# THE OPEN UNIVERSITY OF TANZANIA

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# SOUTHERN NEW HAMPSHIRE UNIVERSITY

## MASTER OF SCIENCE IN COMMUNITY ECONOMIC DEVELOPMENT (2005)

**PROJECT PROPOSAL FOR SOLID WASTE COLLECTION KAWE COMMUNITY DEVELOPMENT TRUST.**

A PROJECT REPORT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN COMMUNITY ECONOMIC DEVELOPMENT (MSC – CED) IN THE SOUTHERN NEW HAMPSHIRE UNIVERSITY AND THE OPEN UNIVERSITY OF TANZANIA

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## SUPERVISOR CERTIFICATION

This is to certify that I have gone through the project report of Jane K. Mtey titled **"PROJECT PROPOSAL FOR SOLID WASTE COLLECTION AT KAWE COMMUNITY"** and found it is in a form acceptable for the partial fulfillment of the requirement for the MASTER OF SCIENCE IN COMMUNITY ECONOMIC DEVELOPMENT of the Southern New Hampshire University and Open University of Tanzania.

Maria Marealle.

NATIONAL HOUSING CORPORATION.

DAR ES SALAAM

JANUARY 2005

**DECLARATION:**

I, JANE K. MTEY, declare that this project report for the fulfillment of Master of Science Degree in Community Economic Development is based on my own efforts and solely done by myself unless where quoted for learning purposes as it has been stated. This work has not been presented at any university or institution for similar purposes.

.....

Jane K. Mtey

Date: 8/9/2005

**DEDICATION**

I extend my appreciation to my lovely children, Jennifer and Kennedy for their understanding when they missed my full motherly care when I was busy undergoing my Msc CED course.

I also extend my appreciation to my husband Kassian (with whom we were undergoing the course together) for his sincere support and encouragement apart from his busy learning schedule.

## ABSTRACT

There exist excellent opportunities for Community Based Organizations (CBOs) to provide a wide range of urban services including waste management in the informal settlement, which have a direct positive impact on community health, creation of employment, income generation and poverty reduction.

The purpose of this study is to see how a CBO involve the community in the solid waste management project in order to solve the problem of uncollected waste after the failure of the municipal council to do so. The study examines the performance of the existing solid waste collection and disposal practices, community willingness to participate and identifying problems relating to the solid waste management system of the Kawe community. The findings have been used in preparing an improved solid waste collection project proposal required by the CBO. The study was carried out in two areas (Ukwamani and Mzimuni), where Kawe Community Development Trust a duly registered CBO is established. Methods used in the study are, questionnaires, interviews and observation. It has been found that there is illegal dumping of waste; low level of awareness and environmental health related diseases afflict the community. Over 80% of the community members accepted to participate through paying refuse collection fees. The success of community based solid waste management project depends on the participation of the community from the initial stage of designing the project, implementation, monitoring and evaluation. Soliciting funds for implementing the project is important as well as providing training and sensitization of the community.

**AKNOWLEDGEMENT**

I am obliged to give my sincere gratitude to all parties who in one way or another were involved in the production of the final project report, including leaders of Kawe Community Development Trust who facilitated my work and appropriately responding to the Project Questionnaire.

Also, I would like to thank Mrs. Maria Marealle, my supervisor for her cooperation and guidance at different stages starting from research proposal to the final product. She was persistently providing me support even at times when it meant interfering with her off-duty hours.

**ABBREVIATIONS:**

| | |
|---|---|
| CBO | Community Based Organization |
| CDS | City Development strategy |
| DCC | Dar es salaam City Council/ Dhaka City corporation |
| EPM | Environmental Planning Management |
| GIS | Geographic Information System |
| IDP | Integrated development Plan |
| ILO | International Labour Organization |
| IMEP | Integrated Metropolitan Environmental Plan |
| JKT | Kiswahili translation for National Service |
| KAWWS | Karachi Administration Women's Welfare Society |
| KCDT | Kawe Community Development Trust |
| KEG | Kawe Environmental Group |
| KIMWODA | Kinondoni Moscow women development Association |
| MSW | Municipal Solid Waste |
| NGO | Non Governmental Organization |
| PSC | Project Steering Committee |
| REPOA | Research on Poverty Alleviation |
| RCC | Refuse Collection Charges |
| SDP | Sustainable Dar es salam Project |
| SMMEs | Small, Micro and Medium Enterprises |

| | |
|---|---|
| SWM | Solid Waste Management |
| UNICEF | United Nations Children Fund |
| UNCHS | United Nation Center for Human Settlement |
| WCED | World Commission on Environment and Development - UN |

**TABLEOF CONTENTS**

## CHAPTER II

## CHAPTER V



## LIST OF TABLES:

## LIST OF FIGURES



**APPENDICES:**

| APPX NO | PARTICULARS |
|---|---|
| 1 | Letter of introduction |
| 2 | Acceptance letter from KCDT |
| 3 | Questionnaires |
| 4 | The work plan |
| 5 | Agreement for refuse collection and disposal for Kinondoni Municipal Council |

# CHAPTER I

## 1.0 INTRODUCTION.

### 1.1 Introduction

A common problem among Sub Saharan cities is lack of appropriate institutional mechanisms to fully address the solid waste management question. Rapid urbanization, abject poverty and inadequate management capacity at the municipal level have constrained the ability of cities to provide basic collection and disposal services, resulting into numerous social and environmental ills. Urbanization and rapid economic growth in the country has resulted into large increase in refuse output

Solid waste management (SWM) is one of the basic services that are currently receiving wide attention in the urban agenda of many developing countries. Seik (1997) has reported that lack of effective SWM can result in environmental health hazards and has negative impact on the environment. This extends wider than just the geographical boundaries of the town or municipalities.

Inadequate solid waste collection services in unplanned urban settlements are one of the serious problems in Tanzania. In most cases the majority of the uncollected waste is generated in the poorer neighborhoods. The city is growing at a rate of 7% per annum and it is estimated that about 70% of the population live in informal or unplanned settlements (Mbuligwe and Kassenga, 2004). There are several reasons why it is often a low priority to collect solid waste from low-income areas. These include difficult access,

low social status, lack of land tenure, awareness, lack of incentives to collectors and lower value of waste produced. (Adrian Coad, 2003)

According to Mengiseny E. Kaseva and Stephen E. Mbuligwe (2002), the current amount of solid waste generated in Dar es Salaam, which is the business/economic capital city of Tanzania, is about 2425 tons per day and the average waste rate is within the range of 0.40 kg per day. The income level is a determining factor for domestic solid waste generation rates. Their study indicated that solid waste collection by the city municipalities is approximately 10% of the total solid waste generated, while solid waste collection by private contractors is 24.4%. Collection through recycling is approximated to 5.5% of the total waste generated in the city. This means about 60% of the waste is uncollected most of it being in unplanned and marginal areas such as Kawe.

Furthermore the research found that the privatization of solid waste collection activities has improved from 10% to 40% of the total waste generated in the city daily. The collectors include the individual contractors, Non Governmental Organizations (NGOs) and Community Based Organizations (CBOs) who normally specialize in primary collection from household to a collection point.

Kawe Community Development Trust (KCDT) is one of the CBOs that were established for, among other things to deal with solid waste problems, the organization which the author is assigned to prepare this proposal.

## 1.2 Background information of the Kawe Community Development Trust

### 1.2.1 Background

Kawe Community Development Trust (KCDT) is a registered community based organization registered on 6th February 2002 under the trustees' incorporation ordinance (Cap 375). It has a status of being a non-governmental, non-religious, non-political and non-profit making organization. Its offices are based at plot No 973 KAWEDET House, Old Bagamoyo Road, Kawe area and its address is P.O Box 2522, Dar es salaam. Kawe Community Development Trust covers of two streets, namely, Ukwamani and Mzimuni with a total area of 2 square kilometers. According to the 2004 census, the total population of the community in Ukwamani is 16,000 people with 1,547 households and Mzimuni Street had 18,500 people with 4,050 households.

Kawe has three organs, namely, the Kawe Elders council, Trustees of Kawe Community Development Trust. Kawe Elders Council is the main development organ for Kawe residents. The Trustees are the executive committees of Kawe Elders Council.

### 1.2.2 Mission Statement.

The organization does not include a mission statement as such but has its vision and objectives clearly stated in its By-laws and brochures:

### 1.2.3 Vision

The vision of Kawe Community Development Trust is to establish;

1) A conscious integrated community with capacity for self-motivated development, sustained by solidarity and spiritual, intellectual, physical, governmental and legal resources.
2) A sharing ethical community that values mutual support and self-advancement.
3) A community that values and conserves its resources, and has a culture of saving and investing in development.

### 1.2.4 Objectives

Kawe Community Development Trust has the following objectives;

1) To promote solidarity and cooperation among Kawe residents for community development.
2) To initiate and implement community development projects relating to land, housing, health, education, food, clothing, the environment and culture.
3) To coordinate and evaluate progress in relation to those projects.
4) To cooperate with Government and its agencies in promoting community development in Kawe.
5) To involve other institutions and individuals, both national and foreign, who are willing to cooperate with Kawe residents in implementing their development projects.

### 1.2.5 Ongoing Programs

KCDT is engaged in five main programs. These includes, Community Bank, Education, Kawedet Women Micro Finance, Women Housing and solid waste collection. Health is among the fore coming programs.

### 1.2.6 Activities

From the above-mentioned programs there are few activities, which are active at the moment. These include:

- Community Bank: With regard to community banking, activities involve provision of short- term micro-loans service to residents through the Kaya (adjoining households)
- Education: A Preprimary School, namely Waldorf Kindergarten already constructed and is operating.
- Women micro-financing
- Women housing Project
- Solid waste collection. It is at the initial take off stage.

## 1. 3 Problem Statement.

Poor solid waste collection and disposal is a threat to public health and reduces the quality of life for urban residents especially in-unplanned settlements. Kawe area is one of the typical examples of such settlements. The municipal council has failed to solve the problem of solid waste management in Kawe Mzimuni evidenced by roadside heaps of uncollected waste. The municipal council engaged a private contractor in the area who

failed to provide the service in this unplanned area. Reasons for the failure include difficult access, low social status, lack of land tenure, awareness, lack of incentives to collectors and lower value of waste.

### 1.4 Purpose of the study

To study the existing solid waste management practices and collect information which will assist in preparing a solid waste collection project proposal required by the CBO.

### 1.5 Research Objectives

The objectives of the research are:

- To examine the performance of the existing solid waste collection and disposal practices.
- To establish whether the community is willing to participate and contribute towards solid waste management.
- To identify and locate where the problems are within the solid waste management system.
- To use the research findings for designing an improved and sustaining solid waste management project proposal.

### 1.6 Research Questions

In order to achieve the above objectives, the following questions should be answered;

- What are the existing methods practiced in the collection and disposal of solid waste?

- How does the community participate and contribute towards solid waste management?
- What are the problems related to the solid waste management system?
- How can the delivery of an appropriate solid waste management service should be improved and sustained?

### 1.7 Rationale and Significance of the study

Provision of basic infrastructure services to the urban poor and ensuring their right to livelihood and access to resources is central to the concept of urban sustainability and poverty eradication in developing countries. According to UNCHS (1996) one way of estimating the scale of poverty in urban centers is to base it on the number of people who live in poor quality houses or neighborhoods that lack the basic infrastructure services such as SWM.

Several approaches have been suggested in order to improve SWM in developing countries including Tanzania. Chan, (1998) has reported environmental awareness campaigns through mass media and advertisements to promote public awareness on SWM and other environmental issues. In another study, Anjum and Deshazo, (1996) proposed an approach based on integrating demand-side information into the planning.

Kaseva and Gupta (1996), Seik (1997), and Kaseva (2001), recommended an enhanced solid waste recycling as a sustainable approach towards SWM in developing countries. One of the SWM approaches adopted by Dar es Salaam City Council is contracting out

waste collection and disposal services to private solid waste collectors and disposal contractors.

The problem of accumulation of uncollected solid waste particularly in low priority areas such as unplanned settlements has contributed to poor sanitation and low quality of life. The production of waste in Kawe Mzimuni Street is 17 tons a day but only 3.5 tons per day is collected leaving 80% of the waste uncollected. This situation challenges a CBO like KCDT to operate in providing solid waste collection services.

To a large extent the solid waste collection efficiency depends on the involvement and participation of the communities themselves in supporting the whole concept. Furthermore, it also depends on the useful information and lessons from current best practices in the provision of this important service. Such information and lessons can be obtained only through research and studies; hence a research such as this can assist in the improvement and performance of solid waste management in the urban settlements.

**1.8 Research scope and limitation of the study.**

The study will examine the process of solid waste collection practice at Ukwamani and Mzimuni areas. The sample size is 200 households represented by the heads of the households and community leaders obtained through stratified random sampling of the two areas. Equal chances were given to the members of the community from the two streets and also the representation provides the same community status. Due to limited

resources in terms of time and finance the sample represents 18.6% of the total households at Kawe. Another limitation is the on going election mood, which sometimes caused doubt to the community members

**1.9 The Assignment**

Solid waste collection is a priority of the community, which has also got attention of the CBO. A joint needs assessment with the community was not done because of inadequate funds, time and logistics. For convenience purposes, questionnaires method was used. This was supplemented with key informant interviews held with some community members and opinions of the leaders in the area. The priority of need for solid waste management project was evidenced from the needs assessments. SWM is one of the CBOs new program and the activities are still at the initial stage organized under a registered group known as Kawe Environmental Group (KEG). My assignment was to write a proposal, which will help the CBO in implementing the solid waste collection project. Also my assignment included offering assistance on important issues required in the process, such as, preparing tender documents for the solid waste collection tender.

# CHAPTER II

## 2.0 LITERATURE REVIEW

The review was based on empirical sources, theoretical reviews and policy papers, where a number of books, publications, journal articles and Acts have been cited. Also articles (electronic) from different web sites were cited.

### 2.1 Theoretical Review

**Solid Waste Management definition.**

This is a term used to refer to the process of cleaning the environment by getting rid of the solid waste materials. Yhdego Ibid, (1985) defines SWM as the entire process of generating waste, collecting and transporting waste, storing waste at transfer stations, street cleaning, disposing waste and waste recovery, recycling and reuse.

