

**HUMAN SETTLEMENT ACTIVITIES INFLUENCING ENVIRONMENTAL
SUSTAINABILITY IN DADAAB REFUGEE COMPLEX, GARISSA COUNTY,
KENYA**

BY

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DECLARATION

This research project is my original work and has not been presented for award of Degree in any other University.

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This research project has been submitted for examination with my approval as university supervisor.

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DEDICATION

This project is dedicated to my dear parents who through their blood and sweat gave me an invaluable gift-education

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ABBREVIATIONS AND ACRONYMS

ASAL	Arid and Semi-Arid Land
AVs	Armoured Vehicle
CARE	Cooperative for Assistance and Relief Everywhere
CSR	Corporate Social Responsibility
DRA	Department of Refugee Affairs
DRC	Danish Refugee Council
EMCA	Environment Management and Coordination Act
FaIDA	Fafi Integrated Development Association
GoK	Government of Kenya
GTZ	German Organisation for Technical Cooperation
IEDs	Improvised Explosive Devices
IRIN	Integrated Regional Information Networks
IRK	Islamic Relief of Kenya
ISSB	Interlocking Stabilized Soil Block
KNBS	Kenya National Bureau of Statistics
KRC	Kenya Red Cross
NCCK	National Council of Churches of Kenya
NEC	National Environment Council
NEMA	National Environment Management Authority
RAS	Refugee Affairs secretariat
RRDO	Relief Reconstruction and Development Organization
SALW	Small Arms and Light Weapons
SDG	Sustainable development Goals
SitRep	Situation Report
SMEs	Small and Medium Enterprises
SWM	Solid Waste Management
UN	United Nations
UNHCR	United Nations High Commissioner for Refugees
WASH	Water Sanitation and Hygiene

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ABSTRACT

Dadaab sub-County of Garissa has undergone unprecedented transformation over the last three decades. There are sprawling human settlements in the Dadaab Refugee camps. These settlements, and their resultant activities have had attendant impact on the socio-cultural, biological and physical environment. The indiscriminate felling of trees and vegetation cover to meet the never ending demand for shelter and fuelwood is materially worrying. Daylong foraging for brush and pastures has led to protracted conflicts between the host and refugee pastoralist. Sand harvesting to build mud walls have left gaping craters on the once aesthetically appealing landmass. Garbage generation and disposal has been a daunting task to the local environmentalist. It is an eyesore in the camps and in Dadaab town with non-biodegradable waste strewn everywhere. Abstraction of ground water resources through boreholes has depleted the aquifer. The purpose of this project therefore was to investigate and quantify the influence of this human settlement activities in Dadaab Refugee Complex on the environmental sustainability under the following objectives: establish the influence of competition for natural resources on environmental sustainability; assess the influence of economic activities on environmental sustainability; determine the influence of conflict management on environmental sustainability; examine the influence of access to social amenities on environmental sustainability; establish the influence of environmental regulatory framework on environmental sustainability. The project has reviewed the existing literature on these human settlement and has identified a knowledge gap to be addressed through survey research design. The target population for this project are the UN agencies, affiliated NGOs, local and National government, host community and refugees. In the case of host and refugees, random sampling will be used. This project will use mixed method i.e. qualitative and quantitative research method. Questionnaires, key informant Interviews and observations shall be used as data collection tools. Quantitative data will be entered and coded into Statistical Packages for Social Sciences (SPSS) and analyzed using descriptive statistics. The findings of this study was that human settlement activities have influenced environmental sustainability. Competition for natural resources has decreased vegetation cover, contamination of water sources and led to air pollution due to clouds of air from the bare land. Economic activities have increased non-biodegradable waste. This poorly disposed waste have influenced soil fertility and aeration. The same economic activities have led to soil erosion due to sand harvesting. Conflicts management with uncontrolled livestock herds has resulted in soil compaction and loss of indigenous plant species. Access to social amenities have increased the burden of construction materials which are harvested from the immediate environment. Environmental regulatory agencies have labored to restore the environment to its original glory. This study concludes that these activities have adverse influence on the environment and all the stakeholders need to put in place deliberate efforts to conserve, restore and rehabilitate the environment. It further recommends that individuals use the resources bequeathed by the environment responsibly

CHAPTER ONE

INTRODUCTION

1.1 Background to the project

Kenya is home to an estimated 250,000 refugees who live in Dadaab refugee camps (UNHCR, 2017). The role of providing basic services and protection to the refugees is shared by UNHCR, humanitarian NGOs and the host government. The vast majority of refugees in Dadaab, the world's largest refugee complex, rely on the immediate and surrounding environment to meet their everyday needs that range from firewood, shelter materials, water and waste disposal

There is an urgent need for safe and sustainable extraction of these natural resources that would allow refugee and host communities to coexist in harmony with the environment. Further women and children foraging the bushes for firewood and shelter materials often find themselves at the mercy of marauding thugs hell-bent on raping them

The refugee agency works closely with local environmental agencies namely FaIDA and RRDO who conserve, restore and rebuild the environment. The support organizations are called the Implementing agencies.

The East and Horn of Africa continues to suffer from conflict and displacement. Kenya is now the second biggest refugee-hosting country in Africa after Ethiopia. Dadaab is located in Garissa County in the former North Eastern Province of Kenya and is the world's largest refugee camp complex.

The increase of the refugees has increased the use of the natural resources and hence raised concerns on environment management concerns in Dadaab refugee camp. The research was therefore to establish the influence of human settlement activities on environmental sustainability in Dadaab refugee camps. The project used the descriptive survey design to conduct the research. Questionnaires and observations were used to facilitate data collection method. The target population for this project were the UN agencies, affiliated NGOs local and National government. The research then collected data from the implementing agencies that are directly involved in refugee protection that have direct impact on the environment like the provision of water, infrastructure, shelter and the provision of fuel to the refugees. The refugee protection implementing agencies have not been able to sustainably provide to

the refugees so the refugees have themselves used the natural resources without regulations. While so much has been used from the environment to provide for the refugees, there are existing gaps at adequately addressing environmental management. The implementing agencies budget has very little provision towards environment mitigation of the degradation caused by the settlement demands. The project therefore recommends that the refugee policies on refugee protection includes and emphasizes on environment management as an aspect of sustaining- both environment management and refugee protection processes. The project also recommends that the refugees be involved in environment management projects since they are the direct beneficiaries of the natural resources in Dadaab. The project research concludes by observing that the refugee protection process is important since Kenya is a signatory to the AOU 1951, there is need for concerted efforts towards the management of the very environment that the refugees and the implementing agencies depends on. The refugee protection process has negative impact on the environment management in Dadaab refugee camp.

1.2 Statement of the Problem

The once sleepy, deserted, little known Dadaab division was almost devoid of humans 30 years ago but full of vegetation cover as far as the eyes could see. Thick bushes and indigenous forest dotted the land mass before the establishment of the refugee camps. However the situation changed very quickly thereafter with arrival of the first batch of refugees in 1991 following the overthrow of President Mohammed Siad Barre of Somalia and the ensuing civil war (New York Times,1995). The situation was further escalated in 2001 with the influx of refugees running away from ravages of drought in Somalia. Dadaab was brought to light and onto the map with mushrooming human settlements in principally IFO camp and ultimately the four other camps.

The immediate aftermath was indiscriminate extraction of the environmental and natural resources to meet their unending basic needs. Destruction of wildlife habitats, desertification and loss of biodiversity, soil, water and air pollution, accumulation of non-biodegradable materials, eutrophication and general loss of aesthetic value became all too common. The national and county governments in conjunction with local conservationist have laboured to restore Dadaab to its former glory.

This foregoing loss, degradation of the ecosystem and restoration efforts due to human settlement activities coupled with the resultant pollution and inevitable conflicts, raises

critical questions about the sustainability of this environment. This is what this project seeks to answer.

1.3 Purpose of the project

This project will investigate human settlement activities influencing environmental sustainability in Dadaab refugee complex

1.4 Objectives

1. Establish the level at which competition for natural resources influence environmental sustainability
2. Assess the extent to which economic activities influence environmental sustainability
3. Determine the level at which conflict management influence environmental sustainability
4. Examine the degree to which access to social amenities influence environmental sustainability
5. Establish the extent to which environmental regulatory framework influence environmental sustainability

1.5 Research questions

1. To what level does competition for natural resources influence environmental sustainability?
2. To what extent does economic activity influence environmental sustainability?
3. To what level does conflict management influence environmental sustainability?
4. To what degree does social amenities influence environmental sustainability?
5. At what extent does environmental regulatory framework influence the environmental sustainability?

1.6 Significance of the project

This project is significant because the findings from this research will help those in charge of environmental conservation, humanitarian agencies and government to formulate policies and guidelines that will address any shortfalls so far. It will also inform the persons using the environmental resources in Dadaab so they can align their use sustainably. Researchers will use this study as a reference for research on refugee settlements

1.7 Limitation of the project

Insecurity at the camps was a significant limitation especially in light of IEDs detonating on the road. This challenge was mitigated by use of Armoured Vehicle (AV)

The second limitation was the local conservation agencies who were reluctant to share their operation and achievements data. The study assumed that the sample used was representative of the general population and thus can be used to draw conclusions for the whole

1.8 Delimitation of the project

The project was delimited to human settlements activities influencing environmental sustainability in Dadaab Refugee Complex, Garissa County, Kenya. The scope was delimited to the four camps in Dadaab. The target population lives in and around the refugee camps. The project therefore confines itself to a 25km radius where there is significant settlement activities approximating a 2000km² landmass

1.9 Basic assumptions of the project

The project assumes that the respondents will be cooperative and willing to give out information. Further they will be truthful. The project assumes there will be unlimited access to participants and survey instruments and the sample selected is representative of the whole and can therefore be applied to the larger population

1.10 Definition of significant terms used

Human settlement activities: These are day to day undertakings by an individual or a group of individuals that relate to their livelihood and way of life

Settlement: A settlement is a place where people live. It can be permanent or temporary. The settlement under research in this case is temporary

Environment sustainability: is the rates of renewable resource harvest, pollution creation, and non-renewable resource depletion that can be continued indefinitely. If they cannot be continued indefinitely then they are not sustainable.

