EFFECTS OF OIL EXTRACTION ON THE LIVELIHOODS VULNERABILITY IN LOKICHAR-KOCHODIN BASIN, TURKANA COUNTY, KENYA

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DECLARATION

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

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DEDICATION

I dedicate this research thesis to my family members for their love, support, patience, encouragement and understanding. They gave me the will and determination to complete my studies. Thank you for allowing me the time to concentrate on this work even at times when you needed me most. I dedicate this research thesis to my children and my siblings, for the moral and material support. I also dedicate this research thesis to all displaced populations all over the world.

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ABBREVIATIONS AND ACRONYMS

AEZ	Agro-Ecological Zones
AGRG	Annual Growth Rate for Grains
AHMI	Average Household Monthly Income
AHME	Average Household Monthly Expenditure
ASAR	Arid and Semi-Arid Regions
CDH	County Department of Health
CIDP	County Integrated Development Plan
CFA	Central Facilities Area
CGOT	County Government of Turkana
CPF	Central Processing Facility
CSR	Corporate Social Responsibility
DESIA	Design, Environmental and Social Impact Assessment
DFID	UK Department for International Development
DSI	Drought Severity Index
EHOA	East and Horn of Africa
EPC	Engineering, Procurement and Construction
FAO	Food and Agricultural Organization
FBRs	Food-Based Recommendations
FEG	Food and Economy Group
FGD	Focus Group Discussion
FPIC	Free Prior and Informed Consent
FRAC	Food Research & Action Centre
GAM	Global Acute Malnutrition
GoK	Government of Kenya
GPI	Global Peace Index
HEA	Household Economy Approach
HLD	Household Livelihood Diversification
IDMC	Internal Displacement Monitoring Centre
IDPs	Internally Displaced Persons
IHRB	Institute for Human Rights and Business
IJP	Innua Jamii Programme
ILRI	International Livestock Research Institute
IPC	Integrated Food Security Phase Classification
IPCC	Intergovernmental Panel on Climate Change
IWGIA	International Work Group for Indigenous Affairs
IWMF	Integrated Waste Management Facility
KDHS	Kenya Demographic and Health Survey
KHC	Key Household Characteristics
KIHBS	Kenya Integrated Household Budget Survey
KII	Key Informant Interview

KIHBS	Kenya Integrated Household Budget Survey
KNBS	Kenya National Bureau of Statistics
KVDA	Kerio Valley Development Authority
LCE	Livestock-Cash-Economy
LEF	Lokichar Export Facility
LLCOP	Lokichar to Lamu Crude Oil Pipeline Project
LLP	Low Livestock Productivity
LMP	Livestock Migratory Practices
LTWP	Lake Turkana Wind Power
LVI	Livelihoods Vulnerability Index
MENA	Middle East and North Africa
MIS	Management Information System
MLFD	Ministry of Livestock and Fisheries Development
NDMA	National Drought Management Authority
OID	Oil Induced Displacement
PCFP	Per Capita Food Production
PDN	National Development Plan
REC	Resource-Ecological Conflicts
RNIs	Recommended Nutrient Intakes
SDGs	Sustainable Development Goals
SEE	Socio-Economic Endowment
SL	Sustainable Livelihood
SHE	Seasonal Household Earning
SLF	Sustainable Livelihoods Framework
SLT	Secure Land Tenure
SLKB	South Lochikar-Kochodin Basin
SSA	Sub-Sahara Africa
SSN	Smart Survey On Nutrition
TAN	Twiga, Amosing and Ngamia
TB	Tuberculosis
UN	United Nations
UNICEF	United Nations Children's Fund
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
UNEP	United Nations Environment Programme
UNHCR	United Nations High Commission for Refugees
UNHRAD	United Nations Human Rights Declaration
USAID	United States Agency for International Development
WFP	World Food Program
WHO	World Health Organization

OPERATIONAL DEFINITION OF TERMS

Compensation	Used to refer to award to a person or household to mitigate a given (identified) loss of livelihood assets, suffering, or injury
Dislocation	Refer to forced, involuntaty, relocation of a person, household or a family from the habitaul residence, location
Displacement	Used as synonymous with dislocation to refer to forced, involuntary, relocation of a person, household or a family from the habitaul residence and livelihoods
Endowment	Refers to ability, capacity and/or assets inherited by a person, household from the family or social network
External shocks	Disruptions or disturbances of a social unit (a person, household or group) by external processes such as natural disasters (earthquakes and volcanoes), environmental variability (climate change, floods, droughts, and famine), conflicts, development, mining or extraction industries
Household	Refers to a social unit, group of persons residing in the same house, homestead, or compound, with the same household head.
Impoverishment	Refers to a process of becoming poor; progressive reduction, erosion of livelihood assets
Livelihood	Activities and capacities of a person, household, to maintain basic necessities of life (such as food, water, shelter, and clothing among others)
Livelihood assets	Refers to five types of assets (capitals); namely human capital, social capital, natural capital, physical capital, and financial capital necessary to support wellbeing and socio-economic empowerment (SEE).
Vulnerability of livelihoods	A risk of possible disruption (reduction, deficiency) of livelihoods
Livelihoods Vulnerability Index (LVI)	Refers to a scale (index) used to assess phases of disruption (reduction, deficiency) of livelihoods; based on the classification of livelihoods vulnerability by FAO, DFID, and IPCC
Livelihoods outcomes	Include increased wellbeing, availability and access to food, food security, increased income and income security, health, asset accumulation and socio-economic empowerment (SEE)
Nomadic pastoralists	A cultural practice of moving from one place to another typically to manage (harness) pasture and water.
Oil-induced displacement	Refers to involuntary eviction (relocation) of persons, households (families) to pave way for exploration, drilling and commercialization of oil. It includes involuntary eviction induced by contaminated environment as a result of exploration, drilling and commercialization of oil
Per capita food production	Amount of food produced per person per year in an area, region or country
Pastroralist	Refers to a person (household, family) who practices extensively production and herding of livestock to support livelihoods
Rehabilitation	Used to refer to resettlement of a displaced person, household
Resiliewnce	Used to refoer to capacity of a person, household, to withstand a vulnerability, shock or disruption of the livelihood assets, or socio-economic wellbeing
Socio-economic Endowment	Used to refer to socio-ecobomic assets inherited by a person, household from the family or social network
Sustainable livelihoods	Assets of a person (household, family) that can cope with and recover from environmental and socio-economic variability, shocks and related challenges. Also used to refer to socio-economic endowment that enable a person

(household, family) to rebound following environmental and socio-economic variability, shocks and related challenges

ABSTRACT

Discovery of oil in South Lokichar-Kochodin Basin (SLKB) in Turkana County, Kenya, in 2012, subsequent exploration and extraction, provided opportunity to assess the nature of vulnerability to displacement and impoverishment, particularly among the pastoral communitiies in arid and semi-arid regions. This study assessed the effects of the exploration and extraction of crude oil on displacement and the vulnerability of the livelihoods. Specific objectives of the study were to; examine the nature of the vulnerability of the livelihoods, assess the nature of oil-induced displacement, examine the effects of the oil dispcement on the vulnerability of the livelihood, assess the narure of recovery and to examine the nature of the compensation. Informed by the theory of vulnerability, impoverishment and displacement (VID), the study was basically a survey design. The location of the study was South Lochikar-Kochodin Basin (SLKB) in the Turkana County targeting 14,713 households. A sample size of 426 was determined using the Yamane (1967) formula. Individual households were drawn through systematic sampling with use of two registers (one from Lokichar location and one from Kochodin location). Data were collected through key informant interviews (KII), focus group discussions (FGD) and a survey questionnaire. Descriptive and Inferential analayis inform of regression was performed. As in most parts of Turkana County, SLKB was largely arid and semi-arid region where livelihoods were based largely on livestock production. Around 78% of the households lived within the margins of the chronic poverty (KES 117 per day or $ 1) and experienced varied forms of the vulnerability of livelihoods. The land tenure in SLKB and most parts of the Turkana County remained a community land; accessible to local members of the community and held in trust by the County Government. The study established that 53% of the households had lost some part of access to land because of exploration and extraction of oil, 42% had witnessed reduced livestock, and 38% had experienced extensive and severe reduction of access to water sources. Reports indicated that by 2018, a total of 700 square kilometers of community land had been curved out to support exploration of oil and gas, extraction, and related infrastructure. The study also established that 42% of increased severity of poverty was driven by oil related impoverishment and displacement and was significant at the probability of error less than 0.001. Out of the seven indicators of impoverishment and displacement, the key drivers were 1) excised/reduced land (Beta=0.482), 2) pasture (Beta=0.236) and 3) family support (Beta=0.174). The study established that 31% of the recovery (new settlement, access to new opportunities) were associated with the socio-economic endowment (resilience) of the households; which was significant at the probability of error less than 0.001.The study established that there had been limited stakeholder engagement characterized by a number of critical challenges such as limited plan, limited information, limited education, inadequate compensation (even at the pilot stage), and multiplicity of stakeholders (i.e. national government, local government, council of elders and the households). The study recommended strengthening measures to accelerate human resource development and socio-economic capacity (resilience), to improve agro-pastoral production, to enforce registration of the community land based on the Land Registration Act (2012) and the Community Land Act (2016), 4) to re-start negotiation of the compensation and resettlemt directed to building the economic endowment (resilience) of the local (indigenous) population.

CHAPTER ONE: INTRODUCTION AND BACKGROUND

1.0 Introduction

It has been expected that the extraction industries including Oil, Gas, and Mining would contribute to positive development outcomes of the local population, generate employment, trade opportunities, stimulate economic growth and therefore reduce poverty (Cameron & Stanley, 2017, Reed et al., 2015). However, research reports continue to indicate that extraction industries have been accompanied by impoverishment, displacement and increased vulnerability of livelihoods; particularly among agro-pastoral communities in arid and semi-arid regions (Kuch, Bavumiragira, & Jean, 2019; Obongo, 2018). The limited or negative development outcomes of the extraction industries have given rise to the concept of natural and extraction resource curse (Cameron & Stanley, 2017).

Crude oil was discovered in South Lokichar-Kochodin Basin (SLKB) of the Turkana County in 2012, and followed by series of explorations, drilling of the initial wells and development of the initial infrastructure. By 2018, 21 wells had been drilled at the Lokichar-Kochodin Basin with an estimated 600 million barrels of recoverable crude oil. It was also projected that oil production will absorb approximately 1,085 hectares of land; when fully operationalized. Discovery, related explotation and extraction of oil provided opportunity to assess the nature of the nature of the displacement and vulnerability of the liveliohoods, particulatly among the agro-pastoral communigties in arid and semi-arid regions.

1.1 Background to the Study

Deficiency (interruption, erosion, or reduction) of livelihoods continues to be a major challenge globally, particularly in developing countries, Sub-Sahara Africa (SSA) and Arid and Semi-Arid Regions (ASAR). By 2018, 26.4% of the global population (equivalent to 2 billion people) experienced limited access to livelihoods and 10.8% of the population (921 million people) experienced severely limited access to livelihoods (FAO, UNICEF, & WHO, 2019; FAO, 2020). On average, over 40% of the population in East and Horn of Africa (EHOA), have been reported to have limited access to livelihoods and chronic food deficiency (FAO et al., 2019).

Limited access to livelihoods has been associated with a number of processes including environmental and climate variability, ecological resource conflicts, socio-economic deprivation and extraction industries including exploration of natural resources such as oil (Warner et al., 2010; Guber et al., 2015; FAO et al., 2019; World Bank, 2017). Indeed, 47% (433 million) of those who experienced severely limited access to livelihoods in 2018 were attributed to extraction of natural resources including oil exploration (FAO et al., 2019; World Bank, 2017). In addition, the demand for energy has been projected to increase by 50% by 2030; thereby doubling the pressure on the natural resources and the effects of impoverishment and displacement of the human population.

Extraction industries have been characterized by two fundamental outcomes; an optimistic expectation of positive outcomes and a discouraging expectation of negative outcomes. In the optimistic expectation, extraction industries have been

expected to generate employment opportunities, business or trade opportunities, and better livelihood, all of which have remained beyond the capacity of the local population (Adeola & Adeola, 2019). The discouraging expectations of negative outcomes have revolved largely around increased vulnerability (risk), impoverishment and displacement. Available reports indicate that a greater proportion of the 70,000 oil fields globally have been accompanied by negative outcomes; increased vulnerability (risk), impoverishment and displacement.

Varied phases of impoverishment and displacement have resulted in varied phases of eroded (reduced) livelihoods (Orr, 2019; Vanclay & Kemp, 2017; IWGIA, 2017; Randell, 2016; Downing, 2002). Between 2000 and 2015, 15 million people globally were forcefully displaced from their habitual location (residence) to pave way for the extraction and development initiatives (Belaymeh, 2020).

In addition, available reports indicate that extraction industries particularly gas and oil have been associated with impoverishment, displacement and or conflict, all of which have destroyed or severely compromised access to livelihoods and the wellbeing of the local population (Abebe, 2020; Vanclay & Kemp, 2017; IWGIA, 2017; Adam, Owen & Kemp, 2015). According to these reports graduated phases of impoverishment, displacement and or conflict have compromised or reduced socio-economic assets of the local population critical for sustaining their livelihoods and therefore rendering the local populations landless, jobless, homeless, and food insecure.

Part of the notable examples that have been reported include expansion of extraction of oil in Niger Delta in Nigeria (Opukri & Ibaba, 2008), displacement

and disenfranchisement of the local communities by the extraction of gas and oil in South Sudan (Ndimbwa, 2014), economic displacement of communities in the Albertine Graben Region of Uganda (Aboda et al., 2019; Ogwang et al., 2018), early indication of economic and/or physical displacement of local population in Lokichar/Kochodin Basin (Obongo, 2018).

In 2012, crude oil was discovered in Lokichar-Kochodin Basin of the Turkana County, which was followed by series of explorations, drilling of the initial wells and development of the initial infrastructure. By 2018, 21 wells had been drilled at the Lokichar-Kochodin Basin with an estimated 600 million barrels of recoverable crude oil. By the time of this study, the oil production life cycle had progressed from exploration to extraction, processing to commercialization phase.

Most of the studies on the exploration and drilling of oil in Lokichar-Kochodin Basin have concentrated on earlier phases of discovery and exploration, expected volume of oil, emerging forms of conflicts, and likely social and economic development (Cordaid, 2015; Nanok & Onyango, 2017).

Other analyses indicate that people in Lokichar-Kochodin Basin have continued to witness vulnerability of the livelihoods particularly among pastoral communities (Obongo, 2018; Nanok & Onyango, 2017). While it present enourmous opportunities towards reduction of the vulnerability of the livelihoods, exploration, drilling and commercialization of oil may also increase vulnerability of the livelihoods, impoverishment and displacement.

Accordingly, limited attention has been given to the vulnerability of the livelihoods among pastoral communities in arid and semi-erid regions, the effects of oil induced impoverishment and displacement. In addition, although some provision of compensation may have been made, issues and challenges of adequacy, and the impact of the compensation on improved livelihood have not been established.

1.2 Statement of the Problem

Extraction industries have been characterized by both the prospects of socio-economic development and vulnerability of the local people to displacement and erosion of livelihoods, particularly among agro-pastoral communities in arid and semi-arid regions. By 2018 one in every nine (1:9) people globally experienced limited access to livelihoods, reduced availability and access to food, reduced wellness, depleted socio-economic endowment (SEE), and inability to overcome socio-economic challenges including disease burden (FAO, 2019; FAO/PDN, 2018; FAO, 2009). Extraction industries have contributed nearly 40% of those experiencing limited access to livelihood through impoverishment and displacement.

The rate of impoverishment, displacement and erosion of livelihoods has been projected to increase; particularly with the projection that the demand for energy will increase by 50% by 2030; therefore, doubling the pressure on the natural resources. Despite the policy and legal framework including the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP, 2007) and the International Labor Organization (ILO) Convention (1989) on the rights of the

indigenous peoples, extraction industries continue to expose local people to impoverishment, displacement and erosion of livelihoods.

In view of the negative effects of the extraction industries, the study was intended to assess the vulnerability of livelihoods in South Lokichar-Kochodin Basin, the effects of the exploration and extraction of crude oil on the vulnerability of livelihoods, and the mitigation measures. Because it had progresses to the appraisal phase, the discovery of oil provided opportunity to assess the effects of exploration and extraction on the agro-pastoral households.

1.3 Purpose of the Study

The purpose of the study therefore was to assess the vulnerability of livelihoods in Lokichar-Kochodin Basin, the effects of the exploration and extraction of crude oil on vulnerability of livelihoods, the nature and impact of the compensation, and the nature of household recovery from the effects of the exploration and extraction of crude oil.

1.4 Objectives of the Study

The overall objective of the study was to assess the effects of the exploration and extraction of crude oil on the vulnerability of livelihoods among the agro-pastoral communities in arid and semi-arid regions. Accordingly, the specific objectives of the study were:

i. To assess socio-demographic characteristics of the local community at the Lokichar-Kochodin Basin of the Turkana County

ii. To examine the nature of vulnerability, deficiency of livelihoods

iii. To assess the nature of oil-induced impoverishment and displacement

iv. To examine the effects of oil-induced displacement on the vulnerability, deficiency of livelihoods

v. To assess nature of recovery of the affected people from oil impoverishment-displacement

vi. To examine the nature of the compensation to the oil-affected population

1.5 Research Questions

Research questions corresponding to the objectives were stated as follows:

i. What were the key demographic and socio-economic characteristics of the local pastoral community in Lokichar-Kochodin Basin?

ii. What was the nature of vulnerability of livelihoods among the pastoral community in Lokichar-Kochodin Basin?

iii. What was the nature of impoverishment and displacement related to exploration and extraction of crude oil?

iv. What were the effects of exploration and extraction of crude oil on vulnerability of livelihoods among the pastoral community in Lokichar-Kochodin Basin?

v. What was the nature and drivers of recovery from oil impoverishment-displacement?

vi. What has been the nature of compensation to the oil-affected households in Lokichar-Kochodin Basin?

1.6 Research Hypotheses

The study adopted the following hypotheses (prediction) which also corresponded to the objectives and the questions of the study:

i. The study predicted that socio-economic endowments of the households in Lokichar-Kochodin Basin would be lower compared to the regional and national indicators.

ii. The study expected that households in Lokichar-Kochodin Basin had experienced vulnerability (risk) of deficiency of the livelihoods and wellbeing.

iii. The study predicted also that pastoral people in Lokichar-Kochodin Basin had experienced varied phases of impoverishment and displacement related to the exploration and extraction of crude oil.

iv. The study predicted that exploration and extraction of crude oil will have influenced vulnerability of livelihoods; specifically, reduction of household livelihoods and wellbeing.

v. Varied levels of the socio-economic endowment (including human and social capital) had influenced the nature of recovery from impoverishment and displacement related to exploration and extraction of crude oil.

vi. The study also predicted that compensation to the affected households was not adequate to restore depleted (eroded) livelihood assets.

1.7 Significance of the Study

The findings of the study were expected to contribute to a number of areas. First, the findings of the study were expected to support measures to mitigate negative effects of the exploration and extraction of oil in SLKB and among agro-pastoral communities in arid and semi-arid regions. Secondly, the findings of the study were expected to support measures to enhance the policy framework to mitigate negative effects of the exploration and extraction of oil in SLKB, and among agro-pastoral communities in arid and semi-arid regions. Thirdly, it was also expected that the various stakeholders, i.e. the national government, county government, the oil exploration consortium and the local leadership would use the enhance policy framework to mitigate negative effects of the exploration and extraction of oil in SLKB, and among agro-pastoral communities in arid and semi-arid regions. Fourthly, ir was expected also that the findings of the study would support measures to address chronic poverty, mitigate hunger in line with UN Sustainable development goals 1 and 2. An immediate challenge was the fact that oil was discovered in an area in which the local population continues to experience chronic poverty. In this respect, it was envisaged that any prospect of development related to extraction of resources would also include measures to mitigate the persistent chronic poverty.

In addition to the SDGs, the African Union Agenda 2063 envisages eradication of poverty and building shared prosperity through social and economic transformation of the continent. The findings of the study were envisaged also to guide the policy makers on the review of the framework of the compensation in extraction

industries, to guide the policy makers on ways to operationalize the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP, 2007) and the International Labor Organization (ILO) Convention ((1989) on the rights of the indigenous peoples.

Lastly, the findings of the study were also expected to guide engagement with the local (indigenous) people particularly in respect to re-negotiation of the compensation package and re-construction of the livelihoods. Available data indicate that about 22 million pastoral people in EHOA continue to be vulnerable to various forms of extraction industries (World Bank 2017) and the findings of the study were expected to guide re-negotiation of the compensation packages and enhancement of their socio-economic resilience.

1.8 Assumptions of the Study

The study was carried-out with a number of key assumptions; particularly in respect to the nature of the vulnerability of livelihoods; the nature of the cultural-pastoral adaptation and the socio-economic resilience.

The study assumed that the vulnerability to reduced (disrupted) livelihoods in most of the regions in EHOA has been prevalence; and driven by the environmental variability including aridity, the nature of the cultural-pastoral adaptation and low socio-economic resilience. By 2018, 88% of the people in Turkana County were reported to live on the margins of the extreme poverty.

In view of this assumption, the study assumed also that the discovery, exploration and drilling of oil in South East of the Turkana County had increased the

vulnerability of livelihoods and increased severity of the poverty. In addition, the study assumed that exploration, drilling and extraction of oil in South East of Turkana County will be carried-out for approximately 25 years during which approximately 1,085 hectares of land will be required to develop necessary facilities and infrastructure. The study also assumed that discovery, exploration and drilling of oil have been accompanied by varied phases of impoverishment and displacement.

The study also assumed that the discovery, exploration and drilling of oil in South East of the Turkana County had provided opportunity to reverse vulnerability of livelihoods and the severity of poverty. The study also assumed that that different levels are of the socio-economic endowment (including human and social capital) had influenced the nature and the rate of recovery from impoverishment and displacement related to exploration and extraction of crude oil.

1.9 Scope and Limitation of the Study

The study was restricted to assess of the socio-demographic characteristics of the households in Lokichar-Kochodin Basin, the nature of the vulnerability of livelihoods, the effects of the oil-induced impoverishment and displacement, the nature of the compensation, and recovery process.

The study was also restricted to one-time collection of data; the 2nd half of 2020. Within this framework, households reported their experiences on the nature of the vulnerability of livelihoods, the effects of the oil-induced impoverishment and displacement, the nature of the compensation, and recovery process.

The study assessed the historical processes of exploration of oil and vulnerability of the local people from 2012 to 2020 through secondary data, available reports, key informats and the focused group discussions.

CHAPTER TWO: REVIEW OF LITERATURE

2.0 Introduction

Review of literatufre was carried-out in this chapter based on the key objectives; namely the nature of the vulnerability of livelihoods, the effects of the oil-induced impoverishment and displacement, the nature of the compensation, and recovery process. It also included a review of the relevant theories and the conceptual framework.

2.1 Access to Livelihoods

2.1.1 Global Access to Livelihoods

Access to livelihoods has remained limited globally; mostly in developing countries and among agro-pastoral communities in arid and semi-arid regions (Sasson, 2012). By 2018 one in every nine (1:9) people globally experienced limited access to livelihoods, reduced availability and access to food, reduced wellness, depleted socio-economic endowment (SEE), and inability to overcome socio-economic challenges including disease burden (FAO, 2019; FAO/PDN, 2018; FAO, 2009).

More specifically, these authorities indicated 10.8% (921 million people) globally experienced severely limited access to livelihoods, lived without secure access to livelihoods, accompanied by inability to overcome disasters, displacements, and socio-economic instabilities, chronic food deficiencies, and related diseases (Cernea, 2004). The affected populations were segments of the global population who lived on extreme poverty (that is, less than US$1.25 per day); and stood in contrast to vision 2030 of a world in which everyone is always assured of access to

necessary livelihoods (Vanclay & Kemp, 2017). It is instructive to note also that large deposits of resources, minerals, oil and gas are located in Arid and Semi-Arid Regions (ASAR) where indigebous communities have been predominantly pastoralists, with poor infrastructure, high levels of poverty, illiteracy, and limited access to basic social amenities.

Key processes that have been associated with eroded (disrupted, reduced) livelihoods include environment and climate variability, ecological resource conflicts, development initiatives and socio-economic deprivation (FAO, 2019). These reports indicated that 37% (341 million) of those who experienced severely limited access to livelihoods globally were affected largely by environment and climate variability, 33% (304 million) by conflicts, 20% (184 million) by development initiatives including mining of resources, and 10% (92 million) by socio-economic vulnerability (FAO, 2019; FAO et al., 2019; FAO/PDN, 2018; FAO, 2017).

Among the environmental variability, drought was one of the key processes that affected or led to loses of a larger proportion of livelihoods particularly in agriculture and livestock sectors (Cohen, 2004). By mid-2018, 33% of those that experienced severely limited access to livelihoods globally were in countries that were experiencing drought and related climate variability and another 33% were in 21 countries and territories affected by conflict or insecurity (Maldonado et al., 2013). The 10% who experienced severely limited access to livelihoods in 2018 were in 33 countries, which were characterized by livelihoods vulnerability with

notable rising unemployment, lack of regular work, and increasing economic shocks that included currency depreciation and high food prices (FAO, 2019).

2.1.2 Livelihood and Access in Sub-Sahara Africa

By 2017, over 42% of the population in SSA remained in extreme poverty, characterized by limited access to livelihoods, related vulnerability, and inability to address life, natural and social shocks (World Bank, 2017; Chauvin, Mulangu, & Porto, 2012). Of the global population that experienced severely limited access to livelihoods in 2018, 36% (333.2 million) were in SSA, and they also experienced severe food deficiency. These figures are the highest among the regions of the world (FAO, 2019; FAO/PDN, 2018).

Limited access to livelihoods and inability to overcome poverty became more acute in SSA in the first two decades of the 21st century. From the year 2000, countries in SSA performed decimally in some of the key indicators of livelihoods (Shikuku et al., 2013). The growth of the population surpassed production of food, Annual Growth Rate for Grains (AGRG) remained below 3%, and the average Per Capita Food Production (PCFP) either stagnated or declined pushing large segments of the population to risk levels of severely low socio-economic zones and inability to access livelihoods, to overcome hunger, malnutrition and related diseases (Sasson, 2012; Chauvin et al., 2012). With the persistent decline (or stagnation), the PCFP was surpassed by the growth of the population in SSA (Funk & Brown, 2009).

Although a considerable proportion of land remained arid and semi-arid, only 5% of the cultivated area in SSA was irrigated in contrast to 14% in Latin America and

37% in Asia, placing the region at risk of rain-dependency and related environmental variability (Shikuku et al., 2013). In addition, FAO (2018) observed that around 70% percent of livelihoods in rural East Africa were derived from productive assets, namely land, livestock, and agriculture. Further, the report emphasized that access to arable productive land in the region has also been declining because of the twin challenges of growing populations and land degradation.

2.1.3 Livelihoods and Access in Turkana County

As part of the arid and semi-arid region, the land in Turkana County is largely property for open community grazing, and livelihoods consists of goats, sheep, cattle, and camels (Watson & Binsbergen, 2008). Indeed, for centuries, nomadic pastoralism has been the backbone of the livelihoods among the Turkana people. In this respect, a large proportion of wealth in the County has been held in form of livestock and virtually all the cash earnings come from sales of either livestock or livestock products (Obongo, 2018; Watson & Binsbergen, 2008). These reports indicate also that livestock holding has been depleted considerably by series of processes including frequent cycles of droughts and famine.

Various studies reported that from early 1990s Livestock-Cash-Economy (LCE) began to penetrate nomadic pastoral practices in Turkana Region in a slow pace. Subsequently, pastoral populations have been undergoing fundamental transformation from barter to cash trading of the livestock (Obongo, 2018). During the last 3 to 4 decades, a modest proportion of livestock have been sold to enable people to acquire basic household needs such as food and clothing, or to meet

school fees (Watson & Binsbergen, 2008). The network for livestock trading consists of traders and intermediaries along the main transport-trading axis.

Below is relational typology of main and secondary markets for livestock in Turkana County where the main markets are also the central transport axe and each of the main market has several secondary markets, where livestock are sourced.

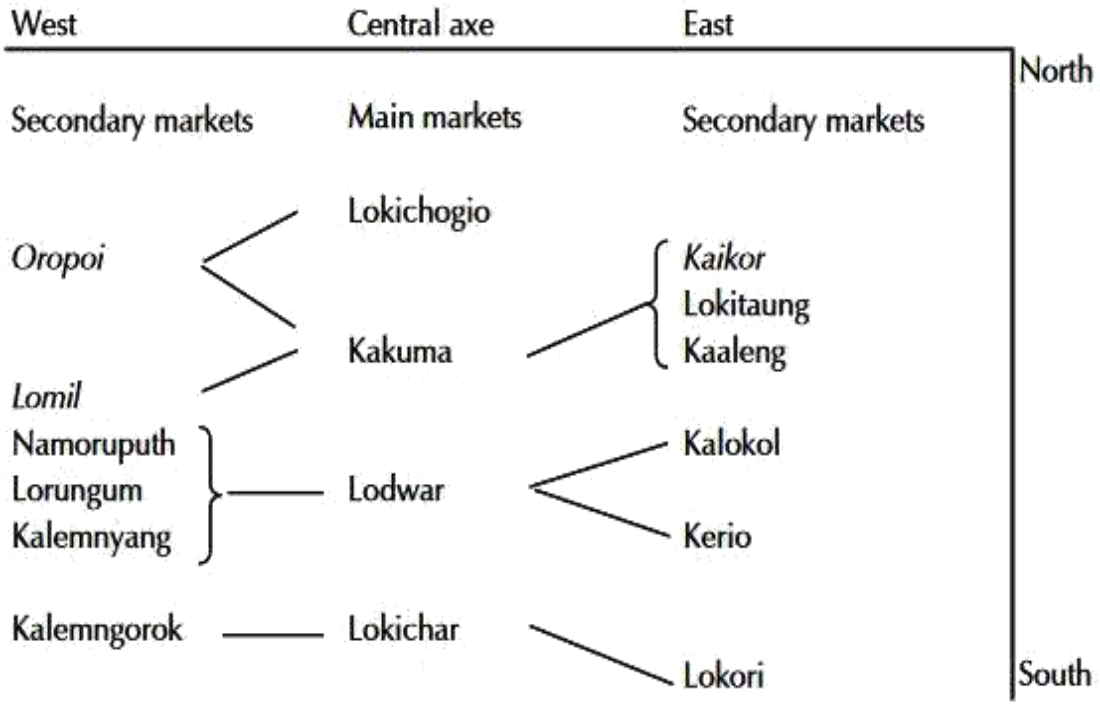


Figure 2. 1: Markets in Turkana County *Source: Obongo (2018)*

In the South East Region, Lokichar has been the principal market for the livestock, with Kalemngorok sub-market to the west towards Turkwel River and Lokori sub-market to the East towards Kerio River. Reports indicate that generally livestock have been concentrated along river Turkwel to the West of Lokichar and River Kerio to the East of the Lokichar. Most of the goats also originate from south of

Lokichar, Naroo Rangeland area, projected to have higher concentrations of livestock. Kerio and Turkwel Riverine are Agro pastoral Zones and sustain agro pastoral livelihoods. In addition, limited casual employment opportunities are available during the rainy seasons through different types of agricultural work: land preparation, planting, weeding, and harvesting.

2.2 Ecological Zones, Archaeological Sites and Developments

2.2.1 Heritage of the Turkana People

Studies on Peoples of East Africa: Nilotic and Cushitic migrations indicate that in 1300-1400, dispersal in modern Karamoja Province led to the emergence of Turkana (Wilson, 1975). It is considered that by 1500s the Turkana people, as part of Ateker cluster of people (confederation), lived in Northeastern Uganda from where they migrated progressively to the present region of Northwestern Kenya. Available reports estimate that by 1600s the Turkana people and related sub-groups had settled at the present Turkana basin, North-West of the Lake Turkana. Although they were never under effective administration of the British, available reports indicate that Turkana people resisted the British rule and in 1918 a British military expedition caused considerable loss of human lives and livestock. Production of food and maintenace of livelihoods have long been surpassed by demand because of processes that include increasing population, environmental conditions, limited productivity, limited investment, and technology as well as local rivalry (hostilities and insecurity).

2.2.2 Environment, Ecological and Livelihoods Zones

Turkana County is part of the arid and semi-arid lands in Kenya, East and Horn of Africa. The altitude of the County rises from 369m at Lake Turkana to the highest point at around 900m in the west, near the border with Uganda. Large part of the County is hot and dry; with temperatures that ranging from 20ºC to 41ºC. From 1982 to the present, recorded average rainfall has remained less than ten inches; with a range of 115mm and 650mm. The surface water, in most parts of the County, disappears immediately at the end of the rains and people resort to digging dry streambeds to reach sub-surface water. Vegetation consists of sparse cover of low bushes, scattered thorn trees, interspersed with stark expanses of lava, and exposed rocks that limit the range and quality of vegetation (CGOT 2013, 2015, 2018). Other landscape of the county consists of low-lying plains, sparsely distributed hills, and mountain ranges. Lake Turkana is the largest desert lake in the world, extending southwards from the Ethiopian border along the Rift Valley, extending 249 kilometers from north to south and 44 km at its widest point.

