OIL EXPLORATION AND PROPERTY RIGHTS IN UGANDA. A CASE STUDY OF THE ALBERTINE GRABEN REGION

BY

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A THESIS SUBMITTED TO THE COLLEGE OF HUMANITIES AND SOCIAL SCIENCES IN PARTIAL FULFILLMENT FOR THE AWARD OF A MASTERS OF HUMAN RIGHTS AND DEVELOPMENT OF KAMPALA INTERNATIONAL UNIVERSITY

MAY, 2023

DECLARATION

I **Andrew Kibumba** do hereby declare that, this thesis work is a product of my individual effort guided by my Supervisor. This is an original copy which has never been duplicated and submitted anywhere for any award or certification.

Sign: _____

Date: _____

APPROVAL

I, the undersigned Supervisor, hereby certify that this research report is the result of the student's efforts, and I hereby suggest that it be accepted for publication.

Signature:_____

Date: _____

DR. BARIGAYOMWE ROGERS

(Supervisor)

DEDICATION

I dedicate this piece of work to my supervisor whose supervision and support helped the progression and smoothness of my thesis am so grateful for the cooperation that was rendered to me.

My Special thanks goes to my parents who have always been there to support me in my entire life in various ways financially emotionally and also my friends also great appreciation to the management and the entire KIU community.

ACKNOWLEDGEMENTS

First and foremost, I am grateful to the almighty God for the abundant grace, love, and favor that have been bestowed upon me in my battle to complete this, by far, the most significant vocation of my life. My heartfelt gratitude goes out to my beloved and all of my brothers for their moral, spiritual, and economical support throughout the years. Further, I would like to express my gratitude to all of my friends, particularly those who work in the fields of social work and social administration, for their companionship. I would want to express my heartfelt thanks to my immediate Supervisors and colleagues at my place of employment for all of the assistance they have provided me. God will generously bless you. Lastly, to my supervisor Dr. Barigayomwe Rogers for guiding me tirelessly throughout my thesis. Thank you so much, Sir.

ABSTRACT

The study was conducted on the Oil exploration and property rights as the study topic which was further broken down into three specific objectives that is to say**;** To explore how the upstream stage of oil exploration has affected the property rights in the Albertine graben region; To assess how the Midstream stage of oil exploration affects the property rights in the Albertine Graben region and to establish how the preparation for the Downstream stage of oil exploration affects the right of livestock in the Albertine Graben region.

The study design that was adopted was a cross-sectional survey design and Additionally, the study also adopted a mixed method approach in data collection, whereby both quantitative and qualitative approaches were used in data collection. Quantitative approach involved the use of questionnaire, while qualitative approach involved collecting data through face-to-face interview and observation. The study population was 2500 with a sample size of 335 respondents.

The findings, using the ANOVA table, revealed that there was also a positive significant effect of the Midstream stage of Oil exploration on property rights. The ANOVA table indicated that the downstream stage of exploration negatively affects the property rights of households in the Albertine Graben Region, Uganda.

It was recommended that the government must simplify and expedite the process of registering customary land to correspond with the rapid pace of large-scale land acquisitions for extractive industry activities. In particular, mechanisms for the purpose of redressing the imbalances created by history, tradition and custom related to women's ownership rights of customary land should be put in place.

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CHAPTER ONE
INTRODUCTION

1.0 Introduction

This study explored the effect oil exploration activities and on property rights in Albertine Graben region in Uganda. Oil exploration is conceived as an independent variable while property rights as dependent variable. In addition to the introduction, this chapter will also focus on the background to the study, problem statement, purpose of the study, objectives of the study, research questions, research hypothesis, conceptual framework, significance of the study, justification of the study, scope of the study which will include the content scope, geographical scope, time scope and operational definitions are stated.

1.1 Background to the study

1.1.1 Historical background

According to Nwankwo, (2015), human beings depend on the resources they derive from the environment for their well-being and their very survival. Warfare is a prominent human activity used to gain access to these resources. Oil, gas, and minerals are vital natural resources that meet crucial human needs. Whether for transport, for heating, or for everyday goods and services, these resources constitute essential raw material inputs. Modern civilization would struggle to survive without readily available access to these resources at reasonable and affordable prices. It is for these reasons, these resources are considered to be strategic resources; critical for national and global well-being and prosperity.

Oil forms the largest percentage of energy consumption in the world, ranging from as low as 30% to as high as 60%, depending on the country's energy consumption level. Forming the world's largest industry in terms of dollar value, the industry which includes exploration, production, distribution, refining as well as retailing is the largest in the world (Venn, 2002).

The world's nations interact with each other in their pursuit of external natural resources through governmental and non-governmental avenues in an astonishing variety of bilateral and multilateral ways. These international interactions change with time, ranging from cordial and synergistic to antagonistic and destructive (Cotet&Tsui, 2013). For instance, one of the several explicitly enunciated national-security objectives of the USA is to protect U.S. economic

interests worldwide by maintaining steady access to energy supplies, other critical resources, and foreign markets. The relations among subdivisions or portions of a nation similarly range in changing patterns from the harmonious to the discordant. At the negative extreme of these spectra of international and domestic interaction are found overt threats of aggression and the actual pursuit of war (Cotet &Tsui, 2013).

Blomberg, Hess & Jackson, (2009) argue that the resort to war by a nation, a group of nations, or a portion of a nation has been a common approach to achieving a policy objective. The half-dozen or more significant wars currently in progress represent a routine human activity that appears not to have changed significantly in the recent decades or centuries in either frequency or in intensity. The global shortage, or perceived shortage, of one or more natural resources, especially oil, contributes greatly to the belligerent political behavior and the onset of war and related conflicts. Minerals like coal, oil, natural gas, and uranium, the ones considered as possible causes of future wars and a possible apocalyptic end are oil and uranium (Blomberg, Hess & Jackson, 2009).

Argentina has also been involved in oil conflicts. The Argentinean government announced that it would seize a majority stake in YPF, the nation's largest oil company. This deal would see the Argentinean government lose over one billion dollars a year, which was not acceptable. Briefly, this particular conflict was mostly fuelled by Argentina's urge to derive greater economic and political benefits from its energy reserves (Erixon and Brandt, 2013).

According to International Union for Conservation of Nature (IUCN, 2003) observes that, oil and gas exploration along with production often paves way for economic activities in relatively undeveloped areas, which promotes economic and social activities; comprising of migration, unstructured settlements, land uncertainty, agricultural conservation and infrastructure development. A report on energy and bio diversity initiative by Energy and Biodiversity Initiative (EBI, 2005), lays emphasis on the increasing global demand for energy projected to triple or even quadruple by the year 2050. It is apparent that in the short and medium term, a significant portion of this demand is to be met with oil and gas.

Generally, there is a consensus in writings that oil as a natural resource has become a kind of paradox for developing and developed economies that engage in its production. This growing concern is due to the rising and persistent nature of conflicts experienced in most of such states. Thus, oil revenues have become a threat to the achievement of sustainable democracy, peace and development in some oil-rich economies like Nigeria, Angola, Gabon, Venezuela and Sudan (Le Billion, 2001; Di John, 2005).This has resulted in claim that oil exploration activities institute poverty and economic inequalities due to their impact on the environment. Thus, oil resources production fuel environmental scarcity and competition, resulting in conflict as other resources, such as land and water, become scarce for other economic activities (Hangman, 2005). Percival and Homer-Dixon (1998), for instance, contextualized such a situation as 'supply-induced scarcity'.

Finally, there is the fact that oil has become a very expensive commodity. In recent years, the demand for oil has been at an all-time high. With high demand comes the need to produce more oil thus more and more oil discoveries are being made all over the world. However, with greater demands comes the rise in the commodities prices. Rise in demand coupled up with rise in prices makes oil a very scarce resource (Heinberg, 2005). This has created conflict as people all over the world are now fighting to access this scarce commodity. What is even sadder is the fact that this is likely to be the trend in the next years to come this would mean that is no solution is sought in the nearby future; the likely hood of an escalation in the conflicts both local and international is likely as far as oil as a resource is concerned.

1.1.2 Theoretical background

The study is guided by the absolute ownership theory and the Non- Ownership Theory

Absolute Ownership Theory

This theory propounded by Woodward, 1965 states that whoever owns a piece of land owns the natural resources lying of underneath it. Absolute ownership has been defined as "the actual right a person is having on a property. According to the absolute ownership theory, oil and gas are owned by the owner of the land where they are found and extracted. When they are extracted, they become possessory personal property of the party that captures it. However, the theory also states that the ownership of crude oil can be denied to the land owner when the crude oil

migrates and captured by others. Hence, ownership of oil and gas could be lost by reasonable drainage and by the rule of capture. In the United States, this theory is also known as the "ownership in place theory".

The theory of absolute ownership of crude is built on the doctrine of ad coelom. Which states that the owner of a piece of land is regarded also as the owner of the petroleum lying underneath the land. Land in this regard includes everything down to the lowest and deepest part of the earth beneath the land and up to the sky. This means ownership of "land to an indefinite extent", upwards as well as downwards. The Latin maxim "cujus est solum, ejus est usque ad coelum ad inferos," which literally translates as: "to whomever the soil belongs he owns also the sky and to the depth."

This theory no longer works in favour of the claimants in many countries such as Nigeria and the UK. This is well illustrated in the following two cases (Bernstein 1978**)** in both cases, the courts rejected the argument and claims that invoked the ad coelom doctrine. However, where the claimant is a sovereign authority or a national authority (e.g.the Government of Kenya) the ad coelom doctrine can be sustained. In jurisdiction like Kenya and Nigeria natural resources are vested in the federal government. The federal government absolutely owns the minerals. The theory of absolute ownership is still valid in some parts of the United States and Canada. For example, in the province of Alberta, Canada, and in the US State of Texas, the private land owners are permitted to own the oil and gas found on their lands.

Non-Ownership Theory

The non-ownership theory by Jones (1965) emphasizes that no person owns the crude oil until produced, extracted or captured and controlled. However, the right to produce or extract crude oil is limited to those persons who own or have the rights to drill on the land where the straddle of the crude is embedded.

