

**UNIVERSITY OF NAIROBI**

**DEPARTMENT OF SOCIOLOGY AND SOCIAL WORK**

**Assessment of the Effects of Human Scavenging on  
Livelihood and Welfare of Low-income Earners at  
Dandora Dump-Site in Nairobi**

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of Master of Arts in Sociology in the University of Nairobi  
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## **DECLARATION**

I declare that this Project Paper is my original work and has not been submitted to any other University other than the University of Nairobi for the award of degree.

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## **ABSTRACT**

The purpose of this study was to find out the effects of scavenging solid waste materials for income on livelihood and welfare at Dandora dump-site. In this study; the respondents were young men and women who come to scoop solid waste materials for make money. Further; the study used non-representative technique to identify respondents in order to get comprehensive information.

The study was useful since it helped to know that scavenging was an opportunity for wealth creation and employment among the low income earners in Dandora. The benefits of the study were analyzed and recommendations made based on data. During the research, data was collected from primary and secondary sources at Dandora-dump-site among the scavengers. Survey method was used to study the respondents. Moreover; case studies and contact techniques were used to select the respondents and their responses rated 90%.A sample group of 40 scavengers were selected for the study. The features represented the whole population of human scavengers.

In the study, questionnaires and oral interviews were used for data collection. Further, in the analysis, the study used tabulations, pie charts and bar graphs which were easy to plot information for interpretation. Bar graphs were also used to show comparisons across categories thus giving clear difference.

The findings indicated that human scavenging had effects on the livelihood and welfare. Additionally; the practice was found to have a potential of creating sustainable employment for thousands of low income earners based on daily discharge of solid waste materials to the dump-site. In that regard, daily earnings ranged from Ksh.150 -300 which is above one dollar per day. The figures showed that the sale of solid waste materials to the re-cycling industries was sustainable and able to withstand the challenge of livelihood and welfare.

In conclusion, findings support that human scavenging is able to sustain livelihood and welfare of low income earners. The activity is profitable hence a means of wealth creation. From the findings, policy makers need to formulate guide-lines on how to control the process of scavenging solid waste materials at the site.

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## **ACRONYM**

**AIDS:** Acquired Immuno-deficiency Syndrome

**CBO:** Community Based Organization

**EIA:** Environmental Impact Assessment

**JICA:** Japan International Co-operation Association

**NEMA:** National Environmental Management Authority

**NGO:** Non-Governmental Organization

**NHIF:** National Hospital Insurance Fund

**Taka:** Solid Waste Materials

**UN:** United Nations

**UNEP:** United Nations Environmental Program

**WHO:** World Health Organization

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## ABSTRACT

The main focus was to look at the effects of scavenging solid waste materials for income on livelihood and welfare at Dandora dump-site. In this study; the respondents were young men and women who come to scoop solid waste materials for make money. Further; the study used non-representative technique to identify respondents in order to get comprehensive information. The study was useful since it helped to know that scavenging was an opportunity for wealth creation and employment among the low income earners in Dandora. The benefits of the study were analyzed and recommendations made based on data gotten from primary and secondary linked to Dandora-dump-site concerning scavengers. Survey method was used to study the respondents. Moreover; case studies and contact techniques were used to select the respondents and their responses rated 90%. A sample group of 40 scavengers were selected for the study. The features represented the whole population of human scavengers. In the study, questionnaires and oral interviews were used for data collection. Further, in the analysis, the study used tabulations, pie charts and bar graphs which were easy to plot information for interpretation. Bar graphs were also used to show comparisons across categories thus giving clear difference. The findings indicated that human scavenging had effects on the livelihood and welfare. Additionally; the practice was found to have a potential of creating sustainable employment for thousands of low income earners based on daily discharge of solid waste materials to the dump- site. In that regard, daily earnings ranged from Ksh.150 -300 which is above one dollar per day. The figures showed that the sale of solid waste materials to the re-cycling industries was sustainable and able to withstand the challenge of livelihood and welfare. In conclusion, findings support that human scavenging is able to sustain livelihood and welfare of low income earners. The activity is profitable hence a means of wealth creation. From the findings, policy makers need to formulate guide-lines on how to control the process of scavenging solid waste materials at the site.

### CHAPTER 1.0 INTRODUCTION

#### 1.1 Setting of study.

Scooping waste has a bird adapted nature related to social traits of humanity inherited from ancestors of pre- historic hominids who developed into humans (Ferrante 2003). According to gathering and hunting theories human-kind is said to have depended on scavenging for livelihood at the time of human ancestry. Similarly, man-the-hunter theory also has a strong back up of the early human- kind as scavengers for meat intake from dead carcasses in the forest. The Olorgesailie site in northern Kenya is cited as one of the 'proofs' of early humans who actively scavenged for meat as part of their diet as evidenced from over 4,700 stone tools (Makaje 2000). Taking the hunting behaviour of chimpanzees as an example of co-operation between individuals, early humans used to ask one another for help in a hunt of larger animals. Muniafu (2010) believes that primitive tools and absence of language as a complex communication device lead to scavenging by early humans on a regular basis and contributed to diet daily. Today human scavenging is a common activity at Dandora dump-site. For years, the phenomenon has turned out to be a profession for low-income earners in Nairobi. Scavengers make a living through sorting solid waste materials and selling them to the re-cyclers who refine them for re-use. The key words of focus throughout the study were human scavenging activity. The terms are defined inclusively as behaviour of searching through waste for items that could be used for different purposes. Human scavenging is a practice that holds the truth that a scavenger is not only a bird or an animal but also a person who looks for waste materials in dust-bins and dump- sites for food stuff, plastics, metals, wood, stones, wire, bones but to mention a few for re-use. Therefore, this study concentrated on human beings as scavengers fending for food and sorting waste materials for re-use as means of livelihood and welfare. Scavenging theory adds that one searches for food by sorting out different items in heaps of waste materials. This practice of separating waste materials for re-use had many effects on the livelihood and welfare of the scavengers at the Dandora dump-

site. In addition to acknowledging the contribution of scavenging activity in the re-cycling industry, the previous studies did not provide sufficient information on the impacts of the practice to the livelihood and welfare of the low income earners at the site. The literature review showed a serious omission of information. Similarly, the issue of livelihood and welfare of low-income earners was weighty at Dandora dump-site. These scavengers had little knowledge about the dangers of the toxic materials. The site is a collection of non-toxic and toxic materials where sorting solid waste continue without order hence compromising working conditions and human health-care. Scores of scavengers in the site have either lost life or suffered from a health related diseases such as asthma, anaemia and skin infections just to mention a few. There was too much waste to scavenge at the site. For instance, Nairobi city generates enough waste materials that could sustain thousands of people in self-employment. The outcome of this study would lead to a set of recommendations in which policies will be established to improve livelihood and welfare of youths, elderly men and women at the site. In conclusion, this proposal aimed at assessing the effects of human scavenging on the livelihood and welfare of the poor scavengers at the Dandora dump-site. According to Muniafu (2010) report, high percentage of waste finds its way to the site due to increasing population in the city. This study was based on assumption that scavenging solid waste materials for sell had effects such as economic growth that lead to sustainable income. To achieve the goal of testing the effects of human scavenging on livelihood and welfare of the scavengers at the site, the following considerations were necessary. Firstly, the characteristics of scavengers at the site. Secondly; the type of solid waste materials to be studied. Thirdly; the protective measures against ill-health during the process. Fourthly, the effects of solid waste materials on livelihoods and welfare of the scavengers.

