ASSESSMENT OF THE COMMERCIALIZATION PROGRAMME OF SOLID WASTE MANAGEMENT IN FCC ABUJA

By

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MSC/ENV-DES/17397/2007-2008

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THESIS SUBMITTED TO THE POST-GRADUATE SCHOOL AHMADU BELLO UNIVERSITY, ZARIA IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF M.SC (URBAN MANAGEMENT)

DEPARTMENT OF URBAN AND REGIONAL PLANNING
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JANUARY 2011

DECLARATION

I hereby declare that this report entitled "Assessment of the Commercialization Programme of Solid Waste Management in FCC Abuja" is the product of my personal research work. To the best of my Knowledge, it has not been produced anywhere for a similar degree. All works encountered in the course of this research have been appropriately acknowledged in the list of bibliography.

AHMED,Awaisu
Sign……

CERTIFICATION

This thesis report "ASSESMENT OF THE COMMERCIALISATION PROGRAMME OF SOLID WASTE MANAGEMENT IN FCC ABUJA" by AHMED AWAISU meets the regulations governing the award of the degree of M.sc (Urban Management) Ahmadu Bello University, Zaria, and is approved for its contribution to knowledge and literary presentation particularly in the area of Municipal Solid Waste Management.

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DEDICATION

This thesis is dedicated to my late friend and Class mate in the URP class of 98" **Musa Isa (1972-2000)** and my dearest family, **Maryam, Habiba, Isma,il** and **Ahmed jnr.** Who missed my closeness during the course of this research.

ACKNOWLEDGEMENT

I must admit that the completion of this thesis would obviously not have been possible without the assistance and cooperation of many people either directly or indirectly. Foremost, I wish to acknowledge the effort of the review committee and the entire staff of the department of urban and regional planning of the faculty of environmental design-Ahmadu Bello University Zaria for their constructive criticism and valuable suggestions which put me under pressure and were instrumental to the completion of this study.

I am indebted to **Dr. Ahmed Adamu** and **Mrs. Ukoje J.E** for their willingness to guide me in this thesis. I say thank you to them and their memories shall last unending as I cherished their reservoir of wisdom and Knowledge and also respect and admire their parental mode of supervision. My thanks also go to Professor J.B Kaltho, Professor M.B Yunusa, Dr. Ma'aruf, Mallam Faruk, Mallam Usman, Pastor Mr. Ojibo, Mr. Gunn, Mr. Yunana Teku, Mallam Ashiru, Mr. Shittu and all other staff and non-academic staff of the Department of Urban and Regional Planning and the Faculty of Environmental Design.

My appreciation also goes immensely to my colleagues who gave their contributions academically through literature materials and moral support. I wish to particularly acknowledge Yakubu Bununu, Kemi , Nuhu Ajoge, Murja, Shuibu, Juluis Baji, Mrs

Yinka Bello, Jubril Garba and Danraka. I wish you all fruitful results in all your life and professional undertakings.

I am grateful to my staff Patricia Omokoro and Anieze Darlington and also to the management and staff of the Abuja Environmental Protection Board, the Abuja Waste Management Service Providers and the entire residents of the districts covered in this thesis.

Most importantly, I thank Allah for his Grace that made everything possible

Ahmed, Awaisu

ABSTRACT

Municipal Waste have become a global concern particularly in the manner they are indiscriminately dump and poorly managed in towns and cities of the world including our capital city of Abuja.

This Study established the gap in the policy framework designed to effect cost recovery mechanism in the process of managing the compounded problems of solid waste in Abuja metropolis.

The study revealed that the residents of Abuja are desirous of quality, efficient and effective waste management service delivery but the provision of such services are constraint by the commercialization policy adopted by the Abuja waste management authorities.

This study will provide valuable insights and allow broad lessons to be drawn out.

The major finding is that municipal authorities have to encourage the private waste service providers to move at their own pace while they develop and implement sustainable plans and new technologies for upgrading Municipal Solid Waste management facilities and systems.

This study also gives some views on public awareness for waste management.

The study also identifies the problems in the present scenario of the Municipal Solid Waste Management. Meanwhile, it is hoped that this study can be a primary reference in

urban planning and management study for municipal waste management in cities in years to come.

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CHAPTER ONE

BACKGROUND TO THE STUDY

1.10 INTRODUCTION

Pollution from domestic and industrial wastes is a necessary outcome of development. In developing countries, inefficient management of wastes is compounded by a cycle of poverty, rapid population growth, bad governance, and low level of environmental awareness. Izeze (1999) observed that the problems of solid waste management in Nigerian cities has resulted from rapid increases in urban populations, rapid industrialization and changing lifestyles. Globally, many municipal areas also generate solid wastes beyond what they can manage, and this is closely associated with economic profiles and background. In many places, municipalities spend 20-50 percent of their available recurrent budget on solid waste management which normally generate marginal results. Yet, it is also common that 30-60 percent of all the urban solid wastes in developing countries is uncollected, and less than 50 percent of the population is served. In some cases, as much as 80 percent of the collection and transport equipment is out of service, or is in need of repair or maintenance. In other instances, open dumping with open burning is the norm. Slums and shanty neighborhoods most times, also receive the least attention in regard to waste collection and disposal services.

Providing efficient municipal solid waste management services is a major problem of local authorities worldwide. Low service coverage and poorly managed strategies are the characteristics of solid waste management that have

resulted in major environmental and health problems. Inefficiencies in service delivery are also typical. To address the shortcomings, commercial delivery of services is often adopted in the belief that service efficiency and coverage can be improved and cost recovery can generate profit. Where existing sudsidized public service delivery is either too costly or inadequate, commercialization is seen as a means to provide and enhance an effective, efficient, affordable, safe and sustainable solid waste services. In situations where local public funds for investment are in short supply, the commercialization option does help mobilize needed funds. Additionally, the commercialised programmes are also viewed as being well situated to draw on local and international experiences in waste management to institute proven and cost effective technologies for better service delivery.

Many Studies show the Commercialization of urban services as an important instrument for the implementation of the UN Agenda 21 (World Bank, Scp, UNCHP, UNEP). The world Bank in particular, has since 1991 been building a global family of city-level projects based on commercial principles to promote sustainable development. The UNEP has also confirmed the claims that the commercial delivery of municipal solid waste services can be successful in terms of greater efficiency, coverage and quality of service. As shown in the litretaure, the key to successful commercialization of waste management services is the creation of contestable markets, establishment of appropriate regulatory frameworks, and creation of adequate government capacity to negotiate contracts and monitor performance of service providers. This extends to operational standards for operators, and strengthening local competition,

transparency, and accountability. Whether these are in place and how they are delivered are important considerations that determine success.

1.20 STATEMENT OF THE RESEACH PROBLEM

The assessment of solid waste management strategies and programmes is justified by the need to learn lessons that will feed into the decision process for better service delivery. In Nigeria, the study of Abuja SWM Programme is valuable on account of its innovative policies and by the growth dynamics of the city. The city's rapid growth from creation in 1980 has positive association with solid waste generation. Domestic refuse generation has been estimated at 4.5 million tons per year (75 % of total wastes); and generation is varied between 0.1 to 0.5 kg per person. (AEPB, 2004).

The problems of Municipal waste management in Abuja was first acknowledged in 1996; and the inability of the system to meet the city's needs for efficient waste collection and disposal explains the establishment of the SWM commercialization programme in 1998. The programme was based on the Urban Management Program (UMP) models of the World Bank and the UNCHS. Because the programme is new, a need exists for evaluating its outcomes, so that the experience can help determine prospects of replication across Nigerian cities. This need is further justified by certain indicators suggesting major inadequacies in results registered in most districts of the Capital City. What are the factors that account for such outcomes is the issue needing investigation. As the Abuja model is amongst the first in Nigeria, a study of its implementation shall provide insights towards improvement and wider adoption by other cities.

Studies carried out on solid waste management are varied in scope, as for instance, on Community participation in Ibadan (Folurunsho,2007); planning and privatization (Adama,2005); and on Solid waste Management Partnerships (Abdullahi,2008) e.t.c. There are insights from these studies, but the focus on outcome determinants, as in this case with the commercialization programme in the FCC, is necessary as a major contribution to knowledge. This shall provide clarity regarding strenthgs, weaknesses and constraints of the system. In this study, the implementation of the commercialization programme is examined as it impacts on SWM service delivery outcomes in Abuja. The questions answared from the study are:

1. What are the outcomes of the commercialization programme in Abuja?
2. What are the explanatory factors of the outcomes?

1.30 AIM OF THE STUDY

The aim of the Study is to assess the outcomes of the commercialization programme of solid waste management in the FCC Abuja, as a basis for providing explanations and making recommendations for improvement.

1.40 OBJECTIVES OF THE STUDY

The following objectives were set out for the study. These are to:

1. Review the management strategies of solid wastes.
2. Review policies and programmes for solid waste management in Abuja with particular reference to the commercialization programme.

3. Examine the implementation of the commercialization programme in the FCC Abuja.
4. Evaluate the outcomes of the programme and identify the explanatory factors.
5. Highlight the limitations of the programme and suggest planning recommendations for improvement.

1.50 SCOPE OF THE STUDY

The study covers the aspects of commercialization of solid waste management with emphasis on its implementation. In this, the spatial focus cover the residential areas of the districts Asokoro, Maitama, Wuse, Garki and Gwarinpa. The research also exermined the institutional framework of SWM in the FCC and the ways it impact on service delivery.

1.60 ORGANISATION OF THE THESIS

The thesis is organized in three parts, the first part covers the theoretical components of the study. Particular reference is made to the concept and strategies of MSWN in chapter two. Chapter three examines the implications of the Commercialization programme in the FCC. These fulfill objectives one and two respectively.

The second part of the report is an attempt to provide an evaluation of the outcomes of the programme. The issues of the outcomes are discuss in chapter four to fulfill objective four. The third part consists of chapter five that is concern in discussing the framework of the commercialization of SWM in Abuja

and the attempt to represent the possible oppoturnities for strategic directions in making recommendations for improvement. These chapter is in fulfillment of objective five.

CHAPTER TWO

MANAGEMENT STRATEGIES FOR SOLID WASTES: A REVIEW OF LITERATURE

2.10 INTRODUCTION

This chapter exermines the management strategies for solid wastes and their limitations. The policies that derive from such strategies are also explored. This is done within the context of the current debate seeking change towards sustainable Solid Waste Management.

2.20 SOLID WASTE MANAGEMENT PROBLEMS OF CITIES

Human activities create waste, and it is the way these wastes are handled, stored, collected and disposed of, which can pose risks to the environment and to public health. In urban areas, especially in the rapid urbanizing cities of the developing world, problems and issues of Municipal Solid Waste Management (MSWM) are of immediate importance. This has been acknowledged by most governments, however rapid population growth overwhelms the capacity of most municipal authorities to provide even the most basic services. In Municipal Solid Waste Management (MSWM) of developing countries five typical problem areas can be identified: 1) inadequate service coverage, 2) operational inefficiencies of services, 3) limited utilization of recycling activities, 4) inadequate management of non industrial hazardous waste, and 5) inadequate landfill disposal. Open uncontrolled dumping is still the most common method of solid waste disposal in most developing countries. Although the

environmental consequences are often quite evident, the problem is seldom dealt with. Reasons for not dealing with the problem are low political priority, inadequate resources allocated, and/or missing know-how regarding alternative solutions for operating and managing a landfill/dump. Many examples are given of cities in Africa where uncollected and illegally dumped wastes constitute problems of human health and environmental degradation. This scenario places the already-desperate urban councils in a difficult situation especially as they have to develop new strategies to deal with increasing volumes as well as strange varieties of wastes. Bamenda and Yaounde in Cameroon with populations of 300, 000 and 1.4 milloin people have fast growing populations but do not have proper and stable waste management strategies and technologies to handle the volume of wastes generated daily. In Mogadishu, Somalia, huge heaps of garbage that accumulated over over ten years of civil war (Barise 2001), and the programme of cleaning was exploited by soldiers who interrupted clean-up operations by demanding payment before allowing refuse to be removed. These type of interruptions also explain why some cities such as Kinshasa register zero collection of waste as seen in Table 1 below. Generation rates for cities in Africa are estimated to range from 0.3-1.4 kg per capita per day (See table 1). This gives an average of 0.78 compared to an average of 1.22 kg per capita for developed countries (Beukering 1999:9).

Table 1: Per capita solid waste generation of households in selected African cities.

Country	Name of City	Per capita SW generation Kg/day	Households with regular Waste collection (%)	Sampled Population (million)
Benin	Porto Novo	0.5	25	0.6
Burkina Faso	Ouagadougou	0.7	40	1.6
Burundi	Bujumbura	1.4	41	1.1
Cameroon	Yaounde	0.8	44	1.0
Congo DR	Kinshasa	1.2	0	6.3
Cote d' Ivoire	Abidjan	1.0	70	3.4
Egypt	Cairo	0.5	75	4.5
Gambia	Banjul	0.3	35	0.5
Ghana	Accra	0.5	60	1.7
Guinea	Conakry	0.7	50	1.3
Mauritania	Nouakchott	0.9	15	0.6
Moroko	Rabat	0.6	90	1.6
Niger	Niamey	1.0	23	0.5
Nigeria	Ibadan	1.1	25	2.0
Senegal	Dakar	0.7	36	2.3
Tanzania	Dar es Salaam	1.0	25	2.3
Togo	Lome	1.9	27	1.8
Uganda	Kampala	0.6	20	0.8
Zimbabwe	Harare	0.7	100	1.5

Source: World Wide cities product sample Data. 1998-98

Even though many factors influence municipal solid waste management, population size is an important one. There is a positive correlation between city population size and both the percentage of waste collected and rate of households enjoying regular waste collection. This suggests that increasing city size poses a greater problem to the solid waste management in Africa.

2.30 SOLID WASTE MANAGEMENT STRATEGIES

Solid waste management strategies are deriven by some goals. These are the reduction of volume and composition; access to waste collection; public awareness and attitude; institutions and legislation; recycling and finding ways to generate renewable energy. There are several strategies that create opportunities which assist in accomplishing these goals. By a review of these

strategies, it is possible that understanding can be obtained on the limits of strategy applications and the potentials in specific case situations. The United Nations and other environmental and financial agencies are encouraging governments of developing countries on cost-recovery programmes and partnership in the financing and delivery of urban services. This is a departure from the state run programme concept that has contrains regarding buruecracy and inefficiencies. The Four known strategies of SWM are; are the Public Service Delivery; the community based service delivery; the Private Service Delivery; and the Commercial strategy of Service Delivery.