Based on the Drought Severity Index (DSI), the cycles of drought increased in the region in frequency and severity between 1950 and 2012 (Opiyo, 2014). Accordingly, the county is divided into four (4) ecological zones; 1) very arid (65%), 2) arid (29%), 3) semi-arid (3%), and 4) other zones (3%). In addition, approximately 30% of the soil in Turkana County has been considered as moderately suitable for agricultural production; largely because of evapo-transpiration associated with low rainfall and high temperatures. In view of the ecological zones, Turkana County has been divided into six (6) livelihoods zones;

namely 1) Border pastoral zone, 2) Central pastoral zone, 3) Kerio Agro-pastoral zone, 4) Turkwel Agro-pastoral zone, 5) Lake Turkana Fishing Agro-pastoral and 6) Lodwar Urban Livelihoods (ILRI, 2008; FEG, 2016).

2.2.3 Remarkable Archeological Sites

With approximately 7,000 square miles of exposed surface area, the County is endowed with a wide range of fossils: reflecting early adaptation and development of various species. The discovery of fossils and related archaeological evidence for nearly all the major stages of the human development has been unprecedented; and key tools for each of the major stages of human development. Fossils of Homo erectus and Homo sapiens were found in the same locality of Lake Turkana Basin. The discovery of Homo habilis dating two million years ago, was an evidence of the existence of a relatively intelligent hominid at such early time. Key archaeological sites include tributaries in the west side of Lake Turkana- Lokalalei, Kokiselei and Nadungu. Others include Lomekwi and Nataruk in Southwest Turkana; including the site of the young Turkana (Nariokotome) boy (KNM-WT 15000) who is estimated to have lived some 1.6 million years ago; the only almost complete skeleton of a human fossil ever found in the world. With such array of fossils, the county is claiming the tile of the Cradle of Mankind.

2.2.4 Development Initiatives in Turkana County

The varied ecological and livelihoods zones, have attracted a number of development projects. Among the major development projects in the County include irrigation schemes, Hydro Power, exploration and extraction of crude oil

(Block 10BB and Block 13T), solar and wind energy including Lake Turkana Wind Power (LTWP), and the potential for geothermal projects in various regions of the Turkana County. Experience of the Turkwel hydropower dam continue to be controversial particularly in respect to sharing of benefits. River Turkwel and Kerio River are two main rivers that support irrigation and agro-pastoral livelihoods in Turkana Country. Accordingly, it had been estimated that River Turkwel has a capacity of about 19.8 m3 /s for irrigation, particularly with the gauge at Lodwar bridge; and Kerio River has a capacity of about 10.5 m 3 /s, particularly at the Lokori (FAO, 2013). Over a considerable period of time, Katilu Irrigation scheme situated along River Turkwel and Morulem Irrigation Scheme situated in Kerio River have been developed through consortiums of sponsors led by the National Irrigation Board, Kerio Valley Development Authority (KVDA), and FAO. By 2018, schemes were reported to have reduced dependency on relief food supply.

2.3 Discovery of Oil in Lokichar Basin

Although distributed globally, extraction industries have been concentrated in developing countries, Sub-Sahara Africa (SSA), and mostly in arid and semi-arid regions. Extraction industry (Oil, Gas and Mining) has been defined as a process that involves a set of activities to extract raw materials from the earth, processed and commercialized (Golder & Ecologics, 2020). More specifically, it is estimated that there are about 70,000 oil fields, globally, across ~100 countries with over 1600 billion barrels of known crude oil reservoirs.

Available reports indicate that a series of exploration of oil was carried-out between 1992 and 2012 at the South Lokichar Basin, (SLB) in Turkana County (Golder &

Ecologics, 2020). In 1992, Loperot-1 was drilled by the Royal Dutch Shell and resulted to discovery of oil which was considered not viable for commercial production. In 2008, the Africa Oil Corp revisited the Basin again with limited success. In 2011, a partnership of Tullow Oil Plc, Africa Oil Corp B.V, and Total S.A revisited the Lokichar Basin and drilled Ngamia-1 which resulted in a major discovery of oil in 2012 with potential to meet commercial operations.

Appraisals of Ngamia-1 and Twiga South-1 in 2012 yielded over 100 metres of net oil pay; leading to a projection that the Lokichar-Kochodin Basin would be yielding approximately 10,000 barrels per day (bpd) by 2017. By 2018, 21 wells had been drilled in Lokichar-Kochodin Basin with an estimated 600 million barrels of recoverable crude oil. Presently, oil and gas extractions are at various stages of appraisal which will be followed by full field oil development (Golder, 2018).

The project design, environmental and social impact assessment (DESIA) indicated that the scope of the extraction of oil in South Lokichar will include New wellpads and 321 new wells, a drilling area and a construction laydown area; Central Facilities Area (CFA) which includes a Central Processing Facility (CPF); the Lokichar Export Facility (LEF) associated with LLCOP, an ancillary area, an Integrated Waste Management Facility (IWMF), a permanent accommodation camp, a temporary accommodation camp, additional temporary accommodation camps (water pipeline construction camp, rig camp and drilling minicamp); Make-up water facilities; and Use of the existing airstrip and basecamp which is leased by TKB among others (Golder & Ecologics, 2020).

The Central Processing Facility (CPF) will degas the oil from the production wells, separate the oil and water and stabilize, heat the oil prior to storage and subsequent transported to Lamu through a separately permitted and operated Lokichar to Lamu Crude Oil Pipeline Project (LLCOP). Flow from high carbon dioxide (CO2) wells will also be degassed separately prior to mixing with the main oil treatment process before it is transported to Lamu via the separately permitted and operated Lokichar to Lamu Crude Oil Pipeline Project (LLCOP) (Orr, 2019, Golder, 2018).

Accordingly, it was envisaged that during construction, the Engineering, Procurement and Construction (EPC), the contractor will be responsible for waste management and disposal in accordance with the legal requirements in Kenya and the standards by IFC. During operations, waste was to be managed at the IWMF which was to be located within the main CFA (Golder & Ecologics, 2020). The IWMF will include a recycling area, an autoclave for the disinfection of medical waste, effluent and sewage treatment plants for treating wastewater and an incinerator for the disposal of wastes. The engineered landfill will continue to be used during operations for the disposal of non-organic wastes. The operations were envisaged to last for approximately 25 years; and will demand (absorb) approximately 1,085 hectares of land to develop the facilities required to construct and operate the Project (Orr, 2019, Golder, 2018).

At the discovery of oil, it was envisaged that there will be new forms of livelihoods and challenges that would need to be addressed (Obongo, 2018). It was envisaged, for example that the oil industry would expand formal employment. It was also

envisaged that the oil industry would expand trade through the classical theory of backward and forward linkages.

2.4 Effects of Extraction of Oil Local Population

It has been expected in theory that extraction industries including Oil, Gas, and Mining would contribute to development outcomes of the local population (Cameron & Stanley, 2017, Reed et al., 2015). More specifically, it has been expected that extraction industries would generate employment, trade opportunities, stimulate economic growth and therefore reduce poverty. To the contrary, large volumes of studies have reported that a larger proportion of the extraction industries (Oil, Gas, and Mining) have been associated with limited or negative development outcomes (Kuch & Bavumiragira, 2019; Obongo, 2018) - a situation where poverty increases, impocversihment and displacement increases. In some cases, the situation deteriorates to cycles of vicious conflict. The limited or negative development outcomes of the extraction industries gave rise to the concept of natural and extraction resource curse (Gamu et al., 2015; Auty, 1993).

Most of the 70,000 oil fields globally have been accompanied by varied effects on the environment, ecosystem, biodiversity, and the human population. Indeed, a wide range of studies have reported that mining and extraction industries including oil have considerable effects (impact) in several areas including the environment (deforestation, soil, water), ecosystem, biodiversity and the human population. Of course, these effects converge at the point of the human population (Kuch et al., 2019; Obongo, 2018).

The primary interest, in this study, however, was the effects of the mining, exploration and extraction of oil on the human population, particularly access to livelihoods. Available reports indicate that the effects (impact) of mining, exploration, and extraction of oil on the local population ranges from mild impoverishment to displacement (Kuch & Bavumiragira, 2019; Obongo, 2018).

2.4.1 Impoverishment-Displacement

Available reports indicate that the effects (impact) of extraction industries on the local (indigenous) population have ranged from limited risk to mild impoverishment to severe impoverishment and displacement (Vanclay & Kemp, 2017; IWGIA, 2017). More specifically, in some cases, extraction industries have had limited risk of impoverishment-displacement; in other cases extraction industries have had considerable reduction of livelihood assets (land, soil, water, and pasture among others) in other cases extraction industries have had extensive reduction of livelihood assets which has also been considered as economic displacement, still in some cases extraction industries have had extensive or severe reduction of livelihood assets (land, soil, water, and pasture among others) and still in some cases extraction industries have had direct displacement of the population; particularly where substantial land has been required.

Similarly, displacement process is characterized by three key stages namely: 1) impeding risk, sign and notification of eventual displacement; 2) indirect displacement, which may involve loss of livelihood assets thereby impoverish affected population; and 3) direct displacement which involves actual dislocation of people from their habitual locations (residence, homestead) where they had

invested most of their socio-econmic endowment (Satiroglu & Choi, 2015; Terminski, 2014; Cernea, 2004). Impoverishment-displacement process of the extraction industries has been characterized by specific components that include loss of physical livelihood assets, marginalization, excised land, unemployment, homelessness, food insecurity and health outcomes.

2.4.2 Loss of Physical Livelihood Assets

Impoverishment-displacement process of the extraction industries has been characterized by loss of physical livelihood assets. Physical assets include housing, proximity to basic social amenities (health facilities, schools, and markets among others), and other utilities such as water, electricity and means of transport According to Adeola (2015) and Cernea (2004), oil-displaced households often suffered the loss of space and homelessness, regardless of the compensation strategies. Adoela (2015) points out that households affected by oil-induced displacement are concerned about the fact that displacement will render them landless or that their resettled homes will not adequately accommodate its members as compared to their previous places of residence. As much as loss of shelter could be a temporary issue affecting majority of the displaced households, worsening housing conditions or homelessness remains an enduring problem for majority of the oil-displaced households (Aboda et al., 2019; Stewart et al., 2003). Cernea (2004) concludes that in a wider cultural sense, loss of a household's individual home and the group's cultural space due to any involuntary displacement situation tend to lead to household's status deprivation and alienation.

2.4.3 Marginalization

Impoverishment-displacement process of the extraction industries has also been characterized by gradual or rapid marginalization; arising from gradual or rapid reduction of socio-economic endowment and falling below poverty thresholds (Aboda et al., 2019, 2018; Cernea 2004). Many of the displaced people may not be able use skills acquired earlier at the new location; human capital is lost or rendered inactive or obsolete. Relative economic deprivation and marginalization begins prior to actual displacement because new investments in infrastructure and services in condemned areas are discontinued long before projects start (Stewart et al., 2003).

Available reports indicated that displacement, particularly development-induced displacements have been associated with an ever-increasing social, economic, and cultural marginalization of the indigenous population (Aboda et al., 2019). It is important to note that majority, if not all the oil projects, in Africa are usually situated in the territories of the indigenous communities. Because of the growth in the oil and mining industry, indigenous communities have routinely been forced to relocate from their lands; in which they had lived for generations. Worst of it all is that the local population usually never takes part in the distribution of revenues earned from oil extraction (Zetter & Morrissey, 2014). Instead, they play hostage to the interests of the key stakeholders who may include multinational petrochemical companies, governments, and even extremist assemblages.

2.4.4 Excised Land and Landlessness

Most of the extraction industries demand a considerable size of land immediately and mechanisms are put in place to excise required land (IWGIA, 2017). It has also been argued that expropriation of land removes the main foundation upon which productive systems, commercial activities, and livelihoods are constructed (Adam et al., 2015; Terminski, 2013; Cernea, 2004). An example is given of a coal mining displacement around Singrauli that increased the proportion of landless people from 20% before displacement to 72% after displacement (Cernea, 2004). Another example is given of the Kiambere Hydropower in Kenya where the average land holdings dropped from 13 to 6 hectares after resettlement; their livestock was reduced by more than one-third; yields per hectare decreased by 68 percent for maize and 75 percent for beans (Owen & Kemp, 2015). It is also reported that loss of land generally has far more severe consequences for the local population than the loss of the house. Further, various examples are also provided of people forced out of their lands and progressively become impoverished characterized by limited access to livelihoods and livelihood outcomes.

2.4.5 Unemployment and Underemployment

Impoverishment-displacement process of the extraction industries has also been accompanied by reduction or loss of employment and income (Aboda et al., 2019, Ogwang, Vanclay, & van den Assem, 2018, Adam, Owen, & Kemp, 2015, Cernea 2004). In a study to examine the effects of oil displacement on communities in Ghana and Uganda, Aboda et al. (2019) argued that majority of displaced heads of households lost their jobs due to displacement, which then led to loss of household

income. The findings from the study indicated that the number of the displaced and resettled household heads without employment increased after displacement and relocation of the affected households. Opukri and Ibaba (2008) in a study in Nigeria noted that the changes in the financial livelihood assets for the displaced households such as loss of income and business profits were attributed to the increased distance to marketplaces for their farm and livestock produce, increased distance and transport expenses to places of employment opportunities, inadequate employment and business opportunities in the relocated area and more importantly unfamiliar neighborhoods. These increase their susceptibility to economic and social marginalization.

2.4.6 Dislocation and Homelessness

Several examples have been provided where forced displacements have resulted to lose of natural and man-made capital assets, including shelters (Cernea, 2004). Displacement is usually accompanied by establishment of temporary shelters and displaced population may not have resources to improve on the location and the shelter. An example is provided in India where 59% of the displaced families were found living in temporary/semi-permanent houses 10 to 15 years after their relocation (Umejesi & Akpan, 2013). It is reported also that loss of shelter represent alienation, and socio-economic deprivation.

2.4.7 Nature of Displacement

It has been argued that displacement is a final phase of the impoverishment-displacement process of the extraction industries (Vanclay et al., 2017; Owen,

2015; Reed et al., 2015; Cemnea, 1995). In environmental studies, displacement has been classified in terms of voluntary mobility; compelled mobility; and forced mobility depending on the intensity of the hazard, the vulnerability of the exposed population, and the availability of assistance (support) (Kälin, 2010).

It is reported that unemployment or underemployment among displaced often endures long after physical relocation has been completed (Cernea, 2004). In rural areas, landless laborers lose access to work on land owned by others (leased or sharecropped) and lose the use of assets under common property regimes. Self-employed small producers-craftsmen, shopkeepers, and others lose their small business. An example is given of villages in Talcher where unemployment increased from 9% to 43.6%, accompanied by a large shift from primary to tertiary occupations. It is also reported that joblessness among displaced will be recurring following various phases of the development project (Plänitz, & Kuzu, 2015). While the initiative may absorb/employ some people such employment, however, is short-lived and not sustainable. A number of studies have reported situation where a dam or oil project create "employment boom" and then opportunities diminish overtime corresponding to various phases of the project implementation (Cernea, 2004).

2.4.8 Food Insecurity, and Health Outcomes

Effectsnofc the impoverishment-displacement process of the extraction industries have been reduction (eroded or depleted) supply of food and resulting. People who have been dislocated have a relatively high risk of falling into temporary or chronic undernourishment, defined as calorie-protein intake levels below the minimum

necessary for normal growth and work resulting to increased cases of morbidity and mortality (Adeola, 2015; Cernea, 2004). In terms of food insecurity and nutrition, studies have reported that displaced households experienced food insecurity, which is usually accompanied by poor nutrition, thus increasing their risk to fall into mild or chronic malnourishment particularly for infants, the elderly, and mothers (Adeola, 2015; Cernea, 2004).

Additionally, displaced persons are often prone to relocation-related illnesses especially vector-borne and parasitic diseases such as cholera schistosomiasis and malaria (Adam et al., 2015). This is because impoverished hygiene and unsafe water sources increase their vulnerability to illnesses and chronic dysentery and even diarrhea. In such situations, the most vulnerable cohorts of the demographic spectrum – older persons, infants, and children – are affected the most (Cernea, 2004). Further, it is reported that massive displacements pose threats that can result in serious decline in health conditions of the displaced individuals. (Aboda et al., 2019).

Furthermore, oil-induced displacement has led to significant negative effects on social livelihood assets of the communities and households that comprise issues of social disintegration and conflict among resettled groups. Cernea (2004) noted that the fundamental characteristic of forced eviction is that it results in a profound disruption of the existing social organization, reciprocity, and trust among the households and the community. Social disintegration is evident in cases where the production systems of the households are dismantled in the process of forced displacements.

In addition, oil-induced displacement has been associated with broken long-established residential settlements and communities and scattered family and kinship ties among the displaced individuals (Adam et al., 2015). In respect to economic displacement, local labor markets and business linkages are often disrupted thus rendering the households economically marginalized due to loss of incomes and business profit. It is also important to note that displacement leads to the loss of leaders resulting from the broken traditional leadership systems (Adeola, 2015; Cernea, 2004). Subsequently, the overall effect of oil-induced displacement is that it tears apart the "social fabric" including cultural identities. To this point therefore, the negative effects of oil-induced development on the livelihood of household cannot be overemphasized as they cut across financial, social, physical, natural, and human dimensions of livelihoods.

2.5 Regional Experiences in Oil Extraction

Regional examples that have been reported include expansion of extraction of oil in Niger Delta in Nigeria (Opukri & Ibaba, 2008), displacement and disenfranchisement of the local communities by extraction of gas and oil in South Sudan (Ndimbwa, 2014), economic displacement of communities in the Albertine Graben Region of Uganda (Aboda et al., 2019, Ogwang et al., 2018), and the economic and/or physical displacement of local population in Lokichar/Kochodin Basin (Obongo, 2018). In Niger Delta forced evictions of the local communities and concerns of the environmental degradation led to violent protests. In South Sudan, extraction of gas and bunkering of oil contributed to conflicts which accelerated the problems of marginalization, population displacement, poverty, and

loss of livelihoods among the local communities. In Uganda, exploration and extraction of oil led to economic displacement and 'petro-violence'. An earlier assessment of the exploration of oil in Lokichar/Kochodin Basin reported signs of economic and/or physical displacement.

2.6 Compensation of Displaced Population

The issue of compensation to oil-displaced households has long been debated across international, national, and local authority levels. Although displacement of households related to mining of minerals and oil has been given attention, limited attention has been given to the nature and the process of compensation and the re-settlement. According to Owen and Kemp (2015), the frameworks and processes used to compensate displaced households vary according to the prevailing social and ethnic circumstances as well as the political contexts, thus having different implications on the household livelihoods.

Compensation refers to the financial and/or non-financial payment given to displaced persons in exchange for land, profits/income, or loss of other assets resulting from a development project (Zetter & Morrissey, 2014). The main aim of compensation has been to restore the livelihoods of the affected population because of either permanent or temporary loss of income or livelihood. The process of compensation in the oil-induced displacement therefore varies depending on what the households were promised prior to the commencement of the project, what they were actually given, and the satisfaction or dissatisfaction of the community with the compensation (Adam et al., 2015).

Existing literature has shown that the most common compensation approaches include compensation on land, structures, economic loss for crops and livestock and compensation for the loss of livelihoods. In most cases, displaced households were compensated through cash equivalent to the displacement losses or being resettled into alternative lands (Adeola, 2015). In the case of the Albertine region in Uganda, Ogwang et al. (2018) reported that the displaced households were promised comprehensive resettlement as a means of compensating them for loss of their lands to the oil endeavor. According to them, the Ugandan government was resolute that the compensation rates given to the displaced households were adequate and were based on the principle of equivalence and equity; implying that the affected households were neither impoverished nor enriched by the compensation (Ogwang et al., 2018). On the contrary, as pointed out by Imaka and Musisi (2013), majority of the households were not impressed nor satisfied with the resettlement plans and opted for cash/financial options that were available. In the Niger Delta compensation process, the case was no different with most of oil-displaced households opting for financial compensation over resettlement, citing that resettlement would have made it more difficult for them to cope and sustain their livelihoods (Opukri & Ibaba, 2008).

In the Kenyan context, limited evidence exists on the history of compensation processes given to oil-displaced individuals and households, and little is documented on whether or not the compensation was comprehensive enough and whether or not the displaced households were satisfied with it (Asati, 2017; Obongo, 2018). However, the resettlement policy framework points out the key

strategies and approaches through which compensation is given to households affected by gas and oil production (EMC Consultants Ltd., May 2019). According to the framework's Replacement Cost Approach (RCA), compensation to be given to the affected persons is to be based on the valuation of their structures. The rationale for this approach is that values and costs are related. Another significant compensation approach is the one for livelihood losses of business profits and of income, which will be estimated from the households' net daily/monthly business profits, verified through an assessment of activities and stocks (EMC Consultants Ltd., May 2019).

In addition to the livelihood compensation, the policy framework also adds a livelihood disturbance allowance of 10 per cent of the total compensation to be accorded to the households. The final compensation approach outlined in the framework is the compensation for the economic loss of crops and livestock. In compensating such losses, the policy outlines that an enumeration approach will be employed, which involves taking count of the affected livestock and crops while applying market rates approved by the national land evaluation team (EMC Consultants Ltd., May 2019). All these compensation strategies are geared towards the restoration of livelihoods thus resilient and sustainable livelihoods. Even so, all these compensation strategies only exist on paper, and little is known on how effective they have been in compensating and restoring individuals who were displaced as a result of development projects including the oil project in Turkana County.

Generally, studies have revealed that the compensation processes are always affected by a number of challenges thus making it not comprehensive enough to restore household livelihoods, hence rendering them worse-off (Owen & Kemp, 2015). In most cases, the indigenous populaces who are displaced by oil projects are often discriminated against in the distribution of revenue and benefits accrued from the exploitation of the crude oil in the sense that majority of them do not take part in incomes and/or they are given only little compensations. Most households lack formal land rights, an aspect that becomes the pretext for economic discrimination against them (Aboda et al., 2019; Ogwang et al., 2018; Owen & Kemp, 2015; Opukri & Ibaba, 2008).

According to the International Alert (2013), the failure of authorities to adequately indulge local leaders in the compensation processes has led to constant failures in achieving the goals of restoring the affected communities, and thus resulted in conflicts. For instance, with respect to the Albertine oil project in Uganda, Kyomugasho (2016) reported that the major distress in the households' compensation process in the region was that both the district and local leaders had not been sufficiently involved in determining the individuals and household who had been affected and how these households were going to be compensated.

Moreover, political contestations have also revealed the complex nature of compensation strategies for the displaced households. For instance, Stewart et al. (2003) argued that most of the local leaders often report that they were not informed on whether the displaced individuals had been compensated or not, and how the nature of their compensation was determined. Compensation processes

have also been blamed for causing domestic and ethnic violence among the displaced communities, particularly in cases whereby political leaders incite local individuals against the project, often citing their plea for inadequate compensation money or non-impressing resettlement plans (Aboda *et al.*, 2019).

In conclusion, therefore, Adeola (2015) argues that there is no single development project that can lead to complete alienation of the customary and legal rights of individuals through facilitated resettlement or payment of a one-time cash compensation. Compensation processes, whether financial or non-financial, must result in the creation of resilient communities and sustainable livelihoods for the displaced households, and creation of frameworks that will render them direct beneficiaries of the oil development projects (Adeola, 2015). To this point therefore, it is evident that the nature and strategies for compensation are complex and multi-dimensional thus requiring a critical and reliable prior needs and livelihood assessments for the oil-displaced households to realize resilient communities, with sustainable livelihoods.

2.7 Gender Dimension in Displacement and Compensation

With regard to gender, Twinamasiko et al. (2018) observed that oil-induced displacement and compensation processes have had devastating outcomes on women as compared to men and many of them have turned out to be more vulnerable. On the other hand, vast literature has reported that unlike women who are more constrained, men often directly get the compensation reimbursements and are able to easily access alternative means of livelihoods (Owen & Kemp, 2015).

The increased vulnerability of women in oil-displaced communities resulting particularly from the compensation processes can be attributed to their subordinate status in their communities, in respect to household decision-making processes and property ownership (Aboda et al., 2019; Adeola, 2015; Obongo, 2018). It is worth noting that while earlier literature on displacement effects of the extractive industry broadly acknowledged gender segregated effects resulting from the inferior position of women in regard to decision-making and property ownership in majority of the Asian and African nations, empirical researches on gender and oil-induced displacement are disparate, thus posing a challenge in distilling a clear image of how the phenomenon has altered the livelihoods of both men and women in these emerging economies (Adoela, 2015). Owing to this, therefore, there is a greater need for scholarly investigation into how men and women are distinctively affected by oil-induced displacement.

2.8 Deficiency (Erosion) of Livelihoods

Livelihood has been defined as the means of pursuing (securing) the basic necessities (food, water, shelter and clothing) of life. It includes accumulated assets (endowments), capabilities (skills and competencies) and activities to secure food, water, shelter and clothing among others. Increased accumulated assets (endowments), capabilities (skills and competencies) would typically lead to enhanced (better) livelihoods outcomes including food security and wellbeing of the people. Conversely, reduced (eroded, depleted) accumulated assets (endowments), capabilities (skills and competencies) would typically lead to

progressively reduced (deteriorated) livelihoods outcomes including food security and wellbeing of the people.

Several processes have been associated reduction of livelihoods in most of the developing countries and sub-sahara Africa; particularly arid and semi-arid regions (ASAR). Among the fundamental processes include environmental conditions, cycles of droughts, conflicts, socio-economic deprivation (poverty), extraction and large-scale development initiatives. These processes have been accompanied typically by graduated phases of negligible, minimal to extensive (severe) impoverishment (compromise or reduction of livelihood assets) and displacement which in turn has been associated with graduated phases of risk (vulnerability) or defiency (erosion, reduction) of livelihoods and the wellbeing of the people.

Accordingly, exposure to adverse environmental conditions, cycles of droughts, conflicts, socio-economic deprivation (poverty), extraction and large scale development initiatives has been likely to be accompanied by graduated phases of negligible, minimal to extensive (severe) impoverishment (compromise or reduction of livelihood assets) and displacement which in turn have been accompanied by graduated phases of risk (vulnerability) or defiency (erosion, reduction) of livelihoods and the wellbeing of the people (Yang, Feldmand, & Li, 2021). Other scholars have emphasized exposure to a risky process, sensitivity to a risky process, and inability to recover from the effects of a risky process (Devereux, Sabates-Wheeler, & Longhurst, 2013). Terminski (2014) defined vulnerability, specifically, as a function of exposure to risk occurrence or initiative leading to inability to recover from the exposure.

In line with the above definition, social vulnerability has been used to represent occurrence of a hazard or development initiative that affects, or will affect, a segment of a human population (Terminski, 2014). Accordingly, several studies have used social vulnerability to represent exposure of human population to an occurrence or development that has likelihood (probability) of adverse effects, to erode livelihoods, and result in inability to recover from the exposure (Hahn, Riederer, & Foster, 2009; FAO, 2009).

Similarly, livelihoods vulnerability has been considered as an occurrence that has had, or will have, adverse effects on livelihoods; leading to depletion (erosion or diminishing) of livelihoods; consequently, reducing access to livelihoods and increasing to inability of a population to address life, natural and social shocks that include disasters, displacements, and socio-economic instabilities (FAO, 2009; Stewart et al., 2003). According to these authors, livelihoods vulnerability represents exposure of a population to a risky occurrence (process) and the probability of livelihoods to be depleted, increasing sensitivity of the population to that risk or eroded livelihoods, and resulting to limited capacity to recover from the exposure and/or eroded livelihoods.

2.9 Livelihoods Vulnerability Index

In view of the deficiency (erosion or reduction) of livelihoods driven by a number of processes, efforts have been made to establish a measure of the level of deficiency (erosion or reduction) (Cernea, 2004) following impoverishment and/or displacement arising from either environment, cycles of mdrouhts and/or extraction industries. One of the key measures has been the Integrated Livelihood - Food

Phased Classification (IPC) developed initially by the Food Security Assessment Unit (FSAU) and adopted by FAO, DFID, and IPCC; an index from generally secure access to severely depleted (catastrophic) access to livelihood or food. More specifically, IPC index has been based on five (5) phases and defines the conditions or severity of each phase (FAO, 2008). In addition, food security and nutrition have been used usually as integrated indicators of livelihoods reflecting severity of a crisis (displacement and impact) with the aim of establishing necessary policy and humanitarian response (Zetter & Morrissey, 2014).

This measure has been used also to derive Livelihood Vulnerability Index (LVI) as a single indicator for the rate or proportion of eroded (depleted) livelihoods following an exposure or adverse effects from either an extreme environmental variability, extensive development or oil initiative and related displacements (Sujakhu et al 2019; Serrat, 2017; Hahn et al., 2009). The basic components of LVI include access to food, access to water, and the rate of wellness or disease burden and can be scaled-up to included socio-economic endowment parameters (Sujakhu et al., 2019; Hahn et al., 2009).

2.10 Livelihoods Assets

Livelihood assets have been defined as resources (endowments) available to a household (or community) to pursue (secure) livelihoods and livelihoods outcomes, including food security and wellbeing (Yang et al., 2021; Chambers & Conway, 1992). In conventional economics, livelihood assets have usually been known as factors of production; which have typically included land (natural capital), labour

(human capital) and capital (physical and financial capital). Of course, social capital is added in the context of the livelihood assets.

The concept of livelihoods, reconstruction of the livelihoods and enhancement of access to livelihoods has been developed from Chambers and Conway (1992), UNDP (1995), and Department for International Development (DFID) (1999) to the present use and adaptation. DFID (1999) defined a livelihood as consisting of capabilities, assets, and activities required for a means of living; and to achieve and to maintain adequate wellbeing. FAO (2009) defined livelihood as assets and activities, which people would need to access at all times to support living and to maintain adequate wellness. Accordingly, adequate access to livelihoods refers to adequate endowment (adequate stock) of relatively secure assets to support living and to maintain adequate wellness.

Key assets have been categorized into five components; namely: 1) natural capital (as land, soil, natural resources, forest, water, air and so on as foundation and stock for livelihoods); 2) physical capital (shelter, water and sanitation, tools and equipment, irrigation where necessary, and the basic infrastructure necessary to support livelihoods, living and wellness); 3) human capital (sound health, knowledge, skills, education, and ability to work); 4) social capital (organization of the community/household, relations, networks and reciprocity); and; 5) financial capital (financial assets, savings, endowments, loan, and credit among others) (FAO/PDN, 2018). The table below summarizes key assets in the five areas

2.11 Theoretical Framework

The study was guided by three inter-related theoretical perspectives; namely 1) The human development theory which emphasizes development of the human resources as a key measure to mitigate adversities including poverty and environmental conditions, 2) theory of poverty which emphasizes adversity of limited resources, capacities and inability to meet basic needs resulting to progressively severe, chronic food insecurity, hunger, starvation and increased disease burden, 3) the theory of impoverishment and displacement (TID) which emphasized phased reduction (erosion) of livelihood assets (land, pastoral or cultivation parcels of land, water, accumulated/inherited endowment, etc) because of processes that include development initiatives and extraction of natural resources (typically mining, gas and oil).

2.11.1 The Theory of Human Development

The human development theory advocated by Sen (1999) also encompasses the human capital theory reformulated initially by Becker (1964). Instead of the emphasis on GDP, the human development theory (HDT) emphasizes the importance of the human characteristics and capacity in reduction of poverty and accelerated development. Key aspects of the human characteristics and capacity include investment, capability (skills and competencies), innovation, other attributes and productivity of a person, household, community or society. The 2017 Capital Report used Global Human Capital Index (GHCI) to rank 130 countries with respect to their investment on human capital and which Norway led

with 77%. Similarly, in 2018, the World Bank assessed global economic performance using Human Capital Index (HCI).

Working with UNDP, Mahbub ul Haq (1995) developed an index to measure the wellbeing of people, household, community or society (rather than simple income or GDP) (Ul Haq, 1995). This index evolved over the years to the present Human Development Index (HDI) which is used to assess the socio-economic and wellbeing of people. Specifically, HDI has been used to assess the rate of disease burden, the level of education, per capita income and the average life longevity (expectancy)

The HDT and HDI have been adopted globally, East Africa and Kenya. In the case of Kenya, the County Integrated Development Plans (CIDPs) for the County Government have been based in part on HDT and HDI; i.e. to eradicate poverty and to improve the wellbeing of the people, household, and/or communities. The average national HDI in Kenya by 2019 was 0.601 which placed the country at the medium human development category; and ranking at 143 out of 189 countries. In contrast, the HDI for Turkana County in 2019 was 0.3331; nearly lower by half. (GOT, 2018). The goal therefore is to prioritize human development in Turkana County.

2.11.2 The Theory of Poverty

Poverty has been defined as a condition of limited resources. *Encyclopaedia Encarta*, defined poverty as a condition of having insufficient resources. In extreme form, poverty has been considered as lack of basic human needs to survive. United

Nations Human Development Report (1998) defined poverty as inadequacy of resources and deprivation of choices that would have enabled people to enjoy decent living conditions. According to SIDA (2005), the poor typically lack access to finance and income-earning opportunities. Key indicators have included per capita income of US$ 740 per year for moderate poverty and US$ 370 per year for extreme poverty; which translate to US$ 2 and 1 per day (World Bank, 2009).