### 1.2 Problem statement

Human scavenging was seen in different forms such as sorting wastes for food and re-use in the re-cycling industry. In all the activities of scavenging, human beings were actively involved with solid waste that comprised of both toxic and non-toxic substances. In the case of Dandora dump- site, hundreds of young people scavenged solid waste materials for livelihood. The previous studies did not factor information on the effects of human scavenging and more particularly the livelihood and welfare of those who collected solid waste materials for sale. Going by the many young people carrying sacks to the dump-site, it was interesting to study the effects of 3 scavenging solid waste on their livelihood and welfare. It was not easy to answer some questions related to the practice of scooping valuable items in the site and taking them to the market for sale. Therefore, a study had to be conducted to reveal how much the practice impacted their livelihood and welfare. This study is based on the effects of human scavenging on the residents' livelihoods. Scavengers at the Dandora dump-site comprise of people of low education whom many have suffered ill- health in the process of scavenging toxic waste materials. In attempt to address the problem of insufficient information, this study proposes to improve scavenging on the basis of findings. Admittedly; solid waste materials have the potential of absorbing thousands of people for employment. UNEP (2008) report noted that re-cyclable waste is a profitable business, where every day, children from slums around Dandora go to the site in search of food, re-cyclables and other valuables they can sell. The missing link of effects on livelihoods of illiterate people is expected to tap the potential of scavenging millions of tonnes of solid waste for economic growth through income generation. This is an area that has not been exploited and information provided to the public domain. This study seeks to bridge the gap of information. Many companies currently make a lot of money through re-cycling solid waste materials. Moreover; they have also employed young people to sort waste for re-use. Nevertheless; nobody knows clearly the impacts of human scavenging on livelihoods of individuals and families of scavengers at the dump-site. UNEP report (2007) puts it clear that, the site is wide and open to accommodate many tonnes of waste from Nairobi County. Reports go further to

note that much of the Dandora solid waste materials are a source of livelihood to low income earners of the neighbourhood. Similarly; studies done by Comboni Missionaries (2009) reveal that the dump is ever busy with people coming to fend for livelihood. Moreover, UNEP (2007) report adds that young people look for valuable items in particular those that are metallic in nature for sale. Indeed, as referenced by the previous studies the dump has the potential of creating thousands of jobs. Malimosa (2008) concurs that the dump-site is a multi-million industry where politicians are highly involved. This report established that many firms have found new havens of re-cycling waste hence opening a big door for employment. Supporting the observation, Muniafu (2010) points out that those solid waste materials constitute of valuable items thrown at the site. It is clear that those who work at the dump-site make a living out of scavenging waste. As the UNEP report (2008) records that at the site and especially during hard economic times one earn between Ksh 50-150 a day. They scoop and separate all types waste from surrounding estates. A detailed study done by the UNEP (2007) indicates a lot of people can benefit from the sale of valuable solid waste materials. Solid waste is a resource. Comboni Missionaries (2009) observes that people of low income benefit at a great deal. It is evident that our waste is a resource to a product useful to life. UNEP report (2008) adds that life can be meaningful in relation to the income accrued from the daily earnings from the dump-site. Previous studies reveal a big potential in the human scavenging practice. Nevertheless, there is no sufficient information on effects on the livelihoods of people at the dump-site. As much as solid waste materials are seen as resources, it has impacts on peoples' life styles. UN research (2007) has shown that the site is a breeding ground for disease and contaminates the surrounding area with toxic chemicals. Here scavengers have little knowledge about the dangers involved in the waste but they make a living. For instance, UNEP (2008) report show that numerous boys have been known for spending many hours looking for items for sale daily. This study advances the argument that solid waste has the potential of creating employment thus improving livelihoods. According to Muniafu (2010), noted people around the dump are ignorant and cannot link any ill-health and positive impacts to the practice. The health of the users is important. Muniafu (2010) observes that many families have suffered from poisonous fumes in the dump-site. UNEP (2008), equally show high levels of heavy metals having a negative impact on the surrounding environment and the local residents. This study points out a big gap of information about effects of activities that affect the life style of human beings at the site. The implication is that scavenging waste materials for re-use is not captured in government policies hence leaving a big room for health abuse. Re-cycling is an obvious business, therefore; those who sort waste should work within a legal frame-work in order to protect the environment and their health. Some measures need to be taken to reverse the previous trend of health centres. Muniafu (2010) note that wide cross-section of analysts point out the requirements of transactions around the dump. For example; Comboni Missionaries (2009) observed that it was important to consider health conditions of those working at the site. Assumedly, human scavenging can lead to many health hazards. UNEP (2007) report indicates that there is an explosion in cases of respiratory, gastro-intestinal and skin diseases. For the hundreds of people who scavenge the site for food or trade-able items are at a threat of HIV/AIDS, hepatitis and other diseases from infected materials. And like any occupation, the results of scavenging are supposed to be fruitful with fewer health implications among the residents. The current study has singled out the gap of effects that needs to be bridged with the correct information in order to improve livelihoods of Dandora dump-site. 1.3 Research questions. The study had one general and two specific questions. These questions posed were addressed and a solution found using empirical data concerning the effects of human scavenging on livelihood and welfare. The study problem was presented through two questions: 1. Are there effects of human scavenging on livelihood and welfare of scavengers

at the site? 2. Will the activity improve living standards of low-income earners scavenging at the site? 1.4 Objectives: To look for distinctiveness of human scavengers at the dump-site, to find out the type of solid waste materials scavenged and disposal outlets, to examine measures used to protect scavengers against ill-health of solid waste materials and to examine the effects of the solid waste materials on livelihood and welfare of scavengers. 1.5 Range and boundaries of this work. Dump-sites country-wide required a lot of time and money which was not available. Therefore; the study was done in Dandora dump-site with an assumption that the findings were applicable to other sites. The target group had low education hence it was assumed that they might not understand questions for interviews thus giving false information. Additionally; scavengers kept off from visitors in fear of their activities been exposed and for that reason time was needed to create awareness about the study. 1.6 Importance of this work. Theoretical and practical impact noted were, first and foremost, the findings acted as a reference to similar work on human scavenging. Secondly, the findings were expected to improve human scavenging for commercial purposes in the recycling industry. Thirdly, the data was made to benefit devolved governments in planning dump-sites in the counties. Fourthly, the study generated information that will add knowledge to the literature of human scavenging. Fifthly, policy-makers will have enough information to make proper human scavenging guide- lines in the dump-sites. 1.7 Definitions of terms. Human: A creature with a high intellectual ability than an animal. Scavenging: Means of searching valuable materials for sale by human effort. Human scavenging: Is an occupation of low-income earners searching for valuable solid waste materials for sale such as plastics, metals, wood, leather, stones, bones, wire, glass and manure. Protective measures: Effort of protection against ill-health from toxic solid waste materials. Awareness: To be well informed, having knowledge or realization of risk, danger or threat. Sustainable: To support; to keep alive or in existence for a long time. Livelihood: A way of earning a living or income and an occupation of selling solid waste materials that can be re-cycled for re-use. Welfare: Happiness, care, prosperity of a person or a group. Money paid to those in need. Perception: It is an insight, opinion or an observation. Policy frame-work: It is law that gives direction and the regulation. Solid: Not in form of liquid or gas; of the same substance throughout containing only one specified material; figure of three dimensions having length, breadth and thickness. Waste: Not fit to be used; no longer useful and to be thrown away. [CHAPTER 2. 0 LITERATURE REVIEW AND THEORETICAL FRAME-WORK](#) 2.1 Opening remark. This work sought to create a link with previous studies through the generated information from reliable sources since this it is not 100% original. First and foremost, literature explaining the characteristics of human scavenging has been provided to establish a foundation of the study. In addition to the uniqueness of the activity, the research dwelt on scavenging at Dandora dump- site. At the site, studies were carried out to determine the type of solid waste materials scavenged. Since solid waste materials comprise of both toxic and non-toxic substances, the study looked at information supporting protective measures against ill-health of the scavengers at the site. Further, this study provided the impacts associated with solid waste material at the site. Scavengers at the site depended on solid waste materials for livelihood and welfare therefore; this section of the work analyzed disposal outlets that make the practice profitable. Re-cycling opened an opportunity of living, consequently; this part of the study gave a detailed feature of positive effects of scavenging activity. Furthermore; this chapter has provided effects of human scavenging on livelihood and welfare of the individuals involved in the practice. This study went on to add information concerning national law of dumping and solid waste material management. The practice is a source of living to hundreds of scavengers, therefore; this chapter finally provided their perceptions about re-locating the site. 2.2 Global overview of human scavenging Haralambos (1995) records that the current human activities have a millennia-old cause that stretch from

the pre-human ancestors. Scavenging at the Dandora dump-site is an ancient human behaviour of searching for food. Schaefer (2004) observes that urbanization throughout the world has increased dumping of solid waste materials. From a global perspective it is, therefore; clear that scavenging is increasingly gaining importance in sustaining livelihood of low income earners in the developing nations through recycling solid waste materials.

### 2.3 Characteristics of human scavengers

Human scavenging entails the use of one's hands to pick valuable items that can fetch money in the re-cycling companies. MacCalman (2008) adds that scavengers do not care when looking for valuable materials. The risks are very high due numerous items that are so toxic and life threatening. The people who rely on scavenging are low income earners. They are exposed to toxic and non - toxic materials at the site. Kim (1998) notes that all that seem to be harmful to human beings will ultimately find itself to the site. Additionally, the activities of scavenging are done all the day long since the site is open 24 hours. This behaviour is lead by desire to eat; therefore, one is able to access the source of food at a time of need. MacCalman (2008) observes that dump-sites are never put under electric fence hence allow in and out flow of people.

