ASSESSMENT OF BUSINESS OPPORTUNITIES IN DOMESTIC SOLID WASTE MANAGEMENT IN ELDORET MUNICIPALITY

BY

JAMES MWANGI NJAU

D53/OL/M/1049/02

Project submitted to the School of Business in Partial Fulfilment of the Degree of Masters of Business Administration (Entrepreneurship) of Kenyatta University

KENYATTA UNIVERSITY LIBRARY

FEBRUARY 2006
DECLARATION

This project is my original work and has not been presented for a degree in any other university or for any other award.

Name of student: - James Mwangi Njau

Signature: ___________________________ Date: 20-2-2006

I confirm that the work reported in this project was carried out by the candidate under my supervision.

Dr. Fuchaka Waswa
School of Environmental Studies and Human Sciences

Signature: ___________________________ Date: ___________________________

Dr. George Gongera
Chairman School of Business Administration

Signature: ___________________________ Date: ___________________________
DEDICATION

My family members, friends and relatives for their support which included, financial, social and spiritual.
ACKNOWLEDGEMENT.

Special acknowledgement are extended to Dr. Fuchaka whose guidance co-operation and constructive criticism made this project what it is.

Also acknowledgement goes to the workers of Ngimwas supply and marketing agencies for typesetting, proof-reading and printing the project. Your contribution is highly appreciated.
Abstract

With inevitable urbanisation pressure, waste management will continue to be an everyday concern in human civilisation. Although the common observation in most towns is net accumulation of wastes, and subsequent environmental and health implications, waste management can be enterprised as a source of income for the increasing numbers of unemployed youths in Kenya. This project focussed on determining the business and employment opportunities available in domestic solid waste management in Eldoret town. Data were collected from three income groups purposively selected, and the subjects within each strata selected through simple random sampling. The results indicated that business opportunities existed in areas of collection, sorting, composting and recycling of domestic solid wastes. To facilitate sorting, households should be provided with specially designed waste bins with four compartments in which one compartment can be used to collect metallic solid wastes, another to collects plastics, another to collect papers and the other for miscellaneous. By virtue of their low initial capital base, the youth as potential entrepreneurs in waste management should be facilitated with credit and other support from relevant authorities like government, civil society and the private sector to engage merchants and other institutions already trading in waste management. There is also need for capacity and competence building among these potential entrepreneurs in all aspects of waste production and management, in line with business requirements. General public awareness on the potential of waste as a source of income is also critical in order to reduce the stigma associated with handling wastes, and the myth that such work is for the low income groups.
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>DECLARATION</td>
<td>i</td>
</tr>
<tr>
<td>Dedication</td>
<td>ii</td>
</tr>
<tr>
<td>Acknowledgement</td>
<td>iii</td>
</tr>
<tr>
<td>Abstract</td>
<td>iv</td>
</tr>
<tr>
<td>Table of Contents</td>
<td>v</td>
</tr>
<tr>
<td>List of Appendices</td>
<td>vii</td>
</tr>
<tr>
<td>Abbreviations and Acronym</td>
<td>viii</td>
</tr>
<tr>
<td>List of figures</td>
<td>ix</td>
</tr>
<tr>
<td>List of Tables</td>
<td>x</td>
</tr>
<tr>
<td><strong>CHAPTER ONE: INTRODUCTION</strong></td>
<td>1</td>
</tr>
<tr>
<td>1.1 Background Information</td>
<td>1</td>
</tr>
<tr>
<td>1.2 Statement of the Problem</td>
<td>2</td>
</tr>
<tr>
<td>1.3 Objectives of the Study</td>
<td>3</td>
</tr>
<tr>
<td>1.4 Research Questions</td>
<td>3</td>
</tr>
<tr>
<td>1.5 Significance of the Study</td>
<td>4</td>
</tr>
<tr>
<td>1.6 Scope of the Study</td>
<td>4</td>
</tr>
<tr>
<td><strong>CHAPTER TWO: LITERATURE REVIEW</strong></td>
<td>6</td>
</tr>
<tr>
<td>2.1 Solid Waste, Environmental Quality and Human Health</td>
<td>6</td>
</tr>
<tr>
<td>2.2 Solid Waste and Income Generation</td>
<td>7</td>
</tr>
<tr>
<td>2.3 Experience from other Countries</td>
<td>8</td>
</tr>
<tr>
<td>2.4 Solid Waste Management Conceptual Framework</td>
<td>9</td>
</tr>
<tr>
<td><strong>CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY</strong></td>
<td>11</td>
</tr>
</tbody>
</table>
3.1 Sample Size and Sampling Procedures ................................................................. 11
3.2 Data Collection Instruments and Methods ........................................................... 11
3.3 Validity and Reliability of Research Instruments ................................................. 11
3.4 Data Management, Analysis and Interpretation ..................................................... 12