2.31 The Strategy of Public Service Delivery

Urban infrastructure has traditionally been provided by central governments in developing countries. In recent times, this capacity has dwindled due to decling in resource allocation and the increase in the volume of waste generation. The world Bank estimates that central governments only have 4-5 % of the financial resources that are needed to provide urban services and infrastructure over the next decade (Rondinelli 1990). In addition to national budgetary constraints, the rationale for making local governments responsible for urban services is that, they can best assess the local needs and priorities of their citizens, expenditure decisions can be made accountable to residents, and resource allocation can be improved by explicit linkage of service costs and benefits (World Bank, 1988). In Indonesia, local governments are highly dependent on central level allocations for both routine and development expenditures. Approximately 80 % of local government funds are derived from the Central Government (McCullough 1990). In 1987, following significant central budget cuts in the

urban sector, the inter-ministerial Coordinating team for Urban Development issued a major policy statement for decentralization, in which a need was made for greater technical and administrative responsibility in urban service delivery (McCullough 1990). In most cities of the developing world, solid waste management is the responsibility of the municipal government, but because service delivery is inefficient, initiating other strategies has been a common practice. The limitations to this strategy are, weak incentives for efficient resource use because the operators lack authority in accessing or collecting solid-waste user charges. Such operators depend on the municipality to finance the majority of their operations. Solid waste management is generally accorded a low priority in collection coverage, and has a low percentage of local government budgets (PT Bumi Prasidi 1989). Low public awareness by the local councils, complete absence of professional management stall and Poor management practices.

Deficiencies in solid waste service delivery are partly attributable to poor personnel, operational and financial management practices. Because the municipality has little appreciation for the technical and financial expertise that is required for designing solid waste management system, the majority of staff has limited skills in sanitation or business management. There has also been no attention in data collection and analysis to aid design of solid waste service systems. Management information systems necessary for monitoring operational cost and anticipating investment needs are either underdeveloped or non-existent (Saleh 1991). Cost recovery performance. There is no any effort to recover cost from the operation as it is mostly done for public welfare. In the early 1990s

there was the argument that the failures in urban service delivery are not merely the result of a lack of technical knowledge on the part of local government staff, but also reflect constraints and the lack of incentives to local personnel and their political leadership to perform.

2.32 The strategy of Community service delivery

Community participation in solid waste management refers to local involvement of civil society in waste management, as for instance the awareness and teaching of proper sanitory bahaviour; contribution of cash, tools and labour in the collection and disposal of trash within a particular community. The community can operate with the public or private entities to set standards in schedule of collection and payment rates for service charges. A good level of community participation gives the community authority and control over the operation, management and/or maintenance of services. Community management may come about through partnership with government agencies and NGOs, or may be in isolation. Community- based waste management CBM projects require institutional support and recognition in order to be successful. An integrated system (waste separation at the source, resource recovery, and composting of organic waste) requires representation of waste pickers, and the integration of the community to work with all stakeholders, including representatives of waste pickers. Local leaders are often active in management of the service or maintaining close contact with the municipality or community management body. Women and teens play crucial roles, such as initiating, managing operation, political activism, educating, and monitoring for the community.

The problem with the community based strategy across the world, is households do occassionally participate in waste management programs because they may view solid waste management as a low priority, they may be unwilling to participate in collection systems or in keeping public spaces clean, or they are unwilling to pay for service. Community-based solutions can use preliminary research and input from the community to generate a list of desired services, appropriate incentives for households and servants, and systems for cleaning streets and other public places, (EGSSAA, 2009).

2.33 The Strategy of Private Sector Service Delivery

Private service delivery has been a global practice following the privatization drive promoted mostly by the World Bank. Privatization is the gradual process of disassociating state-owned enterprises or state-provided services from government control and subsidies, and replacing them with market-driven entities. In the context of municipal services, private service delivery generally implies reducing government activity within a given sector by: involving participation from the private sector; or Reducing government ownership, through divestiture of enterprises to unregulated private ownership. Private sector participation leaves municipal resources available for urban infrastructure and equipment. It reduces the cost of public services to consumers; relieves the financial and administrative burden on the government; increases productivity and efficiency by promoting competition; stimulates the adoption of innovation and new technology; improves the maintenance of equipment; and creates greater responsiveness to cost control measures. Private sector involvement in

the delivery of urban services is facilitated through four frameworks: Concessions, management contract, franchise and private entrepreneurship.

The government acts as a coordinator of service delivery, confining its duties to financing, monitoring, and regulating while private firms operate and maintain the service system (Nolan 1986). Successful contracting out requires clear specification of the expected outputs, establishment of standard competitive bid procedures, and definition and monitoring of performance standards. Analysts attribute the private sector efficiency edge to several factors sush as; businessmen have a vested interest in realizing the maximum return to their capital, private firms are theoretically subject to market pressures that stimulate cost cutting and technological innovations; and private employers have greater flexibility in managing labour (Roth 1987, Savas 1982, Bendick 1984). A growing body of evidence indicates however, that efficiency arises from competition, not from private ownership (Donahue 1989, Sundquist 1984).

The Private sector involvement with garbage collection remains a contentious concept with no agreed definition. Most see it as involving networks spanning across the traditional public-private divide (Jessop, 1997). In service provision, devolution to lower levels of government and formation of partnerships has become hallmarks. Through this, privatization, essentially a partnership between the state and market, remains a common feature of governance, ensuring the continued interests of capital. Privatization of solid waste management is increasingly becoming attractive to governments in developing countries, where most municipal budgets go on waste management (Schubeler, 1996). With no specific policy on privatization of solid waste management in Nigeria at the

moment, current efforts in the sector can be seen as part of an overall plan of the Federal government to privatize public utilities which started in July, 1988 with the promulgation of the Privatization and Commercialization Decree No. 25.

The benefits of privatization, notably increased efficiency and effectiveness have been acknowledged by many, but not its shortcomings. The reasons for this vary. Income differential appears to be a major factor since the poor are most likely to be excluded due to their inability to pay for services. Another is that historically, state policies and practices favour particular classes. What has also become of interest, especially to urban geographers is that exclusion is also spatial. The high visibility of solid waste management, especially when it fails makes spatial inequality obvious. The difficiency in private service delivery includes 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 process. Municipal councils opting to privatize 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. 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.

Within the private sector, two distinctions are made: the private-formal, and the private-informal. The private formal is registered and have technical and administrative capabilities for proper waste collection and disposal. They usually have modern and sanitary protective gears to do their business. The private formal sector does not recover any portion of wastes collected for recycling, which shortens the lifetime of the available dumpsites. Their activities are slightly more expensive than the informal private waste collectors as their income depents only on the monthly fees that are collected from the service recipient. The Private-informal subsector on the other hand uses cheap well-trained laborers, they recover up to 30% of the total waste that is collected, through sorting and recycling activities. They move and sell the recycle materials in other states.

The activity of the subsector can cause a lot of health and environmental problems during waste collection, sorting and recycling, as these activities are done with bare hands and very primitive techniques.

Table:2 Differences between public and private service delivery.

Public/Social Service Delivery	Private Service Delivery
Services are less immediately satisfying.	Services are often immediately satisfying.
Services are attached to complex, abstract values and perception.	Services have clear and strong identities.
Services are motivated by societal gains.	Services are motivated by profit
Services sometimes, involve avoidance behaviour.	Services always involve positive action
Services frequently aimed at the poorest or least educated groups in society.	Services aimed at people with purchasing power.
Services uncover unfulfilled demand	Services create demand

Source: *Marketing of Waste Management service, 1997*

2.34 The Strategy of Commercial Service Delivery

Commercial delivery of SWM services is the application of business principles to the management of municipal solid waste. It is seen as a means to provide and enhance an effective, efficient, affordable, safe and sustainable solid waste management. It involves either contracting service delivery to private enterprises, or control by the public agency on a cost recovery or profit making principles with the view that governments can promote efficient delivery of those urban services that are commercial in nature. Private enterprises must provide services that are readily marketable because they are expected to earn all their revenue from user charges. Compared to government agencies, private enterprises have greater flexibility in pricing and personnel management, and greater financial accountability that should result in more efficient service delivery (Devas 1989).

The experience documented in other countries indicates that there are a number of criteria that must be met in order for local governments to realize significant savings from contracting out garbage collection to the private sector. In order to attract private participation, government must first design contracts that are of a sufficient length and scope for firms to recover their investment in capital equipment. Second, competitive bidding for contracts is necessary to elicit proposals for low cost services from private firms. Third, performance monitoring is required to ensure that public welfare is not compromised by poor quality service. The local government or control agency must have the administrative capacity to establish these conditions. The Dinas Kebersihans in Jakarta and Surabaya contracted out to firms before the essential groundwork was laid and the results have been less than optimal.

Private companies enter markets where they can expect to recover their investment cost and earn a reasonable profit; prevailing contract procedures in Indonesia make realization of these expectations virtually impossible. Contracts cannot exceed one year in length because the local legislative assembly reviews the municipal budget on an annual basis and funds cannot be obligated for contract payment in advance of approval (Cointreau-Levine 1991) Because private refuse operators needs at least five year contract in order to depreciate capital expenditures, they cannot invest in environmentally sound collection vehicles. For example, after the majority of transfer stations in Surabaya were outfitted with armroll container trucks without longer guaranteed contracts. Bank will not approve loans for expensive imported collection vehicles because

repayment takes at least three years and firms are guaranteed contracts for only one year in Jakarta, and three months in Surabaya.

The commercial delivery of MSWM has it strength and weaknesses: It's backed by national policies, legislation and institutional arrangements for effective and efficient waste management; if properly implemented, will bring about efficiency, effectiveness, cost recovery and sustainability in solid wastes management. It's weaknesses inclidue; lack of training for waste management workers (operators & contractors); lack of enforcement; systems designed with heavy emphasis on enforcement (command & control) without commensurate capability to effectively implement; lack of public awareness; inability to develop sustainable financing mechanisms for waste management (cost recovery through fees and levies); weak data collection, monitoring and evaluation systems.

2.40 GLOBAL PRACTICE OF SOLID WASTE MANAGEMENT

In Nepal, urbanisation is increasing at an alarming rate1. It is putting immense pressure on municipal services. One of the problems of the urbanisation is the increased generation of waste. This waste is not being adequately managed and has therefore created a serious health and environmental hazard, particularly in the slum areas, where the residents have less capacity to pay for better services and are often ignored by the official agencies. Poor urban settlements are more affected because of indiscriminate dumping and the lack of open space. In such a setting, Practical Action Nepal has initiated a project known as "Strengthening Local Capacities in Integrated Sustainable Waste Management (ISWM) in small and medium municipalities of Nepal" with financial support from European

Union under its EC Asia Pro Eco II Programme. The project target municipalities and community groups that were found to have limited access to information on how to improve waste systems, how to use waste in an economically productive way, and alternative waste management techniques and practices which would significantly improve the livelihoods, health and environment of the urban poor. The project works with the four chosen municipalities and a variety of local stakeholders, including the Municipal Association of Nepal (MuAN), community leaders, small-scale business entrepreneurs, and local formal and informal private sector enterprises that provide waste management services. The project is done by providing effective house-to-house waste collection services and are making good progress towards final disposal. Communities and private sector service providers have been selected according to their performance in waste reduction. Priority is given to those community-based organisations (CBOs) and non-governmental organisations (NGOs) that are playing effective roles in waste reduction at source, collection, processing and recycling.

In Egypt, the government adopted a National Strategy for integrated Municipal solid Waste Management through which to develop and implement enhanced solid waste management systems. The central objective of this strategy is Privatization of waste management service. The Central government established the institutional framework which include general policies and Strategies. It also facilitates and monitors private sector participation at the Governorate level supports the implementation of SWM strategy and undertakes public awareness activities. The local governorates are fully responsible for all SWM

activities which include; planning, institutional contracting, operation monitoring, control, law enforcement and public Awareness. In the past solid waste Management and infrastructure service has been undertaken at the local level through a 2 percent every month on the rental value of housing units. But now since 2000 at the governorate level SWM fee collection is through electricity bills and was introduced and applied in Alexandria-Cairo-Giza-Aswan- Suez and Port Said. The private sector is involved and given a Contract durations range from 1 to 15 years their main responsibilies are; solid waste collection and transport of domestic solid waste; Solid waste collection and transport from streets, shops and general Places; Solid waste collection and transport from governmental institutes and commercial waste; Street cleaning, silt and vegetation removal from streets; Landfill preparation and transport of solid waste by special vehicle to site of disegnated land fill (Sabrament landfill) and prepare the composite unit at the landfill.

In Germany, they adopted the end-of-pipe approach (EOP) in the management of solid and other environmental wastes. The strategy is called 'end-of-pipe' because it is base on the concept of reduse, reuse and recycle (3R). The objective of the strategy are; to reduce MSW generation; enhance MSW management (segregation, collection, transportation, and process in the Final Disposal) towards healthy & clean environment. The private operators are fully responsible for the collection, transportation, disposal and recycling activities while the government guide, regulate and monitor the activities. The residents seprates and reduce trash at source and sell the recycleble materials to agents of the operators.

2.50 SOLID WASTE MANAGEMENT IN NIGERIA

2.51 The Policies for Solid Waste Management

The policy for solid waste management in Abuja was derived from the national policies. These policies are the National Environmental Protection Management of solid and hazardous waste regulation, National policy on Environment and the National Urban Development Policy. In the national policies, the federal government will assume the supportive "enabling" role, whereas states and local government agencies will be assigned the full operational responsibilities, Public cleansing services and SWM will be gradually delegated to the private sector. The role of governmental agencies will then be focused on the planning, follow-up and control functions within a set of clearly cut licensing and contracting conditions in accordance to the prevailing legislative and regulatory framework, as well as a well grounded "public -private partnership" approach, the "polluter pays principle" shall prevail. Procedures will be fully responsible for their products throughout their whole life cycle, particularly with regards to packaging materials. Full cost recovery will be pursued as a necessary tool for improving service, enhancing commercialization, and safeguarding sustainability, the concept of attaching an economic value to wastes, as being recoverable resources, will be fully stressed as a necessary means for reducing their disposal costs and negative environmental effects. Such policy will require adherence to the plausible "reduce, reuse, recycle, and recover" type of hierarchy, complete involvement of public organs and the served community at large to ensure proper execution.

