INFLUENCE OF LANDSLIDES ON AGRICULTURAL PRODUCTION IN BUSHIKA SUB COUNTY BUDUDA DISTRICT EASTERN UGANDA

BY

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A RESEARCH REPORT SUBMITTED TO FACULTY OF SCIENCE AND EDUCATION, DEPARTMENT OF AGRICULTURE IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF BACHELOR OF SCIENCE EDUCATION (AGRICULTURE DOUBLE MAIN) OF BUSITEMA UNIVERSITY

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DECLARATION

I KUSOLO ROBERT strongly declare to best of my knowledge and believes that this Research Project proposal is my original work and it has never been produced by any another individual or institutions for any academic award. It has been my personal efforts and good will from Almighty God to come up with such material.

Signed: .....

Date: 20/09/2024.

APPROVAL

This research report has been written by Kusolo Robert under our guidance and supervision and meets the requirements set by Busitema University for the award of Bachelor of Science Education.

Signature.....

Date.....20/9/2024

Dr Okiror John James

Research Supervisor

DEDICATION

This Research Project Report is dedicated to my beloved father Mr. Kitutu Moses Wanganda and lovely mum Ms. Wemesa Florence, my uncle Busiku Julius and my son Natubu Moses May the Almighty God bless them abundantly for their support towards my academic journey

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LIST OF ACRONYMS

NRM- natural resource management

IK- indigenous knowledge

GAP-Global agricultural productivity

CSS-Cross-Sectional Study

SRS-Stratified Random Sample

ABSTRACT

The study aimed at Assessing the Influence of Landslide on Agricultural Production in Bushika Sub county Bududa District Eastern Uganda**.** The study had three objectives. This is to say: to identify the factors that contribute the occurrence of landslides; to find out how often landslide occur; and to examine the impact of landslides and agricultural production**.** It was based on a research design basing on the use of descriptive survey design to assess the Influence of Landslide on Agricultural Production. A random sampling was used in the study to select a sample size of 50 respondents from a population size of 63 respondents. Questionnaires and interview guides were used to collect data from 50 respondents. The study established that there was an impact of landslides on the agricultural productivity and the results were abstained. The findings found that majority 62.0 % of the farmers agreed that landslides damages both crops and animals leading to low and poor quality products, the study found out that 54.0% of the farmers agreed that landslides always destroy transport networks on the slope of Bududa hills, furthermore the research findings shows that farmers which is 52.0% of agreed that the occurrence of landslides leads to soil infertility hence lowering the productivity of the land on crop growing, the study show that landslides always destroy the vegetation cover, this hinders the keeping of animals on large scale. This accounts for the low productivity of agriculture. More ever, the study found that 74.0% of the respondents agreed that landslides lead to severe soil erosion.

The findings from the study revealed tough the downhill movement of debris down the slope. This has affected the production of crops. The study concludes that concerning the in influence of landslides on agricultural production, it concluded that there is a positive correlation between the two variables the study implied that landslides occurrence can have an impact on the agricultural productivity leading to low agricultural production. The findings indicate that landslides can cause damage of both crops and animals, leads of soil infertility and destruction of transport networks.

CHAPTER ONE

INTRODUCTION

1.1 Introduction

This chapter deals with background, problem statement, research objectives, hypothesis, geographical location and conceptual framework.

1.2 Background

In the Eastern Ugandan district of Bududa, the degradation of slopes through soil loss from landslides poses a threat to public health, the environment, and potential food shortages. Ten thousand people were relocated and 48 persons died as a result of landslides between 1997 and 1999 (Kitutu et al., 2004). Roads, bridges, and farmlands were among the infrastructure items that were devastated. The early theories and stories surrounding the origins of landslides were primarily related to some enigmatic creature. As farmers have a greater understanding of their surroundings, these beliefs appear to be dispelling. Due to the high costs and difficulties involved, developing nations like Uganda find it difficult to predict landslip disasters both spatially and temporally. Consequently, the application of indigenous knowledge (IK) obtained through farmer participation techniques could if verified to be consistent with the scientific explanations, be useful. Tim Hart came to the judgement in 2005 that future agricultural projects would be more effective if there was an improved understanding of how to use suitable indigenous knowledge. In Uganda, natural resource management (NRM) has made use of farmer participatory methods (Nicoliene et al., 2003). According to Nathalie (2003), farmers have developed incredibly precise local systems for valuing land resources through experiences those frequently span decades. Their methods of acquiring knowledge are comparable to scientists' methods of observation and experimentation in many respects (Chambers et al., 1989). In order to incorporate farmers in an interdisciplinary approach to agricultural research, a number of participatory methodologies have been developed (Nicoliene et al., 2003).

In mountainous areas, landslides are among the most destructive natural disasters. Every year, landslides claim hundreds of lives worldwide and have a significant negative influence on both the local and global economies. In an effort to create maps that depict the spatial distribution of landslip susceptibilities, numerous government and international research institutes have dedicated significant resources to this endeavor over the course of the last 25 years (Guzzetti et

al, 1999). After earthquakes, landslides are the most frequent natural hazard in Turkey (Ildir, 1995), with the Eastern Black Sea region being particularly vulnerable. This area has a topography that includes mountains, and it frequently experiences significant precipitation. Because of this combination, the area is vulnerable to large-scale, highly destructive landslides. In Turkey, during over the past five decades, natural disasters have resulted in home losses valued at around US$15.5 billion. Landslides cause an estimated $80 million in economic damages annually, the majority of which occur in the Eastern Black Sea region (Yalcin, 2007). A variety of alternative methods for landslide susceptibility mapping have been applied and suggested.

The eastern part of Uganda's Bududa District has a history of recurring landslides due to its mountainous topography and regular heavy rainfall. With several destructive landslides in recent years, including the tragic one that occurred in 2018 and resulted in the deaths of over 40 people and the displacement of hundreds of families, the district has proven to be especially sensitive to natural disasters. These incidents have brought to light the serious effects that landslides have on Bududa District's agricultural areas, infrastructure, and local populations. This has made it clear that research and interventions are desperately needed to solve the difficulties that the area's farmers confront.

Scientific literature has extensively studied the notion of landslides to be geological hazard, with research concentrating on the causes, mechanisms, and effects of landslides on human populations and the environment. Landslides can have disastrous consequences on farmlands when it comes to agricultural production, including soil erosion, the loss of fertile soil, interruptions to agricultural operations, and lower crop yields. Determining the susceptibility of farming populations to natural disasters and creating sustainable land management plans to lessen the risks connected with landslides in Bududa District require an understanding of the conceptual structure of how landslides affect agricultural productivity.

Due to its unique topography and climate, Bududa District is particularly vulnerable to landslides; the risk is heightened by steep slopes, loose soil, deforestation, and heavy rainfall. Severe erosion and unstable slopes in the region. As the primary source of income for most people in Bududa District and a substantial contributor to both local and national food security, agriculture is an important part of the district's economy. But the area's frequent landslides have

created serious obstacles to agricultural output, endangering both the long-term viability of farming methods and the welfare of Bududa District farming households.

