

**EFFECTS OF OUTSOURCING ON SUSTAINABLE SOLID WASTE
MANAGEMENT IN THE URBAN AREAS IN KENYA: A CASE STUDY OF
NAKURU MUNICIPALITY, NAKURU COUNTY**

**BY
KIPLAGAT KEMBOI JIMMY**

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DECLARATION

Declaration by the Student

This thesis is my original work and has not been presented to any other examination body in any other university. No part of this research should be reproduced without the author's consent or the consent of Moi University.

.....

Jimmy Kemboi Kiplagat
Registration Number: SHRD/PGD/01/11

.....

Date

Declaration by the Supervisor(s)

This thesis has been submitted for examination with our approval as University Supervisors

.....

Prof. Leonard S. Mulongo
Department of Development Studies
School of Human Resource Development

.....

Date

.....

Dr. Ruth Tubey
Department of Quantitative and Entrepreneurial Studies
School of Human Resource Development

.....

Date

DEDICATION

I dedicate this work to my dear wife and children.

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My great appreciation goes to the almighty God for granting me the strength, wisdom and resources necessary to carry out this work. I am grateful to my supervisors Prof. Mulongo and Dr. Tubey for their guidance and support and to Moi University for granting me the opportunity to pursue Master of Science in Development studies. My special thanks to my employer Eldoret and Sanitation Company Limited for having financed my studies. I am indebted to all my friends who gave me support throughout this study.

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ABSTRACT

Rapid increase in the volume and types of solid waste as a result of continuous economic growth, urbanization and industrialization, is becoming a burgeoning problem for national and local governments in developing countries in ensuring effective and sustainable management of waste. Outsourcing as a concept has been applied immensely when dealing with situations that are beyond an organization's capacity to regulate. Outsourcing in solid waste management emanates from the inability of the local authorities to effectively manage the ever growing volumes of waste generated. This study therefore sought to assess the effects of outsourcing in the management of solid waste in urban areas of Kenya. The study was carried out in Nakuru Municipality. The study's objectives were: to examine the process of outsourcing in sustainable solid waste management, to assess the operations of the private solid waste collectors, assess the effectiveness of outsourcing of solid waste management in the study area, to establish the challenges of outsourcing for sustainable municipal solid waste management and to recommend way forward based on the findings of the study. The research design used in the study was a case study focusing on Nakuru Municipality in Nakuru County. The study targeted active participants in solid waste management within the study area which included the County Government of Nakuru through the department of Public Health and the private solid waste collectors. The target population was 24 private solid waste collectors all of which were purposively chosen. Purposive sampling technique was used in selecting the respondent from the County Government and the senior staff of the private collectors. Questionnaires, semi structured interviews, focused group discussions, photography, satellite imagery and observations were used as the data collection instruments. The findings were subjected to statistical package for social sciences to generate tables, percentages, graphs and charts. Descriptive data analysis was used in the study. The study found that all the operators had functioning offices within their service areas. The Municipality was subdivided into several zones with a majority of the private solid waste collectors operating within one zone with less than 1000 clients. A majority of the private solid waste collectors collected garbage from their clients on a weekly basis using open trucks with tents instead of the recommended closed trucks and the waste is dumped in a poorly managed open dumpsite run by the County Government of Nakuru. The County Government of Nakuru contracts supervises and regulates the operations of the service providers and sets the fees to be charged by the private solid waste collectors for different socio-economic groups. Door to door collection is the most preferable mode of revenue collection with all the sampled private solid waste collectors being profitable. Outsourcing has resulted in efficient delivery of service. The major challenges are lack of clear policy and regulatory frameworks, Political interference, lack of adequate capacities both capital and human resources and poor infrastructure. The study recommends that the County Government of Nakuru restructures the sizes and the number of zones to enable the private solid waste collectors to have sufficient revenue bases and to extend duration of the contracts. Longer contracts coupled with the wider revenue bases will also enable the private solid waste collectors to attract financial support from lending institutions. The County Government of Nakuru should consider commercializing the entire management of solid waste by establishing an independent entity, either a company or a parastatal, to be fully in charge of solid waste collection and disposal.

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ABBREVIATIONS

CCO	County Cleansing Officer
CGN	County Government of Nakuru
MSW	Municipal Solid Waste
MSWM	Municipal Solid Waste Management
NACOSTI	National Commission for Science Technology and Innovation
NEMA	National Environment Management Agency
NGOs	Non-Governmental Organizations
PSWCs	Private Solid Waste Collectors
SPSS	Statistical Package for Social Sciences
UN	United Nations
UNEP	United Nations Environment Programme
USAID	United States Agency for International Development

OPERATIONAL DEFINITION OF TERMS

- Developing Countries** In this study, developing countries are defined as those nations with underdeveloped industrial bases, and a low Human Development Index
- Municipal Solid Waste:** In this study, solid waste is defined to include refuse from households, industries, non-hazardous solid wastes from industries, refuse from institutions, yard waste and street sweepings
- Outsourcing:** In this study, outsourcing is defined as the process of involving the private sector actors in undertaking solid waste management
- Sustainable Management:** Sustainable management is defined as the ability to keep a system running indefinitely without depleting resources, maintaining economic viability, and also nourishing the needs of the present and future generations
- Urban Areas** In this study, urban areas are defined as locations characterized by high human population density and vast human-built features in comparison to the *areas* surrounding them and may be planned or unplanned.

CHAPTER ONE

INTRODUCTION

1.1 Overview

This Chapter focuses on the key issues that lay the foundation for the study. These include background of the study, the problem that the researcher was investigating, the objectives, the research questions, scope of the study and the limitations that the researcher faced.

1.2 Background of the study

County Governments (former Local Authorities) in Kenya are charged with the responsibility of collection and disposal of solid and liquid municipal wastes within their areas of jurisdiction (Rotich, 2005). Centralized municipal solid waste management systems are used by most local authorities in Kenya. According to estimates from the Environmental Guidelines for Small-Scale Activities in Africa, (USAID, 2009), many local authorities in developing countries spend over 30% of their budgets on refuse collection and disposal but can only collect at most 50–70% of Municipal Solid Waste (MSW). Most do not meet environmentally safe municipal solid waste disposal levels because of a lack of sanitary landfills. In Kenya, municipal solid waste is disposed in open dumps which lack proper environmental pollution control and monitoring. An economic survey by the Ministry of Finance and Planning, (2001) showed that most local industries operate their own solid waste handling services independent from the local authorities (Rotich, 2005).

It is estimated that in 2006 the total amount of municipal solid waste generated globally reached 2.02 billion tones; representing a 7% annual increase since 2003 (Global Waste Management Market Report, 2007). The current practice of collecting, processing and disposing municipal solid wastes is considered to be least efficient in the developing

countries. The typical problems are low collection coverage and irregular collection services, crude open dumping and burning without air and water pollution control, the breeding of flies and vermin, and the handling and control of informal waste picking or scavenging activities (Bartone, 1995). Although some cities do spend significant portions of their municipal revenues on waste management (Cointreau, 1994), they are often unable to keep pace with the scope of the problem. Senkoro (2003) indicated that for many African countries, only less than 30% of the urban population has access to proper and regular garbage removal.

Uncollected municipal solid waste at the upper and middle income residential zones is a common phenomenon in most urban areas in Kenya (Rotich, 2005). The situation in the low income suburban zones is worse because of inappropriate disposal of MSW. The suburban areas, which are mainly occupied by the urban poor, rural migrants and the jobless, are characterized by high population densities and unplanned poor residential structures which are hardly accessible. Local authorities tend to concentrate their limited services mainly in the central business districts and the more affluent communities, which have better access. Ramani (2004) says that filth is choking up Kenya and pushing the country to the brink of an environmental catastrophe.

1.3 Statement of the Problem

Most cities and towns in developing countries are rapidly getting overwhelmed by heaps of municipal solid waste which is haphazardly disposed. In, Kenya for example, the streets in many towns and cities are littered with solid waste as a result of lack of proper solid waste management structures being put in place. Rapid increase in the volume and types of solid and hazardous waste as a result of continuous economic growth, urbanization and industrialization, is becoming a problem for national and local governments to ensure effective and sustainable management of waste.

Many municipalities in Kenya have outsourced the collection of municipal solid waste to the private sector in order to enhance efficiency. However, there still are challenges on realizing effectiveness and efficiency in most areas where outsourcing has been implemented. No studies have been undertaken previously to ascertain the effects of outsourcing of municipal solid waste management on service delivery.

It is on the basis of the above that this study sought to find out the effects of outsourcing of solid waste management to the private sector, the challenges and come up with possible solution to improve the service delivery

1.4 Research Objectives

1. To examine the processes of outsourcing municipal solid waste management in Nakuru Municipality
2. To assess the existing operations of the private solid waste collectors within the study area
3. To assess the effectiveness of outsourcing of solid waste management in the study area.
4. To establish the challenges of outsourcing for sustainable municipal solid waste management.

1.5 Research Questions

1. What are the processes involved in outsourcing municipal solid waste management?
2. How do the operators carry out their mandated activities? What are their capacities (personnel, equipment, trainings, access to credit? What are their strengths and weakness? What legal framework do they operate in?
3. How effective and sustainable is outsourcing in the management of solid waste? What are the operational costs of the engaged private solid waste collectors against the collected revenues? Are they self-sustaining? Do they make profits?

4. What are the challenges faced and the existing gaps of outsourcing of Solid Waste Management?

1.6 Assumptions of the Study

The study aimed at collecting information from private solid waste collectors from Nakuru County as a target population. The study assumed that by targeting this group, they will be able to give valid and adequate information to enable the researcher make sound conclusions. The study assumed that regional bias would not exaggerate the findings of the study. The study assumed that the information provided by the respondents represented true positions without exaggerations.

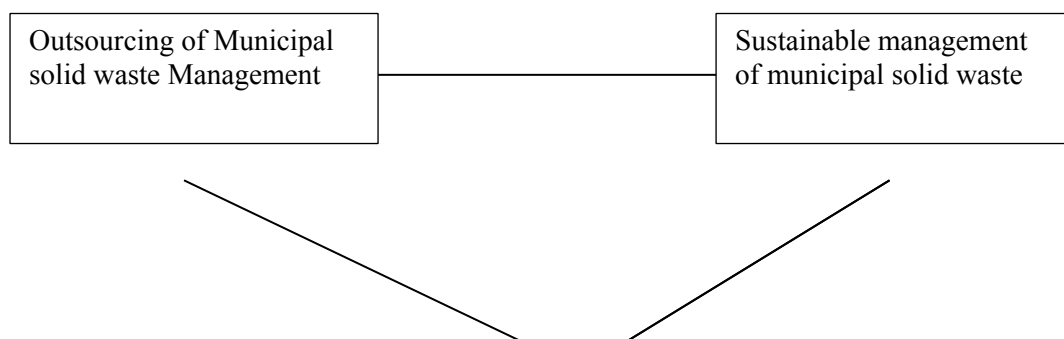
1.7 Significance of the study

This study will assist policy makers in determining the most suitable method of involving the private sector in the management of municipal solid waste in the Urban Areas.

The study will also provide evidence for development of public private partnership policy and regulatory framework for municipal solid waste management. The study is therefore of importance to the government/governmental agencies and other stakeholders such as the environmental regulators responsible for ensuring among other things, safe disposal of Municipal solid waste, County Governments which are directly charged with the management of solid wastes within their areas of jurisdiction.

The study will also be of interest to the world of academia. A key outcome will be the understanding areas of further research.