Competition for natural resources: This is competition by human beings for renewable and non-renewable resources found in the natural environment for their own use or that of the socio-economic activities they are involved in

Economic activities: These are income generating undertakings by the residents of Dadaab refugee complex.

Social amenities: They are infrastructure shared by a community or the general public living in a given locality

Conflict management: This is the process of limiting the negative aspects of a struggle or clash while increasing the positive aspects of unity

Environmental regulatory framework: These are state or non-state agencies whose preoccupation is conservation and restoration of the environment within a given jurisdiction, in this case Dadaab refugee complex

Indicator: In this project, the term has been used frequently in reference to independent, dependent and moderating variables. Whenever the term indicator will be used, it will mean a measure of change, progress or state

Refugee: Refugees are people fleeing conflict or persecution. They are defined and protected in international law, and must not be expelled or returned to situations where their life and freedom are at risk

1.11 Organization of the project

This project is composed of five chapters. Chapter One introduces the project with some background information and statement of the problem, objectives, research questions, limitations and assumptions. Chapter Two reviews literature relevant to the thematic areas: natural resources, economic activities, conflict management, social amenities and environmental regulatory framework as well as theoretical and conceptual frameworks. Chapter Three presents the research methodology and serves as a guide on how the project will be carried out. The areas covered under this chapter include research design, target population, sample size, sampling technique, research instruments, reliability and validity, data collection procedure and analysis techniques feature in this chapter. Chapter Four covers data analysis, presentation and interpretation of findings. Chapter Five provides a summary of findings, conclusions and recommendations of the project

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter examined empirical literature on human settlement activities influencing environmental sustainability. The theme was to: establish the level at which competition for natural resources influence environmental sustainability; assess the extent to which economic activities influence environmental sustainability; determine the level at which conflict management influence environmental sustainability; examine the degree to which access to social amenities influence environmental sustainability; establish the extent to which environmental regulatory framework influence environmental sustainability

This chapter provides a review of studies that have been previously assessed and yielded the base upon which the findings will be discussed and conclusion drawn. The chapter also gives the setting and the theory upon which the project is anchored

2.2 Environmental sustainability

The rule of thumb in any civilized society is to conserve the environment so that there is harmonious co-existence for the present generation and posterity. All the elements making up the environment including but not limited to clean air, water, flora and fauna must be conserved

According to Noor (2004) the vast refugee population in Dadaab refugee camps has not only significantly reduced the firewood stock in the harvesting zones, disturbed rare species of plant and animal habitat. The vegetation cleared for instance takes years to regenerate and re-grow because of the unique and scarce rainfall patterns in this region. Repetto and Holmes (1983)

2.3 Competition for natural resources

Natural resources are defined as materials or substances such as minerals, forests, water, and fertile land that occur in nature and can be used for economic gain. By their very nature, natural resources are finite whereas demand is infinite. It's during the competition for these limited resources that the environment bears the brunt of it all. The forest department in Garissa predicted complete clearance of vegetation in Dadaab, Jarajilla and Liboi divisions in

five years' time from 2004 (Hussein,2004).The use of natural resource in Dadaab while undoubtedly enhances the economic growth, has not left the state of the natural resource and the environment at large, unaltered because of an increasing pressure on natural resource from the economic and population expansion which has led to environmental degradation and natural resource depletion. When so much has been used from the environment to provide to the refugees, there are insignificant efforts done towards environmental management

Discussions on environmental impact of refugees' settlement invoke the ideas of Thomas (1956) book, *Man's Rule in Changing the Face of the Earth*, published at a time when both population and environment had not occupied centre stage in the development discourse. The popular media impression of a refugee as a "problem" rather than a "person with problems" (Harrell-Bond, 1998) underlines the congregation of refugees as a strain on local resources. The presence of the large settlements of refugees in Dadaab has invariably had adverse environmental impact on this fragile ecosystem scavenging for scarce resources (Lenergan and Steve, 1995)

The environmental impact of these settlements has had multiple cause effect on this environment that can lead to irreversible land degradation and loss of biodiversity and economic value of the environment in Dadaab, Liboi and is rapidly spreading to adjacent regions (Helin, 1990)

The host area has seen a steep rise in human settlement and this is having negative impacts on mobility and grazing patterns. The significant increase in total livestock numbers has nevertheless taken place without the pasture and browse resource being completely depleted. The combined demand for firewood and building materials from the camp and host community populations is very significant, with more or less equal total demand from both groups. The supply of wood to the camps has become highly commercialised and is dominated by harvesters based in the camps. A programme of agency-managed firewood supply has provided an average of 11% of estimated camp consumption over the 12 years of its operation. It is disliked by many host community members, however, who report that supply contracts benefit only a few influential individuals. The environmental impact of using thorn bushes for greenbelt fencing is limited, but enclosing portions of the rangeland contributes to an undesirable process of resource alienation and undermines a pastoral mode of production that depends upon communality of resources. The host area is undergoing a

general trend of environmental degradation that has been ongoing since the early 1990s, which is spreading outwards from the camps and will continue to do so

According to UNHCR Situation Report (SitRep) (2017), UNHCR's Water Sanitation and Hygiene (WASH) unit together with the three WASH Partners (CARE, NRC, and KRCS) provide water, sanitation, and hygiene services to the 247,798 refugee population living in four Dadaab Refugee Camps. The water is conveyed to 45 tanks storage tanks with total capacity of 5,550 m³, distributed through a pipeline network of 297.5 km and relayed to 845 tap stands with about 3,926 taps, scattered around the four camps.

On average, the daily water production in April from 28 operational boreholes was 10,253 m³, with about 7,978m³ supplied to the refugee population in the four Dadaab camps. This translated to an average daily per capita water allocation of 32.2 litres. About 2,275m³ was apportioned to other users including Agencies, markets, institutions, hospitals and leakages.

Water is chlorinated at the boreholes and regularly monitored Free Residue Chlorine (FRC) which is 0.8mg/l – 1.0mg/l at tap stands and 0.5mg/l – 0.8mg/l at household level. Due to cholera, Chlorine dose at the source (borehole) maintained at 1.0mg/l to 1.5mg/l to ensure that FRC at house hold level is within recommended standards.

Daily water produced by solar energy was 4,007m³ about 39.1% of total production but if the amount of water produced from the solarized boreholes is compared with amount from Solar and diesel, then this percentage will change to about 44.0% for solar production.

In April, the monthly fuel was 52,596litres (1,753.2 litres/day) for the 28 operational boreholes in the four camps. 26 out of the 28 boreholes operated on solar power.

2.4 Economic activities and environmental sustainability

Knowledge of their social, economic and environmental impacts on the surrounding areas remains scanty, and largely anecdotal. The camps have become major centres for services, shops and social amenities, and host-refugee interactions within the camps are significant

If decision-makers remain unaware of the links between the environment and human well-being, the environment maybe marginalised by inappropriate decisions. Unwitting placement of a camp close to an area of ecological importance can threaten wildlife resources and destroy a country's natural heritage; careless construction of roads can lead to erosion problems and even human deaths; uncontrolled cutting of trees can result in soil erosion; while increased pressure on local natural resources can easily result in conflicts with local

communities. All of these actions have a cost: economic, social and/or environmental (Refugee Operation and Environmental Management Report by UNHCR, 1998)

Environmental impacts of refugee camps and settlements can be diverse. Among the most obvious are the cutting of trees for housing support and fuel. Others such as pollution or the extraction of groundwater resources are far more subtle-at least in the short-term. Changes have also been recorded in terms of impacts on household labour and health. In all cases, the increased pressure on a region's natural resources invariably affects human welfare and the options available for sustainable management of natural resources. Local people and refugees themselves may be equally affected by inappropriate or excessive use of such natural resources.

According to Department of Refugee Affairs (2010), livelihoods in the host community are overwhelmingly pastoral. Many households sell livestock products to the camps or to other local people. Virtually everyone in the host community with more than a few sheep or goats (shoats) keeps part of their herd mobile in order to optimise pastoral production, with a significant proportion of livestock foraging during part of the year in areas far from Dadaab. The number of livestock owned by the host community is estimated to be 80-100.000 camels, 200-250.000 cattle and 300-350.000 goats. This is many times more than the livestock owned by refugees. Livelihoods are diversified and all host community households ensure that they have access to local food relief or refugee rations to avoid complete dependency on livestock.

The UNHCR Environment Strategic Plan (2011) shows that the host communities, whose livelihood is based on pastoralism, have hundreds of thousands of livestock, a situation which is unlikely to change due to limited alternative livelihood options. As such, protracted settlement of large population of refugees in small areas of such an ecosystem creates excessive pressure on environment.

Solid Waste Management (SWM) has become a major concern. According to Cooperative for Assistance and Relief Everywhere (CARE), (2009) effective solid waste management is a major challenge in Dadaab refugee camps. This is due to the increase in refugee population which has constantly put strain on the available resources like water, education facilities, health, environmental sanitation especially management of solid waste

2.5 Conflict management

Refugees and host communities can have conflict due to livelihood issues. Kjaerum et al (1993) discusses the idea of refugee resettlement and observes that refugees must be viewed within the context of broader, international humanitarian policies addressing the causes of forced migration and the principles encapsulated in asylum. It is a notion that provides for both protection and durable solutions for individuals

The Kenyan government's most pressing constitutional and moral responsibility is to ensure the security of its citizens from the risk of violent attack. Our intelligence and security forces have known for a long time that these camps are a dire threat to our people's security (Kibicho-

There is proliferation of small arms and light weapons in the camps. The porous borders are used to sneak these weapons, hidden in the camps and later find their way in the capital city. These assorted firearms are used to cause atrocities within the camps and beyond. According to reports issued by the IRIN, there is a "very strong possibility" that the camps are being used to traffic arms: there have been shooting incidents in the camps and it is also very easy for people to move around with arms on the Kenya- Somali border. Only recently in Hagadera refugee camps that the AID agencies were shot at when demarcating plots for Kambioos relocatees.