In terms of the theory of poverty, it is maintained and predicted that limited access to livelihoods (assets and capacities) would lead to poverty which in turn will reduce livelihood outcomes including food security and wellbeing (Adeyemi, Ijaiya, & Raheem, 2009). These studies have emphasized that poverty represented by reduced livelihood assets, unemployment, low income, poor housing, inadequate health care and barriers to lifelong learning has been accompanied by inability to meet basic needs, severe and chronic food insecurity, and poor health. A key component of poverty is childhood poverty which is typically accompanied by lifelong disadvantages and turbulence

Available reports indicate that drivers of poverty in Sub-Saharan Africa include inadequate access to employment opportunities; inadequate physical assets such as land, capital and minimal access by the poor to credit even on a small scale; inadequate access to the means of supporting rural development in poor regions; inadequate access to markets where the poor can sell goods and services; low endowment of human capital, destruction of natural resources leading to environmental degradation and reduced productivity; inadequate access to assistance (Adeyemi et al., 2009).

The theory of poverty was relevant to the study of livelihoods vulnerability and the effects of the extraction of oil in Lokichar - Kochodin Basin of the Turkana County. The rate of poverty in the county remained at approximately 81%; which was the highest in the region and in the County (KNBS 2018, CDH, 2018). In 2016, 79.4% of the population lived below the poverty line, compared to a national average of 31.6%.2% (KDHS, 2018; SID, 2013). In addition, the environment, the cycles of droughts and the emerging oil extraction have increased vulnerability of the livelihoods driving a large proportion of the population to various phases (severity) of chronic poverty.

2.11.3 Theory of Impoverishment and Displacement (TID)

We have indicated that the theory of impoverishment and displacement (TID) has been used to assess (examine) phased reduction (erosion) of livelihood assets (land, pastoral or cultivation parcels of land, water, and accumulated/inherited endowment) as a result of processes that include development initiatives and extraction of natural resources (typically mining, gas and oil). Specifically, TID has been used to address varied phases of dispossession of resources and livelihoods, leaving the affected population disempowered. Cernea (2004) developed the proposition initially in mid 1990s as a model for Impoverishment Risks and Reconstruction (IRR). The core concepts of the theory were risk, impoverishment, and reconstruction, which in turn had inner linkage to assess the nature of displacement, risks, and vulnerability of the displaced population and necessary socio-economic measures to reconstruct the resettled community.

Cernea emphasized that the primary objective of any induced involuntary resettlement process should be to prevent impoverishment, to reconstruct and to improve the livelihood of the affected people (Cernea, 2004). The theory emphasized that unless the risks are addressed, forced displacement will lead to landlessness, joblessness, homelessness, marginalization, food insecurity, loss of access to common property resources, increased morbidity and mortality, and local disarticulation. In addition to these risks Cernea (2004) and others have included loss of access to public services, disruption of formal education activities, and loss of civil and human rights. Aside from guiding analyses of the risks, the IRR model served several other functions including predictor of impoverishment; formulation of research hypotheses and conducting theory-based studies among others (Cernea, 2004). In summary, the impoverishment framework for displacement is usually used to analyze impoverishment risks because of displacement or more specifically development–induced displacement.

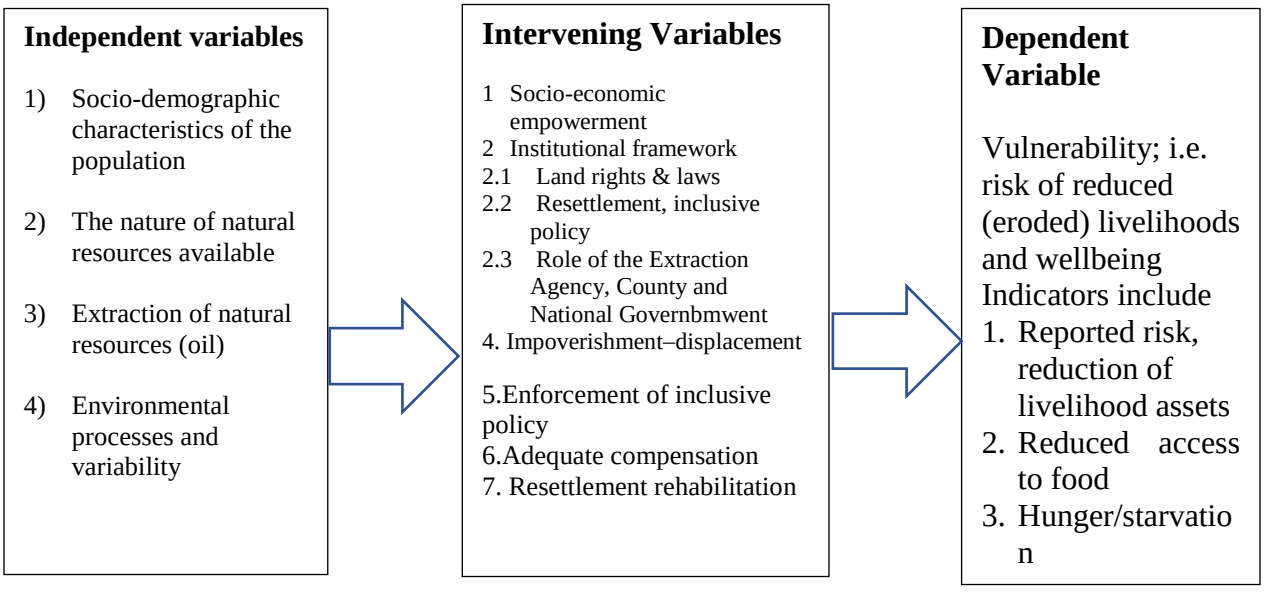
According to the model, compensation whether in terms of cash or alternative land, could be helpful in coping and restoration of livelihoods of the households in their new relocation areas (Cernea, 2004). With regard to this study, the TID (or IRR) perspective were relevant and useful in analyses of the impoverishment and vulnerabilities of the population affected by the exploration, extraction, and transportation of oil in Lokichar-Kochodin Basin. One of the immediate hypotheses was that the population in Lokichar-Kochodin Basin would have experienced impoverished or will have witnessed reduced livelihoods and livelihood outcomes.

It was also important in terms of the general policy formulation as it informs social actors such as governments, project designers, researchers, and the displaced households as a unit.

2.12 Conceptual Framework

It will be recalled that the purpose of this study was to assess the nature and rate of the vulnerability, reduction (deficiency) of livelihoods in Lokichar-Kochodin Basin of the Turkana County and the contribution (effects) of the impoverishment and displacement from the exploration and extraction of crude oil. Accordingly, and based on the foregoing theoretical perspectives, the relation of the key variables was summarized with the conceptual framework below.

Figure 2. 2: Conceptual Framework



It will be noted that the framework illustrates (depicts) the time-based causal sequence of the key variables**.** In this respect, the nature and rate of the vulnerability, reduction (deficiency) of livelihoods was the dependent variable; the impoverishment-displacement, institutional framework and mediating processes were considered as intervening variables; and the environmental processes and variability, natural resources, extraction of natural resources (oil) and the socio-demographic characteristics were considered as the independent variables.

CHAPTER THREE: RESEARCH APPROACHES AND METHODS

3.0 Introduction

This chapter outlines approaches and methods that were used in conducting the study. Approach and methods included research design, study site, population and the unit of analysis, sample size determination and sampling method, data collection methods and instruments, the data analysis techniques and the ethical considerations.

3.1 Research Design

The study adopted a cross-sectional survey research design, in which the survey was carried-out in November 2020. Survey research design involves collection of data once at a scheduled time and it usually has advantages related to one-time collection of data (Bryman, 2016; Babbie, 2016; Creswell, 2014). However, with the use of questionnaire a reasonabley large population can be reached with the survey research design. According to Babbie (2016), the advantages of the Survey research design include coverage of a reasonably larger population, standardization of the responses, potential to ensure representativeness of responses, supports enhanced measurement procedures (structured and open-ended approach). Questionnares can be administered directly or through research assistants.

3.2 Location and Site Description

The study was carried out in Lokichar and /Kochodin Basin of the Turkana County which was the central zone of the exploration, extraction, and processing of oil. We have indicated that the topography of Turkana ranges from arid to semi-arid landscapes characterized by low-lying plains, isolated hills, and mountains. We

have indicated also that oil was discovered in 2012 Lokichar and /Kochodin Basin. By 2018, more than 21 wells had been drilled in Lokichar basin, with an estimated 600 million barrels of recoverable crude oil (Orr, 2019). The map of the area has been presented in Figure 3.1 below. It will be noted therefore that the study sites were the central zone of the exploration, extraction, and processing of oil.

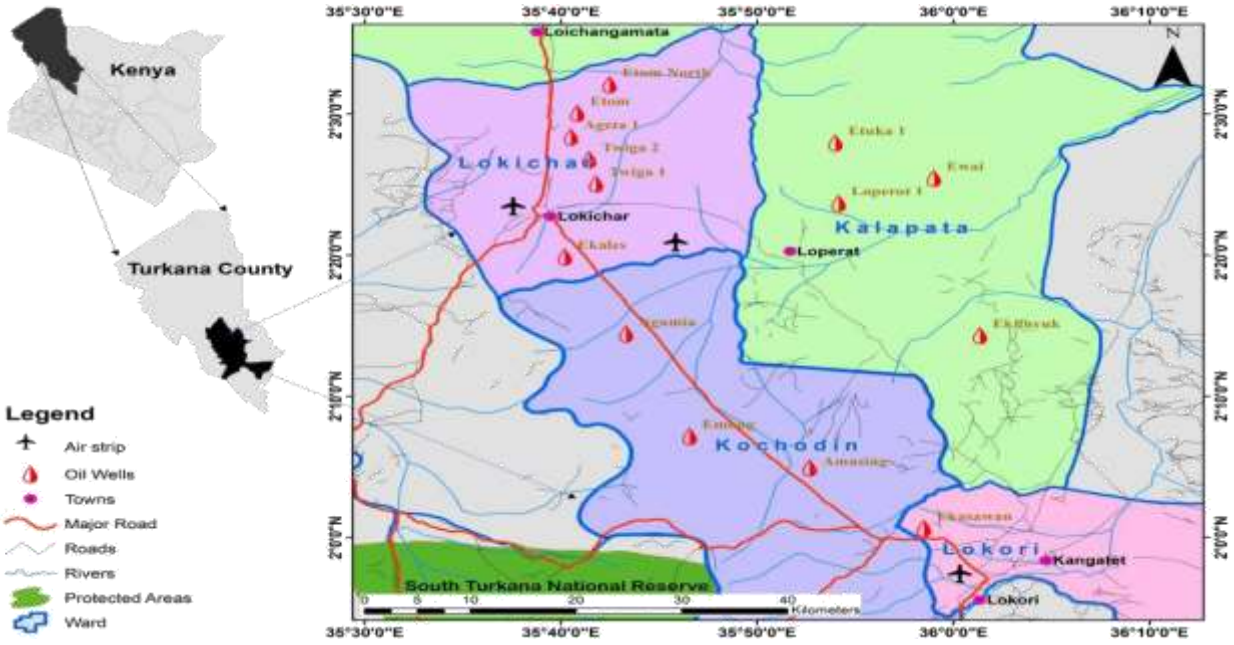


Figure 3. 1: Map of Study Area

3.3 Population and the Unit of Analysis

3.3.1 Population (Entire Households)

The population for the study comprised the entire households in Lokichar and Kochodin Basin of the Turkana Country. The concentration of the exploration and extraction of oil extended from Lokichar Location to Kochodin Location. Accordingly, the population of the study was restricted to the entire households in Lokichar and Kochodin locations. According to available reports and the registers there were 14,577 households in the Lokichar-Kochodin Basin in which 8,397were

in Lokichar location and 6,180 were in Kochodin location. In this respect, in consultation with the chiefs, the study used registers maintained at the offices of the respective chiefs in Lokichar and Kochodin locations to identify and to map out the entire households in the two locations.

3.3.2 Unit of Analysis

The unit of analysis in the study was a household living in Lokichar and Kochodin Locations of the Turkana County. In other words, a household was used to assess the socio-demographic characteristics of the population in in Lokichar and Kochodin Basin, the nature of livelihoods vulnerability, the nature of impoverishment and displacement, and to examine the effects of crude oil impoverishment and displacement on livelihoods vulnerability.

3.3.3 Inclusion and Exclusion Criteria

In this study, the inclusion criterion was eligilble households in SLKB and excusion criteria was the household heads below 18 years of age. The other exclusion critiria was exclusion of the non-residents.

3.4 Sample Size Determination

The total population of the study area by 2019 was 14,713 households: 7,372 in Lokichar Location and 7341 in Lokori/Kochodin Location. Since the study could not assess the entire population, the study opted to determine a representative sample. Usually, a representative sample is one which represents the population in every aspect with a considerably smaller proportion of error. The population was of

a modest size, Yamane (1967) formula for sample size determination was used to determine the sample size of the study.

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

Accordingly, a sample size of 375 was required to achieve a representative sample that would also represent less than 0.05% error. In addition, a 10 per cent contingency was added to cater for non-response, which then adjusted the sample size to 426 households. In view of the determination and adjustment, the study addressed the objectives of the study with a sample of 426 households.

3.5 Sampling Methods

The study used two sampling methods: namely 1) propotional sampling and 2) systematic sampling. In respect to propotional sampling, the proportions of the households in the four (4) sub-locations were determined and used to distribute the required sample of 426 households to the four sub-locations as summarized in Table 3.1 below.

Table 3.1: Proportional Distribution of the Determined Sample

Location	Sub-location	Households	Percent	Sample Size
Lokichar	Lokichar	4424	30	128
	Kapesa	3973	27	115
	Sub-total	8397		243
Kochodin	Kochodin	3973	28	117
	Lokori	2207	15	66
	Sub-Total	6180		183
	Total	14577	100	426

Source: Study Survey 2020

The strategy was to ensure that the number of households sampled per sub-location was proportional to the respective population, or the entire number of the household at that sub-location.

Once the framework of the households and required sample in each location were established, systemtic sampling was carried-out using registers for each sub-locatiuon to draw a sample household at interval of every k^{th}, which was an average of 30 to 35 households until the required target was achieved in each sub-location. Use of proportional and systematic sampling methods were intended to improve efficiency and greater precision in carrying out research, correct conclusions, and generalization.

During the pilot of the study, a list of twelve (12) key informants was generated based on their knowledge and experience of SLKB, exploration and extraction of oil, the effects on the local community and compensation. The key informants included 1) administration officials,2) county officials, 3) religious officials, 4) representatives of the consortium of the oil exploration agency, and 5) the local leaders who were familiar with the status of the local households.

2.8 Data Collection Instruments

Data was collected using key informant interview (KII) guide, the focus group discussion (FGD) guide and a questionnaire. In addition, discussions were held with key stakeholders that included community leaders, civil society organizations (CSOs), the local administration, and representatives of Tullow Oil (the oil mining company). The study worked with nine (9) key informants, five (5) from Lokichar Location and four (4) from Kochodin Location.

The questionnaire was used to collect data from the sampled heads of the households and consisted of structured (closed) and open-ended questions, which therefore allowed the study to obtain both quantitative and qualitative data. The questionnaire was developed to address the key objectives of the study. The questionnaire incorporated three key indexes 1) Livelihoods Vulnerability Index consisting of four (4) phases 1) limited vulnerability, 3) moderate vulnerability to 4) severe vulnerability used by FAO, DFID, and IPCC to assess the status of livelihoods; 2) Impoverishment-displacement index consisting of the same four (4) phases 1) limited impoverishment, 3) substantial impoverishment 4) displacement developed by Cernea,2004, FAO, 2009; Stewart et al., 2003; and recovery

(resettlement) index of the same four (4) phases. The questionnaires were administered with assistance of the research assistants. The key informant interviews and FGDs were audio-recorded for transcription and analysis. The FGD consisted of 15 members that included two chiefs from Lokichar and Kochodin locations, three (3) elders from each location, representatives of civil society organizations, and representatives to Tullowoil.

3.7 Reliability and Validity

Reliability is a process of ensuring that the data collection instruments will be able to generate consistent data across repeated observations. Reliability of instrument and data was addressed through a number of procedures. First, the study adapted established data collection instruments including displacement and livelihood deficiency (vulnerability) index by FAO, DFID, and IPCC that have been used in nearly similar situations. Secondly, the study carried-out a pilot study with a view to improve clarity, reliability of the data collection instruments and therefore the reliability of the data. The data from the pilot was used to assess the reliability of the data collection instruments and the data.

Validity is a process of ensuring that collected data reflected intended issues of study; i.e. oil displacement, impoverishment and vulnerability (deficiency) of the livelihood. Similarly, validity was addressed through two key procedures, established indicators and established data collection instruments including displacement and livelihood deficiency (vulnerability) index by FAO, DFID, and IPCC that have been used in nearly similar situations and which were verified during the pilot and the pre-survey analysis.

3.8 Pilot Study

A pilot study was carried-out in Kalapata and Lokori Sub-locations, which were adjacent to SLKB and had substantially similar ecological and demographic characteristics. More specifically, Kalapata and Lokori Sub-locations had experience of oil exploration and vulnerability to displacement and impoverishment. A two-day pilot study was involved a pilot population of 40 respondents who represented around 10 per cent of the actual sample size for the study. The purpose of the pilot was to ensure that the data collection instruments were clear, understabndable to the local agro-pastoal population, address correct issues and did not have aspects that could be considered to be culturally inappropriate. More importantly, the pilot study was intended to address some of the issues related to reliability and validity of the data collection instrumednts.

3.9 Data Analysis

Both qualitative and quantitative data were analyzed in line with the objectives of the study. Qualitative data was transcribed, coded and analyzed using Nvivo to enhance understanding of the typical livelihoods in Lokichar-Kochodin Basin of the Turkana County and the typical impact of various processes including exploration and extraction of oil. Quantitative data from the sample respondents was analyzed using SPSS to describe the statistical aspects of the livelihoods in Lokichar-Kochodin Basin of the Turkana County and the probability of impact by various processes including exploration and extraction of oil.

Frequencies and percentages were used to describe the statistical aspects of the livelihoods in Lokichar-Kochodin Basin of the Turkana County and the effects of

the various processes including exploration and extraction of oil. Averages were used to analyze issues of the average position, including average disruption and deterioration of the livelihoods. Descriptive statistics included frequencies, percentage, and averages, while inferential statistics included Pearson's Chi-square, regression analysis which was used to examine the factors related to vulnerability of the oil-displaced households.

3.10 Ethical Considerations

Data was collected after the researcher obtained research approval and authorization from Kenyatta University Graduate School, ethical approval from Kenyatta University Ethical Review Committee (KUERC), and a research permit from the National Commission for Science, Technology, and Innovation (NACOSTI). Permission was also sought from the County Director of Education – Turkana County, and the Turkana County Commissioner to conduct the study in the area.

During the actual data collection exercise, the researcher issued respondents with informed consent forms informing them of the purpose of the study, the processes involved, the risks and benefits that may accrue from participation in the study. This allowed the respondents to make an informed decision on their participation in the study. The participation of the respondents in the study was on voluntary basis. Equally important, the researcher ensured that participants' confidentiality and anonymity is maintained during and after the study. This was attained by ensuring that the respondents' names are not used in writing the report or their identity revealed. The collected data was also kept safe from third parties and only used for the purpose of this study. The respondents' right to privacy was also be assured.

CHAPTER FOUR: DATA ANALYSIS AND DISCUSSION

4.0 Introduction

This chapter presents analysis of data and discussion according to the objectives of the study. The first objective of the study was to assess the socio-demographic characteristics of the population in Lokichar-Kochodin Basin of the Turkana County; the second objective was to assess the nature of the vulnerability, reduction (deficiency) of livelihoods; the third objective was to examine the nature of the oil-induced impoverishment-displacement; the fourth objective was to assess the effects of oil-induced impoverishment-displacement on vulnerability, reduction of livelihoods in Lokichar-Kochodin Basin; the fifth objective was to assess experience and characteristics of recovery from oil impoverishment-displacement; and the sixth objective was to assess the nature of compensation to the oil-affected population in Lokichar-Kochodin Basin; and the last objective was to identify necessary intervention measures to reduce livelihoods vulnerability. The study also seeks to recommend interventions towards improving livelihoods among oil-displaced households in Lokichar-Kochodin Basin of the Turkana County. Therefore, this chapter was organized in line with the order of these objectives.

4.1 Soco-Demographic Characteristics

The first objective of the study was to assess socio-demographic characteristics of the population in Lokichar-Kochodin Basin of the Turkana County. It will be recalled that the study was based on four (4) key sub-locations; namely Lokichar and Kapese from Lokichar Location and Kochodin and Lokori from Kochodin Location. The study focused of the study was on these two divisions because of

persistent vulnerability, ongoing exploration, development and commercialization of crude oil.

4.1.1Characteristics of Study locations

According to the 2019 census, the population of Turkana County was 926,976 people: with a population density of 14 people per sq. km and 14.2% share of urban population (KNBS, 2019). The total number of the households in Turkana was 164,519 with an average size of 5.6 people. Nearly 60% of the population is considered pastoral, 20% agro pastoral, 12% agro-fisheries and 8% are in informal and formal employments in peri-urban or urban areas. At present, the County is divided into seven sub counties (Divisions) namely, North, Kibish and West, Turkana Central, Loima, Turkana South and Turkana East.

The study was carried-out in Lokichar/Kapese sub-locations of the Lokichar location and Kochodin/ Lokori sub-locations of the Kochodin location. The population of Turkana South Sub-County was 153,350, in which the households were 24,552, the average household size was 6.2 and the population density was 22 people per sq. km (KNBS 2019). Similarly, the population of Turkana East Sub-County was 138,265, in which the households were 17,981, the average household size was 7.7 and the population density was 12 people per sq. km (KNBS, 2019). In view of the foregoing characteristics, the sample for the study represented four (4) key sub-locations of Lokichar and Lokori Divisions as summarized in table 4.1 below.

Table 4.1 Sub-locations of the Study

Locations	Sub-locations	Frequency	Percent
Lokichar	Lokichar	127	30
	Kapese	116	27
Kochodin	Kochodin	117	27
	Lokori (Nakukulas/ Lokosim-ekori}	66	15
	Total	426	100

The sample was proportional to the number of the households in the respective sub-locations. It will be noted that the sample was relatively higher in Lokichar because the location had relatively higher number of the households and greater population density. In addition to environmental variability, the two locations had experienced considerable exploration, drilling and commercialization of crude oil. Similarly, the two locations of Lokichar and Kochodin have bee situated between two agro-pastoral zones based on Turkwel river and Kerio River; and which support irrigation schemes in zones that would otherwise be semi-arid to arid areas.

4.1.2 Age of the Household Head

As part of the first objective, the study assessed the age of the household heads and results were summarized in Table 4.2 below. Years of the household heads were categorized iat an interval of 10 years, with the criteria and fundamental principle

was that such interval reflected responsibilities associated with various phases of life cycle.

Table 4. 2 Age of the Household Heads

	Years	Frequency	Percent
1	20-29	61	15
2	30-39	91	22
3	40-49	101	24.3
4	50-59	100	24.0
5	60-69	32	7.7
6	70-79	24	5.8
7	Over 80	7	1.7
	Total	416	100.0
	Missing	10	
	Total	426	

The data indicated that a greater proportion of the respondents, 48.3% were in the age range of 40 and 59 years. The data also indicated that 61% of the the respondents were below 49 years old; a prime age considered to be most productive in the human life cycle. These results were consistent with the national indicators where 36.7% of the household heads were between 30-44 years (KIHBS, 2018). National surveys indicate that the average of the head of the household in rural areas has been around 37 years of age and in urban areas has been around 42 years of age. Age of the head of the household has always been important for many

reason including as a key indicator of dependency ratio; defined as the proportion of population that is dependent (age 0-14 and 65+ years) on the working age population (age 15-64 years) (KIHBS 2018). It will be noted that the total dependency ratio in Kenya remains at 78.3 with elderly and youth dependency ratio of 4.6 and 73.7.

4.1.3 Gender of Household Heads

The gender of the housedhold head was important in a number of dimensions; particularly in respect to responsibilities related to securing and developing livelihoods. First, the Turkana people have been organized largely around patriarchal culture; where the leadership of the household, family and clan have largely been men. Secondly, it is usually considered that the head of the household should have capacity to maintain the socio-economic endowment and prosperity of the household. Thirdly, part of the communities practicing patriarchal culture have tended to consider that women household heads will have some limitations in access some critical resources

In view of these coniderations, the study assessed the gender distribution of the household heads and the outcomes were summarized in Table 4.3 below. In principle, 70% of the household heads were male and 30% were females.

Table 4. 3 Gender of the Household Heads

Gender	Frequency	Percent
Male	296	70.1
Female	130	30.2
Total	426	100.0

These results were consistent with the national indicators in which about 70% of the households were headed by males (KIHBS, 2018). Indeed, according to KIHBS male-headed households have been reported to stand at 64.0 % in urban areas and 72.2% in rural areas.

4.1.4 Marital Status of Household Heads

Marital status has been used in most cases as an indicator of the household structure and attendant division of labor. In view of the importance of such social unit, the study assessed the marital status of the household heads and the outcomes were summarized in Table 4.4 below. The findings reveal that 89% of the household heads were married. These results were particularly typical characteristic of the rural areas where family values are either maintained and/or enforced.

Table 4. 4 Marital Status of Household Heads

	Marital status	Frequency	Percent
1.	Single	9	02
2	Married	367	87
3	Separated	20	05
4	Divorced	15	04
5	Widowed	12	03
	Total	423	100.0
	Missing	3	
	Total	426	

Although married household heads were considerably high, the study still considered these results to be consistent with those of previous surveys. Married household heads in Turkana have been estimated to be 58.4%; out of which 38.1% are estimated to be in monogamous union and 20.3% are estimated to be in polygamous marriage (KNBS, 2019; KIHBS, 2018). These reports also indicated that at the national level, 54.4% of the household heads were in monogamous marriage and 6% in polygamous union.

4.1.5 Number of Children in the Household

The number of children in a household has been assessed as a way to understand the size of the household and household dependency ratio. Accordingly, the study assessed the number of children that were still at the household and results were

summarized in table 4.5A below. The findings show that majority of the household heads (34%) had three to four (4) children who were still at home.

Table 4. 5A) Number of Still Children at Home

	Children at Home	Frequency	Percent
1	1-2	44	10
2	3-4	142	34
3	5-6	105	25
4	7 and above	130	31
	Total	421	100.0
	Missing	5	
	Total	426	

These findings were consistent with the national average in which most household had around four (4) children still at home and defined the national household size (KNBS, 2019, KIHBS, 2018). Undeniably, the same reports indicated that the average household size in rural areas was higher at around 4 and 5 members. Other reports indicated that the average household size in the entire Turkana stood at about 6.9 and, therefore, considerably higher than the national average (KNBS, 2019). On the other hand, the number of children that have left home is usually used as an indicator of reduced dependency and potential increase of the social capital. Accordingly, the study assessed the number of children that had left home and summarized the results in table 4.5B below.

Table 4. 5B) Number of Children that Left Home

	Children that Left Home	Frequency	Percent
1	None	158	38
2	1	105	25
3	2	90	22
4	3	41	10
5	4 and above	26	06
	Sub-total	420	100.0
	Missing	6	
	Total	426	

It will be noted that 38% of households reported that they had no child left home and 25% reported that they had at least one child left at home. Therefore, 62% of the households had some children left home; and possibly potential sources of additional resources and/or support.

4.1.6 Education of the Household Heads

Education has been considered as critical for several reasons including promoting inclusivity, upward mobility and improving livelihoods. Goal number 4 of the Sustainable Development Goals is dedicated to education and aims at ensuring that there is unhindered access to inclusive and equitable quality education as well as the advancement of lifelong learning opportunities for all. In this regard, the study assessed the education level and status of household heads, and the outcomes were summarized in Table 4.6A below.

Table 4. 6A) Education of the Household Heads

	Education	Frequency	Percent
1	No formal education	283	67.1
2	Primary	87	20.6
3	Secondary	33	7.8
4	Tertiary/University	19	4.5
5	Total	422	100.0
	Missing	4	
	Total	426	

Responses indicated that 67% of household heads had no formal education and 21% had primary education. These results were basically consistent with those of the KIHBS (2018) which indicated that 68.6% of the population in Turkana County did not have any formal education and only 12.6% had completed primary education. The findings were also largely consistent with KNBS survey of 2019 which found that nearly 78% of household heads in Turkana County did not have a formal education. The study established that only 2% had a tertiary education which would make them eligible for formal employment to improve their livelihoods. Also, almost 16% of household heads in Turkana County have primary, secondary and Tertiary education (KNBS, 2019). In addition, the study assessed education status for an additional member of the households and results were summarized in table 4.6B below.

Table 4. 6B) Education of Additional Household Member

	Education	Frequency	Percent
1	No formal schooling	155	37
2	Primary	170	40
3	Secondary	73	17
4	Tertiary/University	25	06
	Total	423	100.0
	Missing	3	
	Total	426	

The principal objective was to assess any improvement in education that could arise from children or any other member of the household. Although a large proportion of the households (37%) still had additional member who had no formal education, most of the households (40%) had a member who had completed primary education. These results were consistent with those of the previous reports (KIHBS, 2018; KNBS, 2013). Indeed, KIHBS reported that 19.2% of the population in Turkana County had completed pre-primary education, 52.3% had completed primary education and 11.6% had completed secondary education. In addition, other sources indicated that although the net enrolment in primary education had increased 72%, the net enrolment for secondary education remained around 11% (CGOT, 2020).

4.1.7 Occupation of the Household Heads

Occupation is an important means of livelihoods, which remains to be the case in Turkana South and Turkana East sub-counties. The study assessed the occupation of the household heads, and the outcomes were summarized in table 4.7 below. It was interesting to note that the main occupation for the majority (38%) was livestock husbandry; followed by livestock ownership (25%).

Table 4. 7 Occupation of the Household Heads

	Occupations	Frequency	Percent
1	Livstock ownership	100	24.7
2	Livestock husbandry (Herds-person)	157	37.6
3	Charcoal burner	63	15.1
4	Businessman	54	12.9
5	Housewife	26	6.2
6	Other	15	3.5
	Sub-total	418	100
	Missing	8	
	Total	426	

Similarly, the study established that 63% of the households relied exclusively on livestock production and husbandry. While the ownership of livestock (24%) and urban business (13%) were relatively sustainable, 63% of the households remained with considerably vulnerable occupations. Indeed, several studies have reported that occupations for most of the households involved ownership of the livestock,

herding of livestock, agro-cultivation, petty trade such as selling firewood, and charcoal burning among others (CDH, 2018).

Other sources have categorized occupations in the County into four (4) categories namely; livestock and pastoralism (60%), agro-pastoralism (20%), fishing (12%), and causal labor (8%) (Akuja & Kandago, 2019; Opiyo et al., 2015; FAO, 2013). Indeed, rearing of cattle, goats, sheep, and camels have been emphasized as the main occupation for most of the local population. It is also used as a sign of wealth and a source of respect in the community. In addition, livestock have been traded in the main livestock markets and used to pay the price of brides. In addition, several studies have reported that most of the households pursue occupational practices related to livestock ownership, herding (husbandry), agro-cultivation, petty trading through selling firewood and charcoal burning among others (CDH, 2018).

Local experts, including key informants and the focused group discussions, indicated that livestock husbandry was usually carried-out by persons that had limited livestock and/or youth that were yet to acquire their own livestock. Further, local experts and the FGDs indicated that households in pastoral zones typically depended on combination of their own livestock production (milk/meat), livestock husbandry from which a person was rewarded, charcoal burning, casual labor, wild foods, and food aid (including school feeding programmes) to support their wellbeing.

4.1.8 Land Tenure and Access

Access to land is a fundamental asset in rural areas, particularly, where livestock and agro-pastoralism are the predominant means of livelihood. Indeed, it has been emphasized that land is a fundamental natural resource for all types of livelihoods including livestock and agricultural production (Quan, 2006). It has also been considered as a capital asset that provides opportunities for social and economic empowerment. Accordingly, land tenure continues to be critical component for sustainable livelihoods and development (Ogutu, 2019; Alden, 2017; Saygin, 2017; USAID, 2009; Quan, 2006). Even more important is the security of land tenure and use.

Availability and access to land are two keys of the livelihood assets that allows people to navigate socio-economic circumstances of life. Article 17 of the Universal Declaration of Human Rights adopted in 1948 stated that, “everyone has the right to own property, alone as well as in association with others and that no one shall be deprived of his property” (Assembly, 1948). In this respect, the study assessed ownership of the land hosting the household and the results were summarized in Table 4.8 below.

Table 4.8 Ownership of Land Hosting Habitual Residence

Type of ownership	Frequency	Percent
Clan	113	27
Family	134	37
Household	175	41
Total	422	100.0
Missing	4	
Total	426	

Responses indicated while 41% owned the land in which they lived, 64% of the households lived on land owned by either the clan or extended. Except in urban centers, no one had formal ownership, particularly in terms of the title deed.

At the time of the study, the urban parcels of land were allocated to the individual person or agency. However, rural parcels of land remained community lands held in trust by the devolved unit of local goverment. The study also established most of the portions of land in rural areas in the Turkana County remaind unregistered and, therefore, held in trust by the county government. Leasing of community land is threfore regulated by the the county government and a council of elders. Within this framework, it is estimated that a household has access of approximately two hectares of land (FAO/PDN, 2018; UN-Habitat, 2016).

The study established also that land tenure and management of natural resources in the County has evolved for centuries around a common tenancy of land. Perhaps,

this was efficient when it comes to the use of available resources, particularly, herding of livestock (Oduor, Mutune, & Malesu, 2012; USAID, 2009). From 1963 the year of independence of Kenya to 2010, land in Turkana remained as a trust land (communal land) held in trust by local authorities. In 2010 land in Kenya was re-categorised through Article 61(2) of the 2010 constitution into three namely; public land, private land, and community land to be held in trust by the devolved units of local goverments (GOK, 2016).