### 2.4 Human scavenging at Dandora –site

Dandora dump-site is ever busy with groups of children, youth, elderly men and women trying to make ends meet. Malimosa (2008) observes that young people find a way of earning an income to address daily up-keep in the family. Residents of Dandora have an alternative livelihood through scavenging. Those who cannot get a job prefer human scavenging for a means of a living. The solid waste materials in the site sustain their lives. UNEP report (2009) note that in Dandora more than half million people live around the dump-site and thousands try to make a living on the scraps and rubbish dumped on the site. There is a variety of materials to be scavenged at the site. UN-Habitat report (2008) records that the most desperate people find refuge at the site as they try to survive and make a living out of the rubbish that surround them including paper, glass, metals, wood, plastic and even food. The site receives tonnes of solid waste that human scavenging cannot exhaust. Muniafu (2010) alleges that at Dandora dump-site 2000 tonnes of waste is dumped in the site every day, which means from a mathematical perspective, this weight amounts to 12,000 tonnes in a month and 0.144 million tonnes in a year. It is true from the provided statistics that the site can sustain human scavenging for years. Nevertheless, it matters the solid material scavenged. Most of the materials are more valuable than others and they fetch good money in the re-cycling companies. Kim (1998) report reveals that the huge waste at the dump makes thousands of Dandora residents make a living.

#### 2.4.1 Type of materials scavenged at the site.

Dandora dump-site is a collection of all types of solid waste materials. Muniafu (2010) note that as the population of Nairobi increase, waste continue to pile at the site which translates to income per day. Historically, scavenging at the site did not start in the recent past. Muniafu (2010) is trying to cite dumping of solid waste materials from 1973 and predicts the amount that is likely to be dumped in the site by 2015.

Year	Waste (Tonnes)
1973	452.661
1975	501.921
1985	850.861
1998	1,426.002
2002	1,530.003
2004	2,347.004
2015	2,679.895

Muniafu (2010), Solid Management in Nairobi. Vol.2 No.1 The data provided feature only the total collection of all kinds of materials. Muniafu (2010) record that high percentage of solid waste entail plastics in addition to other items. Scavengers at the site look for anything that can bring money. Malimosa (2008) note it is clear that re- cycling business around Dandora dump-site depend heavily on scavenging for sorting solid waste materials. At the site, the valuable materials which are scavenged include the metals, glass, plastics, wood, stones, wire and even leather. UNEP report (2007) shows that there is a lot of business going on around the site and its environs.

### 2.5 Measures of protection against ill-health

Scavenging is a risk activity and the people do not have protection. Further, the site poses a health threat both to the scavengers and the residents of Dandora and the neighbourhoods. UNEP report (2009) recorded that health centres have

attended to hundreds of people around the site. Malimosa (2008) observes that there are unique cases of infections related to fumes at the site. Studies carried in the past revealed that the site is not safe. This is true to the practice of 11 scavenging. MacCalman (2008) notes that site has high levels of dangerous chemicals that affect human health. If children have been affected health-wise then it means scavengers are equally in danger. Muniafu (2010) shows that 50 percent of the children found at the site had been tested and proven to be in a certain level of danger of blood complications. It is not safe for scavengers to go on with their work. UNEP report (2009) points out low hemoglobin levels and iron deficiency anaemia leading to kidney failure and brain dysfunction. Also to note, hundreds of people who scavenge at the site for food or tradable items face the threat of HIV/AIDS, hepatitis and other diseases from infected materials. More importantly; the health of scavengers is not protected and guided by a policy. Leakage of harmful metals to water and environment are poisonous. (Wood 1981)

### 2.5.1 Negative impacts of solid waste collection.

Many people in Dandora estate resort into human scavenging because of poverty. Unemployment is a problem that leads scavengers to the extent of picking contaminated food. Wood (1981) observes that expired food thrown in the site is not fit for human use hence dangerous. In addition to contaminated food stuffs there are other health hazards. UNEP report (2009) record that health hazards associated with the Dandora dump-site are known to affect and paralyze all systems of human body. The report also indicates people around the site have test positive for many terminal diseases. Worse off; employers dealing with re-cycling firms around the site do not care for the health of workers. UN-Habitat report (2008) said that scavengers work under dangerous conditions which open to all sickness. UNEP report (2007) found; “out that industrial wastes such as used chemicals, raw materials, expired products and sub-standard goods , agricultural wastes such as fungicides and herbicides and hospital waste including packaging materials, and containers, used syringes and other sharp, biological waste and pharmaceuticals are all dumped at the site”. It is clear that scavenging conditions are not favourable hence posing health risks. JICA report (1998) noted that both at the site and hundreds around it are at risk of pollution. UNEP report (2009) point out that it is worse for those come to collect items on rare occasion. On social front, children get easily mislead into wrong life-styles because of scavenging to make money. Malimosa (2008) alleges that children in schools around the site have double focus on money making and learning. In such close distance to the site children will always hide and scavenge items for sell. Mangizvo (2010) notes that the dump-site has lured hundreds of children into life in streets on the basis of scavenging for livelihood. Kim (1998) says scavengers have the worst life encounter with sickness engineered by poisonous fumes from the site .once set on fire. According to UNEP (2008) report, scores of people around the site have been treated of complications linked to the site problems. Additionally, Comboni Missionaries report (2009) showed those treated in the neighbouring health facilities showed the level of danger exposed to scavengers and residents of the area. This is a high percentage of infection that would be stopped and perhaps controlled if the residents of the area operated under a strict guide-line. This study sought to learn the existing national law that controls the needs of stakeholders at the site. For instance; the scavenger group falls within the wider scope of the regulation that does not specify properly the operation requirements hence many end up with health complications or succumb to death. This makes scavenging a bit difficult and prone to health risks. Controlled Substances Regulations (2007) states that; “regulation mandates NEMA to monitor the activities of persons handling controlled substances, in consultation with relevant line ministries and departments, to ensure compliance with the set requirements. Under these regulations, NEMA will be publishing a list of controlled substances and the quantities of all controlled substances imported or exported. The list will also indicate all persons holding licenses to import or export controlled substances, with their annual permitted allocations”.

### 2.6 Solid waste disposal outlets-

recycling market. All that find way to the Dandora dump-site is a resource. Low -income earners sort out materials and sell them to dealers who work in re-cycling firms. They do not leave anything behind that can make money. Malimosa (2008) confirms that everything to the poor is money. Dandora dump-site has a strong outlet for waste through re-cycling. Mangizvo (2010) says that if the site can be under good management it is able to provide income for many young people.

### 2.7 Awareness about positive effects of solid waste materials.

Human scavenging is a reliable means of livelihood however; its benefits cannot be attained if the people involved in it are not knowledgeable about the dangers. According to Mangizvo (2008), there is need for general understanding of waste handling principles. However; harmful effects realized at the site would be less if there were proper awareness strategies of reducing toxic substances. NEMA report (2009) says that all the people must be knowledgeable about risks linked to waste. Even though McCalman (2008) points out that many people live in ignorance and open to serious health challenges.

#### 2.7.1 Effects of solid waste materials on livelihood and welfare.

Scavenging solid waste at the site has had positive effects on the income of the poor. Firstly, scavenging has increased income hence better living standards of the residents around the site. Muniafu (2010) adds that scavengers at the site have held dear scooping waste for livelihood and welfare hence formed a heavy network of business that end up creating opportunity to the jobless. Muniafu again acknowledges solid waste has opened a rare opportunity for employment thus improving livelihood. Dandora dump-site is like gold mine. Muniafu (2010) alleges that the rich have a strong decision on the business at the site. Benefits from the site have changed the perception of the residents more than the harm it causes to them. UNEP report (2009) notes that collections of solid waste have transformed living standards of many scavengers and the idea of re-location is not 100% given support. Human scavenging has positive effects to the livelihood of residents and their dependents. Muniafu (2010) observes that proponents of the re- location propose more efforts to be put in place to benefit low-income earners. In addition to reducing poverty among families, the percentage of social evils is going down because the unemployed youth have a means of generating income for livelihood and welfare. The site has become a business hub and a life-line to many scavengers. UNEP report (2009) records that Dandora dump-site has a bee-hive of sorting of solid waste materials. This report continues to note that hard economic time has established a culture of survival, which leads scavengers to fend for livelihood and welfare. Indicating the significance of the site, Kim (1998) says that children are the best agents for sorting waste in the site for business. UNEP report (2008) show that collection of solid waste and sales has brought dependence on the site. JICA report (2009) alleges that school children rely on waste food-stuff such as sweets and chocolate from the dump-site which they sell secretly at the gates. Mangizvo (2008) adds that children are not only the beneficiary of the dump-site. He observes that women also collect items for sale. Scavenging is an up-coming means of livelihood for those that are not employed. This is one sector that can create many opportunities of employment if regulated and guided by policy. The increase of population coupled with double amounts of solid waste materials in the city justify the need to formulate a frame-work of sorting materials in order to guarantee creation of jobs for livelihood. There are million tonnes of solid waste material at the site. This is a resource that needs to be exploited for meaningful gain. UNEP (2009) indicate that many scavengers live on sales of scrap metal, cables and bottles which they re-sell to brokers in the large industries. 15 At present, Nairobi city is experiencing excessive waste disposal as compared to the rates of 1990's. Muniafu (2010) observes that increased generation of waste to globalization, technological advancement in the industrial sector and population increment in city. Nairobi City Council report (2010) indicates that lots of waste materials coming to the site are drawing focus for business. On the basis of the predicament, this study find logic in re-use of waste materials as a way of turning the situation to be an opportunity for