The arms are also traded to criminal elements for a song who later commit heinous crimes within our borders. There have been numerous cases where grenades have been hurled at both the disciplined forces and the general population.

Only recently in the month of May 2017, two Land cruiser carrying police on patrol were decimated by IEDs

Terror cells affiliated to the notorious al-Shabaab stage attacks outside the camps and then seek havens inside the sprawling camps. The camps have little to non-existent security surveillance. It therefore serves as a perfect hideout for this ruthless criminals. The Garissa University College terror attack of April 2016 is a perfect case of this sporadic attacks. The government

Some AID workers in Dadaab have borne the brunt of kidnapping spree. Some are used to seek ransom, others for trade-off with their incarcerated militia. In some sad cases, the abductees pay the ultimate prize. Even as I write this proposal is a humanitarian staff in the

hands of the kidnappers. The hostage takers are believed to have surveyed the subject for many weeks in the camps. When the time was right they pounced with clinical precision. That was the last that was heard from the abductee

2.6 Social amenities

There are various amenities communally enjoyed by the refugees and host community.

However they are stretched out with schools in particular taking more than three times their design capacity. Hospitals are overflowing with patients. These naturally leads to demand for

The vast majority of people in the host communities report improved access to education facilities and to water for people and livestock since the establishment of the camps. Health services catering for host communities have been improved by agencies working in Dadaab and the agency-equipped hospitals in the camps and Dadaab town may be accessed free of charge by local people. The presence of the camps has dramatically improved the frequency and reach of transport services available to the host community.

The estimated annual income accruing to the host community from livestock and milk sales to the refugee camps is KSh 218 million. The price of basic commodities such as maize, rice, wheat, sugar and cooking oil is at least 20% lower in the camps than in other towns in arid and semi-arid parts of Kenya. The main reasons are the re-sale of WFP rations, access to free food by locals registered as refugees and illegal imports via Somalia. The lower food prices result in a total annual saving on food purchase in the host area estimated at KSh 123 million while the estimated value of refugee food rations received by the host community (if it was traded) is KSh 363 million per annum. The annual income accruing to local contractors from assignments for the UN and NGOs is estimated to be at least KSh 35 million. The total economic benefits of the camps and related operations for the host community, using 2010 as the reference year, are around USD 14 million annually. On a per capita basis this equates to around 25% of average annual per capita income in North Eastern Province (Department of Refugee Affairs, 2010).

Light Years ahead report (2014) shows that wholesalers inside the refugee camps import basic commodities via Somalia with high unit value such as sugar, powdered milk, pasta, fruit drinks and upmarket consumer goods. Prices of smuggled goods are cheaper in Dadaab than elsewhere in Kenya. There are around 5,000 businesses in the camps ranging from petty traders to large shops and trading in all kinds of goods, with a further 370 in Dadaab town. Annual turnover of the camp-based businesses alone is estimated to be around USD 25

million. It is estimated that 600-750 local persons have fixed employment related in some way to the refugee operation, with an additional 500 jobs created in host communities related to trade activities. Local wage rates for unskilled labour are significantly (50-75%) higher in Dadaab than in other comparable parts of Kenya

The majority of funds flowing into the Dadaab area come from donors and agencies supporting the refugee operation. The cost of this operation grew from USD 44 million in 2007 to USD 82 million in 2009 and is projected to reach USD 100 million in 2010. Direct support for host community initiatives rose from around USD 2 million in 2007 to USD 5,5 million in 2010, with 12-15 programmes currently working in food security, conflict reduction, environment, education, health, water, sanitation and business development.

As elsewhere in the ASAL areas of Kenya, recurrent droughts have had profound effects on the population in the Dadaab host community. Droughts and significant reductions in family livestock herds have been a major push factor concentrating people in centres with water, food relief, schools and health services. Poverty is also a factor leading to settlement, but surprisingly the project revealed that people who have settled in the host villages within the last five years are not in fact the poorest, but are actually slightly better off than the average (Environment Strategic Plan, 2011).

There are also a number of pull factors to the hosting area that are not typical of other ASAL areas of Kenya. The most important include: the availability of cheap food due to indirect subsidy via distribution in the camps and imports via Somalia; the opportunity to register as a refugee and receive free rations and non-food items; the availability of more services in the area than in other comparable places; and the existence of more employment opportunities. Some of these pull factors are common to other urban centres of the region, but there are also important differences as the economy in Dadaab is fully driven by the funding of the refugee operation and the presence of the refugees.

Deterrent factors keeping people from moving to the host area are the need to belong to one of the clans who own land locally, and the high level of competition for access to natural resources.

The combined demand for firewood and building materials from the camps and the host communities is very significant. With a host population of around 158,428 and a camp population of perhaps 250,000, the demand from the two populations is more or less equal. Collection of firewood and building materials is undertaken by members of host communities

and camp populations alike, and both groups are engaged in its buying and selling (UN-HABITAT, 2010).

Commercial provision of firewood to the camps is largely carried out by firewood harvesters based in the camps. Good quality firewood is difficult to find close to the camps and nearby settlements, leaving only low quality firewood for collection by women and girls in the host communities. Host community women spend two to five hours per trip collecting firewood, typically every second day (Intermedia Development Consultants, 2013). There seems to be no significant difference in the time spent between communities close to camps and those further away. However, closer to the camps the quality of collectable firewood is lower. As the distance to good firewood sources has become greater, the collection process has been taken over by men using donkey carts and has been increasingly commercialised. Firewood collected in this way is mainly destined for sale in the camps or the host communities

The demand for energy for household use is growing with the increasing population in the area as a whole, including both the camps and surrounding communities. The local collection of firewood is becoming more laborious and the potential for conflict is increasing. Only limited charcoal burning is reported so far, but the increasing distances over which firewood must be transported to the camps is going to change this situation, given that camp residents and host community members seek to solve their energy needs in the most practical and cost-effective way (Danish and Norwegian Embassies report, 2010).

The agreement was based on the Geneva Convention Relating to the Status of Refugees of July 28, 1951 (the 1951 Refugee Convention) and its Additional Protocol of January 31, 1967 (the 1967 Protocol) and the OAU Convention of September 10, 1969 Governing the Specific Aspects of Refugee Problems in Africa (the 1969 OAU Convention) and the obligations on the Parties to adhere to and respect the provisions of this Agreement

Further the general principles of international law on the right of all persons to leave and return to their country of origin as enshrined in Article 13 (2) of the 1948 Universal Declaration of Human Rights (UDHR) and Article 12 of the 1966 International Covenant on Civil and Political Rights (ICCPR);

2.7 Environmental regulatory framework

In the United Nations Convention to Combat Desertification (UNCCD) Charter (1994), addresses specifically the arid, semi-arid and dry sub-humid areas, known as the drylands,

where some of the most vulnerable ecosystems and peoples can be found. The parties to the convention further pledged to forge a global partnership to reverse and prevent desertification/land degradation and to mitigate the effects of drought in affected areas in order to support poverty reduction and environmental sustainability

2.7.1 Interventions

Over the years, jointly with its implementing partners, development partners and the Kenya Government, UNHCR has been undertaking a wide range of interventions aimed at addressing human settlement effects. These interventions include: ecological baseline studies and surveys; provision of firewood harvested in an organised and eco-friendly manner; land rehabilitation through the “green-belt approach”; promotion of environmental education and awareness; provision of tree seedlings for planting in institutional & residential compounds; fabrication and distribution of fuel-wood energy saving stoves; support to environmental governance structures such as the Environment Working Group and Divisional Environment Committees; and conducting Environmental Impact Assessments (EIA) and Audits (EA) in compliance with Government regulations (UNHCR Environment Strategic Plan, 2011)

2.7.2 Environmental support projects

A number of environmental projects have been supported by refugee and development agencies, including firewood supply, fuel efficiency improvements and alternative fuels, distribution of tree seedlings, establishment of woodlots and greenbelts, kitchen gardening and irrigated horticulture, environmental working groups and awareness-raising. Harsh climate, poor soils and unreliable rainfall limit what these programmes have been able to achieve in terms of environmental rehabilitation, outside settlements.

2.7.3 The balance of positive and negative impacts

The impacts of the camps on the host community are complex and both positive and negative. Positive impacts relate to access to distributed food, economic opportunities and service improvements, while negative impacts largely relate to depletion of firewood and building materials together with grazing competition in the immediate vicinity of the camps. Overall, the project identifies significantly more positive impacts than negative.

2.7.4 Camp-based environmental issues

The traditional approach to solid waste management within the camps has been burning and *in situ* burial, but this is becoming unsustainable due to the volume of waste now accumulated. CARE recently conducted a project of solid waste generation to inform a new

strategy for managing its disposal (CARE International, 2009) and found that average per capita waste production in the camps is 1.63 kg/day, of which 75% is animal dung suitable for kitchen gardening or compound tree planting. The balance is lower than the volume produced by inhabitants of normal towns of comparable size and is no different to the quantity routinely generated - and disposed of haphazardly - in local communities. Agencies working in the camps are nevertheless concerned about this issue and involved with collection, recycling and landfill initiatives, meaning that it is receiving a level of attention not seen in local communities. Only 8% of the solid waste is unsuitable for recycling or re-use and is being dumped in a trial landfill at Hagadera.

2.7.5 Impacts of sanitation facilities

Again, with a deep water table and no known infiltration mechanism, there is no chance that latrines in the camps are affecting ground-water quality. Surface flooding leads to overflow of pit latrines, however, particularly in the clayey soils of Ifo and Dagahaley. There is also a problem of soil instability in Hagadera which is being addressed through the experimental use of oil drums for latrine pit lining (Porteaud, 2009). Both issues present a localised health risk to camp residents but not to host communities or the wider environment.

2.7.6 NGO environmental activities

UNHCR and the German government have been supporting a programme of environmental activities in Dadaab since 1993 under the management of GTZ. The supply of firewood is one of these activities and others include the promotion of energy-saving cooking practices, the development, manufacture and distribution of fuel-efficient stoves, the distribution of tree seedlings from nurseries in Dadaab and the camps, fencing and replanting of greenbelts, exploring alternative fuels and stoves, promoting “multi-storey” kitchen gardening, catalysing Environmental Working Groups involving refugees and locals, and implementing environmental awareness-raising and educational programmes. Since 2009, two local NGOs have also been supported to work in the settlements closest to the camps on household tree planting, woodlots, kitchen gardening and irrigated horticulture.