(a) The National Environmental Policy on Solid and hazardous waste Regulation: It was enacted in 1991 and has objectives to identify solid, toxic and extremely hazardous waste dangerous to public health and environment, provide for surveillance and monitoring of dangerous and extremely hazardous waste and substances until they are safely disposed of, establish suitable and provide necessary requirements to facilitate the disposal of waste, research into possible reuse and recycling of hazardous waste and classified the collection and disposal of waste as a social service and vested the responsibilities for the collection and disposal to the local government authorities.

(b) National Policy on the Environment: It was enacted in 1999 and the intent of this policy is setting up standards for sanitary facilities for the disposal of human and other solid waste in dwelling, housing estates and public facilities in both urban and rural areas, establishment of an early warning system for the identification of potential waste disposal hazards, provision of utilization of information on the appropriate methods and technologies for the treatment, reuse and disposal of wastes, encouraging of source reduction, reuse, recycling of wastes as well as the recovery of valuable products from wastes (4Rs) and to also secure a quality of environment adequate for good health and well being.

(c) National Urban Development Policy: It was enacted in 2006 theobjectivest of this policy is to promote efficient urban development and management, clearly define responsibilities and functions of each level of

Government with a view to ensuring effective plan implementation and accountability, strengthen the capacity of the urban centers to manage economic growth, social development and poverty alleviation, encourage and promote greater private sector participation in urban development, create enabling environment of regulations, laws, and institutions which will enhance urban market performance and social welfare, and give special attention to new state capitals and local Government Headquarters because of the challenges they face as new growth canters.

2.52 The Programmes for Solid Waste Management in Nigeria

In Nigeria, the quality of solid waste management (SWM) services is heavily dictated by a range of factors inherent in good Governance. In particular the visible cleanliness of a city, is one of a range of indicators which we subconsciously or consciously use to assess the performance of a Government in delivering essential services to its citizens. The mountainous heeps of solid wastes that deface Nigerian cities are largely because of the absence of adequate strategies, policies, enabling legislation, and an environmentally stimulated and enlightened public. Public enlightenment programs lacked the needed coverage, intensity, and continuity to correct the apathetic public attitude towards the indiscriminate dumping of refuse. The activities of the states environmental agencies have been hampared by poor funding, inadequate facilities and human resources and the use of inappropriate technology. Successfull solid waste management in Nigeria will require a holistic program that will integrate all the technical, economic, social, and cultural factors that are often ignored in solid waste programs. Generally, the policy of the government on solid waste

management is not comprehensive. For instance, while some efforts are made in various states to elicit public cooperation during the monthly environmental cleanup exercise, no effort is being made to develop appropriate disposal sites. In most Nigerian cities, wastes are simply gathered together and heaped on the already overflowning open dumps, and no effort is being made on finding solution on reduction at source, appropriate collection and transportation and cost recovery. Sometimes the main objectives seems to be to move the waste out of public sight.

In Minna, Niger State, Solid waste management is done base on the Public service delivery. Service delivery is left under the local government in conjuction with the Niger State Environmental Protection Agency (NISEPA). The the local government and the public body responsible for providing these services, the (NISEPA), don't have a skip truck and only have a few operational tipper vehicles. The NISEPA provide services to the best of its ability with the equipment and operational budget available, concentrating on picking up trash in the high density living areas and collect trash from skips and open dumps at various other locations around the town. As is common in public bodies in Nigeria, the NISEPA suffered greatly from under-funding, over-staffing and poor management structures. In Niger State, the existing situation is largely base on the denser urban population in the capital city Minna. At the time the body responsible for waste services was the Niger State Urban Development Board (NUDB). Because of the lack of operational vehicles and irregularity of waste collection services, a number of local dumps were scattered across the city. Although traditionally starved of funds from government, the role of corruption,

lack of transparent processes, appointment by patronage and embezzlement meant that operational funds were non-existent.

In Lagos State, a different approach was adopted. The programme moved much more swiftly into pilot project implementation of the service delivery model, called Private sector participation (PSP). Following a baseline socio-economic surveys carried out in Lagos, the attitude of the public to SWM services was discovered with people expressing: a clear demand for SWM services and willingness to pay; an understanding of the linkage between SWM services and health; a lack of belief that Government would deliver improved services; and a preference to pay in cash (at the door) to the person providing services. It became clear that for SWM services to be successful in the state there would need to be a direct relationship between service and payment. The pilot project location was Ikeja, an area of medium density housing where the communities could afford to pay a reasonable amount for service delivery. Experience from the Ikeja pilot project influenced design of the service delivery model to be used in the entire Lagos metropolis and also fed back into the re-design of the Lagos service delivery model. The pilot project in Lagos was designed around a bag-based collection system with delivery to transfer stations, and then further loading and transport to the new landfill site. Provition of service delivery were contracted to private service providers to collect waste from house to house and transport to the dumpsites with LAWMA responsible for the management of the dumpsites. The implication of this is that whoever was to provide services in a certain zone, would also need to be responsible for collecting their own revenue. The second key factor in designing the service delivery model was that in order

to ensure reasonable revenue potential, the zones would have to contain a certain minimum number of customers. Also, the service provider would need to be given the sole rights to collect waste from all customers in their zone. The implication of this was that the service provider needed to be responsible for collection of waste and delivery to the landfill site. In Lagos, it was decided that the public authority will be required to sweep the streets, collect infectious waste from markets, with the cost of these services factored into the customer shop tariffs and market levy. It is clear that the service delivery model being designed for Lagos was different from a standard waste collection contract, there was to be no payment from Government for the service, and Government was to be relieved of the revenue collection function. What was in fact being developed required a licensing type of arrangement, whereby a service provider would be allocated rights and responsibilities to operate in a particular zone.

The last link in the chain was to identify a mechanism which would enable the cost of waste treatment and landfill to be recovered. It was determined that the cost of these services would be factored into a license fee, payable either as a lump sum at the beginning of the license period, or in regular monthly instalments. This mechanism was favoured over a gate fee arrangement for the service providers to pay gate fee as they deliver waste to the designated treatment/landfill site.

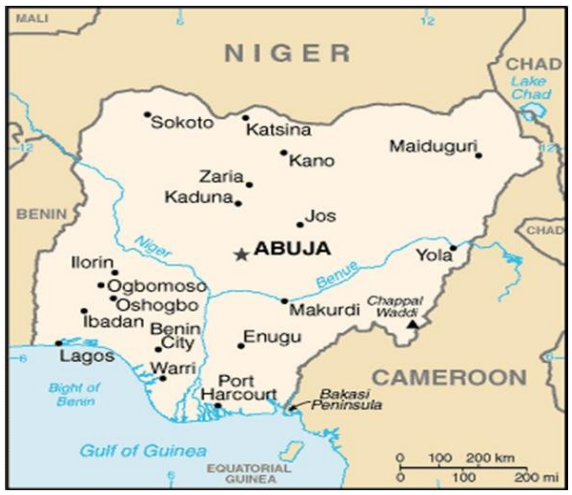
2.60 SOLID WASTE MANAGEMENT IN ABUJA

2.61 Background of Abuja

Abuja was selected as the new capital of Nigeria when it was obvious that population pressures, political and ethic divisions necessitated a move from

Lagos. On February 4, 1976, a decree was signed establishing the Federal Capital Territory of Abuja and setting up the Federal Capital Development Authority (FCDA), the organisation charged with the task of developing the new capital. Physically located in the centre of the country and viewed as neutral both ethnically and religiously, it is where culture and religion meet. The vehicle license plate for the FCT reads Centre of Unity a constant reminder that Abuja was selected in the hope of creating a united central city.

Fig 2.1: Map of Nigeria



Visitors and arriving residents will be greeted by wide, well-designed and maintained roads and clean streets. Abuja also has excellent access to the wider road network to the rest of the country. The 1979 master plan called for Abuja to be developed in four phases. It estimated a population of about 3 million by the year 2010 and a maximum population of 4million well into the 21st century.

Nearly the entire Phase 1 development has been completed and it includes the following: the Central Business District, the Three Arms Zone (presidency, National Assembly and Supreme Court) as well as the Maitama, Wuse, Garki

and Asokoro residential and business districts. The Gwarinpa District, where many of the construction companies are located, has also been developed but lies outside the Phase 1 area. Construction service companies and enterprises continues at a fast pace in Abuja and new places open weekly Phase 2, under development currently, involves the integration of the surrounding Katampe, Mabushi, Utako, Wuye, Durumi, Gudu. Jabbi, Duste and Gaduwa areas into the city. Phase 3 and 4 has not yet been fully planned.

Unfortunately, due to rapid population growth, some of the initial facilities are now being over stretched.The main source of water for Abuja is the Usman Dam, both international and domestic flights arrive at the Dr. Nnamdi Azikiwe International Airport. Administratively, there are six Area Councils in the Federal Capital Territory, each subdivided into words headed by local councils. The Minister of the Federal Capital Territory is the overall leader and is appointed by the President of the federal republic of Nigeria.

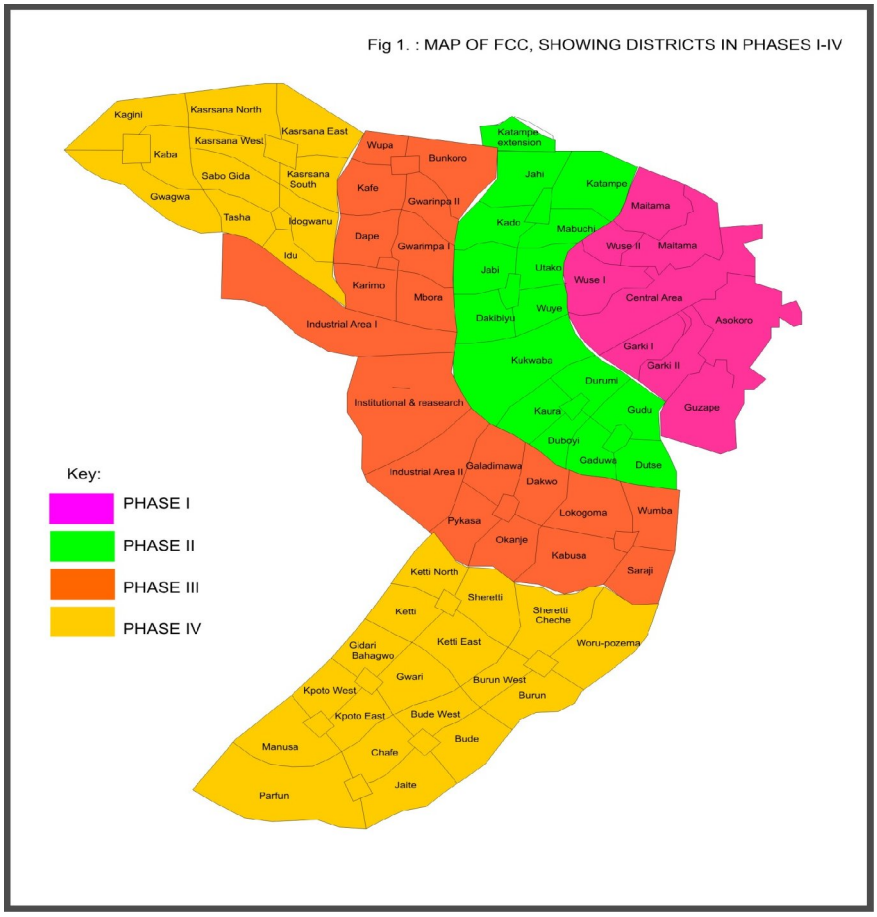


Fig. 2.2 Map of Abuja

2.62 Nature of SW Problem in Abuja

The status of Abuja as the new capital of Nigeria obviously, brought population pressures to the city and the daily human activities create wastes. The problem, is the way these wastes are handled, stored, collected and disposed of, which can pose risks to the environment and to public health. Typically one to two thirds of the solid waste generated in Abuja is not collected.

As a result, the uncollected waste, which is often also mixed with human and animal excreta, is dumped indiscriminately in the streets and in drains, so

contributing to flooding, breeding of insect and rodent vectors and the spread of diseases. Furthermore, even collected waste is often disposed of in uncontrolled dumpsites and/or burnt, polluting water resources and air.

2.63 The Evolution & Implementation of a Solid Waste Strategy in Abuja

The challenges of Solid waste management in Abuja in the 1990's has been: Low public awareness of SW issues, machines and equipments are poorly maintained and operated, there was no articulated strategies or policies related to solid waste management (SWM), fragmented responsibilities among City authority and the area councils, much of the population not served by collection system, most of the vehicles hauling waste are not appropriate or up to standard and enforcement lacking, there was a low priority on litter clearance, many open dumps scattered around the city that were Poorly located and operated, "Scavengers"/salvagers were always on sites and Regular burning was a part of site "management", as a rule.

2.64 Actions taken Legal/Institutional

Establishment of Solid Waste Management Authority (A.E.P.B), 1997, Area Councils were relieved the responsibilities of collection & disposal, Waste Management decree drafted, Collection expanded to include ALL areas, Collection licienced and stringent performance contracts issued, Nebouhood bins provided to control open dump, bulky waste and litter included in contracts, Poorly operated dumps closed, Sustained public awareness programmes

introduced, radio and Tv programmes, newspaper columns and Public Service Announcements, Monthly Clean-up exercise.