The impact of landslides on agricultural productivity can be examined from a theoretical standpoint using frameworks for disaster risk reduction, resilience theory, and vulnerability theory. The social, economic, and environmental elements that make communities more vulnerable to natural disasters are highlighted by vulnerability theory, along with the significance of treating underlying vulnerabilities to improve adaptive capacity and lower the likelihood of disasters. Resistance theory emphasizes the need for adaptive tactics, varied livelihoods, and community empowerment in order to strengthen agricultural systems' and communities' resistance to landslides and help them recover from their effects. Frameworks for disaster risk reduction direct the creation of strategies, policies, and interventions meant to lessen agricultural areas' susceptibility to landslides and increase farmers' ability to deal with and adjust to Bududa District's shifting environmental conditions.

1.3 Problem Statement

Global agricultural productivity (GAP) is seriously threatened by the rising frequency and severity of landslides, which is a serious issue that necessitates thorough examination. Although the complex interactions between landslides and agriculture are well recognized, there is still a significant knowledge vacuum regarding the precise processes by which landslides affect agricultural productivity and the ensuing effects on food security, economic stability, and community resilience. Insufficient comprehension of these interplays impedes the creation of efficacious mitigation tactics, hence exposing susceptible areas to significant agricultural losses, financial difficulties, and increased susceptibility of the community. Thus, the issue at hand is a lack of understanding regarding the impact of landslides on agricultural productivity, which calls for a comprehensive investigation to guide evidence-based policies, flexible methods, and sustainable land management approaches.

1.4 Objectives

1.4.1 The main objective

To assess the influence of landslides on agricultural production in Bushika subcounty Bududa district eastern Uganda

1.4.2 Specific objectives

1. To determine the contributing elements to the landslides incidence in Bushika sub county.
2. To find out the frequent of landslides in Bushika sub county.
3. To investigate the relationship between agricultural output and landslides in Bushika sub county.

1.5 Research questions

1. What are the factors that contribute the occurrence of landslides in bushika Sub County?
2. How often do landslides occur in bushika Sub County?
3. What are the impact of landslides and agricultural production in bushika Sub County?

1.6 Research hypothesis

The researcher hypothesized that the occurrence of landslides in Bududa District has a negative impact on agricultural production, resulting in decreased crop yields and economic losses for farmers in the region. Furthermore, we anticipate that the severity and frequency of landslides are influenced by factors such as land use patterns, soil erosion, and climatic conditions, which exacerbate the vulnerability of agricultural lands to natural hazards.

1.7 Justification of the Study

Understanding the influence of landslides on agricultural production in Bududa District is crucial for developing effective land management strategies, disaster risk reduction measures, and sustainable agricultural practices in the region. By conducting this study, we can identify the specific challenges faced by farmers in Bududa District, assess the socio-economic implications of landslides on agricultural livelihoods, and provide evidence-based recommendations for enhancing resilience and adaptive capacity in the face of natural disasters.

1.8 Significance of the Study

Studying the influence of landslides on agricultural production in Bududa District is of paramount importance for several reasons. Firstly, it will contribute to the existing body of knowledge on the interactions between natural hazards and agricultural systems, providing valuable insights into the vulnerability of farming communities to environmental risks. Secondly, the findings of this study can inform policy-making processes, land-use planning decisions, and disaster management initiatives aimed at reducing the impact of landslides on agriculture and enhancing food security in Bududa District. Lastly, by raising awareness about the connection between landslides and agricultural production, this research can empower local stakeholders, policymakers, and development organizations to take proactive measures to protect livelihoods, conserve natural resources, and promote sustainable development in landslide-prone areas.

Food Security Concerns: Agriculture is a cornerstone of global food security, and any disruptions to agricultural production can directly impact the availability and accessibility of food. By assessing the influence of landslides, researchers contribute valuable insights into potential threats to food security, enabling proactive measures to safeguard the global food supply.

Economic Stability: Agricultural activities contribute significantly to the economies of many regions. Landslides can lead to substantial economic losses due to crop damage, infrastructure destruction, and the subsequent impacts on livelihoods. Studying this influence allows policymakers and stakeholders to develop strategies for economic resilience and sustainable development.

Environmental Conservation: Landslides often result in soil erosion and degradation, affecting the long-term health and sustainability of ecosystems. Investigating the relationship between landslides and agricultural production helps in formulating conservation measures to mitigate soil loss, preserve biodiversity, and maintain ecosystem services.

Mitigation and Adaptation Planning: Understanding how landslides affect agricultural areas enables the development of effective mitigation and adaptation strategies. This includes implementing engineering solutions, land-use planning measures, and early warning systems to reduce the vulnerability of agricultural landscapes to landslide hazards.

Community Resilience: Many communities, particularly in rural areas, depend heavily on agriculture for their livelihoods. Assessing the influence of landslides on agricultural production

is crucial for building resilience within these communities. It aids in developing strategies that enhance their ability to cope with and recover from the impacts of landslides.

Climate Change Interactions: As climate change contributes to the frequency and intensity of extreme weather events, the study of landslides becomes increasingly relevant. By assessing how landslides influence agricultural production, researchers can contribute to our understanding of the interactions between climate change and natural hazards, informing adaptive strategies in the face of a changing climate.

Policy Formulation: Policymakers rely on evidence-based research to formulate effective policies and regulations. Studies on the influence of landslides on agriculture provide valuable data to support the development of policies aimed at sustainable land use, disaster risk reduction, and the protection of vulnerable agricultural areas.

1.9 scope of the Study

This refers to the area domains of the research within which the researcher will carry out his or her study. The study will look into account geographical scope, content scope and time scope

1.9.1 Geographical scope

This research is to be conducted in Bududa district is located in in eastern part of Uganda. It‟s bordered by Budadiri in the north, Kenya to the east, Manawa to the south to and Mbale to the west.

1.9.2 Content scope

The study focused on the identifying the factors responsible for the occurrence of landslides in Bushika Sub-county Bududa District eastern Uganda; finding out how often does landslides occur in Bududa District and examining the impact of landslides on agricultural productivity as crops and animals in Bushika Sub-county Bududa District eastern Uganda.

1.9.3 Time scope

The study focuses on the period from April 2024 to July 2024 because that period is susceptible to heavy rainfall which might be a factor

1.9.4 Operational Definitions of key concepts

Landslides

Landslides refer to the downward movement of rock, soil, and debris on a slope. These events are often triggered by factors such as heavy rainfall, earthquakes, volcanic activity, or human activities like deforestation.

Agriculture

Agriculture is the practice of cultivating land, raising crops, and rearing livestock for food, fiber, and other products. It involves various activities such as planting, harvesting, irrigation, and animal husbandry.

Productivity

Productivity refers to the efficiency with which resources (such as labor, capital, and land) are utilized to produce goods or services. In the context of agriculture, productivity can refer to the yield of crops or livestock per unit of input, such as land area or labor hours.