The camps themselves have been heavily forested as a result of long-term household tree planting with good survival rates. However, the harsh climate, poor soils and unreliable rainfall have limited what these programmes have been able to achieve in terms of environmental rehabilitation outside settlements and domestic compounds. Planted trees will only survive if they are actively tended, watered and protected, which effectively precludes large-scale tree planting. Scope exists for further environmental management activities within

the camps and on private plots in nearby settlements. However, rehabilitating large tracts of the surrounding dryland bush through active intervention, as opposed to reducing human pressure and managing its natural regeneration, would be an extremely expensive exercise with a low probability of success (Dadaab Inter Agency Environmental Management Coordination Forum, 2013)

2.8 Theoretical Framework

This project is grounded on the tragedy of the commons concept. A commons is a natural resource shared by many individuals (Hardin, 1968). In this context, "shared" means that each individual does not have a claim to any part of the resource, but rather, to the use of a portion of it for his/her own benefit. The tragedy is that, in the absence of regulation, each individual will have a tendency to exploit the commons to his/her own advantage, typically without limit. Under this state of affairs, the commons is depleted and eventually ruined.

To avoid the ultimate destruction, the human values and ideas of morality must be changed. This theory assumes that every human exploiter of the shared common resources is driven by self-interest

The basic idea espoused by the tragedy of the commons concept is that if a resource is held in common for use by all, then ultimately that resource will be destroyed. The shared resources in this respect are the trees, groundwater and pasture. Nobody really owns the groundwater; it is technically up for grabs. However, individual pumping of too much groundwater can result in the depletion of the resource, to say nothing of other related effects or losses, such as land subsidence and salt-water intrusion. Again, diffusion acts to spread the effect of the individual's use among all. Eventually, depletion by a few means depletion for all. When the carrying capacity of the commons is fully reached, the exploiters might find themselves in a dilemma of whether to continue with their actions or not. The gain of doing so would go solely to them, but the loss from their actions would be "Communized", therefore they will not give up their actions. Other people with a similar myopic view would follow suit and ultimately, the common property would be ruined.

Exploiters could be aware of the long term consequences of their actions, but generally they are powerless to prevent such damage without some coercive means of controlling the actions of each individual. Idealists may appeal to individuals caught in such a system, asking them to let the long term effects govern their actions. But each individual must first survive in the

short run. If all decision makers were unselfish and idealistic calculators, a distribution governed by the rule “to each according to his needs” might work.

The spoilage process comes in two stages. First, the non-angel gains from competitive advantage of pursuing own interest at the expense of others. Then, once the noble angels realize that they are losing out, they try to get a share out of the commons before competitors do. This shows that, every workable distribution system must meet the challenge of human self-interest. An unmanaged commons in a world of limited material wealth and unlimited desires inevitably ends in ruin. Inevitability justifies the epithet “tragedy,”

This theory underpins the activity of charcoal producers. Unsustainable fuel wood exploitation for charcoal burning results in forest destruction which charcoal producers are aware of but continue because of the selfish economic gains which however have general ramifications. The long term adverse impacts of their actions thus do not matter to them.

The theory is therefore relevant to the project as it explains how unsustainability comes in charcoal business as a result of the need to fulfil self-interest.

2.9 Conceptual Framework

A conceptual framework is a combination of broad concepts and principles obtained from relevant field of enquiry. They are used to formulate a presentation (Reichel & Ramey, 1987). A well thought out conceptual framework helps bring out the meaning of the topic under project. It is a hypothesized model identifying the model under project and the relationship between the independent variable, moderating variable, intervening variable and dependent variables (Mugenda & Mugenda, 2006).

According to Kothari (2003), a variable is a concept which can assume either quantitative, qualitative or both values. The conceptual framework in this project will be constructed based on four independent variables, one moderating variable and one dependent variable

The conceptual framework contains the key factors, the variables and presumed relationships amongst them (Miles & Huberman, 1994). The various variables that are at play in this project are summarized in Figure 1. Dependent variable is environmental sustainability, independent variables are: competition for natural resources, economic activities, conflict management and access to social amenities. Moderating variable is environment regulatory framework.

According to the UN sustainable development agenda summit (2015), sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It listed the four fundamental values of sustainable development thus: profit making, public interest, socially rooted and ecologically rooted values. A parallel can thus be drawn between these values and environmental sustainability realm.

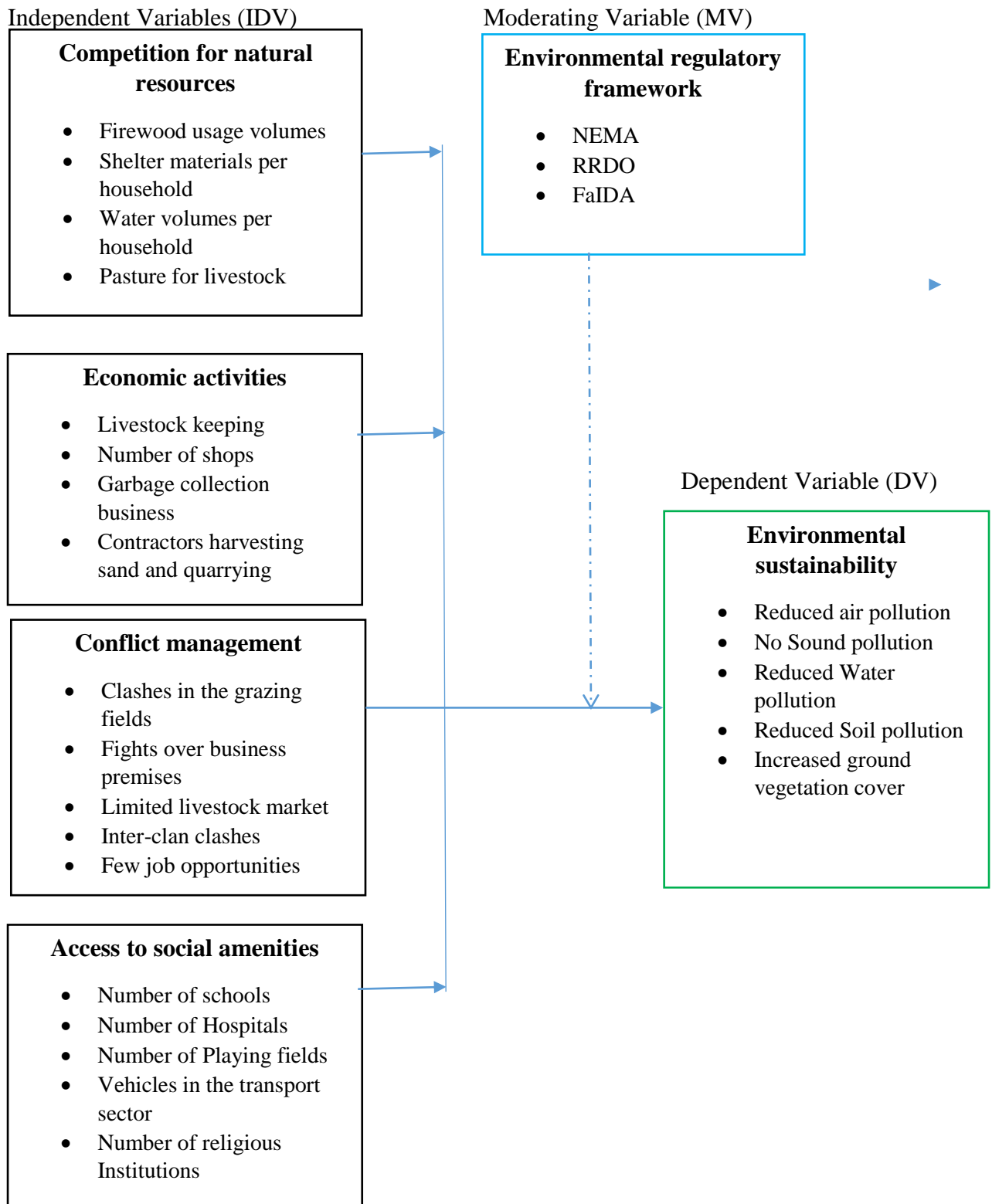


Figure 1 Conceptual Framework

2.9.1 Indicators of Independent variables

Independent variables, as the name suggest, act alone but their effect individually or collectively has a huge bearing on the dependent variable

To start with, the indicators for competition for natural resources are firewood usage volumes, shelter materials per household, water volumes per household pastures for livestock

Secondly, the economic activities of the refugee population is livestock keeping. Although it is not allowed to keep them, majority of them have a sizeable herd of goats, cows and donkeys. Trade in livestock among the refugees was not found to be as vibrant as was expected, although it constitutes big business for the host community. But, livestock products – meat, milk and leather – form part of the popular trade items within the camps (Intermedia Development Consultants, 2013). Trade in smuggled goods through the porous Kenya-Somalia border is also rampant in the camps-rice, sugar, powder milk and variety of cereals. This has led to the proliferation of counterfeit products with some being a bio-hazard. Some refugees are employed in the hotels and guesthouses as attendants (Refugee Consortium of Kenya, 2012)

There are several businesses being run by the refugees including shops and markets. These income generating activities inevitably generate a lot of solid waste that is dumped all over the place with impunity. The camps are awash with litter and garbage. This has an effect on the surface and ground water quality. They are also fertile breeding sites for contagious diseases. The competition in the transport sector is cut throat. The main road is not tarmacked and clouds of dust billows every day. This has had a lot of environmental effect on air quality.

Thirdly, the indicators for conflict management are clashes in the grazing fields, fights over business premises and limited livestock market is another sticking point in the complex. Tension escalate to fully fledged inter clan fights. The complex is in a semi-arid area with little promise for browsing brush even during the short rains. The desperation is compounded during the long dry spells. There is sometimes protracted conflict between the Somali majority refugees and the minority groups mainly Sudanese, Ethiopians and Burundians over allegations of preferential treatment. Inter-clan tussles and scuffles are all too common. This is due to the false belief that one clan is favoured over the other in

the food and shelter material distribution. There is some level of resentment within the host community about the refugees. Some argue that refugees are receiving preferential support, whether in terms of services or in job opportunities.