CHAPTER FOUR: RESULTS AND DISCUSSIONS .......................................................... 13

4.1 Types and Quantities of Solid Wastes ................................................................. 13
4.2 Business Opportunities and their Relative Importance ........................................ 15
4.3 Elements to Operationalise Domestic Solid Waste Management Business .......... 17

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS ......................................... 21

5.1 Conclusions ........................................................................................................... 21
5.2 Recommendations ................................................................................................. 21

APPENDICES .............................................................................................................. 23

6.1 Household Questionnaire ....................................................................................... 23
6.2 Waste Merchants’ Questionnaire .......................................................................... 26
6.3 Eldoret Map ........................................................................................................... 28
6.4 Waste Management Photographs Showing Collection and Dumping Sites ........ 29
6.5 Budget .................................................................................................................. 31
6.6 The Activity Table ................................................................................................. 32
6.7 Work Schedule ...................................................................................................... 33

REFERENCES ............................................................................................................ 34
List of Appendices. 6

6.1 Appendix 1A - Questionnaires for house dwellers.................................................. 23
6.2 Appendix 1.B - Questionnaire for waste merchants.................................................. 26
6.3 Appendix 1.C - Eldoret Map.................................................................................... 28
6.4 Appendix 1.D - Waste management photographs showing collection and
dumping sites............................................................................................................... 29
6.5 Appendix 1.E - Budget.............................................................................................. 31
6.6 Appendix 1.F - The activity Table.............................................................................. 32
6.7 Appendix 1.G - Work schedule.................................................................................. 33
### Abbreviations and Acronyms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWM</td>
<td>Solid Waste Management</td>
</tr>
<tr>
<td>L.C.D’S</td>
<td>Less Developed Countries</td>
</tr>
<tr>
<td>DSWM</td>
<td>Domestic Solid Waste Management</td>
</tr>
<tr>
<td>EMC</td>
<td>Eldoret Municipal Council</td>
</tr>
<tr>
<td>UNCHS</td>
<td>United Nations Centre for Human Settlements (Habitat).</td>
</tr>
</tbody>
</table>
List of figures

Figure 1: Conceptual Framework of Domestic Solid Waste Management........ pg. 10

Figure 2: Extent of Involvement in various aspects of domestic solid waste management..................pg. 17
List of tables

Table I: Quantities of waste generated by different income groups ...............pg. 13
Table 2: Waste storage provider and types of storage facilities .................pg. 14
Table 3: Residents opinion on business opportunities in waste management .......-pg. 15
CHAPTER ONE: INTRODUCTION

1.1 Background Information

Waste is generally seen as undesirable by the public because of the human health and environmental risks associated with it. Plastic bags for instance block gutters and drains, choke farm animals and marine wildlife, and generally pollute the environment. The bags when discarded can fill with rainwater offering ideal and new breeding ground for Malaria causing mosquitoes. In rural areas, the environment absorbs bio-wastes into its natural systems. Agricultural wastes are composted into manure that is used as organic fertilizer on farmland. Similarly animals such as cows, goats, sheep and dogs consume food residues, while others are incorporated into the soil.

