Environmental Issues and Socio-economic Problems Emanating from Salt Mining in Kenya; A Case Study of Magarini District

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Abstract

Salt mining generates colossal profits for the investors and towards Kenya's revenue margin. However, salt farming in Magarini District has increasingly elicited social concerns locally and ecological stress at large. Subsequently, this paper presents the findings of a study that explored the socio-economic and environmental issues associated with salt farming. Primary data sourced from the local community provided bulk of the information. Through multi-stage cluster and snowball sampling techniques, a sample of 120 households and 12 institutions were identified after which appropriately designed questionnaires were administered. This was augmented by interviews and focus group discussions with key informants and observations. The results documents myriad of issues including: perceived forced evictions, delineations, pollution, health hazards, unacceptable labor conditions, intimidations and corrupt local leadership, among others. This informs the need to develop effective monitoring systems that guarantees environmental and social management plan compliance by this industry.

Key Words: Ecological degradation, Marine biodiversity, Health problems, Poverty increase, Social Impact Assessment.

1. Introduction

Salt farming is a major industrial sector which cannot be ignored as Kenya endeavors to achieve Vision 2030. Vision 2030 is the country's development blueprint that is aimed at transforming Kenya into a newly industrializing middle-income country. However, as country endeavors to industrialize, in salt mining should not undermine the objective of environmental sustainability and social welfare as reflected in livelihood if sustainable development has to be achieved. A concept propounded at the World Commission on Environment and Development (WCED), famously referred to as the Brundtland Commission - Our Common Future (WCED, 1987). According to the Brundtland report, Sustainable Development (SD) is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." The report contributed significantly to the recognition of the need to integrate economic, social and environmental concerns in development processes. The definition of SD implies that there should be intra- and inter-generational equity as stated by the Nobel Laureate Amartya Sen.

As an attempt to achieve SD, all the mining projects are required to undertake Environmental and Social Impact Assessment (ESIA) study before the project implementation according to Kenya's Environmental Management and Coordination Act of 1999. Moreover, this is to be followed by annual auditing of the same and reports submitted to the National Environmental Management Authority (NEMA). Social and environmental issues generated by this industry elicit questions about the effectiveness of ESIA process and the implementation of the Environmental Management Plan (EMP) from the studies.

Salt farming in Magarini has farfetched history dating back to 1928 when Mombasa Salt Works industry was established (KNCHR, 2006). The activity is the mainstay of the area's economy, but its socio-economic and ecological contribution has not been fully realized. Magarini has a very high poverty index currently at 66% (GoK, 2005), it is ranked as one of the poorest constituencies in Kenya at position 189 out of 210 (Okoth, 2010).

This is much higher than the national poverty index of about 56% (GoK, 2005), poverty cycle exonerates in a region where there exists immense potential to expand salt farming in the region. This study focused on Magarini region because the setting of solar reliant salt works is determined by the rainfall patterns and presence of impermeable soils. Along the Kenyan coast-belt these conditions occur from Ngomeni up to Lamu (UNEP, 2008). Magarini region has a high population growth rate of about 3.5 % (GoK, 2005), against the national index of about 2.46% (CIA World Fact book, 2012). This continues at its record high when most individuals in the region lack title deeds, this discourage more beneficial utilization of land. The local community stands a challenge of realizing full benefits from salt mining because the area is marked with high illiteracy level of 31%, consequently most of the regions labor force is either semiskilled or unskilled (about 54% in total), many of whom are engaged on casual basis under deplorable conditions (Okoth, 2010). Due to low education levels and high poverty rates most of salt farm employees still work under extremely poor conditions; they lack essential safety gears like gloves, boots, helmets, overcoats, scrapers and basins (KNCHR, 2006).

Long term exposure to brine and associated chemicals according to Okoth (2010) and KNCHR (2006), results into numerous health complications to the field workers. Salt farming in the region is also related to severe ecological issues at Kenya's coastal strip. Therefore there is need to document the specific environmental and social impacts of the mining activities to assist in the development of an integrated sustainable development plan for salt mining for the benefit of local and national economies while preserving ecological, social and human health integrity.