1.8 Conceptual Framework



- Efficiency in service delivery
- Income generation
- Employment opportunities
- Innovativeness
- Clean environment
- Reduction of disease prevalence

Source: Research Student

Outsourcing of urban services can also reduce the cost of public services to consumers, relieve the financial and administrative burden on the government, increase productivity and efficiency by promoting competition, stimulate the adoption of innovation and new technology, improve the maintenance of equipment; and create greater responsiveness to cost control measures (Kassim, 2006).

1.9 Limitations of the study

The study was carried out during the transition period into the new devolved system of governance in Kenya. This therefore means the institutions were undergoing great transitions during the period of the study.

The study was carried out at a time when the contracts of the solid waste collectors were due for renewal thus majority of the respondents, despite being given assurance that this was an academic study, were skeptical about the objectives of the study which might have influenced their objectivity in responding to the questions.

Lastly because a case study nature was used, the findings cannot be generalized and therefore would be low in external validity.

CHAPTER TWO

LITERATURE REVIEW

2.1. Overview

This chapter gives an in depth look at the concept of outsourcing of municipal solid waste management (MSWM), the potential environmental impacts of solid waste management, the contextual issues in outsourcing of solid waste management, the types of solid waste management practices across the world and the challenges/limitations of outsourcing of MSWM in developing countries.

2.2. Global Municipal Solid Waste Management

The management of solid waste is one of the challenges facing any urban area in the world. An aggregation of human settlements has the potential to produce a large amount of solid

waste; the collection, transfer and disposal of that waste has been generally assumed by municipal governments in the developed world. The format varies, however in most urban areas garbage is collected either by a government agency or private contractor, and this constitutes a basic and expected government function in the developed world. Municipal solid waste (MSW) management has become a major issue of concern for many underdeveloped nations, however, especially as populations increase. The problem is compounded as many nations continue to urbanize rapidly; 30-50% of populations in many developing countries is urban (Thomas-Hope, 1998) and in many African countries the growth rate of urban areas exceeds 4% (Senkoro, 2003). Although developing nations do spend between 20 and 40% of municipal revenues on waste management (Thomas-Hope, 1998, Schübeler, 1996, Bartone 2000), this is often unable to keep pace with the scope of the problem. In fact, when the governments of African countries were asked by the World Health Organization to prioritize their environmental health concerns, the results revealed that while solid waste was identified as the second most important problem (after water quality), less than 30% of urban populations have access to “proper and regular garbage removal” (Senkoro, 2003).

Solid waste is broadly defined as including non-hazardous industrial, commercial and domestic refuse including household organic trash, street sweepings, hospital and institutional garbage, and construction wastes; generally sludge and human waste are regarded as a liquid waste problem outside the scope of MSW. Schübeler (1996) points out that although certain contaminated medical wastes and hazardous industrial wastes are not included by definition, in many nations these are in fact part of the municipal waste stream and “special measures” must be employed to encourage their separation and mitigate their potential harmful effects. Also, the threat of toxic waste being present in industrial garbage often leads to it being treated separately, although this is not always the case. The overall problem of MSW is

obviously multi-faceted; many organizations, including the United Nations (UN) and various non-governmental organizations (NGOs) advocate an integrated approach to MSW management by identifying key stakeholders, identifying specific issues which comprise important “stumbling blocks”, and making recommendations based on appropriate technologies, local information, and pressing human and environmental health concerns (UNEP 1996, Senkoro 2003, Thomas-Hope 1998). Within each sector there are various sub-sectors which can and are being dealt with separately by many nations and municipalities, for example the treatment and disposal of potentially dangerous medical wastes by urban health centers.

Developing countries have solid waste management problems different than those found in fully industrialized countries. Indeed, the very composition of their waste is different than that of ‘developed’ nations. Although low-income countries’ solid waste generation rates average only 0.4 to 0.6 kg/person/day, as opposed to 0.7 to 1.8 kg/person/day in fully industrialized countries, Cointreau (1982) and others (Blight and Mbande 1996, Arlosoroff 1982) noted several common differences in the composition of solid waste in developing nations; Waste density 2-3 times greater than industrialized nations, Moisture content 2-3 times greater, Large amount of organic waste (vegetable matter), Large quantities of dust, dirt (street sweepings), Smaller particle size on average than in industrialized nations.

These differences from industrialized nations must be recognized both in terms of the additional problems they present as well as the potential opportunities which arise from their waste composition (Zerbock, 2003)

2.3. The Environmental Management and Coordination Act (1999)

The Environmental Management and Coordination Act which came into law in 1999 and the subsequent regulations provide the guidelines and procedures for Solid Waste Management in Kenya.

Part 12 (a) of the second schedule of Environment Management and Coordination Act (EMCA 1999) states that, “Environmental Impact Assessment (EIA) and Environmental Audits (EA) shall be carried out for waste disposal including site for solid waste disposal”. Further Part VIII Section 87(1) states that “no person shall discharge or dispose of any wastes whether generated within or outside Kenya, in such manner as to cause pollution to the environment or ill health to any person.” □Section 89 states that, “any person who, at the commencement of the Act, owns or operates a waste disposal site or plant or generated hazardous waste, shall apply to the Authority for license under this part, within six months after the commencement of this Act.”

2.4. Concept of Outsourcing of Municipal Solid Waste Management

Solid Waste management refers to the collection transfer, recycling resource recovery, and disposal of municipal solid waste. Municipal solid wastes are defined to include: refuse from households, nonhazardous solid (not sludge or semisolid) wastes from industrial and commercial establishments, refuse from institutions (including nonpathogenic waste from hospitals), market waste, yard waste, and street sweepings (Cointreau, 1994)

According to Cointreau (1994), Solid waste management as a public good. Solid waste management is a service for which local government is responsible. This service is non-exclusive, meaning that once it is provided to some portion of a community it benefits the overall public welfare, not only the resident that specifically receives service. The service is

also non-rivalled, meaning that any resident can enjoy the benefit of the service without diminishing the benefit to anyone else. Beyond this, it is not feasible to exclude from service those who do not pay, because public cleanliness and the safe disposal of waste are essential to public health and environmental protection. These qualities of being nonexclusive, non-rivalled, and essential place responsibility for solid waste management squarely within the public domain as a public good. Because solid waste management is an urban issue, the level of government responsible is typically local or metropolitan government. This does not, however, mean that local government has to accomplish the task of solid waste service delivery entirely with its own staff, equipment, and monies. In fact, this is where the role of the private sector comes into play.

Outsourcing is a reduction in government activity or ownership within a given service or industry when the private sector participates in service delivery or when government enterprises are divested to unregulated private ownership and government agencies are commercialized (reorganized into accountable and financially autonomous semiprivate enterprises) (Cointreau, 1994)

Thousands of tons of solid waste are generated daily in Africa. Most of it ends up in open dumps and wetlands, contaminating surface and ground water and posing major health hazards. Generation rates, available only for select cities and regions, are approximately 0.5 kilograms per person per day—in some cases reaching as high as 0.8 kilograms per person per day. While this may seem modest compared to the 1–2 kg per person per day generated in developed countries, most waste in Africa is not collected by municipal collection systems because of poor management, fiscal irresponsibility or malfeasance, equipment failure, or inadequate waste management budgets (Kassim, 2009)

Though high- and low-value recyclables are typically recovered and reused, these make up only a small proportion of the total waste stream. The great majority of the waste (approximately 70 percent) is organic. In theory, this waste could be converted to compost or used to generate biogas, but in situations where rudimentary solid waste management systems barely function, it is difficult to promote innovation, even when it is potentially cost-effective to do so. In addition, hazardous and infectious materials are discarded along with general waste throughout the continent. This is an especially dangerous condition that complicates the waste management problem (Cointreau, 1994)

Throughout most of sub-Saharan Africa solid waste generation exceeds collection capacity. This is in part due to rapid urban population growth: while only 35 percent of the sub-Saharan population lives in urban areas, the urban population grew by 150 percent between 1970 and 1990. But the problem of growing demand is compounded by broken-down collection trucks and poor program management and design. In West African cities, as many as 70 percent of trucks are always out of service at any one time, and in 1999 the City of Harare failed to collect refuse from nearly all of its residents because only 7 of its 90 trucks were operational (Kassim, 2006).

For health reasons, waste in tropical regions should actually be collected daily. This makes the challenges and costs of solid waste management in much of Africa even more daunting. It is generally the city center and the wealthier neighborhoods that receive service when it is available. In poorer areas, uncollected wastes accumulate at roadsides, are burned by residents, or are disposed of in illegal dumps which blight neighborhoods and harm public health. Where present, manual street sweeping by municipal employees or shopkeepers may

help reduce these effects in the most public areas. Nonetheless, roadside accumulation in many cities has reached levels resembling those that spawned epidemics in European cities 500 years ago (Kassim, 2003). Unless more effective urban waste management programs and public water supply systems are put in place, outbreaks of cholera, typhoid and plague may become increasingly common (Kassim,2003: Kassim 2006).

Only a small amount of the region's waste is disposed of in sanitary landfills; most is deposited in open dumps or semi-controlled unlined landfills with no groundwater protection, leachate recovery, or treatment systems. The larger dumps are located on the edges of cities, towns, and villages, sometimes in ecologically sensitive areas, or areas where groundwater supplies are threatened. They serve as breeding grounds for rats, flies, birds and other organisms that serve as disease vectors. Smoke from burning refuse may be damaging to the health of nearby residents and the smell degrades their quality of life (Cointreau, 1994).

While the recovery and reuse of materials is generally for personal use, there are also many professional waste pickers. They are seriously threatened by disease organisms, sharp objects and other hazards in the waste, especially since they generally lack protective equipment. The high level of reuse of non-organic waste reflects the extent of poverty in the region. Separation and treatment of organic waste is very rare. Municipal composting programs exist in some South African cities, but the few large-scale composting facilities built elsewhere are no longer operating. Anaerobic digestion to produce methane is not widely applied, and then usually uses manure, not organic waste (Cointreau 1994).

While solid waste collection is generally a municipal function, some countries and municipalities are now experimenting with limited privatization of these services, with some success. Because of the poor levels of collection, many residents—from impoverished to wealthy—pay for private collection of their wastes where these services are legalized (Kassim 2006).

Municipal waste incinerators are too expensive for most communities and are not used. In any case, they are generally not practical, since most paper that can be reused from the waste stream is removed, leaving behind an organic waste that is too wet to burn. Some hospitals and municipalities have incinerators for medical waste, but these are often not operated correctly. The HIV/AIDS epidemic has raised concerns about reuse of syringes, and efforts are being made to construct low-cost, high-temperature two-chamber incinerators to destroy syringes along with other medical wastes (Palczynski, 2002)

2.5. Potential Environmental Impacts from Solid Waste Management Activities

The typical municipal solid waste stream will contain general wastes (organics and recyclables), special wastes (household hazardous, medical, and industrial waste), and construction and demolition debris. Most adverse environmental impacts from solid waste management are rooted in inadequate or incomplete collection and recovery of recyclable or reusable wastes, as well as disposal of hazardous wastes (World Bank, 2012). These impacts are also due to inappropriate siting, design, operation, or maintenance of dumps and landfills. Improper waste management activities can result in:

2.5.1. Increase disease transmission threatening public health.

Rotting organic materials pose great public health risks such as above, serving as breeding grounds for disease vectors. Waste handlers and waste pickers are especially vulnerable and may also become vectors, contracting and transmitting diseases when human or animal excreta or medical wastes are in the waste stream. Risks of poisoning, cancer, birth defects, and other ailments are also high (World Bank, 2012).