Justine Ansch, (2001) on his part defines community based solid waste management projects as activities carried out by members of the community to clean up their neighborhood and or to earn income from solid waste. Examples are collection of solid waste, the sale of recyclable, recycling and composting activities.

### 2.1.1 Conventional Approaches to Planning of solid waste management of the Urban Environment.

In this approach the municipal councils is the sole responsible party in managing the solid wastes. They collect the waste from source in the communities, Central Business

District (CBD), industries and institutions and transport it to the disposal sites. (Mgana S, 1996)

For centuries, efforts to address the urban planning and management have been guided by conventional approaches (Armstrong, 1987, Mattingly 1988; Halla, 1999, Majani, 2002). In developed countries mechanisms of conventional approaches have successfully tackled these challenges and many evidences of such successes are remarkable in the United States of America, the United Kingdom, Germany and the rest of Europe (Halla, 1999,2002). The same approaches have been used to tackle similar challenges in the developing countries including Tanzania with very little success not able to provide significant solutions to major problems including solid waste management.

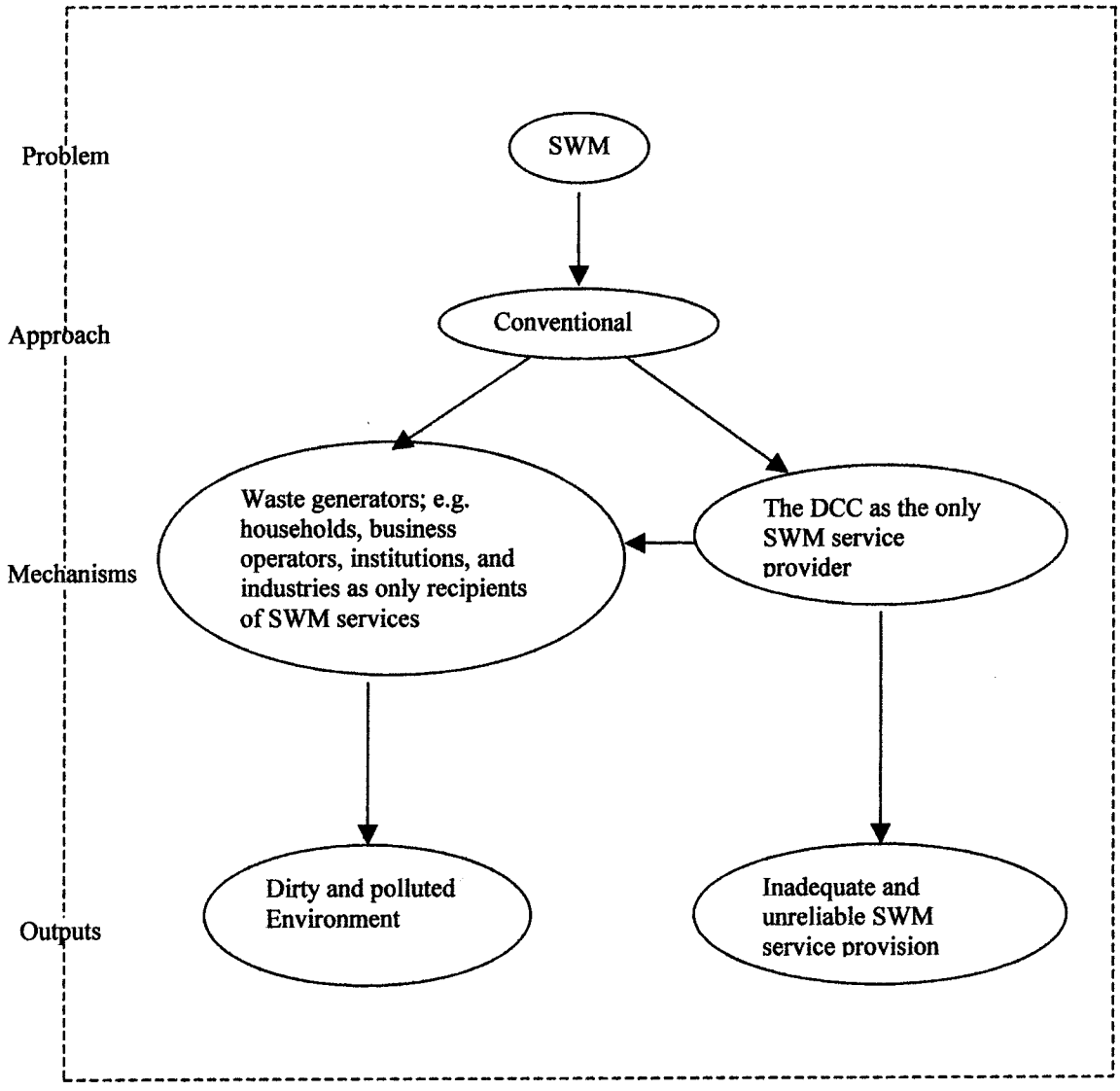
Management of Municipal Solid Waste (MSW) presents a major challenge for many Sub –Sahara African cities where rapid growth, social and cultural changes, wide spread poverty, inadequate and weak local governance and limited financial resources all contribute to increasing pollution and waste disposal problems. (Onibokun, 1999 in Karanja et al). The inability of responsible local authorities to provide effective and reliable solid waste management services including solid waste disposal (Kalwani ,2003)

Onibokun, (1999) also found that there are several problems related to SWM caused by conventional approaches. For example, inappropriate solid waste management causes

air, soil and water pollution leading not only to environmental degradation but also to a growing catalogue of human health problems. Irresponsible solid waste dumping contaminates surface and ground water supplies. In industrial and urban areas, washing "away" solid wastes can clog drains, creating stagnant water for insect breeding and potential for floods in rainy seasons. Uncontrolled burning and irresponsible incineration has a significant influence on air pollution. Organic wastes dumped in landfills generate greenhouse gases, and untreated leachate pollutes surrounding soil and water bodies such as ground water supplies. These environmental problems include only the impacts of solid waste disposal; they exclude the impact of environmental damage resulting from extraction of resources and processing materials, and the World Bank estimates that 95 percent of a product's environmental impact occurs before it is discarded as solid waste.

Problems of waste accumulation have become a serious threat to the health situation of many of its inhabitants. Overall, mechanisms of conventional approaches have been failing to address urban challenges (World Bank 1986, in Halla 1999:94 World Bank 2001:13). According to B.K Majani, (2000), the failure of the conventional approaches has resulted into a set of complex environmental problems that require more effective approaches to address. The conventional approaches have failed to address problems due to their serious conceptual and practical weaknesses, Halla, (1994). The diagram below illustrates the conventional approach (see figure No 1).

**Figure No 1: Solid waste Management Model before EPM Interventions**




*Source: Samson Elisha, 2003*

### 2.1.2 Alternative Approaches to Planning of SWM of the Urban Environment.

EPM is an alternative approach to urban planning and management, has been introduced in preference of conventional urban development planning and management approaches based on grounds that issues that need to be addressed in cities, as already pointed out, are beyond the competence of only conventional approaches (Majani, 1998). The aim of EPM is to enhance the capacity of actors in the public, private and popular sectors to planning and manage the urban environment. In practice however, EPM does not differ significantly from the conventional approaches, except that it is flexible and embodies transparence, acts on priority issues that are crucial to a community, emphasizes partnerships and the need to tap private sector resources to provide public services (Majani, 2002).

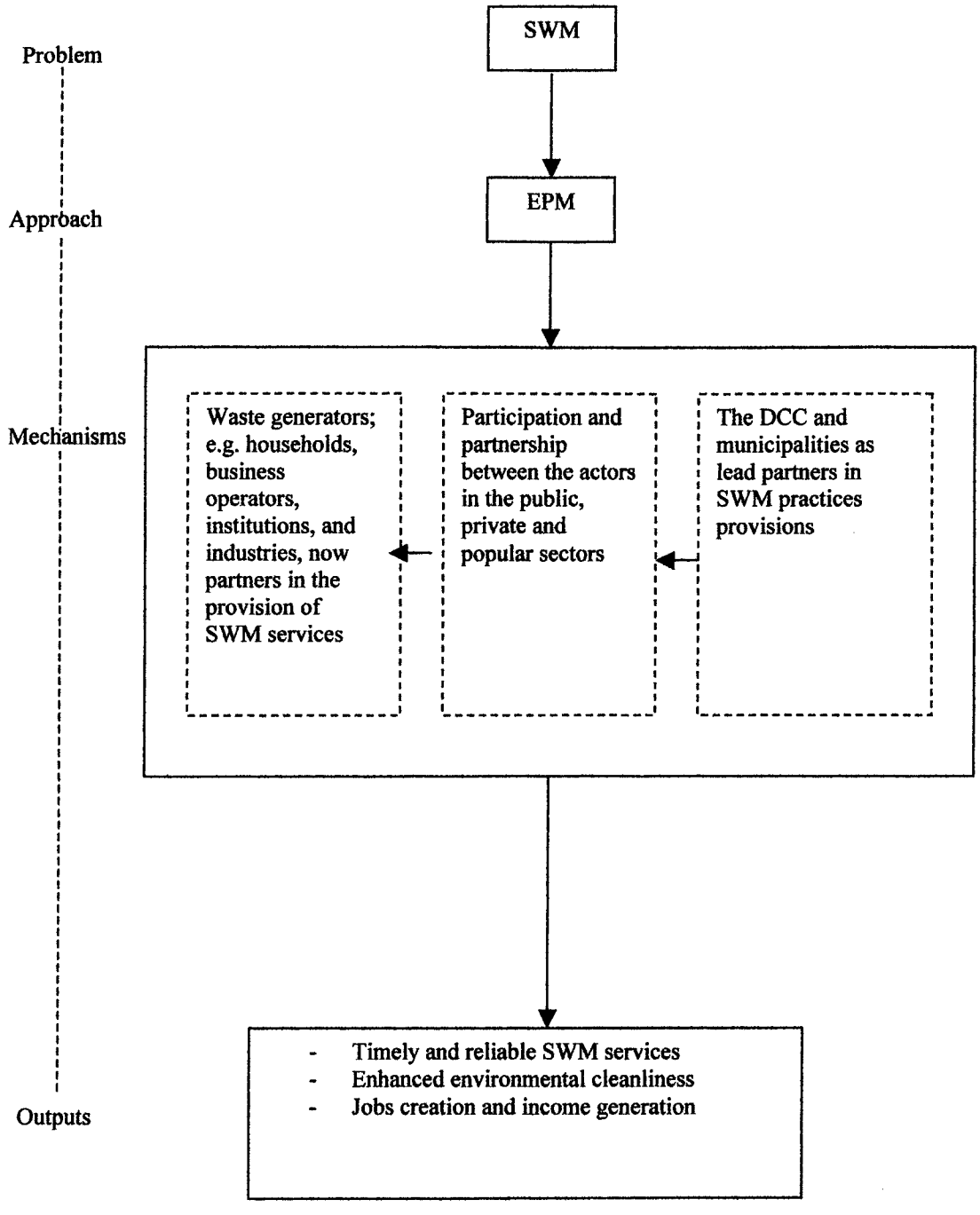
Many countries have thus responded to the problem of urban waste by introducing solid waste management systems that encourage a public/ private partnership. Community groups are encouraged to form associations that deal among other issues with the solid waste management. Private contractors have also been invited to participate.

Solid waste management is a public service and local governments or respective municipal agencies are basically responsible for its delivery. It is therefore imperative that municipal authorities remain in charge of this task to achieve an overall consistent SWM system on a municipal-wide and regional level. However this does not mean that government authorities have to deliver the actual collection services themselves. In fact,

private enterprises or CBOs can, under appropriate conditions, provide solid waste collection, transfer, transport, and disposal services more efficiently and at lower costs than the public sector (Mgana S, 1996). It is evidenced that communities are more than willing to provide for themselves urban service like waste management when local authorities are unable to do so (Kim Peter, 1998).

The Government role then shifts to that of facilitator and supervisor of the service. It is undeniable that every collection scheme, including non-governmental approaches, requires some support from the municipal authorities to achieve sustainability. Hence, municipal enterprises and organizations must be included whenever possible in the planning of such schemes. The diagram below illustrates the alternative approach of planning SWM in the urban environment (see figure No 2).

**Figure No 2: Solid Waste Management Model after EPM Interventions**




***Source: Samson Elisha, 2003***

## 2.2 Empirical Review

Economic development, urbanization and improving living standards in cities, have led to increase in the quantity and complexity of generated waste. Management of Municipal Solid Waste (MSW) resulting out of rapid urbanization has become a serious concern for government departments, pollution control agencies, regulatory bodies and also public in most of the developing countries. Rapid growth of population and industrialization degrades urban environment and places serious stress on natural resources, which undermines equitable and sustainable development. Inefficient management and disposal of solid waste is an obvious cause for degradation of environment in most cities of the developing world. A review of case studies below justifies the situation in different developing countries.

These case studies include the solid waste management in Dar es salaam city by Mbuligwe and Kassenga, (2004) followed by a case study of KIMWODA a CBO in Kinondoni Hanna Nasif Dar es salaam by B.B.K.Majani, (2000). Experience from other developing countries include case studies of solid waste management in Cape Town by Fourie F, 2000; A case study of solid waste management in Dhaka City, Bangladesh by Syed Mohmood Anwar, (2005); A community based initiatives in solid waste management at Faisalabad in Karachi by Mansoor Ali and Marielle Snel and a case study of solid waste management in Mumbai (India) by Sarika Kansal (2001)

### 2.2.1 Existing solid waste management practices in Dar es Salaam.

In the study of Mbuligwa and Kassenga in Dar es Salaam, the problem of SWM has been addressed through the mechanism of both conventional and alternative approaches to urban planning management. The conventional practices have largely been unsuccessful therefore coordinated efforts under EPM practices have been adopted.

**(a) The waste stream and waste disposal practices.**

The major source of Dar es Salaam solid waste can be categorized as; households, commercial and industrial, institutions and street refuse. In Dar es Salaam city, the waste stream encompassing all sources of waste includes; self- disposal, discharge, illegal dumping, recycling, collection, and final disposal as reported by Mbuligwe and Kassenga, (2004). In the case of self-disposal, the waste generated by a source is disposed of by the source itself within its premises. Typical examples of self-disposal methods are burying of waste in pits and burning. Discharge means that the waste generated by a source is given away to a waste collector or discharged at a certain place from where it can be collected by another party. This includes placing the waste at an approved collection point or in a waste collection truck.