2. Materials and Methods

2.1 The study area

The study focused on Magarini District in Kilifi County. Magarini District has an aerial extent of about 2,418km^2(KenSea, 2006). Kilifi County is one of the six Counties in Coast region of Kenya. The County lies between 2^o 20$'$ and 4^o South, and between 39^o 05$'$ and 40^0 14' East (Republic of Kenya, 2005). It borders Kwale County to the south west, Taita Taveta County to the west, Tana River County to the north, Mombasa County to the south and Indian Ocean to the east. The County covers an area of 12,450.4 km^2 (GoK, 2005). Kilifi County has four major topographical features. The first one is the narrow belt, which forms the coastal plain and varies in width of 3km to 20km. The coastal plain lies below 30m above sea level with a few prominent peaks on the western boundary including hills such as Mwembetungu. Across this plain, run several creeks resulting in excellent marine swamps that are endowed with mangrove forests and present potential for marine culture. To the west of the coastal plain lies the foot plateau characterized by slightly undulating terrain. The plateau falls between 60m and 150m altitude and slopes towards the sea. The coastal range falls beyond the foot plateau and has distinct low range of sandstone hills and ranges between 150m to 500m high. The drainage pattern for Kilifi County is formed by seasonal rivers, which drain into Indian Ocean through the various creeks along the coastline. The rivers and streams are Nzovuni, Rare, Goshi, Mtomkuu and Wimbi (GoK, 2005).

2.2 Climatic Information

The region's average annual rainfall ranges from 400mm in the hinterland to 1,300mm at the coastal belt. The coastal belt receives an average annual rainfall of about 900mm to 1,100mm with marked decrease in intensity to the hinterland (GoK, 2005). Areas with highest rainfall include Mtwapa and to the north of the coastal strip around the Arabuko Sokoke Forest (Okoth, 2010 and UNEP, 2008). Evaporation ranges from 1800mm along the coastal strip to 2200mm in the nyika plateau in the interior (GoK, 2005). Highest evaporation rate is experienced during the months of January to March in all parts of the County. The annual temperatures in the County range between 22.5^{o}c and 30^{o}c in the coastal belt and between 30^{o}c and 34^{o}c in the hinterlands. The county experiences relatively low wind speeds ranging between 4.8 km/hr and 10.9 Km/hr (GoK, 2005). The Magarini District lies in semi arid region and is hot and dry. However, heavy rains are experienced in some parts.

2.3 Population profile

The Kenya Population Census Report of 2009 indicates that the district population stood at 151,159 people composed of 72,992 and 78,168 male and female respectively. The population projections for the beginning, mid and the end of the profile period based on the inter census population growth rate of 3.5 per cent per year are as in Table 1.

Table 1: Population Projections of Magarini District

2009 (Census)			2012 (Projections)			2015 (Projections)			2017 (Projections)		
Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
72992	78167	151159	80437	86140	166577	87882	94113	181995	92846	99428	192274

Source: Kenya National Bureau of Statistics, Kilifi 2011

2.4 Education and Health Services

Magarini district has 18 secondary schools, 15 public and 3 private secondary's. The district has 89 primary schools, 74 and 15 public and private respectively. The district has a deficit of approximately 625 and 54 teachers for primary and secondary schools respectively. Promotion of girl child education is greatly hampered by early marriage. The district has two health centers from located in Magarini and Marafa divisions and 14 dispensaries spread across their locations. The common disease occurrences are diarrhea, malnutrition and water borne diseases. These are due to lack of adequate food and clean drinking water which forces people to use the dirty and contaminated water. Most families are beneficiaries of the free mosquito nets distributed by public health sector to contain malaria instances.

