

- Patents - A huge amount of many are collected through official documents such as: marriage certificate, birth certificate, testimony of lost of identity document, diverse legal authorisation documents etc.
- Taxes -KLM also collects money through taxes in the different markets under its jurisdiction, small, middle medium enterprises SMMEs, and small industries, social and commercial establishments etc.
- Retrocession - KLM received about 40% retrocession from central government of taxes and levies collected in the areas of their jurisdictions mainly for the big companies and industries located in their entities.

The interview with Norbert Kima Watete KLM administer on 21 July 2009 has revealed that only 5 local municipality out of 24 which compose Kinshasa city province have benefited 40% retrocession from the city province of Kinshasa. In addition, corruption which starts from the head of the municipality followed by unpaid official at all levels of hierarchy particularly collectors and controllers make the situation more difficult. Less than half of the taxpayers pay the total amount due. This makes the local municipalities more vulnerable, insufficient and unable to tackle the urgent challenges such as solid waste management.

3.2.5 Economic and Social Infrastructure Aspects

Although KLM do not have industries and factories, however, it is the centre of commercial and economic activities of the city province including shops, stores, etc. Municipality has two major markets of the CPK including Great market (Kato) and *Somba Zikita* market; It accommodates the top Congolese's Stadium (*Stade de Martyrs*) and Cardinal Malula Stadium, botanic garden and Zoo. KLM is one of the areas within the City province which attracts many tourists and inhabited by many foreigners (Indians, Chinese, Libanese and West-Africans).

According to International Consulting Office of studies and Researches (BERCI) 2004, the main social infrastructures within the KLM including:

- 23 primary and pre-primary schools.
- 22 high schools.
- 7 private colleges.
- 1 clinic and approximately 55 medical centres.
- Community facilities.
- Two stadiums (Martyrs Stadium and Cardinal Malula Stadium).
- Several Non-government Organisations (NGOs) and Communities Based Organisations (CBOs) in all sectors; and
- Several churches.

The main issues and challenges confronted by KLM include:

- Waste and insalubrities because lack of waste cleaning and collection.
- Dilapidated of basic infrastructure such as roads etc...
- Obstruction of main gutter which cause repeated flooding during rainy season.
- Soil erosion.
- Crime, particularly in the Kinshasa great market.
- Chegues (homeless) problems; they are responsible of approximately 90% of crime committed in the Great market; and
- Poverty and unemployment.

3.3 Legal and Institutional Framework of Solid Waste Management in KLM

The Kinshasa local municipality is currently experiencing various kinds of environmental challenges. The amount of solid waste generated in the local municipality has been increased steadily over the last decade due industrialisation process, urbanisation and concentration of activities (Mazumbi, 2008). Several legal dispositions and institutions have been established since colonisation to manage effectively solid waste in the Democratic Republic of the Congo in general and KLM in particular. The section below discusses legal and institutional framework related to waste management.

3.3.1 Legal Framework for Solid Waste Management in the DRC

The Congolese government has issued series of legal instruments stipulating solid waste management to protect the environment. This report has listed the most important environmental documents related to solid waste management and therefore affects KLM (see appendix 10).

There are others international legal instruments ratified by the Democratic Republic of the Congo which are protecting the environment and they will not be discussed here. The content of legal framework for waste management in the Democratic Republic of the Congo in

general and Kinshasa Local Municipality in particular is summarised into four main pillars counting the main source of the waste include: household waste, agricultural waste, industrial waste and urban transportation waste.

The Congolese positive law has predicted specific modes of waste management depending to the categories of waste. As the focus of this study was household solid, the analysis will be limited accordingly. Regarding household solid waste management; the article 1 and 2 of No 74/345 dated 28 June 1959 and Decision No SC/0034/BGV/COJV/CM dated 18 April 1998 related to decontamination disposition and public health protection predicted three mode of management including: collection, burying and removal. The sanctions under penalty of contravening include administrative penalty, civic penalty and criminal penalty as well as strict respect of principle of "polluter pays for pollution".

Most legal instruments in the Democratic Republic of the Congo are dated from colonisation epoch which demonstrates that Congolese post-colonisation does not accord much importance on environmental issues. However, the environmental risks have systematically increased last twenty years resulting post independence urbanisation and industrialisation process. In addition, another factor which has led to environmental degradation in post-independence of the Congo includes post-independence political crisis and civil wars. The attention of politicians was mostly focused on political issues rather than environmental issues.

3.3.2 Institutional Framework for Solid Waste Management in KLM

The major government authority responsible for environmental affairs in Democratic Republic of the Congo is the Ministry of Environment, Tourism and Nature Conservation currently managed by Minister Jose Endundu with its three main administrative units assigned to undertake the state management in waste including:

a. Ministry of Environment, Tourism and Nature Conservation: as custodian of environmental management in DRC is responsible for promotion and coordination of

all environmental related activities in the DRC. It provides technical advices and strategies for an efficient environmental management in DRC.

b. National Programme of Cleaning up (PNA) is a national agency responsible for decontamination and public health. The PNA's responsibilities include contending the vectors, sold waste collection and transportation and roads cleaning.

c. Office of Roads and Drainages (OVD) is also a national agency responsible for water drainage and soil erosion.

d. National Service of Rural Hydraulic (SNHR) is responsible to manage watercourses; it is mostly operational in rural areas of the Democratic Republic of the Congo.

In the provincial level, there is City Council with its three main administrative units assigned to manage waste including:

- Urban Brigade of Cleaning (BUA)
- Urban Coordination of Environment (CUE)
- Urban Division of Urbanism and Habitat (DUUH)

There is also City Council (Hotel de Ville) who is coordinating all environmental activities in the City province of Kinshasa through its three abovementioned administrative units (urban brigade of decontamination, urban coordination of environment and urban division of urbanism and habitat). All local municipalities CPK have an environmental unit which is responsible for managing all environmental related issues within municipality jurisdiction. It operates independently to national agency.

3.4 Solid Waste Issues in Kinshasa Local Municipality (KLM)

Municipality is experiencing enormous waste management challenges because of its strategic and geographic place within CPK (Mbungu, 2004). This is also the consequences of political instability and vitality of the public service organs of last three decades in the Democratic

Republic of the Congo. The causes of solid waste management challenges in the case study are associated to several factors including: demographic explosion, increasing urban activities in the area; poor public services; inappropriate infrastructure (tarmacadam roads with lots of potholes); soil erosion and illegal construction and extreme poverty (Nzuzi, 2008). A walk on any street in the KLM; there are issues of illegal dumping; illegal refuse alongside of the streets; gutters, water streams and drainage channel blocked, informal burying sites menacing human health of the residents; bad smelling ordour and pollution; inadequate collection of toxic waste etc. which have real consequences on health hazard of the municipality' dwellers.

The figure 11 below indicates unprotected river in the area where householders living along it use to throw their wastes. This cause serious health risks including spreading diseases and pollution in the area.

Figure 10: Drainage Channels at Bitshaku-Tshaku River Next to 24 November Stadium, July 2009



The National Cleaning Programme (PNA) and the Office of the Roads and Drainage (OVD), commutatively government service utilities currently transformed to the public enterprises are responsible for solid and liquid waste management in the area. They are currently experiencing enormous challenges since last two decades exacerbated by war period (1996 – 2006). However, volatility of management organs, corruption, rear/poor/unpaid salaries, lack of the appropriate equipments, unskilled unemployed are making the tasks more difficult.

Consequently, the PNA and OVD are not able to fulfill their legal responsibilities which consist of environmental management particularly solid and liquid waste management.

In the next three decades which have followed the Congolese independence; the PNA and OVD were well equipped and liquid and solid waste issues were well addressed. However, in last 20 years the situation has worsened because of lack political involvement and absence of public environmental awareness. The discussions with the residents of KLM have revealed that, after drinking and eating foods which has a packing; when asked to the *Kinois* where they dispose of packing or refuse (plastic, bottle, paper etc.). The majority of residents said, they throw them of in the Rivers, streets, open spaces, illegal dumping, in the drainage channels, in the gutters etc. The quasi-totality of the streets in KLM is without dustbins. The interview with stakeholder in Kinshasa local municipality on 23 July 2009 has revealed that lack of dustbins is also a concern in the area; one of interviewee states that: "… *I throw of my refuse in the streets to challenge City Council; I do not have dustbin, so I have to put it in the streets, they will come and collect it*".

The figure 12 below shows the informal dumping next to *Soba Zikita;* the second biggest market in the area specialised in food market. This area is a place of refuge of all refuses from market which cause air pollution and eventually health hazard for the business owners.

Figure 11: Informal dumping in Soba Zikita Market, Bokasa Street Opposite Ndolo Airport in the South of the KLM, July 2009



In 2001, a report on Congolese Children and Women's Survey has revealed that household wastewater in Kinshasa is managed as follow: 7.55 use sewerage; 25.45% use rainwater gutters; 1.5% use wells, 17.4% use the hole; 45.2% throw of in the streets or parcels and 3.1% use other techniques. The three first techniques are considered as hygienic which represent 34.4% while the rest are considered as unhygienic (RDC, 2001). For solid waste management, the report revealed that: 29,1% by organised public or private service; 6.4% by incineration; 14.6%; by burying; by throwing in public open space 6.2%; 6.6% by watercourses; 21.6% illegal dumping; 11.6% by composting and 3.9% for other strategies. However, the total of solid waste management considered as hygienic are 61.7% and the rest are considered as unhygienic (ibid).

Consequently, during the rainy season in KLM, there are repeated cases of flooding, smelling which cause health hazard, mosquitoes etc. It is estimated that 88% of sickness cases in the City province of Kinshasa are resulting from unsanitary conditions (Nkeku, 2007). Further, Albion Environmental International, English International Environmental Consulting Company believes that the preservation of lives and prevention of diseases resulting from inadequate waste management facilities and policies in municipality must be addressed first before commercialization can be considered (Meldrum, 2007).

In regard to abovementioned issues, the KLM's dwellers describe their area as "*un cadavre*" (a cadaver), "*une epave*" (a wreck) and further to nickname it as "*Kinshasa la poubelle*" (Kinshasa the dustbin). Devish (2003) estimates that, less of 5% of the "Kinois" (nickname of KLM dwellers) have a permanent job with a regular salary; poverty and unemployment are also are the major causes of solid waste in the study area. The quasi-totality of *Kinois* survives with so-called "*debrouilladise*" (resourcefulness). Every day the *Kinois* are present busy in Great Market (Kato) buying, purchasing and doing other small jobs for their daily livelihoods which generate more solid wastes.

In KLM for example, papers, plastics and ashes should compose approximately 80% of overall solid waste generated (ibid). However, an efficient solid waste management will bring about various benefits to the societies such as increased health standards, reduced risk of flooding, pleasant and clean environment among others. Pavement areas are generally not

surfaced and are frequently covered in mud and waste (Muzumbi, 2008). This then pushes pedestrians out onto the road. A lot of transport is provided by hand carts which again use the side of the road. Bicycles are rare and so are motor bikes.

The figure 13 below indicates the state of drainage systems in KLM; most open gutter within the area is blocked because of ashes and solid waste. This cause flooding especially during rainfall and has dangerous health risks include increasing mosquitoes which has cumulative consequences on spreading of malaria, typhoid etc.

Figure 12: Open gutter blocked with ashes solid wastes in the corner Huillerie and Kato Streets in the west of KLM, July 2009



Due to the high incidence of rainfall in the area the roads have been provided with large drainage channels, some up to 1m wide by 2m deep along either side of the road. In most places these drainage channels are filled to ground level with waste and dirt which has washed off the roads. Where drainage channels have been cleared they are generally operational with minor repairs. Further, drainage and watercourses are frequently blocked with waste. This causes significant issues during the rainy season, where it is estimated that between 100 – 150 people die in the cit y every time it rains (Muzumbi, 2008). If the waste was managed and collected properly, it would not get into the drainage system and this high mortality rate could be avoided.

The figure 14 above is indicating the state of drainage channels in KLM. As discussed in the above paragraph; lack of dustbins and disposal systems; majority of the householders throw of their refuses in the drainage channels, so they can be removed during rainfall.

Figure 13: Untreated Drainage Channel in the corner Mbomu and Bokasa; July 2009



As most of the drains and watercourses are blocked with waste the water is contaminated. The solid waste also provides breeding conditions for mosquitoes which are sources of epidemic such as malaria. The water in these drainage channels and water courses are used by the local people and it will contain: contaminants for example metals from the breakdown of waste; bacteria from the breakdown of solid waste; conditions that are an ideal breeding ground for mosquitoes. The number of people killed each day from chemical or bacterial contamination of the water or from malaria is unknown but is likely to be significantly higher than the numbers killed by the flooding (Muzumbi, 2008) as consequence of solid waste uncollected. One of the priorities must be to clean out and collect all the solid waste so drainage channels and that they should be kept clean prior to the next rainy season. Therefore, inadequate solid management practices are a threat to public health and the environment. Crude tipping and other undesirable practices pollute air, water and land, fostering the proliferation of disease-carrying vectors that directly or indirectly may have an

adverse effect on public health, sanitation personnel, and those who scavenge the refuse to salvage saleable or other materials considered to be of some use.

Furthermore, the power supply in the city is poor with frequent interruptions. This has little impact on solid waste management apart from disrupting of communications. The power supply network is particularly poor both in terms of standard of installation and condition. Many people within the city also die from electrocution, and frequently this is caused by the flooding discussed above, connecting with the live uninsulated cables which are present. This causes the serious problems to informal collectors which are active in Kinshasa to properly do their jobs. Every household throws out its solid waste during the rainy season, so the waste can be carried out by rain water which and used to block the drainage channels with immediate consequences flooding.

Figure 14: Illegal Dumping at Drainage Channel in the corner Mbomu and Bokasa Streets at the centre of the KLM near Great Market; July 2009



The existing waste management infrastructure is very limited; however there are improvements being put in place. The current system relies on hand carts to collect waste and transport it to temporary transit sites. These transit sites do not appear to be temporary and it is clear there is waste at the road side, within the areas where people grow food crops, alongside rivers and drainage channels. The council now has ten trucks to try and clear waste away. All are loaded by hand, and with waste not being bagged, it is time consuming and difficult. Efforts are being made to clean out drainage channels however the wastes from

these channels are very wet and difficult to handle. The main transit landfill is on fertile agricultural land. As the area is filled, houses are being built on the waste. The site also has a population of resident scavengers who will be exposed to additional risks.

Therefore, the waste management system for Kinshasa has most of the pieces of the waste management "jigsaw" missing (Meldrum, 2007). The main part missing is a secure, engineered landfill site. There are other important parts missing for example, no collection infrastructure etc.; however without a secure landfill disposal point the problem will only be moved around the city. As mentioned by Medrum (2007) due to the hard working nature of the people in Democratic Republic of the Congo, the country could have one of the best recycling systems in the world. In KLM, there are the informal collectors which are collecting waste everyday with a payment of FC 200 a plastic or a seal of waste. In fact, if it was not for the recycling already going on, the waste management situation in Kinshasa would be truly appalling.

Figure 15: Informal Collector on Process, opposite Ndolo Airport in the South-East of the KLM, July 2009



The public health issues in KLM are immense and this brief research report can in no way do justice to these issues. Poor solid waste management is not the only health issue in KLM. Lack of clean water, lack of sewerage system and lack of access to health care are also significant issues (Pinnock, 1998). The absence of a waste management system in this city however is a significant contributor to the high level of disease and death in Kinshasa. Other issues which were identified include the visible killers and invisibles killers. The most

obvious visible killer is the large number of people estimated to die every time when it rains. Local estimates ranging from 100 to 150 people are killed every time it rains in the city. Remember during the rainy session it effectively rains for 8 months every year (Pinnock, 1998).

There are a wide range of invisible killers in KLM but again the main ones which directly relate to solid waste management are as follows: landfill gas, the current practice of building houses on top of the waste is unacceptable. As the solid waste breaks down methane, carbon dioxide and trace components will all is produced. Since the houses are built on the waste there is every chance these gases will enter the houses. Main risks are explosion and asphyxiation from lack of oxygen. Houses built on waste should be checked for presence of methane gas as a matter of urgency and if found, houses should be destroyed; malaria, the blocked drainage channels are allowing stagnant water to build up around the city providing perfect breeding conditions for mosquitoes (ibid).

Figure 16: Blocked Drainage Channels at Bitshaku-Tshaku River Next to 24 November Stadium In the eastern part of KLM



Further, if the drainage system is maintained, at least the water in the drains will be flowing, thus reducing the opportunities for mosquitoes; bacterial infection, since people are in extremely close contact with solid waste as they live on waste, grow food on waste and even let their children play on waste, the chances for picking up bacterial infections is

considerable; water contamination, the breakdown of waste will release metals and other pollutants into the water. This water is used for washing and in some cases drinking; clinical waste with little difficulty, we found clinical waste on the transit site; hazardous waste, presumably hazardous waste is also disposed in these transit sites, again posing risk to population.

A clean Kinshasa would deliver significant public health benefits by reducing the incidence of disease and illness. Due to the scale of the public health issues, it is difficult to place our environmental standards on this issue. The environmental issues are significant, but in no way are they close to the public health issues discussed previously. By resolving the public health issues, many of the environmental issues will also be addressed. The main environmental issues are as follows: waste lying around across the city, open to scavenging by people and animals; waste contaminating the land, surface water and ground water around Kinshasa; waste getting washed into the drainage system and then the River Congo; no secure disposal point for waste for a city with an estimated population between 9 and 11 million people (Meldrum, 2007).

3.5 Summary

The analysis of case study has demonstrated that solid waste in KLM is one of dire concern. Even though, there are some structures providing minimum services in the area such: European Union, Informal sector, private sector and government service utilities as well as a legal framework has been established and some rules have been implemented; the lack of coordination of actions, efficacy local institutions, incentive measures and enforcement has led to an aggravation of the waste problem. There is also a perceptible risk to the health of the population because of the absence of regulated disposal facilities, which leads to open collection and dumping. During the site visit in the streets of case study of KLM, there is no dustbin or container used as waste disposal; while the area as business district is generating waste every time not only by its residents but also by the vendors which are not collected.