The study established further that the demand for land has been increasing from 2012 when oil was discovered in Turkana South and East; first in the regions of exploration and production; and secondly in adjacent urban areas. The development has also led to increased acquisition of land for road, rail, pipeline and other services.

Several reports indicate that there has not been any formal and/or forceful acquisition of land from the time oil was discovered (Makathimo, 2019). Instead, the process of land acquisition has been based on agreements and/or signed consents with selected community leaders with promises that explorations and subsequent extractions will bring development and revenue. The process has also led to increased acquisition of land for road, rail, pipeline, and other services.

4.1.9 Land Use by the Household

Recognition and adoption of the 1948 UN proclamation also gives the owner of the land the right to use and benefit from the asset and it excluded others from it (Assembly, 1948). Based on this principle, the households were requested to

indicate the use of the land which they either owned or had access to and the results were summarized in Table 4.9 below.

Table 4. 9 Use of Land by Households

	Household Use of Land	Frequency	Percent
1	Livestock pasture	223	53
2	Agro-pastural practices	90	21
3	Residential	81	19
4	Business	18	04
5	Rental houses	11	03
	Total	423	100.0
	Missing	3	
	Total	426	

Responses indicated that 52% of the households used their (access to) land for livestock pasture; and 21% of the households used their (access to) land for Agro-pastoral practices. Similarly, a considerable proportion (19%) used the land they own or access on residential purposes. These results were consistent with those of the previous studies. CDH (2018) reported that nearly 60% of the population were considered pastoral, 20% agro pastoral, 12% fisher folks and 8% were carrying out urban based occupations.

4.1.10 Sources of Income

Sources of income are part of the essential indicators of the type of livelihoods that enable households and communities to meet their daily needs and improve their wellbeing. In this regard, the study assessed the sources of income, and the results were summarized in Table 4.10 below. The findings of the study show that the leading source of income was livestock products (25%) followed by the sale of the livestock at (18%).

Table 4. 10 Sources of Income for the Households

	Occupations	Frequency	Percent
1	Sale of livestock products (milk, meat, skin)	105	25
2	Sale of livestock	76	18
3	Sale of crops	55	13
4	Causal Labour	46	11
5	Petty trade	42	10
6	Sale of charcoal	34	08
7	Employment	25	06
8	Sale of personal assets	21	05
9	Transfer from childfren	17	04
	Sub-total	421	100
	Missing	5	
	Total	426	

Responses indicated that 43 % of the households relied on the livestock and related products for income. Similarly, 34% of the households relied on a second cluster of sources consisting of sale of crops (13%), causal labor (11%) and petty trade (10%). Further, 23% of the household relied on a third cluster of income consisting of sale of charcoal (8%), employment (6%), sale of personal assets (5%) and transfers from children (4%). These observations were substantially similar to those reported in previous surveys (CDH, 2018; KNBS, 2013). Other sources including key informants and FGDs indicated that 10% of the household received cash transfers from Innua Jamii Programme (IJP) and from Linda Lishe Bora social safety net programme supported by WFP.

4.1.11Livestock in the Households

For centuries, nomadic pastoralism has been the backbone of the livelihoods among the Turkana people. In addition, several reports have maintained that wealth among the Turkana community has been held largely in form of livestock (Barrett, 2001). Similarly, virtually all earnings of the people of Turkana come from either the sale of livestock or livestock products (Little, 2013; Desta & Coppock, 2002; Barrett, 2001). Besides the economic value, livestock particularly cattle, sheep, and camel had a significant cultural value (Kaimba et al., 2011). Indeed, it has been emphasized that livestock has been part and parcel of almost all social interaction, from festive meat feasts to ceremonial functions, bride wealth to legal compensation. Essentially, a household needs reserve of livestock to support itself and fulfil social commitments as well.

By 2013, it was estimated that livestock contributed KES 5.9 billion annually to Turkana County (Kuria, 2019). It is well established also that frequent cycles of droughts and famine have depleted (wasted) progressively the livestock of the Turkana people. Indeed, the County is characterized by low livestock productivity (LLP) because of recurrent drought and related inadequate water and feeds, insecurity, common land tenure, poor breeds and breeding practices, endemic livestock diseases and poor livestock husbandry.

In view of the above and other considerations, the study assessed the number of livestock in the households and averages were summarized in Table 4.11 below. Responses indicated that the average household livestock was goats (4), sheep (3), cattle (3), camel (3) and donkey (2).

Table 4. 11 Average Household Livestock in Lokichar and Lokori Locations

	No of goats	No of Sheep	No of cattle	No of camels	No of donkeys
Total livestock	1279	1154	462	729	410
Median	4.00	3.00	3.00	3.00	2.00
Mean	3.21	3.07	4.0	4.14	2.28
Std. Deviation	1.5	1.4	3.2	3.4	1.4
Valid cases	399	376	115	176	180
Missing cases	27	50	311	250	246
Total households	426	426	426	426	426

HEA and FEG (2013) indicated that in Turkana County, 54% of the households relied on livestock as the primary source of food and income. Same reports indicated that poor households owned only a small herd of sheep and goats. By 2008, International Livestock Research Institute (ILRI) reported that the average household livestock consisted of goats (34.1), sheep (17.0), cattle (3.7) and camels (2.3) in which therefore our data reflected a reducing trend. It will be noted that while goats and sheep has reduced substantially, cattle and camels remain the same. It will be noted also that the average household livestock composition was goats (32%), Sheep (29%), cattle (11%), camels (18%) and donkey (10%). While these estimates were substantially similar to those of the University of Nairobi (2004),

they were considerably less compared to those reported by ILRI (2008); that is, goats (58%), sheep (30%), cattle (6%), camels (5%), and donkey (1%).

In addition, the ratio of goats to cattle was 3:1; and the ratio of sheep to cattle was 2:1; which again were consistent with the regional projections. It was mentioned that goats were relatively more adapted to semi-arid areas, relatively productive (faster breeding), and easy to maintain. According to the key informants, the ratio of goats to camels (2:1) had increased because of not only the value of the camels but also the frequent cycles of droughts. Key informants also indicated that camels have been of greater value during ceremonial functions including payment of dowry.

4.1.12 Household Income

Equally important was the need to estimate the average household monthly income (AHMI). In Turkana, particularly Lokichar-Kochodin Basin to estimate AHMI was a considerable challenge. Some of the households were not used to thinking or reasoning in terms of the monetary value and still even a larger proportion did not keep any records of their daily transactions. However, the study requested household heads to indicate the average monthly household income (AMHI) in the last one year with a view to address seasonal variability and results were summarized in Table 4.12A below.

Table 4.12A Monthly Household Income (Kshs)

Index	Monthly Income	Frequency	Percent
1	2000-2499	120	28
2	2501-5500	140	33
3	5501-8000	91	22
4	8001 and above	72	17
	Total	423	100.0
	Missing	3	
	Total	426	

Average Income =KES 2700; Equivalent to $24

Responses indicated that majority (33%) of the households were in the range of KES 2501-3500 ($ 22.3 to 31.3) per month. More specifically, the average monthly household income (AMHI) was KES 2700; which was equivalent to $ 24; which in turn was equivalent to $ 0.8 per day. According to a number of sources the per capita GDP in KES in the County has been 69,8 (CGOT 2018, 2016, CDH 2018, KIHBS 2018). Further, KIHBS (2018, 2016), which reported rural household incomes at an average of KES 6,088 (USD 55) per month and the national average household income at KES 12,284 (USD 110) per month.

Available reports indicate that poverty line in rural areas of Kenya by 2018 was approximately KES 3,252 and the international poverty line was $1.90 per day (CGOT 2018, 2016; CDH, 2018; KIHBS, 2018). Accordingly, the average monthly household income (AMHI) in South East of Turkana was below the poverty line. It

was instructive to note that HEA & FEG (2013) estimated the annual income of the local population in Turkana along the levels of wealthy and extreme poor as follows.

Wealth segment	Moderately Poor	Poor	Extreme Poor
KES 410,000	KES 273,700	KES 150,300	KES 127,900
($ 3,693.7)	($2465.8)	($ 1354.1)	($ 1,152.3)

The study also assessed the Average Household Monthly Expenditure (AHME) as a way to validate the average income and to assess the level of deficit; or some form of short fall in the daily needs of the local population. Responses on the AHME were summarized in Table 4.12B below.

Table 4.12B Household Monthly Expenditure (Kshs)

	Monthly Expenditure	Frequency	Percent
1	100-2000	77	18
2	2001-5800	176	42
3	5801-8000	85	20
4	8001 and above	82	20
	Total	420	100
	Missing	6	
	Total	426	

Average Expenditure =KES 2700; Equivalent to $24

Again, the average household expenditure was KES 2700; equivalent to $24; where the expenditure for the majority (42%) of the households were in the range of KES 2000-5800 (USD 18-52) per month. In addition, the expenditure for 60% of the households was less than KES 5800 (USD 52).

In principle the study established that approximately 80% of the households lived below poverty line; particularly estimated through average monthly income or average monthly expenditure. By 2018, various reports indicated that 79.4% of the population in the County lived below the poverty line, compared to a national average of 31.6%.2% (KDHS, 2018; CDH, 2018; KNBS, 2013). In addition, these reports indicated that local population experienced limited availability of and access to food resources, which in turn pushed them to chronic, acute food insecurity and malnutrition. Accordingly, most population in the County experienced varied levels of Global Acute Malnutrition (GAM); which exceeded emergency levels in most of the time.

4.1.13 Type and Consumption of Food

The study assessed the type of foods that the households consusmed and the number of meals per day. Accordingly, the households were requested to indicate their typical (conventional) type of food and the results were summarized in Table 4.13A below. The findings indicated that 52% of the households' consumed cereals as their typical type of food. Cereals, in this case, referred to maize, sorghum, millet and/or beans.

Table 4.13A Conventional Types of Food

	Conventional Types of Food	Frequency	Percent
1	Cereals	221	52
2	Animal Products (Milk, Meat, Blood)	190	44
3	Vegetables & Fruits	15	04
	Total	423	100.0
	Missing	3	
	Total	426	

In addition, 44% of the households indicated that their typical food consisted of livestock products; namely milk, meat, and blood. Indeed, production of food in in most of the arid and semi-arid areas (regions) revolves around production of cereals, notably maize, rice, sorghum, millet, bean, and peas which are subsequently eaten with a variety of livestock products (milk, meat) and vegetables. Typical food among the rural households includes maize porridge with milk in the morning, plain maize porridge (nang'aria) with a stew for lunch and dinner. While goat is eaten frequently, a cow (or zebu) is eaten largely during important occasion.

In some of the arid and semi-arid areas including Turkana, maize has become increasing dominant and continue to surpass production and use of the other types of cereals. Accordingly, the study assessed average kilo of grains consumed by households per month and the results were summarized in Table 4.13B below.

Table 4.13B Average Kilos of Grain Consumed by Household Per Month

Index	Average Kilos of Grain Consumed	Frequency	Percent
1	Less than 15	76	18
2	15-19	67	16
3	20-39	131	31
4	40-55	75	18
5	Over 55	72	17
	Total	421	100.0
	Missing	5	
	Total	426	

Responses indicated that that 31% of the households consumed an average of 20 to 39 kilos of grain per month. Similarly, 65% of the households consumed between 15 and 55 kilos of grains per month.

In view of the foregoing, the households were requested to indicate the number of meals that they take per day under normal circumstances and as a common practice and the results summarized in Table 4.13C below. In principle, 35% of the households had one meal per day under normal circumstances (common) practice; which basically reflected a situation of extreme chronic poverty. Further, additional 35% of the households had two meals per day under normal circumstances and as a common practice.

Table 4.13C Number of Meals Per Day

Meals	Frequency	Percent
1	136	34.8
2	138	35.3
3	112	28.6
4	5	1.3
Sub-total	391	100.0
Missing	35	
Total	426	

Responses indicated that nearly $^{1}/_{3}$ of the households had one meal per day, another nearly $^{1}/_{3}$ had two meals per day and less than $^{1}/_{3}$ had three meals per day under normal circumstances and which were also reported to be inadequate in most cases. These observations were consistent with previous reports (CGOT, 2018; CDH, 2018; KIHBS, 2018). Indeed, available reports indicate that the proportion of people living below poverty line in Turkana County has remained at a staggering level of 92% and 72.7% of the households have been categorized as food poor; or food deficient (CGOT, 2018; CDH, 2018; KIHBS, 2018). For example, Lokori Division was ranked 2nd on food insecurity in 2008 and Lokichar was ranked 6th on food insecurity (MLFD, 2008).

4.1.14 Housing, Water and Sanitation

The type of housing, access to water and sanitation are usually considered as part of the human rights and indicators to the standards of living. Accordingly, respondents

were requested to indicate the type of their house and responses were summarizrd in table 4.14 below. Responses indicated that 60% of the households lived in manyatta type of houses (or Landhi); 22% of households lived in shanties; and 18% of households lived in semi-permanent and/or permanent type of houses mostly in urban areas.

Table 4. 14: Type of Houses and Amenities

	Type of Houses	Frequency	Percent
1	Manyatta	256	60
2	Shanty	93	22
3	Semi Permanent/Permanent	77	18
	Total	426	100

The study observed that the sources of water were diverse; consisting of public piped water (21.3%), shared bore holes (18.7%) and the rest (60%) relied on surface (unprotected) water sources (dams, ponds, stream and/or seasonal rivers). Indeed, most of the households relied on distant and seasonal rivers. Similarly, over 70% of the rural houses did not have a toilet facility and depended basically on open field or bush. In fact, KHBS indicate that 63% of the households in Turkan County did not have a toilet facility and depended basically on open field or bush (KIHBS, 2018; CDH, 2018; CGOT, 2018).

These observations were consistent with those of the KIHBS report of 2018 and KNBS survey of 2019 which indicated that over 70% of the houses in Turkana were the manyatta type of structures (KIHBS, 2018; KNBS, 2019; CDH, 2018).

The main roofing materials of the manyatta and shanties were either grass or makuti; the floors were basically earth/ sand. The study was informed by experts and key informants that each household (family or clan) settles in a mobile Manyatta called "**Adakar'** typically established by an elder.

In summary, study observed that the County was largely arid and semi-arid region; and livelihoods for the rural population have been livestock and pastoralism. Various indicators indicated that up to 78% of the households lived within the margins of the chronic poverty; in which the cycles of droughts drive most of the households to extreme poverty. The average household livestock (AHL) has been reducing over the years from 34 goats, 17 sheep and 4 cattle to 4 goats, 3 sheep and 3 cattle. In addition, 77% of the housholds had limited education, and 75.3 of the housholds had vulnerable occupations (livestock herdig and Charcoal burning). Basically, all the households lived in a community land; owned, accessed and used based on the customary land rights and theredfore had no formal land rights. Sources of income have remained livestock and livestoc products which have been largely seasonal and subject the cycles of droughts.

4.2 The Nature of Vulnerability and Reduction of Livelihoods

The second objective of the study was to assess the nature of the vulnerability, shocks and erosion of livelihoods in South Lokichar-Kochodin Basin (SLKB). The overall hypothesis (prediction) was that households had experienced vulnerability (shocks) and erosion of livelihoods and therefore socio-economic wellbeing arising from a number of processes including increased demographic processes, environmental variability, extraction and commercialization of oil.

In order to address this objective, respondents were requested to rate the nature of livelihood vulnerability (shock, erosion) in the last five (5) years; through eight (8) key indicators, namely erosion (deficiency) of 1) livelihood opportunities; 2) household occupation, 3) seasonal household earning, 4) socio-economic endowment; 5) increased poverty, 6) availability of food, 7) food intake practices and 8) increase of disease burden. Livelihoods Vulnerability Index consisting of four (4) phases 1) limited vulnerability, 3) moderate vulnerability to 4) severe vulnerability used by FAO, DFID, and IPCC

The study used a livelihood vulnerability scale of 1 to 4 to assess the nature of vulnerability, shock or erosion of livelihoods in the last five (5) years in each of the eight (8) indicators. The five-year period was intended to cover sustained period of both the cycles of droughts, exploration, and extraction of oil. Use of the scale 1 to 4 was adapted from the Livelihoods Vulnerability Index (LVI) based on the definition of vulnerability by the Intergovernmental Panel on Climate Change (IPCC). Indeed, such index and related approaches have been used in the studies of disasters, environmental variability, and displacement risks (Sujakhu et al., 2019; Amuzu-Sefordzi et al., 2018; Adu-Manu et al., 2018; Hahn et al., 2009). In addition, the 4-scale index (categorization) was also equivalent to the Integrated Food Security Phase Classification (IPC) phases of food insecurity (i.e., 1=minimal, 2= extensive deficiency, chronic deficiency 3= acute deficiency and 4) hunger, famine, starvation and/or emergency).

4.2.1 Erosion of Livelihood Opportunities

Frequent cycles of droughts in arid and semi-arid areas, particularly in Turkana, have progressively reduced livelihood opportunities (Qaisrani et al., 2018; Shackleton 2020). For example, goats have reduced from an average of 34 to 4, sheep from 17 to 3, cattle from 7 to 3 reducing the average livestock and livestock productions (ILRI, 2008; Loibooki et al., 2002). In addition, available reports indicate that mining industries, particularly in arid and semi-arid areas, have been accompanied by reduced livelihood opportunities (Mwakesi et al., 2020; Lewa et al., 2020; Adjei, 2007; Akuja & Kandagor, 2019). This reduction of opportunities increased the vulnerability of the population already vulnerable and excluded. In view of this confounded situation, the study predicted (hypothesized) that, households will have experienced increased vulnerability in respect to livelihood opportunities, or reduced livelihood opportunities.

Accordingly, the study assessed possible reduction of livelihood opportunities and the results were summarized in Table 4.15 below. In principle, 61% of the households experienced varied levels of eroded livelihood opportunities, where 36% experienced moderate loss of livelihood opportunities and 25% experienced extensive to severe erosion (loss) of livelihood opportunities.

Table 4.15 Experience of Eroded Livelihood Opportunities

Experienced eroded livelihood opportunities	1=Mnial shocks; 3=Extensive erosion, and 4=Severe erosion of livelihood opportunities	Frequency	Percent
1	Minimal shocks, erosion	165	39
2	Moderate, shocks, erosion of	152	36
3	Extensive erosion	75	18
4	Severe reduction of livelihood opportunities (abject poverty, hunger and stravation)	30	07
	Sub total	423	100
	Missing	3	
	Total	426	

Existing reports indicate that shocks of eroded livelihood opportunities in the last five (5) years have been a common experience particularly among the rural households in Turkana County (Campbell et al., 2002). By 2008, the average household livestock (AHL) had reduced from 34 to 4, sheep from 17 to 3, cattle from 7 to 3, thereby reducing livestock, livestock productions and livelihoods (ILRI 2018).

In view of the foregoing, the study concluded that 61% of the local agro-pastoal household s experienced reduction of livelihood opportunities as a result of processes that included the cycle of droughts and exploration and extraction of oil. HEA and FEG (2013) indicated that 15% of the households had experienced

minimal reduction of livelihoods, 60% had experienced moderate reduction of livelihoods, and 25% had experienced severe reduction of livelihoods. Experts, key informants and FGD reported that cycels of droughts recur every 2 to 4 years. More specifically, the prolonged drought of 2010-2011 had devasting effects on the livelihoods and was followed by other cycles of droughts, 2015 and 2018, which also coincided with the exploration of oil and pilot drilling were in progress (Akuja & Kandagor, 2019).

4.2.2 Eroded Household Occupations

In most of the arid and semi-arid areas, key household occupations revolve around livestock; particularly ownership, management, and herding of livestock and petty trade. ILRI (2008) reported that progressive reduction of livestock and pastoralism has resulted to progressive reduction of livestock-based occupations. In addition, while exploration of oil provides initially some employment opportunities, the demand for local labor declines rapidly as extraction progress (advances) demanding increasingly specialized skills that would not be available from the community (Obongo, 2018).

In view of the cycle of droughts and the on-going exploration and drilling of oil in South East of Turkana, the study predicted that households will have experienced increased risk of losing their occupation. Accordingly, the study assessed vulnerability (risk or erosion) of the household occupation and results were summarized in Table 4.16 below.

Table 4. 1: Experienced Risk/Erosion of Household Occupations

Eperienced Eroded Occupation	1=Minimal shocks, erosion, 3=Extensive erosion and 4=Severe erosion (deprivation)	Frequency	Percent
1	Minimal shocks, erosion	162	38
2	Moderate shocks, loses	140	33
3	Extensive erosion	88	21
4	Severe erosion of household occupations	31	07
	Sub total	421	100
	Missing	5	
	Total	426	

Responses indicated that 61% of the households experienced varied levels of shocks of losing household occupations where 33% reported moderate loses of losing their occupations and 28% experienced extensive to severe loses of their occupations. Similarly, experts, key informants and focused group discussions linked the risks of the household occupations to the droughts of 2010, 2015, 2018, depleted livestock, and livelihoods. Although they had supported livelihoods for centuries, it has been predicted that livestock based occupations are undergoing fundamental transformation (ILRI, 2008; Blench, 2000). Accordingly, it had become necesary to prepare for emerging types of occupations.

Although, oil exploration and extraction was expected to be accompanied by some occupations, it turned out that the local people did not have necessary skills and/or competence. Contracts to supply goods and services required capital which was extreme scarce among the local population.

4.2.3 Eroded Seasonal Household Earning

Rural household earnings are dependent on seasons. Turkana County has three main seasons 1) long rains from March to June (akiporo), 2) short rains from October to December (akicheres), and 3) the 'hunger season' from January to March each year (Lele et al., 2016). The two rain seasons are subsequently accompanied by increased production of livestock and agricultural produce (FEG, 2016). These rain seasons are also accompanied by the potential for rural households to earn some income necessary to meeting basic needs that include food, clothing, medication, and some education expenses. Similarly, sources of such seasonal earnings in most of the arid and semi-arid areas revolve around the sale of livestock and livestock products (milk, meat, skins) and some agricultural produce.

In view of the cycle of droughts and the on-going exploration and drilling of oil in South East of Turkana, the study predicted that households will have experienced shocks of deficiency (reduction) on seasonal household earning. Accordingly, the study assessed deficiency in seasonal household earning and part of the results were summarized in Table 4.17 below. Responses indicated that 62% of the households experienced varied levels of shocks (deficiencies) on seasonal

household earnings; where 33% experienced moderate shocks and 27 experienced extensive to severe reducetion of the seasonal household earnings.

Table 4. 2 Experienced Shocks, Reduction of Seasonal Household Earnings

Experience Reduced Seasonal Earnings	1=Minimal shocks, 3=Extensive reduction and 4=Severe reduction (deficiency, deprivation)	Frequency	Percent
1	Minimal shocks, reduction	163	39
2	Moderate reeduction (deficiency)	143	35
3	Extensive reduction (deficiency)	72	17
4	Severe reduction (deficiency)	40	10
	Sub total	420	100
	Missing	6	
	Total	426	

More specifically, reduction of seasonal household earnings referred to deterioration of earning from an average of KES 31, 500 (USD 284) to an average of KES 10,500 (USD 95) or progressively less. In comparison, HEA and FEG (2013) estimated that severely poor and moderately poor households would need KES 276,200 KSH (3,200 USD) a year to sustain adequate and nutritious diet. Therefore, below such threshold become areas of severe vulnerability such as exposure to extreme poverty and possible starvation. Such deterioration of the seasonal household earnings has been reported in various sources (Opiyo, 2014;

Turkana County Department of Health, 2018; Ouma, 2017). HEA and FEG (2013) indicated that seasonal earnings of the households were associated with the size of the livestock and deterioration reflected a decrease in the size of the livestock.

4.2.4 Vulnerability of Socio-economic Endowment

The study used the vulnerability of socio-economic endowment to refer to disruption (depletion or erosion) of valuable assets that the household has developed over the years; which may include physical, economic and social assets. It also hypothesized (predicted) that the impoverishment and displacement effects of the oil industry will increase vulnerability of the household socio-economic endowment. For example, it will increase the risk of disruption (depletion and/or erosion) of accumulated physical, economic, and social assets. Accordingly, the study assessed vulnerability to socio-economic endowment and the results were summarized in Table 4.18 below.

Table 4.18 Vulnerability, Reduction of Socio-Economic Endowment

Reduced SEE	1=Limited Vulnerability 3=Extensive reduction and 4=Severe reduction, disruption	Frequency	Percent
1	Limited risk	168	40
2	Minimal reduction	155	37
3	Extensive reduction	70	17
4	Severe reduction	30	07
	Sub total	423	100.0
	Missing	3	
	Total	426	

Responses indicated that 61% of the households experienced varied forms of shocks, reduction of socio-economic endowment, where 37% experienced moderate shocks, reduction of socio-economic endowment, and 24% experienced extensive to severe shocks, reduction of socio-economic endowment. Experts, key informants and focused group discussions repoted that droughts of 2010, 2015, 2018 depleted the livestock, the livelihoods, and the socio-economic endowment for virually all households. Other households expereinced adverse effects from the discovery, exploratio and extraction of oil. (30%) reported having experienced extensive vulnerability of socio-economic endowment and they risk or fear that part of their socio-economic inheritance will be reduced, eroded, or depleted. This is a common concern and risks in most of the arid and semi-arid areas where land inheritance also embodies other socio-economic endowment including clan or family shrine.

In view of the foregloing data, the study concluded that 61% of the households experienced varied forms of shocks, reduction of socio-economic endowment, where 37% experienced moderate shocks, reduction of socio-economic endowment, and 24% experienced extensive to severe shocks, reduction of socio-economic endowment.

4.2.5 Increased Severity of Poverty

Studies have reported the challenge of increased severity of poverty particularly in rural arid and semi-arid regions (Birch, 2018; Ekaya et al., 2012). Increased severity of poverty has been reflected by a number of indicators including acute shortage of food, malnutrion and increased diseases (CGOT, 2020; Azevedo, 2020;

World Bank, 2009). These studies have reported a link betwene increased severity of poverty in rural arid and semi-arid regions with increased population, increased scarcity of land, environmental variability, and appropriation of the natural resources (Birch, 2018; Ekaya et al., 2012). Other studies have linked increased severity of poverty in rural arid and semi-arid regions, particularly in Turkana County, to increasing severity of the droughts (Opiyo et al., 2015).

In view of the foregoing, the study predicted increased severity of poverty in South East of the Turkana largely because of the same processes. Accordingly, the study assessed the rating of the increased severity of poverty and results were summarized in Table 4.19 below:

Table 4.19 Experience of Increased Severity of Poverty

Experienced Severe Povery	1=Minimal shock, reducrion, 3=Extensive increase of poverty, and 4= Increased severity of poverty	Frequency	Percent
1	Minimal shock, increase of poverty	167	39
2	Moderate increase of poverty	155	36
3	Extensive increase	73	17
4	Severe increase poverty (Expereinced abject poverty, hunger and stravation)	30	07
	Sub total	423	100
	Missing	3	
	Total	426	

Responses indicated that 60% of the households experienced varied levels of increased severity of poverty; in which 36% experienced moderate increase in severity of poverty and 24% experienced extensive to severe increase in severity of poverty. Indeed, the series of the Smart Nutrition Survey (SNS) have reported progressive increase of severe poverty in the County (CDH, 2017 and 2019). In addition, the Development Plan (2018-2022) and the Disaster Risk Management (2020) of the County recognized this challenge and proposed some of the mitigation measures (CGOT, 2018; CGOT, 2020). Further, experts, key informants and members of FGD reported the droughts of 2010, 2015, 2018 depleted the livestock, the livelihoods, and the socio-economic endowment for virually amost of the households; which increased severity of poverty.

4.2.6 Reduction of Food Avaliablity

Most of the arid and semi-arid areas, have been characterized by chronic food insecurity arising from processes related disasters, environmental and climate variability, conflicts, development initiatives and mining (Akuja & Kandagor, 2019; FAO, 2013). By 2019, nearly one in ten people in the world were exposed to severe levels of food insecurity and the number was increasing (FAO et al., 2020). It is also acknowledged that most of the arid and semi-arid areas, particularly in Sub-Sahara Africa (SSA) have been characterized by protracted food crises (protracted food insecurity, and vulnerability) as a result of natural disasters, cycle of droughts, conflicts, and development and extraction industries including exploration, extraction, processing and commercialization of oil (Akuja & Kendagor, 2019).

The study had predicted (hypothesized) that households will experience increased vulnerability in access to food (or risk of reduced access to food). Accordingly, it assessed risks to reduced access to food and the results were summarized in Table 4.20 below. Responses indicated that 62% of the households experienced varied levels of shocks or reduced access to food; where 36% experienced moderate shocks, reduction of access to food and 26% reported extensive to severe reduced access to food.

Table 4.20 Experience of Risk/Reduced Access to Food

Experienced Reduced Access to Food	1=Minimal shocks, reduction, 3=Extensive reduction and 4=Severe reduction of access to food	Frequency	Percent
1	Minimal shocks, reduction	162	38
2	Modeate reduction	150	36
3	Extensive reduction	78	19
4	Severe reduction of access to food (Expereinced abject poverty, hunger and stravation)	31	07
	Sub total	421	100
	Missing	5	
	Total	426	

Experts, key informants and focused group discussions reported that access to food has been disrupted by a series of processes including climate variability and the

effects of the exploration, extraction and commercialization of oil. Some claimed that exploration, extraction and commercialization of oil was also accompanied by inflation and rising costs of access to food.

4.2.7 Eroded Food Intake Practices

Food intake practices, is still a measure of food security, also a measure of nutrition, and a measure of health of the household (Lele et al., 2016; Leroy et al., 2015; FAO, 2007). Indeed, several reports have indicated that there had been deterioration of nutritional indicators for the period 2017, 2018 and 2019; particularly in respect to children and women (Turkana County Department of Health, 2019). Food insecurity is usually defined as the depletion, reduction of food intake or eating practice. Such reduction may be precipitated by several processes including disease, natural disasters, and cycle of droughts, conflicts, development, and mining enterprises. By 2019, FAO estimated that 2 billion people in the world were not able to have regular food intake and, therefore, were susceptible (vulnerable) to a wide range of nutrition and health challenges (FAO et al., 2019).

In view of the cycle of droughts and the on-going exploration and drilling of oil in South East of Turkana, the study assessed the vulnerability to food intake and the results were summarized in Table 4.21 below. Responses indicated that 60% of the households experienced varied levels of shocks, reduction of food intake; where 35% experienced moderate reduction and 25% experienced extensive to severe reduction of food intake.

Table 4.21 Experience of Risk/Reduction of Food Intake Practices

Experienced Reduced Food Intake	1=Limited risk, 3=Extensive reduction, and 4=Severe reduction of food intake	Frequency	Percent
1	Limited risk	168	40
2	Minimal reduction	145	35
3	Extensive reduction of food intake (By more than half of the usual food intake)	75	18
4	Severe reduction of food intake (Expereinced abject poverty, hunger and stravation)	32	08
	Sub total	420	100
	Missing	6	
	Total	426	

Indeed, available reports indicated that deterioration of the nutritional indicators reached phase 4 of the IPC classification of food insecurity with weighted Global Acute Malnutrition (GAM) of 25.6% (Turkana County Department of Health, 2019). Also, vulnerability of food intake has attracted considerable attention, particularly in arid and semi-arid regions and in Turkana County (KIHBS, 2018; Turkana County Department of Health, 2018). According to these sources 75% to 80% of the households have been experiencing acute deficiency of food intake practices, particularly with regards to Food-Based Recommendations (FBRs) and Recommended Nutrient Intakes (RNIs).

4.2.8 Increased Disease Burden

According to various reports health indicators in the County have generally remained higher than the national indicators (CGOT, 2018; KDHS, 2014; 2019). Life-expectancy in Turkana County stands 57 years as compared to 62 years at the national level; the Neonatal Mortality Rate (per 1,000 births) stands at 80 compared to 22 at the national; the Under 5 Mortality Rate (per 1,000 births) stands at 74 as compared to 52 at the national; the Maternal Mortality Rate (per 100,000 births) stands at 1594 as compared to 362 at the national; and Tuberculosis (TB) prevalence (per 100,000 people) stands at 183 as compared to 39.

According to WHO (2020), increase of diseases is partly a reflection of deficiency in food and livelihoods. More specifically, chronic under-nutrition is a key driver of a wide range of diseases. Consequently, morbidities are key indicators of food insecurity, poverty, lack of healthy diet, increased social, and environmental challenges. Available reports indicate that morbidities have increased in arid and semi-arid areas of Sub Sahara Africa, particularly because of processes related to poverty, food insecurity, lack of healthy diet, and increased social and environmental challenges (Molina-Flores et al., 2020; FRAC, 2017).

Accordingly, the study assessed the rate of diseases and the results were summarized in Table 4.22 below. Responses indicated that 62% of the households experienced varied levels of disease burden, where 34% experienced moderate increase of diseases and 28% experienced extensive to severe increase of diseases.