This theory states that petroleum is not capable of being owned since it is fugacious (has capacity to migrate). In essence, since crude oil is in fluid form and can move from one place to another, it cannot be owned in the strict sense of the word. There is not much support for this theory as modern practice show that petroleum though may move from one place to the other is

still subject to ownership by the person or authority that captures it at any particular point in time. "The substances are fugacious and are not stable within the container although they cannot escape from it. If any of the three substances (petroleum, gas or water) is withdrawn from a portion of the property which does not belong to the appellant but lies within the same container and any oil or gas situated in his property thereby filters from it to the surrounding lands, admittedly he has no remedy. So, also, if any substance is withdrawn from his property, thereby causing any fugacious matter to enter his land, the surrounding owners have no remedy against him. The only safeguard is to be the first to get to work, in which case, those who make the recovery become owners of the material which they withdraw from any well which is situated on their property or from which they have authority to draw (Borys, 1953).

The two theories as discussed above were selected due to their substance related to oil exploration and property rights for example; According to the absolute ownership theory, oil and gas are owned by the owner of the land where they are found and extracted. When they are extracted, they become possessory personal property of the party that captures it and that the non-ownership theory by Jones (1965) emphasizes that no person owns the crude oil until produced, extracted or captured and controlled

1.1.3 Conceptual background

Oil and gas exploration encompasses the processes and methods involved in locating potential sites for oil and gas drilling and extraction. Early oil and gas explorers relied upon surface signs like natural oil seeps, but developments in science and technology have made oil and gas exploration more efficient. Geological surveys are conducted using various means from testing subsoil for onshore exploration to using seismic imaging for offshore exploration. Energy companies compete for access to mineral rights granted by governments by either entering a concession agreement, meaning any discovered oil and gas are the property of the producers, or a production-sharing agreement, where the government retains ownership and participation rights (Tusiani et al 2017). He added that exploration is high risk and expensive, involving primarily corporate funds. The cost of an unsuccessful exploration, such as one that consisted of seismic studies and drilling a dry well, can cost $5 million to $20 million per exploration site, and in some cases, much more. However, when an exploration site is successful and oil and gas

extraction is productive, exploration costs are recovered and are significantly less in comparison to other production costs.

Conferring to Davis et al. (2005) property rights give a precise understanding for both the local and international perspective. They asserted that the former is part of natural resource management involving considerations on ecological, social and economic systems, which need to be maximized. In reverence to the economic systems, land rights and management is considered an important aspect in any economy and in regional development, since it is a potential source of conflict if not well handled.

Miškolci (2013) distinguished that the conduct of resource use is dependent on the nature of their property rights that govern such kind of behaviors. The proprietorship rights of any resource can be conferred in individuals, which is characteristic in capitalist economies. Private possessions are mutually excludable and rival in nature. Individual property right of entry, use, prohibitions and management are organized and controlled by the private owners. State owned property, means that it is possessed by all, but its right of entry and use are controlled and managed by the state; commonly known as socialist economy

Davis et al. (2005), Klemperer (1996), Tietenberg and Lewis (2009), noted that property rights give way for efficiency in the usage and allocation of natural resources in a well-functioning market economy. Markets can be proficient at producing private goods and possessions, this is because producers and consumers have the right of ownership and control of the resources and their exchange in any economic matters, meaning; Enforceability; Property ownership rights secure involuntary appropriation and or violations on ones property by others. Exclusiveness; The proprietor directly or indirectly appreciates the benefits of possessing such a resource, also the owner is liable to accumulated costs as a result of owning and utilizing this property by sale or other means. Transferability; Property ownership allows easy transferability from one owner to the other in willingly manner, hence lowering chances and conflict susceptibility. However, markets can be less efficient if property rights do not exist and is equally evident in countries where the ownership of this resource is not clear (WWF, 2017). WWF (2017) argues that if not well regulated, for example, more than 80 % of the global forests will be lost between the years

2010 and 2030. This is because of corrupt governments, irrational companies that are aiming at maximizing their profits at any cost, irrespective of the environment.

1.1.4 Contextual background

Oil exploration activities in Uganda are concentrated in the Albertine Graben, in the western region of the country. The oil exploration area stretches from West Nile to the south-western tip of Uganda covering an area of 23,000 km2.land issue; compensation under the constitution, land act and land acquisition act is required for land to be acquired for public purposes which include oil exploration. The challenge is the poor are selling land to rich at a cheaper price and who expect to benefit from the land; this is causing land conflicts and landless people especially in Buseruka Sub-County.

Oil exploration is taking place along the entire western rift of the country, an area which is politically sensitive, because it lies between two countries with a history of violent conflicts and border disputes. This area is also characterised by a number of conflicts, including violent rebellions, ethnic conflicts, land conflicts and insecurity according to the independent, 4th June 2012. The Albertine region is also an area that embraces a multiplicity of local government authorities, traditional institutions and people of various ethnic groups. Given this fragmented identity, the discovery of oil has the potential to stir up tensions along different lines. Therefore, in Uganda, where rural livelihoods largely derive from natural resources, careful management of the impact of oil exploration is crucial for ameliorating the livelihood vulnerabilities of rural households as well as resolving the raging conflicts. It is important to consider mainstreaming conflict-sensitive analysis in programming for the oil and gas sector (International Alert, 2009).

1.2 Statement of the problem

Oil exploration has led to the violation of property rights due to land, housing and livestock conflicts/ wrangles which have threatened the existence of the indigenous people. The media has reported the threats emanating from the land, housing and livestock uncertainty as a result of oil exploration like hatred between the oil exploration company and the indigenous people, and displacement in Hoima District and Albertine region in particular (Kisembo, 2019). Despite the government effort put in place through legal instruments like the Constitution and the National Oil and Gas Policy, housing, livestock and land conflicts still exists in the Albertine region (International Alert, 2013).. A baseline survey carried out by HOCADEO (2012), reports that

the majority of the individuals believed in the idea that there were incidences of land grabbing as seen from the 143(46.7%) who strongly agreed, 84(27.5%) who agreed to the statement. Moreover, the majority of the respondents had a perception that more people were likely to be displaced on their land due to oil discovery.

Article 26(1) of the 1995 constitution of Uganda provides for every person's right to own property either individually or in association with others, while Article 237 states the land in Uganda belongs to the citizens of Uganda and shall vest in them in accordance with land tenure systems: customary, freehold, mailo and lease hold. Such legislation include: land (amendment) Act, 2010, which enhances the security of occupancy of lawful and bona fide occupants on registered land in accordance with Article 237 of the constitution. In spite of the findings, no empirical studies have been done on oil exploration activities and land conflicts and more so in developing countries, like Uganda in confirmation to the above mentioned facts. This lack of studies has resulted into uncertainty, increased hostility, and loss of land among others. Therefore there is a need to conduct a study on relationship between oil exploration activities and property district particularly Albertine region.

1.3 Purpose of the study

The purpose of the study was to investigate on the impact of oil exploration on property rights a case study of 2 selected districts in the Albertine Graben region in Uganda.

1.3.1 Research objectives

i) To explore how the upstream stage of oil exploration has affected the property rights in the Albertine graven region.
ii) To assess how the Midstream stage of oil exploration affects the property rights in the Albertine Graben region.
iii) To establish how the preparation for the Downstream stage of oil exploration affects the property rights in the Albertine Graben region.

1.3.2 Research questions

i) How has the Upstream stage of oil exploration affected the right to land in the Albertine Graben region?
ii) How has the Midstream stage of oil exploration affected property rights in the Albertine Graben region?

iii) How has the preparation for the downstream stage of oil exploration affected property rights in the Albertine Graben region?

1.4 Significance of the study

The study will be useful to the following;

The study will help the Government of Uganda, particularly the Ministry of Energy and Mineral development in making clear policies on how oil companies and individuals are to handle demands of the community concerning issues such as jobs, culture mix, health, displacement and peaceful co-existence.

The study will also enable other stakeholders for example the civil society who are in charge of accountability and participatory mechanisms.

This study will also be useful to other researchers in the field of oil and gas exploration and those who would wish to expound on the area of mining to obtain a foundation in the form of literature review.

The study will also be useful to the Institute of Kampala International University in research purposes for the future students.

1.5 scope of the study

The scope contained three main categories that are geographical scope, time scope and content scope.

1.5.1 Geographical Scope

The study was carried out at the principal prospective area for petroleum in Uganda which is the Albertine Graben. It forms the northernmost part of the western arm of the East African Rift System, stretching from the border with Sudan in the north to Lake Edward in the south, a distance of over 500km. The study area has been chosen because it carries the elements required by the study problem for example the Oil exploration and loss of property rights.

1.5.2 Time scope

The study followed a period when it was discovered to date and was carried out with in a period of 3 months and will run from October 2022 to May 2023

1.5.3 Content scope

The study considered oil exploration as the independent variable and property rights as the dependent variable

1.6 Operational Definitions

Upstream

This refers to exploration and production of crude oil and natural gas.

Middle stream

This is the transportation and storage of crude oil and natural gas.

Downstream

This refers to the conversion of crude oil and natural gas into thousands of finished products

Oil exploration

This involves the removal or blowing out the natural oils that are present in underground which are regarded as non-renewable resource. Exploration refers to mining or exploitation of mineral resources from the land and sea using technological knowledge.

Property rights

Property rights are constructs in economics for determining how a resource or economic good is used and owned, which have developed over ancient and modern history, from Abrahamic law to Article 17 of the Universal Declaration of Human Rights.

Land

Land can mean some territory, forming part of a country. Dry land is the parts of Earth's surface not covered by the ocean or other permanent body of water.

Housing

Housing, or more generally, living spaces, refers to the construction and assigned usage of houses or buildings individually or collectively, for the purpose of shelter.