In urban areas, population increase makes waste management facilities inadequate. In developing countries, 50% of municipal budget is spent on solid waste management, and still waste officials are not able to solve this problem efficiently owing to lack of enough finances (Levin and de Kadt 1991). Traditionally, domestic waste in urban areas was collected as municipal waste for incineration or disposal on land, air or water, (Muthiani 1991). According to the World Bank (1995), populations living in urban areas in L.D.C rose from 28% in 1970 to 38% in 1993. As such, municipal solid waste will continue to be a problem for these countries (Kipkoech, 1999). As a potential remedy, this study looked into opportunities available in domestic solid waste management, ways of converting wastes into viable investment opportunities for entrepreneurs, especially the increasing mass of unemployed youth. Waste management looks into planning, co-ordinating, organizing and controlling of
waste. The public pressure for clean environment and good health, and the large sums of money used to manage waste have led to increased demand for alternative schemes to manage waste efficiently and effectively.

1.2 Statement of the Problem.

Lack of adequate strategies of managing household waste has led to inability of town authorities to manage waste generated. For instance, it is estimated that only 25% of the 1,500 tonnes of the solid waste generated in Nairobi is collected. In monetary terms, 50% of municipal budgets in developing countries is spent on solid waste management (SWM) and still waste officials are not able to solve this problem efficiently (NEMA and KIPPRA, 2005).

This translates into net accumulation of wastes and hence potentially negative socio-economic and ecological implications. For instance, waste sites that are poorly managed are homes of vector insects, rodents and flies that can be a source of worry to those living near the garbage sites. Toxic wastes can lead to deaths or serious injuries when inhaled, ingested or absorbed. Corrosive wastes can cause deterioration of materials and body tissues at the point of contact (OECD1995). Pathological wastes have potential of spreading diseases upon contact with them either directly or indirectly. Large garbage sites provide ideal environments for birds like storks, black kites, cattle egrets and the ibis, which are known to interfere with air traffic by occasionally being sucked by plane engines. Since, both waste management and unemployment are serious problems in Kenya, deliberate efforts to enterprise waste management has potential to help solve them.
1.3 Objectives of the Study

The main purpose of this study was to identify and design business opportunities in domestic solid waste management with ultimate aim of creating employment opportunities for the increasing number of job seekers in our urban centres. The specific objectives were:

(i) To determine business opportunities available in domestic solid waste management as an income generating activity.

(ii) To determine the categories of people in Eldoret municipality who would be interested to do business in domestic solid waste management.

(iii) To design possible business structures for domestic solid waste management.

1.4 Research Questions.

The project was guided by the following research questions:

(i) What are the types and proportions of domestic solid wastes generated?

(ii) Which components can be sold to generate income?

(iii) Who are the likely beneficiaries of this business?

(iv) Is there a marketing structure for the domestic solid waste management?

(v) Is there demand for the wastes as raw materials for other products?

(vi) What can be done to operationalise ethical domestic solid waste management?
1.5 Significance of the Study

Business opportunities in domestic solid waste management will create job opportunities for increasing jobless youth with subsequent improvement in household livelihood. Gradual reduction in heaps of waste will add to environmental quality, aesthetic and hence improved standards of living. The government revenues will improve due to increased tax base from business opportunities and those employed. The gross national product will also increase due to increased production of goods and services from the business opportunities created. Increasing the number of youths in active employment equally enhances socio-political stability.

1.6 Scope of the Study

The study covered solid waste management in Eldoret Municipality and focused on three income categories:

(i) High density (Low income group) with less than Ksh.2, 400 per month

(ii) Medium density (medium income group) With more than Ksh.2, 400 but less than Kshs. 5,000 per month.

(iii) Low density (High – income group) with more than Kshs.5,000 Per month

Eldoret municipality is in Uasin Gishu District, Riftvalley province in the republic of Kenya. The town started as a post office station to serve European settlers (EMC, 1994b, Ndege 1989). It is the fifth largest town after Nairobi, Mombasa, Kisumu, and Nakuru and covers an area of 148km2 (Ndege 1989). The 1989 census showed that the town had a population of
176,000 people with a growth rate of 8% per year. The current population is estimated at about 215,000 people. As an up coming municipality, waste accumulation is likely to be a problem given the trend in other older cities, hence its choice for this research project.
CHAPTER TWO: LITERATURE REVIEW.

2.1 Solid Waste, Environmental Quality and Human Health.

Waste accumulation presents a health hazard to the people around the garbage sites. Waste points are homes of vector insects, flies and rodents that can be a source of worry to those living near the garbage sites. Toxic wastes can cause injuries when inhaled, ingested or absorbed. Corrosive wastes can cause deterioration of body tissues or materials at the point of contact with it either directly or indirectly (Kiplagat 1999).