KLM and its institutions devoted to manage urban environment problems and deal with the crucial issues such as solid waste services collection have failed to accomplish their tasks. As

for any post conflict government often characterised by weak institutions; KLM's institutions such as urbanism, economic affairs, budget and control etc. are very weak and its officials are corrupted, inefficacy and unequipped with low moral staff. This situation is influenced by those of national and provincial including national Department of urbanism and habitat, National Department of Environmental Affairs, Tourism and Nature Conservation, City Council and Provincial department of Urbanism and Environment which are not responding efficiently to their constitutional and traditional responsibilities. The local municipalities do not have any autonomy. Most of the environmental programmes "PAUK" (Kinshasa Urban Cleaning Programme), "*Operation Kin propre*" (Kinshasa Clean programme) aimed to clean up KLM are managed either at national or provincial level of government (CPK).

The strategic location of the case study which is doubled by its status of oldest area in the CPK presents already the potentialities of solid waste challenges. This requires collaborative and sustained efforts as well as political involvement in this area which once protected can give good looking image of the whole City province of Kinshasa. These efforts must be accompanied by decentralisation of solid waste management, local empowerment and establishment of appropriate solid waste strategies and policies.

Another problem in KLM is lack of authority and capacity to take the necessary measures to deal with solid waste issues in its jurisdiction area. Consequently strengthening KLM institutions and establishing strong environmental regulation may help for first stage to tackle environmental challenges before undertaking under necessary disposition. In addition, the formalisation and recognisance of informal collector is very vital in addressing the current solid waste in the case study area. In case of KLM, both government and international organisations should support the informal collectors' initiatives and work with them together to tackle the solid waste challenges in KLM. The first responsible for environmental management is the local government; prior involvement of any stakeholders, government must take his responsibility. The next chapter will present and discuss the findings of the case study research.

CHAPTER FOUR: THE CURRENT CHALLENGES OF SOLID WASTE MANAGEMENT IN KINSHASA LOCAL MUNICIPALITY

4.0 Introduction

This chapter presents research findings from onsite interviews and their interpretations, which have been undertaken with solid waste management key stakeholders in the KLM. It also covers some findings from desktop studies and written material that have discussed some aspects of solid waste management and urban planning in KLM. In addition, the chapter looks at the existing solid waste institutional framework in Kinshasa Local Municipality. It concludes with some discussions of the data found in the tabulation of questions and interviews. The first section will identify the stakeholders. The second section will present the findings of the research through different tables and graphs. The third section will discuss the tables and graphs before reiterating the hypothesis and the objectives which drove this research; and the last section will analyse and interpret the findings. To be noted is the fact that only the findings directly linked to the solid waste management in the case study will be discussed.

4.1 The Identification of Stakeholders involved in Solid Waste Management in KLM

The observation and discussions with local communities have identified some waste management key players active and visible in KLM such as: Kinshasa City Council, Kinshasa Urban Cleaning Programme (PAUK), National Programme of Cleaning (PNA), Office of Drainage and Roads (OVD), PoubelKin, Informal Collectors and other organisations such as *Congo Salubrite* (Congo Health), CBOs and NGOs involved in waste management in the KLM.

The abovementioned have been regrouped under four main sectors:

Public Sector - includes all structures under direct supervision and management of government including: City Council, Kinshasa Urban Cleaning Programme (PAUK), National Programme of Cleaning (PNA) and Office of Drainage and Roads (OVD).

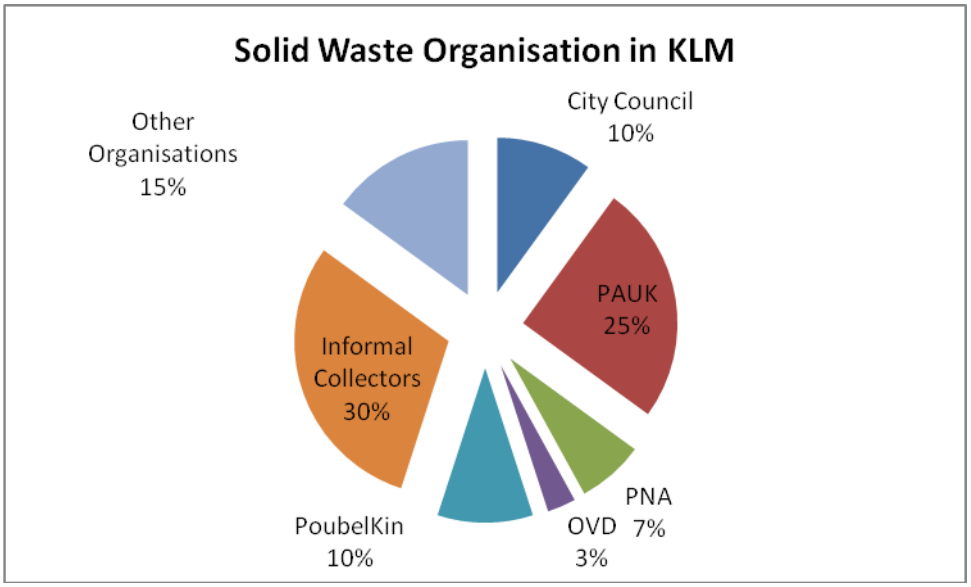
Informal Collectors - which include informal solid waste collectors, informal containers, plastic collectors and informal road cleaners.

Private Sector - has regrouped not only PAUK but also all private companies which are making money through waste such as PoubelKin, Congo Salubrite etc. They have been aligned together because they use similar expertise for waste management.

Local communities – which include households, non-government organisation (NGOs), community based organisations CBOs and other local solid waste associations.

The following interviews and discussions have been ranged according to the above sectors. As indicated previously; women are excluded from waste management in the study area. However, the majority of the respondents were male leaders for each sector contacted.

Figure 17: Solid Waste Organisations in KLM



The above structure has classified the stakeholders according to the degree of their intervention in KLM which are to be further discussed in more detail bellow.

4.1.1 Public Sector

The government intervention on municipal solid waste management in KLM can be well understood through different planning approaches such as rational comprehensive approach: a top down management approach for societal guidance embedded by the state intervention in both market and social processes. Accordingly, Cointreau-Levine (1994) noted that government has the primary responsibility for providing fundamental social services to the communities as well as solid waste management services. The Constitution of Democratic Republic of Congo provides one of the most comprehensive environmental rights. In title two, chapter one, article 53 stipulate that: "Everyone has the right – (a) to an environment that is not harmful to their integral development (RDC, 2006). It is also acknowledged that, it is the primary responsibility of the government to provide the basic needs of the people (Cointreau-Levine (1994). In order to do so, Congolese Government for the efficiency reasons has re-assigned this responsibility to provincial and local governments.

The Congolese Ministry of Environment, Tourism and Nature Conservation (METNC) are responsible for solid waste management. It carries out this task through the services such as: the National Cleaning Programme (PNA), Office of Roads and Drainages (OVD) and National Service of Rural Hydraulic (SNHR).

Through City Province of Kinshasa, there is City Hall called "Hotel de Ville" with its three administrative brigade units including:

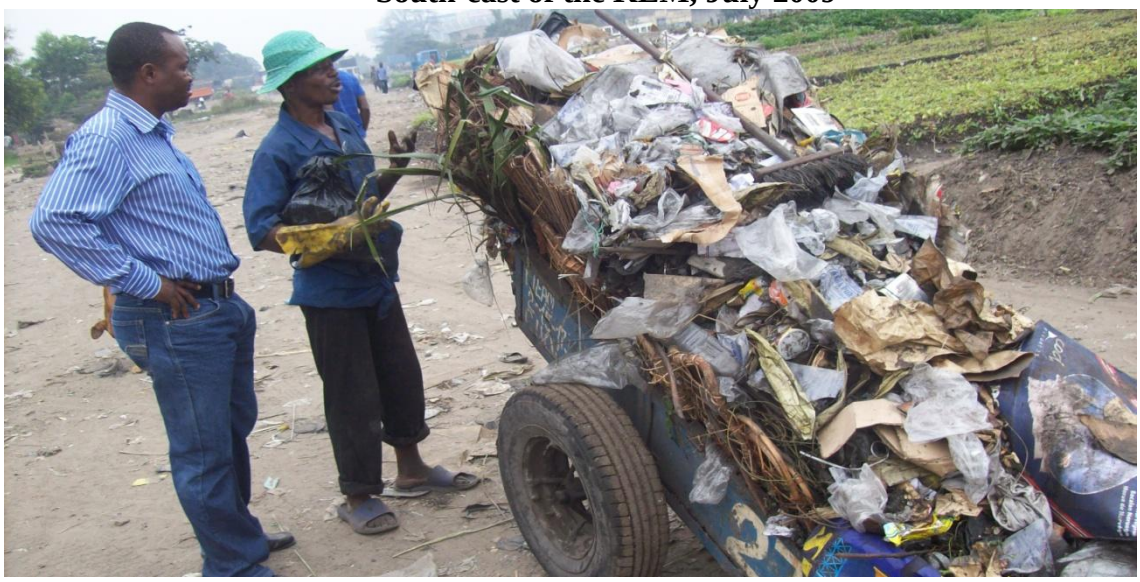
a. Urban Brigade of Cleaning (BUA)
b. Urban Coordination of Environment (CUE)
c. Urban Division of Urbanism and Habitat (DUUH)

At local level there is an environmental unit which is responsible for public health. For the purpose of this research, the researcher had discussions with three officials from national level of government, with one from PNA, one from OVD and another one from SNHR. One official has been selected from the provincial level or City Hall and one from Environmental Unit of KLM. Apparently the management of solid waste in the DRC is structurally decentralized; however, practically all powers are concentrated at national level. The local government is simple an implementer. Local authorities in KLM do not have any resources to manage its solid waste and all environmental management issues within the area are centralised at City Province Kinshasa level.

4.1.2 Informal Collectors (Solid Waste Workers)

Many of informal collectors in KLM move around every day with their trolleys, brooms and materials for cleaning and collecting solid waste, and they do so for a fee. Most of their customers are householders and business owners predominately foreigners (Indians, Pakistanis, Lebanese and West Africans). The charge of rendered service depends on the volume or quantity of solid waste collected and time spent. Some of them collect solid waste daily from house to house for 200 FC either 0, 25$ by full seal of solid waste. Sometimes they make appointments with their customers before dropping by; this happened regularly during week-ends. There is another category of informal collectors operating in KLM who frequently clean and sweep the roads and public space expecting tips from road users. As indicated in the picture below, the informal collectors within KLM are mostly focused on solid waste rather than other categories of waste.

Figure 18: Informal Collector carrying Solid Waste at Soba Zikita Market in the South-east of the KLM, July 2009



As demonstrated previously, the informal waste collectors in the study area arise by lack of job opportunity, however, there are operating occasionally without an organisational structure. Therefore, it is difficult for them to defend their interests and to compete with structured organisations such as government environmental services (Hotel de Ville, KLM), International Organisation (PAUK), Private Sector (*PoubelKin, Congo salubrite*) and Non-government Organisations who are operating for waste management in the area. This lack of organization also means that there is no executive body that can represent their interests given also the fact that majority of them are illiterate. Waste collectors in KLM know each other because frequently they collect solid waste from the same area and same time sharing their customers. Otherwise, they remain strangers to each other because of the nature of their job. There is always competition, with each one always wanting to collect more waste than another.

Further, they also fight for customers. Hence, they have no relationships among themselves except as fellow workers. A large proportion of these waste collectors in KLM are men coming far from poor or low income areas of KCP. Women are marginalised from solid waste activities in KLM. This occurs in both formal structure and informal jobs. There is a perception in DRC that women are unable to perform at work. Thus, their responsibilities are reduced to the domestic duties such cooking, ironing and taking care of children. This situation is exacerbated by the lack of job opportunities in formal sector. It is estimated that

approximately 75% of basic services in African cities are provided informally and the process of in formalization is expanding across discrete sectors and domains of urban life (AbdouMaliq, 2001).

4.1.3 Private Institutions Involved in Solid Waste Management in KLM

a. Kinshasa Urban Action Programme (PAUK)

One of the active stakeholder in solid waste management in the study area is 'Kinshasa Urban Action Program', known originally in French as '*Programme d'Assainissement Urbain de la Ville de Kinshasa'* (PAUK). On 23th June 2000 it has signed the in Benin "Cotonou Agreement", a comprehensive partnership agreements between Africa, Caribbean and Pacific (ACP) and the European Union (EU) which determine twenty years of political, economic and commercial partnership between 79 countries throughout the four continents (CE, 2001).

The PAUK funding agreement was signed on 13 November 2007, for funds totalling €22 million aimed at combating poverty in African continent. This programme initially is funded and managed by the European Union (EU) and intended for the cleaning up of Kinshasa's Central Business District (CBD), especially the area's most affected by solid waste. The areas covered by the Kinshasa Urban Action Program (PAUK) including: Gombe Local Municipality, Barumbu Local Municipality and Kinshasa Local Municipalities. The geographical areas covered by the project are the two basins slopes, Bitshaku-Tshaku and River Congo. As noted by Banyanga PAUK project manager, it has aimed to establish proper drainage networks and to ensure the effective management of domestic waste, including primary collection, recovery and transfer, and treatment (Banyanga, 2007). For this reason, PAUK aimed to strengthen the institutional capacities of the main centralized and decentralized actors.

Table 9: Breakdown Budget for PAUK Activities

Category of Expenses	Budget/in Euros
Cleaning Activities	9.000.000
Solid Waste Management Activities	3.947.667
Equipments	2.949.667
Training and Mobilisation of Stakeholders	500.000
Strengthening capacity and Institutional support (Activities 1 &2 technical support &project management)	4.471.782
Assessment	60.000
Audit	60.000
Fortuitous	1.010.884
Total	**22.000.000**

Source: Vangu, 2008

The PAUK intended to fight against poverty for more vulnerable populations within City Province of Kinshasa during three years period (from January 2008 to 31th December 2010). The specific objective of the PAUK is cleaning up and clearing of two drainage basins (Bitshaku-Tshaku and Congo River) by:

- Evacuation and control of wastewater and rainwater;
- Households solid waste management from cleaning, collecting, transportation to final treatment;
- Strengthening institutional capacities of the main waste actors in DRC including (PNA, OVD, Hotel de Ville, Local Environmental Unit, Private Sectors and Informal Collectors).

As indicated in the figure 20 below; when PAUK was launched in Kinshasa in 2007, it started with the evacuation of the mountain of rubbish (Type K) in the old market area. This intervention was timely because it came at a time when the *Luambo Makiadi* avenue was about to be blocked. The PAUK official in charge of the evacuation of the waste evaluated

the rubbish to be nearly 2.000 m³ high. With the assistance of a shovel loader and several trucks, the PAUK team spent four days on average to evacuate the so-called Type K solid waste.

Figure 19: Evacuation of Type K Solid Waste from Luambo Makiadi Street in LM, PAUK, 2007



Since then, PAUK has largely contributed to the improvement of urban environment in KLM and other surrounding areas. Among its successful achievement in collection of mountain waste in Type K., PAUK is running other environmental projects throughout the city. The successful implementation of PAUK's environmental projects is due to quality of the material used and its experienced and qualified personnel.

b. Poubel-Kin

PoubelKin is another vital private waste contractor in KLM. It is not yet well known to the poor to local communities of KLM compared to PAUK and City Hall which are more visible with high numbers of personal. Poublekin is a private waste management company highly equipped and uses modern technologies in waste collection operations. It has a well trained staff with approved work experience required intended to manage solid waste efficiently. The Poubelkin activities in KLM are limited to industrial or commercial collection in which they are contracted with some important top company in the CPK. However, local communities

such as those living in KLM are not covered by PoubelKin services because they cannot afford to pay for their services. The PoubelKin services are viewed by the majority of KLM dwellers as very expensive, therefore restricting the service to the wealth. .

Figure 20: PoubelKin Waste Contractors and their Materials



Source: http://poubelkin.com, accessed on July, 2009

c. Congo Salubrite

The *Congo Salubrité* which means (Congo Health) is a recycling factory intended for waste treatment. It transforms the plastic rubbish to PVC tube which is sold to the small hardware stores. One and half kilos of agglomerated plastic produce 10 tubes of 3 meters each. The *Congo Salubrite* is a private initiative created by *Kinois* (Residents of Kinshasa) to tackle waste issues in the City province of Kinshasa as well creating jobs by collecting all waste plastic; given that plastic comprise an important waste composition in the city. It is closely working in partnership with City Council (*Hotel de Ville*) which is the main plastic provider of *Congo Salubrite*.

The job opportunities offered by *Congo Salubrite* to the *Kinois* in general and KLM residents in particular consisting of collecting plastic rubbish in the streets and illegal dumping within the City and selling to *Congo Salubrite* is considered by majority of *Kinois* as reserved to poor or low income community. The initiative is being contested; consequently the company

cannot function properly because of lack of regular and significant plastic providers. Several agreements have been signed between *Congo Salubrite* and City Council regarding provision of plastics, but the amount is not sufficient to respond to demand of *Congo Salubrite* because they are not specialized only on plastic collection. However, the company is experiencing enormous problem for its operation.

Figure 21: Local Communities are Collecting Plastics for Congo Salubrite in Somba Zikita market East of KLM, July 2009



Plastic collection is first step of recycling process of Congo Salubrite before transformation and sale in small hardware stores. The company is experiencing enormous challenges to get sufficient plastic for their operations. Most people from local communities view collecting plastic job as taboo duties, thus, the company is not able to get sufficient plastic.