Illegal dumping implies that the waste generated by a source is dumped in the vicinity of the source or in a place where such a practice is prohibited, such as at the roadside, in open spaces, in drains, and in valleys. Recycling means the waste generated by a source is sold or given away for reuse or recycling. Common items for recycling include paper,

plastic, metal and glass. In the case of collection, the waste generated by a source at a certain place is collected by another party for transport to a final disposal place. Some scavenging may take place prior to the collection. Final disposal implies that the waste collection is transported to the official city disposal site.

**(b) Waste collection and transportation**

The two researchers also established that, the existing system of waste collection involves collection and transportation of waste from source or intermediate points in the waste stream to the disposal point. Typically, trucks with a 7 tons capacity and higher are used for long distance transport. Handcarts are used to collect and transport waste from neighborhoods that are inaccessible by motorized vehicles. The handcarts usually discharge at a point from where DCC trucks pick it for eventual transport to the disposal site. Handcarts are also used for collection and transportation of waste to unofficial transfer points or illegal disposal sites. In addition to the DCC, there are licensed private contractors who provide solid waste collection services. Large institutions and industries collect and transport their waste to the disposal site on their own or using contractors

Major problems facing solid waste collection and transportation services in the city include inefficiency of the transportation system due to frequent vehicle breakdowns; inadequacy of collection vehicles; and inaccessibility of some waste sources, such as unplanned undeveloped areas due to poor road conditions. Additionally, crew productivity is low. Furthermore, some private contractors returns from waste collection

services provision are non-economic except in commercial or industrial areas. These problems are aggravated by non-enforcement of relevant solid waste management by – laws and regulations by the DCC.

**(c) Resource recovery and recycling**

Recovery of resources form solid waste is achieved mainly through recycling, which is mostly practiced by individuals. Kaseva M. E, (2002) comment that recycling provides an opportunity to recover some benefits from municipal refuse; particularly in the form of long term energy and resource savings. At the same time while waste disposal prevents environmental degradation and pollution, benefits in terms of energy and useful materials are obtained from what is otherwise unwanted and offensive materials. It is therefore currently widely accepted that the sustainable approach to waste management must emphasis waste reduction from the generation point, recycling of the materials and recovery of nutrients, chemicals and energy values of the waste.

Resource recovery takes place to different extents at the source and disposal places, and applies mostly to household and commercial waste. In the case of Dar es Salaam city, Mbuligwe and Kassenga (2004) found that, household waste on site recycling accounts for 114 tons per day, which is about 8% of the total household waste generated. Recycling of commercial waste amounts to 1.2 tons per day. At the sources, the total amount of waste recycled is 115.2 tons per day, of which 99% is household waste, 0.9% is food waste from restaurants and 0.1% is office waste. At the waste discharge place,

recyclable items are scavenged prior to collection of the waste, for example at markets. The total amount of recycled waste at the discharge point is estimated to be 3.1 tons per day for the whole city. During collection of waste before subsequent disposal, recyclables may be taken out of the waste. In this case, sorting takes place as the waste is loaded into collection vehicles. The extent of recycling at this stage is very small, and this small component is incorporated in recycling at the final disposal place where about 2.1 tons per day of waste is recycled, (Kaseva, 2002)

Waste paper is used by two local industries, Kibo Paper Industries and Tanpack Industries. Some amount of paper is exported to Kenya for recycling, presumably because the internal market is still too small for the time being. For scrap metal, there are six large industries and a number of small industries, and all these use the bulk of recyclable metal. The reuse rate of glass beverage bottles is very high (99%) because of the deposit system. With respect to broken glass, only one industry, Kioo Ltd, produces bottles out of broken bottles at a consumption rate of 200 tons per month. A higher demand for glass recycling is anticipated in the foreseeable future.

In the strict sense of the term, treatment of solid waste does not take place in Dar es Salaam city. Furthermore, the contribution of incineration, which takes place at hospitals, and composting as well as biogas production to waste disposal is currently negligible.

### 2.2.2 Solid waste management, the case study of KIMWODA- CBO in Kinondoni Hanna Nasif – Dar es Salaam city.

There are few literature regarding successes and failure of CBO is engaged in solid waste management particularly in unplanned settlements. Few researchers such as Majani, B.B.K (2000) have tried to study and analyze how solid waste has been managed. A case study was undertaken at one CBO known as Kinondoni Moscow Women Development Association (KIMWODA) situated at Kinondoni Hanna Nasif ward in Dar es salaam. The CBO is involved with solid waste collection in the area since 1994. The organization serves a population of about 40,000 people organized in about 8,000 households. The ward consists of two portions of settlements, the planned part with about 15,000 people and another part, which is undergoing upgrading from unplanned settlement with about 25,000 people.

KIMWODA started as a voluntary organization with five women members with twenty women employees organized under a chairperson and both are residents of Hanna Nasif. The organization became a fully contracted company under the mechanism of Dar es salaam City Commission in 1998. KIMWODA addressed the strategy of community involvement in the collection of waste in unserviced settlements. Since 1994 the cleanliness of the Hanna Nasif environment has improved considerably. KIMWODA has also engaged in practices of conducting awareness campaigns to the Hanna Nasif community on the need to have clean environment.

During the study Majani established some findings that were indicating the potentials of community in that area to manage their waste produced and difficulties faced in the process. Some of the remarkable findings were:

**(i) Type of waste collected and method of collection used:**

Most common types of waste collected in Hanna Nasif come from households of residential, business and farmer's households. KIMWODA was mainly using pushcarts for collecting waste. They had additional equipment consisting of shovels, brooms, hoes, rakes and baskets. They did not have a truck, but occasionally hires from other companies when need arises. KIMWODA collects waste and piles it at some secondary destinations where they conduct the sorting to recover certain materials. The most common recovered materials included metal, glass, paper and plastics. The rest of the waste were dumped mainly in areas where the waste constitutes the base materials for repairing roads or reclaiming lands, which are threatened by erosion in the neighborhood.

**(ii) Income distribution pattern:**

According to the survey done by Majani, (2000), Hanna Nasif area consists of civil servants (40%), business including informal sector (30%), urban farmers (15%) and diplomats (1%). About 45% of its population earn below the minimum wage (set at 30,000shs per month by 2000) and hence reflecting large signs of poverty. He found that only 50% of the households are paying the refuse collection charges. It was also noted

that the pattern of solid waste generation follows the income distribution and the type of activity undertaken. The business people mainly produce paper, metal, glass and plastic.

**(iii)Waste disposal methods:**

Majani found that among the residents of the area, 20% prefer to bury, burn or dispose the waste within their compounds. This group constitutes about 60% of those living in the planned portion of the ward (i.e. 22.5% of the total ward population). The remaining 40% in the planned area (i.e 15% of total ward population) have relationship with KIMWODA to collect the waste from their houses and pay the amount of refuse charge agreed between them, not necessarily corresponding to that issued by the commission.

Households in the upgrading area have a different pattern. About 50% of those living in this upgrading area (35% of total ward population) have agreements with KIMWODA to collect waste from their houses. The remaining 44% (27.5% of total ward population) resort to throw their produced waste in Msimbazi valley, on the main roads, in surrounding drains and streets in Hanna Nasif area. The percentage of people that does not pay the refuse collection charges corresponds very closely with the percentage of the poor people in the area.

**(iv)Waste disposal capabilities:**

KIMWODA was capable of collecting less than 50% of the total 28 tons produced per day and disposes almost none at the official dumpsite because of transport problem. The

material that is not recovered as " valuable" either stays at the temporary transfer station or is haphazardly dumped along major roads and open spaces where they expect the city commission trucks to haul it. KIMWODA resells at some marginal profit the recovered materials to middlemen and relevant industries. These operations to a great extent, supplements the apparent losses suffered by the CBO by reasons of non-payment of refuse collection charge by the residents.

**(v) Introduction of the EPM process strategies:**

The researcher found that the introduction of the EPM process strategies in SWM in 1994 has brought a number of institutional changes at KIMWODA. The organization setup has changed from mere collection group to a hierarchy with single stage, in which a chairman has three specialized operations under her command (collection, sorting, selling). Collection branch has 12 employees, sorting has 5 and selling has 3 people each with a head acting as departmental managers. There are also other community groups including freelance scavengers, which work under the umbrella of KIMWODA. The CBO also advices the small scale producers of items manufactured using recovered materials from solid waste such as small kerosene lamps, knives, metal containers, buckets etc and assist in the marketing of these to local markets.

**(vi)Transaction costs:**

The transaction costs of solid waste are high. Majani found that the hierarchical transaction cost in KIMWODA administration is exacerbated by the operator's low

education and by a virtual lack of training in solid waste collection, sorting and also entrepreneurship. The leadership is not equipped with training in legal matters, record keeping and negotiation skills. Result in inefficient use of income derived from their activities because after payment of routine obligations, the owners of the association divide the remainder among themselves in accordance with their constitution. On the job training skills acquired by the employees are not accompanied by conditions to remain on the job. The mode of payment of salaries is on weekly rate outputs that are but determined basing on a piece rate. The manner in which management reaches decision no single owner may take a decision result to lengthy and denies individual manager opportunity to exercise rationality.

He found another impediment to reducing transaction cost. No efforts have been tried by KIMWODA to integrate the cell and Mtaa leaders into the management structure so that they act as direct supervision of waste collection in their areas of jurisdiction at an agreed fee.

From the research findings, Majani gave some recommendations that he thought may assist Hananasif community in proper management of their wastes at least effort and financial strain. He recommended that:

**(i) Review of City commission fixed charge decision:**

The decision of the commission to fix a homogeneous charge for refuse collection pegged on the area gave rise to the temptation to resist paying by many residents which

therefore escalates the costs of transaction in the economic performance of KIMWODA. He further recommends that it has largely remained the responsibility of KIMWODA to negotiate with the residents on the modalities for payment. The remuneration was then pegged on the amount of waste hauled rather than a daily or monthly charge. Because of this form of payment, several households opted to come together and pile their waste in a common area.

The selective process of collecting waste resulted to 50% of households' deficient of the services. Such lack of waste service delivery further leads to pileups of refuse hence provided grounds for the outbreak of diseases like cholera, malaria dysentery etc. and a virtual decrease in productivity by the dirt residents because of ill-health.

**(ii) Awareness campaigns:**

Failure by the city to conduct public awareness campaigns led to unwillingness of the household to pay for the waste collected services because of lack of enough knowledge on the need to do so which in turn leads to slackened performance by the contractor, KIMWODA, to effectively collect the waste. Similarly, lack of adequate supervision by the commission on the performance of KIMWODA leads to haphazard dumping and have household discomfort from the waste pileups. He also recommended awareness creation among residents is best achieved through learning -by- doing.

**(iii) Contracts awards:**

He recommended that the decision of the commission to award contracts of waste collection to contractors and community organizations without taking into consideration of their origin has resulted into problems of reluctance to pay refuse collection fee and the tendency to haphazardly dump and waste, acts which have partially increased the cost of transaction in the economic exchange of SWM. The researcher also found that most of the city trucks are still very busy collecting waste and dispose to the dumpsite showing the city commission is doing the work of contractors.

An important principle in his analysis is the understanding that roles and responsibilities that can be adequately performed by lower level of institution should not be offered for execution by higher-level institutions.

### 2.2.3 A case study of waste management in Metropolitan Cape Town

Fourie F (2000) attempted to shed light on some of the complicated issues related to solid waste management in Cape Town. He highlighted the problems and possible solutions to improve and create more sustainable waste management systems.

Cape Town which is a metropolitan city of more than three million people, situated on the southern most tip of Africa, a large percentage of the population is poor, with many living below the breadline who cannot afford even rudimentary services.

He postulated that it is possible to achieve the goal for Cape Town of being a world class yet an African city, while caring for the needs of all people, and without compromising the environment. He mentioned that it depends on whether the right decisions are made and solutions to the challenges that face the city are adopted in the short term. Public involvements, along with education and information processes, are seen as the keys to success of the solid waste system.

During the study various findings were highlighted and recommendations given on how to manage the problem of solid waste, especially in the fast growing cities like Cape Town. These are;

**(i) Problems in the field of waste management**

The city of Cape Town has recently been formed out of seven autonomous Councils each with its own administration, level of service and tariffs for its residents. The problems in the field of waste management are immense. Fourie, reports that there is fragmentation and duplication of services, which results in wastage and places a burden on financial resources. The problems are exacerbated by the fact of ever increasing debtors' books, which resulted from unpaid accounts. These arrears are increasing at an alarming rate as a culture of non-payment prevails in certain communities within the city. The resulting lack of funds causes infrastructural problems as well as operational and capital budget cutbacks. In addition to the presence of many bureaucratic procedures, there is also a lack of performance management and incentives for staff. He recommended that the transformation of the fragmented solid waste management

services into optimized customer focused business units is regarded as the most effective way to manage waste in Cape Town.

There are pockets of excellence in the provision of services including the handling of solid waste. These are overshadowed by areas which are littered and which have become the dumping ground for unscrupulous illegal dumpers. These persons dump their waste at the roadsides or in any open space in the dead of night or even in broad daylight, thereby causing health problems and other major environmental problems. In every community there are people who have little concern for the state of the environment. This is due to ignorance or social hardship. There is little formal environmental education on a significant scale for the residents of Cape Town.

The problems associated with illegal dumping and the task of getting all waste into the formal waste stream and upgrading the collection, transfer and disposal facilities coupled with the lack of supporting legislation have resulted in a slow progress towards the goals of waste reduction, minimization and recycling. The waste stream is mixed and very little pre-sorting takes place on a formal level.

**(ii) Structural re-organisation**

He found that following the international trend, solid waste management are reorganized into outcome focused, ring fenced business units with an emphasis on the core business of each unit. This resulted in efficient, cost-effective services for all residents, which are

not harnessed by unnecessary bureaucracy. In the initial study, the trading arm of solid waste, which comprises waste transfer and disposal, has been identified as an area of progress, which could result in improved internal mechanisms or corporatisation into, for example, a utility company. This part of the service is tariff funded and has clearly defined customers from both within as well as outside the council.