Table 4.22 Experience of Increased Diseases

Experienced Increase of Diseases	1=Minimal increase, 3=Extensive increase and 4=Severe increase of diseases	Frequency	Percent
1	Minimal increase of diseases	163	39
2	Moderate increase of diseases	142	34
3	Extensive increase of diseases (Unusual increase of diseases)	87	21
4	Severe increase of diseases	31	07
	Sub total	423	100
	Missing	3	
	Total	426	

Further, the households were also requested to indicate specifically the experience of a sick person in the household. In response, 40% of the households reported experience of a sick person in the household in a month; 30% every three months, and 27% every six months. UNICEF (2017) reported that Turkana South had the highest rate of acute malnutrition at 37%. From 2017, the County in collaboration with a number of development donors have been carrying out annual Smart Nutrition Surveys (SNS). These surveys have indicated that there has been a general deterioration of nutrition status in most parts of the county including Turkana South (Turkana County Department of Health, 2019, 2018 and 2017). According to these reports, by 2017, acute malnutrition remained above emergence level of IPC categorization. In addition, 32.6% of the children were reported to be sick in 2017, 43.4% in 2018, and 41.4% in 2019 (Turkana County Department of Health, 2019). Some of the common diseases include upper respiratory tract

infections, malaria, diarrhoea, pneumonia, diseases of the skin, urinary tract infections, eye infections, fevers, arthritis, and ear infections. In addition, some of the key informants and members of the FGD claimed that the enviroment had been infected with poisonous substance during exploration and extraction phases of crude oil.

4.3 Oil Induced Impoverishment and Displacement

The third objective of the study was to assess the nature of the oil-induced impoverishment and displacement. Specific prediction (hypothesis) was that households had experienced varied phases of impoverishment and displacement related to exploration and extraction of crude oil. It will be noted that impoverishment-displacement has been used to refer to phases of impoverishment-displacement from the risk (vulnerability) to disruption and dispossession to displacement of the population by processes that have included disasters, environmental variability, conflicts, development and extraction initiatives.

Although they have been accompanied by enormous opportunities, extraction industries have also been accompanied by considerable risks (vulnerabilities) leading to impoverishment and displacement (Makathimo, 2019; Cameron & Stanley, 2017; Obiri, 2014; UN, 2012, Downing, 2002). Indeed, the prospect of greater good, improved quality of life and a promise to rehabilitate impoverished and/or displaced to even greater socio-economic endowment has been used to justify risks related to mining, extraction of gas and oil (Cameron & Stanley, 2017; Patel et al., 2015). However, risks of impoverishment and displacement arising from mining, extraction of gas and oil have been devastating to the local

(indigenous) population; particularly in arid and semi-arid areas where the population remains vulnerable, legal land tenure remains weak, and institutional framework also remains inadequate. A number of studies have reported that impoverishment-displacement vulnerability has been driven by fundamental activities that include excised land, clearing the land, technology and chemicals used in exploration and extraction, disposals of waste and land degradation.

In this respect, extraction zones have been considered as battlegrounds because of forced displacement, inadequate compensation, inadequate resources distribution and environmental degradation (Calvano, 2008; Adjei, 2007). Even those who were left next to extractive industry endured the burden of reduced livelihoods and contaminated environment. Risks related to exploration and extraction of oil have included loss of common lands and resources, environmental degradation, physical and non-physical assets, income-earning assets and sources, cultural heritage, sites and identity among others (Haque et al., 2020; Randell, 2017; Downing 2002). The Figure 4.1 below shows areas in South Lokichar Basin where oil-related activities are concentrated.

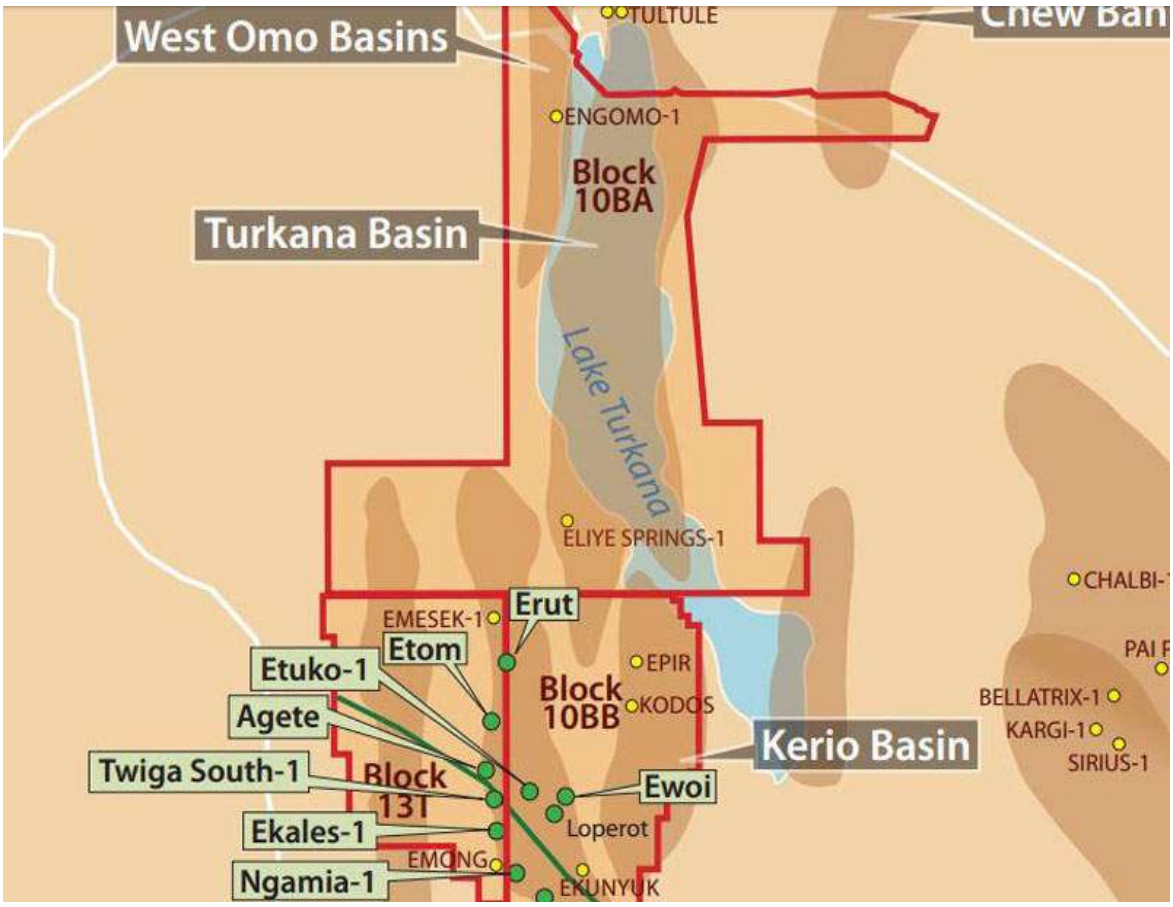


Figure 4. 1: Notable blocks of oil wells in South Lokicar basin

In view of the foregoing observations, the study used seven (7) indicators to assess impoverishment and displacement in South Lokichar-Kochodin Basin; namely 1) excised inherited land, 2) increased contaminated (degradaed) land –or environment, 3) reduced to water sources, 4) reduced access to pasture, 5) reduced livestock, 6) reduced (depleted) household inheritance and 7) reduced (depleted)family support. Similarly, the study assessed the level in which households had experienced each of these components and the rate of vulnerability as a result of the exploration and extraction of crude oil using a scale of 1 to 4 to reflect various levels of impoverishment and displacement vulnerability.

4.3.1 Excised/Abandoned Land

Land has been considered as an essential natural resource which also supports a wide range of other fundamental resources (Saygin, 2017). Land, particularly in arid and semi-arid areas, continue to witness increased demand (pressure) from animals and livestock grazing, cultivation, establishment of varied industries, related infrastructure, and resulting environmental degradation (Saygin, 2017). Combination of the largely human processes and the increasing environment-climate variability, has reduced availability of land that can sustain basic livelihoods (FAO/UNEP, 1997). Even though humans can use technology to stretch the carrying capacity, land is becoming increasingly scarce, finite, and contested resource.

Several reports have emphasized that land is an essential natural resource which in turn supports a wide range of other essential resources (Birch, 2018; World Bank, 2017; UN, 2015; Quan, 2006; FAO/UNEP, 1997). Other reports have emphasized that land particularly in arid and semi-arid areas continue to witness increased demand (pressure) from animals and livestock grazing, cultivation, establishment of various industries, related infrastructure and resulting environmental degradation (Saygin, 2017). Combination of the largely human processes and the increasing environment-climate variability, has reduced availability of land that can sustain basic livelihoods (FAO/UNEP, 1997). Although humans can use technology to stretch the carrying capacity, land is becoming increasingly scarce, finite, and contested resource. Other reports have emphasized that involuntary dispossession of land is one of the fundamental effects of extraction industries (Owen et al., 2021;

Adam, 2019; Ravindran & Kumar, 2019; Downing, 2002). Excised and/or reduced parcel of land has therefore remained one of the fundamental indicators of impoverishment-displacement vulnerability arising from many circumstances including exploration and extraction of oil.

Between 2011 and 2012, reserves of oil and gas were discovered in 2012 in South Lokichar Basin (SLB) or South East of Turkana County. In the intervening years, requirements expanded considerably to support exploration, extraction, processing, storage, transportation, and infrastructure for administration. Part of the initial and fundamental requirement was acquisition of land that was adequate to support exploration, extraction, processing, storage, transportation, and infrastructure for administration. (Golder & Ecologics, 2020; Golder, 2018; FAO/PDN, 2018). Although land required for actual exploration and extraction of oil would have been modest, a larger land space was required to support associated facilities that included coordination infrastructure, storage, and transportation, residential, market and recreational as well as access roads. In addition, there were demands of land to support water sources, generation and disposal of wastes, and infrastructure for commercial services.

Available reports have indicated that parts of the land that were curved out to support exploration and extraction of oil have been contested and were also better for grazing resources and drought reserves. In addition, parts of land were also traditional ceremonial sites which included community prayer sites (ekimwomor), and sites for initiation ceremonies (asapan) (FAO/PDN, 2018; UN-Habitat, 2016). Indeed, a number of authorities have acknowledged that from the onset of the

exploration and subsequent extraction of oil and gas in South Lokichar Basin (South East of Turkana), pastoral communities lost ownership, access, and control of land which had been the basis of their economic production and livelihoods for centuries (FAO/PDN, 2018; UN-Habitat, 2016). Further, they were excluded in the planning and decision-making process.

In view of the foregoing, the study assessed the experience of the households on excised land in a scale of 1 to 4 and responses were summarized in Table 4.23 below.

Table 4. 23 Experience of Excised, Reduced Land

Excised, Reduced Land	1=Minimal excise, reduction, 3= Extensive reduction and 4=Displaced, relocated to new land	Frequency	Percent
1	Minimal experience of excised/reduced land	93	22
2	Moderate experience of excised/reduced land	107	25
3	Extensive experience of excised/reduced land	118	28
4	Severe excised/reduced land (Displaced, relocated to new lands	105	25
	Sub-total	423	100
	Missing	3	
	Total	426	

Responses indicated that 78% of the households experienced varied levels of excised (surrendered) land in which 28% experienced extensive excised or reduced land and 25% experienced severe excised or reduction of land. Available reports

indicated that by 2018, a total of 700 square kilometers of community land had been curved out to support exploration of oil and gas, extraction and related infrastructure; as well as unspecified to support transportation (Golder & Ecologics, 2020; FAO/PDN, 2018). The Initial land acquisition was carried-out in South Lokichar around Twiga, Amosing and Ngamia (TAN) fields to support construction and operation of facilities for extraction and transportation of oil. Of course, the households that were severely affected lived within the vicinity of the areas identified for exploration and extraction of oil. Additionally, this was also a process in which the radius of the affected area was likely or expected to expand.

It will also be noted that parcels of land in those areas were also inherited by the households from their parents and grandparents. Use of inherited land was a key term in South East of Turkana County because land was largely inherited by the households, family and/or the clan (Makathimo, 2019). Several reports indicate that there has not been any formal and/or forceful acquisition of land from the time oil was discovered (Makathimo, 2019). Instead, the process of land acquisition has been based on agreements and/or signed consents with selected community leaders with promises that explorations and subsequent extractions will bring development and revenue. The process has also led to increased acquisition of land for road, rail, pipeline, and other services.

4.3.2 Contaminated (Degraded) Land

Extractive industry has been associated with a wide range of substantial environmental challenges; including clearance of land and related degradation; use of volatile chemicals; acid drainage from oil sites; loss of biodiversity; intensive

use of water; pollution from poorly disposed waste; pollution; and environmental variability including climate change (Addison & Roe, 2018; Jegede, 2016; Obiri, 2014; UN, 2015). Although an essential driver of socio-economic development, extractive industry is also accompanied by acute environmental challenges that increase dispossession (deprivation) of land and livelihoods to the local population. In view of the foregoing, the study assessed the experience of the households on environmental challenges and related dispossessions and the results were summarized in Table 4.24 below.

Table 4. 243 Experience of Contaminated (Degraded) land

Contaminated, Degraded land	1= Minimal contamination 3= Extensive contamination and 4=Severe contamination displaced,	Frequency	Percent
1	Minimal contamination	152	36
2	Moderate contamination	113	27
3	Extensive contamination	92	22
4	Severe contaminated land	65	15
	Sub-total	422	100.0
	Missing	4	
	Total	426	

Responses indicated that 64% of the households experienced varied levels of the contamination (degradation) of land, in which 37% experience of extensive to severe contamination of land. During the study, some of the households reported that dumping (disposal) sites were adjacent to their land; and had poisonous

substances including volatile chemicals which compelled them to relocate the livestock and/or the entire household. Key informants and members of FGD, indicated that considerable number of households witnessed various land contamination from blasting to extraction and disposal of the wastes. Key informants and members of FGD also reported some unpleasant and/or poisonous chemicals. Consequently, they lost some of their livestock and access to land adjacent to not extraction sites but also dumping sites.

4.3.3 Reduced Access to Water Sources

Reduced assess to water sources has continued to be one of the key indicators of impoverishment-displacement vulnerability arising from extraction of crude oil; particularly in arid and semi-arid regions. In arid and semi-arid areas, the average annual rainfall (precipitation) is usually relatively low, erratic, and unreliable. Further, rainfall cycles are also unevenly distributed over the landscape and vary considerably in duration (Dubois, 2011; Heyns, 2009). This uncertainty, variability, and unpredictability make water sources important and sensitive issue in Turkana County and requires an understanding of its relationship with livelihood vulnerabilities. Further, available reports indicate that extractive industry has also been associated with interruption and/or destruction of water sources (Gratzfeld, 2003). The same reports have emphasized that mining and dredging activities, poorly planned stockpiling and uncontrolled dumping of waste, and fuel spills have reduced the amount and quality of water for the local and downstream users and poisoning of aquatic life. Therefore, the study assessed the experience of the households on availability of and possible reduction of access to water sources

because of exploration and extraction of oil. The summary of the results was presented in Table 4.25 below.

Table 4. 25 Reduced Access to Water Sources

Reduced Access to Water	1=Limited reduction; 3= Extensive reduction; and 4= Severe reduction and displaced	Frequency	Percent
1	Limited risk, reduction	140	33
2	Minimal reduction of access to water sources	123	29
3	Extensive reduction of access to water sources	92	22
4	Severe reduction of access to water sources	68	16
	Sub-total	423	100
	Missing	3	
	Total	426	

The data indicated that 67% of the households experienced varied levels of the reduction of access to water sources; where 38% experienced extensive to severe reduction of access to water sources. This was attributed to the fact that typical access to water in the region remained a challenge which local people have been able to manage through migratory practices. In other words, excised lands for exploration and extraction of oil fell along some of the streams, springs and wells that supported livelihoods particularly during raining seasons and for some period after the raining seasons.

It was witnessed during the study that a network of boreholes had been drilled in South Lokichar Basin; several of which were dedicated to the local community as part of the compensation and co-exitence. Experts, key informants, and members of FGD reported that some of the boreholes provided useful water access services the local community; and which had been appreciated. Experts, key informants and members of FGD indicated that enhanced supply of water was part of the mitigation (trade off) with the oil company during negotiations for land concessions with the local communty leaders. Indeed, a number of boreholes have been drilled and water points established to support public access.

4.3.4 Experience of Reduced Pasture

Reduced grazing resources (RGR) continue to be one of the key indicators of impoverishment-displacement vulnerability related to extraction of crude oil; particularly in arid and semi-arid areas. Available reports indicate that grazing resources have been decreasing as early as 1998 in the arid and semi-arid areas of Kenya; largely because of re-occurrence of droughts, overgrazing and increasing competiton on the use of land (WFP, 2018; Macharia & Ekaya, 2005). Vegetation continues to be typically seasonal in arid and semi-arid areas consisting of bushes and woody shrubs, perennial grasses, and grazing succulents that support pasture. Indeed, grazing resources have usually been influenced by seasonal rainfall - with variation in time and length of rainy season - leading to periodic droughts and famines.

It was reported as early as 1998 that pasture in arid and semi-arid areas of Kenya was decreasing because of re-occurrence of droughts, overgrazing, and increasing

use of land for other purposes (Macharia & Ekaya 2005). Vegetation in arid and semi-arid areas is typically seasonal and consists of bushes and woody shrubs, perennial grasses, and grazing succulents that support pasture. Indeed, grazing resources are usually influenced by seasonal rainfall; with variation in time and length of rainy season leading to periodic droughts and famines. Migratory practices among the pastoralists have been driven by low precipitation and droughts. Even in the normal circumstances, pasture is scarce in arid and semi-arid zones (Dickhoefer et al., 2010; Jama & Zeila, 2005; Gratzfeld, 2003). Accordingly, displacement would precipitate even more acute scarcity.

Similarly, extractive industry has been associated with reduction (interruption) of access to pasture particularly by the indigenous population (IWGIA, 2017; Obiri, 2014; UN, 2015; Shackleton et al., 2010; Gratzfeld, 2003). These reports have indicated that both excised land and environmental challenges from extractive industry reduce (or interrupt) access to the pasture by the local (indigenous) population. Therefore, the study evaluated experience of the households on reduced (interrupted) access to pasture and results were presented in Table 4.26 below.

Table 4. 26 Reduced Gracing Resources (Pasture)

Reduced Pasture	1=Limited reduction; 3= Extensive reduction; and 4= Severe reduction of pasture	Frequency	Percent
1	Limited reduction of pasture	137	33
2	Minimal reduction of pasture	88	20
3	Extensive reduction of pasture	128	31
4	Severe reduction of pasture	65	16
	Sub-total	418	100
	Missing	8	
	Total	426	

Responses indicated that 67% of the households experienced varied levels of reduced access to grazing resources (pasture), where 47% experienced extensive to severe reduction of the grazing resources (pasture). Similarly, availability of pasture is governed largely by the processes of the three seasons 1) long rains, 2) short rains, and 3) dry season. For that reason, pasture is relatively available during the rainy seasons and severely scarce during the dry season. In view of this process, most of the households had developed a strategy to mitigate scarcity (reduction) of pasture. However, 47% of the households reported extensive and severe reduction of pasture. It was ascertained that these were households whose parcels of land had been excised or curved out for exploration and extraction of oil. These households included those that had shifted voluntarily because of contaminated parcels of lands and related environmental degradation.

4.3.5 Reduced (Depleted) Livestock

Reduced livestock also remained as one of the indicators of impoverishment-displacement vulnerability arising from exploration and extraction of oil; particularly in Arid and Semi-Arid Areas. Livestock sub-sector is the backbone of occupation and economy in arid and semi-arid areas. Pastoral households in Turkana County rely substantially on extensive livestock production as their principal livelihood, including in South Lokichar Basin. The wealth of most of the households is held in the form of livestock (Barrett, 2001). Virtually, all their cash earnings come from either sale of livestock or livestock products (Barrett, 2001).

However, high temperatures, low precipitation, related cycle of droughts (inadequate feeds and water), and land tenure remain part of the major challenges of livestock husbandry. Available reports indicate that the most devastating droughts occurred every ten years (1952, 1960, 1970, 1980, 1990, and 2000) with increasing severity. Gedamu (2006) estimated that pastoralists lost up to 50% of their livestock during a drought cycle. The same reports indicated that average mortality rates for cattle was 50%, sheep 30%, goat 24% and camel herds 17%. In this respect, goats and camels have been reported to have greater adaptation to aris and semi arid areas; and climate variability. According to Oba et al. (2000) the severity of droughts and their impact on livestock production translate into reduced purchasing power and livelihoods of the pastoral households.

Therefore, extraction industry increases the challenges of livestock husbandry. Reports have continued to indicate that extraction industries reduce available land, water sources, pasture and livestock (Birch, 2018; IWGIA, 2017; IHRB, 2016; Obiri, 2014; Gratzfeld, 2003). For that reason, the study examined the experience of households on reduction of livestock and the results were presented in Table 4.27 below. The data indicated that 68% of the households experienced varied reduction of livestock, where 42% experienced extensive to severe reduction of livestock.

Table 4. 27 Reduced Livestock, Deprivation and Displacement

Reduced Livestock	1=Limited risk, 3= Extensive reduction 4=Severe reduction, displaced	Frequency	Percent
1	Limited (negligible) risk of reduction	133	32
2	Minimal reduction	113	27
3	Extensive reduction of livestock	92	22
4	Severe reduction and displaced	84	20
	Total	422	
	Missing	4	
	Total	426	

Responses indicated that 42% of the households had either lost (deprived) and/or displaced to new land because of reduced livestock. Similarly, this percentage was consistent with the view that such proportion reflected the population that had been adversely affected by the exploration and extration of oil in the area. Livestock husbandry in Turkana County has been sustained through Livestock Migratory Practice (LMP) characterized by pastoralists' traditional practice to move livestock to areas with higher rainfall and then move them back to the drier areas when the rains arrive. Basically sheep and cattle constituted the livestock that were moved back and forth because of their sensitivity to droughts than other livestock species (Watson & Binsbergen, 2008). This LPM is still being maintained alongside emergence of irrigation schemes around Turkwel and Kerio Rivers where some of the households maintain herds of cattle. Accordingly, predominant livestock around the household have been goats, donkeys, and camels which are reported to be more resistant to droughts (Watson & Binsbergen, 2008).

4.3.6 Depleted Household Endowment

The most common sources of the household assets among the pastoralists, particularly the Turkana Community include inheritance, raids, dowry, gifts and purchases (CGOT, 2018; Chelimo, 2018; Ouma, 2017; FAO, 2017; UNICEF, 2016). Indeed, Inheritance is a process of grandparents or parents passing accumulated assets to the younger households. For example, land marked with family graves, old trees, or water wells are typically passed to the younger households. Accordingly, besides raids and dowry, inheritance is the principal source of the household assets including land, water sources, pasture and livestock among others.

In arid and semi-arid areas, and particularly in Turkana County, most of the assets, including land, water sources, livestock, and pasture are typically regulated through the process of household inheritance. This customary practice has remained entrenched in Turkana County (Molina-Flores et al., 2020; Ng'asike, 2015; FEG, 2016; Miller et al., 2011). These reports have emphasized that the key challenge (and even tragedy) is that land tenure and related resources have been regulated largely through household inheritance, with no formal documentation. Accordingly, the study examined experiences of the households on interruption and/or depletion of the household inheritance and the results were summarized in Table 4.28 below.

Table 4.28 Reduced (Depleted) Household Inheritance

Reduced Household Inheritance	1=Minimal Risk, 3= Extensive erosion and 4=Displaced, relocated to new land	Frequency	Percent
1	Minimal reduction of household inheritance	190	45
2	Moderate reduction of household inheritance	120	28
3	Extensive reduction	72	17
4	Severe reduction and displaced	41	10
	Sub-total	423	100
	Missing	3	
	Total	426	

From Table 4.29 above, 45% of the households experienced minimal (negligible) risk to reduced (depleted) household inheritance as a result of oil development in the area. On the other hand 27% of the households experienced either some household inheritance depleted (deprived) and 17% of the households reported to have been displaced (relocated) to new site (new land) because of oil development activities.

4.3.7 Reduced Family Support

Social network, relation and reciprocal support have been part of the customary practice and inheritance among various communities including Turkana Community carried-out with a view to address life vulnerabilities, particularly livelihood shocks (Gichunge et al., 2020; Juma, 2009). Social network, relation and

reciprocal heritage can be equated to modern time insurance against life vulnerabilities and livelihood shocks.

Accordingly, reduction of the household social support has remained one of the indicators of impoverishment-displacement vulnerability arising from exploration and extraction of oil; particularly in Arid and Semi-Arid Areas. Available reports indicate that traditionally pastoralists, particularly among the people of Turkana culture value family support because of their vulnerable pastoral economy (Molina-Flores et al., 2020; Ng'asike, 2015; FEG, 2016; Miller et al., 2011). According to Opiyo et al. (2015), family support is part of the coping mechanisms to mitigate environmental variability and re-occurrence of droughts and, therefore, essential component of livelihood. In view of the foregoing, the study assessed expereinces of the households on reduced (depleted or interrupted) family support as a result of oil development activities in the area and the results were summarized in Table 4.29 below.

Table 4.29 Reduced (Depleted) Family Support

Reduced Family Support	1=Limited risk, 3= Extensive erosion and 4=Severe erosion, displaced, new land	Frequency	Percent
1.	Limited (negligible) risk, reduction	157	37
2.	Minimal reduction of family support	126	30
3.	Extensive reduction of family support	84	20
4.	Severe reduction and displaced,	56	13
	Sub-total	423	100
	Missing	3	
	Total	426	

The data indicated that 40% of the households experienced minimal (negligible) risk to family support as a result of oil development in the area and 30% experienced substantial (greater) risk to reduced (depleted) family support. Even more interesting, 33% of the households reported that some of the family support were actually depleted (eroded) or family support was severely depleted, displaced, and relocated to new sites.

4.4 Effects of Impoverishment-Displacement on Vulnerability of Livelihoods

The fourth objective was to assess the effects of oil-induced impoverishment-displacement on the vulnerability of livelihoods in Lokichar-Kochodin Basin. It will be recalled that the overall hypothesis (prediction) was that the progressive phases of impoverishment and displacement arising from exploration and extraction of crude oil had fundamental effects on vulnerability (reduction) of household livelihoods and wellbeing. In order to assess this hypothesis, the effects of impoverishment and displacement, the study adopted a multiple regression analysis which provided ability to assess effects of each of the seven (7) indicators and the overall joint effects This approach was appropriate because of two main reasons. First, both indicators of livelihoods and oil impoverishment-displacement were operationalized in an interval scale of 1 to 4; and, secondly, the need to assess an interplay of several impoverishment-displacement indicators which reflected the dynamic processes around exploration, extraction, and processing of oil in Turkana South and East sub-counties.

Multiple regression, therefore, enabled the study to assess the effects of each of the seven (7) indicators of impoverishment-displacement and the overall joint effects

on any one given indicator of the vulnerability of livelihoods. Accordingly, the study assessed the effects of of the seven (7) indicators of impoverishment-displacement; namely 1) excised or reduced land, 2) increased contamination of the land, 3) reduced (depleted) access to water sources, 4) reduced access to pasture, 5) reduced livestock, 6) reduced (depleted) household endowment and 7) reduced (depleted) family support on each the seven (indicators) of vulnerability of livelihoods.

The general working hypothesis (H_1) was that the effects of oil impoverishment-displacement on the overall household vulnerability will be substantial (or significant) against the null hypothesis (H_o) that the effects of oil impoverishment - displacement on the overall household vulnerability will not be significannt (or even equivalent to zero). The decision criteria for the study was to accept the null hypothesis if the regression variance was greater than the probability level of error 0.05 and to accept the working hypothesis if the regression variance was less than 0.05.

4.4.1 Displacement and Overall Erosion of Livelihoods

In view of the above hypothesis, the study assessed the effects of impoverishment - displacement indicators on the overall vulnerability (erosion, reduction) of livelihoods, and results were summarized in Table 4.30 below.

Table 4.30 Effects of Oil Displacement Indicators on Overall Erosion of Livelihoods

Regression	Sum of Squares	Df	Mean Square	F	Sig.
Regression	174.6	7	24.9	30.84	0.000
Residual	315.4	390	0.81		
Total	490.0	397			

R=0.597; R^2 (squared) =0.356

Accordingly, the multiple regression R = 0.60 and R^2 (square)=0.36 reflected the strength of the effects of the indicators of oil impoverishment-displacement on the overall household vulnerability. Specifically, the value of R^2 (square)=0.36, indicated that 36% of the reduction in the overall livelihood opportunities were the effects (influence) of the indicators of the oil impoverishment-displacement continuum.

The strength of the effects were reflected by the multiple regression R = 0.60 and the multiple regression R^2(squared)= 0.36 which indicated that the oil impoverishment-displacement indicators influenced the overall household vulnerability by 36%. In other words, 36% of the variation (fluctuation or changes) in overall household vulnerability could be attributed to the effects of the oil impoverishment-displacement indicators.

The co-variation of overall household vulnerability and the impoverishment-displacement indicators (regression variance) was significant at the probability of

error less than 0.001 which was much lower than the study's decision criteria ($P < 0.05$). Therefore, it can be concluded that the effects of impoverishment-displacement indicators on the overall household vulnerability were systematic and significant. Accordingly, it was concluded that effects of the oil impoverishment-displacement indicators on overall household vulnerability were significant - beyond probability of error or chance.

Of the seven key predicted drivers of oil impoverishment-displacement, three had significant effects namely, excised/depleted land (Beta=0.215), depleted/deprived pasture (Beta = 0.237), and depleted/deprived water sources (Beta = 0.225). these predicted drivers were also significant at the probability of error less than 0.000 which was also lower than the study's decision criteria of $p < 0.05$. Accordingly, the study concluded that oil impoverishment-displacement indicators had effects on overall household vulnerability and the key drivers were excised/depleted land, depleted/deprived pasture and depleted (deprived) water sources.

4.4.2 Displacement and Reduced Availability of Food

The study also assessed the effects of oil impoverishment-displacement on availability (access) to food. It predicted (hypothesized) that households will experience greater vulnerability to availability of (access to) food because of emerging oil industry, impoverishing and displacement effects. In addition, it predicted that the key drivers will include excised (or depleted) inherited land; increased contamination (degradation) of land –or environment; reduced (depleted) access to water sources; reduced access to pasture; reduced livestock; reduced (depleted) household inheritance; and reduced (depleted)family support.

More specifically, the working hypothesis (H_1) was that there will be substantial effects of oil impoverishment-displacement on availability (access) to food against the null hypothesis (H_o) that the effects of oil impoverishment-displacement on availability (access) to food will not be significant (or even equivalent to zero). The decision criteria of the study was to accept the null hypothesis if the regression variance was greater than the probability level of error 0.05 and to accept the working hypothesis if the regression variance was less than 0.05.

Accordingly, multiple regression to assess the effects of impoverishment-displacement indicators on availability (access) to food was carried-out and the results were summarized in Table 4.31 below.

Table 4. 31 Effects of Oil Displacement Indicators on Reduction of Access to Food

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	121.22	7	18.75	18.33	0.000
Residual	265.74	350	1.02		
Total	386.97	357			

R=0.560; R^2 (squared) =0.313; P <0.001

Analysis indicated that the regression variance was significant at the probability of error less than 0.001 which was much lower than the study's decision criteria. Therefore, it was concluded that the effects were significant. Specifically, it was also concluded that effects of the oil impoverishment-displacement indicators on availability (access) to food were significant, beyond probability of error or chance.

The strength of the effects were reflected by the multiple regression R = 0.56 and the multiple regression R^2(squared) = 0.313 which indicated that the oil impoverishment-displacement indicators influenced availability (access) to food by 31%. In other words, 31% of the variation (fluctuation) in access to food can be attributed to the effects of the oil impoverishment-displacement indicators.

Of the seven key predicted drivers of oil impoverishment-displacement, three had significant effects namely; excised/depleted land (Beta=0.325), depleted/deprived water sources (Beta = 0.237), and depleted/deprived pasture (Beta = 0.225). These key predicted drivers were significant at the probability of error less than 0.000 which was also lower than the study's decision criteria of $p < 0.05$. Accordingly, the study conncluded that oil impoverishment-displacement indicators had effects on availability (access) to food and the key drivers were excised/depleted land, depleted/deprived water sources and depleted/deprived pasture.

4.4.3 Displacement and Reduced Daily Food Intake

Following the same objective and hypothesis, the study assessed the effects of the indicators of oil induced impoverishment-displacement on daily food intake. Similarly, the study predicted (hypothesized) that households will experience greater vulnerability to daily food intake because of emerging oil industry, impoverishing and displacement effects. We also predicted that the key drivers will included excised (or depleted) inherited land; increased contamination (degradation) of land –or environment; reduced (depleted) access to water sources; reduced access to pasture; reduced livestock; reduced (depleted) household inheritance; and reduced (depleted)family support.

Accordingly, the working hypothesis (H_1) was that there will be substantial effects of oil impoverishment-displacement on daily food intake against the null hypothesis (H_o) that the effects of oil impoverishment-displacement on daily food intake will not be significant (or even equivalent to zero). Similarly, the study's decision criteria was to accept the null hypothesis if the regression variance was greater than the probability of error 0,05 and to accept the working hypothesis if the regression variance was less than 0.05.

In view of the above hypothesis, multiple regression to assess the effects of impoverishment-displacement indicators on daily food intake was carried-out and the results were summarized in Table 4.32 below.

Table 4. 32 Effects of Oil Displacement Indicators on Daily Food Intake

Regression	Sum of Squares	Df	Mean Square	F	Sig.
Regression	93.34	7	13.3	17.8	0.000
Residual	174.83	334	0.75		
Total	268.17	341			

R=0.590; R^2 (squared) =0.35

The outcome of the analysis was that regression variance was significant at the probability of error less than 0.001 which was much lower than our decision criteria ($P < 0.05$). Accordingly, the study concluded that the effects of impoverishment-displacement indicators on daily food intake were significant. Specifically, the study concluded that effects of the oil impoverishment-

displacement indicators on daily food intake were significant; beyond probability of error or chance.