2.5.2. Contamination of ground and surface water.

Municipal solid waste streams can bleed toxic materials and pathogenic organisms into the leachate of dumps and landfills. (Leachate is the liquid discharge of dumps and landfills; it is composed of rotted organic waste, liquid wastes, infiltrated rainwater and extracts of soluble material.) If the landfill is unlined, this runoff can contaminate ground or surface water, depending on the drainage system and the composition of the underlying soils. Many toxic materials, once placed in the general solid waste stream, can be treated or removed only with expensive advanced technologies. Currently, these are generally not feasible in Africa. Even after organic and biological elements are treated, the final product remains harmful (World Bank, 2012).

2.5.3. Emission of greenhouse gases and other air pollutants.

When organic wastes are disposed of in deep dumps or landfills, they undergo anaerobic degradation and become significant sources of methane, a gas with 21 times the effect of carbon dioxide in trapping heat in the atmosphere. Garbage is often burned in residential areas and in landfills to reduce volume and uncover metals. Burning creates thick smoke that contains carbon monoxide, soot and nitrogen oxides, all of which are hazardous to human health and degrade urban air quality. Combustion of polyvinyl chlorides (PVCs) generates highly carcinogenic dioxins (World Bank, 2012).

2.5.4. Damage ecosystems.

When solid waste is dumped into rivers or streams it can alter aquatic habitats and harm native plants and animals. The high nutrient content in organic wastes can deplete dissolved oxygen in water bodies, denying oxygen to fish and other aquatic life form. Solids can cause sedimentation and change stream flow and bottom habitat. Siting dumps or landfills in sensitive ecosystems may destroy or significantly damage these valuable natural resources and the services they provide (World Bank, 2012).

2.5.5. Pose physical danger to people and property.

In locations where shantytowns or slums exist near open dumps or near badly designed or operated landfills, landslides or fires can destroy homes and injure or kill residents. The accumulation of waste along streets may present physical hazards, clog drains and cause localized flooding (World Bank, 2012).

2.5.6. Discourages tourism and other business

The unpleasant odor and unattractive appearance of piles of uncollected solid waste along streets and in fields, forests and other natural areas can discourage tourism and the establishment and/or maintenance of businesses (World Bank, 2012).

2.6. Contextual Issues of Private Sector Participation in Municipal Solid Waste Services

In developing policies and strategic plans for private sector participation in solid waste services, a number of contextual issues need to be addressed. These include those of cost recovery, efficiency, accountability, management, finance, economies of scale, legislation, institutional management, and cost (Cointreau, 1994).

2.6.1. The Cost Recovery Context

There is a simplistic argument that public goods should be paid for by public funds and delivered by public agencies, while private goods should be paid for by private individuals (through user charges) and delivered by the private sector. Many activities within the overall purview of solid waste management vary in the extent to which they are public goods. Taking into consideration only the factor of the degree to which a solid waste activity is exclusive or rivalled. For example, public cleansing, which involves sweeping of public streets and cleaning of public parks and lands, is clearly a public good because it benefits the public at large and not any specific individual. As a public good, the cost of these services is expected to be covered through general revenues of local government. This includes the cost for public education regarding the individual's civic duties in maintaining a clean community (Cointreau, 1994).

It is theoretically appropriate for the cost of sanitary landfill to be covered through general revenues. Nevertheless, tipping fees (user charges on a per tone basis) can be readily collected from private refuse haulers and from individual industrial and commercial establishments that bring their solid waste to the landfill. For tipping fees to be levied in a manner that does not encourage clandestine dumping, relevant local government laws and sanctions need to be comprehensive, and inspection and enforcement systems need to be consistently vigilant in their monitoring of such (Cointreau, 1994).

In developing countries, resource recovery (composting, waste-to-energy incineration) can provide safe disposal of solid waste which is comparable environmentally to sanitary landfill. The cost of resource recovery, however, is usually significantly higher than the cost of sanitary landfill. Resource recovery should not be implemented unless a) the recovered resources (compost, secondary materials, and steam) can be counted as public goods worthy of subvention from government, or b) the cost difference between sanitary landfill and

resource recovery can be covered by revenue from marketing the recovered resources (Cointreau, 1994).

Whether refuse collection from private establishments or individual households can be treated like a private good (even though it is a public good) depends on the education and culture of the residents. In communities wherein residents have been sensitized to the need for public cleanliness and to the problem of limited resources (or efficiencies) of government, the door-to-door collection service to households, institutions and to industrial and commercial establishments can be treated as a private good for which those being serviced would be willing to pay. In communities wherein the residents have not been similarly sensitized, there will be resistance, however, to direct user charges and a tendency toward clandestine dumping. Service to all customers, whether paying or nonpaying, is in the public interest. Unlike water supply or electricity, which can be readily cut off for nonpayment of user charges, solid waste collection cannot be discontinued without jeopardizing the public welfare (Cointreau, 1994).

In developing countries, most local governments experience a serious shortfall in meeting their revenue needs from their tax base. User charges, as one means to cover solid waste cost, should not be neglected, even though most solid waste management services are public goods. User charges give the solid waste agency some autonomy by eliminating the need to compete with all other government agencies for their share of general revenue. User charges also may render the solid waste agency more directly accountable to residents for the cost and value of services that they provide (Cointreau, 1994).

Whether to involve the private sector in solid waste management services is an issue that is separate from cost recovery. Instead, the question of whether to involve the private sector in solid waste management activities is to be examined from the perspective of service coverage, efficiency, reliability, cost, economies of scale, equitability, and accountability (Cointreau, 1994).

2.6.2. The Efficiency Context

According to the World Bank's World Development Report (1991), public spending in developing countries is relatively high for their level of development and provides very low returns. Total government expenditure is roughly 20 percent of GNP in low-income countries and 30 percent of GNP in middle-income countries. This report asserts a "need for smaller, more efficient public sectors and a more dynamic private sector." Furthermore, it states that private sector participation "is not to be undertaken as an end in itself, but as a means to an end: to use resources more efficiently"

Cointreau (1994) explains that within local governments of developing countries, expenditure for municipal solid waste service is usually from 20 percent to 50 percent of total municipal expenditure. Even at such a high level of expenditure, the level of solid waste service is low, and only 50 percent to 70 percent of the solid waste is collected. In response to this high level of expenditure and low level of service, the main argument raised for private sector participation is that the private sector might be more efficient than the public sector in providing services. Private sector efficiency is said to derive from management flexibility, freedom of action, greater financial discipline, and accountability to market forces. Presumably, in a competitive environment, private firms must perform efficiently to make a profit and to maintain their position in the market place. Optimum efficiency does not occur when there are no opposing competitive forces. It doesn't occur when there is a public

monopoly a private monopoly. Even when there are many private companies, efficiency will not be optimized if they are in collusion over prices or work practices.

Conditions leading to efficiency captured by the private sector in the developed countries include smaller, younger crews; lower absenteeism, wages, and benefit costs; more flexible scheduling; efficient vehicle routing; better designed vehicles; managerial incentives; faster vehicle repairs; vehicle standardization; and competition (Dillinger, 1988). In such high income countries, optimization of labor productivity has priority because labor costs are high relative to equipment costs; the converse is true for low income countries.

In dealing with inefficiencies in government, the first response should be to determine if they can be corrected within the purview of public service. In other words, to build on what exists and is working and to fix only what is not working. If the government does not have the political will to make necessary changes to improve efficiency or if workers will not accept change, one may create a competitive environment by contracting out a portion of the public service. Introducing some private sector service will produce the desired result only if a) monitoring is carried out of public versus private service delivery, and b) feedback is provided to ongoing negotiations between management and labor on increasing efficiency (Dillinger, 1988).

2.6.3. The Public Accountability Context

According to Donahue (1989) in his book *The Privatization Decision*, "But efficiency, at base, is merely one aspect of a more fundamental quality-accountability-. The term suggests the idea of taking 'into account' the consequences of one's actions for the welfare of others". Government, which represents the public at large, has a special obligation to be accountable

to public values. In this capacity, each government needs to carefully weigh the decision to privatize "by the yardstick of fidelity to the public's values, whatever they may be. If the citizenry cares about how goods and services are produced, about how equitably they are distributed, about the pay, benefits, and working conditions of those who produce them, then any legitimate measure of efficiency must incorporate these concerns" (Dillinger, 1988)

Local governments in developing countries have typically provided patronage through jobs in the municipal solid waste agency. As a result, the solid waste employment roles are bulging with extra employees, many who are scarcely productive and others who do not produce at all. In addition to the problem of patronage, technological changes have led to labor redundancy. As urban areas become densely populated and travel time to disposal sites increases, local governments tend to change from labor-intensive refuse collection systems, which use pushcarts and open trucks, to capital-intensive systems, which use compaction trucks. Few cities, however, take any parallel steps toward reducing labor redundancy in their refuse collection work force (Palczynski, 2002).

One expected outcome of privatizing solid waste services is that government employment roles would be reduced. This, however, is not necessarily the case. Excess employees are commonly clerical staff and refuse collectors and sweepers with a long tenure (ten to twenty-five years) of government service rather than refuse collection truck drivers and laborers (Cointreau, 1989). Moreover, in many developing countries, government employees cannot be terminated without cause. The discontinued need for the employee, limited performance by the employee, or even excessive absenteeism, is commonly not considered adequate justification for laying off a government employee (Cointreau, 1989). Where layoffs are permitted as local governments' needs change, governments typically are to pay solid waste

employees a severance pay of one to two months' salary for every year of government service (Cointreau, 1989). After privatization of solid waste service, there is seldom the money or political will to do more than to shift government solid waste workers to another department and to retain most of the office employees in place.

In many developing countries, solid waste workers in the private sector are paid much less than government workers enjoy fewer vacation days, and receive fewer benefits (Jones, 1986).

Because the jobs in the private sector are less secure, the private sector workers may also work much harder. The extent to which government may wish to exploit these disparities between public and private sector workers is one of the social issues involved in deciding whether to privatize. Because government solid waste workers typically have job security, the average age of the government worker is higher than the average age of the private sector worker. Solid waste collection is an arduous job. In developing countries, an average collection worker will lift and load daily from 1 to 3 tonnes of solid waste. In industrialized countries, an average collection worker will lift and load two to three times this quantity, because the loading process is facilitated by better designed equipment. Studies in the United States have shown that an older work force is less productive than a younger work force. Comments from solid waste managers in developing countries also indicate that the same is generally true (Dillinger 1988). This raises a social issue, especially in labor surplus countries wherein these essentially older, unskilled workers might not have other work opportunities available to them if they are removed from the municipal solid waste service.

2.6.4. The Management Context

One of the most frequently cited advantages of the private sector over government is its management flexibility. Private sector management has greater ease in firing personnel for

nonperformance and in providing upward mobility for workers with good performance. Also, the private sector is not constrained to government hours and overtime constraints.

Studies on optimal municipal solid waste management have shown that cost is reduced in cities where the span of management between the manager or supervisor and the worker is appropriate. When the span of management is too high, the supervision of workers is inadequate, and worker productivity is low. When the span of management is too low, the supervision of workers is adequate, but supervisor productivity is low. Both extremes lead unnecessarily to high costs. Ideally, to obtain low-cost service, the span of management for solid waste collection systems should be about one supervisor for every four vehicle crews required for solid waste collection (Sicular, 1991). In developing countries, most municipal solid waste agencies have a span of management of about one supervisor to every twenty to fifty solid waste collection crews. Also, government often provides inadequate salaries for supervisory positions, which makes it difficult to obtain qualified supervisors (Saleh, D, et al 1991). If the private sector has a greater ability to implement more appropriate management practices than government, there is opportunity for cost reduction through private sector participation.