He confirmed that waste collection is receiving attention and will be subject to similar studies at a later stage. If the decision-makers favour utility companies, as has been the case in Johannesburg, these companies will be registered with the council as the sole shareholder. The adoption of clear lines of responsibility, accountability, control of resources linked to performance management and possible incentive schemes will surely result in greater operational and economic efficiency.

Fouries recommended that the involvement of communities would be encouraged through policies that assist in the employment of SMMEs (small, micro and medium enterprises). In addition, policies are investigated that focus on waste management as a vehicle for job creation. Entrepreneurial community-based collection systems have already been successfully implemented in Cape Town, where previously unemployed people are now small business owners and employers. These community waste management systems all have a place in the integrated waste management plan for Cape Town.

**(iii) Sustainable and integrated waste management**

The development of sustainable environmental plans such as IMEP (Integrated Metropolitan Environmental Programme) is under way which include integrated waste plans for Cape Town. All planning and operational activities must be considered holistically. A City Development Strategy (CDS) for the city as a whole and a council-specific Integrated Development Plan (IDP) are being developed for Cape Town to facilitate overall integration. In order to be sustainable, waste management must consider the waste stream in a holistic cradle-to-grave manner in order to optimize the use of natural resources and reduce environmental impacts. An integrated approach, which combines several techniques such as waste reduction, reuse, recycling, composting, treatment and disposal must be considered.

He declared that waste generation statistics are now available for the first time. It is essential, that this information is transferred into a dynamic waste information system that can be kept up to date to enable proper planning and continual review. It has been estimated that, on average, each resident of the Cape generates approximately 1kg of waste per day that requires landfill disposal.

Existing recycling and composting programmes were evaluated. Some 6% of domestic waste was recycled. Judging from the waste that goes to landfills, it was estimated that domestic waste recycling could be increased to about 22%. As a first step, sorting of mixed waste was investigated, but long-term plans to encourage and phase in source

separation would be put in place. Education and public awareness are considered as critical components in the success of the plan. Waste management is generally considered to comprise two facets viz. community/logistics as well as scientific/engineering.

The cleansing and waste collection services may be regarded as community services requiring a logistics approach while the planning and management of waste transfer and disposal require a scientific/engineering approach.

He recommended that communities should be encouraged to take responsibility for their waste and should be consulted in the preparation of a strategy for cleaning their area. In addition, citizens will be made aware of and continually reminded of the aims and objectives of the waste strategy implemented in their area. Information on waste types and quantities should be made available. The implementation of any strategy can only be successful with the active participation and support of the communities. The public must be involved in the entire process; people must be included early on in the process so that they understand the effects and costs of management of the wastes that they produce.

There are presently three levels of collection service: rudimentary service, black bags service, and a containerized system. He insisted that illegal dumping in Cape Town must be stopped as soon as possible. An intensive strategy was launched to clean the city, but also to educate and inform the people. This is seen as the corner stone of any

successful strategy; bylaws should be redrafted to improve the enforcement of the laws. The causes of the underlying problems are established and solutions developed; major cleanups without sustainable results should be discouraged. The first and foremost task is to make all waste enter into the waste stream. Communities will be encouraged to take responsibility through proper campaigns that promote a clean and sustainable city. Fourie recommends sustainability must be aimed at by implementing integrated waste management systems, which use a mix of alternative solutions that complement each other. A cradle-to-grave approach is needed.

**(iv) Recycling and composting**

Waste reduction, recycling and composting form major components of a sustainable waste management system. Along with improved standards and increasing disposal and transport costs, waste reduction is also becoming more financially attractive. This concept includes more than just separating post-consumer materials; it also includes reuse, re-processing and re-manufacturing. Recycling is also a vehicle of job creation, and a number of operations are being looked at to determine which of them are suitable for the sorting of waste to recover reusable products and raw materials.

Fourie claimed that there are many success stories in school recycling schemes. In some cases, bottle and paper banks situated inconvenient spots also provide other solutions. These recycling centres are, however, often poorly sited and cause social nuisances. Managing these sites presents a challenge. Public pressure forces the city to consider

closure of certain drop-off sites because of the social problems they cause. Sites must not be neglected; instead, they should be integrated into municipal programmes with appropriate control. Litterbins must be available at each site. Organic material in household waste in the form of green and kitchen waste is a resource that should be returned to the environment to increase soil integrity and productivity. Composting is a natural way to turn waste into a resource in a controlled way before it is returned to the environment.

In Cape Town, there are three large municipal composting facilities, all of which have been in operation for some two decades. These plants have one thing in common – they were not financially viable and required large subsidies. However, as acceptable landfills are often scarce near areas where waste is generated and transfer stations are implemented to move the waste further a-field, a new move is evaluated towards composting as a cost-effective alternative.

**(v) Disposal by landfill**

The study of an integrated strategy for the Cape Town have recognized landfill disposal as an appropriate and a necessary component of waste management in South Africa. Landfills must be properly sited, well engineered, and efficiently operated, and the general effects of operations and the impact on the environment must be monitored. Thus, landfills remain an important component of Cape Town's integrated waste

management plan. Since landfills are increasingly situated in remote areas transfer stations are established.

### 2.2.4 A case study of solid waste management in Dhaka City, Bangladesh

On the other hand, Syed Mahmood Anwar (2005) observed that solid waste management has become a monumental challenge in Bangladesh-a country with a population density, which is among the highest in the world, and a country, which is also experiencing the problems of rapid urbanization. The situation of solid waste management in Dhaka city is inferior. Dhaka City Corporation collected only 42 percent solid wastes among the generated wastes in Dhaka City. Furthermore, some community-based organizations are taking initiatives themselves to manage the rapidly increasing challenge of solid wastes.

Anwar conducted a study at Kalabagan, a neighborhood of Dhaka City. It is located at the middle of the Dhaka City with a mixed land use. There are lacking of waste bins and the wastes are found here and there in the area. In these circumstances, the study was looking to how is the solid waste produced in Dhaka City especially in Kalabagan area managed? How the households, the house-to-house waste collectors, the CBO and the Dhaka City Corporation (DCC) are participating to the solid waste management process? How can Geographical Information System (GIS) be used to identify or select suitable location of community waste collection places in Kalabagan area? In his study he attempted to answer the questions and tried to see whether GIS can be a solution to the solid waste management or not.

The state of Solid Waste Management (SWM) in Dhaka city is a serious concern. On the earlier study conducted by Majumdar (1998) it was estimated that as low as only 42 percent of the solid waste generated in Dhaka city is to be collected by the Dhaka City Corporation (DCC). Majumdar also revealed that 50 percent households do not use waste bins to throw wastes, rather they throw it either in drain, roadside or in any other improper manner. Besides the health problem, solid waste blocks the drainage system and creates flooding in the streets leading towards mosquitoes, bad odor and inconvenience.

The geographical and climatic condition of Dhaka city is favorable for flood; hence, solid waste in streets and drains multiplies the impacts and miseries. He observed that rotten and decomposed garbage make neighborhoods filthy, foul smelling and unhealthy. Flies, cockroaches and rodents thrive in such filth, and they are the known sources of many diseases. Uncontrolled and open dumping also cause frequent floods and threaten the contamination of water supply. In consequences, the growing problem of solid waste in Dhaka city is posing increasing threats to the health and well being of its residents.

Kalabagan, a densely populated area with mainly residential land-use, is located in the central part of Dhaka City. As a part of Dhaka city, the picture of waste management is not different here compared with the other parts of the city. By realizing the overall waste management situation, it is seems that the actors in Kalabagan as well as in Dhaka city are not doing their job properly. All the households are not members of the house to

house waste collection services. His statement indicates there might be some reason, for why the households regret to receive the service of the CBO. He also identifies that the CBO is facing difficulties to throw the collected wastes to the community bins, as the bins are located at far distance. It was also pointed out that DCC sometimes do not clear the bins timely and for this reason, the CBO waste collectors cannot throw the wastes properly.

In addition to the above problem regarding the actor's behaviour, another problem area is regarding to the old technology and method that is exercised by DCC. DCC is running with old and inadequate technology for solid waste management. The working nature of the DCC heavily relies on bureaucratic procedures use incompetent and backdated management tools. On the other hand, municipalities around the globe with a set of efficient management staff, use modern technology to tackle urban solid waste management problems. So, there might be some implications of technology as one of the constraints of the improved and inadequate solid waste management in Dhaka city.

Kalabagan area is lacking community bins while there is no specific rule regarding placement of the dustbins or community waste collection places in Dhaka city Geographical Information System (GIS) could be used in this particular case of problem. GIS tool is applicable in many varieties of areas of urban solid waste concern. The use of GIS is widely applied to design the waste collection routes and distributing the transfer bins in a community.

In his study, he tried to show how a Geographic Information System (GIS) could be used to find out or propose optimum locations of solid waste collection places in a neighborhood. The ultimate goal of finding out the suitable location of waste collection places should be to improve the solid waste management system of a community. Whereas, a sustainable solid waste management system depends highly on how the actors participate. His findings focused on the applicability of the GIS in the present circumstances from actor's perspective. He also studied the following areas:

**(i) How solid waste has been managed**

Dhaka City Corporation (DCC) is the primary responsible authority for the solid waste management in Kalabagan as well as entire Dhaka city, whereas CBO named as the Samaj Kallan Parishad is responsible at Kalabagan neighborhood level where a house to house waste collection system is offered. Nevertheless 40.7 percent of the population is not participating to the house-to-house waste collection system. People can choose between throwing the waste by themselves to the waste bins or give the waste to the house-to-house waste collectors by being a member of house-to-house waste collection service. He found that people were not satisfied with the service of the CBO due to some few reasons such as rudeness of the workers, ill-timed waste collection, and careless waste collection. The unsatisfactory waste management of the CBO gives very little improvement to the overall waste management of Kalabagan. Moreover, non-member households are in many cases found throwing the waste in inappropriate manner

in non-designated places. DCC has insufficient legal and institutional strength to deal with the improper waste dumping by the inhabitants.

The CBO is run by the non-professional management. It is found to be more interested in collecting monthly charge from households rather than to think about the improved and proper management of waste. In some cases, people become the member of house-to-house waste collection service not for the benefit of proper waste management but to get relieved from the waste burden.

Waste bins are located too far from the houses for most of the Kalabagan area. GIS interpretation shows that, many people do not find a waste bin even within a 400 meters walking distance. This explains the presence of lots of wastes being littered along the streets.

**(ii) The perspective of actors of SWM in Kalabagan**

Solid Waste Management (SWM) is a complex task, where the actors should play the role what they are supposed to do in order to manage the wastes properly. Actor's Perspective requires probing more deeply into the social and cultural discontinuities and ambiguities inherent in the 'battlefields of knowledge' that shaped the relations between local actors. Actor's Perspective theory suggested him to analyze the reasons behind the act, reaction, feelings, and comments of the actors. Thus he could reach at the cause of the solid waste management problem in Kalabagan. After analyzing the context from the

viewpoint of different actors, he managed to see, why they are not participating to the solid waste management properly.

He identified four major categories of actors in the solid waste management of Kalabagan area. The actors included the households, house-to-house waste collectors, CBO officials and the City Corporation officials.

**(a) Households**

Households pay a minimum amount to become a member of house-to-house waste collection service. The member households are not satisfied on the house-to-house waste collection service due to some reasons like as untimely waste collection, bad manners of the waste collectors, careless waste taking. A bulk portion of households are not the member of house-to-house waste collection, they manage the waste themselves properly or improperly. However, monthly charge is not the prime reason for not being a member of the house-to-house waste collection service. Many believe that if they find a waste bin around them, it could be more effective to manage the waste rather to be a member of house-to-house waste collection service. People are aware of the impact of improper management of waste. In his view, a culture has been developed that people care only a little to throw the wastes properly. They do not care much about self-responsibility for a common goal. One blames another for throwing waste improperly. In fact at all the levels among the actors, they blame one another than themselves.

**(b) Waste collectors**

Waste collectors were not motivated for being responsible to the cleanliness of the street and proper waste management. They were just following the job routine. Consequently, it ends up with dropping of wastes from their cart in many places. In the process some wastes were left at the door of the households. Other factors include the traffic jam, which sometimes makes delay to the waste collection and causes much trouble to dump the collected waste to the bin. Collectors do not find a waste bin at a short distance and the crowd road just makes their job lengthy. They do not get sufficient earning by the job. As a result, they are much interested to separate the recyclable items from the wastes rather that to manage the waste carefully, since they can earn some extra cash.

**(c) Community Based Organization (CBO)**

CBO officials did not control the waste collectors strongly as they knew that they did not pay them well. But, it is also true that, the CBO did not earn much to run the organization in a professional manner. The managers of the CBO have their own job apart from the waste management business. So, this volunteer job does not get enough priority to these local managers.

**(d) Dhaka City Corporation (DCC)**

DCC employees, who are responsible for waste management service, were not working with professional attitude. They would like to see CBO taking the whole work at local level. Note that, they do not have proper guidelines and criteria for selecting CBOs for

this job. DCC did not do proper monitoring on the waste management at field level. Moreover, modern and effective technology was lacking in DCC. When many developing countries are practicing GIS as a modern tool for waste management in their cities, DCC thinks GIS as simply a tool for map presentation. DCC does not have the skilled and trained manpower of GIS technology that can provide adequate support to the Conservancy Department of DCC for proper waste management. In these circumstances, the possible way to integrate GIS for solid waste management can be engaging consultant who can contribute independently. As for example, the consultant can check how the existing waste bins are serving the community. Then he can find out some suitable locations for the new waste bins. As first he can choose a smaller area of Dhaka city. Then DCC can implement the consultant's proposal in that area and evaluate the performance of the proposal in the time being. GIS thus be integrated partially in DCC for solid waste management.

**(iii) How GIS finds an optimum location of waste bin**

GIS is practiced for solid waste management elsewhere in the world including some developing countries but not in Bangladesh. He found that, DCC has no guidelines for locating waste collection bins in an area. They do not even have any proper instrument to analyze how the waste bin serves the people around. In these circumstances, he used GIS to analyze the existing service area of the waste bins in Kalabagan and then select some suitable locations of the waste bins in the area.