Production

Production refers to the process of creating goods or services through the transformation of inputs into outputs. In the context of agriculture, production includes activities such as planting, cultivating, harvesting, and processing crops or raising and managing livestock.

Soil infertility

Soil infertility refers to the condition in which soil lacks the necessary nutrients and fertility to support plant growth effectively.

1.8 conceptual framework

The researcher conceptualize the independent, independent and intervening variables as shown in the figure 1

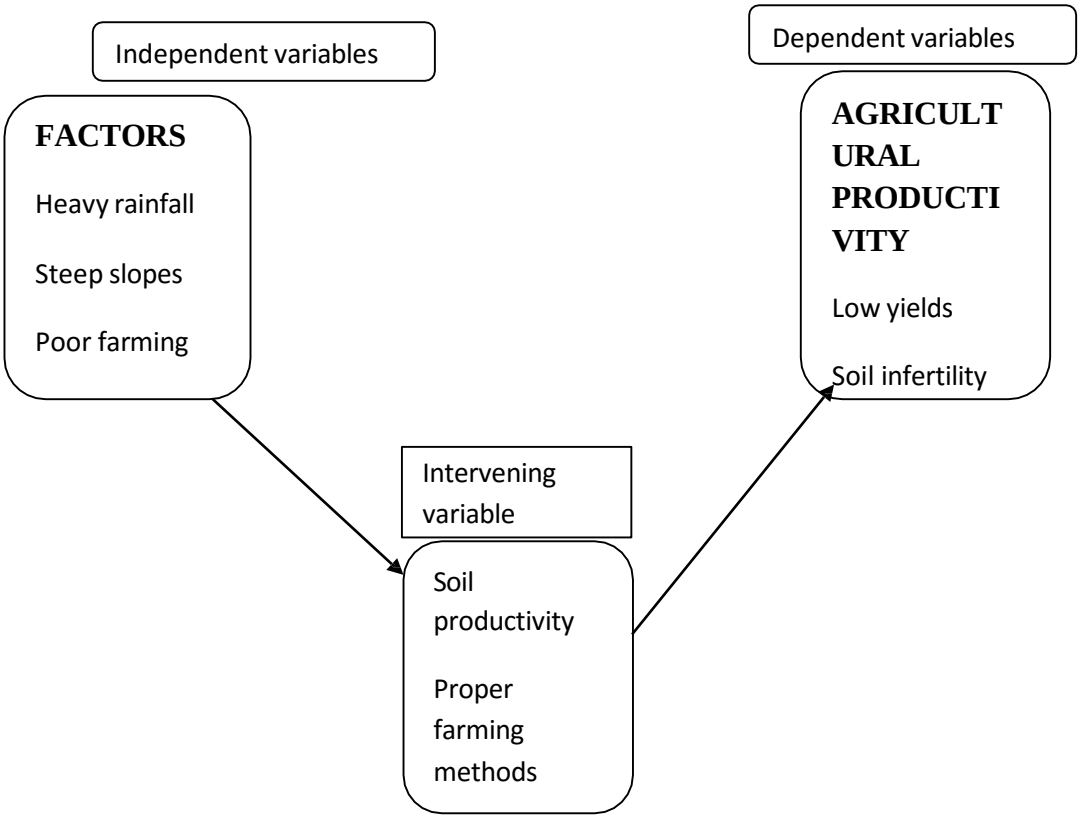

Figure 1: relationship between landslides and agricultural productivity

The figure above shows the concepts of independent variables as heavy rainfall, steep slopes and poor farming. The dependent variable is low yields of both crops and animals.

Heavy rainfall can saturate the soil, increasing the risk of landslides. The weight of the water, combined with the reduced cohesion in wet soil, can trigger slope failure, especially in hilly or mountainous regions. While adequate rainfall is crucial for crop growth, excessive rainfall can lead to flooding, soil erosion, and landslides, negatively affecting agricultural productivity. Conversely, insufficient rainfall can also diminish crop yields.

Steep slopes naturally have a higher risk for landslides due to gravitational forces. The angle of the slope can determine the stability of the soil and the likelihood of landslides occurring during heavy rainfall. Farming on steep slopes can be challenging. Despite the potential for good drainage and microclimate conditions, steep areas are prone to erosion, which can degrade soil quality and reduce agricultural yields. Sustainable practices become essential to prevent landslides while maintaining productivity.

Certain farming practices can exacerbate the risk of landslides. Intensive tillage, deforestation, and monocropping can destabilize soil, increasing susceptibility to erosion and landslides. Conversely, sustainable farming practices such as contour farming, agroforestry, and terracing can reduce the risk of landslides and promote soil stability. The choice of farming methods directly affects agricultural productivity. Sustainable practices, which often involve soil conservation techniques, can enhance soil health and crop yield. However, traditional methods that disregard soil conservation may lead to short-term gains in yield but contribute to long-term degradation and increased risk of landslides.

Implementing sustainable agricultural practices and effective land management strategies can mitigate the effects of heavy rainfall and steep slopes, ultimately reducing the incidence of landslides and supporting agricultural productivity. Practices like reforestation, cover cropping, and maintaining natural vegetation can enhance soil stability

CHAPTER TWO

REVIEW LITERATURE

2.1 Introduction

In this chapter, the researcher presents a review of related literature on assessing the influence landslides on agricultural productivity. The first part deals with the theoretical frame.Then related literature on assessing the influence landslides on agricultural productivity.

2.2 Theoretical Review

This study will be guided by the Fuzzy set theory Zimmermann-J. (2010). in the present study, an attempt was made to assess the landslide risk by using a semi-quantitative method known as Fuzzy set theory. In this method, linguistic rules were formulated for risk scoring and representative Fuzzy membership values for various landslide hazard zones, and different resource categories were assigned on a scale of 0 to 1, depending upon their significance for relative risk to landslides (Mamdaniand Assilian 1975; Alcala et al. 2007). The Fuzzy set linguistic approach may be considered as an extension to the risk ranking matrices approach for landslide risk assessment proposed by Anbalagan and Singh (1996). For the present study, the membership values for landslide hazard zones and different resource categories were assigned based on linguistic rules of knowledge (Ross 1995; Kanungo et al. 2008). Accordingly, for landslide hazard zones a Fuzzy membership value of 1 was assigned for a very high hazard zone, as the potential for landslide occurrence will be maximum in this zone whereas very low hazard zone will have the minimum potential for landslide occurrence; therefore, the least membership value of 0.1 is assigned. Similarly, for intermediate classes high, moderate and low hazard proportionate membership values of 0.8, 0.55, and 0.3, respectively were assigned. Similarly, various resource categories that were mainly land use and land cover classes and are directly related to the socio-economic interest of the local community, in general, were assigned Fuzzy membership values. The settlement resource category may have maximum influence due to any possible landslide activity, as it will have direct impacts on population and their assets such as; houses and in house properties therefore a maximum Fuzzy membership value of 1.0 was assigned. The other resource categories were also assigned with membership values based on their importance for the local community.