Fourthly, the indicators for social amenities include number of schools, hospitals, religious institutions and playing fields. There is increased use of vehicular transport in the form of buses, *matatus*, pick-ups and taxis. Commercial transport is used to go to the refugee camps to trade, visit relatives, access health facilities and collect or buy food. Host community members also make limited use of buses to Nairobi and Garissa. Donkey carts are widely used to transport firewood, building materials, food and other products to and from the camps.

2.9.2 Indicators of moderating Variable

Environmental regulatory framework play a key role in controlling the proper and sustainable use of the environment. The governments is a signatory to regional and global treaties and protocols whose objective is among other things to conserve the environment and curb climate change. Among them is the Kyoto protocol (2005), Vienna convention (1985) and the Paris Climate Accord (2015). These international treaties must be observed religiously and Dadaab complex cannot be an exception. The National Environmental Management Authority (NEMA) through the county environment committee is mandated to oversee the prudent management of the environmental resources. The local Environmentalist namely RRDO and FaIDA headline the restoration and rehabilitation of the camps

2.9.3 Indicators of dependent variable

The measure of success or failure of environmental sustainability is determined by reduced air, water, and soil pollution, no sound pollution and increase in ground vegetation cover over a given landmass before and after the settlements. The activities aforementioned in the refugee complex will determine the magnitude of environmental destruction or conservation. The government intervention and other relevant stakeholders will determine the success or failure of the conservation efforts.

2.10 Research gap

Before the settlement and resultant activities of refugees in Dadaab, the natural environment was undisturbed, dense with vegetation, wild animals, flora and fauna of

various species. This changed with the indiscriminate extraction of natural resources. Previous research on the subject has documented the continued deforestation of this area but none has attempted to appropriate the different activities that contribute to it. The extent to which these activities have changed the quality of air, water, soil and sound will determine the sustainability of the environment. This research therefore comes to fill this gap and provide useful mitigation measures to contain the deteriorating situation

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses how this research will be carried out. It expounds on the research design, sampling and sampling size, validity and reliability of instruments, data collection procedure, data analysis techniques and ethical considerations. The method shall be mixed methods; both qualitative and quantitative in order to complement each other. The aim is to explore the possibility of environmental sustainability in light of mushrooming refugee settlement in Dadaab complex.

3.2 Research Design

Ogula (2005) describes a research design as a plan, structure and strategy of investigation to obtain answers to research questions and control variance. Additionally, a project design is the plan of action the researcher adopts for answering the research questions and it sets up the framework for project or is the blueprint of the researcher (Kerlinger, 1973). This project will adopt a survey research design. This design as defined by Orodho (2003) is a method of collecting information by interviewing or administering a questionnaire to a sample of individuals. The qualitative data “provide insights into the events and situation prevalent in a group.” This insights shall be gathered from the people who have been affected by the environmental degradation in one way or the other. The interviews sessions shall range 15-30 minutes. This period is comfortable for both the researcher and the respondent to provide useful and quality information for an appraisal (Kumar, 2010)

It shall be both descriptive and evaluative.

3.3 Target Population

The target population for this project are the UN agencies, affiliated Non-Governmental Organizations (NGOs) and key informants for the hosts and refugees. This population totals 629. The agency and NGOs are: United Nations High Commissioner for Refugees, Relief Reconstruction and Development Organization (RRDO), Fafi Integrated Development Association (FaIDA), Cooperative for Assistance and Relief Everywhere (CARE), Islamic Relief of Kenya (IRK), Danish Refugee Council (DRC), Kenya Red Cross (KRC), National Council of Churches of Kenya (NCCCK), Norwegian Refugee Council (NRC), Police, Refugee Affairs Secretariat (RAS), National Environmental Management Authority (NEMA), Peace Wind Japan (PWJ), World Food Program (WFP), International Organization

for Migration (IOM), FILM-AID, Lutheran World Federation (LWF), SAVE THE CHILDREN, Center for Victims of Torture (CVT), Handicap International, Refugee Education Trust (RET), Windle Trust Kenya (WTK).

3.4 Sample size

Mugenda and Mugenda (2003) suggested that a sample of 10-20% is good enough if well-chosen and the elements in the sample are more than 20. This project opted for 20% of the population to obtain the sample size of 129 as tabulated hereunder. This project will use mixed method i.e. qualitative and quantitative research method. Questionnaires, key informant Interviews and observations shall be used as data collection tools. Sampling is a procedure, process or technique of choosing a sub-group from a population to participate in the project (Ogula, 2005).

Table 3. 1 Sample size

Agencies	Population of staff	Sample proportion	Sample size
UNHCR	70	20%	14
RRDO	20	20%	4
FaIDA	20	20%	4
CARE	20	20%	4
IRK	20	20%	4
DRC	25	20%	5
KRC	20	20%	4
NCKK	20	20%	4
NRC	25	20%	5
Police	20	20%	4
RAS	25	20%	5
NEMA	20	20%	4
PWJ	20	20%	4
WFP	20	20%	4
IOM	20	20%	4
FILMAID	25	20%	5
LWF	50	20%	10
SAVE THE CHILDREN	20	20%	4
CVT	20	20%	4
Handicap International	20	20%	4
RET	40	20%	8
WTK	85	20%	17
Key Informants	4	100%	4
Total	629		129

Source: Researcher, (2017)

3.4.1 Sampling Procedure

The project employed proportionate sampling technique where 20% of the population in each agency/organization was considered.

3.5 Research Instruments

The main data collection instruments that will be used in this project include a structured questionnaire and a key informant interview. This will be used for the purpose of collecting primary quantitative data and qualitative data respectively. Additionally, the questionnaires will be used for the following reasons: a) its potentials in reaching out to a large number of respondents within a short time, b) able to give the respondents adequate time to respond to the items, c) offers a sense of security (confidentiality) to the respondent and d) it is objective method since no bias resulting from the personal characteristics. A closed ended questionnaire will be used

The questionnaire is divided into the main thematic areas of investigation except the first part which captures the demographic characteristics of the respondents. Other sections are organized according to the major research objectives. A five point Likert scale was used for the closed-ended questions where Strongly agree, Agree, Neutral, Disagree, Strongly disagree had a score of 5, 4,3,2,1 respectively. The choice of close ended questionnaire was because it was easier to administer and analyze

3.5.1 Piloting the instrument

Piloting was done to ensure that the questionnaire was free from ambiguities and contradictions. This was achieved by purposively selecting a few staff in the agency. After piloting, adjustments were made to harmonize emerging issues. According to Orodho (2004) piloting establishes whether the questions measure what they are intended to measure, the respondents understand all questions in the same manner and eliminate potential research bias

3.5.2 Validity of the questionnaire

Validity of the questionnaire was enhanced by appraising the research instruments for applicability, suitability and sufficiency of the instruments from a research viewpoint. The corrections on the identified areas were included in the instrument and a field test was conducted.

3.5.3 Reliability and Validity of the Instrument

Reliability refers to the consistency of measurement and is frequently assessed using the split-half test reliability method (Ngechu, 2004). Reliability of the questionnaire will be evaluated through administration of the said instrument to a pilot group. According to Mugenda & Mugenda (1999), validity is the accuracy and the meaningfulness of inference,

based on the research results. One of the main reasons for conducting the pilot project shall be to determine the validity of the questionnaire. The project shall both face and content validity to determine the validity of the questionnaire. Content validity drew an inference from test score to a large domain of items similar to those on the test. Content validity is concerned with sample-population representativeness. According to Gillham, the knowledge and skills covered by the test items should be representative to the larger domain of knowledge and skills. Thus, interviewing people from different camps where settlement has influence will enable generalizing the impact to the environment

3.6 Data Collection procedures

Both primary and secondary data will be employed. The primary data will be obtained from the interviews and questionnaires. For the secondary data the documents and reports from UN agencies, environmental conservation agencies, host and national governments and other research publications on the subject matter shall be used.

To collect data, a letter of introduction was obtained from the university introducing the researcher to the National Council for Science and Technology (NACOSTI). Instructions were cautiously explained to the respondents prior to completing the questionnaire. Assurance was given to the respondents that the information provided would not be disclosed and was for purpose of the project alone. Each respondent was afforded enough time to fill the questionnaire with the drop and pick up later being the preferred method. Graphs, tables, and figures, measures of central tendencies and deviations shall be used to represent and analyse the data from the field. Both quantitative and qualitative approaches will be used for data analysis. Quantitative data from the questionnaire will also be coded and entered into the computer for computation of descriptive statistics. The Statistical Package for Social Sciences (SPSS) will be used to run descriptive statistics such as frequency and percentages so as to present the quantitative data in form of tables and graphs based on the major research questions

3.7 Data analysis technique

Before data processing, data disaggregation was done on the completed questionnaire by editing, coding, keying and clean-up of data. The data collected was analysed using descriptive statistics. The descriptive statistical tools assist in describing the data and determining the respondents' degree of agreement with the different statements under each factor. Data analysis was completed using SPSS version 20 to generate quantitative reports

which were then presented in the form of frequency tables, percentages, mean and standard deviation

3.8 Ethical Considerationsx

According to Mugenda (2008) participation in research is voluntary and subjects are at free will to pull out from the project at any time without any consequences. The researcher communicated this to the respondents before the start of the project. According to Bryman and Bell (2007) plagiarism refers to taking and using another person's thought and work as if they were your own. Refugees are vulnerable persons. They might feel like their continued stay at the camp is threatened by the research. They would be reluctant to avail information that will implicate them to the environmental degradation.

Non-governmental Organization operating in the area may be hesitant to paint the camp in bad light. Some of them could be their core mandate to conserve and restoration the environment but could be gaps.

The government may want to feel vindicated in their argument that the camp is a fertile breeding ground for elements hell-bent on wreaking havoc and mayhem to the citizenry.