Livestock

Livestock are the domesticated animals raised in an agricultural setting to provide labor and produce diversified products for consumption such as meat, eggs, milk, fur, leather, and wool.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

Under this chapter the researcher brought out a critical review of the issues that were explored and studied both theoretically and empirically in the existing literature on the relationship between oil exploration and land, housing and livestock conflicts in developing countries and elsewhere in the World. It is important to note that the greatest part of the existing literature on the works of other scholars who have written about the topic of the study or those who have addressed similar issues as those of the variable that will be available in the study. The literature will be comparative in that it will be in line with the specific objectives of the study; so as to make the writer appreciate the contributions of the different writers and identify the gaps.

2.2 Theoretical review

The research draws on several documented experiences and theories as foundation stones for organizing ideas on oil exploration activities and land conflicts in oil-rich areas particularly in Albertine Graben Region. In explaining the correlation between primary commodities and conflicts, Hoeffler and Collier (1998) argued that conflict may be explained by either greed or by grievance such as feeling of ethnic or political marginalization. Secondly, Fearon and Laitin (2003) argue that natural resources increase the price value of capturing the state (ndibwa, 2014).

2.2.2 The Resource Curse Theory

The resource curse, also known as the paradox of plenty, refers to the paradox that countries with an abundance of natural resources, specifically non-renewable resources like minerals and fuels, tend to have less economic growth, less democracy, conflicts and worse development outcomes than countries with fewer natural resources(Kisembo,2009).Literature available on ‘resource curse’ (Sachs & Warner, 1995, p.50; Auty, 2001) and the ‘paradox of plenty’ (Karl, 1997) relate both resource abundance and resource dependence to: low levels of human development, corruption, repression, poor economic performance and conflict. However, even with the vast and varied nature of literature on resource and conflicts, ‘the link between resources and conflicts are not always clear’ (O’lear, 2004), there by leading to various dimensions of what constitutes resource conflicts. Natural resource abundance according to (Karl, 1997) shows that

when minerals are the key source of wealth of a state, these mining revenues alter the framework for decision making.

Sorena (2011) summed up resources curse as 'a cluster of observed, cross national relationships between natural resource on the one hand and poor economic performance, state weakness, political corruption and civil conflict on the other'. Proponents of this natural resource as a blessing thinking like Rostow (1961) proposed that abundant natural resources will enable host developing economies to achieve industrial take-off. However, an identifiable oversight in their research findings are that Karl (1997) and Rostow (1961) based their premises only on formal sectors. They gave little consideration on the non-formal sector, non-state institutions and non-formal authorities like subsistence farming, fishing, traditional institutions and community leadership, which in one way or another are affected by extractive activities. Therefore the narrow nature of some of the research leaves the land conflicts aspect as a result of oil exploration activities in local oil communities un-researched.

Absolute Ownership Theory

The theory of absolute ownership of crude is built on the doctrine of ad coelom. Which states that the owner of a piece of land is regarded also as the owner of the petroleum lying underneath the land. Land in this regard includes everything down to the lowest and deepest part of the earth beneath the land and up to the sky. This means ownership of "land to an indefinite extent", upwards as well as downwards. The Latin maxim "cujus est solum, ejus est usque ad coelum ad inferos," which literally translates as: "to whomever the soil belongs he owns also the sky and to the depth."

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example, in the province of Alberta, Canada, and in the US State of Texas, the private land owners are permitted to own the oil and gas found on their lands.

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"The substances are fugacious and are not stable within the container although they cannot escape from it. If any of the three substances (petroleum, gas or water) is withdrawn from a portion of the property which does not belong to the appellant but lies within the same container and any oil or gas situated in his property thereby filters from it to the surrounding lands, admittedly he has no remedy. So, also, if any substance is withdrawn from his property, thereby causing any fugacious matter to enter his land, the surrounding owners have no remedy against him. The only safeguard is to be the first to get to work, in which case, those who make the recovery become owners of the material which they withdraw from any well which is situated on their property or from which they have authority to draw (Borys, 1953)

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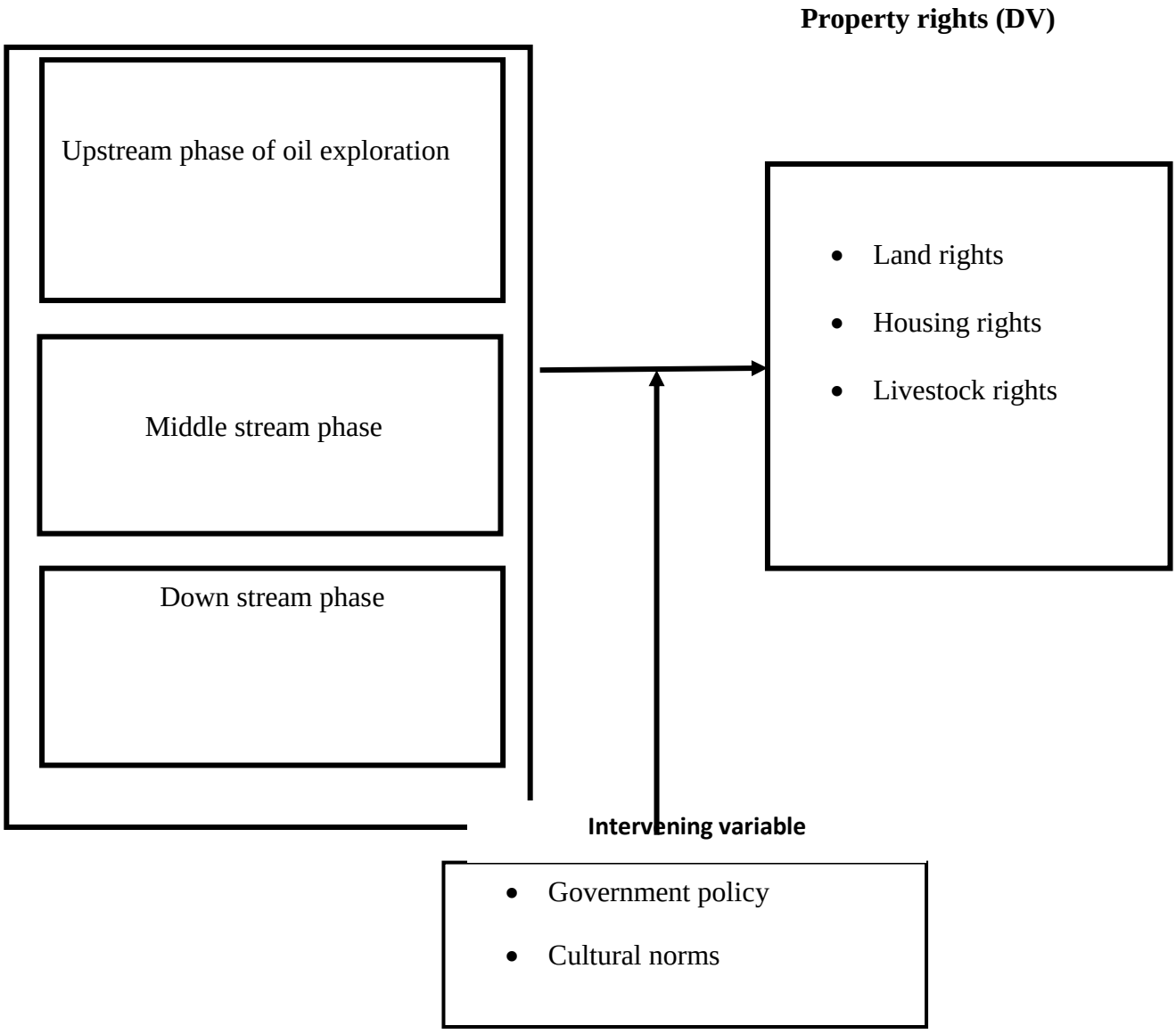
theory as modern practice show that petroleum though may move from one place to the other is still subject to ownership by the person or authority that captures it at any particular point in time.

2.3 Conceptual framework

The Dependent Variable in property rights which are dependent on oil exploration (Independent variable).

The Dependent variable has Dv_1 Land, DV_2 Housing and DV_3 Livestock and the independent variable has IV_1 as Upstream, IV_2 as Middle stream and IV_3 as Downstream.

Oil exploration activities (IV)



Source : Adopted from Teng (2015) and modified.

2.4 Related literature

2.4.1 Upstream stage and property rights

According to Ron (2015), the upstream segment of the oil and gas industry contains exploration activities, which include creating geological surveys and obtaining land rights, and production activities, which include onshore and offshore drilling. Oil and gas exploration encompasses the processes and methods involved in locating potential sites for oil and gas drilling and extraction. Early oil and gas explorers relied upon surface signs like natural oil seeps, but developments in science and technology have made oil and gas exploration more efficient. Geological surveys are conducted using various means from testing subsoil for onshore exploration to using seismic imaging for offshore exploration. Energy companies compete for access to mineral rights granted by governments by either entering a concession agreement, meaning any discovered oil and gas are the property of the producers, or a production-sharing agreement, where the government retains ownership and participation rights. Exploration is high risk and expensive, involving primarily corporate funds. The cost of an unsuccessful exploration, such as one that consisted of seismic studies and drilling a dry well, can cost $5 million to $20 million per exploration site, and in some cases, much more. However, when an exploration site is successful and oil and gas extraction is productive, exploration costs are recovered and are significantly less in comparison to other production costs.

During the upstream phase of oil exploration, there is Contamination of water has been identified as another possible mechanism for observations of health risks. Women relying on surface water for household needs and men working in oil spill remediation recorded the highest levels of urinary mercury in oil extraction regions of Ecuador and Peru (Webb et al. 2016). Overall, however, the urinary mercury levels in this population were consistent with global background levels, while 7% of participants exceeded World Health Organization background levels.

Only one study was found examining birth outcomes in relation to oil extraction. After adjusting for socioeconomic factors, women of child-bearing ages from exposed communities reported higher numbers of spontaneous abortions (OR: 2.47, 95% CI 1.61-3.79); however, no significant differences in stillbirth were observed (San Sebastian et al. 2002). This review did not identify any studies assessing birth outcomes, such as birth weight, pre-term birth, or birth defects.