The strength of the effects were reflected by the multiple regression R = 0.59 and the multiple regression R^2(squared) = 0.35 which indicated that the oil impoverishment-displacement indicators influenced daily food intake by 35%. In other words, 35% of the variation (fluctuation) in daily food intake can be attributed to the effect of the oil impoverishment-displacement indicators.

Of the seven key predicted drivers of oil impoverishment-displacement, three had significant effects namely; excised/depleted land (Beta=0.357), depleted/deprived pasture (Beta = 0.214), and family endowment (Beta +0.179). The three indicators were significant at the probability of error less than 0.000 which was also lower than study's decision criteria of $p < 0.05$.

4.4.4 Displacement and Increased Diseases Burden

Similarly, increase of disease burden was an indicator of the household livelihood vulnerability. Therefore, the study predicted (hypothesized) that households will experience greater vulnerability to diseases (or actual increase of diseases) because of emerging oil industry, impoverishing and displacement effects. Similarly, it predicted that the key drivers will included excised (or depleted) inherited land; increased contamination (degradation) of land –or environment; reduced (depleted) access to water sources; reduced access to pasture; reduced livestock; reduced (depleted) household inheritance; and reduced (depleted)family support.

Accordingly, the working hypothesis (H_1) was that there will be substantial effects of oil impoverishment-displacement on increase of diseases (morbidities and mortalities); against the null hypothesis (H_o) that effects of oil impoverishment-displacement on diseases will not be significant (or even equivalent to zero). The study's decision criteria was to accept the null hypothesis if the regression variance was greater than the probability of error 0,05 and to accept the working hypothesis if the regression variance was less than 0.05.

In view of the above hypothesis, multiple regression to assess the effects of impoverishment-displacement indicators on increase of diseases was carried-out and the results were summarized in Table 4.33 below.

Table 4. 33 Effects of Oil Displacement Indicators on Disease Vulnerability

Regression	Sum of Squares	df	Mean Square	F	Sig.
Regression	170.6	7	24.4	21.4	0.000
Residual	287.4	352	1.14		
Total	458.0	359			

R=0.610; R^2 (squared) =0.37

Analysis indicated that the regression variance of disease vulnerability and impoverishment-displacement indicators was significant at the probability of error less than 0.001 which was much lower than the study's decision criteria ($P < 0.05$). Accordingly, the study concluded that the effects of impoverishmen-displacement indicators on increase of diseases were significant. Specifically, the study

concluded that effects of the oil impoverishment-displacement indicators on increase of diseases were significant; beyond probability of error or chance.

The strength of the effects were reflected by the multiple regression R = 0.611 and the multiple regression R^2 (square)=0.37 which indicated that oil impoverishment-displacement indicators influenced disease vulnerability by 37%. In other words, 37% of the variation (fluctuation) in increases of diseases can be attributed to the effect of the oil impoverishment-displacement indicators.

Similarly, of the seven key predicted drivers of oil impoverishment-displacement, three had significant effects namely; excised/depleted land (Beta=0.372), depleted/deprived pasture (Beta = 0.242), and family endowment (Beta +0.231). Indeed, the three indicators were significant at the probability of error less than 0.000 which was also lower than the study's decision criteria of $p < 0.05$.

4.4.5 Displacement and Reduced Seasonal Earnings

The study also hypothesized (predicted) that households will experience greater vulnerability to seasonal household earning (depletion or interruptions of earnings that households have been able to secure per season) because of emerging oil industry, impoverishing and displacement effects. We also predicted that the key drivers included excised (or depleted) inherited land; increased contamination (degradation) of land –or environment; reduced (depleted) access to water sources; reduced access to pasture; reduced livestock; reduced (depleted) household inheritance; and reduced (depleted)family support.

Accordingly, the working hypothesis (H_1) was that there will be substantial effects of oil impoverishment-displacement on seasonal household earning against the null hypothesis (H_o) that effects of oil impoverishment -displacement on seasonal household earning will not be significant (or even equivalent to zero). The decision criteria was to accept the null hypothesis if the regression variance was greater than the probability of error 0.05 and to accept the working hypothesis if the regression variance was less than 0.05.

In line with the above hypothesis, a multiple regression to assess the effects of impoverishment -displacement indicators on seasonal household earning was carried-out and the results were summarized in Table 4.34 below.

Table 4. 34 Effects of Oil Displacement Indicators on Seasonal Household Earnings

Regression	Sum of Squares	df	Mean Square	F	Sig.
Regression	179.616	7	25.659	23.740	0.000
Residual	272.369	352	1.081		
Total	451.985	359			

R=0.630; R^2 (squared) =0.397

Similarly, regression variance of the seasonal household earning (SHE) and the impoverishmen-displacement indicators was significant at the probability of error less than 0.001 which was much lower than our decision criteria ($P < 0.05$). Therefore, it was concluded that the effects of impoverishment-displacement indicators on seasonal household earning were significant. Accordingly, it was

concluded that effects of the impoverishment-displacement indicators on seasonal household earning were significant; beyond probability of error or chance. The strength of the effects was one of the highest. Multiple regression R was 0.630 and multiple regression R^2 (square) was 0.40 which was one of the highest effects of impoverishment-displacement indicators on livelihoods vulnerability. In other words, 40% of the variation (fluctuation) in seasonal household earning was attributed to the effect of the oil impoverishmen-displacement indicators.

Of the seven key predicted drivers of oil impoverishment-displacement, three had significate effects; namely family support (Beta=0.213), family endowment (Beta=0.209) and water sources (Beta =0.207). Indeed, the three indicators were significant at the probability of error less than 0.000 which were also lower than our decision criteria of $p < 0.05$.

4.4.6 Displacement Indicators on Increased Poverty

The study recognized that the defining aspect of the livelihood vulnerability was the increase of the severity of poverty. In pursuing the same overall objective and hypothesis, the study assessed the increase of the severity of poverty. The prediction (hypotheis) was that considerable households will have experienced increase of the severity of poverty. The study also predicted that the key drivers will include 1) excised (or depleted) inherited land, 2) increased contamination (degradation) of land –or environment, 3) reduced (depleted) access to water sources, 4) reduced access to pasture, 5) reduced livestock, 6) reduced (depleted) household inheritance and 7) reduced (depleted)family support.

In this respect, the working hypothesis (H_1) was that there will be considerable effects of oil impoverishment -displacement on increased severity of poverty; against the null hypothesis (H_o) that effects of oil impoverishment-displacement on increased severity of poverty will not be significant (or even equivalent to zero). Similarly, the criteria was to accept the null hypothesis if the probability level of error accompanying the multiple regression R and R^2 (square) was greater than 0.05 and to accept the working hypothesis if the probability level of error accompanying the multiple regression R and R2 (square) was less than 0.05.

In view of the above hypothesis, the study carried-out multiple regression to assess the effects of the indicators of oil impoverishment-displacement on the increased severity of poverty and results were summarized in Table 4.35 below.

Table 4. 35 Effects of Displacement Indicators on Increased Severity of Poverty

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	158.884	7	22.698	19.047	0.000
Residual	294.347	347	1.192		
Total	453.231	354			

R=0.592; R^2 (squared) =0.351

Analysis indicated that the co-variation of socio-economic endowment and impoverishment-displacement indicators (regression variance) were significant at the probability of error less than 0.001 which was much lower than our decision criteria ($P < 0.05$). Accordingly, the study concluded that the effects of

impoverishment-displacement indicators on socio-economic endowment were significant. Accordingly, it was concluded that effects of the oil impoverishment-displacement indicators on socio-economic endowment were significant; beyond probability of error or chance.

The multiple regression R was 0.592 and multiple regression R^2 (square) was 0.351 which indicated that 35% of the variation (fluctuation) of socio-economic endowment can be attributed to effects of impoverishment-displacement indicators. In other words, emergence of oil industry, related impoverishment, and displacement effects accounted for 35% of the challenges (or changes) in socio-economic endowment.

Similarly, of the seven key predicted drivers of oil impoverishment-displacement, three had significant effects namely; depleted inherited land (Beta=0.482), pasture (Beta=0. 236) and family support (Beta=0. 174). The effects of the three indicators were significant at the probability of error less than 0.000 which were also lower than the study's decision criteria of $p < 0.05$.

4.4.7 Displacement and Reduced Household Occupation

Similarly, the study hypothesized (predicted) that households will experience greater vulnerability to household occupation (expected or actual interruption, depletion, or erosion of household occupations). We predicted also that the key drivers will included excised (or depleted) inherited land; increased contamination (degradation) of land –or environment; reduced (depleted) access to water sources;

reduced access to pasture; reduced livestock; reduced (depleted) household inheritance; and reduced (depleted)family support.

Accordingly, the working hypothesis (H_1) was that there will be substantial effects of oil impoverishment-displacement on household occupation; against the null hypothesis (H_o) that effects of oil impoverishment-displacement on household occupation will not be significant (or even equivalent to zero). The study's criteria for decision was to accept the null hypothesis if the regression variance was greater than the probability of error 0.05 and to accept the working hypothesis if the regression variance was less than 0.05.

In view of the above hypothesis, a multiple regression to assess the effects of impoverishment-displacement indicators on household occupation was carried out and the results were summarized in Table 4.36 below.

Table 4. 36 Household Occupation and and Displacement Indicators

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	201.6	7	28.80	22.35	0.000
Residual	375.1	291	1.29		
Total	576.7	298			

R=0.591; R^2 (squared) =0.350

The results were substantially similar or nearly consistent with those of daily food intake and socio-economic endowment. Co-variation of occupation and

impoverishment-displacement indicators (regression variance) were significant at the probability of error less than 0.001 which was much lower than our decision criteria ($P < 0.05$). In view of these outcomes, the study concluded that the effects of impoverishment-displacement indicators on occupation were systematic and significant. In view of these results, the study concludes that effects of the oil impoverishment-displacement indicators on occupation were systematic and significant; beyond probability of error or chance.

The multiple regression R was 0.591 and multiple regression R^2 (square) was 0.350 which indicated that 35% of the variation (fluctuation) of household occupation can be attributed to effects of impoverishment-displacement indicators. In other words, emergence of oil industry, related impoverishment and displacement effects accounted for 35% of the challenges (or changes) in household occupation.

Of the seven key predicted drivers of oil impoverishment-displacement, three had significant effects; namely excised/depleted land (Beta=0.235), depleted (eroded) pasture (Beta-0.249), and depleted (eroded) family support (Beta=0.246). The effects of the three indicators were significant at the probability of error less than 0.000 which was also lower than the study's decision criteria of $p < 0.05$.

4.4.8 Displacement and Eroded Wellbeing of Children

The study also also assessed the effects of oil impoverishment-displacement indicators on the wellbeing of the childrfen. We had hypothesized (predicted) that households will experience greater vulnerability to the wellbeing of the children

(particularly depletion of food and health). We predicted also that the key drivers will be included excised (or depleted) inherited land; increased contamination (degradation) of land –or environment; reduced (depleted) access to water sources; reduced access to pasture; reduced livestock; reduced (depleted) household inheritance; and reduced (depleted)family support.

Accordingly, the working hypothesis (H_1) was that there will be substantial effects of oil impoverishment-displacement on wellbeing of the children against the null hypothesis (H_o) that effects of oil impoverishment-displacement on wellbeing of the children will not be significant (or even equivalent to zero). The study's criteria for decision was to accept the null hypothesis if the regression variance was greater than the probability of error 0.05 and to accept the working hypothesis if the regression variance was less than 0.05.

In view of the above hypothesis, a multiple regression to assess the effects of impoverishment-displacement indicators on wellbeing of the children was carried out and the results were summarized in Table 4.37 below.

Table 4. 37 Wellbeing of Childfren and and Displacement Indicators

Regression	Sum of Squares	df	Mean Square	F	Sig.
Regression	222.9	7	31.84	58.45	.000
Residual	212.47	390	0.54		
Total	435.365	397			

R=0.716; R^2 (squared) =0.512

The co-variation of wellbeing of the children and impoverishment-displacement indicators (regression variance) was significant at the probability of error less than 0.001 which was much lower than our decision criteria ($P < 0.05$). The study concluded therefore that the effects of impoverishment-displacement indicators on wellbeing of the children were systematic and significant. In view ocf these results, the study concluded that effects of the oil impoverishment-displacement indicators on wellbeing of the children were systematic and significant; beyond probability of error or chance.

The multiple regression R was 0.72 and multiple regression R^2 (square) was 0.51 which indicated that 51% of the variation (fluctuation or changes) in wellbeing of the children can be attributed to effects of impoverishment-displacement indicators. In other words, emergence of oil industry, related impoverishment, and displacement effects accounted for 51% of the challenges (or concerns) on wellbeing of children.

Of the seven key predicted drivers of oil impoverishment-displacement, four had significant effects namely; depleted (eroded) water sources (Beta 0.431), excised/depleted land (Beta=0.252), family support (Beta 0.241) and family endowment (Beta=0.167). The effects of the four indicators were significant at the probability of error less than 0.000 which was also lower than the study's decision criteria of $p < 0.05$.

4.5 The Nature of Recovery (Rehabilitation)

In section 4.4, the study gave attention to aspects of objective three which was to assess the indicators of oil impoverishment and displacement arising from

exploration and extraction of oil; and in section 4.5 the study addressed objective four which was to assess the effects (impact) of the indicators of oil impoverishment-displacement disruption (reduction and/or depletion) of the livelihoods. Re-establishing access to livelihoods and related resources has been considered necessary measure to reversed erosion (depletion), to guard against poverty and marginalization (Mwangi, 2020; Gannon et al., 2020; Birch, 2018; FAO, 2006). These reports have also emphasized the capacity (resilience) of the household to re-establish access to livelihoods and related resources. Consequently, these reports have emphasized the need to understand existing or emerging household capacities that would enhance capacity to re-establish access to livelihoods and related resources.

Accordingly, this section addresses the fifth objective which was to examine A) the nature of recovery (rehabilitation of the livelihoods) and B) key household characteristics (KHC) that promoted such recovery. Several studies have concluded that extractive industries in Sub-Sahara Africa have typically been accompanied by limited (low) impact on the local population - local livelihoods or reduction of poverty with a symptom that has been described as a natural resource curse (Mwakesi et al., 2020; Chuhan-Pole et al., 2017; Mwakwambirwa, 2015; Downing, 2002). Other studies have considered extraction zones as battlegrounds because of forced displacement, inadequate compensation, inadequate resources distribution and environmental degradation (Calvano, 2008; Adjei, 2007). Even those who were left next to extractive industry endured the burden of reduced livelihoods and contaminated environment.

However, it is also usually expected that under the conditions of adversity (impoverishment and displacement) households will establish ways to overcome such adversity and if possible seize opportunities arising from the extraction industries (ADBG, 2016; World Bank, 2016; ILRI, 2013; Alinovi et al., 2010; Boyden, 2009). Reports have also emphasized the importance of capacity (resilience) of the households to re-stablish access to livelihoods and related resources (Kasie, 2017; EU, 2017; Alinovi et al., 2010). More specifically, these reports have emphasized the need to understand existing or emerging household capacities that would enable them to re-stablish access to livelihoods and related resources.

4.5.1 Indicators of Rehabilitation (Recovery)

The first component of the fifth objective was to assess the nature of recovery (rehabilitation) among the households following impoverishment-displacement process. In order to assess the nature of rehabilitation (recovery), the study identified six key indicators of the recovery which include the overall rating of recovery, re-established new access land, re-established new access to water sources, re-established new access to grazing resources (pasture), progress on livestock restocking, and ventures to urban trade services. Indeed, such procedure has been used in other studies (Chuhan-Pole et al., 2017; Mwakwambirwa, 2015). More specifically, Chuhan-Pole et al. (2017) assessed improvements in welfare as reflected by occupations, accumulation of assets, access to infrastructure, and children's health outcomes.

4.5.1.1 Experience of New Access to Livelihoods

In view of the above, respondents were requested to indicate their experience of established new access to livelihoods, after the initial displacement-vulnerability of the household, in a scale of 1 to 4; where 1) referred to no new access to livelihoods (no recovery, no resettlement); 2) minimal new access to livelihoods (minimal recovery); 3) Had some access to livelihoods (assets); and 4) re-established (repossessed) key livelihoods (assets); and the results were summarized in Table 4.38 below.

Table 4. 38 Re-established New Livelihood Opportunities

Rate of Recovery	1=No recovery (resettlement) 2) Minimal recovery (resettlement), 3= Accessed some livelihoods; and 4=Reestablished (repossessed) key asset/livelihoods	Frequency	Percent
1.	No new access to livelihoods	188	45
2.	Minimal access to new livelihoods opportunities	104	25
3.	Access to new livelihood opportunities	87	21
4.	Re-established access to livelihood opportunities	43	10
	Sub-total	422	1.00
	Missing	4	
	Total	426	

Responses indicated that about 70% of the households had experienced no or minimal recovery; 21% reported access to some livelihoods and only 10% reported that they had re-established (repossessed) key livelihoods assets. According to key informants and the FGD part of the 10% were those who relocated far away from oil extraction sites, and they are those who were hosted by extended family or clan. Although water had been provided as part of the community compensation, they had not been distributed evenly. The same was the case with establishment of schools and dispensaries.

Several studies have examined post-displacement (or displacement vulnerability) phase and reported displaced or vulnerable population continue to experience sustained social and economic impoverishment even after the so-called resettlement (Wilson, 2019; Chuhan-Pole et al., 2019; Owen et al., 2021). According to Wilson (2019), sustained impoverishment in Sierra Leone included loss of land-based resources with an adverse impact on the local livelihoods, limited employment opportunities, and marginalization of the affected population in respect to compensation for lost property.

4.5.1.2Experience of New Access to Land

We have acknowledged that land has been an essential natural resource which also supports a wide range of other fundamental resources (Saygin, 2017). Similarly, it was indicated that even though humans can use technology to stretch the carrying capacity, land is becoming increasingly scarce, finite and contested resource. Besides, involuntary dispossession of land is one of the fundamental effects of extraction industries. In view of such fundamental importance, respondents were

requested to indicate on the same scale their experience of established new access to land after the initial displacement-vulnerability of the household. The results were summarized in Table 4.39 below. The results indicated that over 78% of the respondents had experienced no or minimal renewed access to land, thus limited recovery.

Table 4. 39 Established New Access to Land

Established New Access to land	1=No new access to land, 2= Minimal new access to land 3= New access to land; and 4=Reestablished new access to land	Frequency	Percent
1.	No new access to land	281	67
2.	Minimal new access to land	46	11
3.	Had some new access to land	56	13
4.	Re-established new access to land	36	09
	Sub-total	419	100
	Missing	7	
	Total	426	

Several studies have indicated that loss and of regain some access to land has remained a controversial challenge because mining and extraction industries emerge in areas in which land tenure is poorly defined and institutional capacities are limited (Downing, 2002). Inversely, 22% of the respondents had re-accessed some land. According to key informants and FGD those households were hosted by their extended families or clans. Usually, nomadic pastoralists have scattered access

to pieces of land to support livestock and migratory practices. Others simply diversified to urban settlement and petty trade.

4.5.1.3Experience of New Access to Water Sources

Access to water sources is one of the controversial issues particularly in arid and semi-arid areas. It is well acknowledged that water is essential for all forms of life, a fundamental resource for human survival and socio-economic development. In arid and semi-arid areas, apart from short-lived surface waters that remain after rainstorms, most water resources are underground. In view of such importance, respondents were requested to indicate on the same scale their experience of established new access to water sources after the initial displacement-vulnerability of the household. Results were summarized in Table 4.40 below.

Table 4. 40 Established New Access to Water Sources

Established New Access to Water	1=No new access to water 2) minimal new access to water, 3= had new access to water; and 5=Reestablished new water	Frequency	Percent
1.	No new access to water sources	220	53
2.	Minimal new access to water sources	91	22
3.	Had new access to water sources	73	17
4.	Reestablished new water sources	34	08
	Sub-total	418	100
	Missing	8	
	Total	426	

It was revealed that 75% of the respondents reported no or minimal access to water sources. This will be considered surprising given that the flagship compensation in the oil exploration (extraction) in Turkana South and East was drilling of boreholes and positioning of the water access points. However, according to the key informants and FGD, it has also been a case of too little too late. Secondly, there was limited community education and participation. It was argued that people needed to know and to contribute to the drilling of boreholes and distribution of the access points. Similarly, the ultimate solution will be the development and management of adequate water access points. Women cluster heads and council of elders in an FGD said,*"Tullow also provided water for the community but they were using tanks. Some politicians forced to have a tender of supplying tanked water. Tullow has the capacity of drilling water but some people have made it hard to drill water since they want to supply the water to get rich. Tullow should just drill water for the community so that the water will still be there even after Tullow has left. Tullow drilled its own water. This is an indication that it can drill water. That is the water we rely on now. The one supplied by the tanks has disappeared with Tullow's stoppage of operations. Women and children suffer the most when it comes to lack of water. They are the ones seen on the road and near supply points waiting and carrying water. Water is the biggest problem".*

It will be noted also that another 25% of the respondents reported to have re-established some new water sources. According to the key informants and FGD, these were mixed groups that have accessed some family sources, oil-based water access points and urban water access system. Oil exploration agency and urban

planning have established some collaboration to enhance supply of urban water, particularly Lokichar and Lokori.

4.5.1.4 Experience of New Access to Pasture

As previously stated, even in the normal circumstances, grazing resources (pasture) are typically scarce in arid and semi-arid zones (Dickhoefer, 2010; Jama & Zeila, 2000; Gratzfeld, 2003). By 2011, land and pasture degradation was considered to be more severe in Sub-Saharan Africa (SSA) with estimated 75% of dry lands affected by moderate to high degradation (United Nations, 2011). Anthropogenic influences namely, overgrazing and invader-species were considered as the primary driving forces for pasture degradation (Jama & Zeila, 2000). Accordingly, displacement would precipitate even more acute scarcity.

The term rehabilitation has been used to refer to the entire processes of not only accessing new pasture but also rehabilitating the old grazing resources. In view of these circumstances, respondents were requested to indicate on the same scale their experience of established new access to grazing pasture after the initial displacement-vulnerability of the household. The results were summarized in Table 4.41 below. It was revealed that 77%% of the respondents indicated that they had no or minimal new access to pasture.

Table 4. 41 Established New Access to Pasture

Established New Pasture	1=No new access to pasture, 2) minimal new access to pasture, 3= had new access to pasture; and 5=Reestablished new pasture	Frequency	Percent
1.	No new access to pasture	250	60
2.	Minimal new access to pasture	71	17
3.	Had new access to pasture	86	20
4.	Reestablished new pasture	13	03
	Sub-total	420	100
	Missing	6	
	Total	426	

Conversely, 23% of the respondents indicated that they had some new access to pasture. According to the key informants and FGD some of the households shifted to the sites of their extended family while other respondents diversified to petty trade in urban areas. It has been argued however that sustainable rehabilitation of degraded land and grazing resources has been linked to the nature of land tenure (Reed et al., 2015). More specifically, trust land has been considered a key barrier to sustainable rehabilitation of land and grazing resources. It will be recalled that 65% of land in Kenya is trust land with a large proportion in arid or semi-arid areas of northern Kenya, including Turkana County. Accordingly, it has been suggested that a progress has to be made towards a Secure Land Tenure (SLT) - either individual and/or range (Reed et al., 2015).

4.5.1.5 Experience of Restocked Livestock

It is estimated that livestock support livelihoods of about 13 million pastoralists and agro-pastoralists in various arid and semi-arid areas of Kenya (Okoti, 2019). For the local population, livestock are an important source of food and capital assets. Livestock are also sources of income and social relations. Loss of livestock therefore is directly related to destitution and marginalization (Hefferman, 2004). Therefore, any interruption (depletion) will need to be addressed to ensure continuity of livelihoods. In view of such importance, we assessed experience of the household on restocked livestock after the initial displacement-vulnerability of the household and the results were summarized in Table 4.42 below.

Table 4. 42 Restocked Livestock

Restocked Livestock	1=No restocked livestock; 2) minimal restocked livestock; 3= Restocked part of livestock; and 4=Returned to usual number	Frequency	Percent
1.	No restocked livestock	257	61
2.	Minimal restocked livestock	80	19
3.	Had restocked some livestock	45	11
4.	Returned to Usual restocking livestock	37	09
	Sub-total	419	100
	Missing	7	
	Total	426	

The findings of the study reveal that 80% of the respondents indicated to have had no or minimal restocking and 20% reported to have carried-out some stocking. Key informants suggested that the households that had been able to restock were the same with those who had accessed pasture at different sites of the extended family. However, the FGD observed that 1) livestock has traditionally been the main source of household income; 2) combined process of climate changes and oil extraction have increased the rate of livestock-poor households; 3) the same processes have also contributed to Household Livelihood Diversification (HLD) including some of the households pursuing urban support services and petty trade.

Studies in Africa and the neighboring Marsabit County have reported similar trends (Birch, 2018; Mburu et al., 2017; De Haan et al., 2016). Indeed, De Haan et al. (2016) estimated that by 2030, 77% of the pastoralists and 55% of the agro-pastoralists across Africa will have insufficient livestock to stay above the poverty line and, therefore, should look for alternatives. However an FDG among the KRAL leaders showed that there had been compensations but after the community protested by blocking the road. Compensation for instance would be given, if there is was accident that killed livestock and the owner would be compensated after assessment. For instance, a camel was compensated for 180,000ksh However, the commnuity started driving thier livestock to the roadside to be hit to then get compensation.Such indicators point to a commnutiy with no hope of recovery and the only means of sustaining a livelihood would be extreme to enable restocking.

4.5.1.6 Experience of Urban Services

Studies have emphasized that urban services and trade provide alternative to livestock-based assets and livelihoods (Ngugi & Nyariki, 2020; Akuja & Kandago, 2019; Birch, 2018; ILRI, 2017). The same reports have also emphasized urban services and trade have been relatively efficient in enhancing livelihoods in arid and semi-arid regions. In addition, a reasonable network of urban centres has emerged in Turkana County (CGOT, 2020; CGOT, 2018; CGOT, 2016). In view of such importance, the study assessed experience of new access to urban services and trade; and the responses were summarized in Table 4.43 below.

Table 4. 43 Experience of Urban Services (Trade)

Experience of Urban Services	1=No experience of Urban Services, 2) Minimal experience, 3) Extensive experience, and 4) Had established Urban Services (Trade)	Frequency	Percent
1.	No experience of urban servobaices, trade	245	58
2.	Minimal experience of urban services, trade	103	24
3.	Extensive experience of urban services, trade	57	14
4.	Had established urban services, trade	17	04
	Sub-total	422	1.00
	Missing	4	
	Total	426	

Responses indicate that 82% of the households had not or minimal experience of the urban services or trade and only 18% had extensive or actually had been able to

established urban services or trade. Other reports indicate that 9% of the population in the County rely on urban livelihoods (CGOT, 2019).

4.5.2 Effects of Socio-Economic Characteristics on Recovery

As applied in the previous section, the broad working hypothesis was that key household characteristics that included age, education, and income would contribute to the recovery of the affected households against the null hypothesis that such key characteristics did not influence the recovery of the affected households. Accordingly, the study assessed the effects of 1) age of the head of the household; 2) education of the head of the household; 3) education of additional household member; 4) monthly earnings; 5) occupation of the household head; and 6) family size.

In order to identify characteristics that contributed to recovery, the multiple regression analyses was again used and it provided the reseracher with an oportunity to assess simultaneously the effects of each individual characteristic and the joint effect. Indeed, multiple regression analyses was considered appropriate because of two key reasons; 1) interval level of categorization from 1 to 4 for both key household characteristics and the indicators of recovery; and 2) the need to assess the interaction of several household characteristics during the recovery phase. The objective was to assess the individual and joint contribution of six (6) key household characteristeristics.

4.5.2.1 Effects of Socio-Economic on Access to New Livelihoods

Following any disruption (depletion) of livelihoods, establishing new access to livelihoods was an immediate priority for any household. Therefore, the study assessed characteristics of households that contributed to the new access to livelihoods. The working hypothesis (H_1) was that key characteristics had contributed significantly to the rehabilitation of the livelihoods. Similarly, the null hypothesis (H_o) was that key characteristics had not contrinuted to the rehabilitation of the livelkihoods. Thge study criteria for decision was to accept the null hypothesis if the regression variance was greater than the probability of error 0.05 and to accept the working hypothesis if the regression variance was less than 0.05. In view of these hypotheses, a multiple regression was carried out to assess the effects of six key characteristics on new access to livelihoods and results were summarized in Table 4.44 below.

Table 4. 44 Effects of Socio-Economic on Access to New Livelihoods

Regression	Sum of Squares	df	Mean Square	F	Sig.
Regression	93.0	6	15.5	48.21	0.000
Residual	73.3	228	0.32		
Total	166.3	234			

R=0.560; R^2 (squared) =0.312

Results indicated that the multiple regression effects (multiple regression line) of the key characteristic on new access to livelihoods was significant at the probability of error less than 0.001 which was much lower than the study's decision criteria (P

< 0.05). Therefore, the study concluded that the effects of the key characteristic on new access to livelihoods were systematic and significant. In view ocf these results, the study concluded that effects of the key characteristic on new access to livelihoods were systematic and significant; beyond the probability of error (or chance).

The strength of the effects were reflected by multiple regression R=0.56 and R^2 (square) =0.31; which indicated that 31% of the variation (fluctuation and changes) in access to new livelihoods arose from key characteristics of the households. Of the six key characgtersitics 1) education of the head of the household (P < 0.001); 2) education of additional household member (P < 0.01); and 3) the family size (P < 0.02) were systematic and significant beyond the probability of error. Based on these results, it was concluded that education of the household and the family size were fundamental drivers of the recovery (or rehabilitation of the livelihoods).

4.5.2.2 Effects of Socio-Economic on New Access to Land

Excised or degraded land is usually followed by searching for alternatives. Accordingly, the study assessed characteristics of the households that contributed to the new access to land. The working hypothesis (H_1) was that key characteristics contributed significantly to new access to land and the null hypothesis (H_o) was that key characteristics had not contributed to new access to land. The criteria for decision in the study was to accept the null hypothesis if the regression variance was greater than the probability of error 0.05 and to accept the working hypothesis if the regression variance was less than 0.05. A multiple regression was carried out

to assess the effects of six key characteristics on new access to land and results were summarized in Table 4.45 below.

Table 4. 45 Effects of Socio-Economic on New Access to Land

Regression	Sum of Squares	df	Mean Square	F	Sig.
Regression	23.738	6	3.96	7.96	0.000
Residual	65.635	132	0.50		
Total	89.373	138			

R=0.516; R^2 (squared) =0.265

Results indicate that the effects (multiple regression variance) of key household characteristics on new access to land was significant at the probability of error less than 0.001, which was much lower than our decision criteria ($P < 0.05$). Accordingly, the study concluded that the effects of the key household characteristic on new access to land were systematic and significant. More specifically, the study concluded that effects of the key characteristic on new access to land were systematic and significant beyond the probability of error (or chance).

The strength of the effects were reflected by multiple regression R= 0.52 and R^2 (square)=0.27; which indicated that 27% of the variation (fluctuation, changes) in new access to land can be attributed to key characteristics of the households. Of the six key characgtersitics 1) education of the head of the household ($P < 0.001$), 2) the family size ($P < 0.001$) and monthly earnings ($P < 0.02$) were systematic and significant as well as beyond the probability of error. Based on these results, it was

concluded that education of the household, family size and monthly earnings were key drivers of the recovery (or rehabilitation of access to land).

4.5.2.3 Effects of Socio-Econ0mic on Access to New Water Sources

Similarly, the study assessed characteristics contributing to the new access to water sources. The working hypothesis (H_1) was that key characteristics of the household had contributed significantly to the new access to water sources and the null hypothesis (H_o) was that key characteristics had not contrinuted to the new access to water sources. The criteria for decision in this study was to accept the null hypothesis if the rmultiple regression variance was greater than the probability of error 0.05 and to accept the working hypothesis if the multiple regression variance was less than 0.05. Accordingly, a multiple regression was carried out to assess the effects of the six key characteristics on new access to water sources and results were summarized in Table 4.46 below.

Table 4. 46 Effects of Socio-Economic on Access to New Water Sources

Regression	Sum of Squares	df	Mean Square	F	Sig
Regression	51.6	6	8.6	35.9	.000
Residual	46.0	192	0.24		
Total	97.7	198			

R=0.528; R^2 (squared) =0.281

The effects (multiple regression variance) of the key characteristic on new access to water sources was significant at the probability of error less than 0.001 which was

much lower than the study's decision criteria ($P < 0.05$). Therefore, it was concluded that the effects of the key household characteristic on new access to water sources were systematic and significant. In view ocf these results, the study concluded that effects of the key household characteristic on new access to water sources were systematic and significant; beyond the probability of error (or chance).

The strength of the effects were reflected by the multiple regression $R = 0.53$ and R^2 (square) = 0.28; which indicated that 28% of the variation (fluctuation, changes) in new access to water sources can be attributed to key characteristics of the households. Of the six key characgtersitics 1) education of the head of the household ($P < 0.001$); 2) monthly earnings ($P < 0.01$); and 3) the family size ($P < 0.01$) were systematic and significant as well as beyond the probability of error. Therefore, education of the household, household income, and the family size were fundamental drivers of the recovery (or rehabilitation of water sources).

