Environmental and Social Impact Assessment for Mwakirunge Dumpsite, Mombasa County, Kenya

actionaid

KENYATTA UNIVERSITY

Environmental and Social Impact Assessment for Mwakirunge Dumpsite, Mombasa County, Kenya

By

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Acknowledgements

This report is dedicated to the people of Mwakirunge, Mombasa County who have suffered for many years due to the presence of unplanned dumpsite. The survey report is the convergence of efforts made by many people dedicated to ensuring the success of this project. We are grateful to many organization and individuals who took their time to provide the necessary information. Many thanks to ActionAid Kenya for providing resources, and mandate to conduct this study. Special thanks to ActionAid Staff at Mombasa county who provided assistance in data collection. Special thanks also to Mombasa County, Environmental section, the Ministry of Environment, Water and Natural Resources (MEWNR), Government officers, NGOs and the Environmental division at Moi International Airport for providing valuable information. The community within Mwakirunge, women groups, youth groups, community health workers and village elders and all the respondents are highly appreciated for providing the necessary information.

EXECULTIVE SUMMARY

It is well recognized that all human activities generate waste which requires to be properly managed to protect human health, environment and maintain and enhance aesthetics. It is upon this fact that Kenya's Vision 2030 recognizes that efficient and sustainable waste management systems are required as the Country develop into a new industrialized state by 2030. The need for proper and efficient waste management is more pronounced in urban settlements where huge amounts of waste are generated within a very small area. The impacts of solid waste if not properly managed particularly in cities like Mombasa can be disastrous. The composition and amount of solid waste being generated in Mombasa has been on the increase. This can partly be attributed to changing urban lifestyles, resource consumption patterns, improving income levels and other socio-economic and cultural issues. Thus, new approaches in handling these wastes need to be introduced to cope with their increase.

Due to the poor state of affairs regarding the existing waste management within Mombasa County, ACTION AID identified Mwakirunge dumpsite as one site that has created many social economic and environmental problems among the communities. The School of Environmental Studies, Kenyatta University was tasked to carry out an environmental and social impact assessment of the dumpsite. The school has established that the Mwakirunge dumpsite was established without following the laid out procedures as prescribed by NEMA. It is therefore established against the Kenyan law of EMCA (1999).The dumpsite was established without an EIA and this has created many environmental, social and economic problems not only among the communities living near the dumpsite but also to the country as a whole. Anybody flying to Mombasa their lives have been put to danger with the dumpsite being along the flight path for Moi International Airport and being within the 13KM radius of the airport. The dumpsite has led to high crime rate, many diseases, children dropping out of school and family breakups. It is recommended that the dumpsite be relocated after carrying out a proper EIA. To establish a new dumpsite, all the laid out procedures as established by the Kenyan's law should be followed. Mombasa County should be held accountable for the poor environmental standard within Mwakirunge which is leading to poor health and high poverty level among the community. There is need for creating awareness among the community on their rights and empowering them on waste management. There is also need for a socio- cultural attitude change among the residents at household level.

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Acronyms

EMCA	Environmental Management and Coordination Act
MSW	Municipal Solid Waste
COD	Chemical Oxygen Demand
SWM	Solid Waste Management
PM	Particulate Matter
FDGs	Focus Group Discussion
KCAA	Kenya Civil Aviation Authority
ICAO	International Civil Aviation Office

1.0 INTRODUCTION

1.1 Background of the Study

Rapid urbanization and population growth makes efficient management of municipal solid waste (MSW) a challenge to municipal authorities. Ineffective solid waste management remains a major challenge to many developing economies, Kenya inclusive. The uncontrolled manner in which solid waste is disposed of at most in open dumpsites creates serious health problems to humans, animals, and the environment. Inadequate waste disposal translates into economic and other welfare losses (Zurbrugg, 2002). There are a number of ways in which poor waste disposal degrade the environment. Soil become contaminated when it get in contact with solid waste and leachate. Studies carried out in many countries show that there are heavy metals accumulation within the dumpsite. In Kariba dumpsite, Zimbabwe, accumulation of copper (Cu), lead (Pb), iron (Fe), and zinc (Zn) were found within the disposal site (Chifamba, 2007) and concentration of Zn, Pb, and Cu were reported in surface soil samples up to 75 meters away from the disposal site. In Ibadan and Lagos in Nigeria, leachates collected from dumpsites had appreciable levels of dissolved solids, chloride, ammonia, chemical oxygen demand (COD), lead, iron, copper, and manganese. This was attributed most likely to rampant dumping of lead acid car batteries and metal scraps (Ikem et al., 2002). In Kenya, in a study carried out at Dandora dumpsite, 42% of soil samples taken had ten times higher leads levels than normal soils (Oyaro, 2003). Leachates have also been reported to contaminate both ground and surface water. During floods, water mixed with leachate may flow out of the dumpsites and get into nearby ponds, streams, and rivers. This creates a health risk to the communities living near the dumpsite and those downstream who may be using the water for various purposes. A study carried out at Kariba, Zimbabwe showed that water samples taken from the vicinity of the dumpsite had a high level of concentration of mercury (Hg) and Pb (Chifamba, 2007).

People living close to dumpsites are in danger of contracting diseases associated with dumps. A study by Oyaro (2003) reports that tests conducted on 328 children living near the Dandora dumpsite had half of them with excess concentrations of lead in their blood. They were also reported to be disproportionately affected by anemia, skin infections, asthma, and other respiratory diseases. These conditions were associated with high levels of toxins at the dumpsite, which receives plastics, rubber, wood, metals, chemicals, and hospital waste (Oyaro, 2003). There are thousands of poverty stricken people in Africa who make a living through salvaging recoverable materials from waste sites. Every day, women, the elderly, and children spend long hours at the open solid waste dumps sifting through the rubbish for valuable items. Majority of these people use bare

hands and have no protective clothing. The lack of protective clothing and equipment exposes them to direct contact with hazardous waste such as broken glass, human and animal fecal matter, paper that may have become saturated with toxic materials, as well as containers with residues of chemical, pesticides, and solvents (Wilson et al., 2005), They are also exposed to needles, bandages, and other refuse from hospitals, exposing them to diseases, such as HIV and AIDS, and hepatitis (Oyaro, 2003). As such scavenging in open dumps is considered one of the most detrimental activities to health. There are other people who go to the dumpsite to look for food. These people are also exposed to in hailing bio-aerosols, smoke and fumes, which are produced by open burning of waste. This also causes health problems like respiratory and dermatological problems and eye infections leading to low life expectancy.

All human activities generate waste which requires to be properly managed to protect human health, environment and maintain and enhance aesthetics. The need for proper and efficient waste management is more pronounced in urban settlements where huge amounts of waste are generated within a very small area. The impacts of solid waste if not properly managed can be disastrous. It is in this context that Kenya's vision 2030 recognizes that efficient and sustainable waste management systems are required as the country develops into a newly industrialized county by 2030. In Kenya, every person is entitled to a clean and healthy environment and has the duty to safeguard and enhance the Environment. The status of Solid Waste Management (SWM) is associated with many environmental, health and social shortcomings.

1.2 Mombasa County Political Landscape

Mombasa County covers approximately 282 square kilometers, of which 65 square kilometers, is open water. The County lies within the coast lowland, which rises gradually from the sea level in the east to slightly over 76 m above sea level in the mainland west. The highest point is at Nguu Tatu hills in the mainland north that rises up to 100 m above sea level. The county borders Kilifi County to the North, Kwale County to the South West and the Indian Ocean to the East. It is estimated that more than 1,400,000 people live in the County, who according to the 2009 National Housing and Population Census are distributed in its five districts' namely Mombasa and Kilindini districts within the Island with 523,183 people, Kisauni District with 405,930 people, Changamwe District with 282,279 people and Likoni District with 176,426 people. Mombasa Island is the most densely populated. However, the growth of population is now northwards, with the population in Kisauni District, growing at the fastest rate (Mwaguni, 2009). Mombasa city is the administrative, commercial, political, industrial and a major tourist attraction center. The city has attracted a significant number of people from rural areas in search of employment and other opportunities. As a result, the annual population growth rate of the County stands at 4.1% making it higher than the national average, of 2.5% (Mwaguni, 2009). There is high rural to urban migration as people migrate in search for economic

opportunities. The rapid population growth is not matched with infrastructural development to deliver services and therefore, the town and its environs face a number of environmental problems ranging from domestic, industrial and commercial solid and liquid wastes. The situation is compounded by lack of integrated Solid Waste Management planning and lack of equipment and personnel to deliver services and address the waste problem.