2.65 Responsibility for SWM

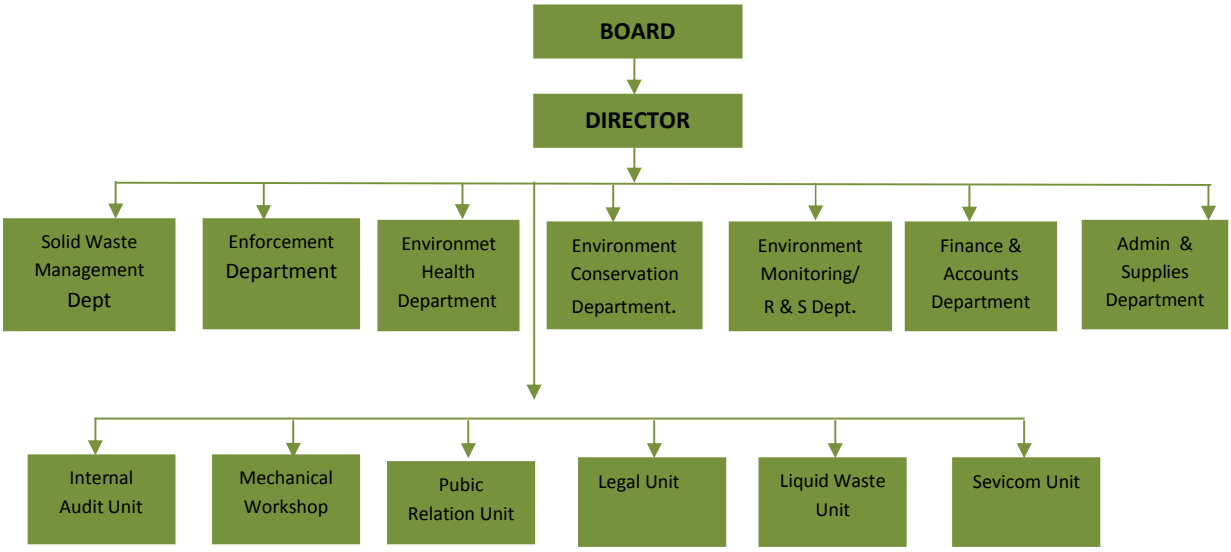
The Abuja Environmental Protection Board was established under decree 10 on the 12th day of August. 1997. The Board was established to achieve a sustainable, clean, healthy and beautiful environment for the well being of the residents of the Federal Capital Territory and other satellite towns in the Territory. The board was saddled with the responsibilities of Preparing strategic document concerned with municipal solid waste management, preparation of guidelines and codes of practice emphasizing different stages of the commercilazation system, Procurement and distribution of Waste Receptacles to tenement and Government Agencies, Prompt and efficient refuse collection, storage and disposal at least twice a week, effective management of waste transfer stations [WTS] separation of waste, landfill site to secure the Environment for present and future generations of FCT residents, management of special waste [Hospital and Hazardous waste] and the street Cleaning and Litter Control on daily basis.

2.66 INSTITUTIONAL STRUCTURE OF THE A.E.P.B

The Management Structure of the Abuja Environmental Protection Board is as shown on Fig. Six departments and six units constitute the administrative organs. There are a total of 147 staff in the agency. The Solid Waste Management department have the responsibility of contracting, monitoring and ensuaring that Solid Waste material are always cleared in the city. The Enforcement department have the sole responsibility of enforcing the performance of collection and disposal by the contractors, payments of user

charges by the residents and obeying the laws, rules and regulations by the general public.

Fig: 2.3 Organisaional Strucure of AEPB



Beside the A.E.P.B, there are registared private waste service operators that are responsible for SWM in Abuja. Some of which are Maishara Investment Limited, Lauman Nigeria Limited, Anetor, Global Green, Cosmopolitan Cleaners, Sole Scissors, White Clean Limited, Morgan Nigeria Limited, Palisco Nigeria Limited, Pick & Pack, etc.

2.67 The Commercialization Programme of SWM in Abuja

The commercialization programme of SWM in Abuja was stated in 2000. The government initiated the strategy in order to apply environmentally sound practices of waste management. The strategy main objectives were: improving institutional set up of SWM to be able of providing collection, transportation and final disposal services, and to also provide an effective, efficient, affordable, safe and sustainable solid waste management system for Federal Capital city.

The following strategic objectives were proposed to reach the overall aim: To upgrade waste collection and transfer, to improve waste disposal and treatment, to reduce waste and maximise recovery through the user collection charges (see table 19), to ensure the safe collection and disposal of all hazardous wastes, to achieve financial sustainability in solid waste management, to strengthen institutional and organisational capacity in solid waste management and to also increase involvement of key stakeholders by raising awareness of solid waste issues.

2.68 THE LEGAL PROGRAMS FOR COMMERCIAL SOLID WASTE MANAGEMENT IN ABUJA

The legal and regulatory framework for solid waste management is elaborated in the form of by-laws, ordinances and regulations which covers inspection and enforcement responsibilities and procedures at city district levels. The programme in Abuja was structured so as the ownership of machines and equipments, regulations of tariff and quality control of service delivery remain at all times vested in the authoriry of the A.E.P.B.

The main legislation relating to SWM is decree no 10 of 1997 (Federal Republic of Nigeria – Abuja Environmental Protection Board) as amended by the waste management rates/charges regulations No 89 of 2005. The law regulates the collection and disposal of solid waste from residential areas, commercial and industrial establishments, and public places. It imposes a cleanliness charges on all housing units based on area location and requires that the A.E.P.B issues a license for all private waste collectors. The law also specifies garbage containers, means of transportation, and the period of solid waste collection. The

powers of the AEPB also extend to the control, removal and disposal of liquid wastes, control of noise which constitute a nuisance and the control of the use of residential areas for prohibited purposes.

The Federal Government of Nigeria-Abuja Environmental Protection Board (Commercial waste management rate/charges) Act was promulgated in 2005. The intent of the act is having a policy where residents and businesses pay for waste services per unit of waste collected on a fixed fee, every owner, caretaker or occupier of any tenement or any person, authority, body corporate who lives, resides or carries on any activity within the Territory shall pay in advance to the board on yearly basis such rates and charges as are specified in the schedule, and any person who contravenes these Regulations is guilty of an offence. The Abuja environmental protection board give out contract and liciences through a bidding process, the successful companies are expected to collect waste from house to house and also ensure that there are no spill bins in all locations within their area of work, while the A.E.P.B distribute and collect the waste bills then pay the contractors.

The A.E.P.B are also vested with the responsibilities of enforcement and regulations.

Table:3 Private waste collection companies allocated the districts of Study

Company	**District**
Sole Scissors	Asokoro
Morgan	Maitama
Anetor	Wuse
Global Green	Garki
White Clean	Gwarinpa

Source: A.E.P.

CHAPTER THREE

METHODOLOGY

3.00 INTRODUCTION

The study methodology is explained in this chapter of the report in 5 sections. The primary objective is to show how the survey elements were chosen; how data collection was organized; and where data was sourced, etc.

3.10 DATA REQUIRED AND SOURCES

To achieve the objectives of the study, data was collected from various sources. These include institutions, private waste service operators, field surveys and observations and the use of questionnaires.

Table: 4. Data Collected and Sources

1	Institutional Framework	A.E.P.B
2	Base Map of Abuja and number of Houses	AGIS
3	Environmental Policies, types of machines and equipments use for MSWM in Abuja.	FM of Environment, FEPA, AEPB and FCDA
4	Distance and Location of Dumpsites	AEPB
5	Characteristics of Waste Generation	Households
6	Socio economics characteristics of the population	Households
7	Service Providers and Contractual agreement.	Service Providers.

3.20 DATA COLLECTION TECHNIQUES

In obtaining the required data, primary and secondary data was collected through the use of questionnaires, interviews, and physical observations.

3.30 PRIMARY DATA COLLECTION METHODS

3.31 The Sampling frame

The five districts from where samples were drawn were; Asokoro,Wuse, Maitama and Garki at the phase 1 of Abuja metropolis and Gwarinpa district of Phase II. Each district is made up of a number of Neighborhoods and collectively have an estimated population of 1.4 million (see Table 4).

The criteria used for selecting districts are to allow for a complete coverage of the low, medium and high income earners and their rate of waste generation.

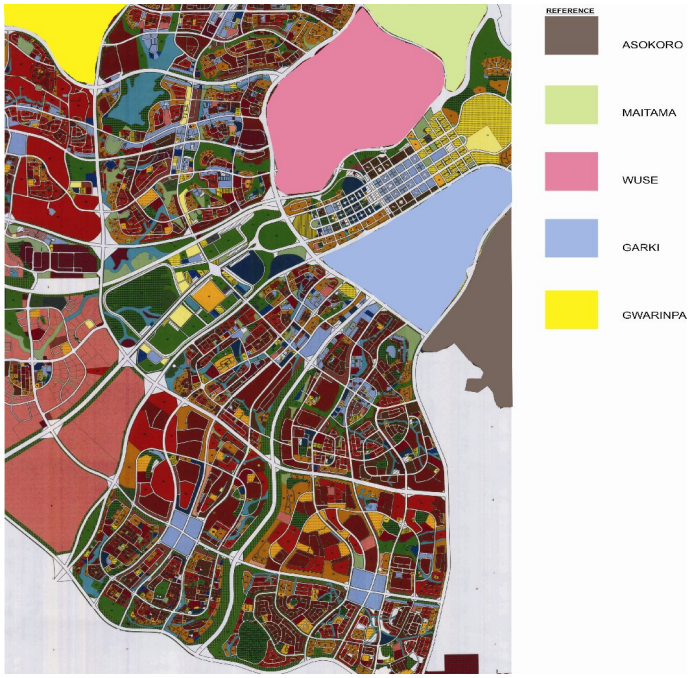
1. District 1: Asokoro accommodates the high income earners, in private and other public buildings.
2. District 2: Maitama District accommodates the high income earners in private and public buildings.
3. District 3: Wuse district is of medium density and accommodate the high income earners and both public and private commercial buildings.
4. District 4: Garki district is also a medium density area and accommodates the high income earners with public and private commercial buildings.
5. District 5: Gwarinpa districts this district accommodate the high and medium income earners and private commercial buildings. 10% of the estimated household of each of the five selected districts were randomly selected and interviewed.

Table:5 Estimated Popolation of the Five Districts.

Districts	Estimated Population
Asokoro	104,316
Maitama	211,623
Wuse	319,700
Garki	427,100
Gwarinpa	381,078
Toatal	**1,443,817**

***Source**: National Burue for Statistics.*

Fig: 3 Map of Abuja and the 5 selected Districts



3.32 The sampling size

A sample size of about 500 households was randomly selected, which is about 0.14% of the total number of household in the study areas.

Table: 6. Registared households at the various Districts.

Districts	Asokoro	Maitama	Wuse	Garki	Gwarinpa	Total
2005	66,222	73,003	79,219	52,114	34,048	304,606
2007	74,517	80,335	90,407	61,319	48,916	355,494
2009	82,707	89,667	101,102	77,574	60,321	411,371

Source: *Abuja Geographical information system, FCT development control & F.H.A*

3.33 Sampling Technique

The primary data for the study was obtained from field survey of the households within the study area, using a cluster sampling technique to select households in the five districts. Assuming an average household size of six (6) inhabitants per household, a sample size of about 500 households were sampled, which is about 0.12% of the total number of households in Asokoro, Wuse II, Maitama, Garki and Gwarinpa put together.The number of questionnaires distributed was calculated based on the number of neighborhoods per district. (See Table 7)

Table 7: Household questionnaire distribution in neighborhoods. (***Source:*** *Field Survey 2009)*

1	Collection Zone	Asokoro	Maitam	Wuse	Garki	Gwarinpa	Total
2	Households 2007	74,517	82,707	90,407	61,319	48,916	355,494
3	Households 2009	82,707	89,667	101,102	77,574	60,321	411,371
4	Estimated household size.per district	117	110	98	75	100	500
5	Chosen neighborhood per district	7	7	6	4	4	28
6	Surveyed Household per district.	102	100	91	33	82	408

The distribution was conducted randomly, on door-to-door basis, depending on the type of housing. Only persons who were 15 years or more were targeted. A

sample five hundred questionnaires was distributed to the residents, five to the service providers and an Interviews was conducted with the policy regulators (AEPB). For the households questionnaire, three income groups were formed. The formation of these groups follows the average household income in Abuja, using the range of about 20,000, 100,000 and 150,000 naira (Naira/household/month) in 20,000 and the basic assumption, that a family with one employed member earning the assumed minimum wage of 20,000 (Naira/month).

3.34 The Survey Instruments

a. Questionnaires

The objective of the questionnaire survey, in the study was to get information from the respondents to cover the demographic characteristics of the respondents, the duration of stay, the type of residence, gender, the level of income and the size of family. It also covered respondents' perceptions and practices on solid waste management: the monthly fees, knowledge of where waste was taken after collection, awareness of composting and recycling activities and the major issues affecting the management of the solid wastes in the study area. Two types of structured research questionnaires were developed; the questionnaires were administered to the households and the service providers.

Table:8.Questionnaire administration according to Districts

S/N	Districts	Household in 2007	Household in 2009	Sample Size	% of total household	Questionnaire returned.
1	**Asokoro**	74,517	82,707	117	20	102
2	**Maitama**	80,335	89,667	110	22	100
3	**Wuse**	90,407	101,102	98	24.3	91
4	**Garki**	61,319	77,574	75	19	33
5	**Gwarinpa**	48,916	60,321	100	14.7	82
6	**Total**	**355,494**	**411,371**	**500**	**100**	**408**

Source: *Field Survey 2009*

b. **Institutional Interview**

Information about SWM in Abuja was gathered by contacting and interviewing staff of the authorities (AEPB), First interviews were held in September 2009 with the Head of Solid Waste Management Department of the Abuja Environmental Protection Board (AEPB), the Head of Public relation unit of the board and some administrative officers. Both gave a brief overview about the existing MSWM system. During the field research, more questions emerged and the service providers, who provided the deepest insight into the MSWM system of Abuja, were visited frequently. All interviews were semi-structured with pre-determined questions due to general information from literature and previous interviews. Wording and order was more or less open.

c. Unstructured or informal interviews

During the field visits in residential areas, and the landfill, numerous unstructured interviews with different stakeholders and other parties involved were held. Questions were related to the specific research object, for instance asking households about their waste disposal practice and scavengers about their business. What made the interviews unstructured was the fact that the questions were not phrased beforehand, but evolved from a specific situation observed by the researchers. For instance, when researchers saw a waste picker while walking through the town, they stopped and started a conversation with him, ending in an interview that provided some useful information.

e. Field visits and participant observation

Several field visits and participant observations were done during the field research. The difference between the field visits and the participant observation was primarily the way how researchers appeared in the field. While in the prior the researchers introduce themselves as researchers to the stakeholders, they do not so in latter. Objects of the field visits and the participant observation were activities of the waste producers in residential areas, the formal waste collection service, the informal recycling agents and people working at the landfill.

f. Measuring waste generation:

To determine the rate of generation and composition based on the economic standing of the individual at the sampling area, 15 houses were randomly selected from Asokoro, Maitama, Wuse, Garki and Gwarinpa,

the households were requested to put in their waste in provided bags, which was collected and replaced by new ones daily, weighing and sorting was then conducted. This process was repeated for 1 week at each of the districts. The objective of this exercise was to know and have an average idea of the: Volume of waste in kilogram (kg) generated per/person/day/week by each category of the household at the selected districts, determine the capacity required for on-site storage, transportation, transfer facilities and disposal of solid waste, identify the recycling and resource recovery potential of solid waste and determine the likely future capacity requirements of the waste management system in Abuja. The equipment and materials used for the waste sampling include:

1. Weighing scales (See plate 3.1)
2. Waste bags for 8(days) x (No. of household)
3. Plastic Buckets, used as a container for weighting.
4. Plastic sheet, to spread waste over it for sorting .
5. Data recording sheets. (See Apendix A1, A2 and A3)
6. Safety equipment, like gloves and masks.