4.5.2.4 Effects of Socio-Economic on Access to New Grazing Resources

The study also assessed the characteristics of the household that contributed to the new access to grazing resources. The working hypothesis (H_1) was that key characteristics of the household had contributed significantly to the new access to grazing resources and the null hypothesis (H_o) was that key characteristics had not contrinuted to the new access to grazing resources. Tyhe study's criteria for decision was to accept the null hypothesis if the rmultiple regression variance was greater than the probability of error 0.05 and to accept the working hypothesis if the multiple regression variance was less than 0.05.

Accordingly, a multiple regression was carried out to assess the effects of the six key characteristics on new access to grazing resources and results were summarized in Table 4.47 below.

Table 4. 47 Effects of Socio-Economic on Access to New Grazing Resources

Regression	Sum of Squares	df	Mean Square	F	Sig.
Regression	22.9	6	3.82	12.3	.000
Residual	50.9	164	0.31		
Total	73.8	170			

R=0.556; R^2 (squared) =0.310

The effects (multiple regression variance) of the key characteristic on new access to grazing resources was significant at the probability of error less than 0.001 which was much lower than decision criteria ($P < 0.05$) of the study. Therefore, it was concluded that the effects of the key household characteristic on new access to grazing resources were systematic and significant. In view ocf these results, the study concluded that effects of the key household characteristic on new access to grazing resources were systematic and significant as well as beyond the probability of error (or chance).

The strength of the effects were reflected by the multiple regression R=0.56 and R^2 (square) was 0.31, which indicated that 31% of the variation (fluctuation or changes) in new access to grazing resources can be attributed to key characteristics of the households. Of the six key characgtersitics 1) education of the head of the household ($P < 0.001$); 2) the family size ($P < 0.01$); and monthly eanings were

systematic and significant as well as beyond the probability of error. Therefore, education of the household, the family size and monthly earnings ere fundamental drivers of the recovery (or rehabilitation of grazing resources).

4.5.2.5 Effects on Restocked Livestock

Similarly, the study assessed the effects of the household characteristics on restocking of livestock. The working hypothesis (H_1) was that key characteristics of the household had contributed significantly to restocking of livestock and the null hypothesis (H_o) was that key characteristics had not contrinuted to restocking of livestock. The criteria for decision in this study was to accept the null hypothesis if the rmultiple regression variance was greater than the probability of error 0.05 and to accept the working hypothesis if the multiple regression variance was less than 0.05. For that reason, a multiple regression was carried out to assess the effects of the six key characteristics on restocking of livestock and results were summarized in Table 4.48 below.

Table 4. 48 Effects on Restocking of Livestock

Regression	Sum of Squares	Df	Mean Square	F	Sig.
Regression	29.941	6	4.99	7.7	0.000
Residual	108.018	166	0.65		
Total	137.959	172			

R=0.466; R^2 (squared) =0.217

It will be noted that the multiple regression effects (multiple regression variance) of the key characteristic on restocking of livestock was significant at the probability of

error less than 0.001 which was much lower than our decision criteria ($P < 0.05$) and therefore we concluded that the effects of the key household characteristic on restocking of livestock were systematic and significant. In view ocf these results, we concluded that effects of the key household characteristic on restocking of livestock were systematic and significant; beyond the probability of error (or chance).

The strength of the effects were reflected by the multiple regression $R=0.47$ and R^2 (square) =0.22; which indicated that 22% of the variation (fluctuation, changes) on restocking of livestock can be attributed to key characteristics of the households. Of the six key characgtersitics 1) education of the head of the household ($P < 0.001$), 2) the family size ($P < 0.01$) and monthly eanings. Based on these results, we concluded therefore that education of the household, the family size and monthly earnings ere fundamental drivers of the recovery (or rehabilitation of grazing resources).

4.5.2.6 Effects on Ventures on Urban Trade Services

The study also assessed the effects of the household characteristics on ventures of urban trade services. The working hypothesis (H_1) was that key characteristics of the household had contributed substantially to ventures of urban trade services and the null hypothesis (H_o) was that key characteristics had not contrinuted to ventures of urban trade services. The study's criteria for decision was to accept the null hypothesis if the rmultiple regression variance was greater than the probability of error 0.05 and to accept the working hypothesis if the multiple regression variance was less than 0.05. For that reason, a multiple regression was carried out to assess

the effects of six key characteristics on ventures of urban trade services and results were summarized in Table 4.49 below.

Table 4. 49 Effects on Urban Trade Services

Regression	Sum of Squares	df	Mean Square	F	Sig.
Regression	55.4	6	9.23	8.37	.000
Residual	111.3	101	1.10		
Total	166.7	107			

R=0.576; R^2 (squared) =0.332

The effects of the key household characteristics on ventures of urban trade services was significant at the probability of error less than 0.001 which was much lower than the study's decision criteria ($P < 0.05$). Therefore, the effects of the key household characteristic on ventures of urban trade services were systematic and significant. In view of these results, it was concluded that effects of the key household characteristic on ventures of urban trade services were systematic and significant; beyond the probability of error (or chance).

The strength of the effects were reflected by the multiple regression R=0.58 and R^2 (square)=0.33 which indicated that 33% of the variation (fluctuation or changes) on ventures of urban trade services can be attributed to key characteristics of the households. Of the six key characgtersitics 1) education of the head of the household ($P < 0.001$); 2) monthly eanings ($P < 0.001$); and 3) the family size ($P < 0.01$) were systematic and significant as well as beyond the probability of error. Therefore, education of the household, monthly earnings, and the family size were

fundamental drivers of the recovery (or emergence of ventures of urban trade services).

4.6 Resource Rights and the Nature of Compensation

The sixth objective of the study was to assess the nature of compensation to the oil-affected population in South East of Turkana County. This objective was addressed in four levls 1) land rights; 2) provisional compensation; 3) the household compensation; and 4) the community based compensation.

4.6.1 Land Rights

About seven (7) legal instruments have addressed rights, access, and control of land in Kenya including the UN human rights declaration (1948); the independence constitution of Kenya (1963); Articles 40 and 63 of the 2010 constitution of Kenya; the Land Act of (2012); the Land Registration Act (2012); and the Community Land Act (2016).

Similarly, after World War II and at the dawn of independence for the developing countries, UN declared the 1948 Human Rights Declaration (UNHRD) in which Article 17 which made it clear that everyone has a right of owning property either alone or with others. It also guaranteed that no one shall be deprived of his property (Assembly, 1948). This remarkable declaration guided constitutional and legal frameworks for most of the developing countries on equity, property, and land. The independence constitution of Kenya (1963) adopted a framework more or less consistent with the 1948 Universal Human Rights.

Nonetheless, subsequent constitutional and legal frameworks were considerably more progressive. Based on the revised constitution of Kenya (2010), the Land

Registration Act (2012) revised, consolidated, and rationalized the registration of titles to land, operationalized the role of devolved government, related principles and objects on land registration, and for connected purposes. Further, the Community Land Act (2016) operationalized Article 63 (5) of the Constitution of Kenya to provide recognition, protection, and registration of community land rights; management and administration of community land; and guided the role of county governments regarding unregistered community land and for connected purposes.

More specifically, article 5 of the Community Land Act (2016) outlines series of basic rights including the fact that every person shall have the right to acquire and own properly either individually or in association with others according to Article 40 of the Constitution. It also provides that customary land rights shall be recognized, adjudicated for, and documented for purposes of registration in line with this Act and any other written laws. Similarly, it also provides that customary land rights, including those held in common shall have equal force and effect in law with freehold or leasehold rights acquired through allocation, registration, or transfer (GoK, 2016).

In addition, Article 6 of the Community Land Act outlines the role of the County Government in community lands including such roles as the county governments holding all unregistered community land in trust on behalf of the communities for which it is held. The respective county government is also supposed to hold in trust for a community any monies payable as compensation for compulsory acquisition of any unregistered community land. Also, the respective county government shall

promptly release to the community all such monies payable for compulsory acquisition upon registration of community land. Any such monies shall be deposited in a special interest earning account by the county government and any transaction in relation to unregistered community land within the county shall be in accordance with the provisions of this Act and any other applicable law (GoK, 2016).

It is well established that Turkana people evolved and adapted to a common land tenure which included related resources particularly water and pastures. Such land tenure was adopted in the independence constitution of Kenya (1963). However, the 2010 constitution of Kenya classified land into three (3) categories; namely a) public, b) private and c) community land. The three categories of land were subsequently regulated by the same constitution of Kenya (2010), the Land Act (2012), the Land Registration Act (2012), and the Community Land Act (2016).

However, the early part of the oil exploration and extraction did not benefit fully from the Land Act (2012), the Land Registration Act (2012), and the Community Land Act (2016) as they were being implemented simultaneously and particularly the last one which was enacted later and still under gradual implementation. Indeed, the present constitutional and legal framework including the Land Act (2012), the Land Registration Act (2012), and the Community Land Act (2016) prohibit arbitrary eviction of persons from their land without prompt compensation. However, these sets of constitutional and legal frameworks were not followed adequately and/or corerctly.

More importantly, there was no adequate (comprehensive) community land register and was, therefore, virtually a nightmare to identify valid member, correct representation in the stakeholder engagement, and in addressing the compensation. With valid membership list and evidence. It was also difficult for members to claim any representation in stakeholder engagement and evetaully claim any compensation directly to Tullow Oil Plc or related agencies that included county and the national governments. Therefore, households could not sell their portion voluntarily and even relocate voluntarily.

In view of the long standing traditional, constitutional, and legal framework for common land tenure, compensation for the land curved out and related resources emerge as a contested and a controversial issue. Besides the understanding (mainly by the counsil of elders and some unit of the local government) that each household had a right of access and use of approximately two hectares of land, there were no regisgtered rights (or any documented evidence). This simple and straight foward fact made it difficult for household to launch any direct claim to the Tullow Oil Plc and related agencies that included local and the national governments.

Ironically, even though the Constitution of Kenya 2010 and related laws including the Land Act (2012) prohibit arbitrary eviction of persons from their land without prompt compensation, the community land did not reflect an individual owner or household. There was also no evidence of their share and, therfore, could not claim any compensation directly to Tullow Oil Plc and/or related agencies – the county and the national governments. Again, households could not sell their portion voluntarily and even relocated voluntarily.

4.6.2 Negotiations and Stakeholders' Engagement

In view of the above circumstances, the consortiun of Tullow Oil Plc, the government, and selected elders agreed on compensation consisting of 5% of the oil revenue to the community or household (who are actually demanding 10%) and direct 20% of the oil revenue to the County Government (as the trustee). Other benefits include unspecified percent through the National Government and the Corporate Social Responsibility (CSR). These key elements of the agreed compensation are summarized in Table 4.50 below.

Table 4. 50 Provisional Compensation

Component	Percent of Oil Revenue
Local communities (households)	a. Offered 5% b. Contested demand 10%
County Government (trustee)	a. Direct 20% b. Some unspecified percent through the National Government
Community/County Government	Corporate Social Responsibility (CSR)

Source*:* GOT Report (2020) and FAO/PDN (2018**)**

Further, even though there had been some aspects of the community engagement by 2017, the consortium of the Tullow Oil Plc did not achieve full Free Prior and Informed Consent (FPIC) from affected pastoral communities (FAO/PDN, 2018; UN-Habitat, 2016). Indeed, various authorities have argued that the discovery of oil should have been followed by either a law or structured process to support education and negotiations with the local population towards compensations for the lands that would be curved out of their respective areas for exploration, extration, and transportation of oil. This process would have also enabled the local population

to secure their livelihoods including residential and ceremonial sites, water resources, livestock and related resources (salt licks and water), and grazing resources such as seasonal pastures, migratory routes. There is also a need for collaboration in planning for operations of extraction activities and environmental standards (FAO/PDN, 2018; UN-Habitat, 2016).

4.6.3 Awareness of Household Compensation

In view of the above objective, respondents were requested to indicated whether or not they were aware of any household compensation from oil related displacement vulnerability and the results were summarized in Table 4.51 below.

Table 4. 51 Awareness of Household Compensation

Responses	Frequency	Percent
Yes	132	33.9
No	257	66.1
Sub-total	389	100.0
Missing	37	
Total	426	

The findings reveal that 66% of the households reported that they were not aware of the household compensation from oil-related displacement vulnerability and 34% indicated that they were aware. According to key informants and local officials part of the challenge was the absence of the law and structured process to guide the process of education and negotiation toward compensation for the lands that would be curved out of their respective areas for exploration, extration, and

transportation of oil, and to enable the local population secure their livelihoods. Key informants and local officials were of the view that most of the local people had limited information and are subsequently racing to catch-up with the whole process of exploration, extration, and transportation of oil in South and East of Turkana County. An FGD conducted in Lokichar with women cluster elders and council of elders revealed that there was compensation but it was not enough. Tullow was able to hire some youth .Among the respondents, there were three women whose children were employed with Tullow. *"Oil activities did not embrace everyone. Most of us here do not know where and how the oil is drawn. We are not allowed entry into oil wells. Most people were not employed by Tullow, Giving out of jobs and cars do not benefit the ordinary members of the community".*

4.6.4 Benefits from Household Compensation

Further, respondents were requested to indicated whether or not they recieved any benefits from household compensation towards lands that were curved out of their respective areas for exploration, extration, and transportation of oil to enable the them secure their livelihoods. The results were summarized in Table 4.52 below.

Table 4. 52 Received Household Compensation

Responses	Frequency	Percent
Yes	46	11.7
No	348	88.3
Sub-total	394	100.0
Missing	32	
Total	426	

It was interesting to note that 88% of the households indicated that they did not receive any benefits from the household compensation toward lands that were curved (excised) out of their respective areas for exploration, extration, and transportation of oil to enable them secure their livelihoods. Conversly, only 12% reported that they received some benefits from the household compensation toward lands that were curved (excised) out of their respective areas for exploration, extration, and transportation of oil to enable them secure their livelihoods.

4.6.5 Awareness of Community Based Compensation

Respondents were also requested to indicate whether or not they were aware of any community-based compensation from oil-related displacement vulnerability. As summarized in Table 4.53 below, 63% of the respondents indicated that they were not aware and 37% indicated that they were aware.

Table 4. 53 Awareness of Community Based Compensation

Responses	Frequency	Percent
Yes	127	37.5
No	212	62.5
Sub-total	339	100.0
Missing	87	
Total	426	

According to key informants and FGDs the distinction between household and community-based compensation was not clear. The distinction was left to a group of selected elders who decided which one was applicable. However, community-

based compensation resonated with the principle of community land and, therefore, selected projects such as primarily water projects, health units (dispensaries), schools and causal labor employment were considered as necessary community compensation.

4.6.6 Benefits from Community-Based Compensation

In addition, respondents were requested to indicate whether or not they received any community-based benefits from oil related displacement vulnerability. As summarized in Table 4.54 below, 70% of the households indicated that they did not receive any community-based compensation and 30% indicated that they received some community-based benefits. In principle, the study established that 30% of the households benefitted from community-based compensation and only 12% of the households benefitted from household compensation

Table 4. 4 Received Community Based Compensation

Responses	Frequency	Percent
Yes	100	29.5
No	239	70.5
Sub-total	339	100.0
Missing	87	
Total	426	

It will be noted that the proportion of those who had received some benefits increased by 18% (from 12% to 30%).

This was because some of the households were able to access water from the public water points, other were able to access health units and schools. However, according to key informants and FGD, the whole oil exploration, extraction, and development should be re-opened for further education, negotiation, and structured compensation guidance since inadequate information is against the rights of the pastoralist as outline in the constitution.

4.7 Proposed Mitigation Measures

The previous section addressed the fifth objective of the study; namely to assess the land rights and the nature of compensation to the oil-affected population in South East of Turkana County. This section examines the sixth objective which was to assess necessary mitigation measures from the perspective of the local population; particularly when it comes to reducing the vulnerabilities related to exploration and extration of oil in South East of Turkana County. This was important because local communities knew the challenges that they had encountered and possible measures to reduce those challenges. Further, it was considered a good practice to enable the local population to contribute to solutions as far as their challenges are concerned.

Accordingly, households were requested to indicate one key measure to reduce present challenges (vulnerabilities) related to exploration and extrastion of oil. In this context, ten (10) key proposed measures were sumarized in table 4.55 below. It will be noted that 20% of the households requested improved communication and information. The FGDs and key informants reported that they had not been given any communication or information in respect to the exploration and extraction of

oil, or other resources, around the areas of their traditional habitat (homestead, pasture, and livelihoods).

Table 4. 55 Measures to Reduce Oil Extraction Vulnerabilities

	Responses	Frequency	Percent
1.	Improve communication and information	82	20
2.	Enhance participation in mapping affected areas	71	17
3.	Establish ways to identify correct land beneficiaries	70	17
4.	Register community land and provide title deeds	53	13
5.	Relocate affected household (suitable land and homestead with water sources)	47	11
6.	Replace lost (depleted) livestock	33	08
7.	Adequate and equal compensation to replace lost asset	21	05
8.	Establish education and health facilities	17	04
9.	Provide job, employment opportunities	13	03
10.	Community training for business skills	11	03
	Sub-total	418	
	Missing	8	
	Total	426	

Equally important to note, 17% of the households indicted the need for community participation in mapping areas of potential oil exploration and extraction. FGDs with members from these households argued that such participation would provide them with adequate information about possible exploration and extraction of oil.

They reasoned also that such participation will enable them to prepare adequately for alternative site for habitual homestead and livelihoods.

Still, another 17% of the households indicted the need to establish a way of identifying correct land beneficiaries. Results from FGDs emphasized that the oil consortium led by Tullow Oil Plc. worked with selected elders who were not able to represent the local population effectively. In their knowledge, most of the local population were not considered and maintained that the government and Tullow Oil Plc. should have a way of identifying correct land beneficiaries.

It will be noted also that another 13% were more specific that there should have been a legitimate register of the community parcels of land to facilitate proper and correct shareholders and, therefore, correct beneficiaries. These households reported that it was difficult to address (or confront) the govenmemt and Tullow Oil Plc. without such register.

Still another 11% of the households reported that affected household should have been relocated to suitable land and homestead with provision of water sources. These households argued that in Turkana custom and tradition, alternative settlements were areas mapped out with suitable water sources (springs or wells) and good pasture. These households emphasized that such traditional guidance should have been followed. Key informants and FGD also emphasized that in the absence of a legal framework, traditional practice should have been followed. They argue that no one should have been pushed to abject poverty and marginalization.

Similarly, 8% of the households indicated that lost (depleted) livestock needed to be replaced. However, key informants and FGD thought replacing the livestock

would need to be considered as part of the package for relocation consisting of land, homestead, provision of water sources and a herd of livestock. Some equated land exchange to dowry and the land excised (curved off) should have been exchanged with alternative land, home stead, provision of water sources and a herd of livestock. A number of other measures were indicated including adequate compensation (5%), education and health facilities (4%), employment opportunities, and community training for business skills (3%).

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

In this chapter, we present the summary of the findings, conclusions and recommendations based on the order of the objectives.

5.1 Environmental Conditions

The study observed that environmental conditions in the Turkana County are considerably challenging. Approximately, 30% of the soil in the county is considered moderately suitable for agricultural production, largely because of evapo-transpiration associated with low rainfall and high temperatures. The county is characterized by four (4) ecological zones; very arid (65%), arid (29%), semi-arid (3%), and other zones (3%). In addition, the Drought Severity Index (DSI) indicated that between 1950 and 2012, the cycle of droughts increased in frequency and severity in the County (Opiyo et al., 2015).

Experts indicate that dominant type of soil in the county are arenosols, regosols, fluvisols, solonetz, planosols, and cambisols. Of these types, fluvisols, cambisols, and planosols are considered to have great potential of productivity for biodiversity. For that reason, it is considered that pasture and crops will flourish in such type of soil under systematic management trees (Oduor et al., 2012).

Presently, the county is divided nto six (6) livelihoods zones; namely Border pastoral, Central pastoral, Kerio Agro-pastoral, Turkwel Agro-pastoral, Lake Turkana Fishing Agro-pastoral, and Lodwar Urban Livelihoods (ILRI, 2008; FEG, 2016). Major development projects in the County include irrigation schemes, Hydro Power, exploration and extraction of crude oil (Block 10BB and Block 13T),

and the potential for geothermal, solar and wind energy in various regions of the Turkana County.

5.2 Demographic and Socio-Economic Characteristics

The first objective of the study was to assess demographic and socio-economic characteristics of the population in South Lokichar-Kochodin Basin. Although some of the demographic characteristics were similar to the national characteristics, there were areas of substantial differences. Key differences included the levels of education, occupation of the households, land tenure and ownership.

While education is typically considered as a mechanism to improve the socio-economic wellbeing of the people and to reduce inequalities, 88% of the household had no formal education or had only primary education. Although the net enrolment in primary education had reached 72%, the net enrolment for secondary education remained around 11% (CGOT, 2016). These findings were substantially similar to those of the KIHBS (2018) which indicated that 68.6% had no formal education in Turkana County. A glimmer of hope was an observation that 40% of the households had at least one member who had completed primary education. Therefore, education remains a critical challenge in respect to enabling household to develop capacities to address their environmental challenges.

The study established that 84% of the households maintained vulnerable occupations where 63% relied on vulnerable livestock either as owners or herders; and 21% carried-out vulnerable petty trades including charcoal burning. The study established also that the average livestock per household in SLKB and in the entire has witness progressive erosion (reduction) because of a number of processes

including environmental variability, exploration and extraction of oil. The study established also petty trade generated limited or indeed negligible income. In view of such occupations, a clear and aggressive agenda will be necessary to transform rural occupations in Turkana County to sustainable occupations that would be able to support the wellbeing and the welfare of the people.

Although 41% of the households reported owning the parcel of land hosting their residence (homestead), 32% by the extended family, and 27% by the clan, the entire rural land in Turkana County has been maintained as a community land. Such lands have typically been access to all members of the community or clan and held in trust by the County Government (GOK, 2016; Opiyo, 2014; Oduor et al., 2012). For that reason, leasing of community land has, threfore, been regulated by the county government and a council of elders. Within this framework, it is estimated that a household has access of approximately two hectares of land (FAO/PDN, 2018; UN-Habitat, 2016). Although the constitution of Keya 2010, related legislations Land Act (2012), the Land Registration Act (2012), and the Community Land Act (2016) have provided mechanisms toward registration of the community lands, it was curious to note that the shareholders (households) of virtually all the community land have not been registered. Accordingly, rural unregistered land remains more of a serious challenge in Turkana County.

In respect to the livestock, the study established three aspects. First, livestock have been a treasure, a critical livelihood, source of wealth and a mechanism of social relation within and between households, families, relatives and even enemies. Raids are carried out to restock the livestock; or to revenge stolen livestock.

Secondly, because of the cycle of droughts and other forces, the average household livestock (AHL) has been shrinking pushing an increasing proportion of households into abject poverty. The study noted that according to ILRI, by 2008 the AHL consisted of 34.1 goats, 17.0 sheep, 3.7 cattle and 2.3 camels; as compared to AHL of 4 goats, 3 sheep, 3 cattle, 3 camels and 2 donkeys established by the study. This comparison which was also consistent with other reports reflected a reducing average composition of livestock and increasing proportion of households in abject poverty. At present, it is possible to have a household with only 3 goats.

The study established also that South Lokichar-Kochodin Basin and the region has continue to witness low livestock productivity (LLP) because of various processes including recurrent drought and related inadequate water and feeds, insecurity, common land tenure, poor breeds and breeding practices, endemic livestock diseases and poor livestock husbandry. In view of the importance of the livestock, it will be necessary to adopt effective measures to revamp, revitalize the livestock and agro-pastoralism, reverse the trend of the reduction in average household livestock, and to rescue greater proportion of the households from abject poverty. Of course, the study noted also there have been research and experiments towards revamping, revitalizing the livestock and agro-pastoralism which would need to be accelerated.

Similarly, the survey observed that the average monthly household income (AMHI) was KES 3500 which was equivalent to KES 117 per day (or $ 1). These figures were below poverty line as compared to the definition of approximately KES 3,252 per month in Kenya and the international standard of $1.90 per pay. This

observation was consistent with the report that 79.4% of the population in the Turkana County lived below poverty line of $1.90 per pay (CGOT, 2018; UNDP, 2018; KNBS 2013). Similarly, the study observed that 60% of the households lived in manyatta type of houses (or Landhi), 22% lived in shanties, and 18% lived in semi-permanent structure. Some of these structures were permanent structure in urban areas.

These observations were consistent with the observations that 60% of the households lived in manyatta type of houses (or Landhi), 22% lived in shanties and 18% lived in semi-permanent structure; some of which were permanent structure in urban areas. In addition, the study established that by 2018 the per capita GDP in KES in the County was 69.8 (CGOT, 2018; UNDP, 2018; KNBS, 2013). In addition, available reports indicated that local population experienced limited availability of and access to food resources which pushed them to chronic, acute food insecurity and malnutrition. Accordingly, most population experienced varied levels of Global Acute Malnutrition (GAM) which exceeded emergency levels most of the time. In view of such circumstances, it will be necessary to put in place measures that would improve the the average monthly household income (AMHI). For example, it will be necessary to set a target of KES 8000 average monthly household income (AMHI); which would be approximately $ 2.3 per day. Where necessary, Unconditional Basic Income (UBI).

In summary, study observed that SLKB was largely arid and semi-arid region in which livelihoods were based on livestock herding and production. Various indicators indicated that up to 78% of the households lived within the margins of

the chronic poverty; in which the cycles of droughts drive most of the households to extreme poverty. The average household livestock (AHL) has been reducing over the years from 34 goats, 17 sheep and 4 cattle to 4 goats, 3 sheep and 3 cattle. In addition, 77% of the housholds had limited education, and 75.3 of the housholds had vulnerable occupations (livestock herdig and Charcoal burning). Basically, all the households lived in a community land; owned, accessed and used based on the customary land rights and theredfore had no formal land rights. Sources of income have remained livestock and livestoc products which have been largely seasonal and subject the cycles of droughts.

5.3 Nature of vulnerability, Reduction of Liveliohoods

The study also addressed objective two which was to assess the nature of livelihoods, indicators, and vulnerabilities in South East of Turkana County. Based on the average of the seven (7) indicators, the study established that 77% of the households experienced varied levels of risk, reduction, or deficiency of livelihoods; in which 53% experienced moderate reduction of livelihoods and 24% experienced severe reduction of livelihoods. More specifically, the study indicated that 78% of the households experienced varied levels of reduced livelihoods; in which 47% experienced moderate loss of livelihoods and 31% experienced severe loss of livelihoods. A number of reports indicated that the risk of reduced livelihoods has been widespread among the rural households in the County (ILRI, 2008; Campbell et al., 2002). Still recent reports indicated that by 2013, 15% of the households had experienced minimal reduction of livelihoods, 60% had

experienced moderate reduction of livelihoods and 25% had experienced severe reduction of livelihoods (HEA & FEG, 2013).

In addition, the study established that 78% of the households experienced varied levels of risk to reduced food intake; in which 55% experienced moderate reduction and 23% experienced severe reduction of food intake. Other studies had reported that an average of 72% to 80% of the rural households were experiencing acute deficiency of food intake; particularly in respect to food-based recommendations (FBRs) and recommended nutrient intakes (RNIs) ((KIHBS, 2018; CDH, 2018; Few et al., 2015; Opiyo et al., 2015). In addition, Smart Nutrition Surveys (SNS) reported increased reduction (deterioration) of nutritional indicators in Turkan County; particularly in respect to children and women; and most of the households remained within phase 4 of the IPC classification of food insecurity; particularly with weighted global acute malnutrition (GAM) of 25.6% (CDH, 2019).

In respect to seasonal household earnings, the study established that 76% of the households experienced varied levels of risk to reduction of seasonal household earning; where 53% experienced moderate deficiency and 23% experienced severe reduction of the seasonal household earnings. Available reports also indicated that the average seasonal earnings (ASE) reduced from KES 6210 ($ 55) to KES 3910 ($ 35) or daily earnings of KES 130 ($ 1.2) or progressively less (HEA & FEG 2013). Indeed, FEG (2013) reported that ASE had reduced to KES 30,700 ($ 279) per year which translated to KES 2,557 ($ 23.3) per month and KES 85.2 ($ 0.77) per day.

Similarly, 78% of the households reported varied levels of disease burden where 56% reported moderate increase of disease and 22% indicated severe increase of diseases. Seasonal Household Earnings reflected deterioration from an average of KES 31,500 (USD 284) to an average of KES 10,500 (USD 95) which reflected progression towards abject poverty. These observations were supported by other sources. For instance, goats have reduced from an average of 34 to 4, sheep from 17 to 3, cattle from 7 to 3 reducing the average livestock and livestock productions (ILRI, 2008; Campbell et al., 2002). Although such deficiencies were consistent with the rate of poverty in the region, they also reflected the net effects of cycles of droughts (2010-2011, 2015, and 2018) which also coincided with the exploration and extraction of oil.

5.4 Oil impoverishment and Displacement

Objective three of the study which was to identify oil impoverishment-displacement components was also addressed. Accordingly, the study identified and assessed seven (7) components of impoverishment and displacement including 1) excised (or depleted) inherited land, 2) contamination (degradation) of land, 3) reduced (depleted) access to water sources, 4) reduced access to pasture, 5) reduced livestock, 6) reduced (depleted) household inheritance, and 7) reduced (depleted) family support.

The study established also that 63% of the households experienced varied levels of reduced household social support; in which 33% experienced severe reduction of the household social support. Various reports indicate that extended social network is closely related to the use of land, management of grazing resources and the

livestock. Accordingly, vulnerability, relocation, or unplanned movement of a household would result in fragmented use of land, management of grazing resources and the livestock (Ouma, 2017; Kalin, 2010; ILRI, 2008).

It was also established that 55% of the households experienced experienced varied levels of reduction of inherited household assets; in which 27% experienced severe reduction of inherited household assets. In addition, experts, key informants and members of FGD reported that inherited household assets have been eroded by the cycle of droughts and raids; and therefore, reducing the impact of the exploration and extraction of crude oil.

Similarly, it was established that 67% experienced varied levels of reduction of water resources in which 38% of the households experienced extensive to severe reduction of access to water sources. However, access to water sources in the region typically remains a fundamental challenge. Oil extraction industry rely largely on drilled boreholes and a plan has been made to extract water from Turkwel Reservoir and to be transported to South Lokichar Basin through an underground pipeline.

Equally, 67% experienced varied levels of reduced access to pasture; in which 47% of the households experienced extensive to severe reduction of pasture. Experts, key informants, and members of FGD reported that grazing resources had been depleted by cycle of droughts, overgrazing and reduced availability of land because of increasing population and extraction of crude oil. Further, the results indicated that 69% of the experienced varied levels of reduced livestock in which 42% experienced severe reduction of livestock.as a result of oil development in the area.

The findings of the study revealed that that 53% of the households reported a loss or surrender of some portion of land where 23% relocated to some other places. A much less proportion of 31% reported varied levels of the contamination of land (habitat) where 12% indicated severe contamination. In addition, 38% of the households reported varied levels of reduced water sources out of which 16% reported severe reduction of the water sources. It was also noted that 47% of the households reported varied levels of reduced grazing resources out of which 16% indicated severe reduction of the grazing resources.

More specifically, the study established that 78% of the households experienced varied levels of excised (surrendered) land in which 30% experienced extensive excised land and 23% severely excised (lost, surrendered) land. Available reports indicated that by 2018, a total of 700 square kilometers of community land had been curved out to support exploration of oil and gas, extraction, and related infrastructure; as well as unspecified to support transportation (Golder & Ecologics, 2020; FAO/PDN, 2018). The initial acquisition of land was carried-out around Twiga, Amosing and Ngamia (TAN) fields to support exploration sites, construction of facilities to support operations, and transportation of oil. These developments affected severely the socio-economic and cultural base of the local population or households that lived within the vicinity of the central exploration and extraction sites and the radius of the affected area was expected to expand.

5.5 Effects of Oil impoverishment-displacement

The data ind8icated among the key risks (vulnerabilities) arising from emerging extraction of oil in Lokichar-Kochodin Basin included permanent loss of residential

structures, loss of land for grazing and cultivation, loss of sacred and burial sites for the local community, loss of social infrastructure, and most importantly loss of their livelihoods (Obongo, 2018).

5.5.1 Effects on Overall Livelihood Opportunities

The fourth objective of the study was to assess effects of impoverishment-displacement indicators on the livelihoods vulnerability. The study addressed the hypothesis (prediction) that households will have experienced increased livelihoods vulnerabilities because of emerging oil industry, related impoverishment, and displacement effects. In view of effects from several impoverishment-displacement components (indicators), regression analyses were used to assess individual and joint effects of impoverishment-displacement indicators on the livelihoods vulnerability. Accordingly, multiple regression provided the researcher with an opportunity of assessing multiple effects of impoverishment-displacement indicators to any one given livelihood vulnerability.

5.5.2 Effects on Overall Livelihood Opportunities

The study assessed the effects of the impoverishment-displacement indicators on the overall livelihood opportunities. The study's prediction (hypothesis) was that livelihood opportunities will be reduced because of exploration and extraction of oil. The results were significant at the probability of error less than 0.001 which was much lower than the decision criteria ($P < 0.05$). it was, therefore, concluded that the effects of impoverishment-displacement indicators on the overall household vulnerability were systematics and significant. The strength of the

effects were reflected by the multiple regression R = 0.60 and the multiple regression R^2 (square)=0.36 which indicated that the oil impoverishment-displacement indicators influenced the overall household vulnerability by 36%.