It therefore behoves the researcher to exercise discretion, trust and confidentiality when interviewing the respondents. The narrative should be that the information is exclusively for academic research and not for policy

3.9 Operationalization of Variables

Research Objective	Type of Variable	Indicator	Measurement	Measurement Scale	Type of Data Analysis
1. Establish the level of influence of competition for natural resources on environmental sustainability	<u>Independent variable</u>	<ul style="list-style-type: none"> •Firewood •Shelter materials •Water •Pasture 	<ul style="list-style-type: none"> •Firewood consumption per household •Number of shelters in the camps, •Water abstraction volumes per month •Grazing area 	Ordinal	Quantitative, descriptive
2. Assess the extent of influence of economic activities on environmental sustainability	<u>Independent variable</u>	<ul style="list-style-type: none"> •Livestock keeping •Shops •Garbage collection •contractors 	<ul style="list-style-type: none"> •Number of livestock •Number of shops •Garbage volume and garbage trucks •Number of contractors 	Ordinal	Descriptive, qualitative, quantitative
3. Determine the level of influence of conflict management on environmental sustainability	<u>Independent variable</u>	<ul style="list-style-type: none"> •Grazing fields •Water points •Business premises •Livestock market •Inter-clan clashes •Job opportunities 	<ul style="list-style-type: none"> •Square area of grazing fields •Number of watering holes/pans •Licensed business premises •Markets for livestock products •Insecurity/Ars on cases, Rape cases •Number of employed refugees 	Ordinal	Descriptive, qualitative, quantitative

4.Examine the degree of influence of access to social amenities on environmental sustainability	<u>Independent variable</u>	<ul style="list-style-type: none"> •Schools •Hospitals •Playing fields •Transport sector •Religious Institutions 	<ul style="list-style-type: none"> •Number of schools •Number of hospitals •Number of playgrounds •Public transport •Number of churches/mosques 	Ordinal	Descriptive, qualitative, quantitative
5.Establish the extent of influence of environmental regulatory framework on environmental sustainability	<u>Moderating variable</u>	<ul style="list-style-type: none"> •NEMA •RRDO •FaIDA 	<ul style="list-style-type: none"> •NEMA offices in Dadaab •Restoration coverage of Dadaab •Greenbelts in Dadaab 	Ordinal	Descriptive, qualitative, quantitative
6.Environmental sustainability	<u>Dependent variable</u>	<ul style="list-style-type: none"> •Air pollution •Water pollution •Soil pollution •Ground vegetation loss 	<ul style="list-style-type: none"> •Air quality •Water quality •Soil erosion •Deforestation 	Ordinal	Descriptive, qualitative, quantitative

Table 3. 2 Operationalization of Variables

CHAPTER FOUR

DATA ANALYSIS, PRESENTATIONS AND INTERPRETATIONS

4.1 Introduction

This chapter gives an analysis of data collected from the field. The results are presented in form of tables highlighting the findings. Tables were used to present data while frequencies (f) and percentages (%) were used to discuss the findings. The analysis is organized into thematic headings to address the research questions

The thematic areas being addressed in this chapter are four: Establish the level of influence of competition for natural resources on environmental sustainability; Assess the extent of influence of economic activities on environmental sustainability; Determine the level of influence of conflict management on environmental sustainability; Examine the degree of influence of access to social amenities on environmental sustainability; Establish the extent of influence of environmental regulatory framework on environmental sustainability

The questions were structured to contribute to the objectives of the project. The data collected was analysed using Excel and Statistical Package for Social Science (SPSS version 20).The raw data was coded and entered into SPSS, cross tabulation of various variables

4.2 Questionnaire return rate

The research was conducted on a sample of 129 respondents. The respondents were categorized by the NGO or agency they work with. In some cases the questionnaire were administered directly by the researcher with drop and pick up later being the preferred method. Others were administered by a designated research assistant. Out of 129 questionnaires issued, 79 were returned. The questionnaire return rate was therefore 61.2%.Some of the respondents failed to fill in the questionnaire in good time while others had travelled elsewhere by the time of pick up

4.3 Demographic characteristics of the respondents

The respondents from the NGOs were largely staff members who work within the refugee complex. They were requested to indicate their sex, age, organization and department they work in. The table below shows their distribution

Table 4. 1 Distribution of respondents by age and gender

Gender	Frequency	Percentage
Men	61	77
Women	18	23
Total	79	100

Age Bracket	Frequency	Percentage
20-30 years	34	43.0
30-40 years	30	38.0
40-50 years	12	15.2
50+ years	3	3.8
Total	79	100

The table above sought to establish the proportion of the respondents based on their age and gender. It is evident from the foregoing data that the majority are men who are 61 in number representing 77% of the total respondents while female are the minority being 18 in number representing 23% of the total respondents. The table also shows that respondents of between 20-30 years make up the largest number of respondents at 43%. Respondents of 40 years and below constitute the highest number of 64 (81%) while respondents over 40 years are the minority with 15 (19%). Therefore, the human settlement activities are undertaken by predominantly men who are 40 years and below

4.4 Competition for natural resources and environmental sustainability

To establish the level at which competition for natural resources influence environmental sustainability, the respondents were asked a variety of question. The first question was on how they believe that competition for natural resources has influenced environmental sustainability. The vast majority (73) answered in the affirmative with a paltry 6 not agreeing.

The results are tabulated below:

Table 4. 2 Competition for natural resources influence on environmental sustainability

Do you believe competition for natural resources has influenced environmental sustainability?	Frequency	Percentage (%)
YES	73	92.4
NO	6	7.6
Total	79	100

From the above table, it suffices to say that competition for natural resources has a huge influence on environmental sustainability.

The second, third and fourth questions that the researcher posed on the respondents was which of the natural resources attracted the highest competition and to what extent they believed it affected the environmental sustainability. The resources were listed as: Firewood, shelter materials, water and pasture. The response based on 5 point Likert scale, with strongly believe having a score of 5, agree 4, Neutral 3, Disagree 2, Strongly disagree 1, gave the following mean and standard deviation

Table 4. 3 Descriptive statistics for competition for natural resources

Competition for natural resources has influenced environmental sustainability	Mean	Std. Deviation
Competition for firewood	4.61	0.590
Competition for shelter materials	4.33	0.741
Competition for water	4.23	0.764
Competition for pasture	4.36	0.713
Mean Index	4.38	0.702

The above descriptive statistics show a general mean of 4.38 and standard deviation of 0.702. This falls under the category of “Agree” in the Likert scale. It therefore follows that the residents of the refugee camp believe competition for natural resources has influenced environmental sustainability

4.5 Economic activities and environmental sustainability

To address this second objective, four questions were asked from the respondents:

The first question was how they believe economic activities has influenced environmental sustainability. The table below summarizes their responses

Table 4. 4 Economic activities influence on environmental sustainability

Do you believe competition economic activities has influenced environmental sustainability?	Frequency	Percentage (%)
YES	68	90.7
NO	7	9.3
Total	75	100

The overwhelming majority of 68 (90.7%) agreed. 7 (9.3%) respondents however did not agree. The economic activities considered in the project are livestock keeping, shop-keeping, garbage collection business and contractual jobs. These are the most prominent economic activities in the complex

Response to the other question gave the analysis tabulated below with the mean and standard deviation to 5 point Likert scale question

Table 4. 5 Descriptive statistics for economic activities

Economic activities have influenced environmental sustainability	Mean	Std. Deviation
Livestock keeping	4.29	0.802
Shop-keeping	3.84	0.886
Garbage collection	4.57	0.597
Contractual jobs	3.99	0.966
Mean Index	4.17	0.813

The foregoing statistics depict a mean of 4.17 and standard deviation of 0.813. This means that the respondents agree that livestock keeping, shops, garbage collection and contractors has influenced environmental sustainability. This is because livestock strip the vegetation, shops generate a lot of non-biodegradable wastes like plastic bags and chemical lazed fertilizers. These wastes are not properly disposed-off and end up polluting the environment.

The contractors harvest soils from the land mass leaving deep craters that promote earth-slides and loss of soil fertility

4.6 Conflict management and environmental sustainability

This third objective was achieved by asking four questions. The questions were structured in a manner that it was user friendly. The first question was a “YES” or “NO” question. The main question was on a Likert scale to establish the level of agreement

Table 4. 6 Conflict management influence on environmental sustainability

Do you believe conflict management has influenced environmental sustainability?	Frequency	Percentage (%)
YES	68	90.7
NO	7	9.3
Total	75	100

68 (90.7%) agreed that conflict management has influenced environmental sustainability. Only 7 (9.3%) disagreed

The second question was on what they perceive to be the major source of this conflict and the extent they agree it influences environmental sustainability. The results are tabulated

Table 4. 7 Descriptive statistics for conflict management

Conflict management has influenced environmental sustainability	Mean	Std. Deviation
Conflict on grazing fields	4.39	0.853
Conflict on watering holes	4.16	0.871
Conflict on business premises	3.84	1.001
Conflict on livestock market	3.80	1.000
Mean Index	4.05	0.931

From the statistics, it is shown that conflict on the grazing fields and watering holes have the highest mean of 4.39 and 4.16 respectively. This falls squarely on the “Agree” category of the Likert scale. The overall mean is 4.05 which also tells us that the residents agree that conflict

management influence environmental sustainability. Grazing fields and watering holes in particular come out quite prominently. The refugee and host community are both pastoralists community. Their fortunes and well-being is defined by the number of livestock one has. In the end, there is more livestock than the available pasture, space and watering points. This results in conflict as competing interests take centre stage. In the end, the environment suffers

4.7 Social amenities and environmental sustainability

This objective featured the main social amenities that the population shares. The amenities are among others, schools, hospitals, transport services and religious institutions sustainability. The response on the question of influence of social amenities to environmental sustainability yielded the following results

Table 4. 8 Descriptive statistics for social amenities

Access to social amenities has influenced environmental sustainability	Mean	Std. Deviation
Access to schools	3.39	1.404
Access to playing fields	3.87	1.018
Access to transport services	3.72	1.073
Access to religious institutions	2.92	1.328
Mean Index	3.45	1.206

The mean from the tabulation above 3.45. The standard deviation is 1.206. It means therefore that it's the view of the population that the social amenities has no major influence on the environmental sustainability. The value of 3.45 is borderline between Neutral and Agree and therefore opinion is divided on this objective. The social amenities aren't many. Schools for instance are 39, 20 playing fields, 4 major mosques and an equal number of churches. These amenities therefore have limited influence on the environment based on their numbers

4.8 Environmental regulatory framework and environmental sustainability

This was the last objective of this research. The question features a moderating variable that would tilt the balance of scale from positive influence of human settlement to negative influence. Environmental regulatory agencies in the complex are expected to play a big role in steering the course for extraction, use and disposal of natural resources and by-products. If

a negative verdict is returned by the respondents, this will be a serious indictment on the performance and relevance of these agencies. A question on results of intervention of the environmental agencies gave some intriguing response.