2.3 Factors contributing to landslide occurrence in Bushika Sub-county Bududa District.

Worldwide, landslides incur catastrophic and significant economic and human losses. Previous studies have characterized the patterns in landslides' fatalities, from all kinds of triggering causes, at a continental or global scale, but they were based on data from periods of 10 years (Iwe, O.2018). The research herein presented hypothesizes that climate change associated with extreme rainfall and population distribution is contributing to a higher number of deadly landslides worldwide. This study maps and identified deadly landslides in 128 countries and it encompasses their role, for a 20 years' period from January/1995 to December/2014, considered representative for establishing a relationship between landslides and their meteorological triggers. A database of dereferenced landslides, their date, and casualties' information, duly validated, was implemented. A hot spot analysis for the daily record of landslide locations was performed, as well as a percentile-based approach to evaluate the trend of extreme rainfall events for each occurrence. The relationship between casualty, population distribution, and rainfall was also evaluated. For 20 years, 3876 landslides caused a total of 163,658 deaths and 11,689 injuries globally. They occurred most frequently between June and December in the Northern Hemisphere, and between December and February in the Southern Hemisphere. A significant global rise in the number of deadly landslides and hotspots across the studied period was observed. Analysis of daily rainfall confirmed that more than half of the events were in areas exposed to the risk of extreme rainfall. The relationships established between extreme rainfall, population distribution, seasonality, and landslides provide a useful basis for efforts to model the adverse impacts of extreme rainfall due to climate change and human activities and thus contribute towards a more resilient society.

Heavy rainfall: Excessive precipitation can saturate the soil, increasing its weight and reducing its stability, leading to landslides.

Deforestation: The removal of trees and vegetation destabilizes the slopes, making them more prone to landslides.

Steep slopes: The presence of steep slopes increases the likelihood of landslides as the force of gravity acting on the soil is higher.

Earthquakes: Seismic activity can trigger landslides by shaking the ground and destabilizing slopes.

Undercutting by rivers: Erosion caused by rivers can undermine the stability of slopes leading to landslides.

Poor drainage: Inadequate drainage systems can cause water to accumulate and increase pore pressure within the soil, reducing its strength and triggering landslides.

2.3 Impacts of landslides on agricultural production,

Landslides cause significant loss of lives and major economic damages every year in communities globally. Previous studies have reported that the 17% of fatalities, attributed to natural hazards worldwide, are caused by landslides; in the decade from 1993 to 2002 it was the 7th biggest killer among natural hazards, causing almost 940 fatalities/ year (Lacasse et al., 2010). This figure is however incomplete.

Both direct and indirect harm to agricultural land can result from landslides, which can also change hydrological regimes and cause soil erosion and fertility loss. Lu et al. (2019) state that landslides, especially in hilly areas where agriculture is susceptible to slope instability, can cause the loss of arable land and interfere with farming operations.

Landslides have a variety of effects on agricultural productivity, some of which are as follows:

Crop damage: Landslides can bury crops, change the composition of the soil, and interfere with farming operations. As a result, farmers may experience a decrease in output and income (Vanacker et al., 2013).

Soil erosion: According to Nyssen et al. (2019), landslides exacerbate soil erosion by depleting soil fertility and influencing agricultural productivity over the long run.

Soil erosion and sedimentation are two of landslides' main effects on agriculture.

According to research by Montgomery and Dietrich (2019), landslides greatly increase the amount of sediment produced in river basins, which has an impact on agricultural areas downstream by altering river shape and causing sediment deposition. Agricultural land becomes less productive due to soil erosion, which intensifies soil degradation processes and removes productive topsoil.

Water contamination: According to Pan et al. (2015), landslides have the potential to contaminate water sources, impacting irrigation systems and the availability of clean water for agricultural use.

Landslides frequently cause changes in land cover and use, which can result in the conversion of land for alternative uses or the abandonment of impacted agricultural regions. The dynamic character of land use changes after landslides is highlighted by research by Vrieling et al. (2019), with consequences for agricultural productivity, livelihoods, and food secure

2.4 The frequent of landslides in Bushika sub county.

Landslides are a common natural hazard in the Bushika sub-county, Uganda, which is situated in a mountainous region with steep slopes and heavy rainfall. The area experiences frequent landslides due to its geographic and climatic conditions. According to a study by Knapen et al. (2006) in the "Landslides in Uganda," the region is highly susceptible to landslides, particularly during the rainy seasons. The frequency of landslides can vary significantly from year to year based on rainfall patterns and other environmental factors. For specific and up-to-date information, local sources such as the Uganda National Meteorological Authority or regional geological surveys would provide the most accurate data.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research Design

Research design is the overall plan or structure for conducting the research study (creswell, 2014), „it involves making decisions about the types of study, data collection, methods and data analysis techniques to be used"

The researcher will use descriptive survey design to investigate Assessing the Influence of Landslide on Agricultural Production in Bushika Sub county Bududa District Eastern Uganda. Descriptive survey is the only means through which opinions, attitudes and suggestions are collected (Koul.1993).

3.2 Research Approach

Field Surveys and Site Visits: Conducting field surveys and site visits to landslide-affected areas in Bududa District to assess the extent of damage to agricultural land, observe soil erosion patterns, and document the impact on crops and farming infrastructure.
Socioeconomic Surveys and Participatory Assessments: Conducting socioeconomic surveys, household interviews, focus group discussions, and participatory assessments with farming communities in Bududa District to understand the socioeconomic context, livelihood strategies, and coping mechanisms in response to landslides.

3.3 Study Location

The study was carried out in Bududa District in Eastern Uganda. The area is geographically bound by the latitude 1º 04‟N and 1000‟N, longitude 34º 15‟E and 34º 26‟E.

This research was conducted in Bushika Sub County is located in Bududa district in eastern part of Uganda. It‟s bordered by Mbale in the north, Kenya to the south, Manawa to the west and Budadiri to the east.

3.4 Study population

The study population in this context was comprising of farmers, and stakeholders directly impacted by landslides in Bududa District. Researcher will engage with local farming households. Bushika Sub County has over 1000 people. However, only 50 people will be considered in this study.

3.5 Sampling Technique

3.5.1 Simple random sampling

The researcher used the simple random sampling to select the farmers by using the lottery approach where names of all the farmers are to be written on the tags and put in the basket, one ta will be picked at a time until the required number is reaches in order to give chance to everyone to be included in the sample.

3.6 Sample Size

Sample size is the number of cases or individuals selected from the population for inclusion in the study. (Babbie, 2016). It represents a specific number or units of analysis that were in the sample.

A sample size is defined as the selection made from the population from which data will be gathered (Omair, 2014). A sample size of 50 respondents were selected basing on the Morgan (1970) table of sample determination for each of the population sizes in order to effectively determine sample size of a given population as below.