However, the scales were not the best choice in terms of accuracy, but the best available ones. Two size of kitchen scales were used, one with maximum load/ subdivision of 2 kg/ 10 g for smaller and one with maximum load/ subdivision of 15 kg/ 50 g for bigger loads.

Plate 3.1: kitchen scales used for waste sampling



Each sample was first weighted total. Then it was separated into the fractions organic, plastic, paper, metal, glass and mixed waste, and each fraction was weighted separately. The recording of data was based on sheets the samples of which are on the appendix. In using the data recording and computation sheets, waste sampling at source approach was adopted instead of the conventional methods, like sampling at transfer stations and at the landfill. The sampling at source approach overcome the weaknesses of these conventional methods, namely the non-consideration of MSW not transferred to the landfill and the inaccuracy of the results. Waste sources considered were mainly from households.

To calculate the flows of relevant materials, data about MSW quantities and composition had to be collected and analysed. Unfortunately, the existing secondary data did not meet the desired requirements of the research work, thus primary data through sampling was needed. For more reliable results regarding waste quantities, samples were collected. For this estimation, a three step

approach was applied. First, a questionnaire survey with waste producers was implemented, to provide base information for the waste sampling survey and to identify the distribution of waste streams from the source. Second, waste sampling was carried out to give information about quantities and composition of waste. As a third step, data gathered from recycling agents (Scavengers) and authorities completed the picture. It should be noted that the decision on method was not made completely in advance. Rather it was a process based on the experiences accumulated during each stage of the research study. A one week pilot sampling from 12th to 20th of September 2009 made the entry point into the waste sampling survey. Five participants were provided with small kitchen scales, waste bags and a form to annotate the daily solid waste generation of the households.

The objective was obtaining information about practical considerations for the main waste sampling, like the amount of waste per day that can be expected and its composition. The collection was done once a day at a fixed time for 8 successive days to allow variation in waste generation over one week. However, the samples on the first day was discarded as they may contain waste accumulated from 2 or more days. After some field visits, income level was considered as basis of decision making, Thus, two presumable high, two middle and one low income area were selected. The areas considered to be of high income are Asokoro and Maitama the midium income areas are Wuse and Garki and the low income area is Gwarinpa. Explaining to the households the aim and the sampling procedure, people were asked about their general willingness of participation. If willingness was assured, household were asked to fill questions

on the questionnaire survey. The most important information there was the address of the household, the number of household members and the household income. 68 households in total were interviewed, while 75 of them were randomly selected, then each household got a number. Two days before the sampling started, the selected households were visited a second time to equip them with two waste bins and sufficient marked bags, 20 for organic and 20 for inorganic waste. The bags, marked with the household number in order to identify them later, were blue and black, one for the organic and one for the inorganic fraction.

Households were asked to separate their waste into these two fractions. Some households got additional bags during the sampling.

Plate 3.2 Bins and waste bags, distributed to the households for sampling





The sampling ended on Sunday September 20th 2009, making up a total of 9 days, each day in the morning the research team, accompanied by two helpers with a tri-cycle (Keke NAPEP) and two wheel barrows, collected the waste from the household and sent it to a waste container, at a location around a football pitch. This location was selected due to the fact that it is a distance away from

residential areas which could have been affected by the sampling activities. Each waste bag was registered, weighted, opened and separated into the fractions organic, plastic, paper, metal and mixed waste. The fractions were then weighted separately. When there was rain or other problems, only the total weight was measured. Finally, 525 samples for the total waste weight and 429 samples for the waste fractions weight were collected ramdomly collected from 75 households at the five districts. From these figures, 14 respectively waste weight and 6 samples were not considered, due to inconsistency of the information, leaving 511 waste weight and 423 considered samples respectively.

Reason for smaller sample number than assumed was either missing or unreadable numbers at the waste bags or people were not at home and forgot to place the waste bags in front of their house.

Table: 9 Waste sample size and waste weight for household sampling

	Total Weight	**Waste Fractions Weight**
Number of samples assumed Max.	530Kg	530Kg
Number of samples collected	525	429
Number of samples considered	511	423
Difference samples assumed.-Considared	19	107

Source: field survey

3.35 Secondary Data Collection

The research built on a high proportion of statements and records from the Abuja environmental protection board (A.E.P.B), literature of waste

management programmes, data were obtained from, existing departmental records or the examination of official statistics at the municipal and/or national level and making maximum use of previous studies in order to avoid unnecessary duplication of effort. Existing national and city development plans/policies were used as sources for information on socio-economic development. Another useful source of data and information used are from NGOs. There was also a review of Journals, textbooks, unpublished materials, Maps, and other appropriate literature on the commercialization of solid waste management.

3.40 DATA ANALYSIS

The analysis of the data was based on stratified sampling technique, based on both simple descriptive statistics and elaborate graphical techniques. The simple statistics were restricted to the frequency in which the interviewees responded to the questions. The graphical techniques was employed primarily to illustrate the different analysis of data by the use of tables, bar and pie charts, using the Microsoft Excell computer software.

3.41 Operational measures for performance assessment

The performance assessment in the study is guided by whether the objectives of the commercialization programme are met or not. In the Literature, the objectives of the commercialization relates to these issues: waste reduction, reuse and recycling. To determine the outcomes of the programme therefore, the 3 objectives are crystallized into the following assessment criteria:

a. **Efficiency:** This is defined as the competence, the ability to implement a programme well; or to achieve a desired result with the minimum use of resources, time and effort. In the context of the study, this will relate to volume the reduction, re-use and recycling, e.t.c
b. **Effectiveness:** This is producing favorable impressions; or causing a successful result, especially the desired or intended result of reduce, re-use and recycle.
c. **Affordability:** This relates to being able to buy or pay for SWM services without unacceptable or disadvantageous consequences.
d. **Profitability:** This is defined in the context of returns to the operators. It is the excess of income over expentidurthat; that is, yelding a financial profit for the companies.

CHAPTER FOUR

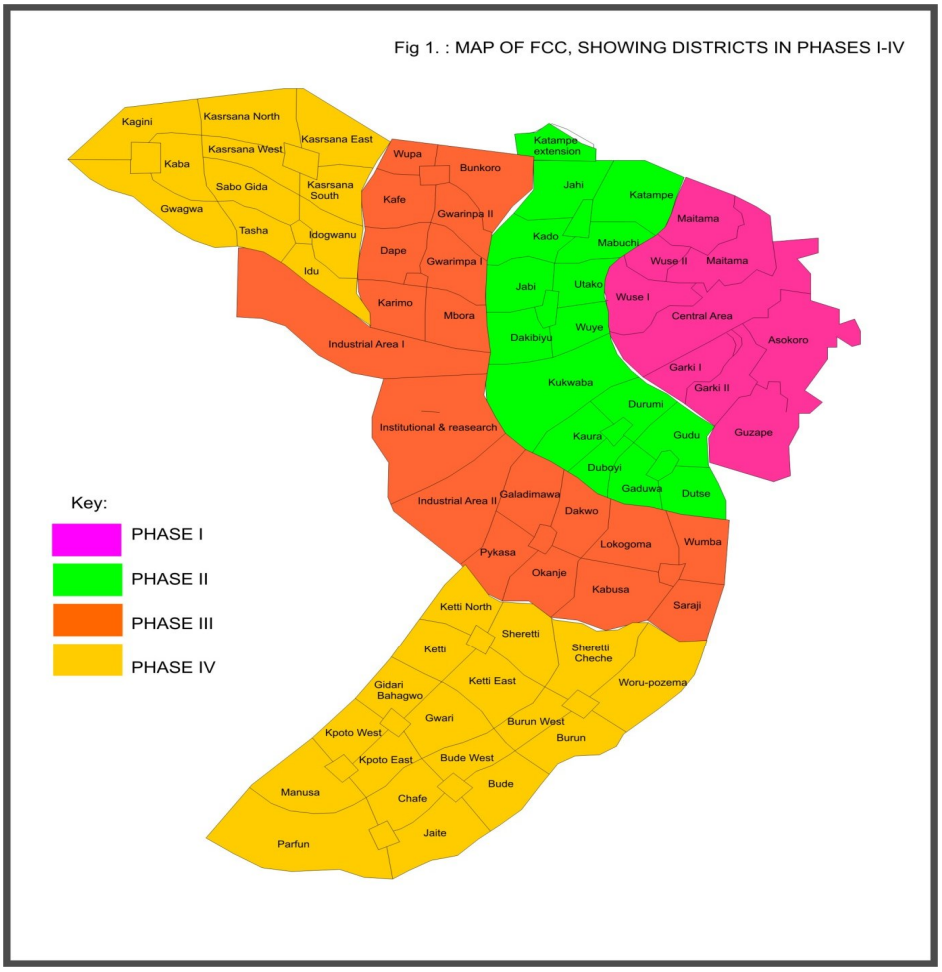
OUTCOMES OF THE COMMERCIALIZATION PROGRAMME

4.10 INTRODUCTION

This chapter presents the assessment results of the SWM commercialization programme in Abuja. The criteria adopted in the assessment have been discussed in chapter III to include efficiency, effectiveness, affordability and profitability. The data generated was based on field and institutional surveys carried out in the five selected districts of Asokoro, Maitama, Wuse, Garki and Gwarinpa.

4.20 EFFICIENCY OF THE COMMERCIALIZATION PROGRAMME

The consistency and timeliness of service delivery with regards to solid waste management is the key criteria employed in assessing efficiency. This was established for each of the activity component of the programme vis - avis, volume of waste collected, waste reduction, waste re-use and recycling. To measure the efficiency of the programme as defined by the rate of collection, the rate of waste generated daily at each of the districts versus the rate or volume collected or uncollected daily was used. As shown in table 10, over 60% of wastes generated in the five districts are satisfactorily evacuated. The performance across the districts however varies. Asokoro and Maitama experience better performance than Wuse, Garki and Gwarinpa. The largest measure of uncollected waste is in Gwarinpa district, and the least is Asokoro.



Abuja Map: Showing spatial spreed of the outcomes

Table:10 Rate of daily wastes generation/collection & uncollected (**Source:** Field Survey 2009.)

S/N	Districts	Daily Generation in Kg	Daily Collection in Kg	Daily uncollected in Kg	% of waste collected daily
1	Asokoro	44,855.88	44,855.12	0.8	99.9
2	Maitama	110,043.93	110,012.50	31.4	99
3	Wuse	121,486	96,113	25,373	79
4	Garki	170,840	86,440	84,400	50.6
5	Gwarinp	167,674.4	79,271.02	88,403.4	47.3
6	Total	620,841.31	235,964.17	201,320.12	375.8

How regular the collection of waste was organized was the second issue considered in assessing the efficiency of the SWM programme. Across the districts, the programme requires 2-3 collections per week to meet efficiency targets. In practice, SWM collection varies between three, two and one collection per week (see Table 11). The target of 3 collections per week is attained in only 2 districts (Asokoro and maitama). In wuse, Garki and Gwarinpa, majority of families receive between 0-2 collections a month.

The variation between the districts has links to poor equipment base of the service operators and partly the insufficient monitoring and control of the garbage collection operation by the policy regulators. If the rate of collection is regular at all the districts and waste is seen to be cleared regularly, then service can be said to be efficient. From the study however, most districts have huge uncollected wastes, and collection in the majority of cases is generally irregular and contrary to planned targets.