employment for thousands of young people in the city and an innovation for vision 2030 through scavenging as an appropriate skill of sorting tonnes of solid waste for re-use. The study acknowledges the challenges that the local authorities have gone through in the attempt to manage waste materials. Solid waste material needs to be harnessed and processed for re-use. It is evident that over 70 firms have understood the potential in solid waste materials for commercial purposes. Since immemorial human scavenging had been used to fend for food. This happens to be a natural and simple way of separating many items hence putting them in different categories. Due to unemployment many young people have found havens of making a living. The present study finds it worthy determining the effects of human scavenging on livelihood and welfare of the scavengers at the site.

### 2.8 National law on solid waste management.

Solid waste materials are a phenomenon of the urban centres and therefore, the current issue of scavenging does not feature prominently in connection with dumping and management. Regulations management report (2008) say that inadequate policy guide-line has left a big room for abnormalities that result to poverty, illiteracy and malnutrition. The provided policy does not clearly stipulate the scope, the requirements, capacity building and site maintenance, awareness initiatives as regulatory frame- work at an individual level. Individual scavengers have nothing to guide as they go about livelihood and welfare work around the site. Focus only is on industrialists, hotel industry, agriculture and those in the manufacturing industry. Admittedly; there is little information on how an illiterate scavenger would go on with the procedure of sorting materials mixed with toxic and non-toxic substances. It is true that the provided regulation, offer guide-line to the upper cadre of handlers of solid waste materials. The scavenging groups who are of low economic class are neglected and no proper policy on how to go about their transaction of sorting solid waste materials. During the initial policy establishment probably little had been known of scavenging solid waste materials and consequently a gap was left on how it can impact livelihood and welfare of the individuals. According to Kim (1998) the degree of scavenging is so intensive at the main Dandora waste disposal such that a visit to the site during the day appears as if the scavengers are people working in a rice field. The point of concern, here is how scavenging is done? The previous studies note that the mandate of the concerned authorities is limited. JICA report (1998) for instance; claims that there are no proper guide-lines on waste disposal. Environment News Service (2007) observes that for the livelihood of the poor measures must be put in place to help them benefit from re-cycling waste. This simply means that scavenging waste for re-use is not illegal. It is clear that scavenging behaviour is not well defined and its confinement within law but an omission of the rightful scavenging policy. NEMA report (2006) distinguishes the agency from other institutions for its key role policy enforcement. Previous studies highlighted livelihood of the poor at the site nevertheless their activities were not captured in the national management policy.

#### 2.8.1 Significance of the Dump-site to the community.

There are different opinions about re-locating Dandora dump-site. These observations range from the scavengers at the site, the neighbourhood, the non-governmental organizations and the government. It is clear that the Dandora dump-site continues to file up with thousands of tonnes of solid waste materials. UNEP report (2008) indicates that thousands of tonnes find way to the site on a daily basis. Malimosa (2009) adds the dump has broken international laws on environmental care for decades. JICA report (2010) contented that scavengers see garbage (taka) as money. They believe that letting the site be re-located will mean giving away money and a source of livelihood. This argument from scavengers has found support from some government quarters that believes that the site can be made better and friendly to the environment. Dandora site is not different from other known dumpsites in the world. NEMA report (2008) cites around the world have transformed dump-sites for economic use. This report does not support the idea of re-location of the site. Further, NEMA report (2010) show that the City

Council of Nairobi work-force is unable to handle the huge garbage collected daily towards the site, consequently; residents of Dandora estate see the site as health problem. UNEP report (2009) indicates that Dandora dump-site is to be moved on the grounds of health risks to the residents. It is argued that Ruai site has an advantage in that, if developed by the government it will support modern waste re-cycling facilities, which are missing at the Dandora site. The non-government organizations and the government want to see the site re-located to a sanitary land. The position of the government was to de-commission the Dandora hence establishing Ruai site to provide recycling facilities. However; Muniafu (2010) says that the Dandora is under control of wealthy people who seek to maintain the status quo in order to protect business interests. The authoritative position taken by politicians and business people make it hard to re-locate it.

### 2.9 Theoretical plan of this work. Sustainable livelihood theory explained the phenomenon exhibited in the dump-site where scavengers generate income with full knowledge of the dangers involved in handling solid waste materials.

#### 2.9.1 Sustainable livelihood theory

Society has a system that controls all the activities of man-kind up to including the way of livelihood. Nevertheless, sustainable livelihood approach advance the insight that the system is likely to distort regulatory guidelines of survival hence subjects ending up looking for an alternative means. Majale (2002) observes that our governance system comprise of departments within ministries which not deliver their mandate to the citizens. It is not the wish of the scavengers to resort into separating toxic and non-toxic substances for livelihood and welfare at the site. These persons sorting solid waste for valuable materials have families to care and feed. However, they are unemployed. Series of corrupt deals and bad policies of the government cannot provide a solution to the thousands of unemployed youth, elderly men and women. To sustain themselves, scavenging is the only alternative means of livelihood and a strategy of reducing poverty. Makaje (2000) defines livelihood as:- “the capabilities, assets (stores, resources, claims and access) and activities required for a means of living: a livelihood is sustainable which can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the long and short term”. Sustainable livelihood approach alleges that there are enough assets around man-kind which can help improve living standards of individuals and families. Dandora dump-site is an environment with all assets to sustain low income earners even though at their own health risk. Schaefer (2004:358) notes that human ecology is concerned with inter-relationships between people and their environment. It is clear that there is a unique manner of inter-relation within the system where man produces waste which again he utilizes to address needs. It is therefore; by nature that scavengers find themselves going back to waste products when nature press hard with needs of livelihood. When individuals, households and communities encounter ineffective regulatory system, sustainable livelihood approach advance that a coping and adaptive strategy is sought to respond to external shocks and stresses such as corruption and failed policies. This theory provides a strong conceptual base of explaining human scavenging as a strategy of livelihood at the Dandora dump-site.

#### 2.9.2 Self-help theory

Life is the concern of an individual therefore, ineffective government systems and poor policies put heavy life burden that lead to alternative means of survival. In that perspective, self-help approach maintains that human beings will always find ways of sustaining life even when the situation is difficulty. Waltz (2004), upholds that that no other states can be relied upon to help guarantee the state's survival. He; further believes that states act in a rational manner in a spectrum of many states competing for autonomy to control resources. Similarly, human scavengers find it as their prime responsibility to look for livelihood against the laid down norms of survival in the society. According to self-help theory, human beings have an ultimate authority over means of livelihood in a multitude of

actors looking for resources. Definitely, human beings act over and above all the laid down policies in order to safeguard life. Beebe (1989) observes that human behaviour cannot sufficiently be explained by one theory and therefore self-help approach seek to provide a deeper insight and prediction of the occurrence of human scavenging phenomenon as a means of livelihood. Human scavenging is an inevitable behaviour. When systems of life are not working, self-help approach explains what to expect and the likely results. 2.9.3

Conceptual framework. Conceptual framework of the study included a network of variables that exhibit the flow and direction of their relationships. In the current study the focus was on the effects of human scavenging on livelihood and welfare. This implied human scavenging an independent variable while sustainable livelihood as a dependent variable. 20 Figure 1:

CONCEPTUAL FRAME-WORK. Independent Variables Characteristics of human scavengers Types of solid waste and disposal outlets Protective measures by scavengers Dependent Variables Effects on Livelihood and Welfare Perceptions of solid waste collectors The above figure shows other variables seeking to bring influence on dependent variable. The proposed scheme of work includes two types of concepts, the independent and the dependent variable. Livelihood and welfare change can also be as a result of characteristics of human scavengers, type of materials scavenged, protective measures and perceptions of solid waste collectors

2.10 Operational definitions Refers to statements made by the government in its various documents as well as national leaders on solid waste materials. This study did assessments on the following aspects:- Livelihood among the scavengers Livelihood: Assessed on the basis of the following aspects:- a. Family stability: Peace of mind in the family as a result of guaranteed income. b. Savings: Money put aside after all other family expenditure. c. Acquisition of assets: The ability to buy domestic assets and meet household needs. Welfare of the scavengers in the interest groups This variable was assessed based on the following effects:- a. Group membership: Referred to membership in scavenging group. b. Goals and activities of the group: Referred to specific goals and activities of the group. c. Frequency of meeting: Referred to the number of meetings in a month. d. Support from the group: Referred to how members were assisted in the group. e. Reason of joining the group: Referred to individual reasons of joining scavenging group.