Due to poor sanitation and absence of safe drinking water there is prevalence of gastro-enteric diseases and high pollution leads to a higher incidence of respiratory diseases. Waste bags and tin cans when discarded can fill with rainwater and offering ideal and new breeding grounds for mosquitoes carrying malaria. Garbage sites provide ideal environment for birds like storks, black kites, cattle egrets and ibis that can cause conflict of birds and aircraft’s flight paths. Garbage sites also provide ideal environment for drug peddlers and muggers. If the standard of living were to be maintained, proper disposal methods should be put in place. Improper disposal of waste is still a major environmental problem especially in developing countries, unlike in developed countries where there is adequate SWM systems for waste collection and disposal. Methods adapted for waste management have their own limitations, for example, there may be fewer or no more landfills available. In the U.S.A for example, land fills have reduced by more than 2/3 since 1979, Where as in Holland there are no more landfills left (UNEP, 1989).
At the same time, leakage’s from landfills pose a serious ground water problem. Waste combustion option has also limitations, waste is burnt to convert combustible materials into gases leaving solid residues (OECD, 1995). The gases emitted to the air affect the ozone layer. The method is also expensive, as it requires high capital outlays and may not be practical for third world countries like Kenya. Other methods emphasize waste minimization and advocate for use of cleaner technologies to end pipe strategies. These strategies have a common origin in the need to supplement the mechanisms of the market economy so that external environmental effects are taken into account to greater degree when making industrial or economic decisions (Freeman, 1990). Bringer (1992), for example argues that management by prevention, besides solving environmental problems can as well prevent pollution at the source, conserve natural resources and develop environmental sound practices.

2.2 Solid Waste and Income Generation

refuse facilities, low participation by the stakeholders and dwindling dumping sites. Kiplagat (1999), stated that recyclable wastes like paper can be sorted out and sold to waste merchants to generate incomes. Kibwage (1996), stated that waste could be composted as manure which could be sold to farmers to be used in place of fertilizers. The study sought to come up with a comprehensive business structure in domestic solid waste management, to improve environmental quality, create employment and generate income.

2.3 Experience from other Countries

Waste management is a problem that is universal to mankind. Each passing year, human beings produce more waste, most of which is hauled and buried in landfills. It is expensive and usually controversial to dig new landfills or to build new incinerators. Recycling is one way of reducing the amount of waste that is land-filled. Reduced waste in terms of weight and volume leads to reduced tipping fee because less waste is land-filled. Recycling waste can save energy as it takes less energy to make a product from recycled materials than it does to make it from new materials. Using recycled aluminium scrap to make cans for example uses 96% less energy than making cans from bauxite ore (the raw materials used to make aluminium). The only exception to the recycling –saves- energy rule is plastics some times it takes more energy to recycle plastics than it does to use all new materials (http://www.howstuffworks.com).

Americans recycled only 6% of their waste in 1960, 10% in 1980, 16% in 1990 28% in 1995 and 30% today. This has been made possible because residents are encouraged to sort out their recyclable such as aluminium cans, newspapers and glass into separate containers. In
some areas people bring their recyclables to collection centres. In many areas, there are machines that accept used beverage containers and reimburse the depositor on the spot. In several states, a five to ten cent deposit on returnable bottles and cans is imposed and once the bottles and the cans are returned, consumers get their deposit back. In some states communities have passed laws or ordinances mandating that citizens recycle at least some of their trash. Residents in their communities separate their newspaper, aluminium, glass and other recyclables from the rest of their trash. Residents who do not comply may be fined or their trash may not be picked up. New York City, which has 2.4 million people, is the only big city which has enforced its recycling program. The city sanitation Department has assigned officers to rummage through resident’s trash. The officers fine those non-complying.