Table 1: the sample size of the farmers and agricultural officer in Bushika Sub County

Category	Population	Sample size	Sampling technique	Instrument
Farmers	**60**	**48**	**Simple random**	**Questionnaire**
Agricultural	**03**	**02**	**Simple**	**interview guide**

officer			**random**	
Total	**63**	**50**		

3.7 Data Collection Methods

Field Surveys Conducting on-site assessments to document landslide occurrences, agricultural damage and soil erosion. This involves direct observation, measurement, and data recording (Gan et al., 2015).

Interviews and Surveys: Engaging with farmers, agricultural experts, and local authorities to gather information on the impact of landslides on agricultural practices, crop yields, and socio-economic factors (Vanmaercke et al., 2012).

Questionnaire Survey: Develop a structured questionnaire to gather data on landslide experiences, agricultural practices, and production

Field Observations: Visit landslide-affected areas to observe the extent of damage and document the condition of agricultural lands.

3.7 Tools that were used for data collection.

Data collection was proceeded by use of the following tools;

3.7.1 Interview Guide

In this study, an interview was conducted between the researcher and the agricultural officers in the area where research was carried out. This tool was used to gather data from agricultural officers and other group of people who could not understand the questionnaire. An interview guide was structured to comprise issues on which the researcher based on to interview the respondents face to face in order to get information on the study to investigate the influence of landslides on agricultural productivity in Bushika Sub-county Bududa District eastern Uganda. A semi structured interview guide is a tool which doesn‟t hold the interviewer to strictly follow a formalized list of questions. Interviews were connected to help the researcher interact with respondents who were not in position to effectively layout their responses through questionnaires

which may require them to read and write. This also helps in probing especially where specific answers are needed. therefore interviews with the target respondents was conducted by meeting the respondents and posing open ended questions of which the researcher recorded the responses by himself.

3.7.2 Questionnaire

A questionnaire is a research instrument consisting of a series of questions for the purpose of gathering information from respondents. The researcher designed a questionnaire that consists of both open-ended and closed-ended questions. The open-ended questions require detailed explanation‟s while the closed-ended questions restrict the views of the respondents. Section A of the questionnaire shows an introductory phase with information about the researcher's intention of conducting the study and demographics information of the researcher. Whiles Section B had statements on the influence of landslides on agricultural productivity in Bushika Sub-county Bududa District eastern Uganda. Therefore, questionnaires are appropriate data collection tools as since they provide well thought out responses, questionnaire also effective when using a large sample (ker linger 1986). The researcher considered a questionnaire as his data collection tools due to the following significances;

They are convenient to administer by both the researcher and the respondents since the majority are able to read and write.

Questionnaires provide room and chance for the respondents to read the questions critically, comprehend them and there after freely and willingly responds without favor of the researcher.

3.7.3 Validity and reliability of research tools.

The two principal aspects of validity and reliability were handled as follows.

Validity

This is the extent to which the tool measures what it is to measure. (Mugenda, 1999). In this scenario, validity aimed at weighing whether the subject matter would be relevant in processing meaningful data. Validity measured whether the respondents perceived the questions in the questionnaires the way the researcher expected. The researcher prepared questionnaires and acquired advice from environmental personnel.

Reliability of research tools

Reliability is the degree to which a tool or instrument consistently measures what it is supposed to measure (Amin, 2005). The questionnaires were presented using randomly selected farmers and agricultural officers before the actual research. After the pre-test, the cronbach's alpha correlation coefficient method was then used to compute the correlation coefficient that showed the degree of reliability. After computation, the correlation coefficient was above 0.8 and was accepted. According to Amin (2005), this is the acceptable reliability implying that the tool is found to be acceptable and reliable worthy for data collection.

3.7.3 Observation

Observation by the researcher by travelling across the parish. The intension is to access the farmers who face the challenges of landslide occurrence.

3.8 Data Collection Procedure

The researcher acquired the transmittal letter from the dean faculty of education, Busitema University, seeking permission to conduct the study in this selected sub county in Bududa district. While in the field, the researcher asked permission from the farmer and agricultural officers to allow me carry out study in the area. The researcher issued out the designed questionnaire and conducted interviews with the respondents in order to collect the required information.

The researcher conducted the interview with the help of the research assistant as per the appointment.

3.9 Data Management and Analysis

Organize and store collected data in a systematic manner to facilitate analysis.

Use statistical techniques such as regression analysis, correlation analysis, and spatial analysis to assess the relationship between landslides and agricultural production.

Descriptive Statistics Summarizing and visualizing collected data using descriptive statistics, charts, and maps to characterize the extent and severity of landslides and agricultural impacts (Kappes et al., 2012).

3.10 Ethical Considerations

Respect of rights

the rights of the respondents was respected during the study for example access to results, right to privacy and right to ask questions were necessary.

Anonymity:

The identity of the respondents was not be revealed anywhere. This was done by not writing respondent‟s names on the questionnaire to protect their privacy.

Confidentiality.

The researcher adheres to confidentiality by making sure the data collected from the respondents was used for only research purposes.

Originality

For the good of ensuring originality of the study, the researcher acknowledged different authors by citing them using American Psychology Association (APA).

CHAPTER FOUR

PRESENTATIONS OF RESULTS

4.1 INTRODUCTION

This chapter deals with the presentations, analysis and interpretations of the findings. The data was collected exclusively from the questionnaire and the interview guide as the research instrument.

The chapter is presented in line with the demographic information of the respondents and the respective research questions.

4.2 The response rates.

Table 2: The response rates of respondents

Issued questionnaires	Returned	(%)	Rejected	(%)
50	39	**78**	11	22

Source: Results of analysis (2024)

From the table above, the researcher administered 50 questionnaires to the respondents, 39 questionnaires were filled and returned. Therefore 78% of the questionnaires were filled and returned and 11 questionnaires were not returned back, this means that they were not filled thereby constituting to 22% of the questionnaires were not returned.

4.3 RESPONDENTS' DEMOGRAPHIC INFORMATION.

This section presents the findings on the demographic characteristics of the respondents in terms of their gender, age, level of education, and serving experience.

Table 3: Gender Disparities of respondents

Gender	**Frequency**	**percentage**
Male	36	72
Female	14	28
Total	**50**	**100.0**

Source: Results of analysis (2024)

In the table above, 36 (72%) of the respondents were male and 14 (28%) were females. This implies that majority of the respondents 72% were males and minority 28% were females. This meant that the males participated more than the females in the study.

Age Bracket of respondents

Age is very important factor since it informs the researcher of the level of consent of the respondents towards certain questions. This is shown in the table below.

Table 4: age bracket of respondents

Age Bracket (Years)	**Frequency**	**Percentage**
21-30	04	8
31-40	16	32
41-50	25	50
51 and above	05	10
Total	**50**	**100.0**

Source: Results of analysis (2024)

The results in the table above, reveals that 8% of the respondents were in the age bracket of 21-30 years, 32% of the respondents were in the age bracket of 31-40, 50% of the respondents were in the age bracket of 41-50, and 10% of the respondents were in the age bracket of 51 and above. This implies that the majority of the respondents with 50% were in the age bracket of 41-50 years. And the minorities with 8% were in the age bracket of 21-30 years. This indicates that farmers between the age brackets of 41-50 years had enough time to answer the questions of the study and thus gave information needed by the researcher.