Contamination of the earth occurs when drilling fluids are spilled during transport by truck or wastewater pipelines, failure of well casings, or leaks from tank pipes (Pichtel 2016). Polluted lands can then impact human health through direct ingestion, crops, dermal contact, indoor and outdoor inhalation of soil particulates, and/or migration to groundwater, with field workers and nearby communities at highest risk for exposure.

Hydrocarbons, primarily measured as total petroleum hydrocarbons (TPH), comprise the major component of crude oil profiles, with hundreds of individual chemicals in a single TPH mixture. These profiles may vary between oil fields. A comparison of TPH soil concentrations between oil fields and farmlands in China found significantly higher concentrations in the oil fields, particularly in the top 15 cm of soil, likely as a result of direct oil spills or leaks (Teng et al. 2013). Similar results were observed around oil production sites in Nigeria, where the TPH concentrations are expected to have adverse effects on soil quality and microorganism health (Olobaniyi and Omo-lrabor 2016). Naphthenic acids, for example, are a naturally occurring component of nearly all crude oils and can persist in water and accumulate in sediments. These compounds have been found to be toxic to microorganisms, aquatic organisms, birds, and mammals (Brown and Ulrich 2015). An investigation across four oil fields measured naphthenic acids in all samples, and many samples were found to be at concentrations that exceeded reported ecotoxicity thresholds (Jie et al. 2015)

Exploratory well drilling activities last from 1 to 2 years, commonly 2 or 3 wells will be drilled during this exploratory stage (oil and gas journal, June 7, 1982, p.66-67).Environmental impacts associated with exploratory well drilling are obviously dependent upon precisely where the exploratory well is to be located; a well site on flat desert terrain will pose different problems than one located in high mountain meadow. A preliminary environmental review occurs before an operator’s plan are finalised and submitted. This review identifies potential conflicts with other land uses or resources and impact mitigation steps that might avoid these conflicts. The purpose of this review is to assist the lessee and operator in developing project plans and directing initial surveying and staking activities before they occur (wondolleck 2013, p.58).The author was not clear on the type of conflicts, therefore this needs further study.

Land is a very important resource. Several reports (e.g., Uganda Land Alliance, 2011, Bomuhangi and Doss, 2012) indicate that oil exploration activities, such as the digging of seismic wells and drilling, have already led to changes in ownership of land, conflict, and displacement as well as an influx of migrants vying for opportunities in the Albertine Graben.

Not only is this growing migration likely trigger population growth, increase land pressure, and escalate competition among the indigenous people and newcomers, it is also likely to place more demand on the already limited social services of education, health and water in the region. This large movement of people has implications for fiscal expenditure and allocation as well, making it critical to capture land issues, demographics and changes in social infrastructure, including schools and hospitals and other physical infrastructure aspects such as roads and telecommunications. In addition, there is a precedent of increased health and other social problems connected with oil exploration: For example, studies from Nigeria and Ecuador document increased health risks to communities as result of pollution from oil exploration. There are also risks associated with transfer of disease by migrant populations to their new communities (Dadiowei, 2003, p.40).Despite, the strength of the literature done by Uganda Land Alliance, more evidence is needed which necessitates further study.

Irrespective of their purpose, large-scale development and infrastructure projects require land, and sometimes very large tracts of land (Vanclay, 2017). Expected international practice suggests that any project should adhere to the following principles: involuntary resettlement should be avoided or at least minimised; where resettlement is unavoidable, all people affected should be compensated fully and fairly; involuntary resettlement should be conceived as an opportunity for improving the livelihoods of affected people and undertaken accordingly; and all affected people should be involved in the resettlement planning process to ensure adequate mitigation of adverse effects and to ensure the benefits of resettlement are appropriate and sustainable (IFC, 2012; Vanclay, 2017).

Many families were affected by the government's plan to build an oil refinery. In 2010, the government commissioned a Swiss firm, Foster Wheeler, to consider the feasibility of a refinery and to identify a suitable place to site it. It was established that 29 square kilometres would be needed for the refinery and associated works. The firm recommended Kabaale Parish in Buseruka Sub-county, Hoima District, an area which comprises 13 villages, as the most

appropriate location. In 2013, the government started the process of resettling and compensating the over 7000 affected residents by paying them cash or relocating them to an alternative land (Imaka and Musisi, 2013)

2.4.2 Midstream stage and property rights

The midstream sector covers transportation, storage, and trading of crude oil, natural gas, and refined products. In its unrefined state, crude oil is transported by two primary modes: tankers, which travel interregional water routes, and pipelines, which most of the oil moves through for at least part of the route (Moen, 2018).

The impact of oil and gas development on the US housing market accounts for the perceptions, experiences, fears, and expectations of a large number of people who buy and sell properties over a given period. Changes in housing prices for homes near unconventional oil and gas development—if they can be disentangled from more general demographic and economic trends—therefore offer a window into the value that the public places on the net impacts of such development in a community or region. These values reflect both actual and perceived risks and benefits as well as very local and broader spatial scales. Oil and gas development in a community tends to affect housing values through its size, spatial pattern, and intensity, which change with the boom and bust cycle. During a boom, rental housing prices and even residential housing prices (particularly those away from the development itself) are likely to increase with demand for living quarters and overall economic opportunity and development. The opposite occurs during a bust. At the same time, for housing located close to booming developments, housing values could diminish, to the extent that home buyers and/or sellers perceive negative externalities from oil and gas operations. These effects could be mitigated or reversed if a property earns royalties and those transfer with the sale. The negative effects on prices could be expected to vary with how close the housing is to development, but the positive effects would end at some distance reflecting when a property line is within or outside the boundary of horizontal drilling activity

The literature related to the housing market impacts of unconventional oil and gas development has largely focused on changes in home values from nearby shale gas or tight oil development. A handful of studies differ in their focus: one study looks at the effect of the New York fracking moratorium on home prices in three New York counties compared to Pennsylvania counties

(Boslett et al. 2016), and another looks at the relationship between unconventional oil and gas development on housing construction (Farren 2014). Weber et al. (2014) analyzes the impact of shale gas– related changes in the tax base on home values. Timmins and Vissing (2015) is the only study in our review to directly assess the impact of lease clauses on home values. Muehlenbachs et al. (2015), James and James (2014), Farren et al. (2013) and Jacobsen (2015) are the only studies to address rental rates. It is important to note that all of these studies analyze housing markets during a boom period of shale development, and therefore do not analyze how these effects might change during a downturn.

Where unconventional oil and gas development is concerned, it is important to note that findings of temporal variation in impacts on communities might be particularly revealing, especially for policymaking purposes. For example, evidence of persistent negative effects on home prices, occurring beyond the short-term construction and drilling phases of wells and well pads, would indicate potentially serious, perceived longterm impacts, as the initial drilling and construction phases are often the most disturbing in terms of noise, light pollution, truck traffic, and local air pollution

Generally, the studies show that homes near unconventional oil and gas development with piped or publicly-supplied water (i.e., not groundwater) see appreciation associated with shale development, while groundwater dependent homes near unconventional oil and gas development see large decreases in home prices. The estimated increases range from $715 (or 0.5 percent) for homes with publicly supplied water within 3.22 km of a well in Washington County, Pennsylvania (Gopalakrishnan and Klaiber 2014), to $4,802 (or 3 percent) for homes with publicly supplied water within 1.5 km of a well in Pennsylvania (Muehlenbachs, Spiller, and Timmins 2015). Groundwater-dependent homes see lower prices, with estimates ranging from a 16 percent decrease in Pennsylvania (Muehlenbachs, Spiller, and Timmins 2015) to a 20–25 percent decrease in Washington County (Golapakrishnan and Klaiber 2014). The properties could see increases in value because of payments for mineral rights that are going to the property owners. The studies above did not have data on mineral rights, but Boslett et al. (2016a) analyzed homes (in Colorado) without mineral rights located within 1 mile (or 1.61 km) of a well, finding large negative impacts—over $63,000, or 34.8 percent. Their study, however, has no information on water supply. Most of the studies find positive effects on prices when homes

are farther away from wells, but still within a plausible range for receiving royalty payments, even for groundwater dependent homes.

An important issue in measuring the costs or benefits of unconventional oil and gas development to homeowners is disentangling the positive and negative effects. All of the studies but one, Boslett et al. (2016a), are unable to separate the positive effects of royalty payments from the negative externalities. Thus, the observed price effects in other studies, if negative, are likely to underestimate the negative externality effects.

Farren et al. (2013), though not a peer reviewed study, analyzed several impacts of shale development on housing in Pennsylvania. In its analysis of Fair Market Rent (FMR)2 data calculated by the US Department of Housing and Urban Development, the study found no strong statistical link between drilling activity and fair market rent. The method of analysis used for these results, however, is not very robust, as it compares the county's fair market rent in 2003–2007 (before shale development) to that from 2007–2011 (after shale development). Shale development could have heterogeneous impacts depending on the timing of the drilling, the drilling intensity, and other factors throughout a period of four years. Additionally, this analysis included only 144 observations (one for each county), a sample size that might be too small to detect differences; additionally, it did not control for within-county variation.

2.4.3 Downstream phase and property rights

According to Jia (2019), the downstream sector covers refining and marketing. While **refining** is a complex process, the goal is straightforward: to take crude oil, which is virtually unusable in its natural state, and transform it into petroleum products used for a variety of purposes such as heating homes, fueling vehicles and making petrochemical plastics. A number of processes are involved in refining depending on the wanted end product. Hydrotreating is used to remove unwanted elements, such as sulphur and nitrogen from hydrocarbons; cracking breaks molecules into smaller fragments to produce gasoline and other lighter hydrocarbons. The gasses produced by cracking are used to create other products like synthetic rubber and plastics. When making gasoline, refiners need high octane numbers to prevent engine knocking. Despite knowing the dangers of lead, tetraethyl lead was added to

gasoline in the United States in the 1920s in order to increase the octane. Since the U.S. government banned lead in vehicle gasoline in 1996 as part of the U.S. Clean Air Act, refineries use alkylation and reforming to develop high-octane gasoline.