http://www.ela.doe.gov/kids/

2.4 Solid Waste Management Conceptual Framework

Current thinking conceptualises sustainable waste management along industrial ecology and life cycle approaches. As such reduction of waste generated, re-use and recycling are important strategies. A management framework should thus address these elements along the whole production process. Decision-making in waste management should start at the generation phase and extend to the last stage of disposal (Figure 1). The challenge is to identify business opportunities at all these stages and map out the most suitable segments of the populace for identified business opportunities. An other challenge would be how to operationalise these businesses. For the ever increasing number of unemployed youths, cost effective business innovations would be critical for national development.
In Nairobi and its environ, the Taka Ni Pato (Trash is cash) project is a fairly successful story when it comes to improving livelihoods of slum dwellers through waste management (SOMIRENEC, 2005). Its success has been based on the mode of operation that taps into synergistic partnership with diverse stakeholders. For Eldoret, the success parameters may be different.
CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY.

3.1 Sample Size and Sampling Procedures

Three groups purposively selected based on density and income constituted the main strata for this study, thus: thus high density (low income), medium density (medium income group) and low-density (high-income). From each group, 30 respondents were selected using simple random sampling for interviews.

3.2 Data Collection Instruments and Methods

Primary data were obtained by use of questionnaires, interview schedules, observation, checklist and photography. The households and merchants were the main respondents. Secondary data were obtained from secondary sources notably existing literature on domestic solid waste management.

3.3 Validity and Reliability of Research Instruments

The validity of the research instruments was checked by use of a pilot study (Pre-survey) conducted in one estate outside the sample groups in the study area. Ten households in the estate participated. The questionnaire were then corrected accordingly. This reconnaissance survey was also used to familiarise with study area and make necessary logistic arrangements.
3.4 Data Management, Analysis and Interpretation

Data generated by the questionnaires and interviews were analysed using descriptive and inferential statistics. Thus interpretation of the data was done by drawing inferences from the computed frequencies, means and percentages. The finding were presented using standard methods.
CHAPTER FOUR: RESULTS AND DISCUSSIONS

4.1 Types and Quantities of Solid Wastes

Food remains constitute the largest part of domestic solid waste generated followed by Polythene papers, plastics, cloth rags, bottles and cans (Table 1). As would be expected, more waste is generally produced by people with high income. Low income groups have to cope with scarcity and hence the inherent drive to efficiently use what is available. With proper planning, composting of food remains and other biodegradable materials could be a business opportunity. The challenges in this venture would include effective ways of collection and storage, and composting sites that are easily accessible to households. The problem of sites is compounded by the urban land tenure dynamics.

Table 1. Quantities of wastes generated by different income groups (Kgs/year)

<table>
<thead>
<tr>
<th></th>
<th>Low Income</th>
<th>Medium Income</th>
<th>High Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food remains</td>
<td>6974</td>
<td>8620</td>
<td>10505</td>
</tr>
<tr>
<td>Polythene papers</td>
<td>6293</td>
<td>7779</td>
<td>9481</td>
</tr>
<tr>
<td>Plastics</td>
<td>2381</td>
<td>2943</td>
<td>3587</td>
</tr>
<tr>
<td>Clothes (rags)</td>
<td>510</td>
<td>631</td>
<td>769</td>
</tr>
<tr>
<td>Bottles (Glass)</td>
<td>510</td>
<td>631</td>
<td>769</td>
</tr>
<tr>
<td>Cans</td>
<td>340</td>
<td>421</td>
<td>513</td>
</tr>
<tr>
<td>Total</td>
<td>17009</td>
<td>21024</td>
<td>25623</td>
</tr>
</tbody>
</table>
Plastics and polythene bags (papers) have no immediate use by poor households. Business here lies in them being collected and passed over to recycling firms or other established merchants.

A major business and occupational health and safely problem is limited efforts in waste separation at the source. Up to 57% of residents did not sort out (separate) their wastes. All types were mixed and disposed together. Besides awareness creation on the value of waste separation, the business opportunities for the Jua Kali artisans in particular lie in appropriate designs of wastes bins. Multi-chambers bins, designed to accommodate different categories of wastes, and also easy to empty and or transport would be appropriate.

As far as waste storage was concerned, the majority of the residents (76%) were provided with facilities by the municipality, mainly dust bins (Table 2).