Staffing ratios are important in maintenance as well as in supervision. Ideally, there should be one mechanic for every four to five solid waste collection vehicles (Sicular, 1991). In developing countries, most municipal solid waste agencies commonly have one mechanic for every ten to fifteen vehicles. In addition, repair operations are bogged down with burdensome bureaucratic procedures that dramatically increase the downtime of solid waste collection vehicles. For a spare part to be purchased it typically takes two to four days to obtain the necessary supplier quotations and to submit the lowest quote for the approval of upper

management. Most vehicles are down for three to six days just for relatively minor repairs. If the part has to be ordered from a foreign supplier, the vehicle is down for three to six months (Cointreau, 1986). For efficient solid waste management service, at any given time, no more than 20 percent of the equipment should be out of service (Sicular, 1991). In most developing countries, however, typically 25 percent to 50 percent of the operable fleet is down. Maintenance and repair service is one area where in which the private sector has typically been able to perform very effectively. Vehicles used in private sector solid waste collection fleets are seldom down for repair service for more than a half day.

2.6.5. The Finance Context

In developing countries, cities are hard pressed to obtain enough capital to finance their solid waste systems and are burdened with political constraints limiting their ability to generate revenues. This problem is related to years of inadequate efforts toward cost accounting for cost recovery in solid waste management, as well as to competing political agendas.

In response, private sector participation is viewed as one way to secure investment finance from private companies for solid waste equipment and facilities in return for contracts to provide service. In reality, in many developing countries, the private sector has expressed an unwillingness to provide solid waste service under contract with local governments. The private sector queries how local governments in developing countries, which do not obtain the funds to provide for the renewal and expansion of existing equipment, can be expected to reliably meet their payments to suppliers and contractors. The track record is not good.

In countries where the private sector is unwilling to work with government under contract, this sector is sometimes willing to work independently (through zonal monopoly or open

competition) and to collect its own user charges. Some problems are: How does government deal with those generators of refuse that are not willing to enter into individual agreements with private haulers and pay for service? How does government regulate the tariffs charged? How does government limit collusion and price-setting? (Cointreau, 1992).

In countries in which the private sector is willing to invest in solid waste management, the apparent and hidden costs of private versus government service need to be carefully analyzed. This needs to be put into comparable and equitable terms, showing any hidden subsidies and costs that might exist in either service. For example, in many developing countries, local governments can borrow at substantially lower interest rates than private firms. These governments are exempt from paying property tax on their facilities and equipment; often can import machinery, spare parts, and even technical assistance without paying custom duties; and can provide a service without paying value added taxes on their services (Cointreau, 1992). These can be viewed as hidden subsidies to government. When comparing private with government service, these hidden subsidies need to be included in a comprehensive accounting of costs. Beyond these subsidies to government (which require analysis), there are hidden costs incurred by the private sector. For example, in many developing countries in which the private sector collects refuse or provides landfill operations, the operators are small (often with only one or two trucks) and the equipment used (open tipper trucks and bulldozers) have already been fully depreciated (during ten to fifteen years of construction use). In such cases, the prices charged by the private sector seldom include monies for renewal. While government may save money in the short term by hiring small operators with old equipment, eventually, the cost of renewal will have to be borne.

When solid waste management service is rendered by public means, there are costs related to political exploitation. These involve the hidden cost of patronage and the political manipulation of the purchase of equipment and facilities. On the other hand, awarding and administering contracts with private firms also provides "numerous opportunities for political manipulation" (Stevens, 1980). This issue is particularly true in developing countries wherein governmental procurement regulations typically limit the term of contracts to one year because of reluctance to commit funding beyond the current budget. Every year, the need for contract renewal is revisited and the opportunities for exploitation reappear. Costs to the economy at large in the form of directly unproductive profit-seeking, include not only the transfers made to bureaucrats but also the cost of lobbying (Schertenleib, 1989).

In some developing countries, the government's reputation for corruption is founded on a long-standing reality-one which contractors to government understand better than anyone. The costs of working under contract (in terms of bribes to get contract payments, delays in payments, and risks of nonpayment) can be substantial. While there are many reasons given in each case of delayed payment or nonpayment (lack of budget, change of government, inadequate invoicing, poor performance), the instances occur far too frequently to always be justified.

Private refuse collection companies take advantage of the fact that local authorities must work toward the overall cleanliness of the cities/towns. In many countries, including Colombia, Mexico, and Nigeria, private sector collectors have been responsible for much of the clandestine dumping of wastes. These collectors service their paying customers and dump on open land, leaving the resulting mess for government to clear at a great expense (Cointreau, 1986).

When developing countries involve the private sector, it is typically for service of areas with predominantly upper income households and large industrial and commercial establishments. If private service costs are covered directly by and matched to user charges within the service area, the opportunity is lost for government to source these wealthier residents for the cross-subsidy of service to poorer residents. In the worst case scenario, the government contracts for this service and the cost recovery paid to government is less than the cost of the service-leading to a hidden cross subsidy from poorer residents to cover the service for wealthier residents (Seader, 1989).

2.6.6. The Economies of Scale Context

One reason that solid waste management is viewed as a possible arena for private sector participation is that the economies of scale are not pronounced. This is in contrast to the case of water, electricity, and telecommunications that have such significant economies of scale that they are often regarded as natural monopolies (Sicular, 1991). In solid waste management, there are economies of scale to a limited extent, as follows:

Collection in low-income areas: Low-income areas are commonly characterized by narrow or steeply graded roads (or both) that are accessible only by relatively small vehicles or hand/animal drawn carts (Sicular, 1991).

Collection in high-income areas: High-income areas are commonly characterized by roads of moderate width and grade that are readily accessed by heavy compaction vehicles of about 6-tonne payload capacity (Sicular, 1991).

Transfer systems. Transfer station design is based on the use of large-capacity hauling vehicles (tractor trucks with trailers) that have a payload capacity of about 20 tonnes and are able to make at least 4 trips for each daily shift (80 tonnes per day) (Sicular, 1991).

Sanitary landfill: Sanitary landfills rely on bulldozers as their main piece of equipment for spreading and grading refuse and for daily soil cover. One bulldozer of 200 horsepower can handle about 400 tonnes per day. Assuming a daily, citywide waste generation rate of about 0.70 kilograms per capita, 1 bulldozer can serve about 570,000 residents (Sicular, 1991).

Composting: Composting systems need be no more complicated than the manual sorting of non compostibles from incoming waste, followed by the mechanized turning of windrow piles with a wheeled loader or windrow turning machine and the screening of compost product with a portable trommel screen. If the composting operation is performed at a site adjacent to the sanitary landfill operation, the wheeled loader used for the excavation of soil cover at the landfill can be shared with the compost operation. If the composting operation is at a separate location, thus requiring dedicated equipment, 1 wheeled loader of about 170 horsepower would handle about 200 tonnes per day (Sicular, 1991).

Waste-to-energy: Waste-to-energy incineration systems are not technically viable for most developing countries, because the refuse, on an as received basis (wet basis), is not sufficiently high in calorific value to sustain incineration. Refuse of least 1,300 kilocalories per kilogram of "lower heating value" needs to exist on a year-round basis for incineration without supplemental fuel. If waste-to- energy incineration is viable, the frequency and duration of downtime for maintenance require 100 percent standby capacity. A waste-to-energy incinerator needs to operate continuously, on a 24-hour basis, at no less than 5 tonnes per hour per unit. As a result, the smallest viable waste-to-energy incineration system would consist of one 120 tonnes per unit per day, plus one standby, which would serve about 170,000 residents (Sicular, 1991).

2.6.7. The Legislative Context

Laws influence the private sector significantly in its assessment of whether to become involved in the provision of municipal solid waste management services. Reputable private

companies want to have "a level playing field," in which they can compete equitably, fairly and with minimal risk. For example, before private companies invest in building, owning, and operating a sanitary landfill for public use, they will want environmentally sound, safe disposal practices to be required by law and enforced by penalty. Before spending money on the development of bid documents in response to government procurements, companies will want assurance that government will follow procurement regulations governing fair competition (Cointreau, 1994).

Few developing countries have domestic, private companies with expertise in municipal solid waste management. For foreign firms to take an interest in participating in municipal solid waste service in such a country, an attractive environment for foreign investment needs to be created. This would necessarily include the local recognition of the value of and need for expertise that foreign firms could contribute. Although developing countries legally restrict foreign ownership in the joint venture to only a minority share, these countries do not protect against liability for nonperformance of a local partner. Laws in many developing countries restrict the ownership of indigenous land or other property, limit the immigration of foreign professionals needed for technology transfer to the local counterparts, prohibit repatriation of profit and repayment on investment capital, and demand high compensation to be paid to workers that are fired for nonperformance or at the end of a contract period (Cointreau, 1984). At the same time, there are few, if any, laws that protect a private firm from nonpayment by government for services rendered.

2.6.8. The Institutional Context

Privatizing some aspects of municipal solid waste service delivery does not take away the need for local government (County Government) to be fully responsible for solid waste

management service. Local government needs to have adequate autonomy to enter into multi-year agreements that capture economies-of-scale, as well as efficiencies (Cointreau, 1984). For some of these services to be effectively privatized, government would need to be strengthened (Bartone, 1995). Only a governmental organization with a competent professional staff and an adequately designated authority with commensurate responsibility would be fully able to develop, negotiate, manage, monitor, and enforce a competent contract instrument. If government does not have political leadership with the will to upgrade and professionalize the staffing of the solid waste agency as part of a decision to privatize solid waste management services, it is doubtful if the private sector will be obliged to deliver service at a low cost. Beyond the strengthening of local (or metropolitan) government, there are obvious needs to strengthen central government to deal with the contextual parameters raised above. According to the World Bank's Urban Policy and Economic Development-An Agenda for the 1990s, central government needs to "establish expectations of local performance" and to "retain some degree of oversight to ensure accountability over some areas of local decision-making" (Cohen, 1991).

Some issues that are directly related to enabling private sector participation to realize low costs can be dealt with only at the central level. These issues include the minimization of risks related to environmental regulatory changes, national inflation, currency convertibility, fuel prices, pricing policies, import bans or quotas, and taxes. These also include the provision of appropriate incentives, such as guarantees for any borrowings, assumption of foreign exchange risk, tax incentives, customs duty exemption, and special lines of credit (Cohen, 1991).

Which level of government is most appropriate to conduct solid waste collection and street sweeping activities? When the technology for a given service is readily known and available, the decentralization of an activity from metropolitan government to local government and private markets may be advisable (Wilson, 1981). Many unfamiliar with solid waste management view refuse collection and street sweeping as simple services that do not require much knowledge or specialized equipment. This is far from true. While it is possible to collect and dispose of refuse without knowledge and with only limited equipment, to do it efficiently and effectively requires substantial planning ability, appropriate equipment, and continuous managerial optimization of vehicle and worker productivity. While it is viable to decentralize refuse collection and sweeping from metropolitan government to local government after the appropriate equipment has been procured and the optimal crew size and routing has been determined, it would be ill-advised to decentralize the equipment procurement or optimization planning activities without the significant development of the technological base within local government and the private sector.

Which level of government is most appropriate to conduct solid waste transfer and disposal activities? When goods and services have significant spillovers (or externalities), the institutional arrangement must have sufficient authority to deal equitably with the entire area of impact. Some solid waste activities, such as refuse collection, have no significant spillovers. That is, all the costs, benefits, and impacts are confined to the area of service. Other solid waste activities, such as refuse disposal, can have significant spillovers, that is, water and air pollution can migrate from the area of service to surrounding areas. Because of the spillovers that typically characterize refuse disposal, it is not advisable to decentralize disposal to local governments within any metropolitan area or to private markets unless the regulatory framework and sanctions are adequate (Wilson, 1981).