According to IPCC, (2013) it was found and opined that during the downstream phase of oil exploration and production as per the Fifth Assessment Report identified the ‘‘likely range” of increase in global average surface temperature by 2100, which is between 0.3 C and 4.8 C The potential impacts on livestock include changes in production and quality of feed crop and forage (Chapman et al., 2012; IFAD, 2010; Polley et al., 2013; Thornton et al., 2009), water availability (Henry et al., 2012; Nardone et al., 2010; Thornton et al., 2009), animal growth and milk production (Henry et al., 2012; Nardone et al., 2010; Thornton et al., 2009), diseases (Nardone et al., 2010; Thornton et al., 2009), reproduction (Nardone et al., 2010), and biodiversity (Reynolds et al., 2010).

The oil exploration impacts on live stock are primarily due to an increase in temperature and atmospheric carbon dioxide (CO2) concentration, precipitation variation, and a combination of these factors (Aydinalp and Cresser, 2008; Henry et al., 2012; IFAD, 2010; Nardone et al., 2010; Polley et al., 2013; Reynolds et al., 2010; Thornton et al., 2009). The impacts of climate change caused by oil exploration on livestock production factors affect most of the critical factors for livestock production, such as water availability, animal production, reproduction and health. Forage quantity and quality are affected by a combination of increases in temperature, CO2 and precipitation variation. Livestock diseases are mainly affected by an increase in temperature and precipitation variation.

In the study of Polley et al., 2013; Thornton et al., (2009) it was found that Oil exploration and production has got a negative impact on Forage and its Impacts on forage quantity and quality depend on the region and length of growing season. This is because an increase of 2 C will produce negative impacts on pasture and livestock production in arid and semiarid regions and positive impacts in humid temperate regions. The length of growing season is also an important factor for forage quality and quantity because it determines the duration and periods of available forage. A decrease in forage quality can increase methane emissions per unit of gross energy consumed (Benchaar et al., 2001). Therefore, if forage quality declines, it may need to be offset

by decreasing forage intake and replacing it with grain to prevent elevated methane emissions by livestock (Polley et al., 2013).

The effects of climate change caused by exploration on livestock diseases depend on the geographical region, land use type, disease characteristics, and animal susceptibility (Thornton et al., 2009). Animal health can be affected directly or indirectly by climate change, especially rising temperatures (Nardone et al., 2010). The direct effects are related to the increase of temperature, which increases the potential for morbidity and death. The indirect effects are related to the impacts of climate change on microbial communities (pathogens or parasites), spreading of vector-borne diseases, food-borne diseases, host resistance, and feed and water scarcity (Nardone et al., 2010; Thornton et al., 2009; Tubiello et al., 2008)

One of the major causes of decreased production in the dairy and beef industry is heat stress (Nardone et al., 2010) and significant economic losses have been related to this. The United States livestock industry has an annual economic loss between 1.69 and 2.36 billion US dollars due to heat stress, of which 50% occurs in the dairy industry (St-Pierre et al., 2003). High-producing dairy cows generate more metabolic heat than low-producing dairy cows. Therefore, high-producing dairy cows are more sensitive to heat stress. Consequently, when metabolic heat production increases in conjunction with heat stress, milk production declines (Berman, 2005; Kadzere et al., 2002). Heat stress also affects ewe, goat, and buffalo milk production (Finocchiaro et al., 2005; Nardone et al., 2010; Olsson and Dahlborn, 1989). In general, ewes are more sensitive to the combined temperature and relative humidity affect (the temperature humidity index) than actual temperature or relative humidity. However, the index values that trigger heat stress on ewes varies by breed type (Finocchiaro et al., 2005). Heat stress also impacts goat milk composition and amount. For example, in lactating goats, a water loss reduction mechanism is activated during hot seasons. This mechanism reduces water loss in urine in favor of milk production during seasons with limited water resources (Olsson and Dahlborn, 1989). Buffalo exposure to high temperatures also reduces milk production because it affects the animal physiological functions, such as pulse, respiration rate, and rectal temperature (Seerapu et al., 2015). However, less attention has been given to these animals because of their adaptability to warm conditions and lower demand for their milk (Nardone et al., 2010)

2.5 Gap in the study

There are several related studies such as Barigayomwe (2012) who studied oil exploration and local content in petroleum industry in Uganda using mixed methods.

Maingi (2013) studied oil exploitation, evaluation in the Albertine Graben region using qualitative analysis.

However no study has been done on oil exploitation and property rights in Uganda using mixed methods and critically analyzing the Upstream, middlestream and upstream stages.

CHAPTER THREE:
METHODOLOGY

3.0 Introduction

Chapter three discussed the general procedures for conducting the research. It explains the research design, research paradigm, study population, sample size and sampling procedure, sources of data, data collection instruments, data quality control (validity and reliability), analysis of empirical data and ethical considerations.

3.1 Research Design

The study adopted a cross-sectional survey design. Thus, data elicited from a representative subset of the study population at a specific point in time and the data gathered from the subset will use to generalize for the entire population. Additionally, the study adopted a mixed method approach in data collection, whereby both quantitative and qualitative approaches were used in data collection. Quantitative approach involved the use of questionnaire, while qualitative approach involved collecting data through face-to-face interview and observation.

3.2 Population of the study

The study population considered a target population of 2500 households in Bullisa and Hoima districts affected by the oil exploration.

3.3 Sample size

Sample size is the number of observations taken from a population through which statistical inferences for the whole population are made. The study sample size was categorized into two: quantitative sample and qualitative sample.

3.3.1 Quantitative sample: The quantitative sample size was determined using Krejicie and Morgan (1970). Based on the study population of 2500 house Households the sample size will be determined to be 335 respondents.

3.3.2 Qualitative sample

This consists of a section of the study population that was selected for key informant interview. The study selected 18 key informants that include local leaders, security officers, local government workers, the key informants were purposively selected based on the researcher's perception of their deep knowledge of the issue under investigation.

Table: 3.1 Categorization of qualitative sample

S/N	Portfolio of Participants	Target population	Sample	Sampling Technique
1	Government officials	11	9	Purposive Sampling
2	Religious leaders	2	2	Purposive Sampling
3	Local government leaders	4	4	Purposive Sampling
4	Ministry of land officials	3	3	Purposive Sampling
	TOTAL	**17**	**15**	

Source: Respondents' data, 2023

3.4 Sampling technique

Sampling is the act, method, process or technique involved in the selection of a suitable sample size or a representative subset of a study population, for the purpose of determining parameters or characteristics of the whole population. The study employed two sampling techniques: Simple Random Sampling for quantitative data (questionnaires) and Purposive Sampling for qualitative data (interview).

3.5 Sources of data

In order to adequately address the purpose of the study and the research objectives, the study adopted two major sources of data: primary and secondary sources of data.

3.5.1 Primary source

In this study, primary source of data reflects the data elicit from the study participants through the administration of survey questionnaires and face-to-face interview with key informants.

3.5.2 Secondary source

Secondary data refers to data that has already been collected and processed by another person other than the researcher. The source of secondary data for the study includes: books, peer review journals, publications of the government of Uganda.

3.6 Data collection instrument

The study utilized two main data collection instruments: survey questionnaire and interview guide, to elicit data from the study participants.

3.6.1 Survey questionnaire

The researcher designed a survey questionnaire, which was used to collect data from the respondents. The questionnaire was structured in five-point Likert scale ranging from: 1= strongly disagree; 2= disagree; 3= not sure; 4= agree; 5= strongly agree. Furthermore, the questions were designed into four segments that captures information about the demography of the respondents, as well as the three objectives of the study. A total of 335 questionnaires were distributed.

3.6.2 Interview guide

In order to generate qualitative data, the researcher interviewed 18 key informants that included: 9 government officials, 2 religious leaders, 4 local government leaders and 3 ministry officials. An interview guide was designed as a template that guided the researcher during the interviews. The interview guide contained open ended questions that were consciously designed to elicit valuable data from the respondents on the study objectives.

3.7 Data Quality Control (Validity and Reliability)

This deals with the validity and reliability of the data collection instrument. Data Quality Control ensures that the instruments used in data collection are capable of generating information that is reasonable enough to realize the purpose of the study, achieve the study objectives and answer the research questions.

3.7.1 Validity

Validity is the ability of a research instrument to produce accurate results and able to measure what it is intended to measure (Mugenga and Mugenda, 2003). The study utilized both face validity and content validity methods.

Face validity: The draft questionnaire was sent to my supervisor and two other experts to evaluate the instrument. The experts assessed the instrument based on the appropriateness of sentence construction and language clarity, length of the questionnaire (in terms of the anticipated time to answer it) and the privacy of the respondents. Based on feedback from the experts, the content validity index was used to calculate and determine the validity of the instrument.

Content validity: To further validate the instrument, the content validity was used to test the validity of the questionnaire based on the result of the expert judgment.

3.8.2 Reliability

Reliability of the instrument was established through a pilot study was conducted at the Albertine Graben region Hoima District. The test-re-test method was adopted.

3.9 Data Analysis

Different data analysis methods were used for the two types of data elicited in the study. For quantitative data, the Statistical Package for Social Sciences (SPSS) was used to analyze the data, after which the result was presented using tables, frequencies. For the qualitative data, the content analysis method was used to analyze the data. The process involves assessment of the accuracy and uniformity of data generated in the field and editing of the answers elicited from the respondents. The interview transcripts were meticulously edited in a way to improve the legibility, while at the same time, the views of the respondents were reasonably maintained in their own words.

3.10 Ethical Consideration

To ensure that the study followed appropriate ethical standards, the researcher obtained an introductory letter from the Directorate of High Degree and Research of Kampala International University. The letter was presented to the study participants to assure them of the essence of the study, thus it helped to eliminate suspicion about the actual reason for the research. Furthermore, the researcher informed the study participants of the confidentiality of the information provided. The participants were assured that information collected from them was to be used solely for academic purpose. Furthermore, they were encouraged to use pseudonym instead of their real names. Also, the respondents were informed of their right not to participate in the study or to discontinue should they at some point during the study feel uncomfortable to continue.