Table 2 Waste storage provider and types of storage facilities

<table>
<thead>
<tr>
<th>Storage waste provider</th>
<th>No. of respondents</th>
<th>% Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Municipality</td>
<td>68</td>
<td>76</td>
</tr>
<tr>
<td>Self initiative</td>
<td>22</td>
<td>24</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of storage</th>
<th>No. of respondents</th>
<th>% Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dustbin</td>
<td>71</td>
<td>79</td>
</tr>
<tr>
<td>Others (Compost pits)</td>
<td>19</td>
<td>21</td>
</tr>
</tbody>
</table>
Although 76% seems significant, the type of dustbin provided does not allow for immediate segregation. All types of waste are mixed, which would add to business costs in the long run. The municipality could contract artisans to design appropriate dustbins with compartments designated for different wastes. Alternatively, each dustbin should be labelled for specific waste type.

4.2 Business Opportunities and their Relative Importance

Up to 69% of the residents seem to favour recycling of wastes in future business planning (Table 3). This translates into the need for awareness on the appropriate kinds of wastes (polythene bags, plastics, paper, glass, and metal). Recycling also means more investment in recycling technology and accompanying concerns such as safety, health and transport. The cost implications would suggest that this venture would be out of reach from the low income groups. Linking the low income group, which could perhaps be responsible for waste collection and sorting, to established recycling firms, of merchants who could buy these wastes in bulk remains a possible business venture.

<table>
<thead>
<tr>
<th>Business type</th>
<th>Response</th>
<th>% Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Composting</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>2. Recycling</td>
<td>62</td>
<td>69</td>
</tr>
<tr>
<td>3. Collection</td>
<td>21</td>
<td>23</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td>100</td>
</tr>
</tbody>
</table>
Although availability of organic waste is likely to be guaranteed from households and market places, business in the same was not a priority with the residents. This could be attributed to the general negative attitude on handling waste and also limited market avenues. The notable absence of transport as a business venture is probably due to the cost implications, which the low income group cannot afford. This aspect of waste management is traditionally the responsibility of municipal councils. However, due to bad local governance, waste accumulation remains a persistent problem. This is indicative of the need to privatise this aspect too and allow business in the same to flourish. This could be done in partnership with the local authorities and other stakeholders.

Although the general consensus was that business in waste management has potential to last due to the guaranteed availability of the waste, very few residents are currently engaged in it (Figure 2). This begs for answers in order to broaden job opportunities available for the populace and thus contribute to governments efforts toward job and wealth creation towards improved livelihoods.

That the majority of the respondents (72 %) had not thought of doing business in waste management, is indicative of the need to increase awareness among entrepreneurs of investment opportunities available in domestic solid waste management. Civil society in partnership with environmental agencies and government can be instrumental in this regard. The same approach can be applied when it comes to addressing sorting and treatment concerns.
Up to 57% of the respondents indicated that the storage facility was not positioned in a coveted point for them to use. This translates into net accumulation of waste in undesignated places. In addition it complicates efficient gathering and sorting. Undesignated sites equally contribute to quality loss of the waste as it is exposed to environmental factors like rain. Papers would in particular be affected. Centralising garbage collection sites may demand for earmarking more land from the municipality and or renting private land for the same purpose.

4.3 **Elements to Operationalise Domestic Solid Waste Management Business**

Waste is a product of a production or service system. Opportunities for business thus exist along the whole production cycle. Some critical questions that could guide the identification and design of a business in the same would include:
i. What is the type, characteristic and quantity of waste generated per unit time?

ii. Does this waste have any residual value?

iii. Can this waste be raw material for other products?

iv. Can this waste be re-used for other purposes without having to re-process?

v. How should this waste stored, what kinds of packaging is required?

vi. What is the cost of accessing this waste?

vii. What is the attitude of the residents about dealing with and handling waste?

viii. Is there market for this waste, where is it?

ix. Who are the key players in waste marketing in Eldoret and what are the marketing dynamics involved?

x. How accessible are other potential merchants except those in Eldoret?

xi. What does the law say about dealing in such waste?

xii. Are there any success stories in the country about business in such wastes?

xiii. Is initial capital available to start off?

xiv. What can be done to ensure sustainability and profitability of the business?

xv. Do you have adequate capacity and competence to operationalise such a business?

xvi. What are the occupational health and safety concerns, and how will they be managed?