Level of education of Respondents

Level of education of the respondents is vital as it reveals the professionalism of the respondents and their ability to manage academic activities effectively. The analysis of the education level was done in certain levels and these were: primary, secondary, tertiary, university as well us uneducated farmers.

Table 5: level of education

Level of education	**Frequency**	**Percentage**
Uneducated	9	18
primary	23	46
secondary	7	14
tertiary	8	16
university	3	6
Total	**50**	**100.0**

Source: Results of the analysis (2024)

According to the results in the table above, it can be observed that majority of farmers were of primary level of education (46%). Followed by uneducated farmer (18%), 16% of the farmers were of tertiary education, 14% of the farmers were of secondary education and only 6% of the farmers were of University education. This implies that the farmers had the required information

to give vivid knowledge concerning the Influence of Landslide on Agricultural Production in Bushika Sub county Bududa District Eastern Uganda.

Table 6: farming experience (years)

Years	**frequency**	**Percentage**
1-5	13	26
6-10	9	18
11-15	17	34
More than 16	11	22
Total	**50**	**100.0**

Source: Results of the analysis (2024)

From the above table, majority of the farmers had experience of farming of between 11-15 years with a proportion of 34.0%. Followed by respondents (farmers) who had a farming experience of between 1-5years with a proportion of 26.0%, 22% of the farmers have stayed in farming for about 16 years and above which is 22% of the entire respondents This implies that the respondents had a farming experience in the farming (the growing of crops and rearing of animals). However, few respondents that are 18% of the farmers had an experience of between 6-10 years in Bududa district.

Table 7: purpose of farming

Nature	frequency	Percentage
Subsistence farming	19	38
commercial	16	32
both	15	30
Total	**50**	**100.0**

Source: Results of the analysis (2024)

Following the table above, It implies that majority of the farmers which is 38% out of 59 respondents in Bududa practice subsistence farming, 32% of the respondents engage themselves in commercial farming, And some farmers practice both commercial and subsistence farming constituting to 30% of the farmers. The results show that the highest number of farmers in Bushika sub- county carryout subsistence farming.

Table 8: Type of farming

Nature	frequency	Percentage
Animals and bird keeping	15	30
Crop growing	25	50
Mixed farming	10	20
Total	**50**	**100.0**

Source: Results of the analysis (2024)

From the table above, majority of the respondents (25) with 50.0% engage in the growing of only crops. 15 farmers with 30.0% practice animals and bird keeping. And 10 of the respondents with 20.0% carry out mixed farming in Bushika sub-county in Bududa district. This implies that majority of the respondent‟s carryout crop growing in Bududa district

4.4 FACTORS CONTRIBUTING TO THE OCCURRENCE OF LANDSLIDES

Table 9: Heavy rainfall always causes landslide

Response	**frequency**	**Percentage**
Agree	33	66.0
Not sure	11	22.0
Disagree	06	12.0
Total	**50**	**100.0**

Source: Results of the analysis (2024)

The results in the above table explains that majority 66.0% of the respondents agreed that heavy rainfall always causes landslides in Bushika sub-county, 22.0% of the respondents were not sure whether rainfall cause the landslides, And 12.0% disagreed with the statement "Heavy rainfall always causes landslide**"**. This implies that most of the respondents (66.0%) were in agreement with the researcher that Heavy rainfall always causes landslide. While the least (12.0%) of the respondents disagreed.

Table 10: Deforestation leads to landslides

Response	Frequency	Percentage
Agree	14	28.0
Not sure	08	16.0
Disagree	28	56.0
Total	**50**	**100.0**

Source: Results of the analysis (2024)

Following the data analysis in the table above, most of the farmers 28(56.0%) disagreed that Deforestation leads to landslides, while 14 (28.0%) agreed as Deforestation leads to landslides; And 08 (16.0%) of the farmers had no opinion since they were not sure. This indicates that minority of the respondents 56.0% disagreed that Deforestation leads to landslides. And the majority 16.0% of the respondents were in a strong agreement that Deforestation leads to landslides.

Table 4.9: Steep slopes in Bushika causes landslides.

Response	frequency	Percentage
Agree	30	60.0
Not sure	04	8.0
Disagree	16	32.0
Total	**50**	**100.0**

Source: Results of the analysis (2024).

The data presented in the table above indicates the most of the farmers during the study, 30 (60.0%) agreed that Steep slopes in this area causes landslides., it merged that 16 (32.0%) disagreed that Steep slopes in Bududa causes landslides., And 04 (8.0%) of the respondents were not sure, This means that majority (60.0%) of the farmers who participated in answering the questionnaire administered to them were in agreement with the researcher. However, the minority (32.0%) were in a disagreement that a Steep slope in Bududa does not causes landslides.

Table 11: Tectonic movements such as volcanicity and Earthquakes also cause landslides

Response	**frequency**	**Percentage**
Agree	15	30.0
Not sure	25	50.0
Disagree	10	20.0
Total	**50**	**100.0**

Source: Results of the analysis (2024)

In the table above, 30.0% of the respondents agreed tectonic movements such as volcanicity, earthquakes among others also cause landslides in Bushika sub-county Bududa district, 50.0% of the respondents (farmers) were not sure since they I had no clear idea about tectonic movements, And 20.0% of the farmers disagreed that tectonic movements does not cause landslides in the place. This reveals that majority 50.0% of the farmers in Bushika sub-county, Bududa district are not having ideas about tectonic movement as a cause of landslides. Only 30.0% of the farmers in Bududa district agreed that earthquakes and volcanicty also cause landslides in their area. While (20.0%) of the farmers completely disagreed with the researcher‟s statement.

Table 12: Vibration from moving objects always cause landslides

Response	frequency	Percentage
Agree	20	40.0
Not sure	18	36.0
Disagree	12	24.0
Total	**50**	**100.0**

Source: Results of the analysis (2024

According to the data in the table above, 40.0% of the respondents agreed Vibration from moving objects always cause landslides, 24.0% of the respondents disagreed, And 36.0% had no any opinion because they were not sure,. This means that minority 40.0% of the farmers agreed that Vibration from moving objects always cause landslides. While the majority 24.0% of the farmers disagreed on the idea that Vibration from moving objects always cause landslides.

4.5 HOW OFTEN DOES LANDSLIDES OCCUR IN BUSHIKA SUB-COUNTY, BUDUDA DISTRICT?

Table 13: landslides does not occur in Bushika Sub County

Response	Frequency	Percentage
Agree	2	4.0
Not sure	0	0.0
Disagree	48	96.0
TOTAL	**50**	**100.0**

Source: Results of the analysis (2024)

In the above table, majority of the respondents 96.0% in Bushika Sub-county disagreed WITH the statement. And only 4.0% of the respondents agreed that landslides do not occur in Bushika Sub-county. This therefore implies that majority of the respondents 96.0% disagreed with the researcher on the opinion that landslide does occur in Bududa District. And the minority 4.0% of farmers believe that landslides do not happens at all.