CHAPTER FOUR
PRESENTATION, INTERPRETATION AND ANALYSIS OF FINDINGS

4.0 Introduction

This chapter present data and interpreted collected using the questionnaire designed to reflect the objectives. The study will consider a study on the effect of oil exploration on property rights. The study focused on 335 respondents who were selected from the selected respondents. The Presentation and interpretation of data in this chapter has been done with the aid of quantitative and qualitative methods. Quantitative methods involved the use of tables for computations of sum and averages, percentages and personal analysis and interpretation presented in essay form.

4.1 Socio-demographic characteristics of respondents

Variable		**Number of respondents**	**Percentage (%)**
Gender	Male	214	63.8
	Female	121	36.1
	Total	**335**	**100.0**
Age	15-17yrs	32	9.55
	17-19 yrs	100	29.8
	19-21yrs	110	32.8
	21-24 yrs	93	27.7
	Total	**335**	**100.0**
Education	Certificate	63	18.8
	Diploma	232	69.3
	Degree	32	9.5
	Masters	8	2.38

	Total	**379**	**100.0**

Source: Respondents' data, 2023

Of the 335 respondents, majority of them were males 214 (63.8%) and 121 (36.1%) were female. Most of the respondents (110) were between the age of 19-21years followed by those between 17-19years (100), and then those 21-24 (93 respondents) while the least number of respondents (32) were 15-17 years of age.

Basing on the data collected, most (232 respondents) went through and had attained at least a diploma as their highest education level followed by those who had certificates in various fields (63, respondents), those who got a degree were 32 and those with a masters were only 8 respondents.

4.2 Descriptive statistics on research variables

The independent variable in this study was Upstream stage and dependent variable was property rights.

4.2.1 Descriptive statistics on upstream phase and property Rights

Table 4.6: Descriptive statistics on upstream and property Rights

Statement	N	Mean	Std. Deviation	Interpretation
Oil exploration and Land Rights				
At the upstream stage of exploration, people's settlements are affected in the Albertine Graben region.	335	3.62	1.319	High
At this stage, Oil exploration and production has got a negative impact on food crop production.	335	3.85	1.349	High
Upstream phase of Oil exploration in the Albertine Graben region has hindered economic activity of stone quarrying carried out by the local people in the region.	335	3.86	1.210	High
It has limited access to rivers through the distortions that has been created.	335	3.85	1.049	High
Oil exploration has resulted into loss of land rights	335	4.14	.882	High
There has been limited access to swamps by the local people as caused by the interference of the oil exploration activities	335	4.15	.939	High

Source: Respondents' data, 2023

Mean ranges	Response mode	Interpretation
4.21-5.00	Strongly agree	Very high
3.41-4.20	Agree	High
2.61-3.40	Not sure	Moderate
1.81-2.60	Disagree	Low

1.00-1.80	Strongly disagree	Very low

Source: Respondents' data, 2023

According to table 4.6, findings showed that property rights in the Albertine Graben region Uganda were affected at the upstream stage of oil exploration. This was ranked high as specified by average mean (Mean = 3.65). This implies that the Upstream stage of oil exploration affects people's settlement in the Albertine Graben Region for example the building of roads and site preparation, comments are centered on vegetation clearance, possible erosion and changes in surface hydrology; vibration and noise from earth moving equipment; disturbance of population and wildlife; impacts related to influx and settlement through new access routes; drainage and soil contamination; land use conflicts; loss of habitat and construction noise. This was rated high with an average mean (Mean = 3.62).

Oil exploration and production has got a negative impact on food crop production (Mean 3.85) this is because Crude-oil exploration destroys the necessary nutrients that will make crops grown on land and grasses livestock eat. These have led to poor agricultural outputs and income making a livelihood in agriculture unattractive.

Oil exploration in the Albertine Graben region has hindered economic activity of stone quarrying carried out by the local people in the region (Mean, 3.86). Implying that an oil spill can harm birds and mammals in several ways: direct physical contact, toxic contamination, destruction of food sources and habitats, and reproductive problems.

It has limited access to rivers through the distortions that has been created (Mean, 3.85), implying that Oil in sediments may be very harmful because sediment traps the oil and affects the organisms that live in or feed off the sediments.

Oil exploration has affected the lakes in the region and the access of people to the water body (Mean, 4.14) this implies that Produced water in offshore drilling is often discharged into the close aquatic environment. Discharge of this wastewater to the freshwater environment affects agricultural resources and destroys aquatic life. Oil spills can suffocate fish, get caught in the feathers of birds and mammals and block light from photosynthetic plants in the water

There has been limited access to swamps by the local people as caused by the interference of the oil exploration activities (Mean, 4.15). This implies that because of the delay in oxygen availability caused by oil can increase stress on wetland plants, unable to supply enough oxygen to their root system.

> *"One the religious leaders from the Albertine Graben region in Hoima District opined that Production activities in the Albertine Graben region has hindered economic activity of stone quarrying carried out by the local people in the region".*
>
> *"According to a local leader in the regions, it was said that obtaining land rights during the Upstream stage distorted the ownership of property rights for local residents".*
>
> *"Another informant from the Ministry of Land in the region said that creating of geological surveys during the upstream stage affects the growth of cash crops in the Albertine Graben region"* therefore this implies that there is a significant impact of the Upstream stage of exploration on property rights.

Linear regression results (Upstream stage of exploration and property right**)**

The coefficient of determination (denoted by adjusted R2) a key output of regression analysis was used to determine whether the Upstream stage of Oil exploration was on property rights

Linear regression results for corona virus pandemic and University education

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.580a	.336	.312	.68360

a. Predictors: (Constant), Upstream stage of exploration of oil

Source: **Primary Data 2023**

Table 4.2.1 comprises of the model summary with scores including R as .580, R squared as .336, Adjusted R square as .312 and standard error of the estimate as .68360 using the predictor; Upstream Stage. The coefficient of determination measures the proportion of variation in the dependent variable that is predictable from the independent variable. The coefficient of determination is equal to adjusted R2; in this case, (0.312) or 31.2%. Therefore, 31.2% of the variability in the extent to which the upstream stage of oil exploration has violated property

rights in the Albertine Graben region with the remaining percentage of 68.8% suggesting proof of other factors contributing to the loss of property rights.

Analysis Of Variance (ANOVA[a])						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.105	1	78.105	12.177	.003[b]
	Residual	519.552	369	7.318		
	Total	608.658	370			

Source: Respondents' data, 2023

a. Dependent Variable: Property rights

b. Predictors: (Constant), Upstream stage of Oil Exploration.

The ANOVA table indicated that Upstream stage of Oil Exploration positively affects property rights and this was indicated by the F-value=12.177 and P-value=.003, since the P-value (0.003) was less than 0.05 and which is the maximum level of significance required to declare a significant effect. This implies that Upstream stage of Oil Exploration highly positively contributes to Property Rights.

4.2.2 Descriptive statistics on how the Midstream stage and property rights in the Albertine Graben region

Table 4.7: Descriptive statistics on Midstream and property rights in the Albertine Graben region

Oil Exploration and right to housing		**Mean**	**S.D**	**Interpretation**
The midstream stage of Oil exploration in the region has negatively affected housing rights in the region	335	3.60	1.412	High
The Second stage of Oil exploration has affected household main houses and servants	335	3.48	1.276	High
Oil exploration in the region has negatively impacted the house hold granaries.	335	3.60	1.412	Moderate
Land lords of rentals have been seriously affected as caused by the oil exploration activity	335	3.46	1.382	High
It has got a negative impact on recreation centers of the region	335	3.60	1.412	High
Average mean		**3.43**	**1.350**	**High**

Source: Respondents' data, 2023

According to table 4.7, outcomes showed that there is a significant effect of the Midstream phase of Oil exploration on property rights in the Albertine Graben region for-example it was found that; Oil exploration in the region has

negatively affected housings in the region (Mean, 3.60) this implies that Midstream oil extraction, which includes exploration and operation to bring crude oil to the surface, frequently occurs near human populations which affects rights of housing.

Results show that at this Oil exploration has affected household main houses and servants (Mean, 3.48) implying that the construction of roads, facilities and drilling sites requires the use of heavy equipment and can affect household settlements and servants on the land. The study findings also revealed that the Midstream phase of Oil exploration in the region has negatively impacted the house hold granaries (Mean, 3.60) this has an implication that Oil exploration has led to environmental problems in the producing communities of the State and has virtually affected livelihood outcomes such as low productivity, low income, reduced food security and severe health hazards among farming households. Land lords of rentals have been seriously affected and evicted as caused by this midstream stage of oil exploration activity (Mean, 3.46)

Oil exploration has got a negative impact on recreation centers of the region (Mean, 3.60), meaning The government of Uganda hopes that oil extraction in MFPA will not harm the tourism industry. Visitor numbers to MFPA doubled between 2008 and 2014, attributable to recovering wildlife populations and the departure of the Lord's Resistance Army in 2006 (Rwetsiba and Nuwamanya 2010; UBOS 2015).