The issue of Solid Waste Management (SWM) in Mombasa County has become an ever more pressing issue as waste generation continues to increase with population expansion and industrialization. The infrastructure available is increasingly incapable of dealing with the amount of waste generated and as a result, many residents end up either dumping their garbage on public land, river and drains, or simply burning them. On top of that, the changing nature of consumer goods creates a new complication, as new synthetic materials, which were historically uncommon in nature's life cycles, are now more prevalent in the waste stream. New methods of management are thus needed for these materials, which are potentially hazardous when released into the environment. In year 2000, the volume of solid waste produced in Mombasa when the resident population was about 700,000 people was about 600 tons/day. Today, the population has more than doubled and consumer lifestyle has become more wasteful. It is estimated that the volume of solid waste generated has therefore more than doubled to an estimated volume of more than 1,200 metric tones per day. Waste in the county originates from various sources including industries, commercial establishments, offices, residential homes, learning institutions, hotels, and hospitals.

Mombasa county uses open dumping as the only method of waste disposal. There are currently two open dumping sites in county namely; Kibarani and Mwakirunge. These two dumping site are basically two pieces of open land that are currently used for waste disposal. The Kibarani dumpsite has been used since independence while the Mwakirunge dumpsite was started in 2002. Currently county trucks empty their trash in Kibarani, while private companies take their waste to Mwakirunge. The Kibarani dumpsite is only 5-10 minutes drive from the city center, making it highly convenient for the disposal of trash collected from the CBD but it poses health hazards and its unsightliness due to its location right next to the Makupa causeway and Nairobi-Mombasa railway. The Mwakirunge dumpsite is about 15km from the city center and is currently being used by private trucks, which are charged a tipping fee of KS 2500 per trip. It is reported that County vehicles dispose their waste collected at Kibarani- dumpsite while private vehicles dump their waste at Mwakirunge dumpsite in Kisauni District. The dumpsite does not have an EIA as required by NEMA and it is there fore operating against the Kenyan law.

1.3. Study Objectives, Tasks and Deliverable

1.3.1 Study Objectives

The main objective of the study was to carry out a social and environmental impact and audit study on Mwakirunge dumpsite. As agreed with the Action Aid, the study has aimed to achieve the following key objectives:

1) To assess the current status of the dumpsite and highlight the coverage, number of people affected and provide both qualitative and quantitative data for the study.
2) To identify the compliance of the dumpsite with the respective conditions of approval of the EIAs
3) To identify environmental health and safety measures that communities have taken, or and can take together with other, stakeholders
4) To Map and review laws, acts, bi-laws, regulations and economic instruments of solid waste management.
5) To identify the enforcement mechanisms available for the enforcement of laws and regulations at various levels of the solid waste management chain while identifying the existing gaps.

1.3.2. Study Area

Mombasa County is situated in the South-Eastern part of Kenyan Coast. It covers an area of 229.6 Km^2 with water mass accounting for 65 Km^2. It borders Kilifi County to the North, Kwale County to the South and West and the Indian Ocean to the East. The County lies between latitudes $3^0 - 80^0$ and $4 - 10^0$ South of the Equator and between longitudes 39 – 80' East of the Greenwich Meridian.

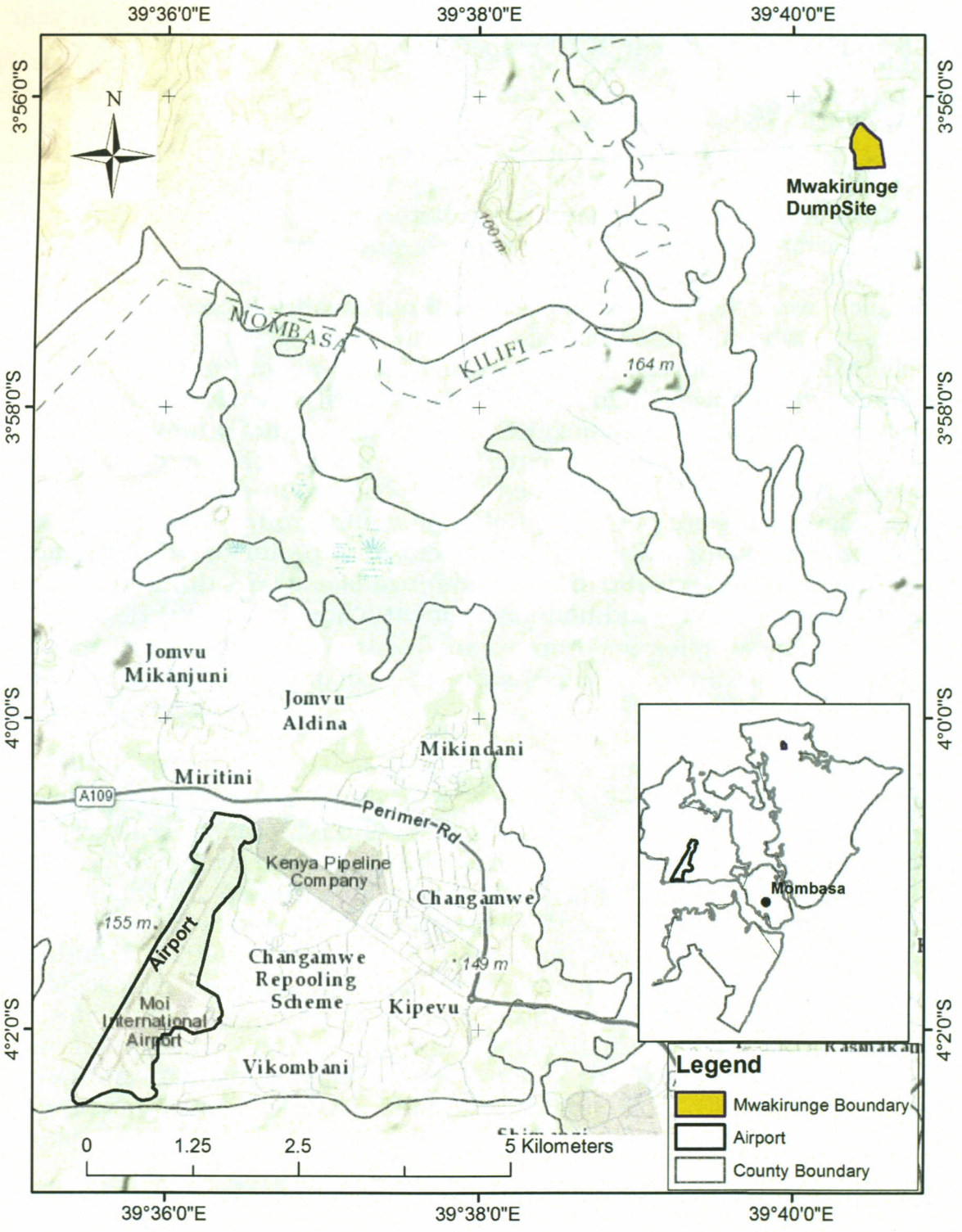

Figure 1.1 Location of Mwangirunge dumpsite within Mombasa County.

1.3.4 Demographic and Population Profile

According to the 2009 census, the population of Mombasa county was..... The female and male population accounted for 45.3% and 54.7%

respectively. The population growth is now 3.6% compared to 3.0% recorded on 1989.The district population is projected to increase to 810,368 in year 2005 and 917,864 by year 2010 respectively.

1.4 Methodologies

1.4.1 Data Collection

The study was a survey that relied on both primary and secondary sources of data. Primary sources of data were obtained from household heads, key informants and focus group discussions. Semi-structured interview schedules were used to collect data from head of household and key informants who included government and non government officers i.e. health officers, children officer, youth officer, agriculture officer, county environmental officer, Kenya Airport Authority Environmental Officer, Assistant chief, NEMA officers, Kenya Human Right Commission, Kisauni Youth polytechnic, employee of county government working at the dumpsite and teachers. A checklist was used with focus group discussion. The focus group discussion were held with Colorado youth group, Sauti ya wanawake women group, community health workers, dump site users and teachers. The study interviewed 196 households' heads and 83 dumpsite users in addition to government and non-government officers.