Table 14: landslides occur in Bushika Sub County after every 1-2 years.

Response	**Frequency**	**Percentage**
Agree	14	28.0
Not sure	07	14.0
Disagree	29	58
TOTAL	**50**	**100.0**

Source: Results of the analysis (2024)

Basing on the results in the above table, 14 which is 28.0% farmers in Bushika Sub-county agreed with the statement that landslides occurs in Bududa District After every 1-2 years , Only 7 respondents with 14.0% were not sure of the interval at which landslides occur. And 29 respondents totaling to 58.0% disagreed on the matter that "landslides occurs in Bududa District After every 1-2 years" This therefore implies that majority of the respondents 58.0% disagreed with the researcher. And the minority 28.0% of farmers believes that landslides occur after every 1-2 years in Bushika Sub-county, Bududa District.

Table 15: landslides occur in Bushika Sub County after every 2-3 years.

Response	Frequency	Percentage
Agree	25	50.0
Not sure	09	18.0
Disagree	16	32.0
TOTAL	**50**	**100.0**

Source: Results of the analysis (2024)

In relation with the results in the table above, it reveals that majority which is 50.0% of the respondents agreed that landslides occurs in Bududa District After every 2-3 years, the least numbers of respondents that is 18.0% were not sure(neutral). And 32.0% of the respondents. This implies that majority of the respondents 50.0% (half portion of the farmers) agreed with the researcher that landslides occurs in Bududa District After every 2-3 years. And the minority 32.0% of farmers disagreed and believes that landslides do not occurs after every 1-2 years in Bushika Sub-county, Bududa District

Table 16: landslides occurs in Bushika Sub County after every after 4 years and above

Response	Frequency	Percentage
Agree	32	64.0
Not sure	05	10.0
Disagree	13	26.0
TOTAL	**50**	**100.0**

Source: Results of the analysis (2024)

According to the results above, it is an indication that majority which is 64.0% of the respondents were in a strong agreement that landslides occurs in Bududa District After a period of 4 years and above, very few respondents accounting for 10.0% were totally not sure. However, 26.0% of the respondents disagreed. This signifies that a big number of the respondents 64.0% were on the same pace with the researchers opinion that "landslides occurs in Bududa District After every After 4 years and above" in Bududa District. And the least 32.0% of farmers disagreed and marked that landslides does not occurs after every 4 years in Bushika Sub-county, Bududa District.

4.6 THE IMPACT OF LANDSLIDES ON AGRICULTURE PRODUCTIVITY

Table 17: Landslide leads to damage of both crops and animals

Response	Frequency	Percentage
Agree	31	62.0
Not sure	08	16.0
Disagree	11	22.0

Total	**50**	**100.0**

Source: Results of the analysis (2024)

According to the data in the table above, 62.0% of the respondents agreed that Landslide leads to damage of both crops and animals, 16.0% of the respondents had no any opinion. On the other hand, 22.0% of the respondents disagreed. This means that minority 62.0% of the farmers agreed that Landslide leads to damage of both crops and animals these results into low agricultural productivity in Bududa District. While the majority 22.0% of the farmers disagreed and did not match with the idea that landslides lead to destruction of crops and animals. Landslides can damage agricultural infrastructure, such as roads, making it difficult for farmers to transport goods to markets or access of necessary resources. In general, it shows that landslides are destructive in Bushika Sub-county, Bududa District on both crops and animals.

Table 18: Landslide causes soil infertility which results into low soil productivity.

Response	**frequency**	**Percentage**
Agree	26	52.0
Not sure	06	12.0
Disagree	18	36.0
Total	**50**	**100.0**

Source: Results of the analysis (2024)

With evidence of the data in the table above, it unveils that 52.0% of the farmers in Bududa District agreed that Landslide causes soil infertility which results into low soil productivity hence low agricultural outputs, 12.0% of the respondents had no any opinion. And 36.0% of the respondents disagreed with the statement above. This eradicates that most of the farmers 52.0%

agreed that Landslide is the cause of soil infertility which leads to low agricultural productivity in Bududa District. While a low percentage 22.0% of the farmers disagreed. This still shows that landslides have a negative impact on agricultural productivity in Bududa District in Eastern Uganda.

Table 19: Landslides hinders agricultural activities due to destruction of transport network.

Response	**frequency**	**Percentage**
Agree	27	54.0
Not sure	04	8.0
Disagree	19	38.0
Total	**50**	**100.0**

Source: Results of the analysis (2024)

The results in the table above tells that majority54.0% of the farmers in Bududa District eastern Uganda agreed that Landslide hinders agricultural activities due to destruction of transport networks which results into low productivity in agriculture, in other ways, 38.0% of the farmers disagreed with the statement above. And 8.0% of the respondents had no any opinion because this group of farmers was not sure at all. This implies that many farmers 54.0% agreed that Landslides leads to low agricultural productivity in Bududa District through destruction of transport networks especial on the slopes where crop growing is carried out in Bushika Sub-county. While minority 38.0% of the farmers disagreed. Therefore, it reveals that landslides on influences agricultural productivity in Bududa District.

Table 20: Landslides leads to destruction of vegetation cover hence limiting animal keeping in Bududa.

Response	frequency	Percentage
Agree	22	44.0
Not sure	02	4.0
Disagree	26	52.0
Total	**50**	**100.0**

Source: Results of the analysis (2024)

In the table above, The results communicates that 22 farmers which give 44.0% in Bududa District agreed on the destruction of vegetation cover by Landslides which causes limited pasture for the animals and hinders large scale keeping of animals in Bududa District Eastern Uganda this results into low agricultural productivity, 02 (4.0%) of farmers in Bushika Sub-county were not sure. And 26 (52.0%) of the farmers disagreed with the researchers statement above. This proven that most of the farmers 52.0% disagreed that Landslides destroys vegetation cover. Meanwhile, a minimum percentage 44.0% of the farmers agreed with the researcher on the opinion that landslides destroys the vegetation cover hence limiting large scale keeping of animals. This means that landslides destroy the pasture for the animal in Bududa District hence leading to low productivity in animal farming.

Table 21: Landslides leads to severe soil erosion in Bududa leading to loss of soils.

Response	frequency	Percentage
Agree	37	74.0
Not sure	06	12.0
Disagree	07	14.0
Total	**50**	**100.0**

Source: Results of the analysis (2024)

Table above, the results analyzed shows that 74.0% of farmers in Bududa District agreed, 12.0%of farmers in Bushika Sub-county were not sure. Furthermore, 14.0% disagreed with statement above. The data analysis aligns that majority of the farmers 74.0%agreed that Landslides leads to severe sloppily erosion which results into soil loss. Meanwhile, the minority 14.0% of the farmers disagreed on landslides leading to severe soil erosion. Landslides can lead to significant soil erosion, removing the topsoil that is crucial for crop growth. This degradation can reduce agricultural productivity. This implies that landslides cause‟s soil loss and leads to skeletal soil structure on steep slopes in Bududa District resulting to poor quality of agricultural products.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter is organized into three sections. The first section summarizes the major findings collected from the field in relation to the research questions or objectives in the same sequence as listed in chapter one. The second section focuses on the conclusion of the study and the third section looks at recommendations thought up by the researcher.