2.5 Economic Activities

Salt farming is the major economic activity in Magarini Disrict providing employment for majority of the residents mostly as casual workers and a few permanent employees. The area has six operational salt farming companies; they include Krystalline Salt Limited, KEMU Salt Packers Production Limited, Kurawa Industries Limited, Malindi Salt Works, KENSALT Limited and Mombasa Salt Works Limited (KNCHR, 2006). Agricultural production is also practiced in area. Main food crops grown are maize, cassava, cowpeas, green grams and mchicha while the cash crops are coconuts, cashew nuts, cotton and simsim (GoK, 2005). Horticultural crops such as mangoes, citrus, pineapples, bananas, tomatoes and watermelon are also grown. Moreover, animal husbandry is practiced where various types of livestock breeds of cattle, poultry, goats, sheep and bees are reared. The livestock projects and programs like ALLPRO and DASS have assisted and educated farmers in livestock production improvement. However, the productivity is still dismal due to occurrence of prolonged drought, pest and diseases, overgrazing, illiteracy, poor infrastructure and land ownership issues. The area also experience huge influx of cattle from Tana Delta District and other areas in search of pasture hence high susceptibility of diseases outbreak in the area (GoK, 2005). Tourism and trade, fishing, sand harvesting is among other economic activities practiced in Magarini District

2.6 Methodology

To address research objectives sufficiently both primary and secondary data was utilized. Data collection techniques broadly engaged questionnaires to collect households' data; face to face interviews were of essence in collecting data from relevant government institutions, NGOs and salt farming companies' officials; Focus Group Discussion (FGD) was conducted with Human Rights interest groups in salt farming sector; observation was utilized to identify physical parameters that are as a consequence of salt farming; and photography was adopted due to its vast advantages. Multi-stage cluster sampling (Hamilton and Brakel, 1984) and snowball sampling techniques were utilized to arrive at the desired sample size. Sampling Size and procedure as advanced by Fisher's formula was used ($n = Z^2PQ*1/d^2$). Snow balling was vital in identifying key stakeholders in salt mining industry in the region**.** A sample size of 120 households and 12 relevant government institutions provided data which was then collated, cleaned and analyzed using the Statistical Package for Social Science and Microsoft Excel.

3. Results and Discusions

3.1 Salt mining in Kenya

Salt production from brine in Kenya is the oldest source of sodium chloride. Salt farming has been practiced since salt crystals were first identified in trapped pools of ocean water. Solar evaporation method is practical in warm climate regions where evaporation rate exceeds precipitation rate annually for projected periods. Salt farming process involves capturing of sea water in shallow ponds where the solar evaporates most of the water.

Concentrated brine precipitates the salt which is then manually harvested. Impurities present in the brine are drained off and discarded before harvesting. Salt ponds are of two types i.e. evaporators where the ocean water is concentrated and crystallizers where the salt is harvested. Crystallizers are ponds with a foot thick floor of salt resulting from four to five months of salt farming. Pure salt crystallizes from the saturated brine solution as the water evaporates (Morton, 2012). Natural chemical impurities are returned to the salt water source.

In Kenya searching and exploitation of mineral resources is regulated by, the Mining Act Cap. 306 established in 1940 and revised in 1987, and the Environmental Management and Co-ordination Act of 1999 (GOK, 1999). Ownership of the minerals is vested in the Government. Kenya's policy on mineral resources development currently seek to ensure that the private sector takes the leading role in mineral development while the government assumes a promotional, encouragement and regulatory role by providing basic geological data and necessary fiscal incentives (GoK, 2002). The Government undertakes reviews of policies, mineral legislation, promotion measures and publicizes the mineral investments in Kenya through the Mines & Geology Department in the Ministry of Environment and Natural Resources. The seventh National Development Plan of 1994-1996, titled 'Resource Mobilization for Sustainable Development' Chapter nine outlined the government policy on mineral resources and recognizes the importance for preservation of a clean environment and the involvement of the private sector for sustainable development (Kariuki, 2002). This is in line with the Agenda 21 which has a host of provisions of direct and indirect relevance to minerals development in Chapter 10 on integrated planning and management of land resources.