2.6.9. The Cost Context

What is a low cost for solid waste management? At first glance, a low cost for service delivery by the private sector would be one that is lower than the cost for government service. After the cost for government to monitor the performance of the private sector is added, a low cost for service delivery by the private sector would be still lower than the cost of government service. But what are the costs for government service? In most developing countries, accounting systems show cash flows rather than accruals, with no clear delineation between recurrent and capital expenditures. There is no attempt to aggregate municipal solid waste management costs incurred by all the various agencies that participate in the system. Moreover, there is typically no attempt to keep track of depreciation, debt service, personnel benefits, land acquisition, and human resettlement costs within the solid waste management accounting system. The result is that most developing countries estimate their costs for municipal solid waste management service to be less than 50 percent of actual cost (Cointreau, 1989).

While waste generation rates and labor rates in developing countries are significantly lower than those in industrialized countries, the costs of solid waste collection, sweeping, and disposal in developing countries require a much higher percentage of individual income than those in industrialized countries. That is because income levels are much lower, while costs attributable to equipment purchase, debt service, spare parts, fuel, and oil are typically much higher. Total solid waste management costs in a low income country might consume two to three percent of individual income while total costs in a high income industrialized country might consume only one percent of individual income (Cointreau, 1994).

Because most of the municipal solid waste management expenditure is for collection, this should be the first service to examine for private sector participation arrangements that would reduce costs through increasing efficiency. These analyses will also provide a framework to determine which parts of the municipal solid waste service require the greatest capital investment. Because solid waste disposal and transfer systems are more capital-intensive than the collection and sweeping systems, these should be examined for private sector participation arrangements that would provide investment (Cointreau,1994).

2.7. Methods of Outsourcing of Municipal Solid Waste Management

Methods of private sector participation most common to solid waste management in the world include; contracting, franchise, concession, and open competition

2.7.1. Contracting

Entails a contract placing a municipal service under private management for a specified period of time, for which the contractor is paid a fee. The fee may be based partly on performance. The private manager has extensive autonomy, as set out in the contract.

The greatest opportunity to involve the private sector lies in having private firms provide collection service under contract with the local government. As noted by John D. Donahue (1989) in his book on privatization in industrialized countries, which includes private sector participation: "One key is the absence of barriers to entry. The service involves low economies of scale, technological simplicity, and moderate investment costs" (Dillinger 1988)

It is feasible for local firms with modest financial resources to enter into the business of solid waste collection. Among the various options for private sector participation, contracting for solid waste service holds the greatest promise to developing countries as a way of lowering

cost. Even when only a small portion of the city is served under private contract, significant efficiencies may be achieved because of contestability of market principles. Studies conducted in 317 cities in England and Wales and in 126 cities in Canada, contracting of solid waste collection service were 22 percent to 41 percent-less costly respectively-than public service. In those cities in which a private contractor provided refuse collection and thus eliminated public monopoly, costs were lower (Dillinger 1988)

2.7.2. Leasing

Contracting to lease equipment, rather than to obtain service, is one way of obtaining equipment when the opportunity to borrow money for a capital investment is limited. In Santa Cruz, Bolivia, 70 percent of the solid waste collection fleet is leased from private firms. The firms provide the vehicles, as well as the drivers, fuel, and maintenance (Wilson, D. C. 1981). In developing countries, the available equipment for solid waste service leasing typically has been fully depreciated during private sector use in construction or haulage. Most leasing involves open tipper trucks or bulldozers that are readily available from construction contractors, especially in recent years when construction activity has declined in most developing countries

2.7.3. Franchise

Franchise is a process in which the city authority awards, through competition, a finite-term, zonal monopoly to a private firm for the delivery of service. The private firm pays a license fee to cover the government's costs of monitoring and recovers earned revenue through direct charges to households and the establishments served. The city authority provides control over the tariff charged to the consumer. This method is suitable for solid waste management. (USAID Environmental Guidelines for Small-Scale Activities in Africa, 2009)

By national law in most countries, local governments own all waste within their boundaries, once it has been discharged for collection and disposal. A local government has the authority to give exclusive franchise to a qualified private firm for the right and responsibility to provide service to customers within a zone. In return for such an exclusive franchise, the private firm pays a license fee to the government. The firm subsequently charges their customers appropriate fees to cover the cost of service. The fees charged may be regulated by ceilings fixed by municipal ordinance (Stevens, 1980). Local government retains responsibility to monitor the performance of private firms having franchise agreements, and to regulate user charges. It also retains the right to renew or revoke licenses in accordance with pre-established criteria.

Franchise is applicable to solid waste systems because economies of service are attainable only when waste is collected along a contiguous route or within an exclusive zone (Dillinger 1988). By the franchise system, private firms collect user charges from each household and establishment that receives private service. Thus, private firms must individually bear the cost of billing and collecting user charges. The cost of billing (including costs of nonpayment and late payment) is estimated to amount to 10 percent of the total cost to the consumer of service. It is one of the reasons why franchise does not usually result in the same low cost as contracting (Dillinger 1988)

2.7.4. Concession

Concession is a contractual arrangement whereby a private operator is selected and awarded a license to provide specified services over a discrete period of time in return for a negotiated fee. The concession agreement sets out the rights and obligations of the service provider, who generally retains ownership of the principle assets. This method is well suited to enterprises

which provide services that are economically and socially important and need significant improvement; are large and usually enjoy a monopoly position; are politically and/or practically difficult to sell; and are in need of investment capital, e.g., trucks and bins (USAID, 2009).

Under concession arrangements, the private sector finances and owns (for period of time sufficient to depreciate investments and to provide a reasonable return to the equity investors) solid waste management facilities (3). In return, the government typically grants and enables access to a specified quantity and quality of solid waste and provides some form of tipping fee. In cases in which the government is the only purchaser of the product or output service of the concession, the government will normally be required to enter into a binding long term agreement to purchase on a "take or pay" basis (3). Concession arrangements involve building, owning, and operating facilities through long-term contractual agreements which include:

Build, Own, Operate, and Transfer (BOOT)

BOOT involves private sector participation in building, owning, operating, and, after a pre-specified number of years, transferring infrastructure. It provides a means of having the private sector finance facilities whose ownership will eventually be transferred over to government. While governments, especially those of developing countries, favor the concept of BOOT, very few have been able to implement these arrangements. In many developing countries, the private sector is not willing to risk its investment money in such long-term and large-scale projects.

Build, own, and operate (BOO)

A private firm, through turnkey contracting, may build, own, and operate (BOO) a facility that provides solid waste service, such as transfer, disposal, or resource recovery. BOO is not as popular with developing countries, because the private sector does not eventually transfer ownership of facilities to government. For many reasons, however, this is a much better arrangement to pursue for the following simple reason: If the private sector is willing to build, own, and operate a solid waste facility, it indicates that the fundamental risks and economic benefits have been satisfactorily managed to create a real-world market opportunity.

2.7.5. Commercialization

Commercialization is a process in which the city authority forms a wholly owned subsidiary. Shares of the new company are restricted, and consumer representatives, the local government and other stakeholders make up the board of directors. The ownership of assets, regulation of tariffs and quality control remain at all times vested in the municipal authority. This method is suitable for managing water supplies.

2.7.6. Open Competition/Entrepreneurship

In open competition (often termed private subscription) of solid waste collection services, each household and commercial establishment hires a private collection firm and pays the solid waste removal fee that the firm charges (43). Generally, this form of privatizing of solid waste collection a) leads to substantially higher costs than those incurred by government contracting with private firms and b) is often more costly than public service. When a number of competing firms operate in the same area, along the same streets, each loses the "economies of continuity" that would be received if one firm served the area and in turn picked up the waste from each establishment (Dillinger, 1988).

Collusion is an issue of concern when open competition is allowed. In developing countries that do not have true competition at a significant level, collusion is a common practice. Price setting occurs and is viewed in some cultures to be an accepted practice (Cointreau, S.J.1989)

2.8. Criteria for Privatization

In deciding whether to privatize a specific aspect or portion of its service, a government needs to weigh the risks—political manipulation, changing environmental regulations, government tariff regulation, currency devaluation, inflation, and unclear taxation systems—against the economic benefits of private sector efficiency.

The following criteria may be helpful in considering private sector involvement in solid waste management services (Cointreau, 1994):

Ease of defining outputs. Ensure that defined, measurable outputs of the proposed service are incorporated in written performance specifications to clearly establish public and private sector deliverables. The government must have the resources and capabilities to monitor service levels and enforce penalties for noncompliant behaviors (Cointreau, 1994).

Efficiency. Consider reasons for public and private sector inefficiencies, including cost accountability, labor tenure, government wage scales, restrictive labor practices, personnel benefits, inflexible work arrangements, bureaucratic procurement procedures, political limitations, and hiring and firing procedures. Assess options for reducing or removing these barriers. Give preference to plans offering economies of scale (Cointreau, 1994).

Capability. Ensure that adequate government capacity exists for planning, design, construction, operation, maintenance and oversight. Evaluate both the public and private

sectors for technical and financial resources, including expertise, skills and access to capital. Private companies must possess required facilities and equipment, or have a business plan that covers them. Governments must have both the capability to monitor performance and the political will to enforce contractual or license agreements (Cointreau, 1994).

Competition. Ideally, a privatization plan will allow for competition between a number of private firms or between the government and a few private firms. Consider possible barriers to market entry and exit, as well as economies of scale that might limit competition. Determine if financial incentives or technical assistance would result in better performance from private firms. Ensure the government's ability and commitment to conducting a competitive procurement process (Cointreau, 1994).

Duplication. Ensure that the government has the political will to cut personnel and assets when services are privatized. Balance the cost savings from reduced staff with new monitoring and enforcement costs (Cointreau, 1994).

Risk. In some developing countries, commercial lenders and private companies do not want to risk their money on long-term or large-scale investments that rely on government payments. Regulatory framework must exist to protect the private sector against risks such as environmental damage, currency adjustments, inflation and political changes. Local governments must be able to generate enough revenue to meet contractual agreements with the private sector and protect against economic instabilities. Plans should include provisions for loss due to corruption (kickbacks, bribes and favors) (Cointreau, 1994).

Accountability. Ensure that private sector participation will not disproportionately benefit wealthy classes. Market openings should be made available to small- and medium-size

enterprises, helping to redistribute income. Government must guarantee a fair minimum wage and safe working conditions. Government should also make provisions for displaced workers, including job training and employment networking (Cointreau, 1994).

Costs. The costs for public waste collection services must be well understood. Cost factors should be analyzed separately for the different components of solid waste service—collection, cleansing, disposal and transfer. Government must have detailed accounting information to determine whether private sector participation would be more cost-effective. A strategic planning and feasibility study should be conducted to know whether the technology offered by the private sector would result in lower costs (Cointreau, 1994).

These criteria help to determine the extent to which a society is open or closed to competitive market forces, whether the procurement process is straightforward or opaque, how interrelated and transparent taxation and subsidies are, and the extent to which corruption skews the system. Moving public services to the private sector will be efficient only where competition, performance monitoring and accountability exist (Cointreau, 1994).

2.9. Limitations of Privatization

To be successful, privatization of solid-waste management must contend with a variety of problems, including insufficient public awareness and little ability to generate the necessary public participation in planning, administering, or monitoring; managerial deficiencies and weaknesses in local authorities that make it hard to carry out policy reform measures; and lack of experienced and competent personnel to administer and manage the privatization. Municipal councils opting to privatize or commercialize their services often find that they need to upgrade all staff in accounting, auditing, information management, policy development and implementation to make these options work. (Dillinger 1988)

Although private solid-waste entrepreneurs work all over a city, most activity is concentrated in residential neighborhoods and biased towards middle- and higher-income households who can be relied upon to pay for services. Little or no private sector solid-waste collection activity occurs in low-income areas, due to inability to pay rather than lack of access to these areas. Large firms usually serve wealthy areas, while small firms generally serve a single, middle or lower-middle income neighborhood. Informal private sector waste entrepreneurs or "scavengers" operate in all areas.