2. 0 LITERATURE REVIEW

Most countries in the world experience challenges in managing waste. The challenges ranges from reducing generation of waste, separation change of habits, collection, transport, treatment, reuse and disposal. UNEP (2005) identifies different challenges for different levels of industrial development. In an attempt to accelerate the pace of industrial development, developing countries end up paying inadequate attention to solid waste management. Ngoc and Schnitzer (2009) argue that increasing population,

2.1 Municipal solid waste management

In every county, one of the major goals is achievement of sustainable development without degrading the natural environment, which the population depends on. Improper disposal of solid waste impacts the health and safety of people negatively. Solid Waste Management (SWM) encompasses the functions of collection, transfer, resource recovery, recycling, and treatment. The primary target of SWM is to protect the health of the population, promote environmental quality, develop sustainability, and provide support to economic productivity. To meet these goals, sustainable solid waste management systems must be embraced fully by local authorities in collaboration with both the public and private sectors. Although in developing countries the quantity of solid waste generated in urban areas is low compared to industrialized countries, the SWM still remains inadequate.

Land filling has been the most common method of solid waste disposal generated by different communities for many years (Komilis et al., 1999). There are three types of landfills that are an integral part of most solid waste systems. These are the open dump, the semi-controlled landfill, and the sanitary landfill. Majority of urban centers in the developing countries (including Africa) use open dumping as their principal disposal method (Rushbrook, 1999). This presents a host of problems as the open dumps expose people, animals, and the environment to serious risks. Most local authorities seem not to pay adequate attention to the dumps, because they do not know better systems and what happens there is out of their sights. It is important to operate them as efficiently as possible to mitigate any health and environmental disasters that may result from the neglect of waste dumps.

In Kenya local authorities are charged with the responsibility of collecting and disposing of solid and liquid municipal wastes within their areas of jurisdiction. Most local authorities use centralized MSW management systems. According to estimates from the World Resources Institute and USAID, many local authorities in developing countries spend over 30% of their budgets on refuse collection and disposal but can only collect at most 50–70% MSW. Most do not meet environmentally safe MSW disposal levels because of a lack of sanitary landfills. In Kenya plans are underway to shift towards sanitary landfilling. At present, MSW is disposed in open dumps,

which lack proper environmental pollution control and monitoring. An economic survey by the Ministry of Finance and Planning in year 2001 showed that most local industries operate their own solid and liquid industrial waste handling services independent from the local authority.

Mombasa County is currently faced with a myriad of problems that have greatly constrained provision of services especially Solid Waste Management (SWM). These problems may be due to economic constraints, rapid population growth that overstretches the capacity of county government to adequately provide services, inflated numbers of workers which exhausts most of the revenue in the form of wages leaving very little to cover for other services making collection and disposal of MSW to be given low priority, lack of human and physical capacity to keep all of the trucks running which would increase the capacity for collection and political interference.

2.2 Threats Posed by Solid Waste Dumpsites

The uncontrolled manner in which solid waste is disposed of at most open dumpsites creates serious health problems to humans, animals, and environmental degradation. This inadequate waste disposal translates into economic and other welfare losses (Zurbrugg, 2002). The environment is degraded in a number of ways. Being in contact with solid waste and leachate contaminates soil. In a study on a dumpsite in Kariba in Zimbabwe, trace metal concentrations were determined in soil samples collected from the area during 1996 and 1997. Accumulation of copper (Cu), lead (Pb), iron (Fe), and zinc (Zn) were found within the disposal site (Chifamba, 2007). Concentration of Zn, Pb, and Cu were in surface soil samples up to 75 meters away from the disposal site. Leachates collected from Ibadan and Lagos dumpsites had appreciable levels of dissolved solids, chloride, ammonia, chemical oxygen demand (COD), lead, iron, copper, and manganese. This was most likely a result of rampant dumping of lead acid car batteries and metal scraps (Ikem, Osibanjo, Sridhar, & Sobande, 2002). In a study carried out at Dandora dumpsite, 42% of soil samples had ten times higher leads levels than normal (Oyaro, 2003). Leachates also contaminate both ground and surface water. During floods, water mixed with leachate may flow out of the dumpsites and get into nearby ponds, streams, and rivers. The Nairobi River for example, passes through the Dandora Municipal Dumping site, and some of the waste from the site finds its way into the river (Environmental News Service, 2007). This is a health risk to the communities near the dump and those downstream who may be using the water for various purposes. In Eldoret town, the operation of an open dumpsite near the Mwenderi River has greatly polluted the Sosiani River, because the dumpsite, formerly a sand quarry, has small streams draining into the Sosiani River (Rotich et al., 2006). The study at Kariba showed that water samples taken from the vicinity of the dumpsite had a high level of concentration of mercury (Hg) and Pb (Chifamba, 2007). Okonkwo and Mothiba (2004) found a high concentration of lead in the Madanzhe and Mvudi Rivers in Thohoyandou, South Africa, which was attributed to the effluent from a nearby sewage treatment plant and a waste

dumping site, which leachate had contaminated with lead flowing into the rivers. The Golden Quarry landfill in Harare pollutes ground water in the area close to it. Levels of coliforms, cadmium, iron, lead, and nitrates were above the water quality guidelines throughout the nearby suburb of Westlea (Love et al., 2006). Water in the suburb is not suitable for domestic use. Mangizvo (2008) identified in a study of the Mucheke Municipal dumpsite in Masvingo, Zimbabwe, that trace metals of lead, iron, copper, zinc, and phosphorus had contaminated soils within a 50-meter radius.

Rapid urbanization has resulted in existing dumping sites originally located at a safe distance outside the municipal boundaries are now being increasingly encircled by settlements and housing estates (Schertenleib & Meyer, 1992). This has caused the public to oppose their existence as they cause odor, dust, and other nuisances. People living close to dumpsites are in danger of contracting diseases associated with dumps. Oyaro (2003) notes that tests conducted on 328 children living near the Dandora dumpsite found that half of them had excess concentrations of lead in their blood. Anemia, skin infections, asthma, and other respiratory diseases also disproportionately affected them. These conditions are associated with high levels of toxins at the dumpsite, which receives plastics, rubber, wood, metals, chemicals, and hospital waste (Environmental News Services, 2007; Oyaro, 2003).

Thousands of poverty-stricken Africans make a living through salvaging recoverable materials from wastes sites. Daily, women, the elderly, and children spend long hours at the open solid waste dumps sifting through the rubbish for valuable items. Wilson, Velis, and Cheeseman (2005) say these people use bare their hands and wear no protective clothing. This lack of protective clothing and equipment puts them in direct contact with hazardous waste such as broken glass, human and animal fecal matter, paper that may have become saturated with toxic materials, as well as containers with residues of chemical, pesticides, and solvents. They are also exposed to needles, bandages, and other refuse from hospitals, exposing them to diseases, such as HIV and AIDS, and hepatitis (Oyaro, 2003). This state of affairs was observed at the Dandora Dumpsite in Nairobi, Kenya. Informal waste pickers are at high risk as basic principles of occupational health and safety are disregarded. As such scavenging in open dumps is considered one of the most detrimental activities to health. Some people come to the dumps looking for food. They are not spared from the inhalation of bio-aerosols, and of smoke and fumes produced by open burning of waste, which can also cause health problems. Respiratory and dermatological problems, eye infections, and low life expectancy are common among these people.

2.3 Municipal Solid Waste disposal and Environmental Pollution

The use of open dumps for solid waste in Kenya makes environmental pollution highly probable. Both surface water and groundwater remain vulnerable to MSW pollution because disposal dumps are chosen for

convenience rather than based on environmental safety considerations. The extent of groundwater pollution in and around the dumpsites still is unknown because adequate pollution assessment studies have not been done conducted on the groundwater. Based on the degree of surface water pollution, it is possible to identify when pollution is taking place in the groundwater. An investigation into the extent of pollution of groundwater will be carried out within the vicinities of the MSW dumpsites.

Mombasa is a gateway to Kenya from the Indian Ocean and a tourist destination. Tourism plays a very important role in its economy and thus any degradation in the environment could negatively impact its fragile economy. Polluted rivers feeding into the ocean threatens coastal recreational beaches and sites such as coral reefs (Rakodi et al., 2000). Strict supervision of solid and liquid municipal waste disposal needs to be put into place to ensure that the beaches remain clean to safeguard the tourism industry. The County Government, Ministry of Environment, Water and Natural Resources and Ministry of Health have to work together to ensure that sanitary disposal of MSW in the County is achieved. Mombasa has embarked on a beautification program, aimed at making it a beautiful city. Strict inspection and surveillance should be put in place for meaningful results to be achieved.