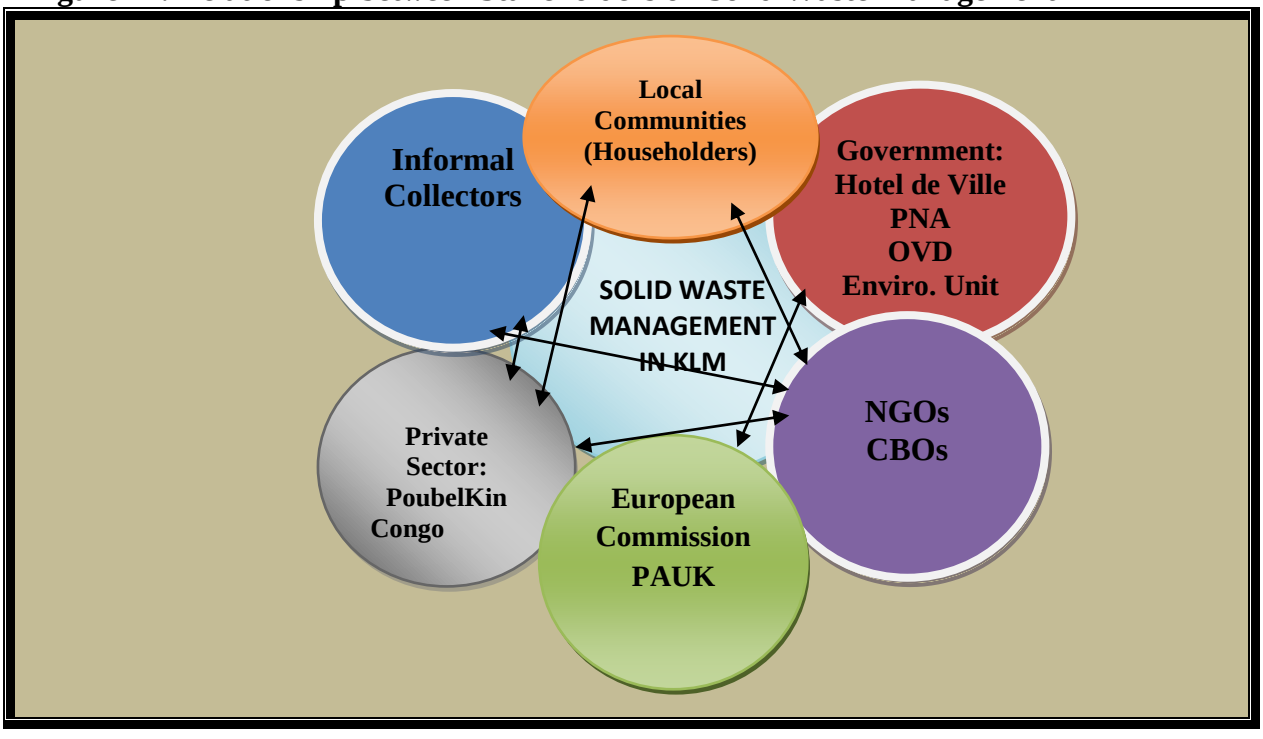
4.1.4 Local Communities (Householders)

The householders in KLM predominately women are crucial stakeholders in solid waste management. They are considered not only as primary producers but also as managers of solid domestic refuse in KLM. In the study area, the householders are to a large extent responsible for household solid waste. Some of them do not have money to pay for informal collectors' services. However, they manage their wastes themselves either by combustion, composting or landfill methods. The latter two methods are mostly used in the KLM; similar to informal collectors; householders in Democratic Republic of the Congo are not structured.

Although operating in informality, they are playing a vital role on solid waste management in City Province of Kinshasa in general; and in the KLM in particular; without them the issues of solid waste in the KLM should be catastrophic.

In KLM, the householders pay for their wastes according to the principle of polluter pay adapted by City Council to their contractors including City Council (Hotel de Ville), informal collectors, PoubleKin etc. However, the marginalized householders within KLM get income from waste - collection of waste plastic to get pay from *Congo Salubrite*. As indicated in the figure below, generally solid waste in KLM like CPK operations and stakeholders are not coordinated and integrated as discussed in literature; the case study shows a relationship between certain stakeholders. This is observable between Kinshasa City Council and private sectors (Poubelkin, European Commission, *Congo salubrite*) through solid waste management agreements.

Figure 22: Relationship between Stakeholders on Solid Waste Management in KLM



The Hotel de Ville (Kinshasa City Council) is a custodian of environment in the CPK in general and KLM in particular which coordinates and supervises all structured waste management organisations. Several agreements have been signed between Kinshasa City

Council (Hotel de Ville) and the private sectors such as PoubelKin and Congo Salubrite to clean up and collect solid waste in the most affected local municipalities including KLM within the City of Kinshasa. The Kinshasa City Council finances most of the projects which are implemented by private sectors under supervision of both local authorities and City Council. The temporary disposals are provided to private sector in each local municipality for waste disposal before carrying them to final landfill located in Mpasa 30 Km far from the Inner City.

In addition, both Kinshasa City Council and private sector do not deal with informal collectors although considered as cheap labour because they are not educated therefore they require training before contracting with them. This approach excludes informal collectors who are majority illiterates. They are only contracted with Congo Salubrite specialised in waste plastics because they do not require any skills.

4.2 Dynamic and Implications of Institutions

4.2.1 Findings and Analysis

The case study of the Kinshasa local municipality has revealed that solid waste constitutes a real environmental problem in the area. As indicated in legal and institutional section, much of the environmental legislatives and planning activities in DRC took place during the colonial period and the ten years which followed independence, when Kinshasa was still called “Kin la Belle” (Kinshasa, the beautiful). City Province of Kinshasa is today called Kin-Dustbin because of inappropriate environmental legislations and policies, lack of environmental education and awareness, as well as inadequate equipment which is also a result of limited finances and lack of modern equipment and personnel. The findings of the study are presented below (see appendix B) and briefly highlighted in the points below:

a. General Perceptions of Solid Waste Management in KLM

Generally, the study indicated that solid waste activities in KLM are mostly concerning women. Majority of householders interviewed in KML referred us to women. The men said

they go out early and come back later; thus they do not know much about waste management. Solid waste in KLM must not only be women's matter, everyone (man, woman, young, old, married, single) must be concerned and involved. Although, everyone produces solid waste, the case study of KLM has indicated that the most pollutants in the area including: householders, clubs, storekeepers, owners of the clubs and retailers. The composition of the waste in the area includes plastics, household refuse, bottles, boxes and other non toxic refuse.

b. Quantity of Solid Waste produced in KLM

As indicated in appendix B, the respondents interviewed from all solid waste structures in KLM do not know exactly the amount of solid waste produced by each householder in KLM. The women as key stakeholders in waste management in the area have no idea about the amount of waste produced. They are not aware and interested on the quantity and weights of waste produced every day. This is because they are ignorant? I think this dependent on the degree of environmental education and awareness in the area and also diverse of solid waste produce. In KLM vegetable is daily diet for the poor because it is very cheap compared to meat which is reserved to the wealthy people. The poor who eat much vegetable produce enough solid waste compared to those who eat meat. The riches also produce many refuses compared to the poor households because they have enough to refuse. Management of waste depends on quantity and category of waste produced. The knowledge about the amount produced is very indispensable for solid waste in KLM.

The issues of solid waste in KLM are due to lack of organisation and management. According to the case study of KLM, householder spend approximately an average of FC 400 weekly which is the value of (0, % US $) for waste management in most cases to the informal collectors. For instance, a household spend 0.5 $ weekly and if per example there 100 households by each street in KML, they will have 50 $ weekly x by 20 = 1000 $ weekly, consequently per month KLM can raise an amount 4. 000 $ which are sufficient to hire a private company which can provide a professional service to the local communities. The City Council and local municipality offering environmental education and awareness to KLM residents on the need to identify the waste could help change this situation for the better.

c. Solid Waste Conservation Methods in KLM

The study indicated that households in KLM used containers like sacks, plastic containers, baskets, old buckets, polythene bags and dustbins to store solid waste. A greater percentage of the respondents in KLM relied on sacks than other storage methods. The raisons of majority use the sacks might be because it is cheaper and perhaps could store more wastes, however, sacks have no covers leading to serious health implications. Most of the refuse are kept close to kitchens and rooms. This may cause diseases like cholera and typhoid fever.

With the exception of the dustbins, none of the containers had covers. A substantial percentage of the garbage is put into polythene bags before kept in the storage containers. These waste handling methods are a likely contributory factor for poor sanitation in the area because much of the refuse is littered about before reaching the sanitary sites. The City Council and local municipality subsidising the prices of standard dustbins and offering education to residents on the need to store refuse in dustbins could help change this situation for the better.

d. Description of Solid Waste produced in KLM

As indicated in the above section, majority of the respondents in case study relied on sacks than other storage methods. The City Council and local municipality subsidising the prices of standard dustbins and offering education to residents on the need to store refuse in dustbins could help change this situation for the better. The perpetual creation of the awareness on the need for household heads and well informed members to educate their household on basic issues on sanitation may help curb the problem. Linked to the interest of the households, educating other members is the lesson that should be taught.

4.2.2 Analysis of the Findings of the Key Stakeholders of Solid Waste Management in KLM

a. From Poor Management of Solid Waste

Regarding the problems/factors that led to poor management of solid waste in KLM, Sapu Kalima Burgomaster of Kinshasa local municipality recognises that: '*there is a lack of community participation in solid waste and environmental awareness programmes. He has asserted that communities were not aware of notions of environmental protection'*. While minimising aspects such as the lack of appropriate environmental policies and poor environmental law enforcement which are their responsibilities, the officials in Kinshasa local municipality identified the lack of community participation as the major factor contributing to poor management of solid waste in Kinshasa.

The majority of informal collectors working in KLM have however found the problem to be just what the officials ignore. For instance Ernest Kalala from Poubelkin notes that: '*the main factors that led to poor management of solid waste in Kinshasa are the lack of environmental policies or legislation and the lack of environmental law enforcement*'. Among the informal collectors the argument is that environmental protection is not one of government's priorities. They have complained that there is no currently operating environmental policy and even where there is some old environmental legislation the government does not enforce them in Kinshasa. As a consequence, everyone can throw his/her domestic refuse anywhere without being prosecuted. Because of this, many householders in Kinshasa throw their refuse in open spaces and during the rainy season some of them throw their domestic refuse out in the streets to be washed away by the rain.

The findings have shown that the majority of waste pickers working for private companies found that the main factors that led to poor management of solid waste in KLM are the lack of community participation and lack of environmental law enforcement. The waste pickers have noted that the communities, including householders, are not involved in solid waste campaigns. They have also asserted that in order to reduce illegal dumping the government must enforce environmental laws in Kinshasa such that all trespassers must be prosecuted and

punished by law. The majority of householders have also criticised the lack of community participation in solid waste management in Kinshasa.

b. From Key Challenges of Solid Waste

The case study of the Kinshasa local municipality has revealed that the area is facing serious challenges to solid waste management. The case study of KLM indicates that the majority of public officials believe that the challenges to solid waste management in Kinshasa are mainly the lack of coordination of solid waste activities and insufficient financial resources. The officials noted that the local municipality does not have enough money to deal with the increasing amount of solid waste in the area. Moreover, the interview with Norbert Watete chief clerk of Kinshasa municipality on 21 July 2009 has reported that: '*solid waste management in Kinshasa is centralised at the national and at provincial levels of government, while at the local level there is no budget allocation for the management of solid waste'*. Some solid waste interventions initiated by the city council fail to involve other solid waste stakeholders such as private sectors, international organizations and householders.

Further, the majority of informal collectors have decried the situation of insufficient financial resources and inadequate technologies. The fact that these collectors are not structurally organised means that they cannot demand a wage increase. They are unhappy about their situation. They claim they are exposed to many diseases whilst they earn little money and also that they do not have the appropriate material for solid waste collections. They are not protected against toxic waste during the collection operation. Nevertheless, the majority of waste pickers working for the private sector stated that the real challenges of solid waste in KLM are lack of infrastructures and traffic congestion. They claim they are exposed to real risk from cars that operate until the late hours. Moreover, they experience enormous difficulties moving around with their trolleys. Flooding is a permanent issue in some areas, so it makes it difficult for collection activities. Some areas in KLM are not accessible because of lack of infrastructure such as tarmac roads and well marked out routes. So these areas are not usually covered.

The findings of the research have shown that the householders in KLM are facing serious challenges in solid waste management in terms of finance, waste collection material and solid waste coordination activities. Majority of them claim that they have not been served by the city council solid waste services. Thus, they spend a lot of money every day to pay the informal collectors who do not even provide them a regular and professional service. They have noted that because of the lack of coordination of solid waste activities, some areas in the city are always left unattended by stakeholders. Householders say they do not have the appropriate containers for storing solid waste; they usually use plastic bags which often get full before collection time.

c. From the Strategies to Curb Solid Waste

The study indicates that several strategies have been proposed by stakeholders involved in solid waste management in Kinshasa. The three major strategies are the privatization of solid waste management, the effective management of solid waste by government, and the development of partnerships in solid waste management. Of the three strategies, the majority of public officials interviewed supported partnership and government intervention as the most effective way to curb solid waste in a city of 11 million people. For many public officials, the role of government in providing basic social services which include solid waste services is crucial. Interview with Mr Erick Mbala Deputy Burgomaster of Kinshasa municipality on the 03 July 2009 has noted that '*the role of government in urban service delivery remain still crucial, the private sectors are looking after the money, while our communities are very poor, they cannot afford to pay for private service; the major problem facing the Kinshasa local authority is the lack of adequate financial resources, not the capacity to deal with solid waste in Kinshasa*'. They suggested partnership with the private sector as an alternative because of their belief that the private sector has the resources and expertise to deal with the problem. Thus, they anticipate that if the government works together with the private sector, the problem of solid waste in Kinshasa would be solved.

The study has also shown that, on the other hand, the majority of informal collectors have opted for privatization as an excellent solution for solid waste management problems. The informal collectors argued that government has failed to ensure a safe and clean environment

for its people. Moreover, government has demonstrated its incapacity to manage solid waste in KLM. CPK which used to be 'Kinshasa the beautiful' is now 'Kinshasa the dustbins', showing clearly the government's failure to maintain the environmental beauty of the city. It is as a result of this that informal collectors advocate the privatization of solid waste management. The majority of informal collectors interviewed said that private sectors have the money, expertise and efficiency to deal not only with the waste situation but also with the greater environmental degradation of the city.

The research shows that the majority of waste pickers shortage of resources (material and financial), especially those working in the private sector, are in favour of partnerships between government and the private sector. For them, the issue of solid waste in Kinshasa is a critical one that needs urgent attention. There is a need for all stakeholders to be involved in finding a definite solution. The case study of KLM indicates that householders are in support of collective efforts (partnerships) to deal with the problem. However, they are also in favour of privatization in cases where the local authority is not strong enough to pursue equal partnership with the private sector. Therefore, for a partnership to be successful, government needs to have in place sufficient resources (material and financial), strong institutions, policies, laws, and regulations that are applicable to every stakeholder. It must also be able to determine the role of each stakeholder involved in the process and to implement a daily control of activities.

4.2.3 Public Officials (PNA, OVD, Hotel de Ville and Local Environmental Unit)

Table one (see appendix five) presents different responses to the questions posed to public officials. From the table, one can see that the situation of solid waste in KLM is disturbing for many people. Three of the five respondents acknowledged the environmental degradation in the city of Kinshasa resulting from poor management, wars and political conflicts. With regard to the solid waste challenges in KLM, the majority of respondents mentioned the challenges related to financial resources, technologies and solid waste coordination activities. As stated by respondents, the biggest challenge facing the public sector in Kinshasa is the lack of financial resources especially at the local level of government. The environmental unit at the local municipality does not have a specific budget for solid waste management. There

are many prisoners within the local community who can be used to clean up the environment, but the local municipality does not have the appropriate material for the cleaning, collection and transportation of solid waste. Moreover, there is no integrated solid waste management system in the city of Kinshasa.

In order to deal with these challenges, the officials, particularly those from the Kinshasa local municipality where the majority of interviewees where based, usually sent reports to the higher authorities, including the Provincial Ministry of Environmental Affairs and the National Ministry of Tourism, Environment and Nature Conservation. Unfortunately, no favourable response has been received. Furthermore, the majority of public officials in Kinshasa are very hostile to the idea of privatising basic social services such as solid waste management. Most of them prefer partnerships as opposed to privatization. They believe that the provision of basic social services is the primary responsibility of the government and should be carried out for the benefit of the general populace.

Concerning solid waste planning activities, the public officials noted that planning activities took place mainly during the colonial era and sometime afterwards. With the collapse of the state as a result of dictatorships, political conflicts, wars and a series of crises, including two greatest lootings in 1991 and 1993, there ceased to be a national solid waste planning scheme. Some waste planning activities are undertaken by individuals and/or groups independently. Finally, four of the five interviewees acknowledged the role of the EU in managing solid waste in the Kinshasa CBD through its PAUK project. They stated that the EU is their potential and most desired collaborator in solid waste management.

4.2.4 Informal Collectors

Table two (see appendix six) focuses on informal collectors involved in solid waste management in the city of Kinshasa. The table covers different responses in relation to interviews held with the informal collectors. Four of the five people interviewed work with solid waste as a permanent job, thus expecting payment for every collection and for every cleaning and sweeping task undertaken. Three of them target the Kinshasa CBD which includes Gombe, Barumbu, and the KLM populated by people from the high and middle

classes, characterised by extensive commercial activities and featuring important places such as the central market, the national zoo, government headquarters and the central seaport.

The numerous activities that take place in the KLM great market generate a huge amount of waste that is not well managed by the city council. In addition, in recent times, there has been an influx of foreign nationals into the Kinshasa CBD, mostly from Lebanon, China, Mali, Senegal, Nigeria and Cameroon. These foreigners have complicated the situation by increasing not only the population but also garbage heap. They have created the formal and informal businesses which are all concentrated in Kinshasa CBD. Most of their activities are solid waste related. They produce every day a huge amount of plastics, boxes, ashes… and throw it in the open places without getting prosecuted because of lack of environment law enforcement in Kinshasa.