Kenya's Vision 2030 long term strategy takes recognition of the fact that economic growth and urbanization, combined with climatic change are likely to impact negatively on the environment, and requires effective management to ensure sustainability (GoK, 2007). In relation to salt farming these economic, social and global changes exerts immense pressure on the already declining natural resource base and on the country's fragile environment. This necessitates a strong policy on the environment in order to sustain economic growth while mitigating the impact of rapid industrialization. The Strategic Plan of the Office of the Prime Minister 2009 – 2012 establishes the Environment and Climate Change Unit (ECCU) within the Policy Coordination Department (GoK, 2012). This is actualized through EMCA, 1999 and Mines and Geology department.

3.2 Environmental Issues Associated with Salt Works

The Agenda 21 requires integration of economic, social and environmental factors of development in decision making at the policy, planning and management levels; so as to influence the actions of governments, industry and individuals towards efficient and sustainable development. This can be achieved by promoting income-generating activities such environmentally sound mining to protect the livelihoods of local communities and indigenous people.

To ensure sound environmental consideration in the economic growth and development in Kenya, the government enacted the Environmental Management and Coordination Act, 1999 (EMCA). The Act created several institutions to play different roles towards good management and governance of the environment i.e. National Environment Tribunal, Provincial and District Environmental Committees, and National Environmental Management Authority (NEMA). *Section 58* of EMCA, requires that Environmental Impact Assessment (EIA) to be conducted in accordance with the regulations and guidelines before the initiation of the development projects. This by extension ensures that *Section 67* of the Constitution of Kenya grants a right to clean and safe environment to all.

However, there are several environmental-related grievances directly attributable to the establishment and operation of salt works in Gongoni, Marereni and Kurawa areas within the greater Magarini division. The field survey results indicated that the ongoing salt works contributed to several environmental impacts including; corrosion of iron sheets, rise in temperatures, deforestation, loss of pasture, salinity of fresh water, air pollution, reduction of rainfall in the area, land degradation and increased dustiness in the area.

According to the field survey, corrosion of iron sheets within the neighborhood is closely linked to acidic rains resulting from the evaporation of highly concentrated brine water from the salt lagoons.

Clearance of vegetation such as the mangrove forests and other agricultural crops such as the coconut and cashew nut plants to pave way for construction of salt lagoons has affected micro-climate of the area leading to increased local temperatures and reduction in rainfall in the area. Generally, the environmental impacts of salt works can broadly be categorized as follows:

3.2.1 Deforestation of Mangrove Forests

The area adjoining the salt pans in Magarini District have several mangroves trees and shrubs species along Kenya's seafront (KenSea, 2006). This forms an important habitat for a variety of terrestrial and aquatic animals, many of which are species of economic importance such as shrimps (*Penaeus*), crabs (*Scylla* and *Uca*), Oysters (Crassostrea) and many marine fish species. Although some fish inhabit deeper waters when mature, many species of fish use mangrove areas to feed and as nursery for their young. Many of the species stay in the mangrove throughout their juvenile stages, benefiting from the shelter, protection and abundant food found there. Both commercial and subsistence fisheries rely on mangroves for a large part of their catch (Ochiewo, 2004). The dominant mangrove species includes; *Rhizophora mucronata* , *Ceriops tagal* , *Bruguiera gymnorrhiza*, *Sonneratia alba*, *Xylocarpus granatum*, *Xylocarpus moluccensis* , *Avicennia marina*, *Lumnitzera racemosa* and *Heritiera littoralis.* From the survey it was clearly indicated that extensive area of mangrove forests had been cleared to pave way for the establishment of the salt lagoons. It is estimated that more than 500 hectares of mangroves have been felled to create room for the construction of salt ponds in the area. What remains now are wasted mangrove forest areas that are utilized as lagoons as depicted in Plate 1. The deforestation of the mangrove vegetation is strongly associated with climate change factors such increase in temperature, reduction in rainfall and the rise in sea levels that generally affects livelihood (Obura, 2005).