Although popular belief states that the private sector will field better-maintained refuse collection vehicles, this is not usually the case. Unless contracts provide incentives for the private firms to invest in appropriate equipment, firms lease second-hand dump trucks that frequently break down (Dillinger, 1988).

CHAPTER THREE

RESEARCH METHODOLOGY

2.1. Overview

This chapter presents the process involved in data collection, analysis and presentation. The chapter discusses research design, the study area, the target population, sample size and sampling technique that was used, the data collection instruments, reliability and validity of instruments, the data collection procedure, the data analysis techniques and ethical issues during the study.

2.2. Research Design

The research design used in the study was a case study where Nakuru Municipality within Nakuru County was chosen to represent the urban areas in Kenya. Nakuru Municipality was

chosen because it was among the major urban areas that had outsourced management of solid waste. The study employed qualitative analysis.

2.3. The Study Area

The study was carried out in Nakuru Municipality within Nakuru County in Kenya. Purposive sampling was used to select Nakuru Municipality since it is one of the fastest growing urban areas in Kenya which has outsourced solid waste management to the private sector. The Municipality faces similar challenges like all the other municipalities in Kenya in the management of solid waste. The climate of the area is moderate tropical with sunshine most of the year round and average temperature of 25 degrees Celsius during the day.

2.4. Target population

The target population was 24 comprising of private solid waste collectors operating in the study area at the time of the Study. The study targeted active participants in solid waste management within the study area which included the County Government through the department of Public Health and the private solid waste collectors who had been engaged by the County Government of Nakuru. This population was chosen because they are the active participants in the management of the municipal solid waste within the study area.

2.5. Sample Size

The entire target population of 24 number private solid waste collectors was considered given its small size.

2.6. Sampling Techniques

Private garbage collecting firms engaged to collect solid waste within the study area were considered based on the available records at the County Government. Purposive sampling technique was used in selecting the respondents from the County Government to be

interviewed. Only those personnel directly involved with solid waste management were interviewed. A community based group was sampled for focused group discussion.

2.7. Data Collection Instruments

Questionnaires, semi structured interviews, focused group discussions, photography, satellite imagery and observations were used as the data collection instruments.

Questionnaire - a detailed structured questionnaire was designed and administered to the sampled respondents. The questionnaire was pre-tested with a small representative sample. Taylor Powell and Herman (2000) argue that questionnaires are best used in surveys as they allow the respondents to simply give a response to the experiences he/she has had with the variables being tested. This study relied on this argument to adopt questionnaires as the data collection instrument. The questionnaire was administered to the entire population of 24 private solid waste collectors.

Semi-Structured interviews; The researcher interviewed the officer in charge of the solid waste management in Nakuru County. The interviews were based on an interview guide with a list of questions that needed to be covered. The interviewer guided and controlled the discussion at all times within the context of the study. Probing for more answers and clarification was done.

Focused Group Discussions; The researcher held meetings with a community based group dealing with community security and safety issues known as “Nyumba Kumi group”

Photography; the researcher captured Photographs at various sites of the study. The photographs are attached in appendix iv

Satellite Imagery; The researcher obtained satellite imageries from the Google earth which were used to establish the aerial view of the study area and to observe the open dumpsite.

Observations; The researcher participated in various solid waste management activities and made direct observations that were documented. Deacon etal, (1999), contends that “one of

the strengths of observation as a technique is that it implicitly includes within itself other methods such as interviewing”. Deacon et al further observes that “one of the strongest claims made by observation studies are about being there – actually witnessing the events or processes that are being researched”. By visiting the sites and interacting with the respondents will give the researcher an advantage of being able to witness events and methods of solid waste management.

2.8. Reliability and validity of instruments

To ensure reliability of the data to be collected, the study pre-tested the questionnaire on a pilot sample of respondents from Eldoret. The inconsistent questions in the questionnaire were corrected until they gave the desired reliability.

Joppe (2000) describes validity as the extent to which an instrument measures what it is intended to measure. Validity therefore is the process of ensuring the instrument is not ambiguous or gives inaccurate data. The researcher developed multiple choices of the expected responses from the respondents. The questions were also made direct, clear and brief for the respondents to easily understand. The instruments were also examined to measure the consistency of the results. The researcher was attentive to responses that were inconsistent and discarded them.

2.9. Data Analysis and Presentation

The data collected was both qualitative and quantitative. The raw data was categorized through coding and tabulation. Editing was done to improve the quality of the data. The findings were subjected to SPSS computer package to generate tables, percentages, graphs and charts. Descriptive analysis was used to analyze the findings.

3.10 Ethical Issues

The researcher acquired letter of authorization from Moi University and sought a research permit from the National Commission for Science Technology and Innovation before embarking on the study. As per the requirements of the research permit, the researcher reported to the County Director of Education and the County Commissioner, Nakuru County prior to commencing the research.

The researcher then made an appointment with the cleansing officer, Nakuru County for a structured interview which was done at his office. The questionnaires were administered through drop and pick method to increase contact with the respondents hence influence the rate of return.

The researcher promised to maintain confidentiality at all times during and after the research and explained the purpose of the research to all respondents in advance and debrief afterwards. The purpose of this study was specified as academic only. Respondents were requested to participate in the study voluntarily and they were free to leave the study if they chose to at any time.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

3.1. Overview

This Chapter presents the findings based on the study objectives. The findings discussed here were analyzed using descriptive statistics and are presented in tables and charts.

3.2. Return Rate

The study targeted a population of 24 respondents, one interview, one focused group discussion and observations. 20 out of 24 questionnaires were returned thus the study achieved 83% return rate. The interview and focused group discussion and observations were conducted as planned.

3.3. Processes of Outsourced Solid Waste Management

The first objective of the study was to establish the processes and activities involvement in solid waste management from the perspective of the private solid waste collectors within the study area. The results collected on this objective are presented in the tables and charts in the following sub-headings:

3.3.1. Legal and Regulatory Framework

The study sought to establish the existing legal and operational frameworks within which the private solid waste collectors operate.

3.3.1.1. Agreements between the Nakuru County Government and the Solid waste Collectors.

During the interview with the Cleansing Officer, it was confirmed that all the Solid Waste Collectors had signed one year contracts with the county government. The service providers

were selected through an open competitive process advertised in the print media. The town was subdivided into zones of different sizes and each was allocated a service provider. All the respondents confirmed they had signed service provision contracts with the County Government of Nakuru. In the past years, it was noted that the service providers were being given three year contracts which had since been revised to one year contracts.

3.3.1.2. Regulatory Framework

The cleansing Officer, during the interview, confirmed that the County Government of Nakuru not only contracts the service providers but also supervises and regulates their operations. The County sets the maximum fees being charged for waste collection services according to the zones. The residential zones have been broadly categorized into three groups (Low income, middle income and High income areas). In low income areas, the service providers are allowed to charge a maximum of Kshs. 100, while in middle income areas a maximum of Kshs. 150 and Kshs. 200 in high income areas. It was however not clear how the County Government had arrived at these figures as there was no evidence that a socio-economic study had been carried out.

When asked how much they charge for their services in low income, the service providers responded as shown in the table below

Table 4.1 Monthly Charges in Low income areas

Charges in Kshs		Frequency	Percent
Valid	50	2	10.0
	70	6	30.0
	80	2	10.0
	100	6	30.0
	200	2	10.0

Total	18	90.0
Missing System	2	10.0
Total	20	100.0

Table 4.1 illustrates that 10% of the respondents charge Kshs. 50, 30% of the respondents charges Kshs. 70, 10% of the respondents charges Kshs. 80, 30% of the respondents charges Kshs. 100 10% of the respondents charges Kshs. 200 in low income areas.

When asked how much they charge for their services in middle income, the service providers responded as shown in the Table 4.2 below

Table 4.2 Monthly Charges in Middle Income areas

Charges Kshs.	Frequency	Percent
Valid 100	4	20.0
150	6	30.0
200	4	20.0
250	2	10.0
300	4	20.0
Total	20	100.0

The table 4.2 above illustrates that 20% of the respondents charged Kshs. 100, 30% of the respondents charges Kshs. 150, 20% of the respondents charged Kshs. 200, 10% of the respondents charged Kshs. 250 and 20% of the respondents charged Kshs. 300 per month in middle income areas.

During the interview, it was noted that the county government has assigned staff to supervise operations of the providers and to ensure compliance by the residents. There are however challenges arising from this structure. One of the major challenge is the non-compliance by the residents to register for the service or default on payments. Both the service providers and

the County Government have no mechanism to compel residents to register for the services or for making defaulters pay for the services rendered. This challenge has had two major consequences. One, when residents have the option to choose whether to subscribe for the service or not, then the overall goal of a clean environment is lost because those not getting the service litter the environment no matter how few they are. This also has a negative influence on those paying for the service and some end up unsubscribing from the service leading to further degradation of the environment.

Two, the service providers are unable to get enough clients or collect enough revenues to make the businesses lucrative hence majority of the service providers can barely survive.

3.4. Operations of the private solid waste collectors

3.4.1. Number of Zones and clients within the Service Area

In order to establish the existing capacity of the PSCs, the study investigated the number of zones and clients covered by the respondent's organizations. The results were as shown in Tables 4.3 and 4.4

Table 4.3 : Number of Zones

No of Zones	Frequency	Percent
1	10	50.0
2	5	25.0
3	2	10.0
4	2	10.0
5	0	0
6	0	0
7	1	5.0
Total	20	100.0

50% of the respondents covered one zone while 25% covered two zones 10% covered 4 zones while Only 5% covered 7 zones . This result clearly shows that a majority of the providers have been given small areas to cover. This result was collaborated by the interview with the cleansing officer of confirmed that the Municipality had been subdivided into various zones and every provider had been assigned zones depending on their capacities while ensuring equitable distribution as well.

Table 4.4 Number of Clients

No. of clients	Frequency	Percent
0-200	2	10.0
201-500	4	20.0
501-1000	3	15.0
1001-2000	3	15.0
2001-5000	8	40.0
Total	20	100.0

From the results obtained, 40% of the respondents had between 2000 and 5000 clients, while 20% had between 201-500 clients, 15% had between 501-1000 clients, another 15% had 1001-2000 clients and a further 10% had between 0-200 clients. This scenario can further be attributed to the uneven distribution of zones based on capacities, the unwillingness of some residents to subscribe to the solid waste collection services, lack of awareness by the residents and open dumping of the waste. Majority of those who had over 2000 clients operated in high and middle income areas while those in the low income areas had few clients.

3.4.2. Solid Waste Collection Cycles

The study sought to establish the schedules maintained by the solid waste collectors for their delivery of services. Table 4.5 shows the findings

Table 4.5: Waste Collection Cycle

		Frequency	Percent
Valid	Daily	1	5.0
	Weekly	19	95.0
	Total	20	100.0

95% of the respondents collected garbage from their clients on a weekly basis. This can be attributed to the fact that their zones are mainly residential areas and generated waste can adequately be stored for a week before collection and disposal

3.4.3. Solid waste Collection and Transportation Modes

The mode of solid waste collection and disposal is one of the major components in the solid waste management cycle. The study sought to know the mode of collection and transportation being used by the service providers. Table 4.6 gives the findings of the study.