Fig 4.1: line graph of daily wastes generation/collection and uncollection

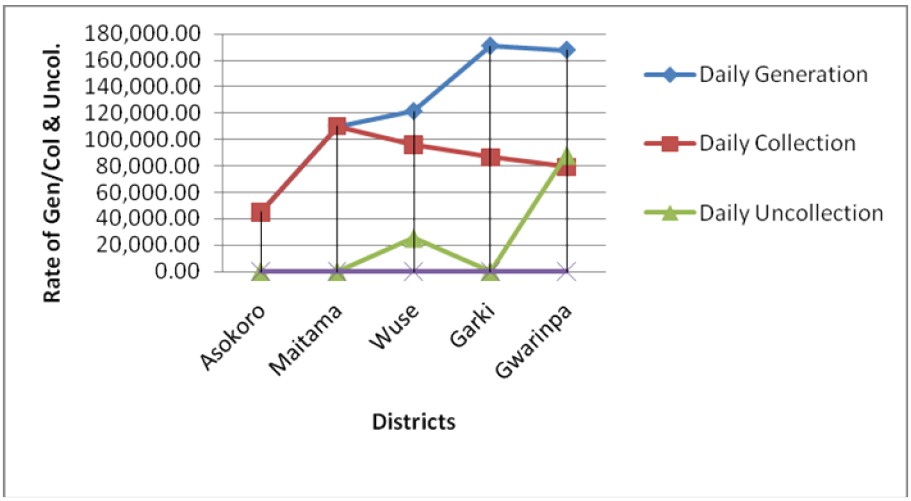




Plate 4.1 An over flown Receptacle at Garki

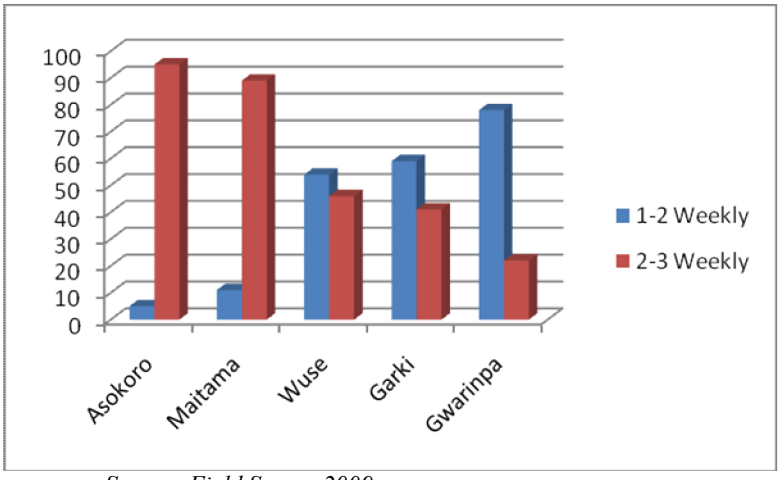


Plate 4.2 Uncollected garden waste at Gwarinpa

Table:11 Frequency of Collection at the Five Districts

Districts	Respondants % of 1-2 collection weekly	Respondants % of 1-3 collection weekly
Asokoro	5 percent	95 percent
Maitama	11 percent	89 percent
Wuse	54 percent	46 percent
Garki	59 percent	41 percent
Gwarinpa	78 percent	22 percent

Fig. 4.2 barchat of collection Frequency



Source: Field Survey 2009

The districts of Asokoro, Maitama and Wuse are largely covered by the house to house collection service, and Residences have receptable bins for waste storage. At Garki and Gwarinpa, not all houses are individually serviced. In these Districts, there are quite a number of open spots where wastes is dumped, occasionally burned on site, and collected arbitrary (See Table 12). No regular awareness Programme is conducted by service providers to make households aware of appropriate conduct for SWM.



Plate 4.3: Arbitrary Dump site at Gwarinpa



plate 4.4: Arbitrary Dump site at Garki

Table:12 How Collection is done (***Source:*** *Field Survey 2009)*

Districts	**House to House Collection**	**Abitrary collection**
Asokoro	97	3
Maitama	95	5
Wuse	94	6
Garki	81	19
Gwarinpa	72	28

For households that are serviced, waste is stored in dustbins of sizes ranging between 50 – 240Litres of iron drums, plastic receptacle bins, polythene bags and galvanized metal containers.

Fig. 4.3: line graph on how collection is done

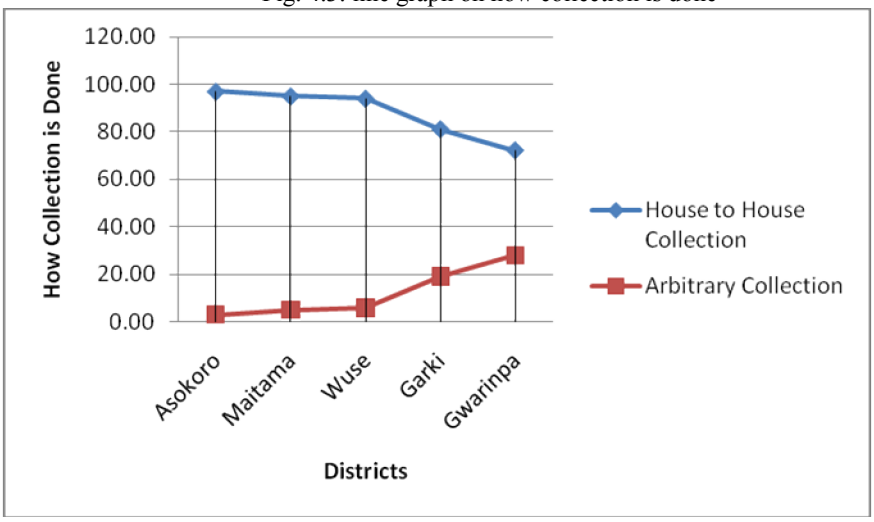




Plate 4.5 A Drum use for storage at Gwarinpa



Plate 4.6 Polythene Bags used for at Garki



Plate 4.7: A Galvanize Bin use for storage at Maitama



Plate 4.8 240lit Receptacle Bins at Asokoro

Inefficient collection is also tied to the time wastage during collection resulting from inappropriate techniques and collection strategies. The explanation is that the service providers don't have the adequate compacting trucks to mechanically carry the containers. Instead, the crew load manually and in most cases have problems lifting some of the containers leading to time wastages and damage to containers.

4.40 EFFECTIVENESS OF THE PROGRAMME

A key objective of commercializing solid waste management is to maximize waste reduction, reuse and recycling. The effectiveness of the programme in Abuja therefore was evaluated based on whether reduction, reuse and recycling are undertaken or not. The first issue measured was waste reduction at source before storage and collection. Waste reduction involves sorting and recovery of recycleable materials. From the results of the survey, no reasonable indicator

exists that households are involved in waste recovery. A negligible practice of sorting however, though unorganized, exists with service providers. The practice is undertaken by field staff outside official company policy, and cannot therefore be said to be formal. Even then, the practice is insignificant (see table 14) to influence positive outcomes. Linked to non sorting and re-use, waste recycling does not exist either with households or with service providers. Recycling generally can create income and has potentials to ensure that the volume of waste that ends in landfills is substantially reduced to meet environmental objectives. In the context of the study, non of these advantages have been drawn, even when data from the field survey indicates reasonable viability of the strategy (see table 14). The literature on what component of waste is recyclable is large; For example, it is relatively easy to produce paper from old paper or clothes; and discarded glass when melted can produce new bottles. Scrap metal, auto wrecks, aluminium (beverage) cans, used copper wires, etc. can be used to make new metal products. Textile off-cuts, old clothes, etc, can be used for the production of door mats, cushions, mattresses, kid's underwears, home made caps, stuffing dolls and others. Also, textile can be used in the production of high quality paper. Plastic waste such as broken buckets, bottles, shopping bags and containers can be melted and formed into new products.



Plate 4.9: Plastic Recyclable Materials gathared at the DumpSite



Plate 4.10: Recyclable Materials collected for exportation

From the study, and as shown in table 13 recyclable materials such as paper, textiles, plastics, glass and metals make up a large percentage of wastes in the five Districts studied. Recyclable waste have a total weight of 3028.3Kg out of the 3675.9 waste composition in the five districts most of which is contributed by metals and paper. The District level contribution is highest by Asokoro, and the lowest is Gwarinpa. The fact that recyclable materials end up in dump sites means that valuable income is lost not only by households but also by service providers. This also implies that, by virture of the volume of wastes dumped, environmental exposure to contamination is increased

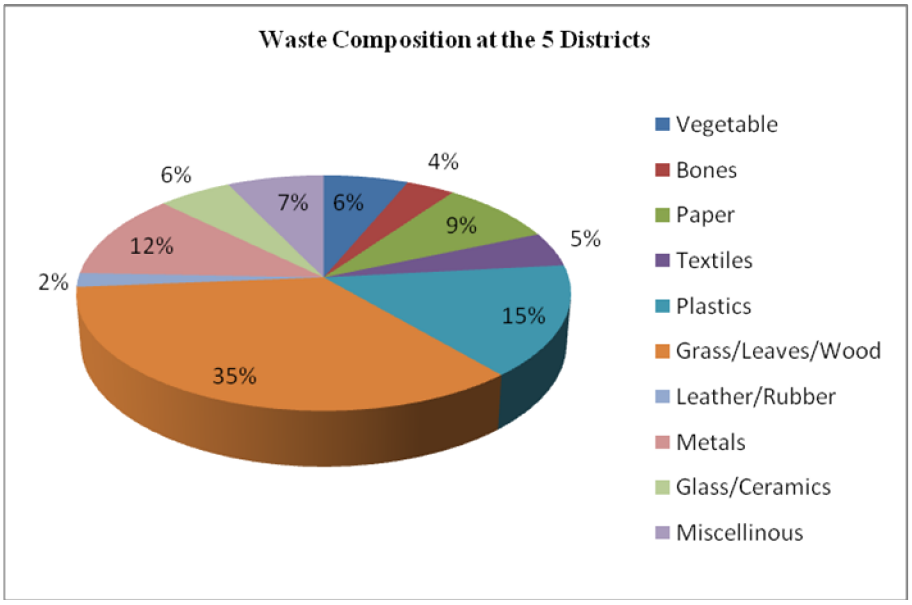
Table:13. Waste Compositions at the five districts

Category	**Districts**					**Total Weight (Kg)**	**%**
	Asokoro	**Maitama**	**Wuse**	**Garki**	**Gwarinpa**		
Vegetable	19.8	20.5	55.3	55	100.6	251.2	6.3
Bones	25.0	23.5	23	22	38	131.5	3.6
Paper	95.4	72.2	69.6	58.8	23.5	319.5	8.7
Texiles	22.8	17.2	35.5	60.7	35.9	172.1	4.7
Plastics	145.9	121.3	121	110.3	62.9	561.4	15.4
Grass/Leaves/ Wood	417.1	300.9	276.5	191	101.2	1286.7	35
Leather/Ruber	13.8	12.0	12	12	18.7	68.5	1.9
Metals	94.1	103.8	79.7	83.2	62.4	423.2	11.7
Glass/Ceramic	55.8	36.4	44.5	50.7	9.5	196.9	5.5
Miscellaneous	48.9	41.8	58.8	55.5	59.9	264.9	7.2
Total	938.6	749.6	775.9	699.2	512.6	3675.9	100

(251.2)+(131.5)+(319.5)+(172.1)+(561.4)+(1286.7)+(68.5)+(423.2)+(196.9)+(264.9)

Grand total weight = 3675.9

Fig. 4.4 Pie Chat showing waste Composition at the Districts



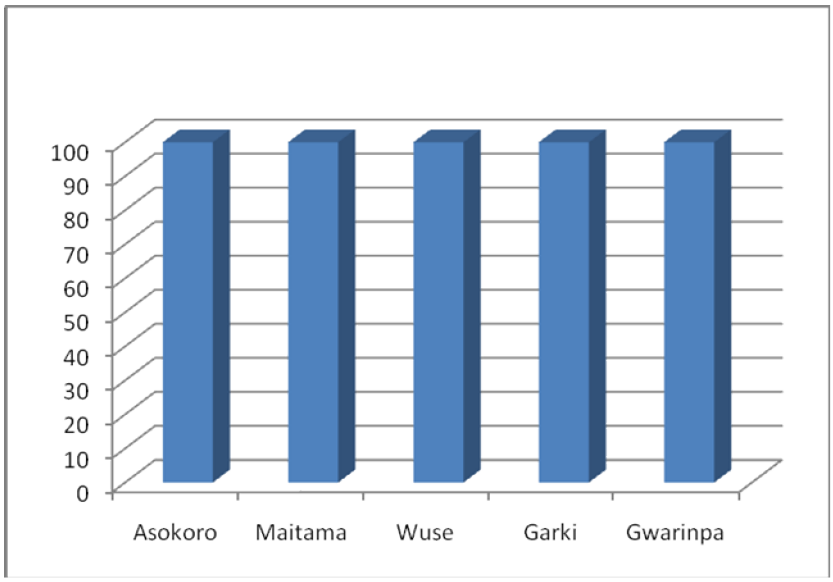
Source: *Field Survey 2009.*

The non recovery of recyclable materials from households is a major deficiency of the commercialization programme that has links to technical and operational contraints (see table 14).

Table: 14. Material Recovared for Recycling by residents

Districts	**Non Recovery**
Asokoro	100 percent
Maitama	100 percent
Wuse	100 percent
Garki	100 percent
Gwarinpa	100 percent

Fig. 4.5: Bar chart showing percentage non recovery of recycly materials



4.50 AFFORDABILITY OF THE PROGRAMME:

The affordability of the commercialization programme was determined based on income data of households as it relates to payment ability. To do this, first, the income data across the Districts was established and analysed. This is shown in table 14 and 15 below

Table:14 Assumed household income groups

Income group	**1(Low)**	**2(Medium)**	**3(High)**
Household income (Naira/household/month	*N20,00-N60,000*	*N50,000-N130,000*	*N300,000-Above*

. As shown by the statistics across the districts, there are more households in the upper income levels in Asokoro and Maitama, than there are in Wuse, Garki and Gwarinpa. In chapter Three, Asokoro and Maitama are contained in the 1st phase development sector of the FCC, and therefore have high concentration of Diplomatic and Government housing apartments.

Table:15 The Assumed Parcentage of each income group at the Districts.

Districts	**N20 - N100,000/Month**	**N50 - N200,000/Month**	**N200,000- Above/Month**
Asokoro	**2%**	**13%**	**85%**
Maitama	**3%**	**17%**	**80%**
Wuse	**15%**	**25%**	**60%**
Garki	**25%**	**20%**	**55%**
Gwarinpa	**30%**	**35%**	**35%**

The usefulness of the income data is to establish whether capacity to pay for services exist uniformly acroos the Districts. The second data needed for the affordability analysis is the fees chagable for services. The charges across the FCT, generally vary between N100 and N3,750 across three spatial groupings: I, II, and III (see table 17). The variations are explained by location and by the type of building development. The spatial determinant is what explains the large fees for Asokoro and Maitama (Diplomatic zones) as compared with Wuse, Garki and gwarinpa, e.t.c

Table:17 Monthly City Residential Property waste collection Fees

	Group I	Group II	Group III
Category	**S/W**	**S/W**	**S/W**
Large Detached Duplex	2,500	3,125	3,750
Small Datached Duplex	2,000	2,500	3,000
Semi Deatached Duplex	2,000	2,500	3,000
Detached Bungalow	1,500	1,875	2,250
Detached Back House	1,000	1,250	1,500
3-4 Bedroom Flat	750	938	1,125
1-2 Bedroom Flat	500	625	750
Mud House	100	125	150

Source: *FCT waste management Rates/Charges 2005*

- Group 1 – Covers all Satelite towns of Kubwa, Nyanya, Karu, Bwari, Gwagwalada, Kuje and Abaji, etc.
- Group 2 – Covers Garki I & II, Wuse I, Jabi, Utako, Durumi, Gwarinpa,etc.
- Group 3 – Covers Asokoro, Maitama, Wuse II, and such other areas as the Board (A.E.P.B) may specify determine from time to time.