To help get to the bottom of this research question, three environmental agencies that operate in Dadaab were selected. For purposes of confidentiality, we will call them Agency A, Agency B and agency C

The findings based on a 5 point Likert scale is shown in the table below:

Table 4. 9 Descriptive statistics for environmental regulatory authority

Environmental regulatory framework has influenced environmental sustainability	Mean	Std. Deviation
Agency A	3.13	0.412
Agency B	3.21	0.132
Agency C	3.61	0.146
Mean Index	3.32	0.230

The mean of the foregoing statistics is 3.32 and standard deviation is 0.23. That means that the residents are Neutral in as far as the influence of the environmental regulatory agencies activities are concerned. This will not be music to the ears of the agencies and the work they do. Two conclusions can be made from this response: To begin with, the respondents believe that whatever is happening to the environment in the complex is beyond the capacity, purview and scope of the three agencies. This therefore means they have no significant leverage to effect the environmental policies and oversight required to keep the environment healthy. Alternatively, they conclude that the agencies are not playing their role as they should have. They have let everyone run amok harvesting and extracting anything in their path reminiscent of the tragedy of commons

Table 4. 10 Quantities of listed variables

Type of variable	Indicator	Measurement	Quantity/Volume
Independent	Firewood	Firewood consumption per household	10kgs per week
	Shelter materials	Number of shelters in the camps	48,000 shelters
	Water	Water abstraction volumes per month	300,000m cubic metres
	Pasture	Grazing area	50 square kilometres
Independent	Livestock	Number of livestock	5,000 Cows,20,000 goats
	Shops	Number of shops	4000 shops
	Garbage collection	Garbage volume and garbage trucks	1000 tonnes of garbage, 5 trucks
	Contractors	Number of contractors	40 Contractors
Independent	Grazing fields	Square area of grazing fields	50 square kilometers
	Water points	Number of watering holes/pans	10 watering holes
	Business premises	Licensed business premises	4000 shops
	Livestock market	Markets for livestock products	3 markets
	Inter-clan clashes	Insecurity/Arson cases,	490 reported cases
	Job opportunities	Number of employed refugees	70 incentive workers
Independent	Schools	Number of schools	39 schools
	Hospitals	Number of hospitals	18 health facilities
	Playing fields	Number of hospitals	20 playing fields
	Transport sector	Public transport	80 Probox, 5 buses, 800 carts
	Religious Institutions	Number of churches/mosques	39 duksi,4 mosques,4 churches
Moderating	NEMA	1 office	1000 hectares
	RRDO	Restoration coverage of Dadaab	1000 hectares
	FaIDA	Greenbelts in Dadaab	
Dependent	Air pollution	Air pollution	
	Water pollution	Water quality	7.4PH, NTU<5
	Soil pollution	Soil erosion	5 square kilometers
	Ground vegetation loss	deforestation	20 square kilometers

Source, UNHCR (2016)

The above table shows secondary data on the quantities and volumes of listed variables

CHAPTER FIVE
SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND
RECOMMENDATIONS

5.1 Introduction

This chapter provides a summary of the findings of the project based on the five research objectives and the broader research topic: Influence of human settlement activities on environmental sustainability: The case of Dadaab refugee complex, Garissa county, Kenya. This chapter consists of the introduction, summary of findings, conclusions and recommendations for policy action, suggestions for further studies and contribution to the body of knowledge

5.2 Summary of findings

The summary is based on the response of 79 respondents with 75 filling in the questionnaire and 4 key informant interviews. The sex distribution being 61(77%) male and 18(23%) female

On the first objective: Establish the level at which competition for natural resources influence environmental sustainability, 92.4% of the respondents believe that competition for natural resources has influenced environmental sustainability. 7.6% disagreed. Firewood (32.8%) was considered the natural resources attracting the highest competition. Overall, a combined mean of 4.38 on the Likert scale was obtained, this corresponds to “Agree”. Therefore the answer to the first objective is that competition for natural resources has a high level of influence on environmental sustainability

On the second objective: Assess the extent to which economic activities influence environmental sustainability, 90.7% of the respondents believe that economic activities have influenced environmental sustainability. 9.3% do not believe they have influenced. Overall, a combined mean of 4 on the Likert scale was obtained on the question of the extent they agree that livestock keeping, shops, garbage collection and contractors have influenced environmental sustainability.

On the third objective: Determine the level at which conflict management influence environmental sustainability, 90.7% believe so 9.3% don't believe so. The major source of conflict is watering holes (30.3%). Other sources of conflicts are grazing fields (20.5%), inter-

clan clashes (14.4%), competition for job opportunities (14.4%), livestock market (10.6%) and business premises (9.8%). The element of the environment highly affected by these conflicts is ground vegetation cover (25.0%). Generally, a verdict of 4.04 on the Likert scale was returned on the level of influence of conflict management on environmental sustainability

On the fourth objective: Examine the degree to which access to social amenities influence environmental sustainability, 88% of respondents believe access to social amenities has influenced environmental sustainability. Schools (42.6%) are the social amenities with the highest number of refugees and therefore places the highest burden on the environment (36.9%). Hospitals, playing fields and religious institutions take up sizeable number of refugees and a commensurate amount of resources from the environment at 19.7%, 24.6% and 12.3% respectively. Ground vegetation cover (36.2%) and soils (36.2%) suffer the greatest brunt of constructing the aforesaid social amenities. Overall, a combined mean of over 3.5 corresponding to “Agree” on the Likert scale was arrived at on the question

On the fifth objective: Establish the extent to which environmental regulatory framework influence environmental sustainability, 88% of the respondents believe that environmental regulatory framework has influenced environmental sustainability. This implies that they still have a lot to do to restore the environment to the desired threshold or adjust the policies to align with this development

5.3 Discussions

According to Abdullahi (2011), the presence of refugee in Dadaab refugee complex had effects on land and forest cover; with cutting of trees for firewood, construction materials, clearing of bushes to set up camps and access roads. Settlement of over 240,000 persons with large herds of livestock impacted serious environmental degradation. The environment is unable to sustain these activities. Large population in a limited zone has caused huge reduction in vegetation cover and wildlife habitat (Hussein, 2004). Settlements activities and large populations in Dadaab has led to declining stock of biomass and continued degradation of the ecosystem (Muteti, 2003). These past research on the Dadaab context fits perfectly to findings of this research.

5.4 Conclusions

To begin with, competition for natural resources have undoubtedly taken a toll on the bush, trees, and indigenous forests as the inhabitants, mostly refugees, forage for shelter materials and fuelwood. Uncontrolled livestock keeping has exacerbated an already fluid situation leaving land bare and billowing dust in its wake. These affect the vegetation cover and soil quality. Moreover, huge movements of livestock from one point to another results in soil compaction on the plains and soil erosion on the slopes. Sprawling makeshift shops churning huge volumes of non-biodegradable waste have suffocated the soils and increased the carbon footprint when they are burnt in the open. These wastes also affect the ground water quality when chemical laced wastes are disposed irresponsibly. Further, contractors harvesting sand in undesignated areas leads to landslides, striping of vegetation cover, land degradation, soil destabilization and lose of soil fertility

Competing parochial interest which inevitably result in conflicts have not spared the environment either. When huge herds have to compete for a singular water pan or watering hole, the entire corridor leading to the waterpoint is wasted land. Air pollution is common place even as the animals fight off each other for a drinking chance

A new finding in this project is that schools and hospitals take up a lot of resources from the environment during their construction. Previous research has cited construction of schools as using concrete blocks and for the walls. Unknown to them is that many schools have wooden posts and frames. This construction materials are sourced from the environment. Religious institutions dotting the complex have rafters and twigs on the walls and roof

Playing fields is another pollutant to the environment. These fields are devoid of grass or any vegetative matter to hold the soil into place. As a result, dust is blown when the refugees are playing. It not only harms the environment but also affects their own health. Additionally, communities don't want to share the fields and therefore each one is clearing the ground for their own field.

Environmental regulatory agencies have tried their level best to contain this situation but their efforts have not born the desired outcomes. According to the opinion of the key informants, the said agencies are ill equipped and lack enough capacity to oversee the vast landmass under review. At the same time, the follow through with their interventions is often random and lackluster.