In addition to potential groundwater contamination, the existing solid waste management system is characterized by the following deficiencies:

- Air pollution and direct harm to health due to emissions and nuisance from the solid waste at the landfill site. This includes odor generated from the chemical decomposition of the waste, particulate matter (PM) and toxic substances which may result from waste burning and/or spontaneous combustion of the waste.
- Direct harm to health may also result from direct contact with the waste in the absence of personnel protection equipment. This already exists as many scanvengers are regularly visiting the landfill sites.
- Nuisance to people and risk on public health due to rats and flyers of random dump sites and accumulation of waste in streets
- Global warming potential due to methane generation from anaerobic degradation of the organic portion of the solid waste in the landfill.
- Contamination of the upper soil layer or wadis due to uncontrolled discharge of rainwater runoff.

2.4 Ways of Solving Solid Waste Management Problems

The open dumping in Mombasa County, even though detrimental to human health, will remain in use, as the County is not able to construct landfills. Most of them are currently pressed with other issues that need immediate attention, such as provision of food to starving poor people, as the result of recurrent droughts. But it is imperative to improve the open dumps so that they do not remain a health hazard. They could adopt some of the ideas suggested below:

- Integrated waste management: this includes waste reduction, recycling, composting, and reuse. Composting is an excellent way of recycling biodegradable waste from an ecological point of view (Zurbrugg, 2003). However, large and small composting schemes have failed because not enough attention was given to the marketing and the quality of the product. It is important to establish a market and a demand for compost product. Local authorities, before looking for markets, could use the composts in their own municipal flower beds, as well as municipal gardens.
- Awareness and attitudes: public awareness and attitudes to waste can affect the population's willingness to participate and cooperate in adequate waste management practices. The population needs to be reminded time and again of the importance of environmental awareness and the health risks associated with poor waste management practices. Residents and dumpsite users should realize the importance of paying for waste management services. Residents in municipal areas need to segregate waste to assist in the recycling process.
- Education and awareness campaigns: municipalities need to have campaigns on a regular basis in communities and schools.
- Resource recovery and recycling activities: in the developing world this activity is driven by the informal sector and in most cases it is done in an unsafe manner. Municipal authorities in some cases actually hinder such recovery activities. Attitudes towards informal waste recovery should be positive and supported from local authorities and companies who ultimately use the recovered materials. Companies need to improve payments for the waste they buy from scavengers.
- The municipalities need to realize that open dumping remains the most viable option in solid waste disposal, due to its affordability. However, in its current forms of operation it is not sustainable and dumping should be regulated. There is an urgent need to improve the open dumping system. It may be necessary to upgrade it to semi controlled landfills. This means that, instead of having a proper lining at the base, the base must be compacted, to reduce infiltration of leachate to ground water. The waste should be covered with soil on a regular basis to prevent diseases vectors, such as flies, from getting to the waste. This will reduce the amount of odor that is released from dumpsites. The dumps should be fenced off and protected. The fence will hold some of the flying litter, as well as stopping animals from getting into the dump. At the site organic and inorganic wastes must be separated to allow for easier reclamation of recyclable materials.

2.5 Strategies towards improvement of MSWM

The problems facing Mombasa County in handling of municipal solid and liquid wastes are not impossible to solve but they need concerted effort from all sectors of society. MSW management is the responsibility of every resident. An all-inclusive approach should be adopted in order to achieve any meaningful and lasting solution.

2.6 Sitting of Open Dumpsites

Sitting a sanitary landfill requires an extensive evaluation process in order to identify the best available disposal location. This location must comply with the requirements of government regulations, and at the same time must minimize economic, environmental, health, and social costs (Siddiqui, Everett, & Viewx, 1996). In assessing a site as a possible location for solid Wasteland filling many factors needs to be considered, and these are categorized as topography and geology, socio-economic effects, economy and safety, and natural resources (Savage, Diaz, & Golueke, 1998). Most of the open dumpsites in Africa were arbitrarily located. Very little or no consideration of environmental impacts were paid in the selection of the dumpsites. Under normal circumstances, an environmental impact assessment is a prerequisite when siting a new dumpsite. However, in most cases convenience takes priority. There has been a tendency by local authorities to locate dumpsites near collection areas.

The dump must not be located too far away from residential areas, as this would deter people from carrying their wastes to these sites. It turns out that borrow pits and quarries are often selected as a reclamation strategy. Love, Zingoni, Ravengai, and Owen (2006) assert that the Golden Quarry landfill site in Harare, Zimbabwe, is an abandoned gold mine which started Operating as a landfill in 1985 to reclaim the land by filling the shafts and pits. Rotich, Zhao, & Dong (2006) contend that in Eldoret, Kenya, an abandoned sand quarry at Mwendeni was used for the disposal of municipal solid waste, yet it was clear that the site was a water catchment area for small streams that drain into the Sosiani River. The Dandora municipal dumping site in Nairobi, Kenya, is an old quarry, which had to be refilled using garbage. It has turned out to be a health hazard to the people living close to its environs (Environmental News Service, 2007).

2.7 Practices at the Dumpsites

Generally, the practices at municipal dumpsites are not effective. Dumping is unrestricted and industrial, agricultural, domestic, and medical wastes end up in one site. Dumpsites are not always fenced off as in some cases the perimeter fence has been stolen or vandalized. This allows easy access to the site at any time of the day. Mangizvo (2008) observed that the perimeter fence at Mucheke Municipal dumpsite had been removed and the place was not guarded, enabling the dumping of restricted materials, such as car batteries and metals. Scavengers had free access to the dump, and they mixed up the waste as they dug into it to salvage any valuable material. As a result of poor control, medical and hazardous wastes end up at municipal dumpsites even though they have their own special dumping areas.

In Dar es Salaam City, industrialists and hospital owners take their waste to the Vingunguti dumpsite (Mato & Kaseva, 1999). In Ibadan, Nigeria, pathological wastes and sharps from the city's hospitals are dumped in an unregulated and haphazard manner in open dumpsites at Aba-Eku, Aperin-

Oniyere, and Ajakanga. Maintenance of the open dumps is also an issue; there is no compaction and covering of waste (Agunwamba, 1998). As a result waste is easily blown away by the wind, making it an eyesore as plastics litter the area around the dump. Most local authorities resort to burning the waste to curb the nuisance produced by flying litter. Scavengers and workers at the dump run the risk of contracting respiratory diseases as they inhale the smoke. The lack of soil cover enables rainwater to infiltrate refuse and produce leachate that contaminates ground water reserves.

3.0 PROJECT FINDINGS

The dumpsite has affected the environmental, social and economic status of the community and it was having this in mind that the School of Environmental Studies, Kenyatta, University was tasked by Action aid, to carry out a social and environmental Impact Audit study on the dumpsite. The study is to provide Action Aid with evidence to inform key policy/guidelines decisions regarding the dumpsite.

- Assessed the current status of the dumpsite and highlighted the coverage, number of people affected providing both qualitative and quantitative data for the study.
- Identified the compliance of the dumpsite with the respective conditions of approval of the EIAs
- identified environmental health and safety measures that communities have taken, and can take together with other, stakeholders
- Mapped and Reviewed laws, acts, bi-laws, regulations and economic instruments of solid waste management.

Identified the enforcement mechanisms available for the enforcement of laws and regulations at various levels of the solid waste management chain while identifying the existing gaps.

3.1 History of Community Settlement in Mwakirunge

According to oral history and based on living memory of some elders (some of whom are or were grandfathers of some of the informants) people began settling in Mwakirunge from the 1900s. According to one informant, his grandfather came to Mwakirunge from Lango Mbaya in Malindi in the 1930s. At the time, the area had approximately 15 families and was sparsely populated. The area was also forested and wild animals like lions roamed the area. Another informant said that his grandparents moved to Mwakirunge from Chonji in Kaloleni in the 1940s together with their small children one of whom is the father to the informant. It was revealed that other people settled in mwakirunge around 1920, some came from Galana Karima, which is in Kilifi, Magogoni (Kaloleni),

Based on living memory, the land in Mwakirunge was owned by handful of rich persons. Some of these rich men and women had title deeds. Among them was Musa Mudi who owned 1485 acres. Due to population increase at Mwakirunge, the government bought 1000 acres of land from Musa, which was meant to be community land. In 2013 (Nov-Dec) the government through the land office subdivide the 1000 acres into numerous plots of about three quarter acres each. It is not clear how the beneficiaries of the plots were selected but informants reported that the majority of those who benefitted from the plots allocation were indeed 'outsider' consisting of ethnic groups alien to the region.