> *A Government officials in the Albertine Graben region opined that the midstream stage of Oil exploration in the region negatively affects housings in the region and that this is because the effects on housing result into the destruction of the house hold granaries, household main houses and servants*
>
> *According one of the Ministry of land officials, Land lords of rentals have been seriously affected as caused by the oil exploration activity*

4.3.3 Midstream of Oil exploration stage and property rights in the Albertine Graben region

Table 4.10: Regression results on oil exploration affects the right to housing in the Albertine Graben region

Model summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.669[a]	.448	.440	2.17548

Source: Respondents' data, 2023

a. Predictors: (Constant), Mid-stream stage of Oil exploration

Analysis Of Variance (ANOVA[a])						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	272.633	1	272.633	57.606	.000[b]
	Residual	336.024	334	4.733		
	Total	608.658	335			

Source: Respondents' data, 2023

a. Dependent Variable: Property rights

b. Predictors: (Constant), Midstream stage of Oil exploration

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	13.285	2.339		5.680	.000
	Mid stream stage exploration	1.299	.171	.669	7.590	.000

Source: Respondents' data, 2023

a. Dependent Variable: Property Rights

The results in table 4.10, indicated that Regression analysis results in the model Summary table indicated that the Mid stream stage of Oil exploration positively significantly affects the property rights in the Albertine Graben Region, Uganda at a rate of 44.8% and this was indicated by r-squared of 0.448, hence implying that Oil exploration significantly influences the rights to housing.

The ANOVA table indicated a positive significant effect Oil exploration have on Rights to Housing and this was indicated by the positive F-value=57.606 and Sig-value=.000, since the sig. value 0.000 was less than 0.05 and which is the maximum level of significance required to declare a significant effect.

The coefficients table indicated that considering the standard error, the Midstream phase of Oil exploration positively significantly affect the property rights in the Albertine Graben Region, Uganda β=.669, Sig=0. 000.

4.4 Downstream Stage of oil exploration and Property Rights

Table 1 : Showing the descriptive statistics about the downstream stage of oil exploration and property rights

Relationship	**Mean**	**Std. Deviation**
The downstream stage of exploration and production leads to the increase in global average surface temperature by 2100, which is between 0.3 C and 4.8 C which has potential impacts on livestock	2.32	.756
Downstream stage of exploration has led to the changes in production and quality of feed crop and forage	3.42	1.301

This stage impacts on live stock are primarily due to an increase in temperature and atmospheric carbon dioxide (CO2) concentration, precipitation variation, and a combination of these factors	3.21	1.332
Oil exploration affects the quality of water and green pasture for domestic animal use like goats, sheep, cows donkeys and pigs	3.49	1.196
Oil exploration has an impact on climate change on microbial communities (pathogens or parasites), spreading of vector-borne diseases, host resistance, and feed and water scarcity which directly affects livestock.	3.17	1.332
Average means	**3.21**	

Source: Primary Data, 2023

Results in table 4 indicated that there was a significant effect of the downstream stage of oil exploration on property rights this was indicated by the overall mean of 3.21, which implies that The downstream stage of exploration and production leads to the increase in global average surface temperature by 2100, which is between 0.3 C and 4.8 C which has potential impacts on livestock (2.32); from the above results, it was found out that Downstream stage of exploration has led to the changes in production and quality of feed crop and forage (3.42); findings also revealed that This stage impacts on live stock are primarily due to an increase in temperature and atmospheric carbon dioxide (CO2) concentration, precipitation variation, and a combination of these factors (3.21); Oil exploration affects the quality of water and green pasture for domestic animal use like goats, sheep, cows donkeys and pigs (3.49); Oil exploration has an impact on climate change on microbial communities (pathogens or parasites), spreading of vector-borne diseases, host resistance, and feed and water scarcity which directly affects livestock. (3.17), this therefore implied that there is a significant effect of the downstream stage of oil exploration on property rights.

From the Albertine region, a local leader opined that the downstream stage of Oil exploration has an impact on climate change on microbial communities (pathogens or parasites), spreading of vector-borne diseases, host resistance, and feed and water scarcity which directly affects livestock.

Further more it was said that oil exploration affects the quality of water and green pasture for domestic animal use like goats, sheep, cows donkeys and pigs

Downstream stage of exploration has led to the changes in production and quality of feed crop and forage

4.3 Regression results on downstream stage of oil exploration and property rights

Regression results on downstream oil exploration on property rights in the Albertine Graben Region

Model summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.524[a]	.274	.272	.41854

a. Predictors: (Constant), Down Stream stage of oil exploration

Analysis Of Variance (ANOVA[a])						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	89.105	1	89.105	12.177	.001[b]
	Residual	519.552	334	7.318		
	Total	608.658	335			

a. Dependent Variable: Property rights

b. Predictors: (Constant), Downstream stage of Oil Exploration

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		

1	(Constant)	18.734	3.510		5.338	.000
	Downstream stage of oil exploration	.625	.179	.383	3.490	.001

Source: Respondents' data, 2023

a. Dependent Variable: Property Right

The results in table 4.8, Regression analysis results in the Model Summary table revealed that Oil exploration accounted for 27.4% on the Effect on livestock in the Albertine Graben Region, Uganda and this was indicated by r-squared of 0.274 implying that Cattle are poisoned by petroleum and substances used in drilling and operating oil and gas wells. The most common reported route of exposure for non-gaseous material is oral. Exposures occur when the petroleum or chemicals used in oil and gas field activities are available to cattle and when water and feed-stuffs are contaminated. Cattle, as a leisure activity, explore and ingest crude oil. Based on morbidity patterns in cattle herds, the amount of toxic substance ingested is variable. When water and feedstuffs are contaminated, a larger number in a herd generally are affected. Cattle have been poisoned by a wide variety of chemical mixtures.

The ANOVA table indicated that the downstream stage of exploration significantly affects property rights in the Albertine Graben Region, Uganda and this was indicated by the F-value=12.177 and Sig value=.001, since the sig. value 0.001 was less than 0.05 and which is the maximum level of significance required to declare a significant effect. This implies that the downstream exploration highly contributed to the violation of property rights in the Albertine Graben region Uganda.

The coefficients table indicated that considering the standard error, the downstream stage of Oil exploration negatively influence the property rights in the region β=0.383, Sig=0. 001.

CHAPTER FIVE
DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

In this chapter, discussion, conclusions and recommendations are made basing on the findings from chapter four. The discussion, conclusions and recommendations were done according to major study themes in relation to the study objectives.

5.1 Discussion of the findings

5.1.1 Effect of the upstream phase of oil exploration on property rights

The Upstream stage of oil exploration affects people's settlement in the Albertine Graben Region for example the building of roads and site preparation, comments are centered on vegetation clearance, possible erosion and changes in surface hydrology; vibration and noise from earth moving equipment; disturbance of population and wildlife; impacts related to influx and settlement through new access routes; drainage and soil contamination; land use conflicts; loss of habitat and construction noise. This was rated high with an average mean Mean = 3.62.

Oil exploration and production has got a negative impact on food crop production Mean 3.85 this is because Crude-oil exploration destroys the necessary nutrients that will make crops grown on land and grasses livestock eat. These have led to poor agricultural outputs and income making a livelihood in agriculture unattractive.

Oil exploration in the Albertine Graben region as hindered economic activity of stone quarrying carried out by the local people in the region Mean, 3.86. Implying that an oil spill can harm birds and mammals in several ways: direct physical contact, toxic contamination, destruction of food sources and habitats, and reproductive problems.

It has limited access to rivers through the distortions that has been created Mean, 3.85, implying that Oil in sediments may be very harmful because sediment traps the oil and affects the organisms that live in or feed off the sediments.

Oil exploration has affected the lakes in the region and the access of people to the water body Mean, 4.14 this implies that Produced water in offshore drilling is often discharged into the close aquatic environment. Discharge of this wastewater to the freshwater environment affects

agricultural resources and destroys aquatic life. Oil spills can suffocate fish, get caught in the feathers of birds and mammals and block light from photosynthetic plants in the water

There has been limited access to swamps by the local people as caused by the interference of the oil exploration activities Mean, 4.15. This implies that because of the delay in oxygen availability caused by oil can increase stress on wetland plants, unable to supply enough oxygen to their root system.

5.1.2 Effect of oil exploration on property rights

According to table 4.7, outcomes showed that there is a significant effect of the Midstream phase of Oil exploration on property rights in the Albertine Graben region for-example it was found that; Oil exploration in the region has negatively affected housings in the region Mean, 3.60 this implies that Midstream oil extraction, which includes exploration and operation to bring crude oil to the surface, frequently occurs near human populations which affects rights of housing.

Results show that at this Oil exploration has affected household main houses and servants (Mean, 3.48) implying that the construction of roads, facilities and drilling sites requires the use of heavy equipment and can affect household settlements and servants on the land

The study findings also revealed that the Midstream phase of Oil exploration in the region has negatively impacted the house hold granaries Mean, 3.60 this has an implication that Oil exploration has led to environmental problems in the producing communities of the State and has virtually affected livelihood outcomes such as low productivity, low income, reduced food security and severe health hazards among farming households.

Land lords of rentals have been seriously affected as caused by the oil exploration activity Mean, 3.46

Oil exploration has got a negative impact on recreation centers of the region Mean, 3.60, meaning The government of Uganda hopes that oil extraction in MFPA will not harm the tourism industry. Visitor numbers to MFPA doubled between 2008 and 2014, attributable to

recovering wildlife populations and the departure of the Lord's Resistance Army in 2006 (Rwetsiba and Nuwamanya 2010; UBoS 2015).

5.1.3 Effect of the preparation for the downstream stage of oil exploration on property

The results in table 4.8, Regression analysis results in the Model Summary table revealed that the preparation for the downstream Oil exploration accounted for 27.4% on the effect on property rights in the Albertine Graben Region, Uganda and this was indicated by r-squared of 0.274 implying that Cattle are poisoned by petroleum and substances used in drilling and operating oil and gas wells. The most common reported route of exposure for non-gaseous material is oral. Exposures occur when the petroleum or chemicals used in oil and gas field activities are available to cattle and when water and feed-stuffs are contaminated. Cattle, as a leisure activity, explore and ingest crude oil. Based on morbidity patterns in cattle herds, the amount of toxic substance ingested is variable. When water and feedstuffs are contaminated, a larger number in a herd generally are affected. Cattle have been poisoned by a wide variety of chemical mixtures.

The ANOVA table indicated that Oil exploration significantly affects the property rights in the Albertine Graben Region, Uganda and this was indicated by the F-value=12.177 and Sig value=.001, since the sig. value 0.001 was less than 0.05 and which is the maximum level of significance required to declare a significant effect. This implies that Oil exploration highly contributes to the poor welfare of livestock in the Albertine Graben region Uganda.