Plate 1: Deforested mangrove forest for establishment of salt pond in Magarini District

Source: Field Survey, 2012

3.2.2 Loss of wildlife biodiversity

About 35,000 species of plants, animals and microorganisms have been documented in Kenya. This shows that the country has one of the highest gene pools, but some species are endemic, rare, threatened or vulnerable. Mining affects the environment and associated biota through the removal of vegetation and topsoil, displacement of fauna, release of pollutants, and generation of noise (MINEO Consortium, 2000). Kilifi County coastline is extremely rich with its diversity of birds.

Over 450 species have been recorded within the area, including some rare and little-known species that have made the area known world-wide amongst birders and ornithologists (WWF, 2001). Since many species of birds are restricted to specific habitats, major reason for this diversity around Magarini is the rich habitats that occur in the area. The scrub and forest along the coast is unique and as such a significant number of birds are only found in the narrow coastal strip where this habitat occurs. The beaches, reefs, creeks and open ocean support another group of birds not found elsewhere in Kenya (NMK, 2005 & Kazungu, *et al*., 2001). The area is not only good for plain birding, but is also internationally important for the continued survival of a significant number bird species. According to BirdLife International criteria (www.birdlife.org), one species in the area are listed as Globally Endangered, five globally threatened, and a further 33 listed in the Regional Red Data list of endangered species (IUCN/SSC, 2010).

Five species of marine turtles have been recorded in Kenya's waters, namely, the green turtle (*Chelonia mydas*), the hawksbill (*Eretmochelys imbricata*), the Olive ridley turtle (*Lepidochelys olivacea*), the loggerhead turtle (*Caretta caretta*) and the giant leatherback turtle (*Dermochelys coriacea*). However, records in Ungwana Bay show the occurrence of both the green and hawksbill turtles in feeding grounds and nesting beaches. Marine turtles, over the years, have been of great value to the coastal people because of their nutritional, economic and cultural purposes (Ochiewo, 2004). Their meat and eggs are used as food, while the tortoise shell is exported and some used to make ornaments. It also produces oil, which the local community uses as medicine and protection against evil spirits.

On the other hand, Marine mammals such as dugongs belonging to the Order Sirenia, one of the major mammalian groups are found in Kenya's coast, is also under threat. The marine animals are exclusively found close to the coastline's large bays and near shore archipelagos, where they feed on sea-grass and seaweed. Recent surveys show that dugong has been localized in Ungwana Bay and the Lamu Archipelago. They usually inhabit depths of 1-20m and inhabit places where the water is murky, varying in temperatures of between 20^0C and 30^0C, and exhibiting seasonal salinity changes. But because of their limited distribution and movements, are vulnerable to direct exploitation and any changes in their habitat, such as pollution and siltation.

The massive deforestation of the mangrove forest by the salt mining companies has led to the migration of some of the avian species or making them threatened. Traditionally, these forest areas were important sources of food, herbal medicine and also acted as land for pasture which is important for local people's livelihoods. The deprivation resulting from loss of biodiversity without meaningful alternatives has contributed to increased poverty and vulnerability witnessed among the local inhabitants of the area. In addition, the impact of salt operations on the coastal and marine ecosystem has had a negative impact on species of conservation concern such as marine turtles and dugongs, which use the beaches and near shore waters as nesting and feeding grounds.

3.2.3 Salination of fresh ground and surface water

Effect of mining on the water quality and availability is regarded as the most significant impact of a salt farming in the region. According to Nsikak (2007) key questions are whether surface and groundwater supplies will remain fit for human consumption and whether the quality of surface waters in the project area remains adequate to support native aquatic life and terrestrial wildlife. During the survey in Magarini the community complained on the effect of salt manufacturing operations on the traditional freshwater sources in the area, which have become salty. The salinization of surface and groundwater was been attributed to deliberate contamination of the water sources through dumping of salt and incidental contamination through underground leaching and discharge of hyper-saline water (UNHCR, 2006). As a result of the contamination of these traditional water sources, both area residents and workers have been deprived of their right to access water.