The traffic congestion, lack of waste disposal infrastructure, poor coordination of activities and inadequate financial resources are the main challenges facing informal collectors in KLM. Due of traffic congestion, for instance, informal collectors usually have difficulties moving around with their trolleys and doing their job properly. The interview with Robert Katende one of informal collector on 14 July 2009 has mentioned that …'*we are working in informality just because of lack of job opportunity, we are facing serious challenges, neglected, lonely, working without any external support, without any planning and without any formal structure*'. Concerning the proposed ways to curb solid waste in the area, the majority (four out of five interviewees) supported the privatization of solid waste management in the city of Kinshasa. They accused the government of not doing much to curb solid waste in the area. Some of them accused the government of being responsible for the increase in solid waste in the area. According to them, they could do better than the government if they were organised into and supported by a formal structure.

4.2.5 Waste Pickers (PAUK, PoubelKin, Congo Salubrite)

Table three (see appendix seven) covers different responses to the interviews held with Waste pickers involved in the PAUK project financed and managed by the European Union (EU). The responses reveal that the situation of solid waste in Kinshasa is at a stage of advanced

degradation. The majority of the respondents (three out of five) worked in the Kinshasa CBD comprising Gombe, Barumbu and Kinshasa municipalities. One major finding is that most of the waste pickers were using traditional materials for sweeping, cleaning, collecting and transporting solid waste. These materials include brooms, wheelbarrows, trolleys, shovels and pitchforks and other protecting materials that are not really modernised or adapted to the new modern system.

Like informal collectors, the waste pickers working for PAUK also had complaints regarding traffic and infrastructure. Concerning the shortage of financial resources for the management of solid waste, many of them were not happy with the situation but could not propose any solution. The waste pickers also said they needed appropriate material for their protection such as masks and disinfectants. They claimed that because of the poor condition of the material they were using, some of them were exposed to sicknesses and other health dangers. Therefore, that the workers had to put in extra effort to get their work done. Working conditions of waste pickers working for PAUK need to be reviewed, said the respondents. The majority of waste pickers supported the collaboration between PAUK and the EU.

Concerning the future ways to curb solid waste, the majority of interviewees (three out of five) supported the partnership approach to solid waste management in the city of Kinshasa. They advocated for a partnership or collaboration between local and national government, on the one hand, and the EU and other stakeholders, including informal collectors and householders on the other. Such a partnership or collaboration would be geared towards solving the solid waste problems in Kinshasa.

4.2.6 Local Community (Householders)

Table four (see appendix eight) focuses on householders (local community) in the city of Kinshasa. It presents the different responses to the questions posed to householders in the city of Kinshasa. Although, the householders were randomly selected, the majority were women in which were four women and one man. As stakeholders, women play a crucial role in solid waste management in the city of Kinshasa in spite of the fact that they are not organized into a formal structure. From the table, it can be seen that three out of the five respondents had

acquired tertiary education, while four were from the middle income class. They were either running their own small businesses or their husbands were businessmen.

The table indicates that the potential and permanent solid waste service providers for householders in Kinshasa are informal collectors that the workers had to put in extra effort to get their work done. Three out of five interviewees admit that their waste is collected by these informal collectors. Householders without funds to pay for the informal collectors' services use incineration and traditional landfill methods to discard their solid waste. The findings have shown that the majority of householders in Kinshasa use seals and plastic bags for solid waste storage because of the lack of formal bins. This therefore means that the bags have to be emptied on a daily basis to avoid an overflow. Nevertheless, the majority of householders in Kinshasa empty their solid waste daily or fortnightly.

The findings show that waste removal in KLM is being done mostly by informal collectors. However, the majority of householders are not happy with these solid waste service providers. They have accused the informal collectors of irregularity and unprofessionalism because the collectors have not respected the agreement of emptying the householders' containers on a daily basis. The householders acknowledge that their service providers are not organized and effective but they have no alternative than to accept the poor service they provide. The city council's service is very limited and it targets only the city's strategic areas such as areas where the government has its interests or where ministers' offices are located or high income areas.

The findings have shown that a minimum solid waste service is being provided in the areas, but it is not coordinated. Consequently, many parts of the study area are not covered. The majority (four of five respondents) have indicated that they are not involved in any community projects to manage solid waste because there are no such initiatives in their area. Solid waste management is not a priority in KLM although it has enormous sanitary and environmental consequences. The priority for many householders in Kinshasa is to get food and to pay rents, which are for them is indispensable. The findings have shown that mosquitoes and flooding are major problems in the study area. Because of irregular solid waste collection and the high cost of the service offered by informal collectors, most

householders dispose their refuse by throwing it in open spaces and in the streets. Consequently, the garbage blocks drainages and pollutes the environment. Kinshasa is one of the cities in the world with the highest rate of floods and mosquitoes, especially during the rainy season.

Concerning the future ways to curb solid waste in the areas, the majority of householders in Kinshasa support the idea of public-private partnerships and the privatization of solid waste management in the city of Kinshasa. They suggest partnerships that will involve all stakeholders working together to curb the rapid growth of solid waste in a rapidly growing city. They accuse the government of failing to fulfil its traditional responsibilities which should ensure a clean, safe and affordable environment for everyone in the society.

4.3 Analysis and Interpretation of Findings

4.3.1 Urbanization and Solid Waste Generation in KLM

The case study of the KLM has revealed that the City Province of Kinshasa is one of the cities in the world which has experienced a remarkable urbanization rate during the 21st century. The population of CPK has almost tripled in the last fifteen years, moving from an estimated population of 4,632,000 in 1984 to 11,000,000 in 2008. Among the causes of this rapid urbanization in the city of Kinshasa are wars and political conflicts.

The result of this unplanned and unexpected increase in KLM's population is a rapid generation of huge amounts of solid waste because of the everyday activities of the people. This in turn puts the City council under enormous pressure, since it is now unable to manage the city's solid waste properly. The council and local municipality are unable to render waste collection services, and this resulted in mountains and mountains of uncollected garbage in the streets and open spaces within the city. According to the local officials, the municipality is unable to manage the garbage because of lack of financial resources and appropriate technologies.

4.3.2 Urban Governance and Solid Waste Management in KLM

The case study of the KLM has shown that inefficiency urban governance is one of the aspects that pose a challenge to solid waste management in the area. The problem plaguing the management of the local area in terms of the provision of basic urban social services can be traced to both local and central levels of government. There is a lack of intergovernmental cooperation in projects, where coordination in planning and construction of infrastructure could result in significant cost savings. According to the officials of the KLM, the local municipality was structured in such a way that there should be cooperation among the different departments.

However, this was rarely the case. This made the running of the municipality affairs more complex. Moreover, the corruption which has established itself in the country since the rise of dictatorial regimes and has exacerbated during conflicts era has made the effective management of government projects almost impossibility. The neglect in the collection of taxes, out-land rates, dishonesty of revenue collectors, inadequate enforcement authority, political interference and pressure on the local officers in charge of the running of the municipality to be less aggressive in revenue collection, and payment relapse on the part of many government institutions and parastatals are all the result of poor governance.

These problems are exacerbated by political interference at the municipality level. The Burgomasters are more concerned with the private accumulation of wealth than with the efficient management of urban services. For officials to keep their jobs, they had to do what the politicians wanted them to, irrespective of the effects their actions will have on the provision of urban services. Moreover, the officials from the local municipality spent most of their time outside their offices. The interview with the chief clerk of KLM Mr Norbert Kima Watete as the principal litigation officer said, '*most government employees lacked the passion to work*'. They had this view that everything that belonged to the government belonged to no one and therefore no one was expected to assume responsibility for it. To the litigation officer, this lack of passion for work was made worse by the view that anything that is owned by the government was the root cause of the financial problems that was ailing the municipality.

In most municipalities in the world, the cost of managing waste is shared between the waste generators – households, commercial centres, hospitals, industries, government, etc – and the municipal authorities. In most cases, the part taken by the waste generator is very small, as increasing service charges may force more people to evade paying and hence increase illegal dumping. However most municipal authorities are left with no choice but to work within the limits of exiguous financial resources at their disposal.

The case study observations and interviews have revealed that in KLM: centralization, poor urban governance, poor political leadership, greed, poor service cost accounting and financial planning, in addition to poor cost recovery, are factors that forced the municipality into enormous financial problems. The interview with Clement Mfingulu, a Waste Worker in KLM has reported that '*KLM do not have either power or financial capacity to decide on issues of solid waste, the centralization of decision and management has plunged KLM in undeniable poverty'*. These financial problems left the local municipality incapable of buying solid waste evacuation material such as vehicles, trolleys, wheelbarrows, as well as other important equipments for solid waste cleaning, collection and transportation.

In most cities of the world, municipalities are in charge of providing basic social services, including public facilities such as street garbage bins and household waste collection points. The case study has revealed that this is not the case in KLM where all basic services are centralised at national or provincial level and where public facilities remain a real concern. Water drainage, flooding and other problems are increasing the solid waste in the area.

4.3.3 Poverty and Solid Waste Management in KLM

The case study has revealed that poverty is a real concern in the area where the majority of the population live on less than US$ 1 per day, and it is also one of the major causes of the increase of illegal dumping of solid waste in Kinshasa (Muzumbi, 2008). The unemployment rate in the DRC is estimated at a scandalous 96% in 2007, whereas in 1982 it was only 8% (ibid). The consequences of *Zairenization* in 1973, the two greatest lootings of 1991 and 1993, the political crisis sparked by dictatorship, and the war which has dragged on since 1996 are the main causes of unemployment and poverty. These problems have an impact on

the quality of life enjoyed by local dwellers. KLM's inhabitants live in houses and neighbourhoods with minimal infrastructure, inadequate social services and a shortage of facilities essential for the maintenance of good health in an urban environment. Thus, their standard of living is below expectation.

The interview with Madam Catherine Tshituku householder has mentioned that '…*the poverty remains the main cause of increasing solid waste in KLM;* she noted… *how you can pay for waste services when you do not have anything to eat!*' This has confirmed the theory which link poverty and solid waste. The rich areas generate more solid waste for the reason that they have more things to throw away, while the poor people most of them are living in the quarters; produce small amounts of solid waste remain slimy and muddy because of the abnormality or absence of collection services. In KLM, poverty means living in a dirty, unsafe and degraded environment (Mbuyi, 1989). Usually, waste generation and waste collection are associated with revenue levels. Richer areas of the city have a good or at least acceptable waste collection system, but the same cannot be said for low-income areas. The solid waste generated during night-time in the area is thrown in open spaces, even though there are containers. Because of darkness caused by the lack electricity in many parts of Kinshasa solid waste disposal remains a concern for urban dwellers. KLM is one of the darkest and dirtiest cities in the world in spite of its capacity to supply the whole of Africa with hydro-electric power (ibid).

As earlier noted, the case study interviews and observations have shown that the need for a safe and clean environment is not yet a priority for both local government and Kinshasa's dwellers. One of the research participants, a public official from the KLM, stated: "*How can we address solid waste issues while basic needs such as food, housing, electricity and water are not yet solved*?" This, in effect, means that the need to make the environment safe and clean for Kinshasa's dwellers will come only after survivable conditions have been ensured for the majority of the population living without food, water and housing. Therefore, in Kinshasa, basic needs such as food, shelter, water and electricity must be met first before attention can be focused on environmental protection.

4.3.4 Partnership in Urban Solid Waste Management in KLM

The case study interviews reveal that all the stakeholders involved in solid waste management in KLM view partnership as the best strategy to deal with solid waste management challenges. Throughout the research, the private sector was targeted for investigation as a possible solution to the city's solid waste management problems because the private sector is known for its advanced technologies, equipments and skills, mobilization of investment and introduction of new ideas. The experience in KLM has demonstrated that Kinshasa City Council has signed several contracts of million US$ with Congolese private companies to curb the issues of waste in the city.

In addition, the private sector recovers effectiveness and lowers non-productivity by introducing the new commercial principles such as limited and well-focused performance objectives, financial and managerial autonomy, a well defined budget, and clear accountability to both customers and providers of capital (Korten, 1996). However, some participants have criticised the privatization of waste management as a solution to KLM's solid waste management problems. They feel that because of the growing poverty levels many local residents (*Kinois*) will be unable to afford the charges of private companies. Only a few people from the upper and middle class and from higher income levels will be able to afford the cost of the services.

For above mentioned reasons, the majority of participants have supported partnership as the ultimate solution to KLM's solid waste problems. The Kinshasa local municipality must form partnerships with the private sector, which includes private businesses (Poubelkin, *Congo Salubrite*, etc), international organisations (European Union, Canada Cooperation for Development, Western Union, etc,), and NGOs and CBOs (Engineers without borders, Women Householders associations, Informal Collectors Union etc).

Through PPPs, private sector entities can invest in public services. NGOs and CBOs can also radically diminish the cost of providing services, throughout several networks connecting active participation of the users (DEAT, 2000). Partnerships stimulate the active participation of all stakeholders; their interests must be put together towards a sustainable development.

However, African cities lack an integrated planning for solid waste management involving all stakeholders that the workers had to put in extra effort to get their work done. If there is such planning somewhere, the texts governing the relationship among the partners involved that the workers had to put in extra effort to get their work done are not clearly determined and precise.

Korten (1996) has underlined that for a partnership to be successful, the interests of all stakeholders must be put together to work towards a common goal – sustainable development. There should be active participation by all stakeholders. This has, however, never been the case in many African cities, due to the poor governance systems and inadequate resources. To be effective, any partnership in solid waste management must be accompanied by strong states and institutions which have clear rules applicable to all stakeholders involved in the process and which can determine the role and areas of operation of each stakeholder. Government must regulate and supervise the implementation of the process. Unfortunately, in a country like the Democratic Republic of the Congo where war has weakened existing institutions and there are no that the workers had to put in extra effort to get their works done appropriate environmental policies, no enforceable law, and no decentralised system of social services provision, the prospect of successful partnerships in solid waste management is far from being realized.

4.4 Environmental Implications of Solid Waste Management in KLM

4.4.1 Pollution Due to Solid Waste

Inadequate solid waste management has a negative impact on the environment in that it results in air, water and soil pollution. Wanton dumping and other undesirable practices pollute the air, water and land, fostering the proliferation of disease-carrying insects. This situation has adverse effects, directly or indirectly, on the health of members of the public, the sanitation personnel and those who scavenge the refuse to salvage saleable or other materials considered being of some utilization. The major environmental problems in the area include the lying of waste around across the city which are open to scavenging by people and

animals; waste contaminating the land, surface water and ground water; and waste getting washed into the drainage system and producing unpleasant gases (air pollution).

However, if the drainage system is well managed, at least the water in the drains will be flowing, thus reducing the opportunities for mosquitoes and other bacteria to spread and harm people and causing other several diseases including malaria and typhoid. Since people are in extremely close contact with solid waste, as they live on waste, grow food on waste and even let their children play on waste, the chances of them picking up bacterial infections are significantly high.

4.4.2 Flooding Due to Solid Waste

The main causes of flooding in KLM are poor roads, poor drainage and illegal dumping. For the reason of the high effect of rainfall in the Kinshasa local municipality, the streets are armed with large drainage channels, some up to 1m wide and 2m deep, on either side of the road. In most areas in Kinshasa local municipality, these drainage channels are filled to ground level with waste and dirt which has been washed off from the roads. Accordingly, the interview with Michel Uyumbu environmental engineering has revealed that: …'*because inadequate waste collection and transportation in Kinshasa; the inhabitant of our area have a bad behavior to stock their solid wastes and waiting for rainfall, then they drop it in the streets so they can be evacuated*'. Drainage and watercourses are usually blocked with solid waste. This causes serious problems in KLM especially during the rainy season and occasion many deaths in the city every time it rains. If the waste was managed and collected properly, it would not get into the drainage system and this high mortality rate could be avoided. Many people in KLM throw their waste in open spaces or wait for the rain and then throw their waste to be washed away. The result is the constant blockage of the drainage system, which in turn causes flooding.

As most of the drains and watercourses are blocked with waste, the water is contaminated. The solid waste also provides a breeding ground for mosquitoes. The water in these drainage channels and watercourses is used by the local people and it usually contains:

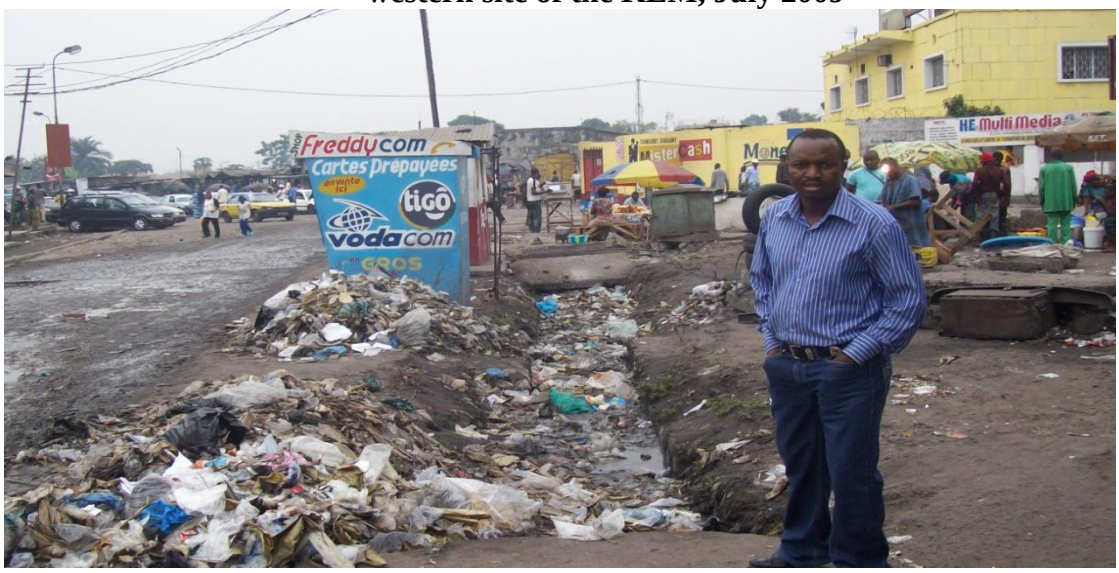
a. Contaminants for example, metals from the breakdown of waste.
b. Bacteria from the breakdown of solid waste.
c. Conditions that are an ideal breeding ground for mosquitoes.