He got the actor (household)'s view that, they need to have waste bin nearby or walking distance. Then he needed something that could help him to analyze the spatial and service coverage of the existing waste bins. With the GIS interpretation, he could easily analyze that the existing bins are too few and not located well to get a good service area. In addition, the service areas of the three existing bins are overlapping each other to big extent. GIS interpretation also shows that most of the Kalabagan area is not covered by the existing waste bins within acceptable distances.

**(iv) Simply GIS is not enough**

Optimizing the locations of garbage collection points to ensure efficiency and cleanliness is ambiguous. However, an improved solid waste management is not possible without an immense amount of grass roots interaction. He observed Solid Waste Management (SWM) is not simply a matter of technology or GIS. GIS in a way can deliver an ideal, preferable system but it cannot make things work without proper participation of all the stakeholders. When he worked with GIS to find out suitable locations for the waste bins in Kalabagan area, it seems that modern technology could solve the problem. However, in practical situation the work might not go with the theoretical result, especially where people and other actors act otherwise. In this case the analysis of the actor's perspective in solid waste management in Kalabagan area becomes important. GIS can participate to the solution of problem by producing alternative technical solution, but there are some social factors and practical conflicts remain unconsidered. He concluded that the solution, which comes out after GIS

interpretation, might not work if the social, cultural and other malpractice will not be overcome. The actors need to behave, as they are supposed to. In a third world country like Bangladesh the systematic and well-behaved actors may be expected in a remote future. So, any solution should be worked out within the frame out of the existing actor's environment. Though the modern technology like GIS cannot have direct benefit for implementation work, but it has fruitful utilization in other way when the authority needs to seat with different stakeholders to resolve the conflict among each other.

### 2.2.5 A case study of Karachi Administration Women's Welfare Society (KAWWS) at Faisalabad, Pakistan

This case study was reported by Mansoor Ali and Marielle Snel who conducted a research at Faisalabad in Karachi Pakistan. They looked into a community based women organization, which had the aim of improving the environment in the neighborhood and at the same time generate income. As in many other developing countries the activities were based on local initiatives of community members themselves since the governments are not able to provide the services that are always increasing due to population increase.

Karachi Administration Women's Welfare Society (KAWWS) at Faisalabad is a group of housewives based in a higher middle-income area known as the Karachi Administration Society (Baloch Colony). Each member of KAWWS pays a monthly fee of Rs.60 (UK £0.90) per month to the society. The area is not fully developed i.e. there

are a number of open plots. In the absence of a reliable primary waste collection service, these plots become convenient places for the disposal of household waste. The aim of the KAWWS programme, which began in 1990, was to prevent this build up of waste by encouraging the purchase and use of waste bins.

**Operation:**

The KAWWS activist's motivated housewives to form a group that collect money and purchase the waste collection bins. In addition, some housewives were sufficiently motivated to organize a street sweeping system for their lanes. However, the lack of regular and reliable secondary collection from the bins by municipal crews meant that waste build up continued at waste bin locations. Complaints to municipal employees failed to improve the service and in the end KAWWS made an arrangement with the refuse vehicle driver, paying him a regular amount to ensure reliable secondary waste collection from the area.

In 1994, KAWWS obtained a small grant from UNICEF (Pakistan) for use as a revolving fund for the purchase of waste bins. Shopkeepers and other residents were motivated to place bins at strategic points in the area. An independent evaluation in 1994 concluded that the KAWWS were highly motivated and working well together to improve the local environment, and that the programme had a positive impact on the overall cleanliness of the area.

**Constraints:**

The following constraints were identified:

(i) Municipal officers perceive the initiative as a one-off, and believe that it is beyond their scope to encourage, support or duplicate such programmes. The initiative thus relies upon the continued presence of KAWWS as the catalyst for change.

(ii) The KAWWS has 50 members making regular contributions to group funds. This limited membership means there is little possibility of scaling up the programme.

(iii) The continued development of the area means that there are fewer sites suitable for waste bins. People remain averse to waste bins sited very close to their homes.

(iv) The waste disposal points are close to peoples' homes and there is less need for them to contract municipal sweepers to provide an additional informal primary collection service. Sweepers have lost this additional source of income, and as a result will spend much less time in this area. Less time is spent on official street sweeping and the streets become dirtier.

**2.2.6 A case study of solid waste management in Mumbai (India).**

In the study of Sarika Kansal (2001) municipal solid waste management in India has severe problems. Very high rate of urban growth is a major reason for the increased solid waste management problems. This problem of SWM is very intense in urban areas and it

is due to the fact that 217 millions out of 844 million people of India (25.72%) live in urban cities (1991 Census). Waste generation is not rare in urban areas, or any other part of the world. The only difference is in the management of wastes. An effective, efficient and sustainable waste management system is still rare in India. Mumbai, is one of the largest and densely populated metropolitan cities in the world.

The commercial capital of India, spans over an area of 437.71 sq km. with population nearing 15 millions. Solid waste generation of the city is the highest by any Indian city with more than 6256 tones a day.

Per capita waste generation of Mumbai is among the highest in Indian cities with 0.450 kg of waste being generated per capita. Though it is not comparable with developed countries whose per capita waste generation goes over 2.5 kg, it is considerably high when compared with many cities in developing countries.

The wastes are in the form of garbage, debris, silt removed from drains and nallahs, cow dung and also waste matter removed from common house gullies or inaccessible narrow lanes between old buildings. The waste comprises 890 tones of construction waste and silt 1420 tones of mix waste (Biodegradable and Recyclable) 3950 tones of Biodegradable waste *(Source: Bombay Municipal Corporation)*

Mumbai is considered to be having one of the best waste management systems though it is not up to the expectations on its own. It was chosen as a case because of the fact that with the expected growth of population and waste generation, Mumbai is expected to pose a severe MSW problem in the years to come. Future plans are to carry out a through cost benefit analysis of the existing solid waste management system (collection, transportation, disposal) in Mumbai considering following disposal methods as these are most prominent among all;

- Vermi composting
- Aerobic composting
- Sanitary landfills

He recommended that a thorough economic analysis for better waste management in Mumbai is required. Cost benefit analysis can be carried out with consideration for all possible costs and benefits involved in waste management system. This would result in representing the real value of the entire waste management system and support policy amendments for its improvement. Further cost benefit analysis can be used to analyze the existing system of recycling industry and suggest possible policy/economic measure to achieve improved performance of the recycling industry which in turn results in better waste management.

## 2.3 Policy review

One of the most important outputs of the Earth Summit (United Nations Conference on Environment and Development) in 1992 was Agenda 21: an action plan for the 1990s and well into the twenty-first century, elaborating strategies and integrated programme measures to halt and reverse the effects of environmental degradation and to promote environmentally sound and sustainable development in all countries (UNCED, 1992).

Agenda 21 included an action plan for cities wishing to enhance urban sustainability. These recommendations included institutionalizing a participatory approach and improving the urban environment by promoting social organization and environmental awareness. The need to promote actively, to strengthen and expand waste re-use and recycling systems was also recognized in Agenda 21. The consensus on sustainable development, which emerged from the Earth Summit, now must be transformed into action by engaging in a period of decentralized experimentation (Brugmann, 1994: 129).

Dar es Salaam city is among cities in the world that adopted the Environmental Planning and Management (EPM) process in1992 through the Sustainable Dar es Salaam Project. The programme stemmed from Urban Management under the Habitat/ UNEP agreement towards creating conducive environment for city productivity with minimal environmental risks.

The National Environmental Policy 1997 underscores the fact that the survival of man depends on his harmonious relationship with the natural elements. Sustainable development by UN World Commission on Environment and Development emphasizes development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987 in B.K.Majani, 2000). The policy document further reiterates two points. First, sustainable development means achieving a quality life that can be maintained for many generations because it is socially desirable, economically viable, and environmentally sustainable. Secondly, development is sustainable if it takes place within nature's tolerance.

The National Human Settlement Development Policy states that unplanned and un-serviced settlements shall be upgraded by their inhabitants through CBO's and NGOs with the government playing a facilitating role. The government through local governments shall support the efforts of the inhabitants to form and run CBOs and NGOs for upgrading purposes. The policy stipulates the responsibilities of the local authority in carrying out environmental mass awareness campaigns.

There are legislations concerning solid waste management. The oldest piece of legislation is the Sanitary Rules made under the Township Ordinance. (Cap 101 of 1920) which gives the Medical Health Officer power to deal with sanitary nuisances and unsanitary premises. The basic rules of this legislation are still being used by the local government authorities to curb the unsanitary behavior of the population when dealing with solid wastes.

Another legislation is the local government (Urban Authorities) Act, (Act No 8 of 1982) was enacted to replace the Municipalities Ordinance of 1949 Cap 105 which was repealed) this Act gives the local authority powers and responsibilities. One of the responsibilities is solid waste management issue. The Act provides urban authorities with the responsibilities of removing all refuse and filth from public and private places and to provide and maintain dustbins and other receptacles for the temporary deposit and collection of rubbish.

Act No. 8 of 1982 was followed by the Dar es salaam City (Disposal of refuse) By law, which impel the occupier or tenants to provide for ashes and non liquid domestic refuse and prohibiting the throwing of refuse (dust, refuse garbage, decaying animals, vegetable or noxious matter in any street or public place. The By- law also empowers the city authorities to make residents to keep their premises and surroundings clean of any nuisance that shall exist by reason of domestic or trade refuse produced thereon or proceeding there from. The By-law also provides for penalties (fine and or imprisonment) for those found guilty of offences against the By-law.

The recent legislation related to SWM in Dar es Salaam is the Waste Management and Refuse Collection Fees) By-laws, 2000 provided in the three councils of Kinondoni, Temeke and Ilala. The main aim being privatization of solid waste collection. This By-law provides schedules of the refuse collection charges and requires the people to pay.

All the above-mentioned policies and laws support the existence of solid waste management projects. However one of the major problems that are constraining the performance of SWM activities in all strategies is the poor enforcement of the relevant environmental laws.

# CHAPTER III

## 3.0 RESEARCH METHODOLOGY

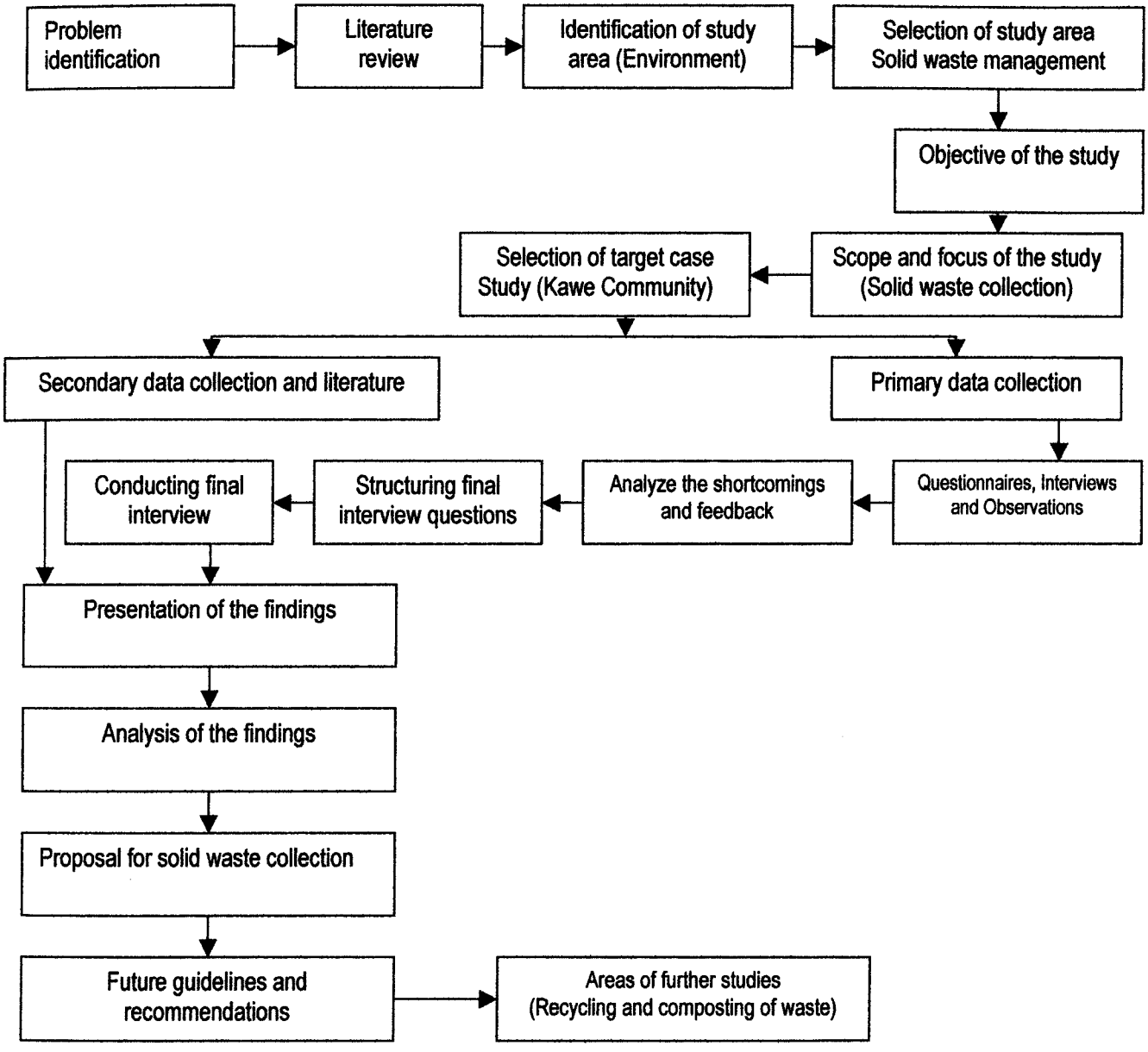
### 3.1 Introduction

Both qualitative and quantitative methods were used to collect primary and secondary data in the form of self-administered questionnaires that were used to obtain important information about solid waste collection in Kawe area. Each item in the questionnaire was developed to address a specific objective of the study. Heads of households and the community leaders completed the questionnaires and responses were good from all respondents approached. Also, interviews were used vis-à-vis municipal councils and local authority leaders for other issues not covered in the questionnaires. Observations and past experience of the researcher were also part of the methodology in this study.