They were also being impoverished more as they have to purchase water for domestic use from the same salt manufacturers, the same people who had contributed to the salinization of their traditional water sources such as springs, wells and fresh water wetlands which now are occupied by salt lagoons or salinated by underground seepage from the lagoons. Majority of correspondents complained of debilitating shortages of fresh and portable water for domestic use. Complaints had been recorded by Guddy Birgit of Robinson Island that Malindi Salt Works released highly concentrated brine into the 50 meter common corridor between their salt firm and Krystaline. This is where two seasonal rivers, River Kambi ya Waya and River Balesa had their natural courses blocked by Malindi Salt Works and Krystaline Salt limited respectively. The study also established complaints by the local community and largely consumers of water from Timboni water wells.

3.2.4 Water Pollution

Water pollution occurs mainly through the discharge of mother liquor into creeks. Mother liquor is final waste product of highly concentrated waste brine water during the process of salt extraction. The process involves direct discharge of hypersaline water into the environment and estuary without prior treatment. The concentrated salt water increases sea salinity, thus impacting negatively on marine life such as juvenile fishes, fish eggs and mangrove saplings. Salinization also affects soil and has far reaching consequences on food security and livelihoods of the people. According to some witnesses, Ngomeni was a thriving well-known harbor in the Indian Ocean trade route before the salt companies started diverting rivers and building dykes that destroyed almost all the 24 landing sites. Cases of fishing boats and trawlers colliding in the ocean due to interferences with water level in Ngomeni areas were cited. It was also reported that fish production in the area has considerably reduced over the last two decades.

3.2.5 Diversion of Natural Rivers Courses

Salt farming companies divert river courses in order to protect their salt lagoons from flooding or dilution which affects crystallization process. The diversion of river from its natural course affects the local's livelihood and biota that depends on it. The field survey established that, Malindi Salt Works diverted Kambi ya Waya, Krystaline Salt Limited Kokotoni and Krystaline Salt Company diverted Balesa seasonal rivers respectively. This has caused flooding of the 50 meter corridor between Krystaline and Malindi salt works and changed the brackish water species. The field survey also established that, Krystaline Salt Company diverted the course of Balesa seasonal river by creation of a huge dyke at right angle to the flow of the river. The river water was redirected by a channel to the dyke leading to a 50-meter corridor between Krystaline and Malindi Salt Works made to be an access road to the beach and Robinson Island. However, due to the low gradient from the point of diversion to the 50 meter corridor, the water flow is very low and this causes a huge build up of river water when it rains, causing severe flooding of homes neighboring the diversion channel. The corridor that was meant to be an access road to the beach and Robinson Island has been rendered un-motorable and unusable by pedestrians and cyclists. It was noted that also the brackish water species have changed overtime.

3.1.7 Coastal erosion and flooding caused by the construction of dykes

Soil erosion is a major problem in many degraded land resulting in sedimentation of the water systems downstream (Ochiewo, 2004). Field survey established that the construction of dykes parallel to the coastal line has prevented free flow of sea water into plains as was the case before their construction. When it rains, these dykes block free flow of storm water and the buildup of such water causes severe flooding in areas close to the dykes. Magarini residents expressed their concerns particularly over the severe flooding of the Ngomeni road during heavy rains. Another complaint associated with the dykes is that Ngomeni residents feel strongly that the severe coastal erosion was threatening to submerge their villages is caused by these dykes.