CHAPTER 3.0 RESEARCH METHODOLOGY 3.1 Introduction This chapter outlined the procedures of conducting the study. It began with identifying the site of study and the strategy of assessment. Further, it provided an assessment design; a sampling methodology that helped to collect data from the target population. 3.2 Site selection and description The site of the study was at Dandora dump-site which is located in Embakasi constituency, 4 kilometres away from Nairobi city. It is surrounded by residential estates such as Baba Dogo, Dandora, Kasarani and Kariobangi. It is the major disposal point of waste materials from the whole city. Re-cycling of waste materials such as wood, metal, glass, wire, plastic as well as stones sustain livelihood of hundreds of scavengers. Business contacted at the site is on the basis of human scavenging acquired over the years by the vendors of solid waste materials. This occupation is natural and normally practiced in the time of need for food particularly at the site as a source of livelihood and a means of employment. Nevertheless; the focus question in this study was; “Does human scavenging have effects on the livelihood and welfare of Dandora dump-site low income earners?” Therefore; this study sought to assess the effects of human scavenging on livelihood and welfare of scavengers at the site. 3.3 Research Design The study was based on survey with a fact finding for maximum reliability of the outcome. To determine the effects of human scavenging on livelihood and welfare of low-income earners at Dandora dump-site, the researcher used both qualitative and quantitative techniques to analyze data. 1.4 Units of observation and analysis. Respondents on survey showed a progress in livelihood and welfare. Indicators in the study were food, rent, school fees, welfare contribution and medication. The practice added value to the needs of the respondents. To study the effects of

human scavenging on livelihood and welfare, the researcher looked at the number of government statements and gazette notices about dumping regulations. Further, the study looked at age, years of scavenging, marital status and education of the scavengers to see how these factors contribute to their livelihood. The study also sought to establish the type of trade-able materials that brought income hence improving living standards of the scavengers. The type of protective devices against ill-health was studied to 23 determine the impact towards living standards of the scavengers. The kind of decisions made by the scavengers was assessed and the change they brought to the lives of the group. To every factor related to the livelihood and welfare of the scavenging group was analyzed in terms of income per day, savings per month and investment in a month, school fees paid per term and medical bills per month.

1.5 Target population, Sample size and Sampling technique The dump-site has an estimated population of 500 scavengers both men and women. The population at the site is in terms of the individuals involved in the process of sorting waste materials and do not have homogeneous units in terms of age, gender, marital status, experience and level of education. This research chose (40) scavengers as part of the target population such that the selected portion represented the group in the site. Further; the population entails young men and women who earn little income from unreliable sources in the society. They have a rich experience in scavenging solid waste materials in search for valuable items for food and sale. A good number of them sniff glue and smoke bhang. This was a complex study. It was not easy to get representative sample from the larger population therefore; the researcher selected respondents using sampling methods that are non- representative. Not being easy to use other methods to obtain a sample, convenient sampling technique was ideal for drawing 40 respondents required for study. In this case, the researcher was able to reduce bias in the selection. This method entailed the use of contacts of scavengers at the site in order to build up a sample of the group to be studied. Further; individual scavengers were used to introduce their friends to the researcher hence building the required sample of study.

3.6 Case studies The study also used case studies to get detailed information from 3 well informed scavengers. From the nature of the behaviour studied, the researcher tried to obtain a representative cross-section of the population. On the basis of human behaviour, the characteristics could not be representative. The individuals portrayed unique behaviour in attempt to sustain livelihood. These cases did not guarantee representative sample of the study even though they provided a comprehensive understanding of the scavenging group.

3.7 Techniques of data collection. a) Secondary data The available sources of information were the newspaper; journals, gazette notices, government policy documents and reports published books and related research findings. b) Primary data. In this study, the researcher collected information from the identified respondents at the site. The respondents chosen for study answered questions from a well designed questionnaire with closed and open –ended questions. To get relevant information, the researcher interviewed the key informants. In the study, key informants with vital information about human scavenging were interviewed and generated qualitative data.

3.8 Tools of data collection Questionnaire The questionnaire consisted of both closed and open questions examining the characteristics of human scavengers, the type of solid waste and disposal outlets and protective measures by scavengers. First and foremost, the questions sought to explore bio-data of characteristics such as age, sex and marital status. Further, the opinions of the respondents were collected in the data. Secondly, economic variables such as earnings, savings, academic levels and investments were captured in the data. Thirdly, the study recorded the factors that influence human scavenging such as language, religion and ethnic background. Interview guide for key respondents The researcher used an interview guide with pre-determined set of questions which were simple and open. The guide was flexible to factor relevant issues from the key informants. The responses from the informants were recorded in a tape upon writing down the necessary details.

3.9 Data analysis The

information obtained in the study was interpreted and presented in pie charts, tables, and histograms. The findings have given direction to human scavenging and its effects on livelihood and welfare of Dandora dump-site scavengers. The numerical data also gathered and analyzed using SPPSS for easy interpretation. In this case the researcher used statistical tools to project the future situations of human scavenging for commercial use. The projections attained enhanced the occupation of scavenging therefore; foreseeing future trends for improved livelihood and welfare. In this study; data was put in a statistical form in order to be understood and interpreted. In operationalising the concepts of measurements, scavengers under study were real. Designated variables were measured at nominal, ordinal, interval and ratio. Nominal variable was a category of labels. Scavengers group was categorized into age, gender, marital status and level of education. The nominal variable waste had three categories plastics, metals, wood and glass therefore scavengers were categorized according to the type of materials sorted for sale. In this case the class of nominal variable was an arithmetic operation. This research dealt with measures of nominal scale into measures of percentages. At the site, the materials were positioned in a numbered order in accordance to the frequency of sorting from the site. The categories were labeled as rare, occasional, frequent and regular. The scavengers were ranked in the extent in which they acquired education, training and awareness of scavenging risks. The researcher was able to rank, add and subtract the units. A variable was considered to be in ratio level if the scale of values assumed by the variable ranged from an absolute zero value 0 to 100%.The current research synthesized a set of values reflected in the variables in statistical measures making quantitative data useful. All the variables studied helped the researcher to understand the scavenging population through data. The responses generated in the interviews and group discussion were coded and quantified in order to make computation and interpretation possible. In measuring the factors of the scavengers it was vital to assign a numerical value to represent rate of the variables measured. The large numbers recorded were summed up into categories through classification which harmonized numbers on value distribution. Raw data from the field was organized in a way of arranging it in pre-set format through statistical tools that enhanced description of the situation in numbers. Raw data therefore, acquired distribution of values for statistical interpretation.

**CHAPTER 4.0 DATA ANALYSIS, PRESENTATION AND INTERPRETATION**

**4.1 Introduction** This chapter analyzed and presented data collected from the scavengers at Dandora dump-site in Embakasi constituency. The data was based on the conceptual frame–work of the study discussed in chapter three guided by the following objectives:-To examine the characteristics of the respondents involved in scavenging at Dandora dump-site; to find out the type of solid waste materials scavenged and their disposal outlets; to examine measures used by scavengers to protect themselves against ill- health at the site and to examine the effects of the solid waste materials on livelihood and welfare of the scavengers. The empirical data presented in this study answered all the proposed questions thus adding more knowledge about human scavenging as an emerging form of self- employment to hundreds of people.

**4.2 Characteristics of the respondents involved in scavenging at Dandora dump-site** The first objective of the study was to examine the characteristics of human scavengers at the Dandora – dump site in terms of gender, age, marital status, education level, religion, ethnic composition, language and dependents. To help understand the presentation of the aforementioned characteristics, below is a table showing gender, age and marital status the findings. Table 2. Gender, Age, Marital status and education level of the respondents.