### 3.2 Research Design.

**Figure No 3: Research design Methodology**

The study is designed as shown on the followings chart:




*Source : Research methodology design converted form Claire Selltiz illustration, 1962*

### 3.3 Unit of Inquiry

The major unit of inquiry was the two areas of Mzimuni and Ukwamani, which are under Kawe Community Development Trust. Respondents from the two areas came from heads of households and community leaders.

### 3.4 Sampling Techniques.

Both stratified random and simple random sampling has been used to select major units of inquiry for the study. The sample size was 200 households represented by 185 heads of the households obtained through stratified random sampling and 15 community leaders of the two areas and simple random sampling of the selection of households. This was done in order to give equal chances to the members of the community from the two areas and also the representation provided the same community status.

### 3.5 Data Collection methods

Questionnaires, interviews and observations have been used in this study to obtain important information about solid waste collection. Each item in the questionnaire was developed to address specific objective of the study including examining the performance of the existing solid waste collection. Structured or closed ended and unstructured open-ended questionnaires were formulated for the purpose of this study.

Self–administered questionnaires were distributed to the heads of households and leaders in the community. This was done so to make sure there is proper understanding of the

questions and return of all questionnaires (See appendix No 5 of data collection and processing)

Structured and unstructured interviews were another source of primary data collected. Interviews were conducted with the CBO leaders, local government leaders including ten cell leaders, ward chairpersons of the two streets (Ukwamani and Mzimuni), Ward Executive Secretary, Ward health officers, Kinondoni Solid Waste management Officer and the City Solid Waste management Officer to mention a few.

Observation was done by several visits in the community. Another method used to collect secondary data used was literature review. Review of different materials including books, articles, policies, electronic means and Kawe Baseline Survey report was made.

### 3.6 Data Analysis Methods

Once the questionnaire has been administered, the masses of raw data collected were systematically organized in a manner that facilitated analysis. Both descriptive and statistical analysis was anticipated; therefore the responses in the questionnaire were assigned numerical values. Coding, entering data and analysis was done using Microsoft Excel.

# CHAPTER IV

## 4.0 STUDY FINDINGS AND RECOMMENDATIONS

### 4.1 Introduction

Cleanliness is a major factor that influences development of any nation, which is otherwise hampered due to improper solid waste practices. CBOs like Kawe Community Development Trust have great opportunity in solving this problem in the community. Starting a community solid waste collection project needs a prior study of the community, which will assist in understanding extent of the problem, the existing and expected success and challenges of the project.

The findings of this study include the demographic features of the community, the existing solid waste practices in terms of collection and disposal methods and the condition of the cleanliness in Kawe. Other findings include the community participation in terms of the level of awareness, acceptance of payment of refuse collection fees and the community health. The recommendations of the findings aim at enhancing the solid waste collection project in the community.

### 4.2 Demographic features

One hundred and eighty five (185) heads of households and fifteen (15) community leaders were approached and completed the questionnaires from the two areas of Ukwamani and Mzimuni. The respondents were male 50.50% while women were 49.50%. Background characteristics of the respondents include age, sex, education and

source of income. These parameters were used in one way or another to assess whether any or some of these have any influence on the respondents behavior.

The study indicated that out of the 200 respondents, 105 (52.5%) were of young generation between 18-34 years, while 84 (42%) were aged between 35-59) and the remaining 11 (5.5%) were old people of over 60 years (see table 1 below).

**Table No. 1: Categorized age of respondents**

| Parameter | Frequency | Percentage | Cumulative % |
|---|---|---|---|
| Age btw 18 and 34 | 105 | 52.5 | 52.5 |
| Age btw 35 and 59 | 84 | 42 | 94.5 |
| Above 60 | 11 | 5.5 | 100 |
| **Total** | **200** | **100** | |

***Source: Field study, 2004***

The above information shows the existence of the working group estimated to reach 94.5% (i.e 52.5% added to 42%) of the Kawe community, is able to participate in solid waste collection both in terms of employment and payment of the refuse collection fees.

### 4.3 Solid Waste Management Practice in Kawe.

The solid waste collection and disposal practice in the two areas of Ukwamani and Mzimuni was similar due to the fact that, private contractors were engaged in the areas. The collection capacity is low, not able to reach most of the community members. Apart from their low incomes, 54.05% of Kawe community agrees to participate in the cleaning programme to make their environment clean (table 2)

**Table No. 2: Participating in existing cleaning program**

| Parameter | Frequency | Percentage | Cummulative % |
|---|---|---|---|
| Yes | 100 | 54.05 | 54.05 |
| No | 85 | 45.95 | 100 |
| **Total** | **185** | **100** | |

*Source: Field study 2004*

Information from the Ward Executive Secretary and Community leaders shows that the contractor serving Mzimuni area dropped the service. The reason for dropping the service could be similar to those provided by Adrian Coad, (2003) i.e. difficult access, low social status, lack of awareness, lack of incentives to collectors and lower value of waste. However, the major constraints facing the contractors include high cost of transportation of municipal waste to the dumpsites at Mtoni area in Temeke district and lack of required working tools and safety gears. Most of the trucks are in poor running condition with frequent breakdowns blocking the poor accessible roads sometimes with loads of refuse collected which threaten the health and sanitary condition of the community. Most of the contractors consider solid waste collection as a small business notwithstanding its high cost of operation.

Apart from the contractors there are informal solid waste collectors and scavengers. The informal solid waste collectors do house to house collection at individual households as requested. This is mostly practiced in Mzimuni area, which is lacking the contractors' services. The informal collectors normally practice illegal dumping and some dump the waste along the main road where the municipal trucks can collect. The scavengers

collected materials such as metal, bottles both plastic and glass from the collected waste to be transported and from the surroundings within the households.

### 4.3.1 Waste collection and disposal methods

Illegal dumping is a common practice in most of the unplanned settlements. It ranges from burning the waste, burying and illegal dumping sites. At least a good number of people, (56.76%) use dustbins to collect waste before disposition. 27.03% burry or burn their waste but it is very difficult to such a congested area, which shows that they will resort to join those who throw waste everywhere (16.22%).

**Table No 3: Waste disposal Method**

| Parameter | Frequency | Percentage | Cummulative % |
|---|---|---|---|
| Burry/ burn | 50 | 27.03 | 27.03 |
| Dustbin | 105 | 56.76 | 83.78 |
| Anywhere | 30 | 16.22 | 100 |
| **Total** | **185** | **100** | |

*Source: Field study 2004*

According to the Kinondoni Municipal Commission (Waste Management and Refuse Collection Fees) By-laws section 5 under the Local Government Finance Act of 1982 which was repealed in 1992, " every occupier and or tenant of any residential dwelling shall provide and maintain to the satisfaction of the authority, a receptacle for domestic refuse of not less than $50m^3$ and fitted with a good and effective lid and shall daily cause to be placed within such receptacle the domestic refuse from the said residential dwelling in so far as the said receptacle shall be sufficient to contain the same."

Although 56.76% of the respondents admitted to keep their waste in dustbins for easy collection by the contractor, but the researcher observed that 95% of the storage containers do not conform to the requirements of the municipal by laws. Storage containers such as open baskets (matenga), plastic bags and polythine bags (viroba) have been used instead. There was no separation of organic and non-organic waste, which simplifies sorting of materials for recycling or reuse.

### 4.3.2. The condition of cleanliness.

About the condition of cleanliness at their locality the study revealed that 19% respondents claimed to be good, 43.5% said it was fair and 37.5% claimed that it was poor (table No. 4 below).

**Table No.4: Condition of cleanliness**

| Parameter | Frequency | Percentage | Cummulative % |
|---|---|---|---|
| Good | 38 | 19 | 19 |
| Fair | 87 | 43.5 | 62.5 |
| Poor | 75 | 37.5 | 100 |
| **Total** | **200** | **100** | |

*Source: Field study, 2004*

## 4.4. Community Participation in SWM

### 4.4.1 Level of awareness

The public awareness on environmental issues is an important aspect, which cannot be overlooked. This is because, for sustainability purposes of SWM, the first stakeholder is

the producer of the waste. This means awareness is necessary and should be given its due weight. The level of education of the people facilitates the understanding and solving the environmental concern. There is a great relation between education and awareness. The level of awareness of a person depends on the level of education. The more educated one is the more sense of awareness on different aspects is expected.

**Table No. 5: Education Levels**

| Parameter | Frequency | Percentage | Cummulative % |
|---|---|---|---|
| Higher Education | 17 | 8.5 | 8.5 |
| Secondary | 50 | 25.0 | 33.5 |
| Vocational Training | 27 | 13.5 | 47.0 |
| Primary | 100 | 50.0 | 97.0 |
| Adult Education | 4 | 2.0 | 99.0 |
| No education | 2 | 1.0 | 100 |
| **Total** | **200** | **100** | |

*Source: Field study, 2004*

The survey revealed that above 50% of the community have not reached above primary education level, which gives a picture of the low education level for people residing in that area.

According to (REPOA, 2003) baseline report 12.5% of the community members were without any education. In this case majority of the community members are illiterate therefore it is rather difficult for them to digest some concepts, which are necessary for proper waste management practice. Although the level of awareness seem to be low, about 70.8% of the community member claimed to be aware of the local government

duties on solid waste. From the survey it has been noted that even the level of awareness of community leaders is low.

Some respondents (46.67%) from leader's category claimed that they were not satisfied with the government participation in solid waste collection, (table 6).

**Table 6: Satisfied with government participation**

| Parameter | Frequency | Percentage | Cummulative % |
|---|---|---|---|
| Yes | 8 | 53.33 | 53.33 |
| No | 7 | 46.67 | 100 |
| **Total** | **15** | **100** | |

*Source: Field study 2004*

Also in response towards the question on the community capability in participating in solid waste collection, the majority of leaders (40%) confessed that the Kawe community is not capable (table 7).

**Table No.7: Community capability on solid waste collection**

| Parameter | Frequency | Percentage | Cummulative % |
|---|---|---|---|
| Paying contractors | 3 | 20 | 20 |
| Manpower | 3 | 20 | 40 |
| Not capable | 6 | 40 | 80 |
| Not sure | 3 | 20 | 100 |
| **Total** | **15** | **100** | |

*Source: Field study 2004*

### 4.4.2 Payment for refuse collection fees

Willingness to pay is a rather central point, because it is important for the success of a community-based solid waste management project and it is related to many other aspects such as the motivation of operators and households and the reliability of the service. Community perception of fees and of the waste collection service is essential for its willingness to pay. Poor perceptions of residents who think they have already paid for collection through property tax or lack of trust for the service reduces willingness to pay for refuse

The Kinondoni Municipal Commission (Waste Management and Refuse Collection Fees) By laws of 2000, requires every household and every occupier of trade premises to pay at the end of every month refuse collection charge as provided for in the first schedule of the by law. In this study it was observed that 54.05% of the members were participating in the cleaning program under the private contractor while 45.95% were not interested (table 8).

**Table 8: Participating in existing cleaning program**

| Parameter | Frequency | Percentage | Cummulative % |
|---|---|---|---|
| Yes | 100 | 54.05 | 54.05 |
| No | 85 | 45.95 | 100 |
| **Total** | **185** | **100** | |

*Source: Field study 2004*

People who participate in the cleaning programme do so in various ways. While 80% of them (from Ukwamani) were paying collection fees to contracted company, 17% provided manpower, while 3% claimed to provide collection centres (table 9).

**Table 9: If you participate, how?**

| Parameter | Frequency | Percentage | Cummulative % |
|---|---|---|---|
| Paying | 80 | 80.00 | 80.00 |
| Manpower | 17 | 17.00 | 97.00 |
| Dump site | 3 | 3.00 | 100 |
| Others | 0 | 0.00 | 100 |
| **Total** | **100** | **100** | |

Since the place is congested and there is waste everywhere, the other portion (45.95%) of the community who were not participating in the cleaning programme showed their willingness to participate accounting for 96.47% of the respondents while 3.53% were not interested to participate as illustrated in the table 10 below.

**Table No. 10: Ready to participate now?**

| Parameter | Frequency | Percentage | Cummulative % |
|---|---|---|---|
| Yes | 82 | 96.47 | 96.47 |
| No | 3 | 3.53 | 100 |
| **Total** | **85** | **100** | |

*Source: Field study, 2004*

Members of Kawe community are poor but they are not willing to stay in a dirty environment. They are able to use their meager resources to ensure that the area remains clean. When asked on how they expected to participate in the programme, 71.76%

respondents were ready to pay, 16.47% agreed to contribute manpower, 3% rejected to participate and 8.24% ready to give other resources (table 11).

**Table 11: How will you participate?**

| Parameter | Frequency | Percentage | Cummulative % |
|---|---|---|---|
| Paying | 61 | 71.76 | 71.76 |
| Manpower | 14 | 16.47 | 88.24 |
| Others | 7 | 8.24 | 96.47 |
| Rejected | 3 | 3.53 | 100.00 |
| **Total** | **85** | **100.00** | |

*Source: Field study 2004*

## 4.5 Community health and solid waste

Uncollected solid waste creates the most dangerous risks to human health because the distance between people involved and waste is very short and done by untrained people. Also on-site storage is everywhere, thus, difficult to control.

Solid waste breeds high-risk insects, which can cause malaria, bacillary dysentery, and amoebic dysentery. Flies and mosquitoes can travel several kilometers, but the shorter the distance the larger the risks. There are many common diseases in Kawe and the leading one is malaria that account for 63.24% compared to other diseases as shown in the table 12 below.

**Table No.12 Common Diseases at Kawe**

| Parameter | Frequency | Percentage | Cummulative % |
|---|---|---|---|
| Malaria | 117 | 63.24 | 63.24 |
| Diarrhoea | 10 | 5.41 | 68.65 |
| Malaria and Diarhoea | 41 | 22.16 | 90.81 |
| Cholera | 4 | 2.16 | 92.97 |
| Others | 13 | 7.03 | 100 |
| **Total** | **185** | **100** | |

*Source: Field study, 2004*

The study indicated that 22.1% of Kawe community members are affected by both malaria and diarrhoea. There are few cases of cholera at 2.16% and other diseases reaches 7.03%.

When the leader were asked on the causes of such diseases, 40% of the respondents claimed that the major reason was, lack of health education, dirty environment at 26.6% while both dirt and lack of education contribute to 33.3% (table 13).