The number of people killed each day in KLM from chemical or bacterial contamination of the water or from malaria is unknown but is likely to be significantly higher than the number killed by flooding as a consequence of uncollected solid waste (Muzumbi, 2008). Moreover, the power supply network is particularly poor both in terms of the standard of installation and the condition of operation. The cables are not carefully covered to protect people from harm. Moreover, the power supply network is particularly poor both in terms of the standard of installation and the condition of operation. The cables are not carefully covered to protect people from harm. Number killed by flooding as a consequence of uncollected solid waste. Moreover, the power supply network is particularly poor both in terms of the standard of installation and the condition of operation. The cables are not carefully covered to protect people from harm. Many people within the city die from electrocution, and frequently this is caused by the flooding discussed above, particularly when it takes place in areas with live un-insulated cables. This dangerous situation poses serious problems for informal collectors in KLM in that it hinders them from doing their jobs properly.

4.4.3 Health Hazards as Risks of Solid Waste in KLM

In KLM solid waste is the home to numerous disease-carrying organisms as mosquitoes, flies, fleas and rodents. Other issues which were observed in the research include the visible killers and the invisible killers such as mosquitoes, insects, etc. Poor solid waste management is not the only health issues; lack of clean water, lack of a good sewage system and lack of access to health care are also significant. The absence of a waste management system in KLM however is a significant contributor to the high level of death and of many diseases including malaria, diarrhea, chest problems and other respiratory diseases (Surjadi, 1993). The figure 25 below exposes the risks presented by solid waste in the area.

Figure 23: Solid Waste as a Health Hazard in Kabambare Street, Corner Huilerie in western site of the KLM, July 2009



Besides the visible health hazards here are a wide number of invisible health hazards in KLM; also the main challenges which directly relate to solid waste management are illegal dumping and the current practice of throwing sold waste in the street during rainfall. Pinnock (1998) has noted that as the solid waste breaks down, methane, carbon dioxide and trace components are produced. Moreover, most houses in the area are built on the waste dump areas. There is a higher probability that the gases will filter into the houses. The main risks are explosion and asphyxiation from lack of oxygen. Hence houses built on waste should be checked for the presence of methane gas as a matter of urgency and if found such houses should be destroyed. Malaria is a major health hazard because the blocked drainage channels cause stagnant water to build up around the city, providing perfect breeding conditions for mosquitoes.

4. 5 Hierarchy of Solid Waste Management in KLM

The management of solid waste comprises a cycle of activities which should be permanent and continuous. These activities are cleaning, collection, recycling, transportation and disposal.

4.5.1: Cleaning of Solid Waste in KLM

Cleaning is the first step in solid waste management activities. It is a practice that the municipality has learned from householders, one that ensures the prevention of pollution. Pollutants on sidewalks and other pedestrian traffic areas and plazas are typically due to littering and vehicle use. The case study interviews have revealed that the method of cleaning used is still traditional. It involves the use of conventional equipments such as wheelbarrows, spades, brooms, seals, pitchforks, etc,. This makes it difficult to get things done properly.

Figure 24: Cleaning Methods outside Zoo of Kinshasa in the north-west of the KLM, July 2009



In many countries in the developed world, the sweeping of streets and other open spaces is done with a mechanical sweeper. This modern cleaning method is effective in controlling pollution. The major parties involved in cleaning activities are the city council staff that usually cleans the main streets of the city including Boulevard Lumumba, Boulevard du 30 Juin, Boulevard Triumphal, Boulevard du 24 and other open spaces in Gombe. PAUK however covers both the high income and low income areas. Most private sector companies such as Poubelkin and Congo-Salubrite focus more on collection activities rather than cleaning services.

4.5.2 Collection of Solid Waste in KLM

Collection is one of the most important steps in solid waste management. It starts just after the cleaning operation when containers are filled with the refuse and ends when the refuse is loaded onto the collecting truck. Literally, there are many different collection systems as discussed in literature review such as the simple emptying approach, exchange approach, one-way approach, non-system approach, vacuum waste collection and scavenger force.

Figure 25: Informal Collectors in Kinshasa Local Municipality in (Kato Street) at Centre of KLM, July 2009



In KLM where there is no integrated solid waste management, the collection systems are complex and diversified depending on clusters. Informal collectors go from door to door pushing their trolleys. They attend mostly to their clients but can also collect the garbage of everyone who offers payment. The informal collectors' client pays Congolese Franc (FC) 200 or FC 300 (which is about R2 or R3 in South African currency) for a full plastic bag or seal container of solid waste. The clients complain that the amount is expensive, while the informal collectors think that the amount is insignificant. Moreover, private businesses and international organizations also offer professional solid waste collection services. They mostly provide service to the clients in higher income areas or private companies.

The Kinshasa city council also covers vast parts of the city of Kinshasa. It collects waste in the open spaces and illegal dumps but offers a lower quality of service because most of its staff members are officials from the public sector who are badly paid and thus not motivated.

4.5.3 Recycling of Solid Waste in KLM

After the collection activities, solid waste needs to be treated and safely disposed. Re-use, reduce and recycle are key words for sustainable solid waste management. Recycling reduces the amount of waste that goes to disposal sites. Biological treatment, thermal treatment and land-filling are the main approaches used in recycling, as discussed in the literature review section. The figure 28 below shows the informal dumping in the heart of KLM. The solid waste that is collected by informal collectors from householders in the area is not taken away; rather it is thrown on the open space around the local municipality area.

Figure 26: Informal Disposal in KLM opposite Martyrs Stadium in KLM, July 2009



Recycling is poorly practised in KLM. Besides *Congo Salubrite,* the only recycler company in the area, there are only few people from lower income areas who collect and re-use solid waste. People from other areas see the re-use of solid waste as a shameful activity and feel that it will rob them of their dignity if they are associated with it. These informal recyclers amass all sorts of material ranging from used tyres to clothes, shoes, and household appliances which they repair and resell to people in low income areas. Lastly, it is important

to mention the collection of scraps of metal which are exported overseas for use by steel companies. However, recycling in KLM is remains as a tricky venture because the government does not have any policies promoting and guiding the treatment of solid waste.

4.5.4 Transportation

Transportation is another step on the solid waste management process. After the treatment of all solid waste collected, the un-usable solid waste must be evacuated to the final disposal site where it will be submitted to its elimination stage. Transportation is very important because when the waste collected is not transported to the final site of disposal, there is a risk of eventual pollution.

Figure 27: PAUK Solid Waste Transportation to Disposal Site in Kalembelembe corner Kasai in the south of the KLM, July 2009



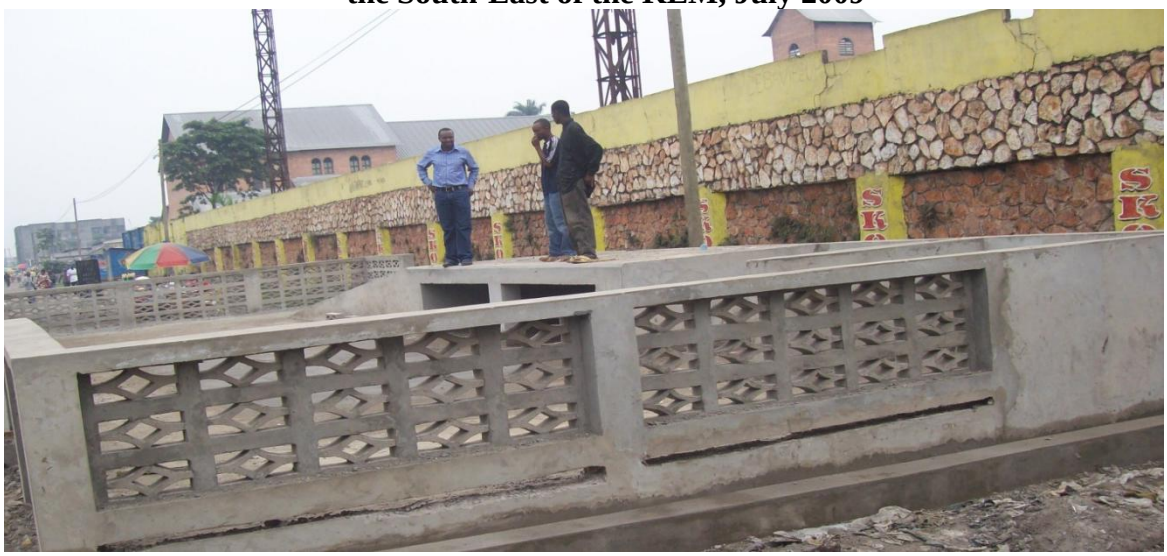
In KLM, the transportation of solid waste is very difficult. Informal collectors do not have appropriate transport facilities; they evacuate their solid waste using trolleys. On the other hand, private companies have modern trucks intended for solid waste transportation, but these trucks do not cover the whole of the CPK. Moreover, the EU through PAUK is well equipped but does not cover a large part of the community. The city council, like the solid waste informal collectors, does not have the appropriate transport facilities for solid waste management. This deficiency of transportation facilities for many important stakeholders in

solid waste management in Kinshasa increases the problem of uncollected waste and illegal dumping.

4.5.5 Disposal of Solid Waste in KLM

Solid waste disposal is also an issue in KLM. There are insufficient transitional disposal sites in the city. Before PAUK's operation, which has constructed two formal transitional disposal sites (one in Barumbu local municipality and another one in Kinshasa municipality), collected waste was disposed in informal disposal sites for years. Sometimes, the waste was never evacuated to the final disposal site which is located in Mpassa, outside the city of Kinshasa. There used to be an informal disposal site with a mountain of solid waste opposite the Martyrs Stadium in KLM. This had direct and indirect health consequences for players and their supporters, and also for the people who stay around the stadium.

Figure 28: PAUK's Construction of a Formal Disposal Site outside St Pierre Stadium in the South-East of the KLM, July 2009



Another informal disposal site was located in old market 'Type K' opposite (Somba Zikita) small and very busy market. PAUK started by evacuating the quantity of rubbish in the area. This intervention came at an appropriate time because the avenue Luambo Makiadi was about to be jammed. The person in charge of the evacuation of solid waste at PAUK evaluated the rubbish to be nearly 2.000 m^3. With the assistance of a move loader and several trucks, the team of PAUK workers used four days on average to evacuate the Type K solid

waste. This is only one of the consequences of the insufficiency of formal solid waste disposal sites.

4.6 Conclusion from the Case Study

The solid waste in the KLM is undertaken and managed by several stakeholders who are working separately. The lack of existing unique solid waste policy and programme within national government as strategy to deal with environmental challenges and urban problems have put the stakeholders to take their own initiatives to address the problems. The roles of women in solid waste management are largely neglected in Kinshasa Local Municipality where they do not have any part of the responsibilities among all stakeholders involved in solid waste. The failures of solid waste management are contradictory and are being accused mutually among stakeholders.

Several solid waste management interventions in KLM are discriminatory. Frequently it is the wealth neighbourhoods that are attended to by all stakeholders involved in waste management because of monetary interest as opposed to environmental issues. The reasons are that all the parts have first as purpose to make money rather than to protect the environment. The situation is exacerbated by the fact that all sectors are using survivalist mechanism which is tolerant to minimal services as subsequent to the post war institutional inferiority.

The stakeholders in solid waste management in KLM are enormously challenged in doing their work properly. It becomes a one man's meat is another man's problem situation. For instance, when government and local community lack financial and material resources to manage solid waste, financially and materially well resourced private businesses lack personnel and campaign for the success of their projects with which the government and local community will be better positioned. Hence there is a need for an integrated solid waste management approach as a unique solution to address environmental issues in KLM.

A prospectively explosive part of any post conflict scenario is the incapacity of property institutions to perform in effective, legitimate and equitable way**s.** The Congolese post

conflict institutions in the case of KLM have revealed such evidence in solid waste management sector. The lack of strong institutions to tackle urban challenges is the characteristic of KLM's institutions. Local Municipality's institutions in Kinshasa have failed to deliver urban services to the communities. The KLM seems to be amongst the mostly affected local municipalities with solid waste challenges in the world. The reasons are not only limited to rapid urbanism and post war rural emigration but also due to irresponsive local municipalities.

The Republic Democratic of the Congo is amongst the countries which have a higher rate of unemployment. Poverty is another real challenge in the city; several solid waste theories link waste to poverty. The involvement of local communities in solid waste has shown the interest of the Congolese aimed to protect their environment, without them solid waste situation will be more critical in KLM. The direct or indirect consequences of poor solid waste mismanagement have critical environmental implications. The effects of lack of solid waste management in KLM are ostensibly higher than the war which has affected the country. However, the environmental problems in KLM are a humanitarian disaster which seeks a rapid intervention by national and international institutions.

CHAPTER FIVE: IDENTIFICATION OF CHALLENGES AND PLANNING FOR SUSTAINABLE SOLID WASTE MANAGEMENT IN KINSHASA LOCAL MUNICIPALITY

5.0 Introduction

This chapter identifies the main challenges facing KLM in solid waste management as discussed in the study findings and elaborates planning for a sustainable and integrated solid waste management within the municipality. The research has shown that KLM is facing real and multiform solid waste challenges. I am of opinion that solid waste management in KLM is a humanitarian disaster which calls for urgent and immediate intervention as it poses a risk of compromising lives of the present and future generation. The causes of solid waste management in the area are immense, ranging from political conflict and institutional change, to social and economic factors. It is evident that rapid and unparalleled urbanization in the KLM due to political conflicts and Congolese's bloodiest wars plotted in African history since World Cold War; which eventually has lead to the deaths of some of millions people are the causes.

5.1 Identification of Solid Waste Management Challenges in KLM

This research questions the challenges facing City province of Kinshasa in solid waste management, the case study of KLM. The qualitative research method by the tools of interviews, observations and photographs around case study area used to collect primary data and literature for secondary data have offered rich and informative findings.

The findings of this research have shown that challenges of solid waste management in the KLM are characterised amongst others by: unplanned growth and increasing pressure to provide services; lack of adequate authority to address people, infrastructure and resourcing problems; bureaucratic confusion and delays due to a multitude of agencies; lack of accountability; limited communication within the city administration and more importantly between the city administration and the various stakeholders; lack of environmental

education and awareness within local municipality; lack of skills of municipal workforces; financial constraints and gender related issues.

5.1.1 Lack of adequate Authority to address People

The case study observations and interviews have revealed that in KLM, centralization, bad governance, insatiability, poor leadership, graft and poor collection and service cost accounting, and financial planning, in addition to cost recovery, forced the municipal into enormous financial problems. These problems promote powerlessness to the local municipality to manage solid waste efficiently. Further, political interference where official are serving firstly the politicians than the people's interest, poor leaderships and corruption have promoted mismanagement coupled with low worker's morale have resulted in poor solid waste management.

The municipal authorities are most focused to the private gathering of wealth rather than the efficient management of urban services. The case study of KLM has revealed that for the municipal officials to keep their jobs, they have to do what the politicians tell them no matter what kind of effects their actions will have on urban services.

5.1.2 Infrastructure and Resourcing Problems

The findings of this research have indicated that lack of infrastructure and resourcing problems are a factor negatively contributing to solid waste challenges. Kinshasa does not dispose adequate infrastructure for solid waste. Most areas are not covered by existing solid waste services due to inaccessibility. Blocked water drainage systems and flooding are making the task even more difficult. The collectors are experiencing enormous difficulties to collect the waste and to pass with their trolleys. In KLM, the householders which are living in extreme poverty do not have the containers for their waste storage, consequentially; all household refuses are thrown in open space. City province of Kinshasa has only recently constructed two transitional sites which are still insignificant. There is illegal dumping and a mountain of solid waste (e.g. mountain of solid waste opposite Martyrs Stadium and at *Type K* around *Wenze Somba Zikita*).

5.1.3 Inadequate Enforcement Authority

The research has demonstrated that the solid waste constitute a real environmental problem in KLM resulting from lack of environmental policies and law enforcement. The environmental policies in the entire City of Kinshasa are those inherited from colonisation epoch, however they are not enforced. The community is not aware about the notions of environment protection and there is not any environmental campaign organised so far.

Moreover, the environmental protection is not government's priority. Since a decade, government's attention is focused on security and political issues rather than on environmental protection. Consequently, everyone can throw their domestic refusal everywhere without being prosecuted. Lack of solid waste service collection and environmental law enforcement have led to increasing illegal dumping and many households in KLM throwing their refuses in the streets during the rain so it can be carried out by rainfall.

5.1.4 Limited Communications within Local Administration and the various Stakeholders

The findings have shown that there are some sufficient solid waste stakeholders and activities which are undertaken in the area; but not organised and co-ordinated. Every cluster is operating individually and as a consequence some areas are discarded. The lack of co-ordination of solid waste activities is not only within the local stakeholders but also between local, provincial and national levels of government. National Cleaning Programme created by national government does not know the areas covered by the provincial and local solid waste key players.

The KLM needs to identify all stakeholders involved in solid waste working formally or informally in order to empower and to organize them through a framework or platform which will be supervised by local municipality, a sort of liable partnership. Majority of the population in the area is willing to pay for their waste services but they lack a responsible service provider. Some of them would like to pay but they are not covered by any solid waste

services. Further, the population claim to spend lot of money regularly with the informal collectors which are not providing equipped and supported services and they are not delivering a regular and professional service as wanted by the population. Moreover, the private sector is very expensive for the population where the majority is comprised of poor and unemployed people who cannot afford to pay private businesses services.