Consequently, title deeds were issues haphazardly leading to some members of the Mwakirunge community having title deeds yet they have no idea where the actual plots are located. Majority of title deeds overlap in ownership of specific plots. Due to such confusions many people in Mwakirunge continue to stay put in their 'original' settlement areas. The youth are especially concerned about the tenure rights problem in the area. For them, secure rights of tenure will be a foundation of 'self-development' since the government has actually failed them. Ironically the president was among distinguished quests that were called upon to issue the disputed title deeds. To the residents, 'this was a mere political move' complains the youth.

3.2 History of the Dumpsite and Ownership of the Land in Mwakirunge

From the Focus group discussion it was revealed that the dumpsite came first to Marimani in 2002 then it moved to Mwakirunge (near Colorado) in 2007, due to struggles over ownership of the parcel of land in Marimani. The government and other representatives visited Mwakirunge area and proposed a section of one gulley as an ideal place for the dumpsite. In 2007 a meeting between the locals and the government was held. The government informed the locals that the dumpsite was to be moved to Mwakirunge from Marimani. Prior to the relocation, the government representatives and Mombasa municipal council stake holders promised the community among other things to build a perimeter fence around the proposed area; that the dumpsite would provide jobs to the majority of unemployed youths; that they will construct a school, health center and roads; and to provide a garbage plant that was capable of converting the garbage to manure for use by the in farmers. The proposal to have the dumpsite at the gulley was also seen as a possible remedy of soil erosion control since it was expected that garbage would block surface runoff from expanding the gulley. However, due to poor management, the trucks ferrying garbage have not been dumping waste at the designated gulley but instead, drivers chose to litter the area closest to the main earth road – on land owned by about three families. The three families did not have title deeds to this land and the only claim they had was the presence of graveyards of their forefathers. This form of claim is customary accepted within the community. With increasing air pollution from smoke and odor from the dumpsite and since garbage already threatened to cover their own houses, at least two of these families relocated elsewhere within Mwakirunge. One family did not have anywhere else to settle and thus forms one the housing units within the dumpsite today. The said families have no voice to claim the land. They accuse the government of 'grabbing' their land and claims to be haunted by the spirits of the dead who are now covered under heavy garbage.

The locals were initially reluctant because they were already experiencing effects of the dumpsite even when it was far e.g. bad smell and they feared that similar effects would be overwhelming if the dumpsite moved closer (e.g.: smell, smoke, general pollution and street kids) but because of the promises that the government made the local community gave in. The

people also viewed the government to be very powerful and since it had already made a decision they felt they could not be able to refuse and the government were capable of using its authority.

The government promised that the damping will be done well and that a machine (incinerator) will be brought to help in managing and recycling of wastes. In the beginning the government began designing and constructing the roads in and out of the dumpsite. However, when the dumpsite began, the wastes was dumped haphazardly and even on the roads. One Speaker commented that: it seemed that there could have been an agreement between the local administrator (chiefs) and the government.

3.3 Social Economic Status of the Respondents

3.3.1 Age of the respondent

There were a total of 196 households and 83 dumpsite users that were interviewed during the study. Among the household respondents, 57% were female while 43%, were male. Among the dumpsite users, 72% of the respondents were male while 28% were female. As shown in Table 1, majority of the respondents in the households were between 25 and 34 years old, making up 30.6% of the respondents. Among the dump site users, majority were also between 25 and 34 years old.

Table 3.1 Age group of the respondents in Mwakirunge location.

Age Group	Households respondents		Dumpsite users respondents	
	Frequency (n)	Percentage (%)	Frequency	Percentage
15-24 years	31	15.8	18	21.7
25-34 years	60	30.6	28	33.7
35-44 years	54	27.6	14	16.9
45-54 years	24	12.2	11	13.3
55 and above years	22	11.2	7	8.4
Total	191	97.4	78	94

Five of the respondent did not review their age and therefore the data was for 97.4 % of the respondents. Most of the respondents among the household's heads were young with 74% being less than 44 years old. Among the dumpsite users, 72.3 % were below 44 years old.

3.3.2 Marital Status of the Respondents

Majority of the household respondents were married (72.4%) while 39.8 % of the dumpsite users were also married. There were more than double the percentage of dumpsite users who were divorced and separated while a big percentage constituting 36.1% were singles. During the focus group discussion, the respondents pointed out that one of the major problems of the dumpsite is breaking up of families and prostitution.

Table 3.2. Marital status of the respondents at Mwakirunge location

Marital status	Households respondents		Dumpsite users respondents	
	Frequency (n)	Percentage (%)	Frequency	Percentage
Married	142	72.4	33	39.8
Widowed	21	10.7	4	4.8
Divorced	6	3.1	7	8.4
Separated	6	3.1	9	10.8
Single	21	10.7	30	36.1
Total	196		83	100

3.3.3 Literacy level in Mwakirunge area

From a focus discussion with teachers, it was reviewed that schools in Mwakirunge have approximately 400-1000 pupils. Teachers pointed out that, there seemed to be more girls than boy students in the basic education institutions in the area. This was attributed to the presence of the dumpsite. The dumpsite was also identified to impact education in the area negatively through :

- Children detour to the dump site instead of going to school,
- The children go to the dump site without the parent's permission,
- Due to pupils absenteeism, school performance have dropped,
- Absenteeism is also brought about by sicknesses which arise due to dump site eg bad adour causing head aches, stomach aches etc

The dumpsite was said to impact youth negatively. Some of the negative effect identified includes:

- Youth working in the dumpsite hail from the surrounding villages, although, others hail from other sub-counties of Mombasa or outside Mombasa including up-country
- Youth are becoming addicted to drugs which are readily available at the dumpsite
- There is the problem of alcoholism among the youth in the area.
- The youth are involved into crime and causing insecurity
- The youth engage in unprotected sex hence fuel the HIV/aids scourge
- The youth have started "families" inside the dump site with children born and bred on the food provided at the dump site.
- The dump site has bred a "chokora culture"- drug addicts, using vulgar language and generally crime prone
- On a positive note-youth retrieve materials for sale. They thus get income from the dump site

Table 3.3. Education level of the respondents

Education Level	Households respondents		Dumpsite users respondents	
	Frequency (n)	Percentage (%)	Frequency	Percentage
Not gone to school	66	33.7	34	41.0
Primary	100	51	42	50.6
Secondary	19	9.7	4	4.8
College	10	5.1	3	3.6
University	1	0.5	0	0.0
Total	196	100	83	100

3.3.4 Peoples Dwelling Structures in Mwakirunge

People in Mwakirunge live in different types of houses. As shown in Table 4, majority of the households (49%) live in mud walls with makuti or grass roofed houses. Among the dumpsite users, majority (75%) live in makeshift structures made up of plastic papers. This is a clear indicator of high poverty level in the area.

Table 3.4 Type of houses in Mwakirunge

House type	Households respondents		Dumpsite use respondents	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Stone walls with tiles/iron sheet roofing.	16	8.2	4	4.8
Timber walls wit iron sheet roofing.	1	0.5	0	
Mud walls with iron sheet roofing	96	49	4	4.8
Mud walls with Makuti/grass roofing	0	0	9	10.8
Make shift (polythene papers)			62	74.7

Plate 3.1 Makeshift structures at Mwakirunge dumpsite

3.4 Mwakirunge Dumpsite

3.4.1 Current Status of Mwakirunge Dumpsite.

Mwakirunge dumpsite is situated along the Zakhem Road 13 kilometers from the Nyali Bridge and 17 kilometers from Mombasa's Central Business District. The road leading to the dumpsite is an earth road, which degenerate into very poor conditions during the rainy seasons. This makes waste transport especially by big trucks to be very challenging with many times, the trucks getting stuck in the mud and ending up disposing the wastes on the road. The National Electric power grid passes through the site, and also the Baricho water pipeline, which supplies drinking water to the residents. The dumpsite covers approximately 50 acres and there are many squatter settlements on the site residing in temporary dwellings. Bordering the dumpsite are the settlements of Nguu Tatu, Marimani, Mwakirunge, Maunguja and Mishomoroni.