Where in the opinion of the Board a tenement or premise does not appropriately fall into any of the classification, the law permits the Board to undertake inspection and assessment towards billing. As established in chapter four, SWM fees are required to be paid on an annual basis.

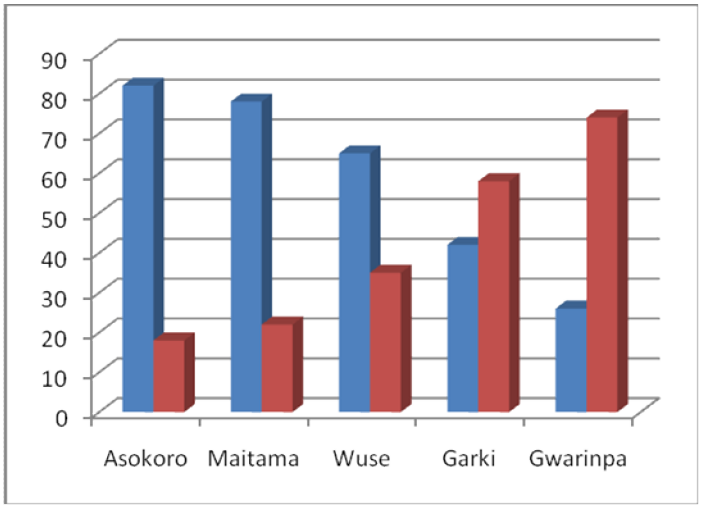
The comparison of income and chargeable fees was next undertaken to establish affordability of SWM services. From the computations, payments on SWM services were found to represent only 2% of total income across all districts, implying that services are not only affordable, but relatively cheap. Next, an attempt was made to establish whether despite the low service charge, residents are regular and comfortable with making payments. The principal finding to this was that the majority of households default in Wuse, Garki and Gwarinpa as compared to Asokoro and Maitama. The attempt to interrogate this provided two explanations. First, poor attitude is what explains non payment in the cases

observed in Maitama and Asokoro. This is interpreted as 'refusal' or 'unwillingness' to pay for the services, as the capacity otherwise exists for doing so. Households, as it appear, are mainly interested in receiving effective and reliable waste collection services at no cost.

Table: 18 Respondents of SW service rate at the five districts

Districts	**Adequate**	**Not adequate**
Asokoro	82 percent	18 percent
Maitama	78 percent	22 percent
Wuse	65 percent	35 percent
Garki	42percent	58percent
Gwarinpa	26 percent	74 percent

Fig 4.6: Bar-Chat percentages on the adequacy of service provision

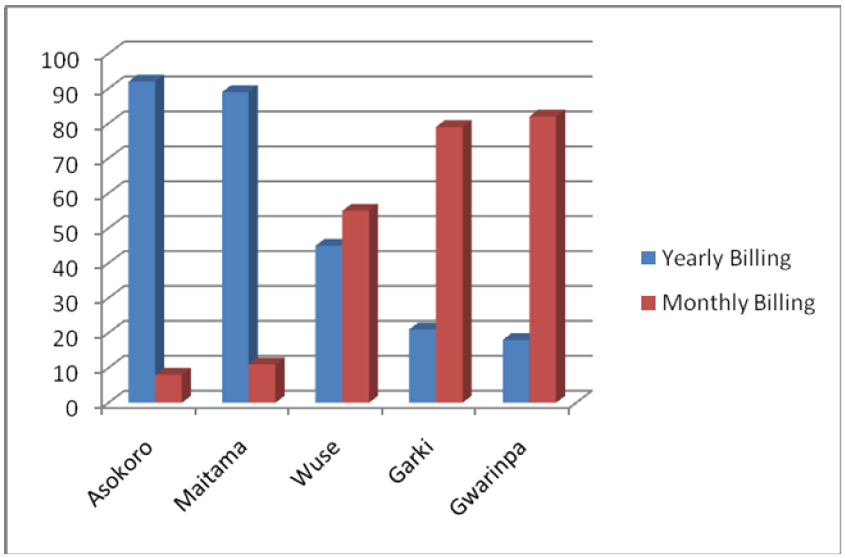


The second explanation for default in payment is tied to the accumulated billing system, where households are required to pay the SWM bills upfront yearly. In Garki and Gwarinpa, an accumulated bill of N30, 000 represents about 30% of the average income of a large segment of households. While this is a decent excuse in the two districts, the excuse finds no logic in Asokoro and Maitama where the average accumulated bill of N48,000 represents only 15% of income of households. A third explanation for default which has validity across all districts is that the accumulated billing system creates problems for most households, especially where tenancy expires before paid services are delivered. The right to refunds has no recognition in the programme, and constitutes a major problems for the system. The difficulties in getting refunds also mean that families become losers where services are undelivered but with payments having been made fully. Because of this, as shown in table16, majority of the families especially in Wuse, Garki and Gwarinpa have preferences for the monthly billing system.

Table: 19 Preferred Method of Billing

Districts	**Yearly**	**Monthly**
Asokoro	92 percent	8 percent
Maitama	89 percent	11percent
Wuse	45 percent	55 percent
Garki	21percent	79percent
Gwarinpa	18 percent	82 percent

Fig 4.7: Chat percentage of preferred method of billing



Source: *Field Survey 2009*

In Asokoro and Maitama however, residents have no problem with accumulated billing, because they belong to the high income group and the houses they live in belong to them, or are federal and state government lodges, guest houses, embassies or multinational organizations, e.t.c.

4.60 PROFITABILITY OF THE PROGRAMME:

The main data based on which the profitability of the programme was determined were the income and expenditure profile of the companies that anchor the SWM services; and the return on investment from SWM activities. The investment of the private sector as commercial providers of services, in this case the SWM usually based on market principles and profit making objectives. To establish the rate of return on investments, the income expenditure profile of the 5 firms with jurisdiction over the five Districts were examined. First, the overhead cost elements were identified to cover: registration with the A.E.P.B; renewable annual license fees; registration and annual renewal fees with the

Nigerian Environment Health Council; overheads on purchase and maintenance of machines and equipments; and salaries and logistics including diesel; etc. The annual average overhead cost of the five sampled firms is N138, 000,000. Second, the income profile established was largely service charge driven; This excludes incomes from recycling and the re-use of wastes which is not common with all the five firms. The estimated average income of the five firms is N156, 000,000, and as established in sections 5.20 and 5.30, no part of it comes from re-use or recycling.

Table: 20 Income and Expenditure of the service providers

District	Total Quantity of Waste (kg/day)	Operator	Annual Contract Value (N)	Average Annual Expenditure (N)
Asokoro	44,855.9	Sole Scissors	34,000,000	29,000,000
Maitama	110,045.9	Morgan	32,000,000	27,600,000
Wuse	121,486	Anetor	32,000,000	28,200,000
Garki	170,840	Global Green	28,000,000	25,700,000
Gwarinpa	167,674.4	White Clean	30,000,000	27,500,000

The income/expenditure analysis as shown in table 18 reflects a profit margin of about 15%. Although reasonable against short run targets, such returns are marginal to offset depreciation on capital and promote growth of the business over a long time span. The profit margin has explanation in poor rates of collection and the low charge on services approved by the A.E.P.B. Generally, because the Abuja Environmental Protection Board has not made adequate measures in implementing the commercialization programme, there are

constraints faced in ensuring that households comply with payment schedules. Non timely payments apply to 60% of households. The low charges on services has links to the flat rate set by the AEPB on the basis of an imputed 'ability to pay' as computed from 'legitimate' assets of households such as property values, income, location or plot size. The ineffectiveness of service charge collection and poor remittance to companies (which occasionally takes up to 3 or more months to effect) means that cost recovery can become ineffective. It also makes successful service provision and enforcement difficult for both the policy regulators and the service providers. Because households don't respond promptly to the payment of bills, the A.E.P.B is unable to pay the service providers as at and when due; service providers therefore find it difficult to deliver services efficiently. Efficient fee collection has not been achieved because as established in section 5.40; the billing is accumulative, annuall, and requires residents to make payments in advance. This has created a lot of negative responses to payment as most residents are tenants and query why they have to pay for services that are not yet rendered. Residents believe the bills cannot be justified and are reluctant to pay for the waste collection services which they perceive to be unsatisfactory. Poor payments leads to further deterioration of service quality by the service providers.

4.70 EXPLAINING THE OUTCOMES

Generally, the outcomes of the commercialization programme in the FCC have been established in the previous sections to be poor with respect to the four adopted assessment criteria. Irregular collection schedules, accumulative billing, none response to payments by residents, lack of adequate machines and

equipments and lack of proper monitoring and enforcement by the A.E.P.B, etc are some of the explanatory factors. In this section, the shortcomings are discussed in four groups: technical, operational financial and institutional.

4.70.1 Technical Contraints

Technical expertise is generally weak for solid waste management at both the A.E.P.B and private company levels. Many officers in charge of solid waste management, particularly at the A.E.P.B, have little or no technical background or training in engineering or environmental management issues. For instance, of the 240 staff at A.E.P.B, only 8 have the requisite training background in SWM and related activities. The implication of this is that not only are plans poorly prepared, but enforcement is rarely satisfactorily done.

The wrong choice of solid waste technology is also often sited in the literature as a negative influence on performance outcomes has manifestations also from the study. This happens where technology is selected without due consideration to its appropriateness in the overall solid waste management system. In such case, attention is given to a component of a solid waste management system for which the use of resources may not be most cost-effective. In this study, a the link of poor outcomes to technology choice is weak, except as it relates to the feasibility of engaging in the re-cycling of wastes. In the current situation, recycling is not a practice in the FCC, but can become unprofitable in the future due to the existing use of mixed open dumping of refuse. Cell dumping from the experience of some european cities, is required to support practicable waste recycling.

4.70.2 Institutional Constraints

The second major finding is that the management support system of AEPB for SWM is generally weak and has links to the inefficiency of the programme. Institutional mandates are poorly articulated for implementation due to the lack of understanding of the policy issues related to effective SWM. This extends to the lack of experience and understanding of issues regarding successful implementation of the commercialization programmes. Weak staffing by training and number has diminished the institutional relevance of A.E.P.B. This is worsened by political intervention that occasionally has led to the appointment of non-professionals into management positions. As established earlier, poor staffing also impacts on ability to monitor and enforce laws and regulations. The unprofessional choice of contractors that derives from political interference also connects to A.E.P.B lack of ability to enforce rules. From the literature, an acceptable level of service for commercial waste management depends on well planned programmes and management, covering for instance, the approach to reporting and monitoring, licensing, monthly billing and enforcement, etc. These are necessary for generating the financial resources required to meet operational expenses not just for the companies, but also for supporting the oversight functions of the A.E.P.B.

4.70.3 Financial Contraints

The financial constraints are at two levels. The first relates to service receivers. The policy of accumulative billing has been established in section 4.33 as a major problem that affects the ability to pay for services by the consumers. In the study, accumulated billing has made it difficult for households especially at

Garki, and Gwarinpa to pay for the services. In many cases also, inability to pay was not necessarily influenced by lack of capacity, but also by the fact that refunds are impossible where a consumer relocates midway through his contract. Related to this is that claims for refund cannot be made by consumers regarding undelivered or poorly delivered services. Of course, a few consumers lack capacity to pay. This applies to tenement housing in Garki and Gwarinpa districts. The second constraint relates to service providers. It is with regards to the selection of companies by the A.E.P.B who clearly lack financial capacity to perform. Companies like Anetor, Global Green and White Clean are doing poorly because they lack financial capacity to obtain machines and equiptments. Related to this, is the delay by the A.E.P.B in making remittances to service providers, who occasionally have to wait for upwards of 3 months to receive payments.

4.70.4 Operational Constraints

This relates directly to issues of finance. As shown earlier, the lack of equipment and staff for waste collection and disposal and/or their lack of skills associates partly with poor financial capacity which impacts negatively on operational performance of some of the service providers. Operational inefficiencies also are a direct result of the bureaucratic cost recovery mechanism emphasised by A.E.P.B. In many instances, the service providers depend on temporary rather than permanent staff to adapt to the situation. Of course, the temporary staff is unskilled, poorly paid and therefore unprepared and unable to deliver services effectively. The operational limitations are also connected to the poor equipment base of most service providers. The average equipment stock across companies

is 2, even though a maximum of 6 is necessary for efficient service delivery (see table 21).

Table:21 Equipment, capacity and the number of crew men of the sevice providers:

District	Contractor	Equipments	No	Capacity	Trips/day	Crew
Asokoro	Sole Scissors	i.Compactor ii.Tipper	3 3	75tonne 15tonne	2	12
Maitama	Morgan	i.Compactor	3	75tonne	2	12
Wuse	Anetor	i.Compactor ii.Tipper	1 1	75tonne 5 tonne	2	8
Garki	Global Green	i.Compactor	2	50tonne	2	7
Gwarinpa	White Clean	i.Compactor ii.Tipper	2 1	50tonne 5tonne	2	11

Length of work day for all the contractors is 10 hours
Source: Field survey

Staffing is also too low to permit effective operations. As shown in table 19, the average staffing is 10, which effectively translates to 4 staff per truck. As low as the equipment base is, few of the service providers have serviceable equipments to meet their contractual obligations (see table 22).

Table:22 Condition of Machines/ Equipments

Contractor	Nunber of Trucks	Year of Manufacture	Chasis	Mechanical Condition
Sole Scissors	3 compactor 3 tippers	1979 1975	Mack Ford	4 are good 2 are bad.
Mogan	3 Compactors	1979	Ford	2 are good 1 is bad.
Anetor	1 Compactor 1 Tipper	1980 1979	Daf Benz	All are good
Global Green	2 Compactors	1979	Daf and Mack	1 is good and 1 is bad
White Clean	2 Compactors and 1Tipper	1980 1975	Daf Benz	Only one compactor is good and one Tipper



Plate 4.11: A typical Compacting Truck



Plate 4.12 A typical tipping truck

Regarding the maintenance of equipment, the study shows the A.E.P.B and most maintenance workshops at Tiper garage to be operating in disarray and requiring re-organization. As there is clearly a marked shortage of well-trained staff (e.g. mechanics, engineers, electricians and other technicians) and tools across-the-board, much of the complicated work is usually sent to Kano or Jos. There is general agreement that mechanical expertise exists in the private sector, but not in the municipal workshops. This situation most likely stems from the lack of training given to workshop staff, which was a frequently heard complaint during the study. In addition, the workshops suffer from inadequate space and funding. In some workshops, there is little or no space for greasing or washing vehicles. Most workshops lack enough space to accomodate 3-5 waste collection vehicles at a time. In terms of funding, the A.E.P.B workshop has no annual fixed budget for maintenance and that the board sends money on an infrequent and irregular basis. Due to the deficient capacity of maintenance workshops in Abuja, most garbage collection trucks are in very poor condition, and because of the time it takes to be taken to Kano or Jos for repairs, it makes it difficult for most of the service providers to offer even once a week collection service on a reliable basis.