This research has demonstrated that human activities: competition for natural resources, economic activities, conflict management, access to social amenities and environmental regulatory framework have negative influence on the environmental sustainability. If proper planning, collective responsibility and care for the environment is not at the core of the persons of concern. The human settlement activities resulting from the ravages of civil war and drought have attendant impact on the environment. Care should be taken when siting, sourcing, using and disposing the resources from the environment. If this is not heeded, the tragedy of commons will continue to rear its ugly head upon our beautiful motherland

5.5 Recommendations for policy action

The following recommendations are suggested in light of the research findings:

Alternative sources of energy should be explored and provided particularly fuel efficient stoves, biogas plants and solar cookers, photovoltaic power, wind powered generators, dry animal dung and Liquid Petroleum Gas (LPG)

Use of alternative construction materials especially for the walls. Prefabricated fiberglass panel and cement blocks and Interlocking Stabilized Soil Blocks (ISSB) will reduce the burden on the environment

Livestock numbers should be restricted based on the amount of feed and space. Pastoralist should be encourage to sell their livestock when they reach a set figure

There is need to plant more trees to increase the forested area per land mass. Drought resistant seedlings should be distributed to the refugees, host community and the United Nations Agencies. Greenbelts should be increased and patrolled to deter trespassers. Agroforestry should also be encourage

Responsible waste disposal, clean-up initiatives involving gathering, sorting, recycling, incineration and landfills for the biodegradable waste. Strict compliance with the ministry of environment and natural resources directive on use of plastic bags should be enforced

Civic awareness on the need to conserve the environment should be promoted through barazas, broadcast media and curriculum. The agencies working in Dadaab should mainstream their environmental conservation in their refugee protection mandate. This will include: modification of sectoral guidelines/policies, promotion of environmentally friendly procurement e.g. non-use of internationally prohibited chemicals, use of recyclable packaging material and promotion of environmentally friendly technologies

Expert assessment of safe yield of ground water should be done to ensure the rate of abstraction affords the aquifer enough time to recharge. The physical location of the settlement viz-a-viz the water point should be considered to reduce the chances of water contamination

5.5.1 Suggestions for further studies

There is need to research on sustainable energy sources for cooking and lighting. This will give the vegetation some breathing space

There is also need to research on modern building technologies that uses limited raw materials from the environment

A research can be carried out on alternative, environmentally friendly economic activities specifically to substitute livestock keeping

5.6 Contribution to the body of knowledge

This research has gone to great lengths to show the specific human settlement activities that were hitherto not expected to contribute to environmental degradation. To the extent that the very agencies mandated to conserve, protect and restore the environment are influencing the environmental sustainability, negatively so, is manifestly new

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APPENDICES

Appendix 1: Letter of Transmittal

David Mwangi
P O Box 15553-00400
Nairobi.
26th October, 2017

Dear Sir/Madam,

**RE: INFLUENCE OF HUMAN SETTLEMENT ACTIVITIES ON
ENVIRONMENTAL SUSTAINABILITY: THE CASE OF DADAAB REFUGEE
COMPLEX, GARISSA COUNTY, KENYA**

I am a Master of Arts student at the University of Nairobi and in my final year of project. As part of the requirement for the award of the degree of Master of Arts in Project Planning and Management I am undertaking a research project on the reference topic.

In this regard, I am kindly requesting for your support in terms of time, and by responding to the attached questionnaire. Your accuracy and candid response will be critical in ensuring an objective research. It will not be necessary to write your name on this questionnaire and for your comfort, all information received will be treated in strict confidence.

In addition, the findings of the project will solely be used for academic research purposes. Thank you for your valuable time on this.

Yours faithfully,

David Mwangi

University of Nairobi

Appendix 2: Transmittal Letter



UNIVERSITY OF NAIROBI
OPEN DISTANCE AND e- LEARNING CAMPUS
SCHOOL OF OPEN AND DISTANCE LEARNING
DEPARTMENT OF OPEN LEARNING
NAIROBI LEARNING CENTRE

Your Ref:

Our Ref:

Telephone: 318262 Ext. 120

Main Campus
Gandhi Wing, Ground Floor
P.O. Box 30197
NAIROBI

6th November, 2017

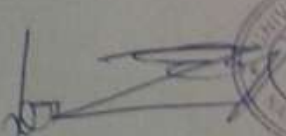
REF: UON/ODeL/NLC/27/9

RE: DAVID NJUGUNA MWANGI - REG NO.L50/84226/2015

The above named is a student at the University of Nairobi Open, Distance and e-Learning Campus, School of Open and Distance Learning, Department of Open Learning pursuing Master of Arts in Project Planning and Management.

He is proceeding for research entitled "Influence of Human Settlement Activities on Environmental Sustainability: The Case of Dadaab Refugee Complex, Garissa County, Kenya."

Any assistance given to him will be appreciated.


CAREN AWILLY
CENTRE ORGANIZER
NAIROBI LEARNING CENTRE



Appendix 3: Interview Guide

Kindly answer the following questions by ticking in the appropriate box or filling the spaces provided. The questions below are exclusively for academic research purposes only. The information obtained herefrom shall be treated with utmost confidentiality

1. Name (optional) _____

2. Gender Male [] Female [] Other []

3. What is your age bracket?

20-30 years []

30-40 years []

40-50 years []

50+ years []

4. Name of your organization _____

5. What is your area of specialization? _____

6. In your own thinking what factors do you think facilitate environmental degradation?

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

7. What are the possible causes that impact environmental sustainability?

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

8. What impact has human settlement in Dadaab refugee complex have on the environment?

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

9. What are the main sources of energy in the refugee camp?

Appendix 4: Research Questionnaire

Kindly answer the following questions by ticking in the appropriate box or filling the spaces provided. The questions below are exclusively for academic research purposes only. The information obtained herefrom shall be treated with utmost confidentiality

Part 1: General Information

i. Name of the respondent (optional).....

ii. Organization of the respondent

UNHCR	[]	RRDO	[]	FaIDA	[]	CARE	[]		
IRK	[]	DRC	[]	KRC	[]	NCCK	[]	NRC	[]
Police	[]	RAS	[]	NEMA	[]	PWJ	[]		
WFP	[]	IOM	[]	FILMAID	[]	LWF	[]	SAVE THE CHILDREN	[]
CVT	[]	Handicap International	[]	RET	[]	WTK	[]		

iii. Age bracket of the respondent

20-30 years []

30-40 years []

40-50 years []

50+ years []

iv. Department of respondent

Administration []

Environment []

Refugee affairs []

Education []

Legal []

WASH []

Community service []

Livelihood []

Technical []

Other []

v. Sex

Male []

Female []

Other []

Part 2: Human settlement activities influencing Environmental Sustainability

2a) Establish the level at which competition for natural resources influence environmental sustainability

- i. Do you believe competition for natural resources has influenced environmental sustainability?

Yes [] No []

- ii. If yes to (i) above, which of the following resources has attracted the highest competition?

Firewood [] Shelter materials [] Water [] Pasture []

- iii. What element (s) of the environment is affected by this competition?

Air quality [] Sound quality [] Water quality [] Soil []

Ground vegetation cover [] None []

- iv. To what level do you agree competition for firewood, shelter materials, water and pasture have adversely influenced environmental sustainability?

Statement	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
-----------	--------------------	-----------	-------------	--------------	-----------------------

Competition for firewood has adverse influence on environmental sustainability

Competition for shelter materials has adverse influence on environmental sustainability

Competition for water has adverse influence on environmental sustainability

Competition for pasture has adverse influence on environmental sustainability

2b) Assess the extent to which economic activities influence environmental sustainability

- i. Do you believe economic activities has influenced environmental sustainability?

Yes [] No []

- ii. What economic activity is common in the refugee complex?

Livestock keeping [] Shops [] Garbage collection []

Contractors []

- iii. What element (s) of the environment is affected by these economic activities?

Air quality [] Sound quality [] Water quality [] Soil []

Ground vegetation cover [] None []

- iv. To what extent do you agree that Livestock keeping, Shops, Garbage collection and contractors have influenced environmental sustainability?

Statement	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Livestock keeping has adverse influence on environmental sustainability					
Proliferation of shops have adverse influence on environmental sustainability					
Lack of garbage collection has adverse influence on environmental sustainability					
Contractors competing for opportunities and extraction of natural resources has adverse influence on environmental sustainability					

2c) Determine the level at which conflict management influence environmental sustainability

- i. Do you believe conflict management has influenced environmental sustainability?
Yes [] No []
- ii. What is the major source of conflict in the refugee complex?
Grazing fields [] Water points [] Business premises [] Livestock market [] Inter-clan clashes [] Competition for job opportunities []
- iii. What element (s) of the environment is affected by the above conflicts?
Air quality [] Sound quality [] Water quality [] Soil []
Ground vegetation cover [] None []

- iv.** To what extent do you agree that Grazing fields, water points, business premises, livestock market, Inter-clan clashes and competition for job opportunities have influenced environmental sustainability?

Statement	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Conflict on the grazing fields has adverse influence on environmental sustainability					
Conflict on the watering holes has adverse influence on environmental sustainability					
Conflict on business premises has adverse influence on environmental sustainability					
Conflict on the livestock market has adverse influence on environmental sustainability					
Conflict on scarce job opportunities has adverse influence on environmental sustainability					

2d) Examine the degree to which access to social amenities influence environmental sustainability

- i.** Do you believe access to social amenities has influenced environmental sustainability?
- Yes No
- ii.** Which of the following social amenities serve highest number of refugees?
- Schools Hospitals Playing fields Transport sector
- Religious Institutions
- iii.** Which of the above amenities has used the most resources from the local environment?
- Schools Hospitals Playing fields Transport sector
- Religious Institutions

iv. What element (s) of the environment is affected by use or construction of the above social amenities?

Air quality [] Sound quality [] Water quality [] Soil []

Ground vegetation cover [] None []

v. To what degree do you agree that schools, hospitals, playing fields, transport sector and religious Institutions have influenced environmental sustainability?

Statement	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
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Access to schools has adverse influence on environmental sustainability

Access to playing fields has adverse influence on environmental sustainability

Access to transport sector has adverse influence on environmental sustainability

Access to religious institutions has adverse influence on environmental sustainability

2e) Establish the extent to which environmental regulatory framework influence environmental sustainability

i. Do you believe environmental regulatory framework has influenced environmental sustainability?

Yes [] No []

ii. Have you seen tangible results from the activities of NEMA, RRDO and FaIDA?

Yes [] No []

iii. Which of the following do you work closely with in terms of environmental conservation?

NEMA [] RRDO [] FaIDA []

iv. What element (s) of the environment has improved due to the involvement of NEMA, RRDO and FaIDA?

Air quality [] Sound quality [] Water quality [] Soil []

Ground vegetation cover [] None []

- v. To what extent do you agree that NEMA, RRDO and FaIDA activities have influenced environmental sustainability?

Statement	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
NEMA has adverse influence on environmental sustainability					
RRDO has adverse influence on environmental sustainability					
FaIDA has adverse influence on environmental sustainability					

Thank you

Appendix 5: Map of Dadaab Refugee Complex