Table 4.6: Mode of waste Collection and transportation

		Frequency	Percent
Valid	Closed Trucks	6	30.0
	Open Trucks with tent	14	70.0
	Total	20	100.0

A majority of the respondents (70%) used open trucks with tents whereas only 30% used the recommended closed trucks. The National Environment Management Authority(NEMA) requires all garbage transporters to use closed trucks or open trucks with tent so as to avoid spillage of garbage on transit. During the field visit, the researcher noticed that none of the open trucks observed had its tent strapped as required although the tents were on board. This

observation implies that a majority of the truck operators ignore the requirement hence are likely to be spilling garbage on transit to the dumping site.

3.4.4. Dumping Site

The study inquired where the service providers discharge the waste after collection. 100% of the respondents said they dump at the Municipality's recommended open dumpsite at Giotoo which is approximately 5 Km out of the CBD.

The researcher visited Giotoo dumpsite and observed that there were staff directing vehicles to the appropriate dumping ground as scheduled, the dumpsite was an open site without a perimeter fence, there was no compaction of the waste hence occupying plenty of space, the access road to the dumpsite was a earth road which was likely to pose challenges during rainy seasons, the site was in very poor condition despite the County Government being charged with the responsibility of its maintenance, the site posed a health and security threat to the neighbouring communities due to its poor state and presence of many people scavenging every vehicle was required to pay Kshs. 400 per trip of the solid waste disposed at the site as maintenance fee.

3.4.5. Organizational Structures

The study sought to establish the existing structures and the capacities of the private solid waste providers.

Number of staff in the organizations

The study inquired the number of staff in the organizations and the findings were as shown in Table 4.7 below:

Table 4.7 Total number of staff

No. of Staff	Frequency	Percent
Valid 0-10	3	15.0

11-20	15	75.0
21-30	2	10.0
Total	20	100.0

A majority (75%) of the service providers had between 11-20 staff while 15% had between 0-10 and 10% had 21-30 staff.

Departments in the Organization

The study sought to establish the different levels developed in the organizations in order to increase efficiency in service delivery. When asked what departments existed within the organizations, 40% of those polled said they had technical department, 60% had finance department, 70% had human resource and administration departments, 60% had customer care while 50% had marketing departments. This shows that despite the fact that the organizations are very small, a majority of them are well structured to undertake the operations of solid waste management commercially.

Marketing and Modes of Payment

Marketing and revenue collection are key functions of any commercial entity that contribute to financial sustainability. The study sought to establish how the organizations marketed their services and how revenue was being collected. All (100%) of the sampled organizations confirmed that they market their services and have designed application forms for new customers.

On the available modes of payments by the clients, 60% said they have pay points at the offices, 30% had Mpesa an account and a majority (90%) made house to house collections. This analysis shows that the most preferable mode of revenue collection is house to house collection due to high rate of default.

4.4.6 Operational Expense, Revenue and Profits

In order to establish the financial sustainability of the organizations, the study inquired on the monthly operational costs, revenue collections and the profits. The results were as highlighted in below.

Figure 4.1: Average Monthly Expenses, collections and Profits

A majority of the respondents (40%) made profits of between Kshs. 50,000-80,000 per month, 10% made Kshs. 31,000-50,000 per month, 20% made Kshs. 21,000-30000 per month, 20% made Kshs. 1000-1000 per month and 10% made Kshs. 1-1000 per month.

From the findings, all the firms were able to make profits although on different margins depending on the number of clients, the zones they operate, collection efficiency in and overall management of their operations.

As to whether outsourcing of solid waste management to private garbage collectors is sustainable, 100% of the respondents replied in the affirmative a fact that was also supported by the County Cleansing Officer.

3.5. Effects of Outsourcing of Solid Waste Management

The study sought to establish the impact that has resulted from outsourcing of the solid waste management within the study area.

3.5.1. Effects on the Service Delivery

During the interview with the cleansing officer, it became clear that the service delivery had become more efficient as compared to when the County Government (formerly the Municipal council) managing. This was corroborated by the residents who took part in the focused group discussions. Timely collection of the waste throughout the year was pointed out as a major achievement of the PSWCs. Some of the residents noted that the PSWCs always

ensured that their clients were served even when they experience challenges like vehicle breakdown. It was also pointed out that PSWCs were providing plastic bags for storage of waste which was not the case before.

A majority of the residents felt that the environment was a bit cleaner as a result of the engagement of the PSWCs although they pointed out the fact that enforcement was lacking hence the service was being viewed as a choice rather than a requirement anchored in law. Due to the separation of roles between the county government and the PSWCs, the county government was performing oversight roles thus making the PSWCs comply with the laid down requirements.

3.5.2. Employment and Income Generation

The study noted that the PSWCs had employed staff of different cadre thus creating employment for many people. Each of the organizations had more than eleven employees. A majority of the garbage collectors were the youth who were now engaged in gainful employment but would otherwise have been engaging in unproductive activities. Majority of the supervisory and revenue collection staff were well educated.

3.5.3. Effects on the County Government

The study observed that through outsourcing of the solid waste management in the residential areas, the county government had managed to consolidate its scarce resources (Staff and equipment) in the management of solid waste within the central business district (CBD). This had enabled the county government to effectively manage solid waste within the central business district of Nakuru Town. It was also noted that through outsourcing, the county government had reduced its operation and maintenance costs that were associated with solid waste management which included vehicle and staff costs.

3.6. Challenges of Outsourcing of Solid Waste Management

The study aimed at establishing some of the challenges arising out of solid waste operations both for the County government and the Operators.

3.6.1. Challenges faced by the County Government

Lack of Clear policy and regulatory framework – The County Government does not have a clear policy guiding on the management of solid waste in the county. Initially, the county contracted waste collectors for a period of three years but has revised to one year contracts which pose a big challenge to the new comers. There is no clear legal mechanism compelling residents to subscribe to the services hence a majority of the residents do not subscribe for the services. The providers do not have mechanisms of compelling defaulters to pay for the services rendered.

Political interference – Politicians try to influence the selection process so as to put firms of their choice in place and when they fail, they end up frustrating the firms on the ground by misadvising the residents against the services.

Capacity – Majority of the firms employ street boys as their garbage collectors majority of who are illiterate. Such personnel mishandle customers and are not passionate in their work. The firms also lacked key personnel such as accountants, customer service clerks and supervisors. Some of the firms lack entrepreneurial skills hence are unable to grow.

Poor Infrastructure – Some of the estates especially in the low income areas have very bad roads which cannot easily be accessed posing a challenge to the service providers. The road to and within the dumpsite is not paved and vehicles often get stuck during rainy season.

3.6.2. Challenges faced by Private Solid Waste Collectors

90% of the respondents said there were instances when garbage was uncollected for various reasons. 90% of those said the major reason was due to motor vehicle breakdown, 22% said it was due to bad roads and 67% said it was due to poor weather.

A majority of the PSWCs said they faced challenges on revenue collection due to high rate of defaulters. Due to lack of enforcement of the law, the PSWCs had to literally market their services which was being viewed by the residents as an option rather than a requirement of law. The residents who were not subscribing the services of the PSWCs were dumping their waste in either in the open or on the roadsides creating a hazardous environment which the PSWCs often got blamed for.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

4.1. Summary of Findings

4.1.1. Findings on the processes of Outsourcing Solid Waste Management

The first objective of the study was to establish the processes involved in outsourcing of solid waste management. The study found that County Government of Nakuru contracts, supervises and regulates the operations of the service providers. The County sets the maximum fees being charged for waste collection services according to the zones. In low income areas, the service providers were allowed to charge a maximum of Kshs. 100, while in middle income areas a maximum of Kshs. 150 and Kshs. 200 in high income areas.

The study found that the service charges in low income areas ranged from Kshs. 50 to Kshs. 200 per month with a majority 30% charging Ksh. 80 and 100 respectively.

The study also found that the service charges in middle income area ranged from Ksh. 100 to Ksh. 300 per month with a majority of the service providers (30%) charging Ksh. 150 per month.

The study also observed that both the service providers and the County Government have no mechanism to compel residents to register for the services or for making defaulters pay for the services rendered.

4.1.2. Findings on operations of the private solid waste collectors

The study found that a majority of the providers (50%) covered one zone while 25% covered two zones and the 10% covered 4 zones and 5% covered 7 zones. 40% of the respondents had between 2000 and 5000 clients, while 20% had between 201-500 clients, another 15% had between 2501-1000 clients, 15% had 1001-2000 clients and a further 10% had between 0-200 clients. 95% of the respondents collected garbage from their clients on a weekly basis. 70% of the respondents used open trucks with tents whereas only 30% used the recommended closed trucks. 100% of the respondents said they dump at the Municipality's recommended open dumpsite at Giotoo which is approximately 5 Km out of the CBD.

A majority (75%) of the service providers had between 11-20 staff while 15% had between 0-10 and 10% had 21-30 staff. 40% of those polled said they had technical department, 60%

had finance department, 70% had human resource and administration departments, 60% had customer care while 50% had marketing departments.

100% of the sampled organizations confirmed that they market their services and have designed application forms for new customers. 60% said they have pay points at the offices, 30% had Mpesa an account and a majority (90%) made house to house collections. This analysis shows that the most preferable mode of revenue collection is house to house collection due to high rate of default.

A majority of the respondents (40%) made profits of between Kshs. 50,000-80,000 per month, 10% made Kshs. 31,000-50,000 per month, 20% made Kshs. 21,000-30,000 per month, 20% made Kshs. 1000-1000 per month and 10% made Kshs. 1-1000 per month

As to whether outsourcing of solid waste management to private garbage collectors is sustainable, 100% of the respondents replied in the affirmative a fact that was also supported by the County Cleansing Officer.

4.1.3. Findings on Effects of Outsourcing of Solid Waste Management

The study found that a majority of the respondents were of the view that service delivery had become efficient as compared to when the County Government (formerly the Municipal council) was managing. Timely collection of the waste throughout the year was pointed out as a major achievement of the PSWCs. Some of the residents noted that the PSWCs always ensured that their clients were served even when they experience challenges like vehicle breakdown. It was also pointed out that PSWCs were providing plastic bags for storage of waste which was not the case before.

A majority of the residents felt that the environment was cleaner as a result of the engagement of the PSWCs although they pointed out the fact that enforcement was lacking hence the service was being viewed as a choice rather than a requirement anchored in law.

Due to the separation of roles between the county government and the PSWCs, the county government was performing oversight roles thus making the PSWCs comply with the laid down requirements.

The study found that the PSWCs had created employment for many people thus becoming an income earner. A majority of the garbage collectors were found to be the youth who were now engaged in gainful employment but would otherwise have been engaging in unproductive activities. Majority of the supervisory and revenue collection staff were well educated.

The study found that through outsourcing of the solid waste management in the residential areas, the county government had managed to consolidate its scarce resources (Staff and equipment) in the management of solid waste within the central business district (CBD). This had enabled the county government to effectively manage solid waste within the central business district of Nakuru Town.

4.1.4. Findings on Challenges of Outsourcing of Solid Waste Management

The study aimed at establishing some of the challenges arising out of solid waste operations both for the County government and the Operators. The major challenges that were highlighted were lack of Clear policy and regulatory, Political interference, lack of adequate capacities both financial and personnel and poor infrastructure. 90% of the respondents said there were instances when garbage was uncollected for various reasons. 90% of those said the major reason was due to motor vehicle breakdown, 22% said it was due to bad roads and 67% said it was due to poor weather

4.2. Conclusions

The study concludes that whereas the County Government of Nakuru has the mandate of the management of the solid waste, it lacks clear policies on the same. The County Government only engages PSWCs on annual renewable contracts. Whereas the County has set maximum fees to be charged, some of the PSWCs violate the limits. Both PSWCs and the County Government have no mechanism to compel residents to register for the services or for making defaulters pay for the services rendered. This scenario has led to overall poor management of the solid waste within the study area.