3.1.8 Poor Implementation of EIA and EA Requirements

Though the salt companies had prepared annual Environmental Audit (EA) reports, the reports did not have useful metrics for measuring their environmental and social performance. No standards were available to measure adherence to environmental and social performance. Further, institutions such as the Magarini District Environment Committee, and community based environmental organizations, did not impact on the supervision and management of environmental issues due to lack of capacity.

3.2 Socio-economic Issues Associated with Salt Works

According to the Salt company officials interviewed, positive contribution of the salt mining works to the development of the greater Magarini District could be evaluated from two perspectives. First, in terms of the multiplier benefits associated with the physical presence of the salt firms and secondly, the direct contribution of the salt mining firms as part of their corporate social responsibility (CSR) by giving back part of their economic gains to the community. With regard to the former, multiplier benefits include employment, roads, fisheries and growth of market centers due to increased business opportunities. Examples of the latter include schools, educational scholarships, health centers and water supply.

Despite all these initiatives, the local community pin pointed several social-cultural problems associated with the salt works in the area.

The problems includes; family conflicts scored, increased rate of immorality, school drop outs for employment opportunities, human displacement, increased cases of insecurity, alcoholism and child delinquency. High rates of family conflicts, immorality and school dropouts in Magarini division are associated with relatively high poverty levels in the District. It was established that approximately 66% of the population was considered to be living in absolute poverty. This is significantly above the national average of 56%. The survey found out that most of the school going children abandon studies to so as to earn a living at the salt manufacturing farms. Prostitution and family conflicts is also high between the locals and the workers in the salt farms as a result of unaffordable basic requirements. Human displacement in Magarini is linked to land clearance to pave way for construction of salt lagoons without procedural and adequate compensation. The study also established that most of the workers in the salt extraction farms were engaged in alcoholism with little income they earn.

According to the survey, most respondents comprising of 39% considered the reduced crop productivity as the major economic loss, 26% considered loss of farming land, 19% poor wages that is incommensurate to the labor output, 9% inadequate compensation for land while 7% regarded the increased medical expenses due to health implications on the salt mining workers. According to KNHCR (2006), the post-colonial government perpetuated colonial injustices against the community by leasing their land to salt manufacturing companies without ensuring that the people had recourse to alternative and equally valuable settlements. This resulted to loss of farming land. The situation is farther exacerbated by inadequate compensation for land. The study noted that, while the salt companies sought to compensate the local community on the basis for assessment of crops and property, compensation was grossly unjust as many members of the community had not been compensated for crops or property that was destroyed or taken over several years after. Unfair compensation for land resulted to property destruction and other loses. The survey also observed that the healthy and safety of workers in these companies is undermined. Poor working conditions and maintenance of machines had led to unacceptably high numbers of accidents in the factories. This has resulted to increased medical expenses for the workers. The toilet facilities for the workers were also inadequate, exposing them to risky health conditions (Malindi DEC, 2007). The shortage of clean water for domestic use was another major threat to the health of the workers because most water sources were polluted.

The survey also established that in many aspects, salt farming is conducted on a seasonal basis. Thus, the salt farming companies engage their employees mainly on casual terms with just a handful on contract basis. Moreover, the companies still paid employees meager wages for their labor output. The wages were below the minimum requirements recommended by the Department of Labor. Statistics from Gongoni health center indicated that between January and June 2011, the most prevalent diseases among over 5 years of age in the area along the salt belts were diseases of respiratory system and skin diseases and diarrhea for less than 5 years. Severity of the diseases was observed to occur during peak seasons in March and June. Respiratory related diseases were associated with air pollution by salt particles which affect the respiratory system of the residents causing air borne transmission of diseases such tuberculosis. Skin diseases are mostly found among the workers in the salt manufacturing firms. This is linked to failure to use protective attires at work stations. Contact with highly concentrated brine solution at the salt lagoons during harvesting was found to cause cracking of the skin and wounds as well as general skin dryness. Pollution of water wells by contaminated discharge from the salts lagoons were thought to contribute to diarrhea in children less than 5 years of age. The survey also established that the HIV prevalence rate is also very high, standing between 15% - 17% far above to the national average of 6.7% as at 2003, attributed to prostitution.