**Table 13: Causes of disease in the area**

| Parameter | Frequency | Percentage | Cummulative % |
|---|---|---|---|
| Dirty | 4 | 26.67 | 26.67 |
| Lack of health education | 6 | 40.00 | 66.67 |
| Dirty/ lack of health education | 5 | 33.33 | 100.00 |
| Others | 0 | 0.00 | 100 |
| **Total** | 15 | 100 | |

*Source: Field study, 2004*

Positive participation and involvement of members of the Kawe community will reduce the problem of solid waste management in the area despite of limited ability to dispose the ever-increasing waste generated. The area is overpopulated making it more

vulnerable to dangerous epidemic diseases i.e. cholera, meningitis, etc. Health education should be provided together with government effort in upgrading the settlement to allow proper management of waste.

## 4.6 CONCLUSION AND RECOMMENDATIONS

### 4.6.1 Conclusion

Excellent opportunities exist for CBOs to provide a wide range of urban services, including waste management, in informal settlements. Community Based Organizations have many perceived advantages, for example participation by the community and collective decision making enhance the use of the service and cost recovery. Community investment starts with internal resources, ease of collection of payment as owners and users of the service who live in the same area where the service is provided. Effective response to complaints is easy to access the providers of the service and ownership by community members result in a better care of equipment and a closer relationship with the beneficiaries of the service. Because of its impact on community health, waste management fits well with the concerns of those groups dealing with issues of community concern.

As for community members not directly active in the CBO, they need to participate in waste management by separating their wastes at source so that contamination is prevented and the work of CBOs and waste pickers is facilitated.

The success of community based SWM project depends to a large extent on the participation of the community from the initial stage of designing the project, to implementation, monitoring and evaluation. Efforts to protect the environment, the use of law enforcement as strategy to ensure waste generators apply appropriate solid waste disposal practices has failed and fallen far short of the expected outputs. Community solid waste management strategy augurs very well with the ongoing initiatives to protect the environment while at the same time supporting livelihoods through employment creation, income generation and poverty reduction. Community participation may comprise varying degrees of involvement of the local community. It may range from the contribution of cash, kind and labor to consultation, changes in behavior, involvement in administration, management and decision-making.

This study has demonstrated the base for designing a community based solid waste collection project at Kawe. It has been evidenced that the performance of the existing solid waste management practice in Kawe is poor. The major problem is low capacity of solid waste collection evidenced by haphazardly dumping of the uncollected waste. This also proves the illegal dumping practices exercised by the community members, which include throwing waste haphazardly, burning or burying. The survey has also proved the existence of unclean environment where only 19% of the community members declared the environment to be good.

Therefore, the study of the existing solid waste management practice at Kawe justifies the need of the proposal for solid waste collection project. The survey has established the willingness of the community to participate and contribute towards solid waste management despite of the low level of awareness, which is a result of low education level of majority of the community members. Furthermore, the chance that solid waste management being a high-ranking community problem will be possible when the initiative for the project should come from the community itself. If solid waste management is not a felt need, this will certainly have consequences to their participation in the service and their willingness to pay. A possible solution to the problem of lack of community priority for solid waste management is education.

### 4.6.2 Recommendations

There is no standard methodology for analyzing the extent to which CBOs play a role in delivering effective solid waste management, for this remains a relatively new development. The future of solid waste management depends on the quality of the co-operation of the local government with NGOs and CBOs and citizens themselves. It has been shown that CBOs in solid waste management ought to be an essential component of new developments in this area. The future of municipal waste management depends not only on the effectiveness of local government, the operator of public services, but also on the attitude of citizens, and on the key role of CBOs to shape and develop community participation, as the reality of formal waste management.

For proper implementation of solid waste collection project it is recommended that:

(1) In order to have positive participation the CBO should facilitate campaigns and workshops/seminars for sensitizing and raising the awareness of the community in solid waste management issues. The provided knowledge should include not just the financial obligation of the households but also other benefits of the service. Education is the major solution to problems of low participation of households, which comprises issues such as low community priority for solid waste management, low willingness to participate in collection systems and in keeping public spaces clean, and low willingness to pay.

Also benefits and practice of separation of wet and dry waste at source and schedule of collection should be observed. Creating of this awareness must not only be included at the outset of a project, but should be carried on throughout. In this regard there is a need for having strong leadership.

(2) Sustainable willingness to pay and payment in relation to achievement will increase willingness to pay because households will receive an observable benefit. Willingness to pay has to be studied beforehand to conceive acceptable ways of payment that are financially affordable by the households. Due to the fact that not all service fees charged are affordable there is a need of introducing different fees and different collection systems for different generators of waste. Households in the unplanned area should pay a low fee and send their garbage to communal bins, which are simple to empty to the waste collection vans. Clinics, restaurants and hotels, etc. should be

charged a higher cost that covers fee for door-to-door collection. Fees should be based on the amount of garbage produced and/or on the income level of the household.

(3) Kinondoni Municipal Council can assist community-based solid waste systems in different ways. One-way is the provision of facilities (equipment, collection sites, etc.); others are the establishment of legislation, financial assistance, and promotion. The council has to plays a highly positive role in stimulating community-based solid waste management. The council can, for example, stimulates a neighborhood sorting and recycling plant by doubling the sales of recyclables. This money can be invested in local projects, selected by the community.

The tenure of the contract for solid waste collection set by the Kinondoni Municipal Council is renewable after one year. This is a threat to the projects because normally during the first years of operation there is more cost than profit. The council should make efforts to ascertain the costs incurred and use in forming the basis for renewal of contracts.

# CHAPTER V

## 5.0 IMPLEMENTATION OF ASSIGNMENT.

After conducting the study, the findings as explained in the previous chapter have revealed the extent of solid waste collection problem at Kawe Mzimuni. Failure of the Municipal Council to provide a proper solid waste collector has resulted to the Kawe Community Development Trust CBO to get involved in the exercise under Kawe Environmental Group. The problem of poor solid waste collection is a community concern. After the CBO,s decision to start a community solid waste collection project, the need for preparing a solid waste project proposal raised. The proposal shall ensure a sustainable solid waste collection project that will enhance sanitary environment at the same time create employment, income generation and reduce poverty.

Solid waste collection proposal offer a host of benefits for Kawe community. The preparation of this proposal shall assess the current and future waste management needs, set priorities, and allocate resources accordingly, which will help to ensure a sustainable and economic waste management system. The proposal will assist and guide Kawe community in developing and implementing its solid waste management program by establishing what actions need to be taken and setting the criteria for decision-making.

A solid waste management proposal is a practical document that can help guide community's solid waste management efforts.

During the period of the study one major progress was made in relation to the solid waste collection project. This was getting a contract of waste collection and disposal from the Kinondoni Municipal Council after wining the tender. Although KEG had the contract in hand, the implementation of the project delayed to commence because of lack of necessary arrangements in terms of awareness campaigns, recruitment of operatives and lack of sufficient funds. However the project implementation started in January this year by house-to-house collection involving 1,800 households under 20 ten-cell leaders employing ten youth who were practicing informal solid waste collection. The waste collection started by using pushcarts.

## 5.1 PROJECT PROPOSAL

**EXECUTIVE SUMMARY OUTLINE**

**PROJECT TITLE:** Kawe Community Solid Waste Collection Project

**CONTACT PERSON:** Kitembe John Mrita, chairman of Kawe Environmental Group Telephone number 0745-778573

**PROPOSAL SUBMITTED BY:** Kawe Community Development Trust of P.O.Box 2522, Dar es salaam.

**PROBLEM STATEMENT:** Lack of proper solid waste collection services at Kawe Mzimuni mostly an unplanned area, is a threat to the community health and reduces the quality of life. Poor sanitary condition evidenced by volumes of uncollected waste has contributed to environmental health diseases such as malaria, diarrhea and cholera.

**MISSION STATEMENT:** To create an enhanced environmental quality community through a solid waste collection project, which creates employment, generate income and reduce poverty.

**TARGET GROUP:** The project will cover Kawe Mzimuni area that is mostly unplanned with a population of 18,500 consisting of 4,050 households. The project will employ over 24 unemployed youth and women in the community organized under Kawe Environmental Group (KEG)

**ACTIVITIES:** Conducting intensive environmental awareness campaigns for the community, training courses for the working staff, house-to-house collection and transfer of garbage, removal of accumulating solid waste from the streets (sweeping and cleaning drainage channels), cutting grass and planting trees in open areas.

**OUTCOME:** Established sustainable system of solid waste management that ensure a sanitary environment, creation of employment and income generating activities that reduces poverty.

**REQUEST FOR FUNDING: Tshs 54,500,000**

**CBO CONTRIBUTION: Tshs 1,500,000**

## THE PROPOSED PROJECT

## TITLE: KAWE COMMUNITY SOLID WASTE COLLECTION PROJECT

**Background Information.**

Urban governments in many developing countries are facing serious problems with the management of solid waste. The problem of accumulation of waste is more serious particularly in low priority areas such as unplanned settlements such as Kawe, which contributes to poor sanitation and low quality of life. The failure of the private contractor commissioned by the Municipal council has driven the CBO under the Kawe Environment Group (KEG) to operate in solid waste management service. The Environmental Planning and Management (EPM) process in 1992 through the Sustainable Dar es salaam Project, stemmed from Urban Management. This was under the Habitat/UNEP agreement towards creating conducive environment for city productivity with minimal environmental risks. The programme promotes the establishment of CBOs to deal with solid waste management.

The solid waste collection efficiency depends to a large extent on the involvement and participation of the communities themselves in supporting the whole concept. Previous efforts made to improve SWM include several approaches such as environmental awareness campaigns through mass media and advertisements, integrating demand side information into planning and enhancing solid waste recycling. SWM is a potential

economic good that can be used to enhance environment quality, create employment, generate income and reduce poverty.

**Location, size and economic activities**

**Location:**

The project is located at Kawe Mzimuni areas of Kawe ward in Kinondoni District, Dar es Salaam. Boundaries: Mlalakua JKT to the south, Kawe Primary school and Local Government offices to the west, Tanganyika Packers to the east. Bagamoyo Road runs from southeast to north –west. The unplanned settlement lies between Bagamoyo Road to the east and Lugalo creek to the west.

**Size and economic activities.**

The Mzimuni area covers about one square kilometer. The area is a mostly unplanned settlement with few-planned plot. Its population is about 18,500 and has about 4,050 households. Ethnically the area is relatively heterogeneous with different ethnic groups mostly migrants from other regions.

**Economic Activities**

The majority of the people in the community have low income. Major activities of the head of households include street vendors about 38.4%, 28.78% income from renting houses, 28.7% privately employed, 27.10% mama/baba Lishe, 19.8% civil servants,

19.4% small scale agriculture, mansory 11.50% and fishing is 4.70% (source REPOA 2003). Street vendors receive an average of Tshs 30,000 per month.

Also according to the REPOA (2003) base line report, about 12.5% of the community members can not read or write while about 70% have primary education, which result in poor level of income due to lack of skills.

**Problem Analysis and Statement**

Poor solid waste collection and disposal is a threat to public health and reduces the quality of life for the urban residents especially in-unplanned settlements such as Kawe. The large increase of refuse is a result of urbanization and rapid economic growth. Dar es salaam city is growing at a rate of 7% per annum and about 70% of the population lives in informal or unplanned settlements, which usually have low priority in collecting solid waste. Reasons for less priority being difficult access, low social status, lack of land tenure, lack of awareness, lack of incentives to collectors and low value of waste.

There are some related problems of SWM that led to the preparation of the proposal. These are;

-Kawe Mzimuni lacks a proper service of the private contractor in the collection of solid waste. The result has been poor sanitary condition with volumes of uncollected wastes.

- Lack of sensitization and awareness of the solid waste management has led to poor participation in the solid waste management system.

- Poor health education partly caused by the low literacy level has contributed to environmental health hazards where diseases such as malaria, diahorea and cholera are persistent in the community. The diseases are related to unsanitary environment of which the negative impact may extend wider than just the geographical boundaries of Kawe Mzimuni.

During the study, members of the community were actively involved in defining the problems and their causes through questionnaires and focus group discussions

**Project Rationale and Justification**

The project aims to clean the environment thus improve the quality of sanitation and hygiene. This work will bring a significant improvement of the community health. The project will improve cleanliness and conserve the environment, improve community participation in solid waste management and create employment to the vulnerable group of youth and women in the community. There will also be generation of income through refuse collection fee and latter through recycling and composting from collected organic garbage. This is one way of reducing poverty, as the project will include youth and women who are considered poor.

This programme is a way of eradicating poverty by providing basic infrastructure services to poor urban centres as stated by UNCHS (1996). It is a cost effective programme, which entails collection fees for the solid waste collection. SWM is one of

the basic services that are currently receiving wide attention in the urban agenda of many countries including Tanzania.

The solid waste collection by Dar es Salaam City municipalities is about 10% of the total solid waste generated, private contractors is 24.4% and 5.5% of the total city waste is collected and recycled. This means 60% of the waste is uncollected most of it being in unplanned and less priority areas such as Kawe Mzimuni. In Kawe Mzimuni the estimated production of waste is 17 tons per day (source Kinondoni Municipal Council) but the amount collected per day is only 3.5 tons.

**Organizational Experience.**

KEG is one of a number of CBO dealing with solid waste management initiated by the Kawe community members. The goals of KEG are to improve the environment, health and income status of unemployed youth and to do so in ways that will allow for changes to take root, sustain and enhanced beyond the implementation period. KEG has experience on supporting informal solid waste collection.

**Sustainability Analysis**

The sustainability of solid waste management project is greatly dependent on the acceptance of the community served to participate fully. The community members are the generators of the municipal waste to be collected and also they have to pay the collection fee for the service. The survey reveled about 80% of the community members

accepted participation through payment of collection fee. The amount of money to be generated is significant in real terms to continue smooth running of the project. The project is designed so that local government and the community take responsibilities.

The project has a capacity building component, which will ensure human resources development to enhance their capacity and ability to manage the project and be able to sustain it later on through a well-established strong monitoring and evaluation systems. Another component is public meetings and workshops for raising the awareness of the community on issues related to solid waste management.