The coefficients table indicated that considering the standard error, Oil exploration significantly influence the welfare of livestock in the region β=0.383, Sig=0. 001.

5.2 Conclusions

5.2.1 Effect of oil exploration on property rights

According to the findings, Oil exploration has a moderate positive significant effect β=0.383, Sig=0. 001) on the land rights in the Albertine Graben region.

For example study findings in table 4.8, Regression analysis results in the Model Summary table revealed that Oil exploration accounted for 27.4% on the Effect on livestock in the Albertine Graben Region, Uganda and this was indicated by r-squared of 0.274 implying that Cattle are poisoned by petroleum and substances used in drilling and operating oil and gas wells. The most

common reported route of exposure for non-gaseous material is oral. Exposures occur when the petroleum or chemicals used in oil and gas field activities are available to cattle and when water and feed-stuffs are contaminated. Cattle, as a leisure activity, explore and ingest crude oil. Based on morbidity patterns in cattle herds, the amount of toxic substance ingested is variable. When water and feedstuffs are contaminated, a larger number in a herd generally are affected. Cattle have been poisoned by a wide variety of chemical mixtures.

The ANOVA table indicated that Oil exploration significantly affects the welfare of the livestock in the Albertine Graben Region, Uganda and this was indicated by the F-value=12.177 and Sig value=.001, since the sig. value 0.001 was less than 0.05 and which is the maximum level of significance required to declare a significant effect. This implies that Oil exploration highly contributes to the poor welfare of livestock in the Albertine Graben region Uganda.

5.2.2 Effect of the Midstream stage of oil exploration on property rights

According to the findings, oil exploration has a moderate significant effect Beta=0.423, Sig=0.000 on the rights to housing in the Albertine Graben region.

The results in table 4.9, Regression analysis results in the Model Summary table indicated that the Oil exploration accounted for 17.9% on land rights in the albertine region, Uganda and this was indicated by r-squared of 0.179 implying that Oil exploration and production has got a high impact Land right that is to say on food crop production because Crude-oil exploration destroys the necessary nutrients that will make crops grown on land and grasses livestock eat. These have led to poor agricultural outputs and income making a livelihood in agriculture unattractive.

The ANOVA table indicated that Oil exploration significantly affects Land rights in the region, Uganda and this was indicated by the F-value= 15.452 and Sig value=.000, since the sig. value 0.000 was less than 0.05 and which is the maximum level of significance required to declare a significant effect. This implies that Oil exploration highly affects the Land right in the Albertine Region.

5.2.3 Effect of downstream phase of Oil exploration on the live stock in the Albertine Graben region.

According to the findings, Oil Exploration have a high positive significant effect (β=.669, Sig=0. 000) on the live stock in the Albertine Graben region.

The results in table 4.10, indicated that Regression analysis results in the model Summary table indicated that the Oil exploration significantly affects the rights to Housing in the Albertine Graben Region, Uganda at a rate of 44.8% and this was indicated by r-squared of 0.448, hence implying that Oil exploration significantly influences the property rights.

The ANOVA table indicated a positive significant effect Oil exploration have on Rights to Housing and this was indicated by the positive F-value=57.606 and Sig-value=.000, since the sig. value (0.000) was less than 0.05 and which is the maximum level of significance required to declare a significant effect.

5. 3 Recommendations

Basing on the study findings as well as study conclusions, the researcher recommends the following;

Many issues emerging from extractive industry operations appear to be based on lack of information and transparency. Ensuring full and mandatory disclosure of documents of public interest concerning the mineral and petroleum sector will equip people with knowledge that can improve legal compliance, and give public credibility to the decisions and actions of the regulating authorities.

There is also a need to simplify the relevant legislation and have it available in local languages and user-friendly formats for affected communities. Information must not only be available, but also accessible and adapted to the needs of the rights-holders.

The government and the various stakeholders must carry out widespread sensitisation of the communities on all legislation, policies and documents related to the mineral and petroleum sector, so that the information is understood and can be utilised. Only through effective sensitisation can there be free, prior and informed consent.

The government institutions must formalise and strengthen communication and reporting channels among extractive companies, communities affected by their activities, the local governments, Department of Geological Survey of Mines (DGSM), Petroleum Exploration and Production Department (PEPD), the Ministry of Lands, Housing and Urban Development, and the other government institutions, to ensure better protection of the people affected by activities of the companies. This includes allocating the necessary resources to enable these government agencies to better function.

The government must ensure access to justice within the framework established in the UN Guidelines and Principles on Access to Legal Aid in Criminal Justice Systems,113 by providing legal aid services to the affected population. The government must also build the capacity of administrative and judicial bodies to handle matters relating to the human rights violations and abuses in the extractive industry, and to ensure that the mechanisms have adequate resources, mandate and ability to handle complaints in a timely and efficient manner. Local communities need to be empowered so that they know and understand their human rights, and know how to seek redress for any rights violations or abuses that occur.

The government should amend both the Mining Act and the Petroleum (Exploration and Development) Act to include a requirement for a human rights impact assessment to consider the actual and potential human rights risks and impacts of extractive activities, and how the impacts and risks can be mitigated or avoided.

The human rights impact assessment could potentially highlight gaps in the approach of a mineral right holder to assess and address human rights issues. It would also provide opportunities for developing a systematic management process that incorporates human rights risks and impacts, and a grievance mechanism within the reach of the local populations where mining activities take place.

The government should also amend the Land Act to recognise the principle that everyone has a right to decide what happens to their land, and to provide a basis for free, prior and informed consent (FPIC), allowing communities the right to give or withhold consent to proposed projects that may affect customary land tenure interests

The government must simplify and expedite the process of registering customary land to correspond with the rapid pace of large-scale land acquisitions for extractive industry activities. In particular, mechanisms for the purpose of redressing the imbalances created by history, tradition and custom related to women's ownership rights of customary land should be put in place.

5. 4 Suggested areas for research

The study suggested the relationship between Oil Exploration and increase of employment Opportunities in the Albertine Graben Region.

5.5 Contribution to existing knowledge.

This study has had a significant contribution to the body of knowledge band has significant recommendations to how the 3 stages of Oil production (upstream, Middle and Downstream) should be handled so as to respect the property rights. This is important especially in the areas that exploration is still underway, both in Uganda and the entire region

5.6 Contribution to theory

The study also contributes to the absolute rights theory by suggesting areas of amendment to the Uganda land tenure system in order to compulsory take over land for public interest.

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QUESTIONAIRES

SECTION A. Questionnaire

I am a student of pursuing a Master Degree in Human Rights and Development carrying out a study entitled ***"oil exploration and property rights in Uganda. A case study of the Albertine Graben region".*** You are kindly requested to answer the following questions as you have been selected to be part of the sample that is going to participate in this research study. Please answer accurately by filling in /ticking the appropriate answer in the space provided. The information obtained will be used purely for academic purposes and treated with utmost confidentiality.

Thank you.

PERSONAL DATA (Please tick as appropriate)

1. Gender

Male	Female

2. Age range

25-30yrs	31-34yrs	35-40yrs	41-44yrs	45-50yrs	51 & above

3. Level of education

Certificate	Diploma	Degree	Master

SECTION B: Upstream phase and Property rights.

Direction: Please rate your ability, knowledge or skill on the following statement by ticking the right number corresponding with each question. Key; 1=Strongly Disagree; 2 = Disagree; 3 = Neutral/Not Sure; 4 = Agree and 5=Strongly Agree.

Statement	1	2	3	4	5

		SD	D	N	A	SA
Upstream phase and property rights						
1	The creating of geological surveys during the upstream stage affects the growth of cash crops in the Albertine Graben region					
2	Obtaining land rights during the Upstream stage distorts the ownership of property rights by local residents					
3	Production activities in the Albertine Graben region has hindered economic activity of stone quarrying carried out by the local people in the region.					
4	It has limited access to rivers through the distortions that has been created.					
5	Oil exploration hinders people from accessing the water body.					
6	There has been limited access to swamps by the local people as caused by the interference of the oil exploration activities					

Section B: Midstream and property rights

Statement		1	2	3	4	5
		SD	D	N	A	SA
Midstream stage and property rights						
1	Oil exploration in the region has negatively affected housings in the region					
2	Oil exploration has affected household main houses and servants					
3	Oil exploration in the region has negatively impacted the house hold granaries.					
4	It has got a negative impact on recreation centers of the region					
5	Land lords of rentals have been seriously affected as caused by the oil exploration activity					

Section C: Downstream and property rights

		SD	**D**	**N**	**A**	**SA**
1	Oil exploration and production leads to the increase in global average surface temperature by 2100, which is between 0.3 C and 4.8 C which has potential impacts on livestock					
2	Oil exploration has led to the changes in production					

	and quality of feed crop and forage					
3	The oil exploration impacts on live stock are primarily due to an increase in temperature and atmospheric carbon dioxide (CO2) concentration, precipitation variation, and a combination of these factors					
4	Oil exploration affects the quality of water and green pasture for domestic animal use like goats, sheep, cows donkeys and pigs					
5	Oil exploration has an impact on climate change on microbial communities (pathogens or parasites), spreading of vector-borne diseases, host resistance, and feed and water scarcity which directly affects livestock.					

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i) How has the Upstream stage of oil exploration affected the right to land in the Albertine Graben region?

ii) What do you recommend to be the best way of protecting property rights in the upstream state of oil exploration

iii) How has the Midstream stage of oil exploration affected property rights in the Albertine Graben region?

iv) What do you recommend to be the best way of protecting property rights in the midstream state of oil exploration

v) How has the preparation for the downstream stage of oil exploration affected property rights in the Albertine Graben region?

vi) What do you recommend to be the best way of protecting property rights in the downstream state of oil exploration

Sample determination table

N	*S*	*N*	*S*	*N*	*S*
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—*N* is population size. *S* is sample size.

Source: Krejcie & Morgan, 1970