3.3 Violation of Human Rights by the Salt Farming Companies

3.3.1 Eviction of people from land without provision of alternative settlement

According to KNHCR (2006), there exist land grievances among indigenous communities living within the Ten-Mile Coastal Strip in Magarini. Respondents argued that the land now occupied by the salt manufacturers were the community's collective birth right as Mijikenda people. The British and the Arabs had previously interfered with their ownership of their land, but never entirely displaced them. This problem was farther exacerbated through evictions by salt manufacturing companies. The companies sought to compensate the community members affected; however, the compensation covered only standing crops, trees and houses but excluded land. On the other hand, the compensation was assessed at woefully inadequate levels.

The affected people found the basis for the assessment of crops and property for purposes of compensation, grossly unjust. Many members of the community have to date, not been compensated for crops or property that was destroyed or taken over.

The eviction of people often led to harassment of the community members occasioned by both the Provincial Administration and Police breached fundamental human rights. Individual and community rights were violated by unnecessarily destroying property while evicting members of the community from their land, which was leased to salt manufacturing companies. According the community, the Provincial Administration and the Police also colludes with the salt manufacturing companies by misusing their powers to illegally harass, arrest, or incarcerate members of the community. They stated that they were surprised when the provincial administrators, including lands officers and local authority officials, went round announcing that the land had been allocated to investors and were required to vacate. Some of them were evicted forcefully as a result became homeless and landless squatters.

3.3.3 Violations of workers' rights

Occupation and Safety Health Act of 2007 clearly embeds in *Section 3(2)* the need to; secure the safety, health and welfare of persons at work; and protect persons other than persons at work against risks to safety and health arising out of, or in connection with, the activities of persons at work. On the other hand *Section 10 (1)* of the Act provides that; an employer shall not make any deduction from an employee's remuneration or levy, or permit to be levied on any of his employees any charge in respect of anything done or provided in pursuance of this Act or any regulation made there under.

Not with standing these provisions, most workers employed in salt farming companies work under extremely poor conditions. Workers who harvest salt and work in the factories are not provided with appropriate protective gears such as gloves, boots, helmets, overcoats, scrapers and basins. The means of transport to and from the workplace was equally inappropriate. For instance, most vehicles are uninsured. The health and safety of workers in these companies is undermined by company practices and ineffective government inspection regimes (KNCHR, 2006). While it is the duty of the Ministry of Labor and the Department of Occupational Health and Safety to enforce acceptable working conditions, poor maintenance of machines has led to unacceptably high numbers of accidents in the factories. There is also lack of reasonable housing for workers as most companies had no housing units for the workers.

According to Malindi Rights Forum (an organization fighting for the right of the salt workers), the companies continue to abuse piece rate employment by paying workers excessively low wages for specified work. This is advanced by giving the workers limited opportunity to participate in collective bargaining processes. The limitations are occasioned by the salt manufacturing companies, which discourage them from joining trade unions. The situation is farther exacerbated by the absence of or ineffective recruitment strategies of trade unions and prolonged employment of workers on casual terms. That is, companies generally retained workers on perpetual casual terms with no benefits, irrespective of how long one had worked. Some employees had worked on full-time basis for many years without contract and as a result, lost their benefits (KNCHR, 2006).

Plate 2: Poor Usage of Protective Gears by Workers

Source: Field Survey, 2012

4. Acknowledgement

This study was conducted by Postgraduate 2010 students from Department of Environmental Planning and Management, Kenyatta University as their Regional Studio IV with financial support from KU Finance and Administration Office. The authors are thankful to individuals who participated in data collection and organization; including Stanley, Caroline, Njeri, Samantha, Jane, Resi and Yvonne. We are also grateful to the Salt mining factories and different government institutions in Magarini Region for gladly sharing information regarding the salt farming activities and the locals for their hospitality.

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