The dumpsite is not fenced though Focus Group Discussion (FDGs) reviewed that this was one of the promises made before the dumpsite was relocated in the area in year 2007/2008. There was a promise that there will be proper fencing, recycling plants, tarmacking of road, building of schools and dispensary and creation of employment. The dumpsite was relocated before a full Environmental Impact Assessment was fully carried out. As shown in Figure 3.1, the dumpsite is already within the 13Km radius of Moi International Airport and to make the matters worse, it lies along the landing flight path. The Kenya Airport Authority had raised their complaints that the dumpsite is located within the 13Km radius of Moi International aircraft landing flight path where the Kenya Civil Aviation Authority (KCAA) has installed the landing equipment. Because of the poor

location, the dumpsite has been posing danger to landing aircrafts and already, a number of birds strike has been reported. The report has already been submitted to the International Civil Aviation Office (ICAO), which can end up declaring the airport unsafe for aircrafts. This will highly affect the economic status of Mombasa County and other bordering counties at the coast. There is therefore urgent need to address the problem posed by the dumpsite.

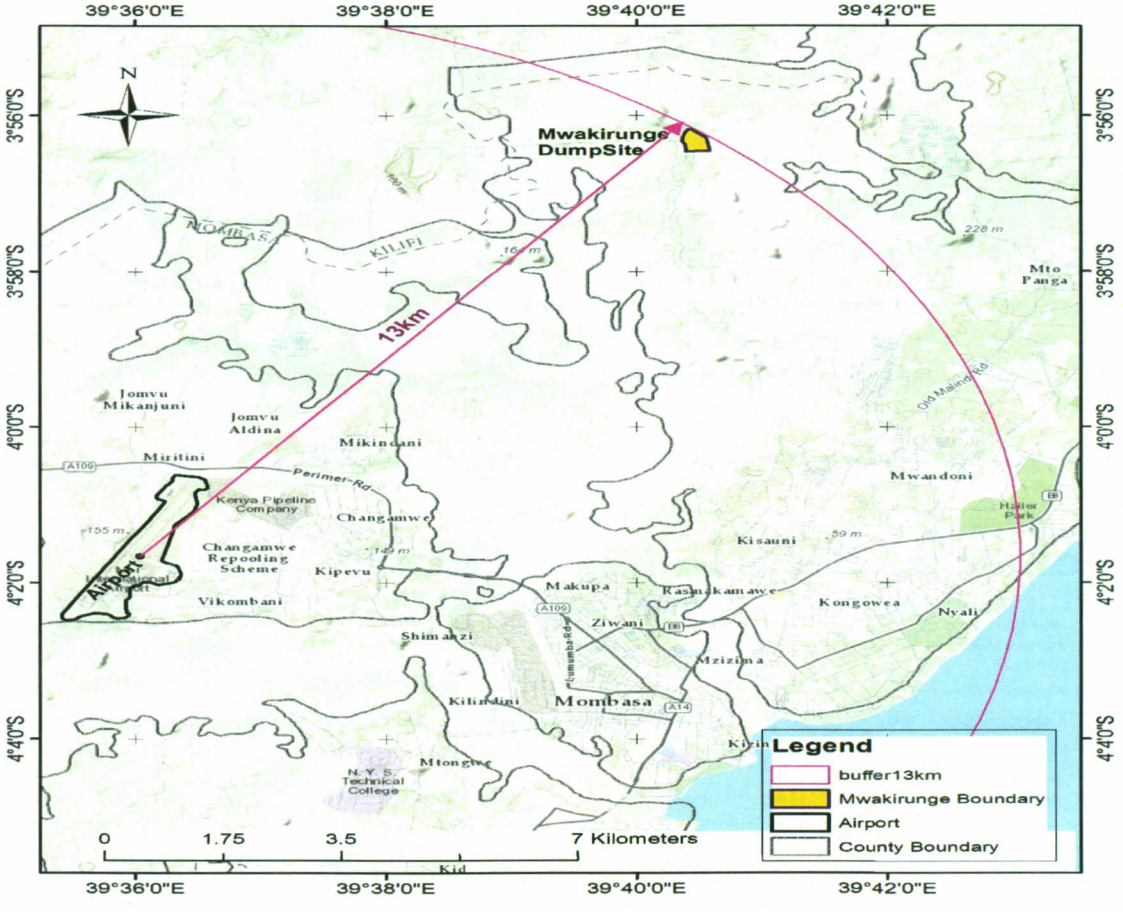

Figure 3.1 Location of Mwakirunge dumpsite in relation to Moi International Airport.

The community has been blaming the dumpsite for the increased high children drop out from schools who ends up 'scavenging' for recycled items, children indiscipline, raping of women, crime, family breakup, diseases, pollution and illicit brew. The dumpsite is said to be a major health hazard due to high rate of air, water and soil pollution. It is also identified as a breeding ground for vermin, flies and other potential carriers of communicable diseases (e.g. diarrhea and cholera) and has affected the community adversely in several ways. Many of the children, some coming from the nearest villages and others from as far as Mombasa, have dropped out of school and have opted for scavenging. In the dumpsite, there are scattered wastes, which has led to numerous cases of children injuring their feet after walking on sharp objects, which are poorly dumped by trucks.

There are reports of some cases of people who have died from food poisoning after eating rotten food from the dumpsite.

The dumpsite poses serious security risk for women since the site has become a safe haven for criminal elements. Cases have been reported by the communities in the area pointing out that some girls and women are attracted to the dumpsite by cash for sex, which not only contribute to family break ups but also to spreading of HIV and AIDS infection. The plastic papers from the dumpsite are blown by wind to neighboring farms leading to animal death and negatively affecting crop cultivation. As people burns waste to reduce the volume and preserve disposal space at the site, there is emission of dangerous toxic fumes that causes chronic respiratory problems and other diseases. People are reported to have been burned while passing near the dumpsite.

3.4.2 Major Diseases Associated with Mwakirunge Dumpsite

The dumpsite has been associated with various diseases in neighboring society. Health-related risks – mostly houseflies, mosquitoes, polluted air due to smoke, rotten foods, burned plastics etc. lead to many people suffering from many diseases. Some substances dumped in the area as also toxic and poisonous including used hospital products. Used condoms are also found in the dumpsite and become an attraction to children who uses them as balloons. This exposes small children to sexually transmitted diseases. Broken bottles have also been reported to injure many dumpsite users and community members.

As shown in Table 3.5, among the households respondents, majority of the respondents were suffering from malaria (91.8%), respiratory/infection (55.6%) and skin diseases (53.6 %). Among the dumpsite users, the major diseases reported were malaria (74.7%), diarrhea (56.5%), respiratory/infection (47%), eyes/nose irritation (%) and burns (39.8%)

Table 3.5 Major diseases reported by the respondents

Type of diseases	Households respondents		Dumpsite users respondents	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Malaria	180	91.8	62	74.7
Typhoid	34	17.3	13	15.7
Diarrhea	149	76	47	56.5
Bilharzia	2	1.0	2	2.4
Amoeba	34	17.3	19	22.9
Respiratory/infection	109	55.6	39	47
Skin diseases	105	53.6	31	37.3
Eyes/nose irritation	105	53.6	39	47
Burns	0	0	33	39.8
Others	6	3.1	6	7.2

3.4.3 Major Problems and Risks Associated with the Dumpsite

To the local community, the dumpsite is a major problem to the area (98%). Even the dumpsite users concurred that the dumpsite is a major problem (88%).

Table 3.6. Community perception on problems associated with the dumpsite

House type	Households respondents		Dumpsite users respondents	
	Frequency (n)	Percentage (%)	Frequency	Percentage
Yes No	192 4	98 2.0	73 10	88 12
Total	196	100	83	100

Plate 3.2. Air pollution from the dumpsite

The problems and risks associated with the dumpsite can be classified into four broad areas:

- Health problems as discussed in section 3.3. Among the household respondents 45.9% of the respondents associated the dumpsite with

detelioration of health. Among the dumpsite users, 54.2% associated the dumpsite with health challenges. The dumpsite was also associated with increase in mosquitoes, flies and smoke which causes other diseases like malaria, respiratory diseases and diarrhea.

- Insecurity – From the household survey, 98% reported that the dumpsite is a major source of insecurity. From the focus group discussion it was reported that the dumpsite users have threatened some locals in the evenings or very early in the morning. The dumpsite is open to everybody and therefore, many criminals from places hide at the site. It was said that the dumpsite has the potential to become a breeding ground for criminals who could possibly cause mayhem outside and within the community. Some informants reported of knowing people who have been threatened by dumpsite users. Theft of chicken, goats and other livestock has also increased in the area. Stray dogs are reported as a major problem. The dogs not only attack villagers but also kill goats and chicken.
- School drop outs – The dumpsite is easily accessible by anyone irrespective of age. A good number of school-going children are already scavenging for items for sale and for 'foods'.
- Moral decay – The dumpsite is identified as an area of immorality. The men who scavenge garbage for sale are accused of luring teenage girls to early sexual intercourse, leading to early pregnancies. Married women have also not been spared. During the focus group discussion, it was reported that there has been about six rape cased of young girls and two mothers in the dumpsite. Children who visit the dumpsite on regular basis were also reported to become intoxicated with bad language and immoral character.