5.5.3 Effects on Availability and Access to Food

The effects of oil impoverishment-displacement on availability (access) to food was also assessed. The prediction was that households will experience increased vulnerability to availability of (access to) food because of emerging oil industry, impoverishing, and displacement effects. The regression variance was significant at the probability of error less than 0.001 which was much lower than the decision criteria of the study ($P<0.05$). The strength of the effects were reflected by the multiple regression R = 0.56 and the multiple regression R^2 (square)=0.31 which indicated that the oil impoverishment-displacement indicators influenced availability (access) to food by 31%.

5.5.4 Effects on Daily Food Intake

The prediction (hypothesis) that households will experience increased vulnerability to daily food intake because of emerging oil industry, impoverishing and displacement effects was also tested. The regression variance was significant at the probability of error less than 0.001 which was much lower than our decision criteria ($P < 0.05$); and therefore we concluded that the effects of impoverishment-displacement indicators on daily food intake were significant. The strength of the effects were reflected by the multiple regression R = 0.59 and the multiple regression R2 (square)=0.35; which indicated that the oil impoverishment-displacement indicators influenced daily food intake by 35%.

5.5.5 Effects on Disease Burden

The prediction (hypothesis) that households will experience increased vulnerability to diseases (or actual increase of diseases) because of emerging oil industry, impoverishing and displacement effects was tested as well. The regression variance of disease vulnerability and impoverishment-displacement indicators was significant at the probability of error less than 0.001 which was much lower than our decision criteria ($P < 0.05$). It was, therefore, concluded that the effects of impoverishment-displacement indicators on increase of diseases were significant. The strength of the effects were reflected by the multiple regression $R = 0.611$ and the multiple regression R^2 (square)=0.37 which indicated that the oil impoverishment-displacement indicators influenced disease vulnerability by 37%.

5.5.6 Effects on Seasonal Household Earnings

The study also hypothesized (predicted) that households will experience increased vulnerability to seasonal household earning because of emerging oil industry, impoverishing and displacement effects. The regression variance was significant at the probability of error less than 0.001 which was much lower than our decision criteria ($P < 0.05$). It was, therefore, concluded that the effects of impoverishment-displacement indicators on seasonal household earning were significant. The strength of the effects was one of the highest. Multiple regression R was 0.630 and multiple regression R^2 (square) was 0.40 which was one of the highest effects of impoverishment-displacement indicators on livelihoods vulnerability.

5.5.7 Deterioration of Children Wellbeing

The study also established that 51% of the deterioration on the wellbeing of children in the household was as a result of the effects of the indicators of impoverishment and displacement and which was also significant at the probability of error less than 0.001. Of the seven (7) indicators, four had significant effects; namely 1) depleted (eroded) water sources (Beta 0.431), excised/reduced land (Beta=0.252), family support (Beta 0.241) and household endowment (Beta=0.167). The effects of the four indicators were significant at the probability of error less than 0.001; which of course were lower than the study criteria of $p < 0.05$. In view of these observations, the study accepted the hypothesis that impoverishment and displacement influence the livelihood vulnerability. More specifically, the study concluded that impoverishment and displacement influenced reduction of household's livelihoods in which the key drivers were reduction of the water sources, land space, family support, and depletion of household endowment (accumulated assets).

5.5.8 Increased Severity of Poverty

The study also established that 42% of the increased severity of poverty was as a result of the effects (influence) of the indicators of impoverishment and displacement and which was also significant at the probability of error less than 0.001. Out of the seven indicators, the key drivers were 1) excised/reduced land (Beta=0.482), 2) pasture (Beta=0. 236) and 3) family support (Beta=0. 174). These indicators were significant at the probability of error less than 0.000; which of course were lower than the study criteria of $p < 0.05$. The study concluded,

therefore, that impoverishment and displacement influenced reduction of household livelihoods in which the key drivers were reduction of the land space, grazing resources, and family support.

In summary, the study established that the indicators of oil impoverishment-displacement had relatively higher effects on seasonal household earnings, increase of diseases, wellbeing of the children, and increased severity of poverty. In addition, the same indicators of oil impoverishment-displacement had considerable effects on the reduction of the livelihoods opportunities, access to food, daily food intake, and reduction of the household occupation. Among the signficant and fundamental drivers included reduction of the land space, grazing resources, water sources, erosion of the household endowment, and family support.

5.6 Experience and Characteristics of Recovery

The fourth objective of the study which was to examine A) the nature of recovery (rehabilitation of the livelihoods) and B) Key Household Characteristics (KHC) that promote such recovery was assessed.

5.6.1 Experience of Recovery

The first component of the fourth objective was to identify the nature of recovery (rehabilitation of the livelihoods). In this respect, the study established 70% had no or minimal experience of new access to livelihood opportunities and 30% of the households had either extensive experience or indeed had established new access to livelihood opportunities. In addition, the study found that 78% had no or minimal experience of new access to land and 22% of the households had either extensive

experience or had established new access to land. Similarly, the study established that 75% had no or minimal experience of new access to water sources and 25% of the households had either extensive experience or had established new access to livelihood opportunities. Also, the study established that 77% had no or minimal experience of new access to pasture and 23% of the households had either extensive experience or had established new access to pasture. The study also established that 80% had no or minimal experience of restocking livestock and 20% of the households had either extensive experience or had restocked livestock. The study also found that 82% had no or minimal experience of urban services or trade and only 12% of the households had either extensive experience or had established urban services or trade. The study observed that re-establishing access to land and urban services or trade were relatively difficult.

5.6.2 Effects of Characteristics on Recovery

The second component of the fourth objective was to assess the effects of the household characteristics (age, size of households, education, and socio-economic indicators) on recovery (ability of the households to establish new access to livelihoods). The broad working hypothesis was that key household characteristics including age, education, and income would contribute to recovery of affected households against the null hypothesis that such key characteristics will not influence the recovery of affeted households. To identify characteristics that contributed to recovery, multiple regression analyses were again used which helped in assessing the effects of each individual characteristic and the joint effect simultaneously.

5.6.3 Effects of Characteristics on Access to New Livelihoods

Specifically, the study established that 31% of the new access to livelihood opportunities were the effects of the households' characteristic and which was significant at the probability of error less than 0.001. The multiple regression effects (multiple regression line) of the key characteristic on new access to livelihoods was significant at the probability of error less than 0.001 which was much lower than the study's decision criteria ($P< 0.05$). It was, therefore, concluded that the effects of the key characteristic on new access to livelihoods were systematic and significant. The strength of the effects was reflected by multiple regression $R = 0.56$ and multiple regression R^2 (square) was 0.31 which indicated that 31% of the variation (fluctuation or changes) in access to new livelihoods arose from key characteristics of the households. Of the six key charactersitics, education of the head of the household ($P< 0.001$), education of additional household member ($P < 0.01$), and the family size ($P< 0.02$) were systematic and significant. Based on these results, it was concluded that education of the household and the family size were fundamental drivers of the recovery (or rehabilitation odf the livelihoods).

5.6.4 Effects on New Access to Land

Similarly, the study established that 21% of the new access to land were the effects of the households' characteristic and which was significant at the probability of error less than 0.001. The multiple regression effects (multiple regression variance) of key household characteristics on new access to land was significant at the probability of error less than 0.001 which was much lower than the decision criteria

of the study ($P < 0.05$). It was, therefore, concluded that the effects of key household characteristics on new access to land were systematic and significant. The strength of the effects was reflected by multiple regression R= 0.52 and multiple regression R^2 (square) =0.27 which indicated that 27% of the variation (fluctuation or changes) in new access to land can be attributed to key characteristics of the households. Of the six key characgtersitics education of the head of the household ($P < 0.001$), the family size ($P < 0.001$), and monthly earnings ($P < 0.02$) were systematic and significant.

5.6.5 Effects on Access to New Water Sources

The study established also that 28% of the new access to water sources were the effects of the households' characteristic and which was significant at the probability of error less than 0.001. In addition, out of the six characteristics, three (3) effects were significant notably; 1) education of the head of the household ($P < 0.001$), 2) monthly earnings ($P < 0.01$), and 3) the size of the household ($P < 0.01$) were also less that the probability of error 0.05. Based on these results, the study concluded therefore that education of the household, household income, and the size of the households were key drivers of the recovery (or rehabilitation of water sources).

5.6.6 Effects of Characteristics on Access to New Pasture

The study established that 22% of the new access to pasture were the effects of the households' characteristic and which was significant at the probability of error less than 0.001. In addition, out of the six characteristics, three (3) effects were

significant namely, 1) education of the head of the household ($P < 0.001$), 2) the size of the household ($P < 0.01$), and 3) monthly eanings ($P < 0.01$) were also less than study criteria of 0.05. In view of these results, the study concluded that education of the household, the size of the household, and the monthly earnings were key drivers of the recovery (rehabilitation) of grazing resources.

5.6.7 Effects on Ventures on Urban Trade Services

The study established also that 33% of the new access urban services and trade were the effects of the households' characteristic and which was significant at the probability of error less than 0.001. In addition, out of the six characteristics, three (3) effects were significant namely, 1) education of the head of the household ($P < 0.001$), 2) the monthly eanings ($P < 0.001$), and 3) the size of the household ($P < 0.01$). In view of these results, the study concluded therefore that education of the household, monthly earnings, and the family size were fundamental drivers of the recovery (or emergence of ventures of urban trade services.

Therefore, the effects of the household characteristics were relatively lower. The percentage of the effects of the household characteristics on recovery ranged from 21 to 33. The household characteristics had considerably low effects on new access to land (21%), pasture (22%) and restocked livestock (22%). On the other hand, the household characteristics had modest effects on new access to water sources (28%), new access to livelihoods (31%) and access to urban services and trade (33%).

5.7 The Nature of Compensation

The fifth objective of the study was to assess the land rights and the nature of compensation to the oil-affected population in South East of Turkana County. This objective was addressed in four levls 1) land rights, 2) provisional compensation, 3) the household compensation, and 4) the community based compensation. There are several legal instruments have addressed rights, access, and control of land in Kenya such as UN human rights declaration (1948) and the constitution of Kenya among other of its articles. Land is classified into three categories by the Kenyan constitution: a) public, b) private, and c) community land.

5.7.1 Legal Framework and Land Rights

Even though the existing constitutional and legal framework including the Land Act, (2012), the Land Registration Act (2012), and the Community Land Act (2016) prohibit arbitrary eviction of persons from their land without prompt compensation, the survey indicated that 66% of the households were not aware of the household compensation from oil related displacement vulnerability and 88% of the households reported that they did not receive any compensation (benefits) as a result of their impoverishment-displacement vulnerability. Conversely, only a smaller proportion of 12% acknowledged that they received some compensation. "*Land is owned by the community. There are no title deeds in Lokichar. One's land is where he lives. All land belongs to the community and one can graze anywhere as long as there is pasture. One needs a letter of allotment to be able to build a house. However, people have started to accumulate and lay claim on land. They have started to own and sell land but there are no title deeds. There is a difference*

between land in the rural area and urban areas or towns. There is free movement in rural areas but not in urban areas since people have built permanent houses and laid claim to that land. They even sell it. But the grazing land is communal. The community is planning to register the land. But even if people migrate from one place to another, they still know where their land is. No family can live on graves' land, ancestral, and borehole of a certain family or clan. The people could live on land as families before. Things are, however, changing".

5.7.2 Compensation to Affected Households

The consortiun of Tullow Oil Plc, the government, and selected elders agreed on compensation consisting of 5% of the oil revenue to the community or household (who are actually demanding 10%) and direct 20% of the oil revenue to the County Government (as the trustee). In addition, there is an unspecified percent through the National Government and the Corporate Social Responsibility (CSR). Further, although there had been some aspects of the community engagement by 2017, the consortium of the Tullow Oil Plc did not achieve full Free Prior and Informed Consent (FPIC) from affected pastoral communities (FAO/PDN, 2018; UN-Habitat, 2016).

5.7.3 Awareness and Recognition of the Compensation

Subsequently, the survey indicated that 66% of the households were not aware of the household compensation from oil-related displacement vulnerability and 88% of the households reported that they did not receive any compensation (benefits) as a result of their impoverishment-displacement vulnerability. Conversely, only a

smaller proportion of 12% acknowledged that they received some compensation. In addition, 70% of the households reported that they did not receive any community-based benefits in which 30% indicated that they received some community-based benefits. In principle, the study established that 30% of the households benefitted from community-based compensation and only 12% of the households benefitted from household compensation

5.8 Proposed Mitigation Measures

The study also assessed objective six of the study which was to assess necessary mitigation measures from the perspective of the local population in order to reduce vulnerabilities related to exploration and extration of oil and to improve their wellbeing. Five most important proposed mitigation measures iclude improving communication and information (20%); enhancing participation in mapping affected areas (17%); establishing ways to identify correct land beneficiaries (17%); registering community land and provide title deeds (13%); and reloacting affected households to suitable land and homestead with water sources (11%). Others recommended adequate and equal compensation to replace lost asset (5%).

5.9 Conclusions

It was noted that education, particularly vocational education, need to be addressed in order to enable household to develop capacities to address their environmental challenges. The findings of study indicated that occupations in the rural South East of Turkan remain vulnerable and would need to be transformed into sustainable occupations that would be able to support the wellbeing and the welfare of the people. Rural community lands should be registered in compliance with the

constitution of Keya 2010, related legislations Land Act, (2012), the Land Registration Act (2012) and the Community Land Act (2016). This aspect will sunsequently improve management of local resources. Finally, sources of monthly household income (MHI) will need to be transformed into sustainable sources of income.

5.10Recommendations

5.10.1 Measures to Accelerate Human Resource Development

The study established that human development index in SLKB and entire Turkana remained substantially low, poverty remained high, illiteracy and lack of technical skills remained high. The convergence of these key parameters over a considerable time has resulted to low socio-economic capacity (resilience) and therefore limited ability to address the cycles of drought, environmental variability and development challenges.

In addition, the study established that exploration, extraction and commercialization of oil aborbed limited proportion of the human resource in SLKB largely because of the same parameters, and low socio-economic capacity (resilience), More specifically, the various streams i.e. upstream, midstream and downstream of the exploration and extraction of oil demanded varied levels of competencies and technical expertise which were ont available in SLKB and in the entire county. Only 2% of the household heads had a tertiary education which would make them eligible for formal employment to improve their livelihoods In view of these observations, the study recommended adoption of measures to

accelerate human resource development with a strategy to generate varied technical experises.

5.10.2 Measures to Imporve Agro-Pastoral Production

The study established also that while it has been the backbone of the livelihoods, the agro-pastoral production has been eroded by cycles of drought, environmental variability and other processes. More specifically, the study established that the occupations for most of the households consisted of ownership of the livestock, herding of livestock, agro-cultivation, petty trade which have overtime been eroded by the cycles of drought, environmental variability and other processes. Secondary sources indicated that the average household livestock (AHL) had reduced from 34 to 4, sheep from 17 to 3, cattle from 7 to 3, thereby reducing livestock, livestock productions and livelihoods (ILRI 2018). Accordingly, the study recommended adoption of measures to reverse erosion and to improve agro-pastoral production including enhanced irrigation. Experts have projected that Turkana County has capacity to produce livestock enough for domestic consumption, eradication of poverty, and to sell the surplus.

5.10.3 Accelerate Registration on Community Land

The study established talso hat the foremost and critical challenge in exploration and extraction of oil in SLKB was the community land and the lack of individual formal right to the land. Accordingly, the study recommended accelerated registration of the community land in SLKB and indeed in entire Turkana County in compliance to the Community Land Act (2016), and the 2010 constitution of

Kenya in order to enable the individual households to have formal right to the land. Such legal formal right to the land will empower the households to participate in the community engagement, negotiations, pursue favourable compensation and resettlement.

It will be appreciated that the principle of community land has been useful in arid and semi-arid areas, particularly among agro-pastoal and pastoral communities. However, this principle has become increasingly inconsistent with large and differentiated population, increased multiple uses of land, and increasing commercialization of the outcomes. In principle, SLKB, Turkana County and most of the arid and semi-arid areas have witnessed unprecedented transformations which have disadvantaged communities maintaining the cultural practice of community land. With the exception urban areas, rural parcels of land in SLKB and in Turkana reman community land, held in trust with individual households having no formal right.

accelerate completion and adoption of land Management Information System (MIS) in Turkana which had been initiated by FAO and UN-Habitat, and 3) to harmonize land MIS and community land registration

5.10.4 Re-Open Stakeholder Engagement

The established further that the Stakeholder Engagement was severely limited and was characterized by a number of critical challenges that included limited plan, limited information, limited education, and multiplicity of stakeholders (i.e. the Consortium of Tullow Plc, the national government, local government, council of elders and the households). Limited plan, limited information, limited education,

and multiplicity of stakeholders obscured the importance of the local agro-pastoral households; remaining simply as the community. In view of these observations, the study recommended re-opning a **structure stakeholder engagement** based on the conventions, guidelines and standards to safeguard the socio-economic wellbing of the indigenous people (local agro-pastoral households) in development and extraction industries.

5.10.5 Measures to Improve Compnensation and Resettlement

The study established that although exploration and extraction of oil was still categorized as the pilot phase, compensation was limited, even negligible; given that 30 benefitted from the community-based compensation and only 12% of the households recived some form of benefits from household compensation. In view of this obervation, the study recommended adoption of measures **to improve compensation and resettlement** based on the conventions, guidelines and standards to safeguard the socio-economic wellbing of the indigenous people (local agro-pastoral households) in development and extraction industries. It will not only be adeaute compensation but also sustainable resettlement.

5.11 Areas of Further Research

A number of different and distinct studies will still be necessary to develop greater understanding between poverty, the rate of human resource development and vulnerability of livelihoods in SLKB, and the entire Turkana County. Other studies will still be necessary to assess the impact of public education, the community engagement on the advantages and challenges of exploration, extraction and commercialization of oil. The Community Land Act (2016) is the first legal

framework in Kenya to regulate the community land and it is therefore not yet clear how it will be operationalized. Accordingly, studies will still need to be carried-out to asess the way the Community Land Act (2016) will be operationalized and the effects of that operationalization on the compensation and resettlement. It will also be necessary to carryout studies on gender dimensions of the vulnerability of livelihoods in SLKB, and the entire, impoverishment-displacement by extraction industries, recovery and resettlement

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APPENDIX I: HOUSEHOLD QUESTIONNAIRE

Informed Consent Form

My name is Agnes C. Kirui. I am a PhD student from Kenyatta University, pursuing a degree of Doctor of Philosophy in Sociology. I am conducting a study titled "Oil-Induced Displacement and Livelihoods Vulnerability among Households in South East of Turkana County, Kenya." This study seeks to examine the livelihoods of the population affected by the oil production life cycle in South East of Turkana County, the nature and impact of the compensation, the processes and characteristics that have influenced access to sustainable livelihoods. This is with a view to establish ways to minimize related risks and to improve livelihoods among oil-displaced households.

Accordingly, you have been selected to participate in this study because you are a resident in South East of Turkana County and locations directly affected by the exploration, extraction and transportation of oil. It is my expectation that your experiences following the oil-displacement will contribute to our understanding of oil-related challenges, risks and opportunities for improved livelihood, socio-economic wellbeing.

Participation in this study will require that I ask you some questions which will either be noted down or recorded using a digital audio recorder. Your participation in the study is voluntary, and you have the right to refuse participation in this study.

1. Serial No: _____
2. Date: _____
3. Sub-location: _____
4. Location: _____
5. Ward: _____
6. Rural-urban dimension of place of residence:

1)Rural Village	2) Semi Urban Village	3) Town	4) Any Other

A. Demographic and key characteristics

7. Indicate age of household head in years (or date of birth)

_____

8. Religious affiliation of household head

_____

9. Gender of the household head (respondent)

1)Male	2) Female

10. Marital status of the household head

1)Single	2) Married	3) Separated	4) Divorced	5) Widowed

11. Indicate the number of children.

A) Number at the household

_____

B) Those that have left the household

_____

12. Indicate education of the household head.

1) No formal schooling	2) Primary	3) Secondary	4) Tertiary/University

13. Indicate education of the spouse.

1) No formal schooling	2) Primary	3) Secondary	4) Tertiary/University

14. Indicate education of any other household member; Specify ----------

---

No formal schooling ____ Primary ____ Secondary _____Tertiary/university____

15. Indicate the following.

A) your traditional occupation_____

B) your present occupation_____

16. Indicate any training towards your occupational

1) Apprenticeship	2) Certificate	3) Diploma

Other (specify) _____

17. Indicate the following.

A) General (conventional) food types in South East of Turkana

_____

_____

B) General number of meals per day in South East of Turkana

_____

18. Indicate average kilos of grains that the household consume in a month?

A) Average Kilos per month _____

B) Cost of buying grains per month _____

C) Comment

_____

19. Indicate (or estimate) the following

A) Household income per month, (Kshs)_____

B) Household expenditure per month, (Kshs) _____

C) **Comment**

_____

20. Indicate average livestock that the household has traditionally maintained

1) Number of Goats	2) Number of Sheep	3) Number of Cattle	4) Number of Camel	5) Number of Donkeys

Comment_____

21. Indicate the **main trustee (or owner)** of the land that the household use (for residence, pasture, cultivate)

1) Clan	2) Family	3) Household	4) Household Head

(**indicate only one)**

Comment_____

_____

22. Indicate main use of land available/accessible to the household.

1) Pasture Rural Village	2) Cultivate (food/cash crops)	3) Business	4) Rental houses

(**indicate only one, the main one)**

Comment_____

23. Indicate the following

A) How often your household has been receiving relief food from administration.

1) Never	2) Sometimes	3) Seasonally	4) Monthly	5) Weekly

B) How much per schedule (Kgs)_____

C) What has been the main cause for seeking relief food?

_____

_____

B. Experience of Oil Dispossession and Displacement

24. You are aware that oil activities have been taking place in the region since 2012. Accordingly, use the following guide 1) experienced minimal risk; 2) experienced increased; 3) Lost/surrendered household assets (possessions), 4) more than half of the household asset (possessions) lost/surrendered, 5) the household was actually displaced (relocated to a new location) to indicate direct experience by the household.

In such rating of 1 to 5, mark only one most appropriate

	1 experienced minimal risk from oil activities	2 Experienced increased risk from oil activities	3 Lost/surrendered some household assets (possessions) to OD activities	4 More than half of household assets (possessions) lost/surrendered	5 Household was relocated because of OD activities
Tick only one most appropriate					

25. Similarly use the same guide to indicate the way each of the following household assets (possessions) were (or has been) affected by oil related activities in the area. **In a rating (range) of 1 to 5, tick only one most appropriate for each asset/possession**

No	Item	1 experienced minimal risk from oil activities	2 Experienced increased risk from oil activities	3 Lost/surrendered some household assets (possessions) to OD activities	4 More than half of the asset lost/surrendered	5 Lost/surrendered the entire asset to OD activities
1.	Livestock					
2.	Pasture					
3.	Water					
4.	Inherited Land					
5.	Environmental Challenges					
6.	Family inheritance					
7.	Family endowment (ownership)					
8.	Family support					
9.	Cultural shrine/ Right					
10.	Cultural education					
11.	Formal education					
12.	Employment					
13.	**Any addition**					
14.	**Any comment**					

26. In order or importance, indicate three (3) key assets that the household lost (denied/deprived) as a result of the oil related activities in the location/sub location?

---

27. Indicate in order of severe impact to household three (3) oil activities that affected the household.

1)---

2)---

3)---

28. In the case of actual displacement, what was the distance of the household relocation in kilometer.

---

29. Indicate in order of severity, three (3) challenges associated with that relocation.

1)---

2)---

3) ---

Livelihoods Vulnerability

30. Use the guide provided to indicate the way oil related activities in the area affected livelihoods and wellbeing of your household: 1) fear of disrupted access to livelihoods (**food, earnings, occupation, employment and economic endowment**); 2) adjustments made to address fear of disrupted access to livelihoods; 3) depleted/diminished access to some livelihoods, 4) more than half of access to livelihoods disrupted as a result of exploration and extraction of oil; and 5) household experiencing severely limited (acute) access to livelihoods (dire poverty).

31. In such rating of 1 to 5, mark only one most appropriate

	1 Fear disrupted access to livelihoods **(3 meals a day)**	2 Adjustments made to address fear of disrupted access to livelihoods **(2 meals a day)**	3 Depleted/ diminished access to some livelihoods as a result of exploration/extraction of oil **(one meal in a day)**	4 More than half of access to livelihoods disrupted as a result of OD activities **(One meal in two (days)**	5 Household experiencing severely limited (acute) access to livelihoods (dire poverty) **One meal in 3 days**
Tick only one most appropriate					

32. Using the same guide, indicate the way each of the following livelihood/wellbeing aspects were (or has bee) affected by oil related activities in the area.

In a rating (range) of 1 to 5, tick only one most appropriate for each livelihood/wellbeing aspect

No	Item	1 Fear from ODV of disruption of access to livelihoods **(3 meals a day)**	2 Made adjustments to address fear of disrupted access to livelihoods **(2 meals a day)**	3 Depleted/ diminished access to some livelihoods as a result of OD activities **(one meal in a day)**	4 More than half of access to livelihoods disrupted as a result of OD activities **(One meal in two days)**	5 Household experiencing severely limited access to livelihoods (dire poverty) **One meal in 3 days**
1.	Average food Availability					
2.	Daily food intake					
3.	Access to human drinking water					
4.	Access to Livestock water					
5.	Average Earnings per season					
6.	Occupation of the household head					
7.	Socio-economic endowment of household head					
8.	Household Wellbeing					
9.	Education of the children					
10.	Wellbeing of the children					
11.	Family cohesion					
12.	**Any Addition**					
13.	**Any comment**					

33. What were the household typical food types?

A) before oil related interruption

B) after oil related interruption

---

34. What was the household number of meals per day?

A) before oil related interruption -3 times----------2 times ----------once--------

B) after oil interruption ---3 times ----------2 times ----------once ----------

C) Comment on actual number of meals per day

_____

35. Explain your actual experience in household access/availability of food in the last three (3) years.

_____

_____

_____

36. Indicate the following.

A) How often your household has been receiving relief food from administration following interruption from oil related activities.

1) Never	2) Sometimes	3) Seasonally	4) Monthly	5) Weekly

B) How much per schedule (Kgs)_____

C) What has been the main reason for seeking relief food after oil related interruption?

_____

37. Indicate in range of 1 to 4, experience of diseases in the household

	Period	1 Yearly	2 Half yearly	3 Quarterly	4 Monthly
A.	Before oil activities				
B.	After oil activities				

38. Which diseases has the household continue to experience and why?

C. Displacement (Disturbance) Compensation

39. Have you been aware of any compensation from oil development activities?

Yes----------No----------

40. Has your household benefitted from any of the compensation from oil development activities?

Yes----------No----------

41. Indicate specifically the types (schedules) of compensation that your household was awarded from oil development activities?

1) ---

2) ---

3) ---

42. Indicate estimated Ksh of the total compensation to your household from oil development activities Kshs----------

43. Indicate intended use of that compensation; i.e. what was intended to achieve?

1)---

2)---

3)---

44. Indicate one key achievement that you were able to do (achieve) with the total compensation to your household.

	Asset Replacement i.e. bought	Adequate	Not adequate	Comment
1.	New farm land			
2.	New pasture			
3.	Replaced livestock			
4.	Built a new homestead			
5.	Established business			
6.	Educated children			
7.	Trained for a new career			
8.	Developed town residence			
9.	Other (specify)			
10.	Overall comment			

Note: any price difference will be a good guide

45. Indicate in order of importance three (3) key measures you consider would have improved the overall compensation to your household?

1) ----------

2) ----------

3) ----------

46. Have you been aware of the community-based compensation?

Yes----------No----------

47. Has your household benefitted from community-based compensation from oil development activities?

Yes----------No----------

48. Indicate community-based compensation that your household has enjoyed or participated

	Community based compensation	No	Yes	Not adequate	Adequate	Comment
1.	New farm land					
2.	New pasture					
3.	Replace livestock					
4.	Water and water services					
5.	Clinics and health centers					
6.	Primary education					
7.	Secondary education					
8.	Plots in urban centres					
9.	Other explain					

49. Indicate in order of importance three (3) key measures you consider important to improve community-based compensation?

1) ----------

2) ----------

3) ----------

D. Resettlement and Recovery

50. Indicate level of recovery that the household has experience following disturbance (disruption) from the oil related activities.

In a rating (range) of 1 to 5, tick only one most appropriate to reflect recovery of the household: 1 reflect reduced fear of further disruption, 2) early stage of recovery but limited progress, 3 reasonable recovery experienced by the household, 4) access to key assets (land, business, employment, etc.), and 3) re-establish and developing assets (land, plot, rental premises, business, career development, etc.)

	1 Fear of disruption from oil development activities	2 Recovery still negligible from OD disturbance (disruption)	3 Reasonable Recovery made from OD activities	4 Access to key assets/ livelihoods restored	5 Re-established assets/ livelihoods (Sustainable socio-economic capability)
Tick only one most appropriate					

51. Indicate specific aspects that the household has witnessed reasonable recovery. **In a rating (range) of 1 to 5, tick only one most appropriate on each aspect to reflect recovery of the household**

		1 Fear of disruption from oil development activities	2 Negligible recovery from OD disturbance (disruption)	3 Reasonable recovery from OD activities (one or two sustainable assets)	4 Access to key assets/ livelihoods restored (More than two secure assets)	5 Re-established assets/ livelihoods (Sustainable socio-economic capability)
1.	Land					
2.	Access to water					
3.	Rural pasture					
4.	Rural residence					
5.	Livestock development					
6.	Cultivation					
7.	Urban plot					
8.	Urban residence					
9.	Rental units					
10.	Employment					
11.	Business					
12.	Improved food security					
13.	Improved security					
14.	**Any addition**					
15.	**Comment**					

52. Overall, indicate measures you would recommend to improve recovery and sustainable livelihoods _____

Thank you.

APPENDIX II: KEY INFORMANT INTERVIEW GUIDE

Keeping in mind the circumstances around SLKB, and most parts of the Turkana County, the key informant guide was used to address three basic issues 1) to provide strategic guidance to the study, 2) to generate some form of baseline data and 3) to acquire technical information on the SLKB, exploration and extraction of oil, displacement and impoverishment, engagement of the community and outcomes.

1. Sub-Location _____
2. Location _____
3. Rural-Urban Dimension

1)Rural Village	2) Semi Urban Village	3) Town	4) Any Other

4. Position in the Location _____ Sub-Location _____
5. Gender _____
6. Religious Affiliation _____
7. Education achieved _____
8. Main occupation _____
9. Location/sub-location/ area most affected by oil development.

_____

_____

10. Indicate the following

A) General (conventional) food types in South East of Turkana

_____

_____

_____

B) General number of meals per day in South East of Turkana

_____

11. Indicate average kilos of grains that a household consume in a month?

A) Average Kilos per month _____

B) Cost of buying grains per month _____

C) Comment

_____

12. Indicate the main trustee (or owner) of the land that the household use (for residence, pasture, cultivate)

1) Clan	2) Family	3) Household	4) Household Head

Only one response; most appropriate

Comment_____

13. Indicate the main use of land available/accessible to the household

1) Pasture Rural Village	2) Cultivate (food/cash crops)	3) Business	4) Rental houses

Only one response; most appropriate

Comment_____

14. Indicate the following

A) How often your household has been receiving relief food from administration

1) Never	2) Sometimes	3) Seasonally	4) Monthly	5) Weekly

B) How much per schedule

(Kgs)_____

C) What has been the main cause for seeking relief food?

_____

D) What has been the impact of the oil related interruption?

_____

15. What specifically was the types (schedules) of compensation to the household from oil related activities?

1) ----------

2) ----------

3) ----------

16. Indicate estimated Ksh of the total compensation to the household from oil related activities Kshs----------

17. What was the compensation intended to achieve?

1)----------

2)----------

18. Any experiences on re-settlement and development?

---

19. Overall, indicate measures you would recommend to improve recovery and sustainable livelihoods

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Thank you

APPENDIX III: FOCUS GROUP DISCUSSION GUIDE

In addition, the focused group discussion was used to address three basic issues 1) consensus on experiences related to exploration and extraction of oil, displacement and impoverishment, engagement of the community and outcomes and consesus on possible mitigation measures.

1. Panel name _____
2. Number of members (10-15) _____
3. What have been the main (basic or typical) livelihoods for a household in South East of Turkana County?
4. What has been the nature/level of access/availability to those livelihoods in South East of Turkana County?
5. What have been the key challenges/barriers to required access/availability to those livelihoods South East of Turkana County?
6. What have been the key effects of oil exploration/extraction on access to livelihoods South East of Turkana County?
7. Which year did the following processes of oil exploration/extraction start in South East of Turkana County

A. Exploration

B. Extraction

C. Transportation

8. How were the following components of oil exploration/extraction communicated to the people in the South East of the County

A. Exploration

B. Extraction

C. Transportation

9. How many acres were required/acquired for the following components of oil exploration/extraction in South East of Turkana County

A. Exploration

B. Extraction

C. Both exploration & extraction

10. How were those acres of land obtained for oil exploration/extraction in South East of Turkana County?

11. What has been the impact of the following components of oil exploration/extraction on the livelihoods of the people in the South East of the County

A. Exploration

B. Extraction

C. Transportation

12. What were the types of compensation? And would you say the compensation was adequate?

13. What would you say need to be done to improve access to livelihoods to the people and sustained socio-economic empowerment?

Thank you.