Characteristics of solid waste scavengers

Frequency (N)	Percent (%)
Male 37	92.5
Female 3	7.5
Total 40	100
Age 7-13 Years 5	12.5
15-19 Years 17	42.5
20-24 Years 6	15
25-29 Years 12	30
Total 40	100
Marital Status Married 25	62.5
Widowed(er) 13	32.5
Divorced 1	2.5
Separated 1	2.5
Never married 0	0
Total 40	100
Level of education Level	Number
	Percent

Primary 22 55 Some secondary education 3 0 7.5 0 Completed secondary 15 37.5 No school Total 40 100

**Gender** The respondents interviewed were 40, consequently; the study showed that 83% were men while 17% were women. The data revealed that the phenomenon of separating solid waste materials was dominated by men. The researcher sought to know why women were few in the business and a key informant said, “We fear men raping us therefore; we are not comfortable working with them without authority to protect our rights”. Age Age was also another aspect that was under study and the outcome depicted that age bracket of 15-19 years constituted 54% followed by 21% of those with 25-29 years. Records show that 20-24 years 28 represented 15% while 7-14 years 10% as the least age bracket among the respondents. The ideal age for scavenging was also an issue of concern. The modal class as indicated from the table above was 15-19 years. This age bracket had the highest distribution meaning that it was the ideal age for scavenging.

**Marital Status** By nature, scavenging demanded many hours of bending and lifting heavy materials in search of valuable items for sale. The study sought to establish the representation of the respondents in terms of marital status. In that regard, the findings showed that the majority of the respondents were married with 65% control of the business. Further; the widowed(er) had 33% showing that they also had dependents that needed income for livelihood. Divorced and separated respectively had 1% representation which was a clear indication of less family dependents. Moreover; those who had not married did not have family need and therefore with 0% representation.

**Education level** Further; the researcher also wanted to know the levels of education among the respondents and the table below illustrated the outcome of this feature. The majority of the respondents had attained only primary education with 55% share of representation in the business. The next level with greater control of the activity was represented by 37.5% of no school. The records showed that those with some secondary education stood at 7.5% at the site. Results indicate that nobody had completed secondary school and for that reason; the representation was 0%. Computer literacy was also a feature of consideration in the study and the findings showed that 98% of the respondents did not have the knowledge. Only a few of them knew how to operate a computer with 2% representation.

**Religion** Moreover; the study was out to know religious composition among the respondents at the site and the figure below showed the findings. Among the respondents studied 77% were Christians. None-believers came second in population size with 17% while Muslims had a percentage value of 6% in the activity. The figure below has the full details on representation. Figure 2. Religious representation of the respondents at the site. Christians, 77% Muslims No religion , 17% Christians Muslims, 6% No religion

**Ethnic Composition** Ethnic composition was also studied to understand who controlled the business and below is a figure demonstrating the data. As revealed from findings, ethnic composition varied in control of the activity. The Kikuyu represented 90% in the business followed by the Kamba with 45% while Luyias were the least with 34.6%. Other ethnic groups were insignificant and not captured in the data. Figure 3. Ethnic composition of the respondents at the site.

Ethnic Group	Percentage
Kikuyu	90
Luyia	34.6
Kamba	45
Others	30

**Language** In every activity involving more than two people communication was essential and therefore; the researcher wanted to establish the languages spoken at the site among the respondents. To help know the outcome of the study, the figure below has details. The findings revealed that 82% of the respondents spoke Sheng and 10% Kiswahili. Mother tongue and others respectively showed 8% and 0% in representation. Figure 4. Languages spoken by the respondents at the site

Language	Percentage
Sheng	82
Kiswahili	10
Mother Tongue	8
Others	0

**Dependents** The respondents had a heavy burden of providing livelihood to dependents in their household who ranged from spouses, children, siblings, relatives, friends and adopted children. Below is a table showing categories of dependents of the respondents who relied on income from the site. Table 3.

**Dependents in the households** Characteristic of the household of the respondents Frequency

(N) Spouse 1 Percent (%) 1 Type of dependent Daughter 14 57 Son 6 13 Siblings 10 22 Relatives 2 2 Friends and Non relatives 5 3 Adopted children 2 2 Total 40 100 Special Dependent Directly dependents 33 82.25 Indirectly dependents 7 17.75 Total 40 100

The table above revealed the reality of life in Nairobi with dependents. Direct dependents included the spouse 1%, daughter 57% and son 13%. The study revealed that indirect dependents included siblings 22%, adopted children 2%, relatives 2% and friends with non-relatives 3%. The study found out two types of dependents which were special dependents with 82.25% direct and indirectly dependents 17.75%. The numbers of dependents showed a heavy burden of livelihood. One of the key informants said, "Life in Nairobi is expensive and one has to look for means of livelihood".

### 4.3 The type of solid waste materials scavenged and disposal outlets

The second objective of this study was to determine the types of solid waste materials scavenged, non-toxic materials, level of experience, means of transport, storage, disposal outlets and income. Types of solid waste materials in the site

The respondents interviewed said plastics were marketable than the other solid waste materials. This fact is therefore; clear plastics at (90%) with the highest demand in the re-cycling industry. The figure below also showed that metals at (28%) followed with a low demand in the market. Glass (20%) and other materials were of least value. The materials at the site were a mixture of toxic and non-toxic. In addition to plastics, metals, glass and others the respondents also picked anything that was useful. There were times in which they picked food stuffs, manure, wood and others. It is clear that the dump-site is full of wealth. Figure 5. Valuable materials on percentage scale measure 100 90 80 70 60 50 40 30 20 10 0 Glass Metals Plastics Others

Glass Metals Plastics Others Non-toxic materials Respondents said that the dump-site was full of valuable materials such as food, wood, materials for manure and others. The figure below show that food stuff with 46.9% was collected in large quantities followed by materials for agricultural manure at 45.9%. Wood and others were also available for market in 45% and 43.9% respectively. Figure 6. Non-toxic solid waste materials useful 47.5 Manure Percentage 47 46.5 46 45.5 Food stuff 45 44.5 44 43.5 Wood 43 42.5 42 Manure Food stuff Wood Others Others 45.9 46.9 45 43.9

### Solid Waste Materials Level of experience

The study showed that respondents did not start scavenging at the same year and therefore; the table below indicate the years in which they began benefiting from the sales of solid waste materials. Records showed that 72.5% began scavenging in the years between 2008 and 2012. Respondents who began the activity between 2002 and 2007 stood at 20%. The year between 1997 and 2001 represented 2.5% while 1996 had 5% of respondents beginning the activity at the site. Table 5. The year one began scavenging at the site. Year of beginning scavenging Range 2008 -2012 2002-2007 1997-2001 1996 Frequency (N) 29 8 1 2 Percent(%) 72.5 20 2.5 5

### Mode of transport

To reach markets outside the site one needed transport and the researcher also sought to know the mode of transport used. The figure below illustrates different modes of transport used by the respondents to reach their preferred markets. Individual means constituted 50% of transport followed by 34% Boda Boda. The use of lorry represented 15% and others took 1%. The study indicated that human transport was significant since majority of respondents were poor. Figure 7. Mode of transport to the market. Boda Boda 34% Lorry 15% Boda Boda Lorry Others 1% Individuals 50%

Individuals Others

### Storage

The study also sought to establish whether there was any storage before dispatching solid waste materials to the markets and the figure below displays the picture of storage prior to dispatch. Figure 8. Storage of solid waste materials before dispatch No Yes The figure above illustrate that 99% of respondents said that solid waste materials were not stored. They went on to say that at the site there were no storage facilities even though it was necessary. Only 1% said that they stored materials before dispatching to the market. It was clear that this activity was not well structured with storage facilities. Disposal outlets. It was vital as to enquire more about disposal outlets and markets of the waste

materials and the figure below explains the ready markets of the products from the site. The findings demonstrate that the largest sales of solid waste materials found market in the industries with 0.4 tonnes per week. This allegation is clearly supported by majority saying all the time they sold in the industries. Agricultural firms (0.35 tonnes) were second preferred markets with respondents indicating most times they found a market. Occasionally, companies(0.3 tonnes) were also preferred hence their market coming number 3. At times hotels (0.1 tonnes) were preferred once in a while others were not applicable. Figure 9.