As far as Eldoret is concerned, business opportunities exist in segregation of domestic solid waste. This can be done by use of a bin with four compartments in which one can be used to collect metallic solid waste, another to collect plastics, another to collect papers and the other for miscellaneous. This will make it easy to recycle those wastes which are recyclable. In addition, supply of plastic bags to households for waste storage and subsequent collection and
concentration at central point is a business opportunity for the low income and unemployed youth.

Waste being heterogeneous demands that appropriate linkages with various interested parties be established. In Eldoret, there was only one established household merchant (i.e. Highlands Paper Mills), who deal with all types of waste paper which is recycled into soft boards. A partnership with such a group would jump start any small business in waste paper management. Often lack of exposure, limited education, and finances hinder aspiring youths from taking advantage of such possibilities. To get started, civil society, government, and environmental agencies should step in and help establish synergistic partnerships.

Business in solid waste management should not be divorced from deliberate efforts to enhance environmental quality. Indeed planning for improved environmental quality is a prerequisite for business planning. In Eldoret like other emerging cities, environmental health could be promoted through the following approaches among others:

i  Provide adequate waste storage facilities
ii  Regularize waste collection to avoid accumulation
iii Increase dumpsites and make them accessible
iv  Invest in more targeted campaigns to sensitize people on proper waste management
v  Provide more appropriate dustbins within the city and residences
vi  Ensure that waste are dumped at only designated sites
vii Operationalise door to door waste collection
Invest in clean production, industrial symbiosis, recycling and reuse.

In the long run, it may be prudent to divide the town into autonomous sections as far as waste management is concerned and privatise this service.
CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Most households in Eldoret do not sort their wastes. The first business opportunity would therefore be in sorting. The low income group could take advantage of this. Other players could take up business in collection and transportation to processing plants or to damping sites. Availability of financial capital becomes a critical consideration in this regard.

More specifically, there is potential for business in composting due to the guaranteed availability of raw material from households. This however is hinged upon existence of technical know-how and availability of ready market for organic manure.

Majority of residents indicated that their was high potential for business in plastics (polythene bags and heavy plastics). This however would require recycling technology or ready market from established merchants.

5.2 Recommendations

To operationalise business in domestic solid waste requires among others the following items:

i. Provision of credit facilities for the youth and other willing players to get started.

ii. Investment in the capacity and competence building of potential entrepreneurs in all aspects of waste production and management as required by law.
iii. There is need for increased awareness among city dwellers on the potential of waste as a source of income. This would help change the common negative attitude on waste, and the myth that engagement in such business is for the low income group.

iv. Since waste is everybody’s problem, there is need for increased participation in waste management business; integrating the private sector, civil society, local authorities and industrialists through appropriate synergistic partnerships.

v. There is need for the municipal authorities to formulate laws and policies that would act as incentives for enterprising waste management.

vi. More research should be done in the areas of waste reduction, reuse and recycling technologies.
6.1 Household Questionnaire

No. respondent.......................................................... Date

Occupation.................................................................

1. Sex ( ) Male ( ) Female

2. What is your age (years)........................................................................

3. What is your education level?
   ( ) None ( ) Primary ( ) 'O'level
   ( ) College/University

4. What is your main source of income
   ( ) Civil service ( ) Trade ( ) Farming
   ( ) Private sector ( ) Computing ( ) Other

5. What types of solid waste do you generate? Please list in order of decreasing quantity

........................................................................................................

6. Do you separate your waste?.................................................................
   If so how?...........................................................................................

8. Who provides you with storage facilities?
   ( ) Municipality ( ) Myself

9. What storage facility do you use?
   ( ) Dustbin
   ( ) Other. - Specify

23
10. Which business opportunities do you think exist in waste management?

11. Who are the likely beneficiaries of this kind of business? Why?

12. Do you think such a business can last? (Yes/No) Why?

13. How would you rate the quantities of available waste daily? (Too much, Much, Little, Very little)

14. Have you ever thought of doing business in waste management? (Yes/No) Why?

15. Indicate by ticking the activity that you usually do when handling domestic waste in your household.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Yes</th>
<th>No</th>
<th>How</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sorting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Proper storage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Treatment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Disposal by burning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. etc</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
16. Who transports and disposes of the major waste?