5.1.5 Inappropriate Technologies and Financial Constraints

The findings of this research have indicated that the solid waste management in KLM is still operating traditionally for the most of stakeholders involved in waste activities. The use of operational tools such as seals, brooms, forks, wheelbarrows is still current in the area. The majority of informal collectors have decried of under payment as well as insufficient of financial resources and technologies. The fact that many stakeholders including informal collectors and householders are not structured means that they cannot defend their interests. Due to inappropriate technologies, many solid waste stakeholders are exposed to the diseases, and they are not protected against toxic waste during collection operation. Moreover, they do not have the appropriate containers for solid waste storage; they are usually using the plastics which get full rapidly before collection times.

The challenges facing public sector in KLM is mainly lack of the resources, particularly in local level. The environmental unit in local municipality do not have a specific budget for solid waste. Local municipality have many prisoners but lack appropriate and liable materials to clean up, collect and to transport sold waste. Kinshasa City council has insufficient trucks to collect the solid waste, however, private sectors in the area have sufficient technologies and materials, but as profit makers, they seem too expensive and majority of poor population cannot afford their services. Therefore, there is a need for a partnership or an integrated solid waste management approach/plan/strategy.

5.1.6 Lack of Environmental Education and Awareness within Local Communities

The findings of the research indicate that the factors that led to poor management of solid waste management in KLM are linked to lack of community participation in solid waste programmes and environmental awareness and education. Local communities are not involved in management of urban problems. The population is not aware about the simple notion of environmental protection and management. The case study has shown that the majority of Kinshasa's dwellers "*Kinois*" after utilisation throw their refuse in the streets and in open space because of lack of educational environment. The local communities as the first beneficiaries of development projects need to be informed for any projects concerning their development. However, local communities are the consultants rather than the participant on environmental programmes.

5.1.7 Gender Related in Solid Waste Management in KLM

With regard to gender, the findings of this study have indicated that local community is a crucial stakeholder in solid waste management in KLM, however householders are mainly composed of women to a large scope accountable for household solid waste management, including dealing with servants and travelling solid waste buyer. Majority of women do not work, their main duty is cleaning up and sweeping the houses, washing kitchenware and looking after kids.

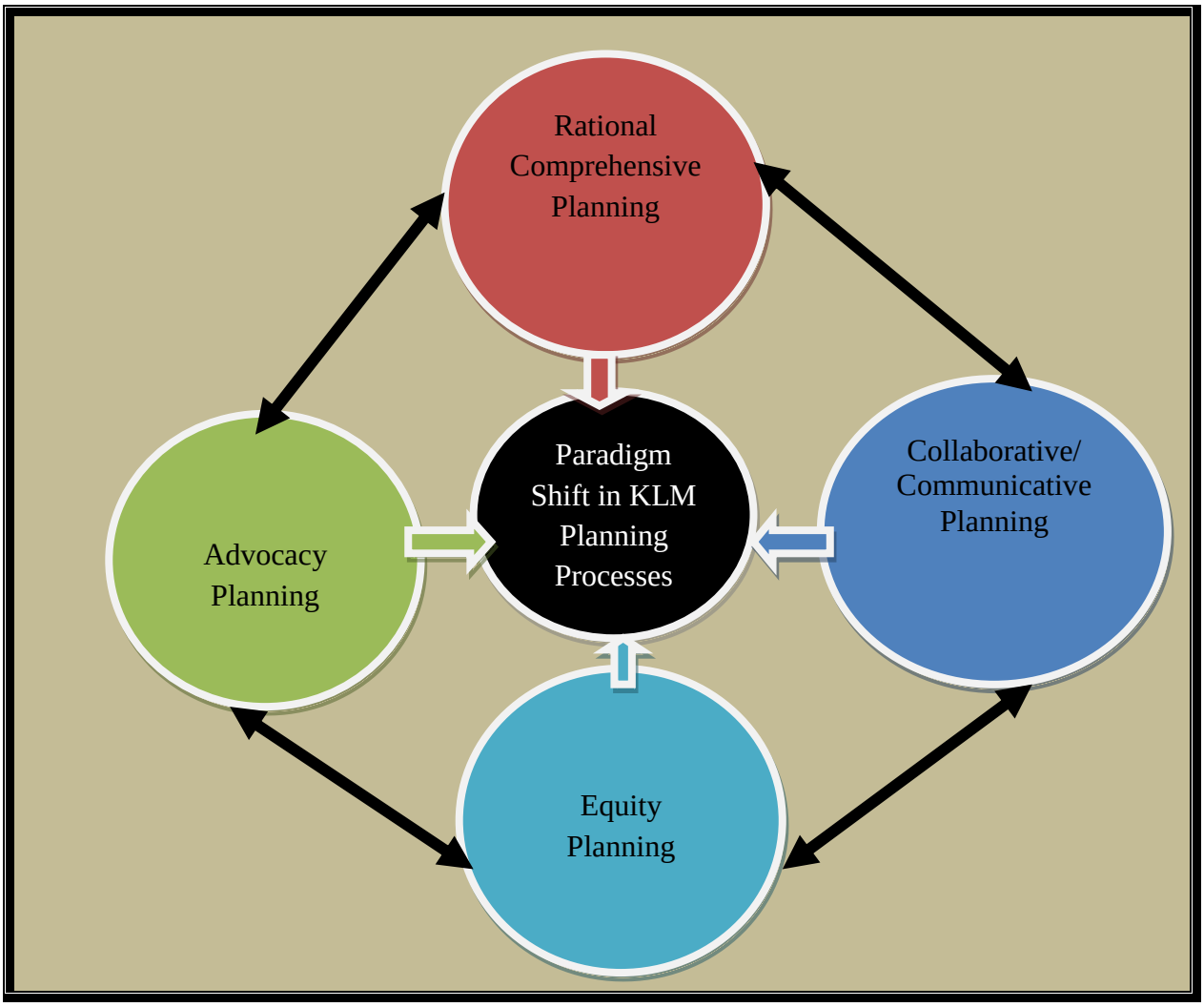
Further, the shopping and other activities generating waste in KLM are exercised by women as directors of households in the area Women are the main producers and at the same time the collectors of solid waste. Thus, it is crucial to involve women in solid waste management. In KLM, women seem to be majority but there are excluded in solid waste management. Among the stakeholders involved in solid waste activities including cleaning, collecting, recycling and transporting, the case study did not find any case of women in ongoing waste activities. Therefore I should say that women are excluded from solid waste management.

5.2 Planning for Sustainable Solid Waste Management in KLM

The focus of integrated planning is on the need for intervention by the state in the market and in social processes with the aim of facilitating societal guidance. Formulation of objectives and planning for their achievement are important for improving solid waste management at the national, regional, and local level. Planning requires the definition of a strategy that will facilitate careful implementation of the necessary measures and the appropriate allocation of resources according to the identified strategies. This is crucial for the motivation of all stakeholders involved in solid waste management in the area and for defining further actions that may be needed**.**

The recommendations of planning for solid waste management are interpreted and outlined through the planning theories developed below. The planning as a democratic process aimed at promoting environmental sustainability, social welfare and social justice; against the technical and administrative machineries promoted and created to pursue these goals focused on a narrow and dominatory scientific rationalism (Healey, 1997). Solid waste management in Kinshasa must be understood and managed following the integrated Planning processes as demonstrated below. Fainstein (2005) has mentioned that planning theory needs to consider under what conditions conscious human activity can produce a better municipality for all citizens. Sustainable solid waste management in the KLM can be achieved through planning theories. Since the history of planning, it has played a significant role in changing urban life from more complex urban problems such as the case in KLM to a better and well-being municipality for all urban residents. This section has combined five significant planning theories which can be useful to explain and guide the good practices for solid waste management in KLM.

Figure 29: Sustainable Solid Waste Management in KLM



5.2.1 Rational Comprehensive Planning

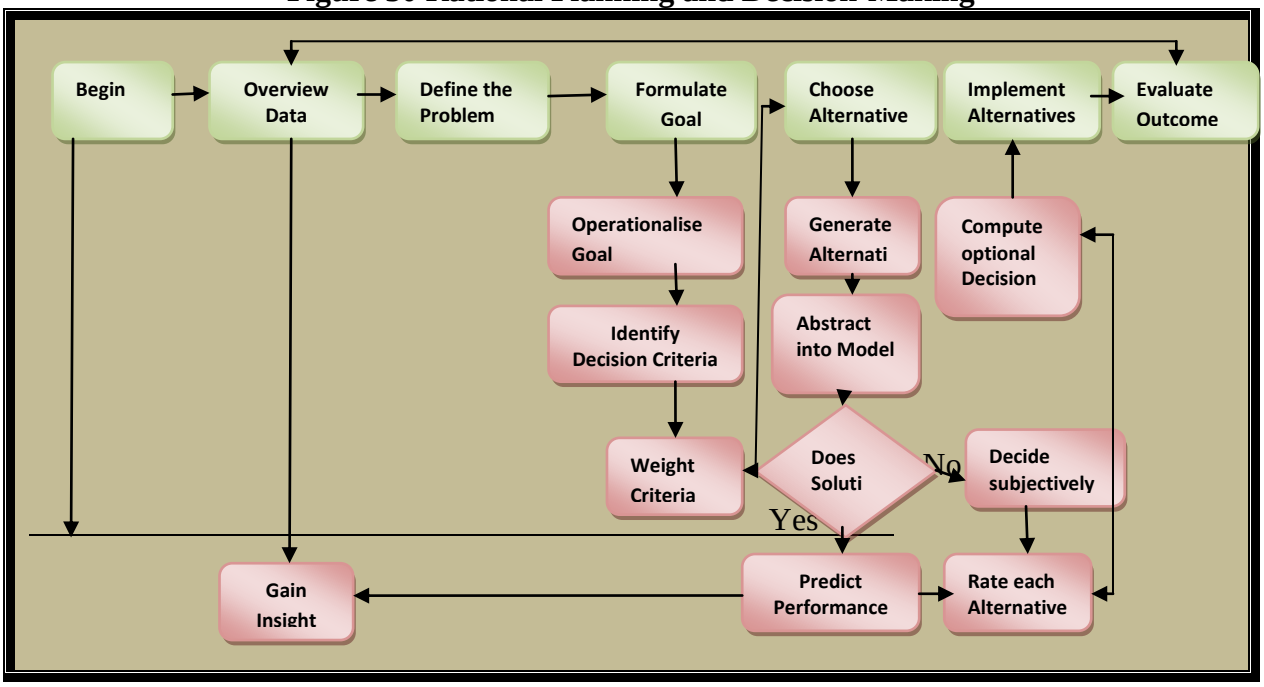
The inclusion of the rational comprehensive model seeks to enable the influence of power in planning processes and focus on physical or/and morphological aspects of urban management.

The attention of rational comprehensive planning is focused on policy analysis, administrative behavior, organization theory, public choice theory, system theory, and so on, because the central concern for planning was to come up with a universal solution after all alternative courses of action were evaluated. This is a decision-centered rather than a control-centered approach to planning, where planning is defined as correct decision making

concerning future courses of action (Winkler, 2009). Planning is at its heroic, confident in its capacity to discern the public interest in specific case. It works in daily environments encompassed by rationality and its bureaucracy implications (Sandercock, 1999).

The figure 32 below illustrate the rational planning model which is the process of resolving a problem, establishing and assessing planning criteria, creating alternatives, implementing alternatives, and monitoring progress of the alternatives.

Figure 30 Rational Planning and Decision-Making



Source: David Levison Unknown date, accessed on August 2010

However, this planning approach is largely criticized for its form of top-down planning as anti-democracy -impossibility of aggregating public interest and the impossibility of relying on the large scale model for societal guidance (Sandercock, 1999). In context of KLM, rational planning will help in medium-term intervention to assist in establishing solid waste policies and regulations for solid waste management and processes control among the stakeholders. Government still needs to play a crucial role in solid waste management in KLM. The importance of strengthening solid waste local institutions is vital to respond to the challenges of partnership and integrated solid waste management in KLM. The role of local

municipality to influence planning process in KLM is crucial; where state is quasi- inexistent because of civil war which has affected all local institutions.

Rational comprehensive planning theorists center their intervention on physical aspect, the morphology of the city. However, it may help KLM to be attractive, clean and with little attention on social living conditions. In case of KLM, it assists to reinforce local bureaucracy to set up regulations to change physical aspects of the area. It should enforce the top-down measures to change morphology of the municipality which may have consequences on safe and clean environment within the local area.

5.2.2 Advocacy Planning

The aim of advocacy planning was to represent and advocate on behalf of poor which are marginalized by rational comprehensive planning which focuses on physical rather than social aspects of city dwellers (Sandercock, 1998). The poor who have been previously unrepresented in public decision making processes and outcomes would now be represented by advocacy planners. They would go to deprived neighbourhoods, find out what those people want and bring that back to the desk in the planning office. The advocacy planning intends to help people make their interests felt, especially people of low-income communities who seem to be under-represented in the planning process. It assists the poor communities marginalised by top-down decision-making process to be heard; it is an indispensable lobbing for poor communities.

However; the efforts of advocate planners to represent these groups are made difficult because of their frequent lack of homogeneity, community feeling, and common interests in action. Advocacy planning is criticised for being still expert-centred, the poor still with no voice in planning process. It has emerged as a prevailing social myth which has become the current practice of all planning activities. The growing concentration of economic and political power centres, the alienation of people from the decision-making process, the effective lack of meaningful access into the political process by groups and individuals, and the failure of conventional, electoral politics are identified as the primary indicators by which the failure of advocacy planning can be measured (ibid).

Once they are heard and represented, this will emerges a radical planning which critique the existing unequal relationships and distributions of power, opportunity and resources; and work for structural transformation of systematic inequality and in process to empower those who have been disempowered (Sandercock, 1998). Planning for social transformation begins with a critique of the present situation that is creating systematic inequalities and then provides an alternative response to this critique via policies for structural transformation and the potential empowerment of those who have been systematically disempowered (ibid). Radical planning is an insurgent against all rational planning process which does not take account of the poor community's issues; it promotes empowerment to assist the poor for the practical solution for a participatory development.

In KLM environmental situation is much degraded causing several diseases. This situation does not retain attention of the decision-makers because the poor's interests are not represented in decision making process. Although, constitutionally, everyone has a right to environment that is not harmful; the residents of KLM particularly low income suffer with real stress of environmental degradation. Regrouped under several user organisations, they have difficult to participate in planning process of the decision in which they will be affected. Advocate planning should be a response to the low income concerns and issues. However, it is not yet easy to apply advocate planning in actual context of KLM issued from a civil war where legal and institutional framework are not set up. Maybe this should be planned for long-term intervention.

5.2.3 Equity Planning

Just-city has a most radical expression of participation that is not a simple involvement of stakeholders to governance by civil society as suggested by collaborative planning (Winkler, 2009). It acknowledges conflict view of society and power influence (Fainstein, 2005). Just-city is a political economy approach and radical democrat which takes an explicit rational position concerning the redistribution of social interests (Winkler, 2009). Because political economy analysis mostly condemns policy makers for being the captive of business interests, it is addressed primarily to insurgent groups against officials in progressive cities The question about who get what and when has strongly challenged equity planning; there is

never been equable repartition. Equity planning is still engaged in speaking truth to power (Sandercock, 1998), a state –centred planning because the excluded poor are still not part of the action, however, there is a need for more participative planning approach.

This approach to planning is known as equity planning because it promotes a fairer, more just outcome for as many people as possible through the local municipality's planning decisions/ policies/ plans (Winkler, 2009). Although, it is difficult to get an equitable distribution of services, equity planning may assist to reduce scale between rich and poor in terms of services delivery in KLM. The case study of KLM has shown that there is no justice in solid waste service in KLM. As mentioned by Mbuyi (1989), the collection of waste in the City province of Kinshasa depend on the areas whereby only wealth areas are regularly covered while the poor or low income areas are not regularly covered by collection services. The Just City planning approach may establish equality in solid waste services; thus both wealthy and poor areas will be equitably covered by municipal solid waste services. For those of the poor who cannot afford to pay for their services, municipality must provide free basic services for them.

5.2.4 Communicative or Collaborative Planning

The communicative model thoroughly discussed by Healey (1997) in her collaborative planning explains the process by which participants arrive at an agreement on action that expresses their mutual interests. This approach has been inspired by American pragmatist philosopher John Dewey and communicative action of German Jurgen Habermas who argues for the reconstitution of a public realm where meaningful and undistorted communication is possible (ibid). The aim of a collaborative approach for planning is to facilitate a fair, inclusive and transparent planning process; if the planning process is just, then the outcome will also be just (Winkler, 2009). It relies on qualitative research methods rather than on scientifically objective methods and seeks to understand the unique and the contextual. Although equity planning is trying to improve planning by promoting the equitable redistribution of resources, communicative action is trying to improve planning by removing the barriers to communication and by creating a model of open discourse (Forester, 1989).

Consequently, the disadvantages of this approach are: -it put more emphasized on open debate rather than to solve the problems; - it is focuses on consensus while it is always difficult to reach a consensus because of different interests, feelings and background of interested groups; - It does not acknowledge the power while the power is everywhere and has impact on planning processes. The poor or/and marginalized people do not have the power, their interests are not well negotiated. However, radical planning has emerged to empower the poor and marginalized people to take active part on the planning processes. Radical planning will not be discussed here because it is far to be applied in the actual context of KLM as described in the above section. There is a real need in KLM of creation of the community based organizations particularly those related to solid waste management to defend their interests; they may plaid and make pressure on local government authorities to improve the living conditions of their members as well as improve their environment.

Communicative and/or collaborative planning entails communicating ideas with different interest groups, arguing about these ideas, debating differences and eventually reaching some kind of consensus on an appropriate course of action. However, solid waste management in KLM consist of several groups with different interests, hence a need for interaction, debate communication and collaboration, integrated programmes to curb the issues of solid waste in the area. Therefore, the communicative planning is relevant to be applied in short-time for KLM actual context.