The study further concludes that whereas Nakuru Municipality has been subdivided into various zones within which private solid waste collectors have been assigned, the number of zones are too many and some are very small which do not enable the PSWCs to make meaningful profits. The study concludes that a majority of the private solid waste collectors serve less than 1000 clients meaning that their revenue base is significantly low. The study also concludes that a majority of the PSWCs maintain a weekly schedule for collection and disposal of the waste. The County Government is fully in charge of waste collection, street cleaning and disposal within the CBD. Whereas NEMA recommends that all solid waste trucks should be covered, a majority of the PSWCs use open trucks. Although the trucks are fitted with tents, majority hardly put up the tents hence there are great chances of solid waste being spilled on the streets during transportation. All PSWCs dispose the waste at the designated Giyotoo open Dumpsite which is in a very bad state without a fence and is poorly managed. Waste is blown by wind downstream thus littering the neighborhood posing environmental and health risks.

The further study concludes that a majority of the PSWCs maintain a lean workforce without proper organizational structures. However, majority have working offices within their zones and have put more emphasis on marketing of their services and door to door revenue

collections. The use of mobile phone money transfer services is quite minimal within the industry.

On operational expenses, revenue and profitability, the study concludes that PSWCs within the study area are able to recover all operational costs and make profits. However, the profit margins differ depending on the number of clients served, operational costs and revenue collection efficiency. The PSWCs with few clients have a small revenue base while those with over 2000 clients have a wider revenue base and wider profit margins. The study further concludes that outsourcing of solid waste management to private garbage collectors is sustainable provided adequate legal and operational frameworks are put in place.

On the effects of outsourcing of solid waste management, the study concludes that though outsourcing of the solid waste management, delivery service had become more efficient as compared to when the County Government (formerly the Municipal council) was managing alone. The PSWCs maintained schedules for solid waste collection resulting in timely collection of the waste throughout the year.

Though the environments for those residents who subscribe for the services had become cleaner as a result of outsourcing of the services, the study concludes that overall environment had not become cleaner because the service is still viewed as an option rather than a requirement. This is compounded by the fact that the PSWCs are only responsible for waste collection within an individual's premises. No one is in charge of cleaning of streets or public areas within the PSWCs designated areas. This fact negates the overall achievements of outsourcing because the environment remains heavily polluted by solid waste.

The study further concludes outsourcing has created employment opportunities thus generating income for a number of people who are directly and indirectly involved in solid waste management.

On the Challenges of Outsourcing of Solid Waste Management, the study concludes that the major challenges of outsourcing of solid waste management are lack of clear policy and regulatory frameworks, Political interference, lack of adequate capacities both financial and personnel and poor infrastructure.

4.3. Recommendations for Implementation

The study recommends that the County Government of Nakuru restructures the sizes and the number of Zones. The rezoning should be done in order to ensure that every zone has adequate number of residents that can allow the private solid waste collectors to break even and make profits. The existing number of zones are too many but very small that do not allow the PSWCs to collect significant revenue. If the Municipality is rezoned into bigger zones with less PSWCs, the few shall be able to collect significant revenues and thus will be able to make sufficient profits that can be reinvested back into the business. This way the PSWCs will be able to realize substantial growth hence better service delivery.

The CGN should also review the duration and modes of engagement of the PSWCs. At the moment they are all engaged on annual contracts which are considered too short. Solid Waste Management requires heavy capital investments at the initial phases which take time to recover. It is therefore prudent for the CGN to consider awarding longer contracts which will attract serious investors. Longer contracts coupled with the wider revenue bases will also enable the PSWCs to attract financial support from lending institutions hence greater

investments can be made and by extension better service delivery. The CGN should also consider the leasing as a way of attracting the private sector into solid waste management. The study recommends that the CGN considers commercializing the entire management of solid waste by establishing an independent entity (Either a company or a parastatal) to be fully in charge of solid waste collection and disposal. This will be similar to what happened in the water sector after the enactment of the Water Act 2002. In commercializing the service, the CGN will be able to attract donors to invest in the sector through loans and grants. The quality of the services will be significantly improved and better managed. A commercial entity will be able to attract and retain qualified personnel.

The study further recommends that the CGN enacts clear policies and regulations to regulate and guide the sector. The reporting structures should be clear. The CGN should develop a monitoring tool that guides its supervision team. The PSWCs should have a mechanism through which to compel the residents to subscribe for the services and pay for the rendered services. The CGN should have a customer service desk for solid waste where residents with issues concerning service delivery can be raised and addressed.

The study recommends that the PSWCs be guided by the CGN to establish the structures within their organizations. At the moment the CGN only requires the PSWCs to open functional offices within the service areas. The CGN should go further and provide guidelines on the departments that every provider should maintain, provide trainings on solid waste management, record keeping, financial management etc. This way, the upcoming firms will be nurtured and will be able to grow over time.

The CGN should delink itself from the operational issues of solid waste management and be a regulator of the sector. This way the PSWCs will be able to function devoid of political interference emanating from the County Government. The CGN should develop the necessary infrastructure including roads and a sanitary landfill to ease the business of the PSWCs.

4.4. Recommendations for Further Study

The study recommends the following for further study:

Socio-Economic study is recommended to be carried out in order to establish the abilities and willingness to pay for the services by the different socio-economic groups within the study area. Cost factors should be analyzed separately for the different components of solid waste service—collection, cleansing, disposal and transfer. This study will inform the authorities while creating the zones and during the setting of the fees to be charged.

A Knowledge attitude and Practices (KAP) survey is also necessary to gauge the community's knowledge and attitude on solid waste.

Study of the nature and quantity of the generated solid waste, its re-use or recyclable values and possibility of energy generation are recommended.

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6. APPENDICES

APPENDIX I: Letter of Introduction

TO WHOM IT MAY CONCERN

Dear Sir/Madam

RE: REQUEST FOR RESEARCH DATA

I am a postgraduate student at Moi University pursuing a Master’s Degree in Development Studies. As part of my research work, I am required to submit a research project report on **“Outsourcing for sustainable municipal solid waste management in the urban areas in Kenya”** Nakuru Municipality of Nakuru County was chosen as the target area for this study. In order to achieve the objectives of the study, you have been chosen as a participant. You are kindly requested to fill the attached questionnaire so as to generate data required for this study. This information will be used purely for academic purpose and your name will not be referred to in the final report.

Your cooperation and assistance will be highly appreciated.

Thank You.

Jimmy Kemboi Kiplagat

Researcher (Student)

APPENDIX II: Questionnaire

QUESTIONARE FOR THE EFFECTS OF OUTSOURCING ON SUSTAINABLE SOLID WASTE MANAGEMENT IN THE URBAN AREAS IN KENYA: CASE STUDY OF NAKURU MUNICIPALITY

SECTION A: BACKGROUND DATA OF THE RESPONDENT

Tick or fill in where appropriate

1. What is the name of your Employer? _____
2. What is your age bracket?
 - 18- 25 years
 - 26 -35 years
 - 36-45 years
 - 46-55 years
 - Above 55 years

3. What is your gender?
- Male
 - Female
4. What is your highest level of education?
- Primary School
 - Secondary School
 - College
 - University
5. What is your level of employment?
- Senior management team
 - Middle Management
 - Supervisor
 - Junior Staff
6. What is your current job title? _____
7. How long have you worked with the organization?
- 0-5 years
 - 6-10 years
 - Over 10 years

SECTION B: OPERATIONAL PLANNING

8. How many routes/zones/areas are allocated to your organization for collection of solid waste? _____
9. How many clients do you serve within your area of jurisdiction?

10. Compare the current no. of clients to those served 3 years ago
- Decreased
 - Not increased
 - Slightly increased
 - Doubled
 - Tripled
 - Don't Know

11. How many teams of solid waste collectors does your organization have?

12. Each team has how many staff? _____

13. How many clients does each team handle per cycle? _____

14. What is the cycle of solid waste collection per client?

- Daily
- Twice a week
- Weekly
- Once in two weeks
- Monthly
- Random

15. How do your clients store their waste?

- Individual Litter bins
- Communal litter bins
- Dumping in pits
- Open dumping
- Others _____

16. What do you use to collect and transport garbage?

- Closed garbage trucks
- Open trucks
- Open pick-ups
- Donkey carts
- Wheelbarrows
- Hand carts
- Others _____
-

17. Are staff provided with personal protective equipment?

- Yes
- No.

18. What kind of protective gear is provided?

19. Where do you dump the waste?

- Sanitary landfill
- Open dumpsite
- Bush
- Other _____

20. Are there instances when garbage is left uncollected?

- Yes
- No

21. If yes above, what are the main causes ?

- Motor vehicle Breakdown
- Delay in completing cycles
- Absenteeism of staff
- Bad roads
- Poor weather
- Others _____
-
- _____
-

22. Do you market your services?

- Yes
- No

23. How does a new client within your area of operation apply for the service?

- Fill application form
- Talk to in charge
- Talk to field staff
- Any Other _____

24. How much does the organization charge per client?

- Household Kshs _____
- Rental houses Kshs. _____
- Commercial Buildings Kshs. _____
- Industries Kshs. _____
- Others _____

25. How do clients pay for the services?

- Cash point at office
- Through Mpesa
- Through the Municipality
- House to house collection
- Through water bills
- Through electricity bills
- Other _____

SECTION C: ORGANIZATIONAL STRUCTURE

26. What is the working arrangement with the county government?

- Contract
- Lease
- Concession

27. What is the duration of the agreement?

- 0-3 years
- 3-5 years
- 6-10 years
- Over 10 years

28. What is the total number of staff in the organization? _____

29. Have the staff been trained on solid waste management?

- Yes
- No

30. What departments/sections exist in the organization?

- Technical

- Finance
- Human Resource and Administration
- Customer care
- Marketing
- Others_____

31. How are the vehicles maintained?

- Own vehicle maintenance unit
- Outsourced

32. What is the average down time for vehicle breakdown?_____

- Within a week
- Two weeks
- Within a month
- Over a month

33. What is the average monthly operational expenses? KSH_____

34. What is the average monthly collection? KSH_____

35. In your opinion, is the business sustainable?_____

36. What recommendations would you make to improve service delivery?

__END

APPENDIX III

INTERVIEW QUESTIONS FOR THE COUNTY CLEANSING OFFICER IN CHARGE OF SOLID WASTE MANAGEMENT.

1. Who collects and disposes solid waste within your area of jurisdiction? Yourself or private solid waste collectors
2. How is the area divided? Each operator is allocated how many zones/routes
3. How do you identify and select the private solid waste collectors? Is the process competitive and transparent?
4. What are the minimum requirements for a company to be engaged to operate?
5. Do you have any solid waste management standards?

6. What agreements do you enter into with the private collectors and for how long?
7. Do you determine the fees being charged by the collectors or its left to them? What are the charges?
8. Where is the solid waste disposed?
9. Who manages the disposal site?
10. How are the private collectors supervised and monitored? Are there any penalties for defaulters?
11. Is there a customer care center where customers can lodge complaints?
12. Do you demand and receive progress reports from the operators?
13. In your opinion, is outsourcing of solid waste management sustainable?
14. What improvements would you recommend in the management of solid waste?

APPENDIX IV

Photo of the Giyotoo Dumpsite



Picture of one of the Sampled Respondents



Satellite Imagery of Nakuru

County