Economically, the project is geared towards improving the environment condition of Kawe, by creating employment for youth and women, income generation and poverty reduction. It will also empower the community to determine their own development priorities and participation in designing, implementing, monitoring and evaluating development programme.

Socially, sustainability of the project depends very much on the changes of socio – cultural aspects. These changes will be achieved through sensitization and training of the beneficiaries and the public at large.

The capacity of the CBO in terms of resources include money at Akiba Commercial Bank 1,500,000 Tshs, few working tools (10 brooms, 5 racks, 2 shovels) and human

resources (project coordinator, one field officer, a secretary, two fee collectors and 20 waste collectors. The project has a positive impact on the environment due to its nature.

**Project Objectives**

To improve the quality of environment in Mzimuni area through solid waste management, which will also create employment, generate income and reduce poverty in the community.

The project result will be:

-Solid waste collection services for all members of the community at minimum cost;

- Creation of employment for the unemployed youth and women;

- Changes in community practices towards more responsible solid waste management practices.

**Programme Strategies**

- Promotion of participation and empowerment of the urban poor would be critical elements of strategy so that participants would acquire self-determination, learn how to practice good SWM from separation of waste generated in the households.
- Employment of informal solid waste collectors who were providing the service.
- The work should start in phases involving 20 cell leaders who oversee about 1,800 households.
- Start to collect fee per collection round and later to collect monthly.

**Project Beneficiaries**

The primary beneficiaries of the project will be the Kawe Mzimuni community members in the 4,050 households who will benefit by living in a clean environment, employment creation for vulnerable group of poor youth and women in the community. The income generated form the collection fees will be used to sustain the project and in other poverty reduction activities in the community. Similarly, households of the urban settlements especially unplanned areas will indirectly benefit from the project through demonstration effects of community based solid waste management.

**Project Activities**

- Conducting intensive environmental awareness campaigns
- Training of youth and women operating staff.
- Generation of work opportunities (hiring 20 persons to work in the project)
- House to house collection and transporting of garbage
- Removal of accumulating solid waste from the streets (sweeping and cleaning drainage channels).
- Cutting grass and planting trees in open areas.
- Collection of refuses collection fees

**Expected Outcomes of the Project**

- Establishing sustainable system of solid waste management.
- Providing income-generating activities for unemployed youth and women in the community.

- Raising environmental awareness

**Resource Requirements and Cost Estimates**

**Human resources**

This will include the project coordinator, secretary, one treasurer, two fee collectors, one watchman, and twenty waste collectors.

**Table 14: Budget**

**KAWE COMMUNITY DEVELOPMENT TRUST**

**(KAWE ENVIRONMENTAL GROUP)**

**REVENUE AND EXPENDITURE**

| PARTICULARS | 2005<br>70% | 2006<br>80% | 2007<br>90% | 2008<br>100% |
|---|---|---|---|---|
| REVENUE | | | | |
| Garbage collection fees | 59,817,800 | 68,363,200 | 76,908,600 | 85,454,000 |
| EXPENDITURE | | | | |
| Capital expenses | 245,000 | 0 | 0 | 0 |
| OPERATIONAL EXPENSES | | | | |
| salaries and wages | 11,400,000 | 11,400,000 | 11,400,000 | 11,400,000 |
| Working tools | 815,000 | 815,000 | 815,000 | 815,000 |
| safety gears | 1,030,000 | 1,030,000 | 1,030,000 | 1,030,000 |
| transport of garbage | 21,600,000 | 21,600,000 | 21,600,000 | 21,600,000 |
| Garbage dumping fees | 13,824,000 | 13,824,000 | 13,824,000 | 13,824,000 |
| Total operational expenses | 48,669,000 | 48,669,000 | 48,669,000 | 48,669,000 |
| ADMINISTRATIVE EXPENSES | | | | |
| salaries and wages | 2,400,000 | 2,400,000 | 2,400,000 | 2,400,000 |
| Stationary | 1,308,000 | 1,308,000 | 1,308,000 | 1,308,000 |
| Utilities | 1,320,000 | 1,320,000 | 1,320,000 | 1,320,000 |
| Depreciation | 49,000 | 49,000 | 49,000 | 49,000 |
| other costs | 253,850 | 253,850 | 253,850 | 253,850 |
| Total administrative expenses | 5,330,850 | 5,330,850 | 5,330,850 | 5,330,850 |
| TOTAL EXPENSES | 54,244,850 | 53,999,850 | 53,999,850 | 53,999,850 |
| SUPLUS/(DEFICIT) | 5,572,950 | 14,363,350 | 22,908,750 | 31,454,150 |

NOTE 1

REVENUE

| Type of premises | Rate Payable | Units | Amount p.m Tshs | Amount p.a Tshs |
|---|---|---|---|---|
| Residential households | | | | |
| Planned plots | 2,000 | 100 | 200,000 | 2,400,000 |
| Unplanned area | 1,500 | 3,950 | 5,925,000 | 71,100,000 |
| Guest Houses | 10,000 | 5 | 50,000 | 600,000 |
| Dispensary (Domestic waste) | 10,000 | 6 | 60,000 | 720,000 |
| Carpentry | 5,000 | 20 | 100,000 | 1,200,000 |
| Retail shops | 5,000 | 50 | 250,000 | 3,000,000 |
| Private day schools | 10,000 | 6 | 60,000 | 720,000 |
| Pharmacy (II) | 5,000 | 20 | 100,000 | 1,200,000 |
| Church/Mosques | 2,000 | 11 | 22,000 | 264,000 |
| Butchers | 5,000 | 5 | 25,000 | 300,000 |
| Street market (magenge) per table | 2,000 | 30 | 60,000 | 720,000 |
| Food vendors | 1,000 | 15 | 15,000 | 180,000 |
| Bars | 20,000 | 20 | 400,000 | 4,800,000 |
| Hotels | 30,000 | 1 | 30,000 | 360,000 |
| Garages (workshops) | 5,000 | 11 | 55,000 | 660,000 |
| Hair salons | 5,000 | 20 | 100,000 | 1,200,000 |
| Shoe makers | 500 | 5 | 2,500 | 30,000 |
| Total Revenue | | | 7,454,500 | 89,454,000 |

EXPENDITURE NOTE 2

| Item | Quantity | Price per item | Total cost p.m | Total cost p.a |
|---|---|---|---|---|
| Capital expenses | | | | |
| Furniture | | | | |
| Chairs | 6 | 5,000 | 0 | 30,000 |
| tables/desks | 3 | 50,000 | 0 | 150,000 |
| Bench | 1 | 20,000 | 0 | 20,000 |
| Loud Speaker | 1 | 45,000 | 0 | 45,000 |
| Total capital expenses | | | | 245,000 |
| Recurrent Cost | | | | |
| Personnel (staff cost) | | | | |
| Operating Expenses | | | | |
| Project coordinator | 1 | 150,000 | 150,000 | 1,800,000 |
| Field supervisor | 1 | 100,000 | 100,000 | 1,200,000 |
| Fee collectors | 2 | 50,000 | 100,000 | 1,200,000 |
| Garbage collectors/ sweepers | 20 | 30,000 | 600,000 | 7,200,000 |
| | | | | 11,400,000 |
| Working tools | | | | |
| Brooms | 88 | 500 | 0 | 44,000 |

| | | | | |
|---|---|---|---|---|
| Shovels | 22 | 3,000 | 0 | 66,000 |
| Hoes | 10 | 3,000 | 0 | 30,000 |
| Racks | 22 | 3,500 | 0 | 77,000 |
| Handcarts | 14 | 35,000 | 0 | 490,000 |
| Folks | 22 | 4,000 | 0 | 88,000 |
| Clashers | 10 | 2,000 | 0 | 20,000 |
| | | | | 815,000 |
| Safety gears | | | | |
| Musk | 60 | 2,500 | 0 | 150,000 |
| Gum boots | 40 | 8,500 | 0 | 340,000 |
| gloves | 40 | 3,500 | 0 | 140,000 |
| Coats | 20 | 10,000 | 0 | 200,000 |
| overalls | 20 | 10,000 | 0 | 200,000 |
| | | | | 1,030,000 |
| Transport of garbage (hiring to Mtoni Dumpsite) | 2 trip per day | 30,000 | 1,800,000 | 21,600,000 |
| Garbage dumping fees | 12.8 tons per day | 3,000 per ton | 1,152,000 | 13,824,000 |
| Total Operational Expenses | | | | 48,914,000 |
| ADMINISTRATIVE EXPENSES | | | | |
| Administrative staff | | | | |
| Secretary | 1 | 60,000 | 60,000 | 720,000 |
| Accountant | 1 | 100,000 | 100,000 | 1,200,000 |
| Guard | 1 | 40,000 | 40,000 | 480,000 |
| | | | | 2,400,000 |
| Stationary | | | | |
| Receipt books | 195 | 500 | 97,500 | 1,170,000 |
| counter books | 3 | 2000 | 6,000 | 72,000 |
| Rims of papers | 1 | 5,500 | 5,500 | 66,000 |
| | | | | 1,308,000 |
| Utilities | | | | |
| Office rent per month | | 60,000 | 60,000 | 720,000 |
| water, electricity and telephone | | 50,000 | 50,000 | 600,000 |
| | | | | 1,320,000 |
| Depreciation 20% of capital cost | | | 4,083.30 | 49,000 |
| Other costs 5% of administrative exp | | | | 253,850 |
| Total Administrative expenses | | | | 5,330,850 |
| TOTAL EXPENSES | | | | 54,244,850 |

**Project Organization, Management and Implementation.**

**Organization and Management.**

This project is community based using participatory approach. Therefore, the organization structure and implementation will involve the community members, the local authority and community leaders and the KEG. The overall executing agency will be the KEG.

**Project Steering Committee Set Up**

The effective and efficient implementation of the project activities is vested the Project Steering Committee (PSC). The secretary of the PSC will be the Programme Coordinator of the KEG. The membership will include representatives from the local government, beneficiaries and experts in solid waste management and other interested stakeholders.

**Responsibilities**

The main responsibilities will be:

a) Provide policy guidance in relation to the project

b) Provide advice and directives on the implementation issues

c) Overall supervision of implementation

d) Review reports and budgets

e) Review audit reports on project expenditure

f) Decisions on issues that require follow-up

g) Any other major issues related to the project.

**Implementing Agency**

The KEG will be the implementing agency of the project.

**Responsibilities**

a) Negotiate with donors and other financiers

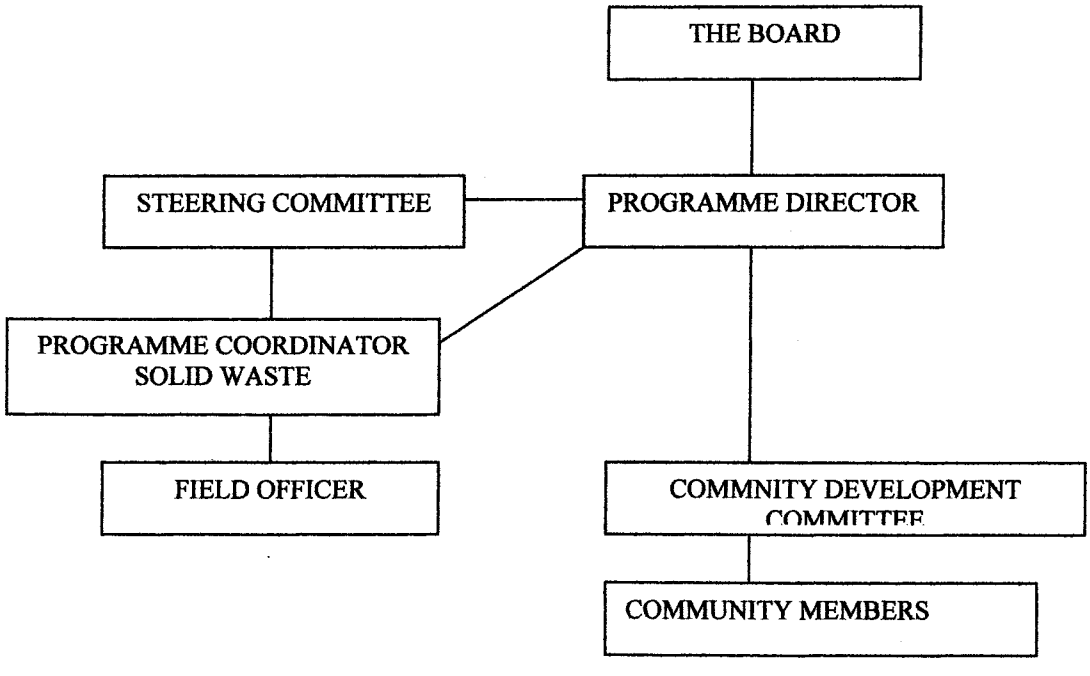
b) Recruitment of the project personnel

c) Supervision of the project

d) Coordinate follow-ups on recommendations made by donors and other financiers

e) Facilitate and authorize procurement of project inputs

**Figure No 4 : Proposed Project Organization Structure**



**Implementation Plan**

The project will be implemented in 4 years, commencing from date of launching as follows:

**Recruitment and Training**

**Recruitment:**

The staff of KEG will be recruited and the posts will be appointed.

**Training:**

The training will be carried out through Participatory Urban Approaches (PUA) to equip the implementers of community based solid waste management. These implementers include the working staff and the community leaders.

**Monitoring and Evaluation**

Monitoring and Evaluation are management components that can be used to generate information relevant for improvement of programme planning, policy formulation and quality improvement. KEG should formulate a monitoring and evaluation framework for the programme, detailing the M&E objectives, tools, methods and types of information to be collected to assess the progress and impact of the programme interventions. These tools and methods should be participatory whereby the community and the support system plays a leading role. Quarterly, semi annual and annual reports will be prepared. The midterm review will be undertaken in the year two and half of the project implementation plan with the intention of examining progress against key indicators and

objectives as originally set out. The project management will prepare the project completion report (PCR) at the end of the project and submit it to the PSC for review and comments.

**Critical Assumptions**

The critical assumptions for implementation of the project activities are:

i) The Kawe Environmental Group under the Kawe Community Development Trust has sufficient capacity to execute the project activities.

ii) The available governing policies are made effective, efficient and carefully monitored;

iii) The community members will respond and participate in the project including payment of the collection fees.

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