Adding to these factors, the weak operational control system of the AEPB hinders the achievement of an efficient, effective and profitable commercial SWM service in Abuja.

CHAPTER FIVE

RECOMMENDATIONS FOR IMPROVEMENT

5.10 INTRODUCTION

The concern in this chapter is to discuss the areas of reform needed to enhance the commercialization programme of SWM in Abuja. This will includes the possible opportunities for strategic new directions for policies and procedures. The focus extends to technical, financial, administrative and institutional issues. In each of those areas, recommendations have been made.

5.20 SUMMARY OF FINDINGS

In the course of the reseach the results obtained showing the outcomes of the SWM programme are: The implimentation of the commercialization model in Abuja has faced some drawbacks and weaknesses that have affectted its success. These drawbacks shown where as having negative implications on the effectiveness, efficiency and profitabibilty of the programme. It shows that as the performance across the districts varies. Asokoro and Maitama experience better performance than Wuse, Garki and Gwarinpa. The largest measure of uncollected waste was recorded in Gwarinpa district, and the least is Asokoro. The study also found out that the effectiveness of the programme is not attained as regard the principle of the 3Rs (reduction, reuse and recycling). It is apparent from the study that the programme seems not to appreciate the potentials of reduction, reuse, recycle and cost recovery towards the successful implementation of the programme. From the results of the survey, no reasonable indicator exists that households are involved in waste recovery. The study also found some setbacks regarding affordability. In particular, the programme

design has been constrained by narrow conception of the criteria for accumulative billing and the procedure for contracting the provision of services

5.30 RECOMMENDATIONS

The recommendations are discussed at two levels to enable the improvement of service delivery by the commercialization programme. This is drawn from the technical, financial, administrative and institutional shortcomings established in section 4.35.

5.31 Technical Issues

It is recommended that the selection of experienced companies for the programme should be the priority. That is, consideration should be on competence and capabilities; and on the availability of adequate machines and equipments to potential service providers. That is companies should have experienced engineers with capacity to prepare plans, including the ability to design a series of transfer stations where wastes could be sorted and baled, encouraging sorting of waste at stations where wastes could be sorted and baled. The failed programme of sorting can be corrected by encouraging sorting of wastes at least among high and middle income neighborhoods; encouraging the use of the multiple use packaging materials such as can, bottled, textile bags, etc. This extends to encouraging the use of receptacle bins to separate recyclable and non recyclable materials, by which people can return plastic or glass bottles for easy collection by recycling agents. There should be a collaborative project design to improve the solid waste management situation gradually over a long period, instead of attempting a quick fix.

Selection of properly designed vehicles is important. Various factors like width of the road, transport volume, road conditions, etc. play important role in selection of vehicles. Proper garage should be provided to save the vehicles from wear and tear. Preventing maintenance system should be introduced which is useful for longer life of the vehicles. Vehicle route should be properly planned for proper utilization of manpower, saving of fuel and reduction of time. Time and motion study should be conducted to reduce the non-productive idle time of the vehicles and increase productivity.

5.32 Financial Issues

To facilitate cost recovery, it is recommended that A.E.P.B stops collecting user fees on behalf of service providers. In this respect, A.E.P.B should rather emphasize compliance of the public to the payment of dues. This implies creating instruments to ensure that every household enlist in the programme and pays on schedule. A.E.P.B should also encourage waste minimization and recycling programs which not only reduces the amounts of waste, but also, enable households and service providers to recover and improve earnings/income. To support this, the A.E.P.B should establish a waste recycling revolving fund that will give incentives to waste collectors and recyclers. At the national level, waivers are recommended on custom duties, fees, taxes etc, to enable service providers improve their equipment base through importation.

A.E.P.B should aadopt a remittance policy, where all service providers remit a certain percentage of their monthly income to the board so as to increase their revenue base is recommended also that the policy of monthly payment of user charges should replace annual payment.

5.33 Institutional Issues

Corrupt tendencies in the selection and award of contracts should be stoped. Regular training of the A.E.P.B staff to handle monitoring, evaluation and enforcement, is also recommended and companies (Service Providers) lacking experience should be disengaged and those requiring technical support be assisted. Government industrial policy should encourage set up of companies to recycle wastes. The A.E.P.B should establish a data base on SWM regarding not only waste generation rates, but composition. This will help service providers design effective operational programme and also help the A.E.P.B in the strategic execution of its oversight functions in planning and the strategy deployment in execution of oversight functions. In this respect, it is necessary to weighing exercises regularly to assess the quantity of waste generated. Future per capita quantity can be estimated with the help of projected population and annual per capita increase. On the basis of this data infrastructure requirement can be estimated. It is also necessary to carry out characterisation studies frequently in order to assess the changes in waste characteristics due to changing scenarios. This data will also serve as a basis for selection of disposal/treatment option. Related to this, A.E.P.B should create special programme to encourage collection/treatment/recycling and the market potentials of waste materials, and recycled products.

5.34 Operational and Management Issues

The A.E.P.B has to step up measures of inspecting the offices of the service providers berore they are registered. This will allow the A.E.P.B the opportunity to know the strength and capacity of every service provider in terms of the

number of machines, equipment, knowledge, finances and the manpower available to the company prior to appointment. The service providers on their own part, should provide training to their crewmen on how to properly operate the compacting trucks and the handling of the receptacle bins to avoid delay in collection. The A.E.P.B has to also step up with monitoring, evaluation, enforcement and intervention to clear trash where service providers fail to do so.

Part of the operational issues extend to the collection, disposal and treatment or recycling of waste. In this respect, Properly designed collection bins and implements should be used for collection and storage of waste. Wastes should be collected frequently in order to avoid accumulation, which leads to degradation of environmental and aesthetic quality. Suggestion from the citizen as well as workers for improvement in the design of bins and implements will be useful. Spacing and location of the bins should be fixed on the basis of the waste load and public opinion. House to house collection system can be introduced gradually to ensure environment friendly collection practices.

Sanitary landfill technique should be adopted for disposal of wastes. Compaction of waste should be carried out regularly preferably with bulldozer. A daily earth cover of 15 cm thickness and final cover of 60 cm thickness should be applied over the compacted waste. These practices will minimize migration of leachate through soil strata, suppress the foul odour and improve the aesthetic quality. Impervious clay liner/synthetic liner should be provided at the bottom of the landfill for protection of groundwater from environmental pollution. Perforate polyvinyl chloride (PVC) pipe can be provided for leachate collection. It is also desirable to install gas collection and flaring system to prevent continuous escape of methane in the surrounding atmosphere.

There is a need for popularization of composed waste product among farmers and to exploit the manure value of the product. Waste minimization, through segregation of recyclable materials like plastics, glass, metals, etc. is another aspect, which needs special attention. NGOs can come forward to promote the activity. Waste pickers may be trained so that the segregation of recyclable items can be done in a more systematic and organized way.

5.40 Others Issues

Community participation is essential for smooth and efficient operation of Commercial SWM system. In every area, citizen forums should be formed. These forums should comprise citizen's representatives, social workers and municipal officers. Immediate action based on feedback from such forum will go a long way in improving the success of the Commmercial programmme. Various activities should be conducted for increasing public awareness.

5.50 CONCLUSION

Conclusively, the performance outcomes of the commercialization programme of solid waste management in Abuja has revealed a number of setbacks which where traced to number of issues. In particular, the programme design was shown to have constraints by its narrow conception of the criteria for billing, the accumulative billing and the procedure for contracting the provision of services. It was also apparent from the study that the programme seems not to appreciate the potentials of reduction, reuse, recycle and cost recovery towards the successful implementation of the programme for the sustainance of the commercialization programme. The residents have therefore been alienated from

the conception and implementation of the programme activities which has consequently undermined the ability of the programme to sustain itself. Other fundamental significance, the programme activities have been carried out on an adhoc bases with little spatial considerations, thereby leading to the under utilization of natural, capital and human resources that are endowed in solid waste management. The study argues, that Commercial programme of Solid waste that is devoid of stakeholders input is not likely to achieve the desired goals of effective, efficient, affordable, safe and sustainable solid waste management programme.

APPENDIX A

DATA SHEET FOR RECORDING AND COMPUTATION OF SAMPLING SURVEY

(a) Recording

Apendix A1 Sample data Sheet used for Daily Generation Rate

House No. *	**Family Size ****	**Days**							**Total**
		1	**2**	**3**	**4**	**5**	**6**	**7**	
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
Total	**(A)**	a	B	c	d	e	f	g	**(B)**

Computation: (Mean) daily generation rate = (B)/(a)/7(kg/person/day).
Source: *(WHO) Solid waste generation survey.*

Apendix A 2 Sample data sheet for recording volume (Density).

Day	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Total**
No. of bucketful Loads*								
Daily Total volume	**(a)**	**(b)**	**(c)**	**(d)**	**(e)**	**(f)**	**(g)**	**(A)**

- The number of bucketful loads are entared in this row for each day.

b. Computation:

Daily total volume, such as (a), (b), etc.= No. of bucketful loads) x (the volume f the buket)

Grand total volume= (a) + (b) + (c) + (d) + (e) + (f) + (g) = (A)

Apendix A3: Sample data Sheet for recording the Composition of Waste

Category	**Day**							**Total Weight**	**%**
	1	**2**	**3**	**4**	**5**	**6**	**7**		
Vegetable								(a)	(a)/(A) x 100
Bones								(b)	(b)/(A) x 100
Paper								(c)	(c)/(A) x 100
Texiles								(d)	(d)/(A) x 100
Plastics								(e)	(e)/(A) x 100
Grass/Leaves/Wood								(f)	(f)/(A) x 100
Leather/Rubber								(g)	(g)/(A) x 100
Metals								(h)	(h)/(A) x 100
Glass/Ceramics								(i)	(i)/(A) x 100
Miscellaneous								(j)	(j)/(A) x 100
Total								(A)	100

- The Entries in this table are weights of waste in each category.

Comptation

Total weight in each category, such as (a), (b), etc., is addition of all entries across the row.

Grand total weight = (a) + (b) + (c) + (d) + (e) + (f) + (g) + (h) + (i) + (j) = (A).

The computation formula for the percent composition of each category is shown in the lastcolumn of the table.

Source: *(WHO) Solid Waste generation survey-2002*

APPENDIX B

Sampled Interview Questions: For A.E.P.B Officials.

1) When was the first commercialization system within the city implemented?
2) Please what was the composition of the team that worked on the implementation?
3) What kind of external assistance did the team receive from the FCDA, AEPB, AMMC or other organizations?
4) Did the FCDA or AEPB provide any start-up equipment during implementation within the initial period? If so, do they still provide start-up equipment?
5) Did the city participate in the collection, transportation and disposal of MSW?
6) Please describe the community education, general public awareness, and public participation workshops which were initially required to implement the commercialization system?
7) Please describe those community educations, general public education, and public participation workshops which are still required for each new community added to the commercialization system?
8) In districts which are served by private contractors, does the type and level of service vary at all from the service provided by the AEPB? If so, please explain.
9) Do you have a different system for collecting user fees from residents at various districts?
10) What percentage of city recurrent costs to provide waste collection, transport and disposal for refuse from the districts are derived from the MFCT?

11) How does this compare with the level of cost recovery from neighborhoods served by door-to-door collection by the city refuse collectors?



My name is Ahmed Awaisu, an Msc Student of the Department of Urban and Regional Planning in the Faculty of Environmental Design. A.B.U Zaria

I am writing a thesis on the commercialization of MSWM in Abuja and want you to kindly assist me with information on this questionnaire. Thank you.

Sampled Questionnaires: For Residents

1. Name: Mr/Mallam/Mrs/Prof/Doc/Alh/Miss…….
2. What is your position within this household?
3. How many people live in this household and what are their relationships to you?

   Family ( )

   Extended family ( )

   Friends ( )
4. How long have you lived here?
5. Do you rent ( ) this house or own it ( )
6. Do you know what your household income is? If so, what is your household income?
7. Out of your household income, would you please estimate what percentage is spent on water bills ( ) electricity ( ) refuse collection ( )
8. What type of refuse collection service do you use?
9. How much do you pay each month for refuse collection, and to whom do you pay it?
10. How often do you receive refuse collection service in a week/Month?

11. Is the refuse collection service which you receive, adequate to justify the amount you are charged?
12. If not, what is unsatisfactory about it? Frequency ( ) care of the refuse dustbin clean-up of dropped refuse from the dustbin ( ) location of collection point ( ) attitude and behavior of the refuse collection worker ( )
13. Are you happy with the cost of the refuse collection service?
14. If not, please explain?
15. When are you asked to pay?
16. a. At the time of collection?

    b. At the end of every month?
17. In addition to the fees collected for refuse collection, do you also give tips to the refuse collection workers? ( ) If yes, how much and how often and why?
18. If service and cost recovery activities are completely satisfactory, what do you think would be a reasonable charge for the service?

    a. Should it be higher? ( )

    b. Should it be lower? ( )

    c. Should it be adequate? ( )
19. Are you satisfied with the location, appearance, cleanliness, and odor of the receptacle? ( ) If not, please explain.
20. Do you recover any materials for recycling?
21. Please describe which materials you recover for recycling

    Paper ( ) cardboard ( ) thin plastic bags ( ) copper ( ) aluminum( ) bottles ( ) broken glass ( ) bones ( ) textiles ( ) rubber ( )leather ( ) food wastes( ) wood ( )

22. For each of these, describe whether you use the recyclable material in your own home, give it to someone in the community, sell it to someone in the community, or take it to a redemption center to sell?
23. Do you think recycling is important for the environment of the city?

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