( ) Myself  ( ) municipality  ( ) other-specify

If municipal, how often does it do so?

( ) Everyday
( ) Thrice a week
( ) Weekly
( ) Fortnightly
( ) After over a month
( ) Not at all

17. Do you use storage facilities meant for many people and placed in a position coveted for all users? (YES or NO).

If yes, what problems do you encounter with such a facility?

18. In which ways do you think waste management can be improved?

Thank you very much for answering or filling the questions.
6.2 Waste Merchants' Questionnaire

1. No of the respondent? 

Date: 

Occupation: 

2. Sex ( ) male ( ) female 

3. What is your age? 
   - Below 25 years ( )
   - Between 25 years and 50 years ( )
   - Between 50 years and 75 years ( )

4. What's your level of education? 
   ( ) None ( ) Primary ( ) ‘O’ Level
   ( ) College/University. 

5. What's your main source of income? 
   ( ) Civil Service ( ) Trade/Business
   ( ) Farming ( ) Private sector
   ( ) Other 

6. What types of solid wastes do you deal with? Please list in order of decreasing quantity. 

7. How do you get your raw materials (wastes)? 

8. Are wastes separated before receiving them?
9. If no, how do you separate your waste?


10. Which problems do you face as a trader in wastes?


11. What do you think can be done to improve doing business in solid waste management?


Thank you very much for answering or filling the questionnaire.
APPENDIX 6.3  Eldoret Map
AREA = 147.9 SQ KM

Source – Eldoret Municipality
APPENDIX 6.4 WASTE MANAGEMENT PHOTOGRAPHS SHOWING COLLECTION AND DUMPING SITE.

Plate 3: Sorted Cartons Ready for Recycling.

Plate 4: Bones Sorted for Processing.
Plate 1: Plastic Containers awaiting Collection for Recycling.

Plate 2: Dumpsite for Unsorted garbage.
<table>
<thead>
<tr>
<th>Description/Activity</th>
<th>Cost{ Shs}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Writing of synopsis</td>
<td>3,125</td>
</tr>
<tr>
<td>Traveling {meeting the supervisor}</td>
<td>3,125</td>
</tr>
<tr>
<td>Collecting/gathering of information about the topic</td>
<td>10,937.50</td>
</tr>
<tr>
<td>Writing of proposal</td>
<td>6,250</td>
</tr>
<tr>
<td>Collecting of data</td>
<td>9,375</td>
</tr>
<tr>
<td>Analyzing of data</td>
<td>14,062.50</td>
</tr>
<tr>
<td>Writing and presentation of the project work</td>
<td>3,125</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>50,000</strong></td>
</tr>
</tbody>
</table>
## APPENDIX 6.6

### Time Activity Schedule.

<table>
<thead>
<tr>
<th>Serial No</th>
<th>Activity</th>
<th>Time (weeks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Writing of synopsis</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>Information gathering about the project</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>Consulting the supervisor</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>Writing of proposal</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Defending/presentation of proposal</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>Collecting of data</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>Analyzing of data</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>Writing of the report</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>Presentation of the 1st draft</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>Correction of the draft</td>
<td>2</td>
</tr>
<tr>
<td>11</td>
<td>Presentation of the draft</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>34</strong></td>
</tr>
<tr>
<td>---------------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>Writing of synopsis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information gathering about the project</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consulting the supervisor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Writing the proposal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defending/presentation of the proposal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collecting of data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analyzing of the Data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Writing of the project</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presentation of the 1st draft</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correction of the draft</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presentation of the project</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Eldoret municipal council (1994b) Urban management Eldoret experience a paper presented to Broad based Workshop as a preparation for Habitat ii conference, Hotel Sirikwa, Eldoret. PP 1-144


Muthaura P (1990), Refuse storage, collection and disposal within Meru municipality (BA, Building Economics Dissertation) Nairobi University.


Shibaanda B.M.C (1980) Planning for basic infrastructural services in Thika with specific reference to water sewage and solid waste disposal MA Thesis, University of Nairobi