5.2 Summary of Findings

The Influence of Landslide on Agricultural Production in Bushika Sub county Eastern Uganda had majority 62.0 % of the farmers agreed that landslides damages both crops and animals in Bushika Sub-county eastern Uganda leading to low and poor quality products, the study found out that 54.0% of the farmers agreed that landslides always destroy transport networks on the slope of Bushika hills, furthermore the research findings shows that farmers which is 52.0% of agreed that the occurrence of landslides in Bushika Sub-county leads to soil infertility hence lowering the productivity of the land on crop growing, the study show that landslides always destroy the vegetation cover, this hinders the keepin of animals on large scale. This accounts for the low productivity of agriculture in Bushika Sub-county Bududa District Eatern. More ever, the study found that 74.0% of the respondents agreed that landslides lead to severe soil erosion.

The findings from the study revealed though the downhill movent of debris down the slope. This has affected the production of crops in Bushika Sub County.

5.3 Conclusion

The Influence of Landslide on Agricultural Production in Bushika Sub County.

The study aimed to assess The Influence of Landslide on Agricultural Production in Bushika Sub county Bududa District Eastern Uganda. It concluded that there is a positive correlation between the two factors because the study revealed that landslides can affect agricultural productivity, leading to low production levels.

Landslides are caused heavy rainfall, steep slopes and poor farming methods in bushika Sub County as identified by the respondents. Most of the respondents agreed that those factors lead to landslide occurrence.

The findings indicated that landslides leads to damage of both crops and animals, causes soil infertility, destroys transport networks and destroys vegetation cover. Additionally, landslides leads to severe surface flow which create skeletal land scape which discourages the crowing of crops.

5.4 Recommendations

Following the findings of the study, the following recommendations were considered necessary:

1. Engage in modern farming practices to improve on the productivity of the soils. This can help in boosting the agricultural productivity as well as high quality agro-outputs.

2. Mass sensitization should be carried out so that people should be taught about the dangers of deforestation and settling on steep slopes. This will reduce on the rate of people who destroy the vegetation cover and this can be done through seminars, newspapers, televisions etc.

3. Law enforcement should also be applied , sometimes laws protecting the environment should exist and such laws should be strictly enforced to discourage destruction of the environment

4. Ensure afforestation create adequate resources, vegetation cover, so as to mitigate the effect of soil loss by surface flow through gulleys and rills.
5. Foster a strong relationship with environment and the people living in Bushika Sub-county to encourage their positive involvement in their agricultural daily activities. This environmental relationship can lead to better agricultural productivity.

Suggestion for further research

To shed more light in this area of study, the following recommendations were made for further research:

1. Conduct longitudinal studies to understand the long-term effects of landslides on agricultural productivity. This can provide deeper insights into how to changes in management of agricultural inputs and outputs.
2. Compare and contrast farming methods and agricultural productivity between Budada district and other regions prone to landslides. This can help identify best practices that could be adopted across different regions.
3. Explore the relationship between nature of soils and agricultural productivity performance. .
4. Investigate the impact of environmental policies on farming activities in Bududa and their effect on agricultural productivity. This can inform policy recommendations for agriculture improvement
5. Study how calamity factors influence the development of agricultural practices and trade in Bududa district. This can help identify strategies to mitigate environmental hazards and improve agricultural productivity.

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APPENDIX I

Questionnaire to farmers

Dear respondents

I am a student of Busitema University perusing a bachelor‟s degree of science education. I am carrying out research on “Assessing the Influence of Landslide on Agricultural Production in Bushika Subcounty Bududa District Eastern Uganda “. The purpose of this questionnaire is to help me in accomplishing this research. Please read the information below and respondent precisely.

Tick against the alternative you think is suitable

Name of the parish……

SECTION A: demographic characteristics

1 age

20-30years ☐ 31-40years ☐ 41-50years ☐ 51 and above ☐

2 sex

a) Male ☐ b) female ☐

3 level of education

Primary ☐ secondary ☐ tertiary ☐ university ☐ uneducated ☐

4 Farming experience

a) 1-3years ☐ b) 4-6years ☐ c) 7 and above ☐

5 purpose of farming

Commercial farming ☐ subsistence farming ☐ civil servant ☐

6. Type of farming

Crop growing ☐ Animal keeping ☐ mixed farming ☐

SECTION B. ASSESSING THE INFLUENCE OF LANDSLIDE ON AGRICULTURAL PRODUCTION

Basing on a scale in the table below, choose and indicate the most appropriate responses of your choice to the statements.

A	N	D
Agree	**Not sure**	**Disagree**

4. Factors contributing to landslide occurrence

S/N	Statements	A	N	D
1	**Heavy rainfall always causes landslide**			
2	**Deforestation leads to landslides**			
3	**Steep slopes in this area causes landslide**			
4	**Earthquakes also cause landslide**			
5	**Vibration from moving objects causes the occurrence of landslides.**			

In case of other factors leading to landslide occurrence, mention them here

……..

……..

2 HOW OFTEN DOES IT OCCUR?

S/N	Statements	A	N	D
1	NIL			
2	1-2 years			
3	2-3 years			
4	4 and above			

3. IMPACT ON AGRICULTURE PRODUCTIVITY

S/N	Statements	A	N	D
1	Landslide leads to damage of both crops and animals			
2	Landslide causes soil infertility			
3	Landslides hinders agricultural activities due to destruction of transport network.			
4	Landslides leads to destruction of vegetation cover			
5	Landslides leads to sever soil erosion which results into loss of soils.			

In your opinion, what are other effects of landslide on agriculture?

……

……

……..

THANK YOU FOR YOUR RESPONSES AND TIMES

APENDEX II

INTERVIEHGUIDE FOR AGRICULTURAL OFFICERS

Self-introduction and rationale of the study.

I am Kusolo Robert Reg No BU/UP/2021/1626 a student of Busitema University carrying out research on the influence of landslide on agriculture production in Bushika Sub County. Your assistance in answering these questions is highly appreciated. The information you give will be treated with a high confidentiality and it will only be used for academic purposes.

QUESTIONS:

I. What are the causes of landslides in Bushika sub-county Bududa District?

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…….

II. How often do the landslides occur in Bushika?

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……

III. What do think are the impacts of landslides on agricultural productivity?

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……
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…….

III. How do you suggest landslides can be controlled in Bushika Sub-county in Bududa district?

……

……

……

……

……

THANK YOU VERY MUCH FOR YOUR TIME AND RESPONSES.