Disposal outlets of materials to the industries, companies, hotels and domestic use. 0.45  
Occasionally 0.35 Agricultural Firms All the time Companies Most time 0.25 Tonnes 0.3  
0.2 Once in a while 0.15 0.1 Not applicable 0.05 Hotels 0 Occasionally All the time Most  
time Once in a while Not applicable Hundreds 0.4 Industries 30.6 38.6 34.6 0.8 Solid Waste  
Materials Income from the site The researcher sought to know for how long the respondents  
did the business and the money made in a month. The table below shows details of income  
generated in a month. Table 6: Income in a day per person Income per day Frequency (N)  
Percent (%) Ksh.150-170 14 35 Ksh.180-200 16 40 Ksh. 200-220 5 12.5 Ksh. 240-260 3 7.5  
Ksh.280-300 2 5 Total 40 100 The highest income stood at 40% that came from the  
respondents who generated Ksh 180-200. The second best income of 35% was generated  
from Ksh.150-170. The third best income per month represented 12.5%. The lowest income  
per month was recorded as 7.5% and 5% respectively. Data showed that human scavenging  
created income daily. Those involved in the activity made good money which is equivalent to  
a day wage in the industrial area. "A key informant said that they made daily income between  
Ksh.150-200 and pointed out that scavenging was beneficial beyond expectations." 4.4 The  
measures used by scavengers to protect themselves against ill-health. The third objective of  
the study was to look at health matters such as health problems, the measures of protection  
against ill-health, means of treatment, ill-health workshop, and NHIF medical insurance  
among the respondents at the site. The activity of sorting out toxic and non-toxic solid waste  
materials had risks, consequently; the table below illustrates problems in the past six months.  
Health problems Table 7: Health problems that affected the respondents in the past six  
months. Health problems Yes (%) No (%) Total Percent (N) Skin disorders 5 95 100 40 Eye  
infections 30 70 100 40 Respiratory Ailments 85 15 100 40 Abdominal problems 2.5 97.5  
100 40 Others specify 0 100 100 40 The infections reported had different ratios of  
percentage. Abdominal problems and skin disorders recorded the highest rates of infection  
with 97.5% and 95% respectively followed closely by eye infections with 70%. Respiratory  
ailments were not common even though 15% of the respondents suffered. Measures of  
protection Table 8: The measures of protection against ill-health of the respondents at the  
site. Protection measures Yes (%) No (%) Total Percent (N) I put on boots regularly 5 95 100  
40 I wear gloves rarely as a protective device 30 70 100 40 I protect myself with heavy  
clothing. 85 15 100 40 I put on a mask against toxic fumes at the site. 2.5 97.5 100 40 I put  
on eye glasses at the site. 0 100 100 40 I cover my mouth completely at the site. 62.5 37.5  
100 40 Protection of health was an issue of concern to the researcher. In this study,  
respondents were asked to show much they cared about their health. Having attended health  
forum, the results were not matching since 95% of the respondents did not put on boots to  
protect their feet. 70% did not wear gloves as protective device. Even though heavy clothing  
received a positive back-up with 85% response. Almost 97.5% neglected masks against toxic  
fumes while eye glasses were 100% forgotten. Mouth covers showed 62.5% of those who  
cared for themselves. Type and cost of treatment The study sought to understand the form of  
treatment administered and below is a table providing a comprehensive means of treatment  
given to the respondents. At time of sickness, respondents sought different means of  
treatment. Records indicate that 57.5% of the respondents decided to buy themselves  
medicine from either chemist or pharmacy. Only 27.5% were able to go to the hospital.

Herbal clinic and others were also given 12.5% and 2.5% respectively. Those who opted to buy medicine went to different vendors hence variation in cost. The table demonstrates that those who spent between Ksh.250- 400 represented 47.82% while Ksh.300-400 stood at 39.13%. The least number of respondents who spent Ksh.400-450 represented 13.04%.

Table.9: type and cost of treatment sought by the respondents. Type of treatment Frequency (N) Percent(%) Hospital treatment 11 27.5 Herbal Clinic 5 12.5 Chemist and pharmacy 23 57.5 Others 1 2.5 Total 40 100 Total cost of treatment Ksh.250-400 11 47.82 Ksh.300-400 9 39.13 Ksh. 400-450 3 13.04 Total 23 100

Ill-health workshop. In the past six months, NGOs organized awareness training on ill-health among the respondents. Below is a figure showing training workshop attendance. Statistics demonstrate high level of awareness among the respondents however; when the knowledge was put to test many of the respondents ignored to practice. The table below show how ill-health knowledge was put into evaluation. Figure 10: Attendance of ill-health workshop. North, Present, 1372.22903 2, 97% Present Absent North, Absent, 43.9, 3% The findings showed 97% of the respondents attended a workshop for 2 weeks in 2012 while 3% were absent. The forum was organized by Comboni Mission in conjunction with local CBOs working in the neighbourhoods of Dandora. Consequently; percentage provided demonstrates the level of awareness among the respondents as per health matters. Medical insurance Figure 11: NHIF-Medical insurance among the respondents Yes, 2.5% No ,97.5% No yes In the study, “no” group had the highest representation 97.5% without NHIF medical insurance. On the other hand, the “yes” group at 2.5% with 1 person with cover and therefore; it is conclusive that the (no group) looked for their own medical care. 4.5 The effects of the solid waste materials on livelihood and welfare of scavengers The fourth objective of this study was to investigate how respondents benefited from the sales of solid waste materials in relation to livelihood and welfare. A key informant said, “Solid waste materials are like minerals and oil from the ground and sustainable”. Savings for livelihood among scavengers around dump-site One of the informants said; “These days we do not go to industrial area to look for casual work, we have more than enough to make good money at the dump-site.” In comparison to their counterparts on daily wage scheme in the industrial area, they had better livelihood. Looking at the expenditure, the researcher wanted to know whether there was savings done from the income. The table below demonstrates how the aspect was assessed in reference to money saved to buy domestic assets. Table 10: Savings and expenditure on domestic assets Savings Frequency (N) Percent (%) Yes 39 97.5 No 1 2.5 Total 40 100 Expenditure Furniture 3 7.5 Utensils 35 87.5 Others 2 5 Total 40 100 Records were as follows; 97.5% of the respondents said that they saved for tomorrow while 2.5% did not save. Much of the income and savings were spent on domestic assets as follows; 87.5% of the respondents bought utensils. 7.5% and 5% bought furniture and others respectively. The data was a clear indication that scavenging guaranteed livelihood at present and in the future. Expenditure of income The study was designed to look at the expenditure on different needs. Below is a table with full details. Table 11: Benefits of income from the sales of solid waste materials. benefits I buy food for the family % I buy cloths % I buy medicine % I pay house rent % I educate my children % Increased economic growth % I save and invest little money % Group welfare % Yes 100 100 60 84 100 80 66 25 No 0 0 40 16 0 20 34 75 Total 100 100 100 100 100 100 100 100 The above table revealed that 100% of the respondents used their income to buy food, cloths and educate children in school. Further, 94% spent money in house rent while 80% relied on the income to invest in other areas in order to improve their livelihood. Only 66% and 60% respectively was spent in business and medicine. The least percentage of 25% was spent in groups’ welfare. Further; the study showed that needs were different and therefore; 40% and 75% respectively of the respondents did not spend money on medicine and group welfare. Moreover; data revealed that 34%, 20% and 16% respectively did not spend anything on investment, business and house rent. It was clear from the data that

every basic need in the house of the respondents was addressed with the little money from the sales. School fees In the process of getting the true picture of human scavenging, the researcher sought to know how income from sales benefited school going children. Normally children go to school from Monday to Friday. Moreover; this study established most of the schools in the neighbourhood of the Dandora dump-site were commercial and a fee was a necessity. Therefore; it meant that if fee was not paid children, had to miss school. Since the respondents were making good income from the dump-site waste materials, the researcher looked at the frequency in which children went to school from Monday to Friday in a given week. Table 12: Respondent's reports about frequency of their children's attendance to school

Children's school attendance	Frequency (N)	Percent (%)
Missed two days	12	30
Did not miss school	18	45
Missed more than a week	10	25
Did not go to school	0	0
Total	40	100

Table above represent a frequency of child school attendance among the households of the respondents. The frequency of going to school on the basis of school fees was a clear indication of the benefits of scavenging solid waste materials for sale. Record show that 45% of the respondents did not have their children missing a single day because of school fees. They paid school fees. Those respondents whose children missed two days stood at 30% while 25% represented those whose children missed more than a week. This showed that 0% did not go to school. The outcome of the study indicates financial stability among those involved in the activity. Food Food provision was equally important in this study and therefore; the researcher wanted to know whether there was improvement on meals based on income from the sales. To understand clearly the outcome of this inquiry the table below expressed how meals were taken in a given month among the households of the respondents. Table 13: Food in the family based on income from the site. Meals Number of meals per day

Percent (%)	1 meal	2 meals	3 meals	Others specify	Total
	4	10	23	2.5	40
	10	30	57.2		100

The above illustration show how families took meals based on income from scavenged materials. The report indicated that there was progress since 57.2% of the respondents were able to take 3 meals in a day. Record show that 30% of the respondents could afford 2 meals a day for the family. One meal and others represented 10% and 2.5% respectively a clear indication that scavenging had transformed livelihood of families. Respondent's perceptions of their well-being. The table below showed that 100% of the respondents supported that the activity improved payment of school fees, house-rent and reduced social evils in the area. On achievements, 94% and 80% agreed that scavenging created self-employment and increased economic growth respectively. More importantly, 75% showed that income had improved per year and 67% increased financial status. Additionally, 60% of the respondents agreed that health status also improved. On the other hand 40% and 33% observed that there was no improvement on health and financial status. On the contrary, 25% and 20% also disagreed that income brought economic growth. On a lesser note, 16% of the respondents disagreed that scavenging created employment. Table 14: The effects of solid waste materials on livelihood of families.