Plate 3.3. Poor waste disposal on the road in Mwakirunge dumpsite

Table 3.6 Community perception on the major problems associated with Mwakirunge dumpsite

Problem	Households respondents		Dumpsite users respondents	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Health challenges	90	45.9	45	54.2
Pollution	79	40.3		
Littering	51	26.0	24	28.9
Insecurity	192	98.0	14	16.9
Children drop out from school	101	51.5	28	33.7
Death of domestic animals	27	13.8	5	6.0
Family break ups	28	14.3	19	22.9
Children moral decay	36	18.4		
Smoke	171	87.2	40	48.2
Bad smell	185	94.4	59	71.1
Dust	64	32.7	27	32.5
Snakes	12	6.1	11	13.3
Birds	42	21.4	19	22.9
Wild dogs	123	62.8	43	51.8
Flies	184	93.9	56	67.5
Mosquitoes	81	41.3	41	49.4
Fires	25	12.8		
Others	3	1.5	1	1.2

Other problems associated with the dumpsite include children dropping out of school, accidents e.g. cuts from glasses, burns especially children and animals. One of the participants in the focus group discussion mentioned that even livestock are also affected for they get burned. She mentioned that two goats were burned were burnt at the dumpsite. It was also reported that sometimes there is some ash or sand that come from industries and when it is dumped at the dumpsite, it does not look dangerous but when children are step on it when scavenging, it causes serious burns. It was reported that there was a boy who was seriously burnt from the waist downwards and his treatment cost was over KS. 100,000/= .The boy was unable to walk for a long time and even to date the he can only walk for a short distance. A member of one of the focus group discussion mentioned that the hot ash/ sand also burned one of the boys of one of the ladies in the group. Another speaker mentioned that there have been rape cases around the dumpsite-. Already 6 children and 2 adults are known to have been raped. There have also been cases of early marriages with some schoolgirls dropping out of school to be married by men working at the dumpsite at very at early age.

At the family level the dumpsite was blamed for:

- Marriages break up because some married women get involved with the dumpsite users and some end up getting married there.
- Increase in immorality within the community and increase in number of people getting infected with HIV and AIDs.
- Indiscipline among children due to exposure to indiscipline society at the dumpsite. Children are reported to be rude, disrespectful and using abusive and vaguer language, which they pick from other dumpsite users. Many of the children at the dumpsite have become street boys (chokoras) and they are joining criminal gangs at the dumpsite that sometimes poses as policemen to terrorize the people.
- Chemicals or wastes in the dumpsite making water availability very difficult especially when there is no tap water pollute Rivers and streams in the area.
- Sometimes there are poisonous chemicals that are delivered and buried at night in the dumpsite, which ends up polluting the soil, rivers, and seawater.
- The dumpsite has encouraged some people to be lazy since they do not need farming but they can rely on the dumpsite for provision of food and money.
- The dumpsite has attracted so many flies in the area making people with small l businesses to be affected e.g. food kiosks. Some customer refuse to pay for food or tea served if they notice there are flies in them.
- There have been cases of homes being broken into and threats of rape in the area.

3.4.4 Benefits Associated with Mwakirunge Dumpsite

Despite the risks and problems associated with Mwakirunge dumpsite, some of the respondents identified some benefits of the dumpsite. To the majority of the respondents who are the dumpsite users, the benefits include:

- Provision of construction and roofing materials. These are sold locally to willing buyers in the village. They include nylon papers and hard boards as well as timber among other recycled materials.
- Job creation. Since the sale of metal scraps forms a main activity in the dumpsite, villagers have also resorted to scavenging for old metal scraps from outside the dumpsite for sale.
- Foods, and animal feeds. Despite the rotten state of some foods which are dumped in Mwakirunge dumpsite from hotels, some villagers and dumpsite users have developed some innovative ways of processing and preparing such foods for consumption. For instance, meat was reported to be washed thoroughly and boiled severally before it is cooked and served. Villagers have also been using waste from maize millers to feed their chicken, although some complained that such feeds contribute to deaths of their chicken.

- Boosting of local/informal businesses. The dumpsite was reported to have boosted the local market. In total, there were six women who were said to be marketing their foods to the dumpsite users and to passers.

Plate 3.4 Firewood collected from the dumpsite

3.4.5 Suggested Community Role in Solving Problems at Mwakirunge Dumpsite.

Various respondents and focus group discussion suggested various roles that community can play in solving the problems at Mwakirunge dumpsite. For youths who are in their prime years the urgent concern is to control the free movement of school-going children into the dumpsite. CYSHG hopes to achieve this goal by mobilizing support from the community and dumpsite users. The group also hopes to facilitate the setting up of rules of movement into the dumpsite. It was also suggested that the community can engage themselves in peaceful demonstration, organizing clean up days and restrict children from visiting the dumpsite.

3.4.6 Suggested County and Central Governments Roles in Solving the Problems at the Dumpsite

The respondents suggested that apart from enacting by laws on proper management of the dumpsite, the government should fulfill its earlier promises. The respondents suggested the following:

- Relocate the dumpsite to another area where there are no people.
- Fence the dump site; erect a gate and office/ residential blocks.
- Assign a tractor / shovel to the site so that it can move waste from the road and also level the waste.
- People whose land is close to the dump site should be resettled elsewhere by the county or central government.
- Construction of all weather road to the dumpsite and within the dumpsite.
- Construction of a waste recycling plants
- Putting up a school and a health center.
- Putting up a gate and manning the dumpsite to ensure it is only adult who get access to the dumpsite.
- The government should also take action against parents who allow their children to visit the dumpsite
- Provide youth with Personal Protection Equipments (PPEs) to enable them work in the dumpsite.
- Share proceeds from the dumpsite with the community.
- Ensure that waste isbe sorted out from the sources (where they come from).
- Designate lorries to carry specific types of wastes.
- Put up a recycling plant at Mwakirunge which will create employment for the locals and especially the and youth.
- The government should also provide a title deed for the dumpsite and clearly mark the boundaries.
- The government should also build hospitals and equip them with drugs. It should ensure ambulances are available to ferry the sick to hospital.

Table 3.8 Community suggested roles and responsibility for County government

Role and responsibility	Households respondents		Dumpsite use respondents	
	Frequency (n)	Percentage (%)	Frequency (n)	Percenta (%)
Convert the dumpsite to a landfill	4	2.0		
Fence the dumpsite	159	81.1	42	50.6
Build a heath centers	30	15.1		
Provide tractor to the dumpsite	14	7.1	17	20.5
Relocate the dumpsite	64	32.7		
Organize clean up days	1	0.5		
Build a recycling plant	29	14.8		
Provide security	20	10.2	6	7.2
Develop policies for managing the dumpsite			11	13.3
Provide protective gears			5	6.0
Restrict children visiting dumpsite			11	13.3
Improve the management the dumpsite			7	8.4

Community around Mwakirunge dumpsite felt that the government has forgotten them. They mentioned that the government only visits the area when they need votes and make promises that they do not keep or fulfill after they win their votes. They pointed out that children have no schools and the ones that are available are very away. The government should fulfill their promises and also build schools.

3.4.7 Suggested Roles and Responsibility of Non Governmental Organization in Solving the Problems at Mwakirunge Dumpsite

Action Aid has been at the forefront in capacity building in Mwakirunge especially in relation to the laws set out in our constitution with regard to the Environment. The youth in the focus group hope that Action Aid continues with the good course. If it were not of Action Aid, the group confirmed that they would not have known whether they had rights to a clean environment. The respondents felt that Non government organization especially ACTION AID has been very beneficial to the community. It has continued raising community awareness on the negative impacts of the dumpsite. It was suggested that NGOs could:

The respondents felt that Non government organization especially ACTION AID has been very beneficial to the community. It has continued raising

awareness on the negative impacts of the dumpsite and this should continue. It was suggested that NGOs should:

- Facilitate trainings. The youth who deal in waste scavenging should be made aware of the health related dangers they are exposing themselves to. They should also be issued with Personal Protection Equipments (PPEs).
- Community should be informed and allowed to participate in any improvement effort.
- The area can be organized in such away that the proceeds from the dumpsite are shared with the community (formation of a waste recycling cooperative)
- Help in puting up recycling plant at Mwakirunge. It will create employment for the locals / and youth.