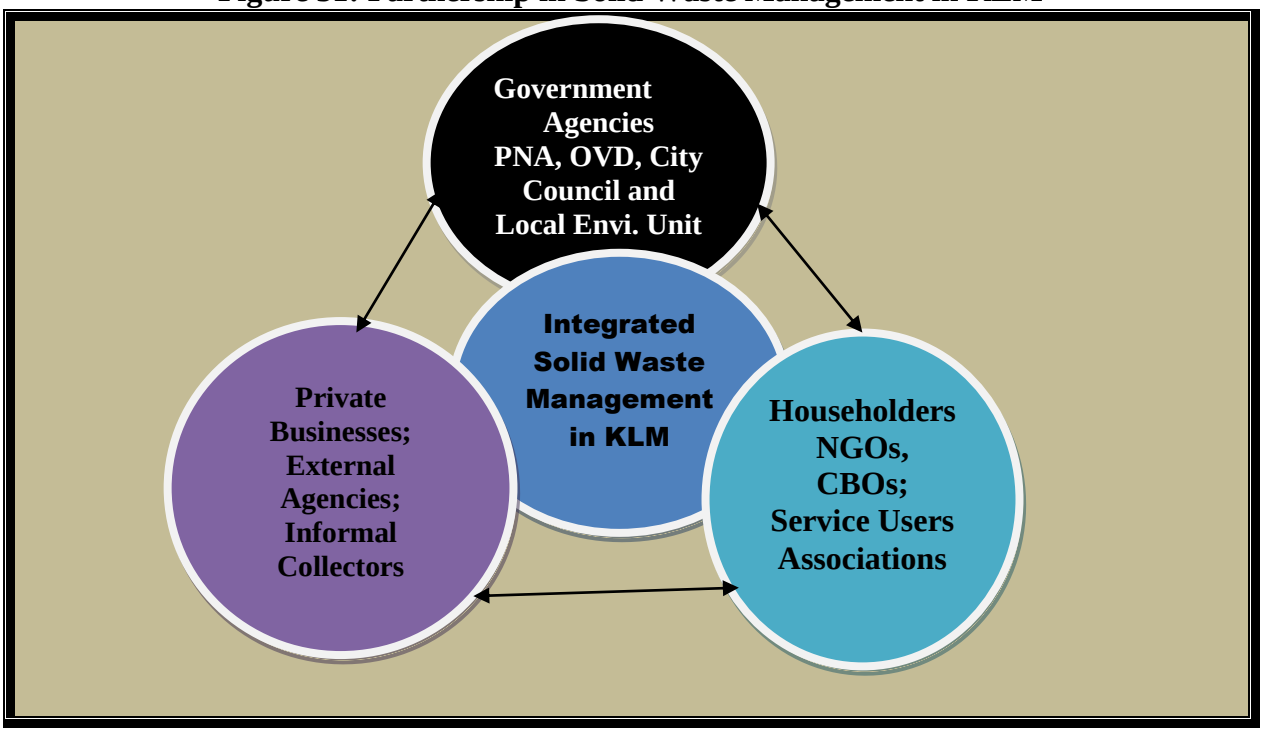
The above sections have demonstrated that the different stakeholders in solid waste management in KLM are rejecting each other the responsibilities of environmental challenges and also more solid waste programmes are not coordinated in the area. The communicative approach may respond to those challenges by confronting interest groups, arguing about these ideas, debating differences and eventually, reaching some kind of consensus on solid waste management. Based on the result of this research and planning theories discussed, the following recommendations are made for an efficient solid waste management in KLM.

5.2.5 Partnership in Solid Waste Management in KLM

It is recommended that a partnership in solid waste management in Kinshasa be established. The City council and Kinshasa local municipality should engage in partnership with the private sector which includes -private businesses, international organisations and the NGOs and CBOs. A collaborative planning and consensual complementarities management of solid waste should bring a solution to Kinshasa solid waste challenges. Communicative planning can be useful in promoting partnership among the stakeholders in management of solid waste in KLM.

The majority of the research participants are in favour of integrated action or partnership as a strategy to solve the solid waste problems in the city of Kinshasa. Although some participants share the traditional view that the public sector is best positioned to provide public services, they also acknowledge that the public sector in Kinshasa in particular and African cities in general is manifestly inefficient, corrupt and lack the capacity and appropriate resources to manage solid waste properly.

Figure 31: Partnership in Solid Waste Management in KLM



As discussed on literature review section, challenges of solid waste management in many local municipalities are attributed to lack of financial resources, skilled personnel and appropriate technologies by many local municipalities in developing countries (Wolf et al. 1999). The involvement of private sector in environmental problems, rising poverty levels and the private sector profit driven approach has forced local government to form a partnership in order to deliver efficiently the services. In KLM, partnership between above mentioned stakeholders may stimulate an active participation of all stakeholders and assist to address the issues of solid waste in the area. However African cities lack integrated planning for solid waste which involves all stakeholders in solid waste management, nevertheless, if there is somewhere, the texts governing their relationships are not very clearly determined and precise.

There is a need in KLM for a partnership in solid waste built on clear regulation précis roles and responsibilities. For a partnership to be successful in KLM, the interests of all stakeholders must be guaranteed and put together to work towards a sustainable solid waste management. To be effective, the partnership of solid waste management must be accompanied by strong leadership and institutions which have the obvious regulations enforceable to all stakeholders involved on the process. It must establish the roles and boundary areas of collection to every stakeholder. Further, local government must control and supervise the functioning of the course.

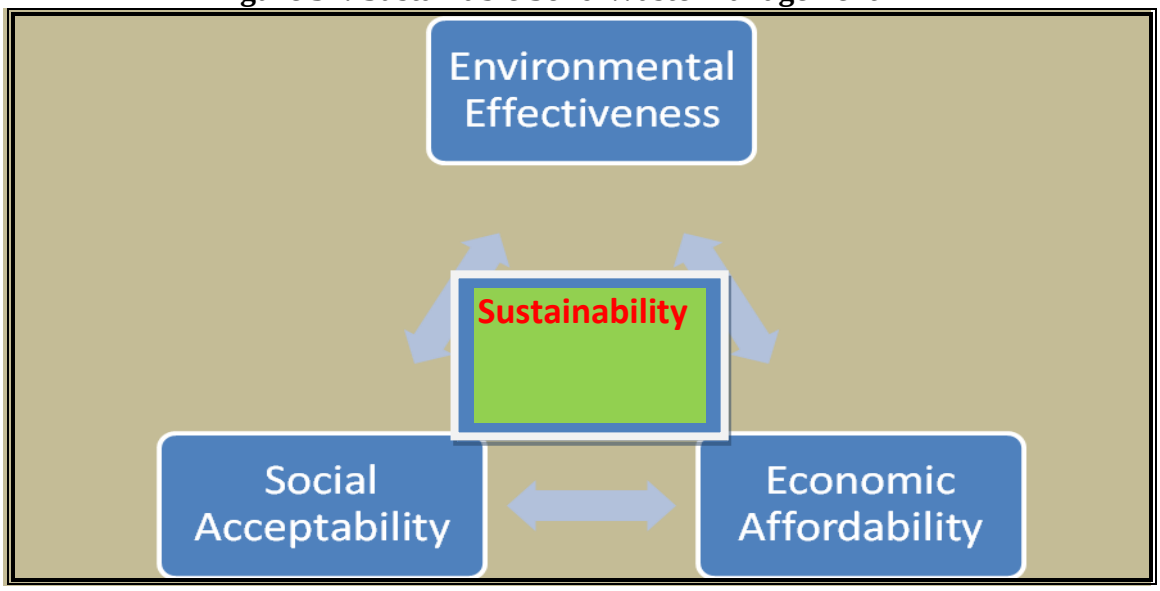
5.2.6 Sustainable Solid Waste Management in KLM

The rational comprehensive planning is relevant to addressing the issues of environmental legislations in KLM where there is lack of societal guidance for solid waste. The involvement of local government on solid waste management is still crucial. As noted in literature and legal framework sections, the local government is the first responsible for providing basic urban services including solid waste management. The local government needs to establish environmental legislation and policies to regulate solid waste management activities in the local level. There is a need in KLM for a clear and recent environmental legislation with a focus on solid waste to respond to actual solid waste challenges. Most of legislations applicable for KLM are dated from 1985 when the area was not experiencing a critical

environmental problem like it is today for the reasons discussed above, this require policy change. As discussed by Blight et al. (1998) in environment in Botswana; the next environmental legislation in KLM should have as objectives: affordability, protection of natural resources, protection of human health, and protection of air, soil and ground water.

There is a need in KLM to sustain environment. McDougall et al., (2001) has suggested three components for sustainable solid waste management; which take into consideration the environmental effectiveness, economic affordability and social acceptability of any strategy that is put in place. McDougall summarises this in the form of a triangle as show below.

Figure 32: Sustainable Solid Waste Management

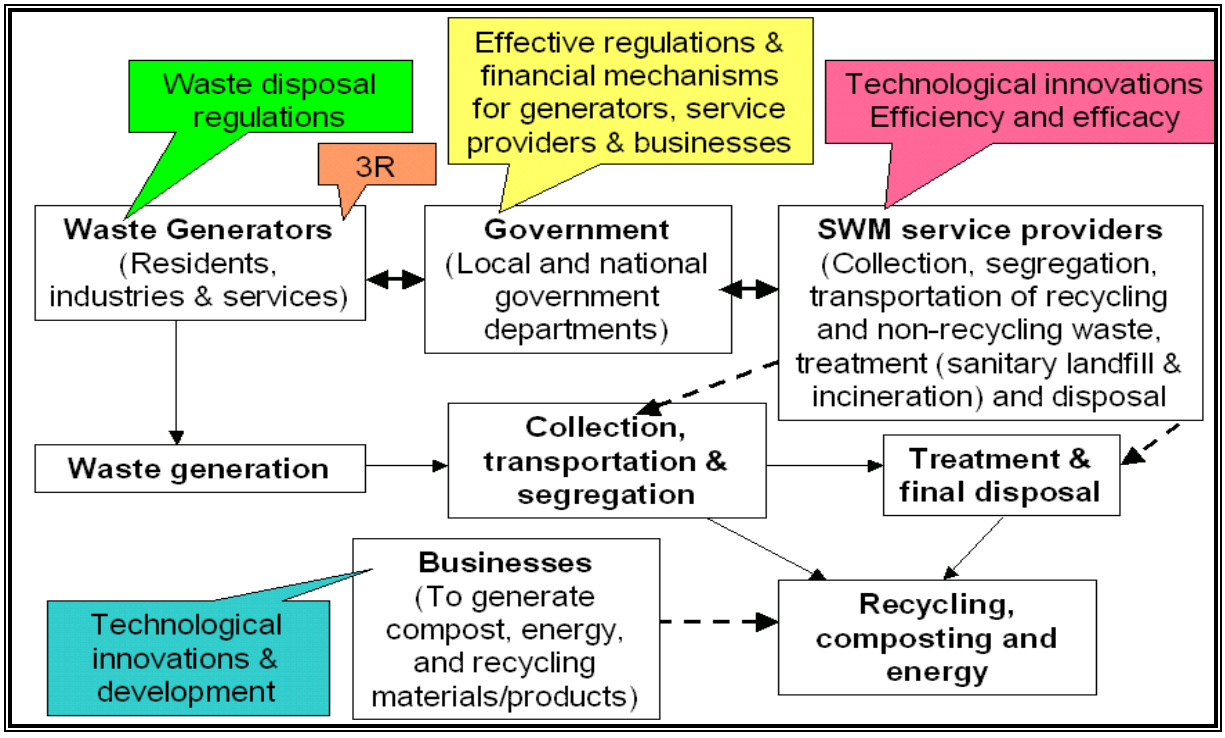


The next legislation on environment in KLM would likely to embody: Integrated pollution control; the responsibility of everyone to regulate the emissions to air, water and land; the polluter pays for pollution; everyone who generate the waste must carry the cost of its management; adaption of the precautionary principle; one must be sure of the consequences if any action otherwise that action should not be taken; the duty of care, every waste generator remains responsible of waste generated; cradle-to-grave control, which is taking a hostile view of the whole of solid waste cycle or activities and affordability (ibid).

5.2.7 Planning for Integrated Solid Waste Management in KLM

The implementation of an Integrated Waste Management Planning system is seen as key to aligning and coordinating the activities of government institutions and other stakeholders in order to optimise waste management maximise efficiency and minimise the associated environmental impacts and financial costs of waste. The research has revealed that in City Province of Kinshasa in general and KLM in particular there is no planning or coordination of Solid waste. However, Furedy (1992) has mentioned that an efficient solid waste management requires a strategic planning which involves the identification of all stakeholders involved in projects, their empowerment (training, networking) and the repartition of the responsibilities and tasks are very crucial for successful of solid waste management in KLM.

As discussed by UNEP (2009) Developing Integrated Solid Waste Management, ISWM involves several operations which include regulations and laws, institutions, financial mechanisms, technology and infrastructure, and the role of various stakeholders in the solid waste management chain as demonstrated in diagram below.



Source: UNEP, 2009, accessed on November, 2010

Integrated solid waste management (ISWM) entails the choice of appropriate strategies, technologies, policies, institutions and management programs to achieve specific waste management objectives and goals. Many stakeholders in solid waste management in KLM are working separately. Some of them lack financial resources but do not have human resources and others have human resources but lack financial resources. There is a need for inter-complementarities in solid waste management in KLM. Integrated planning in solid waste in the local municipality will excite an active participation of all stakeholders and their interest must be put together towards the sustainability. It will involve all stakeholders in solid waste. Further, there is a need to revitalize the council to provide for the majority of urban poor.

An integrated solid waste management entails formulation of goals and planning for improving solid waste management at the national, regional, and local level. Planning requires the definition of a strategy that will facilitate careful implementation of the necessary measures and the appropriate allocation of resources according to the identified strategies, legislations and institutions to determine the guidelines for the short, medium and long-term solid waste management.

Table 10: Proposed Strategies for an Integrated Solid Waste Management in KLM

Strategies	Description	Duration
Organization of public awareness and education campaign in KLM	There is a need for solid waste campaign, education, training and information to raise awareness of local communities about solid waste issues in KLM.	Short-term
Formalization of the informal waste management practices	There is a need to formalize informal collectors and to form a network between Local authorities, recycling agents and investors such as "Congo salubrite" to address the issues such as plastic rubbish in KLM. Local authorities should provide incentive measures both for informal collectors and recycling companies.	Short-term
Appointment of solid waste management government	There is a need to create solid waste government agencies from national, provincial and local level to manage, regulate	Short-term

agencies.	and supervise solid waste activities at all levels of government	
Conducting a research project on solid waste quantity and type produced by householder in KLM	There is a need to conduct a research project to determine the quantities of solid waste produced per day, per week and per month as well as the type of solid waste produced (degradable or undegradable) in order to facilitate the planning for management process	Short-term
Empowering and Promoting Women intervention in Solid Waste Management in the area	As learnt from Johannesburg experience, women must play a role indispensable in waste management in KLM. As women represent the nucleus of the KLM, institutional programs and successful solid waste activities must depend on them.	Short-term
Funding and Subsiding free dustbin containers	There is urgent need for environmental provident authorities to fund and subvention free distribution of dustbin containers in every house, public place, every corner and along the streets of KLM.	Short-term
Establishment of Integrated Solid Waste Management Master Plan for KLM	There is need to establish an Integrated Solid Waste management master Plan. This must be done with consultation with all stakeholders involved in solid waste management in KLM.	Short-term
Integration of Indigenous waste practices	Solid waste local authorities should integrate indigenous solid waste practices into strategy plan for SWM in KLM	Medium-term
Enforcing laws and policy	Environmental law and legislation should be strictly enforced to allow a total compliance to everyone	Medium-term
Strengthening Local Solid Waste Management institutional capacity	There is a need to establish a local solid waste management board which will be responsible for managing solid waste activities in KLM. It must have capacity to address solid waste management issues.	Medium-term
Promoting Private-Municipal Partnerships	Strengthening the power, responsibilities of KLM to involve on partnerships with private sector operators, NGOs and	Medium-term

	CBOs; informal collectors and householders.	
Promoting the commercialisation and waste recycling companies	There is a need to promote the recycling companies in KLM to achieve Zero Waste in the area. Attractive legislations and policies may encore many recycling companies in KLM	Long-term
Establishment of reasonable mix of appropriate technical and management options to Rethink, Reduce, Reuse, Recover, Recycle disposal	Solid waste local authority must stress the use of an affordable mix of appropriate solid waste technology and management options and thus will cease to depend solely on the conventional collection and disposal method	Long-term