Effects	Improved income per year	% Pay for basic needs fees, rent, bills	Improved financial status	Improved health standards	Create employment opportunity	Reduced social evils	Increased economic growth	Agree	Disagree	Total
	75	100	67	60	94	100	80	25	0	100
	100	100	100	100	100	100	100	100	100	100

Welfare of scavengers around the dump-site A part from sustainable livelihood, the study also sought to know the effects of scavenging on the welfare among the respondents who had joined groups. The findings indicated that 93% were in a welfare group while 7% were yet to join. The figure below illustrates the number of respondents in the welfare groups that enhanced their scavenging rights. Key informants revealed that welfare groups were formed to enhance businesses among its members since from the sales the members were able to save small amount of money weekly. Further, it was found out that the groups provided small loans for business. The researcher established that welfare groups had one goal of improving business

status of its members through savings. A respondent was open to the researcher and said, "We save Ksh.100 per week to improve our social welfare and business." Figure 12:Welfare groups among the respondents No, 7% Yes,93% Yes No Welfare group meetings It was also an issue of concern to the researcher to establish how respondents attended meetings to achieve their goals and the findings provided below explain the aspect in details. The frequencies showed in the figures varied among the respondents who attended meetings within a month. Consequently; the attendance to meetings was as follows 64% of the respondents showed commitment of attending meetings regularly in a month. Slightly lower were 19% of the respondents who attended occasionally. On the other hand, 11% and 6% represented those who attended rarely and not sure respectively. These welfare groups were significant in the life of the respondents. As recorded from one of the key informants: "Our group has helped us unite and we assist each other in time of need such as sickness". Figure 13:Frequency of meetings of respondents in welfare groups Not sure Rarely 6% 11% Rarely Occassionally 19% Occassionally Regularly Not sure Regularly 64% 4.6 Conclusion This chapter presented the findings of solid waste materials from human scavengers through questionnaires and the key informants by interviews. The dump-site absorbed hundreds of young people thus reducing social evils such as robbery and petty stealing. The outcome of the study revealed the significance of the site to the Dandora residents. The majority of the people interviewed had not been employed therefore; the site provided them a means of livelihood through self-employment. Records showed that the respondents were able to sustain their families and dependents for a better livelihood and welfare. Daily income that ranged from Ksh 150-250 from the site took care of costs of food, clothing, rent, medication and school fees. The income also took care of welfare requirements in groups such as savings. Further; the study showed that young people aged between 15-19 years had low or no education and therefore; the activity created an opportunity for self-employment. They separated waste to get valuable items which earned them income such as plastics, metals, glass but to mention a few. The research indicated that scavenging involved non-toxic materials which are valuable. Health matters were also highlighted in terms of infections such as skin disorders, eye infections, respiratory and abdominal ailments affecting the scavengers. The research indicated that the income from the dump-site was sustainable from millions of tonnes of solid waste materials that guarantee self-employment. 44 CHAPTER 5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS 5.1 Summary This chapter put together conclusions and recommendations of the research according to the analysis and interpretations of chapter four. The content of this chapter was in line with study objectives which included: the finding out of the characteristics of human scavengers, the finding out of the type of solid waste materials scavenged and disposal outlets, examining measures used by scavengers to protect themselves against ill-health, examining the effects of the solid waste materials on livelihood and welfare of scavengers at the dump-site. The findings showed clearly that human scavenging had positive impacts on the livelihoods and welfare of the Dandora residents and the neighbourhoods. The income that was generated from the sale of solid waste materials was able to cater for basic needs in the families such as food, cloth, school fees and house rent. The outcome of the research concurs with the literature review from global impact of human creativity of making income from the sale of solid waste materials. The global overview agrees that unemployment world-wide has lead man to be creative to the extent of recycling solid waste materials to make ends meet is an emerging form of self-employment among the young people. Unemployment is a world- wide phenomenon among the young people. Scavenging waste materials is an alternative means of generating income for the family. It was found out that the types of solid waste materials scavenged at the site are non-toxic and valuable in money terms. As much as the health of the scavengers was necessary, this study established that many of them hardly put on protection

gear. Depending on the nature of activity involved at the site, life was at risk. Statistics revealed that the highest daily income could be between Ksh.150-250. These figures were not far below Ksh.400 daily earnings of casual workers from the industrial area. This study showed that the income scavenged was enough to cater for daily needs of low income families in the Eastlands. This level of creativity has helped reduce the challenge of unemployment and social evils such as prostitution and petty stealing which are driven by nature to meet basic needs. Scavenging solid waste materials is a practice that broke the viscous cycle of poverty in Nairobi and its' neighbourhoods. Scavengers had a positive attitude on the way of making ends meet, therefore, the study revealed that many involved in the activity called upon government to put measures to protect them.

### 5.2 Conclusions

In conclusion, therefore; the findings were rewarding to the low income earners in Dandora. More particularly, the results showed that scavengers were able to address household needs with the generated income. The bigger percentage of income went to food, rent, health-care and education. Scavenging at the dump-site had improved the livelihood and welfare of respondents interviewed. The impressive changes in lives of people were seen through affordability of fees of school going children, health, food, cloths and requirements of welfare groups that demand savings weekly or monthly. The unemployed youth have a source of income and employment hence reducing levels of insecurity in the area. There was a remarkable increase on savings and reduction of idling among the youth. Basically, this meant that there was improvement on livelihood and welfare in the families. Further analysis showed that food ratio improved unlike before the practice. Education recorded important improvement with few cases of children going home for school fees. Generally, out of the practice, families had the pride of life. Unemployed around the dump-site had a sustainable income to celebrate. Before scavenging become fruitful, there were many cases of diseases. Even though records indicated that scavengers at the site were able to access cheap health-care thus less instances of sickness. Children on the other hand were not hustling for necessary school fees since their parents could afford. Similarly, the scavengers had also put little savings in their merry-go around groupings that took care of expansion of their businesses and uncertainty such funeral expenses. It was evident from the study that garbage collection and sale had greatly improved livelihood and welfare of the scavengers. In the previous years, a good number of the unemployed youths were seen as a big challenge to security and development in the area. Reports from key informants showed that security had continued to improve with income generation from the site. Youths were able to generate enough money for luxury hence few cases of theft were reported in the area. The more lorries went down to empty solid waste materials at the site, the more livelihood and welfare continued to improve in the families of scavengers.

### 5.3 Policy Recommendations

According to the analysis of data from questionnaires, interviews and case studies the following were the recommendations to the policy-makers.

- Literature review of the study showed an important role of scavenging solid waste materials as a means of enhancing livelihood and creation of self-employment among the youths in Nairobi. Results from the study showed that little income from the sale of solid waste materials made a significant improvement to the lives of low income earners. Life had become meaningful to many scavengers around the dump-site. Based on findings we recommend that the government should regulate, supervise and evaluate the progress of scavenging activity at the Dandora dump-site.
- This study revealed that scavenging was successful and therefore it should be expanded to other counties in the country. Solid waste materials are resources within the city and therefore they need to be harnessed for economic growth.
- There is need for a department of the government mandated to put together all stakeholders of solid waste for effective collaboration, coordination and utilization of the resources in the counties. This is a new avenue of generating income from solid waste materials. The perception of a few people was negative

and therefore, stakeholders should organize for trainings and awareness programs on how to improve the practice. 5.4 Further studies on the scavenging concept. This study was not all inclusive and therefore the researcher suggests that further studies be conducted to give more insight on the scavenging phenomenon and how its potential can be harnessed to create employment in the counties. 1 4 5 7 8 9 10 12 13 14 16 18 19 21 22 24 25 26 27 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 45 46 47