3.5 Legal Framework
3.5.1 Constitution of Kenya:

Many of the respondents were not aware of whether there is any policy or laws on the management of solid waste. They were not aware of their rights as citizen to live in a clean environment. There were only 25% of the households' respondents who had heard of a law in relation to the environment. Accumulated waste deposits are an indication of societal lifestyles, level of waste management practices and production technology in place. Some societies at the peak of their development are reported to have stagnated due to inadequate management of their waste leading to proliferation of disease; environmental degradation and ultimate impact on livelihoods. This can be seen in Mombasa County and there is an urgent need to address the waste management problem. Improper management of waste poses a threat to Climate Change and eventually in the achievement of sustainable development. Waste being one of the contributors of greenhouse gases, affects climate change and it is for this reason that as a county and even the country at large, there is need to develop sustainable waste management technologies and initiatives to cub this growing waste management challenges.

Since Kenya subscribe to the vision of a prosperous and equitable society living in harmony with our natural resources, Mombasa County should come up with laws and policies to make this happens. There is reinforcement in Kenya's constitution under the fundamental right to a clean and health environment. Sound environmental management entails use of waste reduction technologies in production, sustainable product design, resource efficiency and waste prevention, re-using products where possible; recovering value from products. Although, elimination of waste entirely may not be feasible, systematic application of modern waste management systems should be explored and implemented in Mombasa County.

The Kenya's constitution provides every person the right to a clean and healthy environment. On Article 42 on the Environment, the constitution provides that-

"Every person has the right to a clean and healthy environment, which includes the right:

a. to have the environment protected for the benefit of present and future generations through legislative and other measures, particularly those contemplated in Article 69; and
b. to have obligations relating to the environment fulfilled under Article 70."

On Article 69 the Constitution provides obligations to the Environment in that –

(1) The State shall—

i. encourage public participation in the management, protection and conservation of the environment;
ii. establish systems of environmental impact assessment, environmental audit and monitoring of the environment;
iii. eliminate processes and activities that are likely to endanger the environment; and
iv. utilize the environment and natural resources for the benefit of the people of Kenya.

(2) Every person has a duty to cooperate with State organs and other persons to protect and conserve the environment and ensure ecologically sustainable development and use of natural resources.

Part 2 of the fourth Schedule in the constitution also explicitly provides that the

County Governments shall be responsible for; refuse removal, refuse dumps and solid waste disposal. It is on this that the community in Mwakirunge should be encouraged to stand for their right and demand from the county and central government for a proper management of the dumpsite. They should be encouraged to engage the relevant county and central government officers to get their rights.

3.5.2 Kenya's Vision 2030

Kenya's Vision 2030, identified the importance of proper solid waste management initiatives. Mombasa city under vision 2030 has been identified to be among the five leading municipalities where there will be need for development of solid waste management systems. The county should take advantage of this and come up with appropriate projects to address the same.

3.5.3 The Environmental Management and Coordination Act (EMCA), 1999

Section 3 of EMCA, 1999 stipulates that - "Every person in Kenya is entitled to a clean and healthy environment and has a duty to safeguard and enhance the environment."

Section 9 of EMCA, 1999 further states that –

(1) The object and purpose for which the Authority is established is to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of Government in the implementation of all policies relating to the environment.

(2) Without prejudice to the generality of the foregoing, the Authority shall –

(a) co-ordinate the various environmental management activities being undertaken by the lead agencies and promote the integration of environmental considerations into development policies, plans, programmes and projects with a view to ensuring the proper management and rational utilization of environmental resources on a sustainable yield basis for the improvement of the quality of human life in Kenya;

Section 86 of EMCA, 1999 provides that – "The Standards and Enforcement Review Committee shall, in consultation with the relevant lead agencies, recommend to the Authority measures necessary to:-

(1) prescribe standards for waste, their classification and analysis, and formulate and advise on standards of disposal methods and means for such wastes; or

(2) issue regulations for the handling, storage, transportation, segregation and destruction of any waste."

Section 87 of EMCA 1999 states that – "(1) No person shall discharge or dispose of any wastes, whether generated within or outside Kenya, in such manner as to cause pollution to the environment or ill health to any person.

(3) No person shall transport any waste other than –

(a) in accordance with a valid licence to transport wastes issued by the Authority; and

(b) to a wastes disposal site established in accordance with a licence issue by the

Authority.

(4) No person shall operate a wastes disposal site or plant without a licence issued by the Authority.

(5) Every person whose activities generate wastes shall employ measures essential to minimize wastes through treatment, reclamation and recycling.

Environmental Management and Coordination (Waste Management) Regulations of 2006 stipulate that-

In the Responsibility of the Generator, Regulation 2 states that – "Any person whose activities generate waste shall collect, segregate and dispose or cause to be disposed off such waste in the manner provided for under these Regulations."

Regulation 5 on the Segregation of waste by a generator states that –

"(1) Any person whose activities generate waste, shall segregate such waste by separating hazardous waste from nonhazardous waste and shall dispose of such wastes in such facility as is provided for by the relevant Local Authority."

According to the EMCA act, the operation of Mwakirunge dumpsite is illegal since there is no licence that has been provided by NEMA. The way waste is also transported and disposed is also illegal since vehicles are expected to cover their waste as they transport it.

Conclusion

Mwakirunge dumpsite has very many negative environmental, cultural, social and economic impacts to the community living in Mwakirunge. It has highly affected the health of the community while many children has dropped out of school. Families are also being broken with many girls and women being raped. It is very clear that the right procedure for developing a dumpsite was never followed and a NEMA license was never issued to Mombasa municipality since Kenya Airport Aviation objected to the location of the dumpsite since it is within non acceptable 13Kms radius and worse still on the flight path where airplanes take position to land in Moi international airport. The dumpsite is a an accident in waiting though it has continued operating illegally against the Kenyan law.

Management of the dumpsite is also very poor and it does not meet the minimum requirement of a dumpsite according to Environmental Management and Co-ordination Act (EMCA) of 1999. The constitutional right to the community to a clean environment is being violated and the county government should be held responsible for the many ills facing the community. There is need for awareness creation and empowerment of the community to know their rights. Awareness creation should be carried out to officers in Mombasa county so that they understand and relocate the dumpsite. If not possible, proper management of the waste should be done stating with putting up a perimeter fence all around the dumpsite. The county should develop policies on waste management which should be in tandem with the Kenya constitution, environmental laws and policies.

Source reduction and reuse of waste

Mombasa County government should undertake management reforms to bring an end to unsightly areas of uncollected or illegally dumped solid wastes. This would involve minimization of waste reaching the drop off points and the dumpsite. The 3Rs approach – **Reduce, Reuse and Recycle** of wastes should be promoted to gain acceptance. Source reduction of MSW could involve measures such as: (a) product design and packaging to make them easy to reuse; (b) use of existing packaging materials as opposed to producing new ones; (c) lengthening usage life of products to minimize the

frequency of replacement; and (c) developing alternatives to disposal such as composting of grass and food wastes and other compostable solid wastes from farms or markets. Reuse can work well with packaging of drinks where reusable glass bottles and cans instead of non-reusable plastic or paper packaging could be used for bottling. This strategy, however, may need changes in industrial technology and in consumer choice and preferences, as well as taste. The county can create awareness on this. Mombasa County government should also consider offering a tax concession to industries involved in developing reusable products that will reduce solid wastes intended for disposal.

Youth groups in Mwakirunge should be trained as artisans and form groups such as "Jua Kali' (private artisan groups) which can provide another avenue for reuse of old and disposable items. These groups could work in built shades where they could purchase and resell plastics, papers, old office equipment; household wares and used industrial wares. They could also be involved in producing inexpensive farm tools such as sprays, watering cans and other plastic products. These products are low in cost and have a big market among the low-income population. They could contribute in reducing waste and also creating employment.

Recycling of municipal solid wastes

With the increasing cost of raw materials, recycling provides a cheaper source of raw materials for manufacturing industries. This can give value to the otherwise worthless MSW and should be encouraged to have a second look at a product before making a decision to dispose it. Sorting and separation of municipal solid waste should be encouraged in different sectors. Government and Non government organisations should join hands and promote recycling of solid waste in Mombasa county.

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