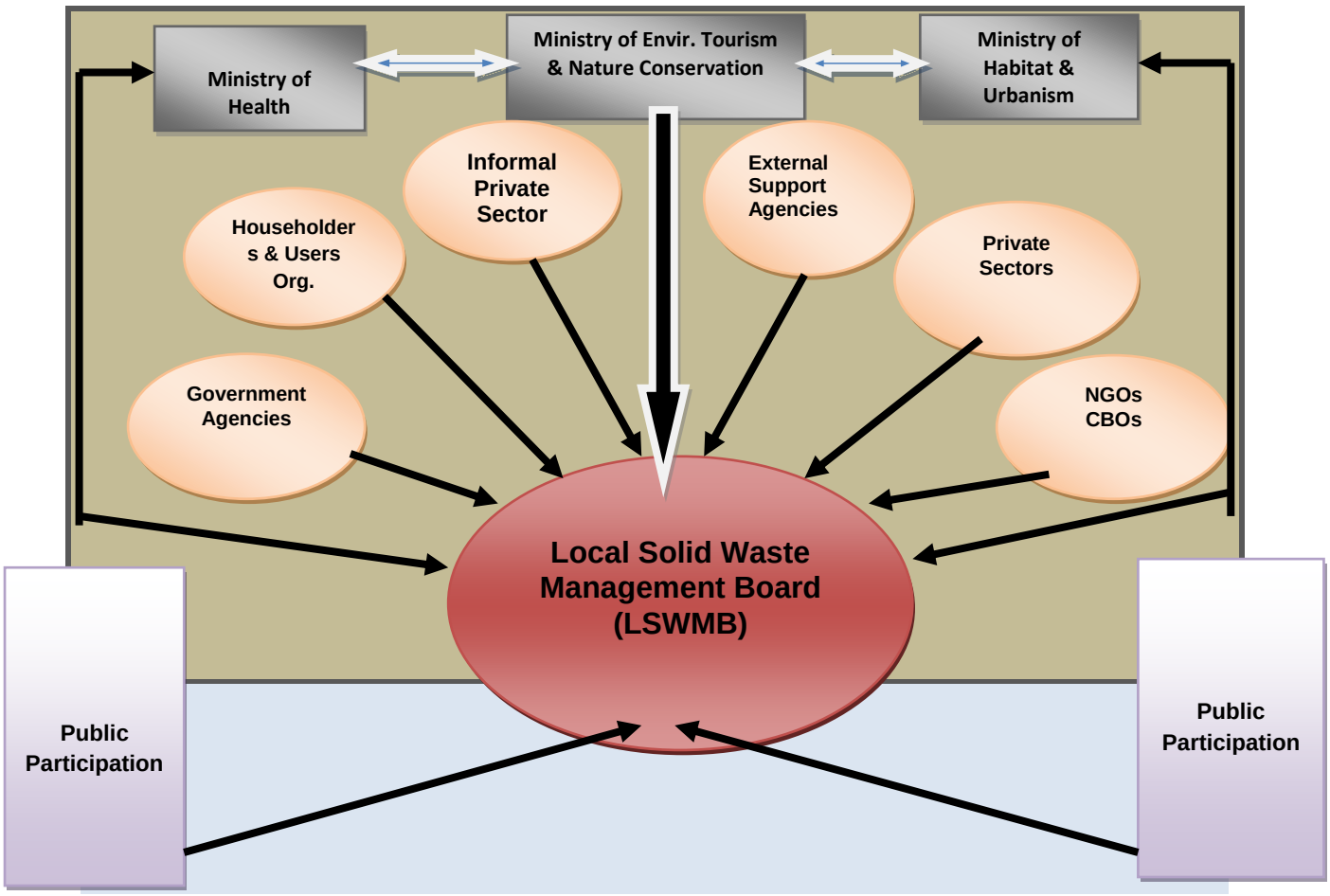
a. Proposed Legislation Framework for Integrated Solid Waste Management in KLM

The implementation of solid waste strategies requires a legal and regulatory framework which may be elaborated in the form of bylaws, ordinances and regulations concerning solid waste management. This includes corresponding considerations and enforcement responsibilities. Proposed regulations framework for an integrated solid waste management in KLM requires to:

- Classify waste according to its origin and characteristics.
- Determine the source of solid waste and penalties for contraventions.
- Develop regulations and related laws to set up mechanisms for implementing of Reduce, Reuse and Recycle.
- Declare all solid waste disposal facilities as pollution sources, which if done should be strictly enforced.
- Set up of appropriate pollution discharge standards for solid waste disposal facilities.
- Establish procedures for managing waste, monitoring facilities, and enforcing standards.
- Establish that producers, importers and distributors of packaging are responsible for their products when they are discarded as wastes “polluter pays”.

- Encourage the participation of private sector.
- Define all solid waste stakeholders' roles and responsibilities.
- Strengthen local municipal solid waste management rules and regulations to create attractive incentives for recycling and composting sponsor.

Figure 33: Proposed Institutional Framework for Integrated Solid Waste Management in KLM



b. Proposed Institutions Roles and Responsibilities

- Ministry of Environment, Tourism and Nature Conservation (METNC) - the METNC is a custodian of SWM in KLM. It is responsible for establishing the institutional and legal framework, defining strategies, funding projects for MSWM and ensuring that local governments have the necessary authority, powers and capacities for effective solid waste management. It coordinates and collaborate SWM activities at national level.

- Ministry of Public Health (MoPH) - the Ministry of Public Health should be involved in the environmental legislation and regulations and in coordinating and defining strategies, programs and projects dealing with solid waste. It is responsible for controlling septic waste in hospitals and clinics.

- Ministry of Urbanism &habitat - it should coordinate and collaborate on legislation and regulations regarding waste management and urban environment in general- Institutional and Financial Assistance and strategic support.

- Local Solid Waste Management Board (LSWMB) - the LSWMB is primary responsible of implementation of solid waste management in the area. It should coordinate all solid waste strategies, programmes and policies and implement them in KLM. It sets up and manage controlled waste dumping operations and to create waste processing units. It is also responsible for - instruction approval of facility, licensing business approval of facility monitoring and treatment and disposal of waste.

- Governmental Solid Waste Agencies - coordination and management of solid waste management including collection, reduction recycling and disposal. Administrative and technical support and budgetary concerns. Cornerstone of environmental sustainability in government. Strategic advices.

- Private Sectors Organization - as potential service suppliers, private enterprises should be primarily interested in earning a return on their investment by selling waste collection, transfer, treatment, recycling and/or disposal services.

- External Support Agencies - it should provide technical advices, funding, training and solid waste programmes support. It should also involve on Collection, Transport & Disposal of local waste.

- Informal Private Collector Association - it should keep the local area clean by providing basic waste services. Involved on Collection, Transport & Disposal of local waste.

- Solid Waste NGOs and CBOs Council - it should support solid waste programmes, raise awareness on solid waste issues, solid waste concerns and should support services.

- Householders and Users Association - Support programmes and services.

Integrated solid waste management is an ongoing process which involves many stakeholders including waste generators, regulators and service providers such as organizations involved in waste collection and disposal, and organizations involved in recycling and recovery. Each stakeholder has a specific, clear and active role to improve the efficacy and efficiency of SWM by active participation and continuous interaction. The determination of roles and responsibilities for solid waste management within a city such as KLM may enable solid waste to be well managed and keep the environment sustainable and people healthy. This process may go beyond a simple environmental management by the involvement of certain development projects and contributing to economic development of KLM.

5.2.8 Conclusion

The history of the African local municipalities in general and Kinshasa Local Municipality in particular is an experiment with many issues apparently unresolved such as solid waste management. Kinshasa Local Municipality leaders are experiencing serious challenges to curb solid waste phenomenon. They are not sufficiently exploring and using and encouraging local initiatives and strategies which could go a long way to improve solid waste management. Local and adapted strategies involving partnerships with the stakeholders and coordinated by the government would be important. In addition, bottom-up and participatory management with mutual respect and close collaboration of all stakeholders is crucial. Solid waste management in KLM presents the real health hazard and it is a humanitarian disaster

which needs urgent and immediate intervention as it pose the risk of compromising lives; not only of the present generations but also for the future generation.

This last chapter therefore finishes with the recommendations made after the analysis of the findings of the case study with regard to the planning theories. This include a summary of proposed strategies for an integrated solid waste management, the proposed legislations and policies for solid waste management and the proposed institutional framework for solid waste management in KLM . Further, the types and the amount of solid waste generated in by household still need to be investigated in the future research in order to intervene with exactitude and to ensure sustainable solid waste management in the area.

Although, the KLM has become the attractive places where everyone would like to live and enjoy because of several advantages that it offers such as lifestyle, adequate infrastructure, liable social services, job opportunities, business opportunities and recreation facilities etc. The situation has been perceived and managed differently through the world. While the management of the urban local municipalities has succeeded in developed countries through the use of planning tools, public management etc..; the phenomenon has presented the enormous challenges in KLM because of the above noted causes. Kinshasa Local Municipality as other African local municipalities is experiencing a real urban challenge. Consequently, the integrated solid waste management will bring a solution in the area which seems to be abandoned and dilapidated.

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7. APPENDICES

Appendix 1: Local Communities (Householders)'s questionnaire

Name of respondent_____

Location: ---------- Age: ---------- Gender ---------- education----------

High income	Middle-income	Low-income	Informal settlement

Who collect it? ----------

Which type of containers do you use for household waste storage?

Plastic bags	Bins	Banging hole	Other specify……..

How often does waste removal take place?

Daily	Fortnight	Weekly	Monthly	Longer

Who does waste removal?

Self	Private contractor	Local authority (Government)	Other (Specify)

If self, where do you take it?

If private contractor, how much do you pay? _____

If local authority (Government), how much do you pay? _____

Yes	No

What can you say about your service provider?

If not covered by any services, are you ready to be covered?

If yes, how much are you willing to pay? _____

If no, why?

_____

What problems related to solid waste management do you face?

_____

Are you involved in some community initiatives in solid waste management in your area?	Yes	No

If yes, what is your opinion on CBOs involvement in solid waste management?

_____

If no, why?

_____

Who are you collaborating with? ----------

What problems are you facing in your endeavors? ----------

How do you deal with these problems? ----------

What is your opinion on private sector and government as services providers on solid waste management in the city? ----------
---

Appendix 2: Public Sector interviews (PNA, OVD, Hotel de Ville and Environmental Unit)

Preamble

I am Clement, student at Wits University/Johannesburg and I am conducting a research as a requirement to finish my degree on Solid Waste Management in Kinshasa. Because of increased urbanization and high population growth rate in African cities, solid waste has become a crucial problem to many local authorities through the world. Some have resorted to the private businesses and community-based organizations to help them to curb the problem; what is the situation in the area?

What are the challenges you face regarding waste in this area? ----------
---

What are you doing about these challenges? ----------

Privatization has been favoured as the best way to deal with solid waste management in most cities in the world; what is your opinion on this?----------
---

There is a growing convergence on public-private partnerships as the best way to curb environmental problems; what is the situation in the city?----------
---

For you, what is the best way to deal with solid waste in your area?----------
---

Appendix 3: Solid Waste Workers (Informal Collectors)' interviews

Preamble

I am Clement, student at Wits University/Johannesburg and I am conducting a research as a requirement to finish my degree on Solid Waste Management in Kinshasa. Solid waste has

become the biggest challenge to many countries through the wide world, particularly in developing countries. The private sectors have played vital roles in solid waste management all over the world; what are your roles in this area?

What areas are you covered?----------

In your operations, what challenges are you facing? ----------

---

How do you go about these challenges? ----------

Are you collaborating with government and private businesses?

Yes	No

If yes which areas? ----------

If not, why?----------

Yes	No

Are you getting any external support?

If yes, where from? ----------

If not, why? ----------

According to you, what should be the best way of dealing with solid waste in this area? -------

---

Appendix 4: Waste Pickers' interviews (PAUK, PoubelKin, Congo Salubrite)

I am a student at Wits University/Johannesburg and I am conducting a research as a requirement to finish my degree on Solid Waste Management in Kinshasa. The problem of solid waste have been recognized internationally as a serious concern, local authorities and governments have used various methods to curb it; however, private businesses have played a very crucial role in solid waste management. What is the situation in your area?

What areas are you covered? ----------

What type of material do you collect and where do you get it?----------
---

What challenges are you facing? ----------

How do you go about dealing with these challenges? ----------
---

Yes	No

Do you collaborate with CBO, NGOs and Government?

If yes, which areas? ----------

If not, why? ----------

What is the best way to curb solid waste in this area? ----------

---

Appendix 5: Interviews with Public Sector (PNA, OVD, Hotel de Ville and Environmental Unit) on Solid Waste Management in KLM

Questions	**Responses** **No of participants: 5**		
1. What is the solid waste situation in the area?	Bad	Neutral	Good
	3	1	1
2. What are the challenges you face regarding solid waste management?	No co-ordination	heavy traffic and lack of adequate infrastructure	shortage of resources (material and financial)
	2	1	2
3. What are you doing about these challenges?	Self-help	Report to central government	Nothing
	1	3	1
4. How would you respond to the privatisation of solid waste management**?**	Hostile	Neutral	Helpful
	3	1	1
5. What is your opinion on PPPs on solid waste management?	Hostile	Neutral	Helpful
	1	1	3
6. Are there any Plans for managing solid waste?	No planning	There is planning	We still plan
	3	0	2
7. What is the best way to deal with solid waste in the area?	Privatization	Public sector	PPPs
	1	2	2
8. Which group or organization are you collaborating with?	European Union	Informal collectors	None
	4	0	1

Appendix 6: Interviews with Solid Waste Workers on Solid Waste Management in KLM

Questions	**Responses** **No of Respondents: 5**		
1.What is your role in regard to solid waste management in the area?	Free collection	Paid collection	Nothing
	1	4	0
2.Which areas are you collecting waste from?	Only Kinshasa CBD	Kinshasa municipality	City of Kinshasa
	3	2	0
3. What challenges are you facing?	No co-ordination	heavy traffic and lack of adequate infrastructure	shortage of resources (material and financial)
	1	2	2
4. How do you go about overcoming these challenges?	Working hard	We buy materials	Nothing
	3	1	1
5. Which organizations are you collaborating with?	Government	Private business	None
	0	0	5
6. Why are you not collaborating with any organization?	Poor payment	Hostility towards us	No reason
	1	3	1
7. Are you getting any external support?	No	Yes	Yes and No
	5	0	0
8. What is planning prospect on solid waste management in the area?	No planning	There is planning	We still plan
	4	0	1
9. What should be the best way of dealing with solid waste in the area?	Privatization	Public sector	PPPs
	3	0	2

Appendix 7: Interviews with Waste Pickers (PAUK, BoubelKin, Congo Salubrite) on Solid Waste Management in KLM

Questions	**Responses** **No of Participants: 5**		
1. What is the solid waste situation in your area?	Bad	average	Good
	3	1	1
2. Which areas do you collect waste from?	Kinshasa CBD	Kinshasa local municipality	City of Kinshasa
	2	3	0
3. What type of materials do you collect?	Standard materials	Modern materials	Traditional materials from
	3	1	1
4. What challenges do you face?	Health	heavy traffic and lack of adequate infrastructure	shortage of resources (material and financial)
	1	3	1
5. How do you go about dealing with these challenges?	Working hard	We buy materials	Nothing
	4	0	1
6. Who do you collaborate with?	Government	Informal collectors	Private sectors (E.U)
	1	0	4
7. What is the best way to curb solid waste in this area?	Privatization	Government	Partnerships
	1	1	3

Appendix 8: Interviews with Local Communities (Householders) on Solid Waste Management in KLM

Questions	**Responses** **No of Participants: 5**		
1. Age groups	-30	30-40	40+
	3	1	1

2. What level of education have you completed?	Primary		Secondary			Tertiary		
	0		3			2		
3. What is your income level?	Low-income		Middle-income			High-income		
	1		4			0		
4. Who collects your household refuse?	Self		Informal collectors			European Union workers		
	1		3			1		
5. What type of containers do you use for household waste storage?	Plastic bags	Bins	Landfilling		Seals			
	2	0	1		2			
6. How often does waste removal take place?	Daily	Fortnightly	Weekly		Monthly	Longer		
	2	2	1		0	0		
7. Who does the waste removal?	Self	Informal collector	Government		Others			
	2	3	0		0			
8. What can you say about your service provider?	Very bad	Bad	Good	Very good	No service			
	0	2	1	0	2			
9. What challenges related to solid waste management do you face?	No co-ordination		heavy traffic and lack of adequate infrastructure		shortage of resources (material and financial)			
	2		2		1			
10. Are you involved in some community initiatives in solid waste management in your area?	Yes		No					
	1		4					
11. Who are you collaborating with?	Private sectors		Government		(NGOs)	Nobody		
	3		0		1	1		
12. What problems are you facing in terms of waste	Irregularity of collection	High cost	Flooding	Environmental degradation				

disposal?	2	2	1	0
13. How do you deal with these problems?	Throw waste at open space	Buy anti-mosquitoes	Go to Hospital	Nothing
	1	3	0	1
14. What is your opinion on the best way for solid waste management in your area?	Privatization	Private-public partnerships	Public sector	Community involvement
	2	2	0	1

Appendix 9: List of Key Person Interviews

Paul Sapu Kalima: Kinshasa Local Municipality, Kinshasa, 03 July 2009

Erick Mbala: Kinshasa Local Municipality, Kinshasa, 03 July 2009

Michel Uyumbu: Koba Engineering, Kinshasa, 13 July 2009

Robert Katende: Informal collector, 14 July 2009

Banyanga: Kinshasa Urban Action Program (PAUK), Kinshasa, 20 July 2009

Ernest Kalala: PoubelKin, Kinshasa, Kinshasa, 18 July 2009

Norbert Kima Watete: Kinshasa Local Municipality, 21 July 2009

Clement Mfingulu: Waste Worker in Kinshasa Local Municipality, 23 July 2009

Catherine Tshituku: Householder in Kinshasa Local Municipality, 16 July 2009

Appendix 10: List of Environmental documents In the KLM

Ordinance dated 24 April 1899 creating a commission of hygiene in every district city.

Ordinance n°127/6 dated 15 June1913 relating to general rules on the constructions in the urban areas.

Ordinance dated 1^{est} July1914 applied to pollution and contamination streams, lakes and watercourses.

Ordinance dated 10 May 1929 creating in every town a technical direction of sanitation works.

Decree dated 6 May 1952 concerning the servitudes regarding groundwater, lakes water and watercourses and their uses.

Ordinance n° 41/48 dated 12 February 1953 guiding dangerous, unsanitary and inconvenience companies.

Ordinance n°62/181 dated 25 April 1958 providing the technical conditions applied to vehicles affected to human transportation.

Ordinance n°74/345 dated 28 June 1958 applied to public sanitation in the urban areas.

Ordinances n°75/231 dated 22 July 1975 promulgating the roles and responsibilities of department of Environment and nature conservation.
Law n°78 - 002 dated 30 August 1978 prescribing new Road conduct.

Departmental Circular n°014/DCNT/CCE/81 dated 17 February 1981 creating National Decontamination Service.

Ordinance n°82/027 dated 29 March 1982 prescribing framework for government public work for decontamination.

Ordinance n°87/331 dated16 September 1987 creating Roads and Drainages Board

Decision n° SC/0034/BGV/COJU/CM/98 dated 17 February 1998 applied for decontamination measures and protection of public health in City province of Kinshasa.

The Constitution of the Democratic Republic of the Congo of 18 February 2006.