IMPACT OF LANDSLIDES ON SOCIAL ECONOMIC WELLBEING OF HOUSEHOLDS IN NAMETSI SUB COUNTY, BUDUDA DISTRICT

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UGANDA CHRISTIAN UNIVERSITY

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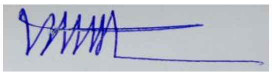
DECLARATION

I **Maliba Zadogi** declare that this research report is purely prepared through my own effort. This research report is original and has never been submitted to nay institution of higher learning for any academic award.

Signature  Date 25th June, 2025

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APPROVAL

This research report has been done by **Malibu Zadoki** in consultation with on the topic "Impact of landslides on social economic wellbeing of households in Nametsi Sub County, Bududa District"

Signature   Date   25th June, 2025

MR. KOMO RICHARD SAMSON

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Special thanks go to my supervisor Mr.Komo Richard Samson for his tireless efforts; words of wisdom and guidance until the completion of this research report may the Almighty God bless the work of his hands abundantly.

ACRONYMS

BDLG	Bududu District Local Government
MoES	Ministry of Education and Sports
UNICEF	United Nations International Children's Emergency Fund
UPE	Universal Primary Education
US	United States

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ABSTRACT

The study concentrated on the Impact of landslides on social economic wellbeing of households in Nametsi Sub County, Bududa District. To find out how human activities contributes to landslides in Nametsi Sub County, Bududa District, to assess prevalence of rainfall induced landslides in Nametsi Sub County, Bududa District and lastly to identify landslide mitigation and prevention measures in Nametsi Sub County, Bududa District.

Findings concluded that failure to draw the poor in to the design of development program is a determinant of poverty, that natural calamities such as drought and man –made disasters induce transitional poverty, that lack of participation in decision making in civil social and cultural life is a determinant of poverty, that there are many long-term challenges such as chronic stress due to poverty that affect academic performance that poor emotional health is caused by lack of parental support may cause an increase in disruptive behavior affecting academic performance ,that correct assessment is critical to identification of student’s weakness and strengths, that correct assessment is critical to identification of student’s weakness and strengths and can improve academic performance, that that recruiting teachers with skills is foundation of increasing academic achievements in schools and lastly that identifying what students are lacking can help improve on their academic performance.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

This study is about establishing the impact of landslides on socio-economic wellbeing of households in Nametsi Sub County, Bududa District. This chapter therefore presents; the background of the study, statement of the problem, purpose of the study, research objectives, research questions, scope of the study, significance of the study, conceptual framework and definition of key terms.

1.1 Background to the Study

Worldwide, there were 15 major reported landslides last year, killing 1,480 people, with Colombia, Nepal, Brazil, Indonesia, Tajikistan and Burundi also among the worst-affected countries. Two landslides were also among the world's 10 deadliest disasters in 2015 – on a list topped by April's Nepal earthquake – killing 627 people in Guatemala in October and 256 in Afghanistan in April. Natural disasters are complex detrimental events that occur entirely beyond the control of humans (Acosta, 2018). Natural disasters can be classified based on the speed of onset; some disasters occur within seconds (landslides), minutes (tornadoes) or hours (flash floods and tsunamis) and others may take months or years to manifest themselves (droughts) and how they influence socio-economic wellbeing of households. Furthermore, rapid onset disasters such as landslide shave a massive impact on human life and property.

Landslides are more widespread than any other geological event, and can occur anywhere in the world. They occur when large masses of soil, rocks or debris move down a slope due to a natural phenomenon or human activity. Mudslides or debris flows are also a common type of fast-moving landslides (Acosta, 2018). Landslides can accompany heavy rains or follow droughts, earthquakes or volcanic eruptions. Areas most vulnerable to landslides include steep terrain, including areas at the bottom of canyons land previously burned by wildfires as well as land that has been modified due to human activity, such as deforestation or construction. Between 1998-2017, landslides affected an estimated 4.8 million people and cause more than 18 000 deaths and economic losses of about $65billion. Climate change and rising temperatures are expected to trigger more landslides, especially in mountainous areas with snow and ice. As permafrost melts, rocky slopes can become more unstable resulting in a landslide. Using the global fatal landslide database, researchers evaluate the characteristics of landslides induced by natural and anthropogenic factors with respect to topographic, climatic, and anthropogenic factors, drawing attention to their persistent spatial pattern.

The majority of natural (69.3%) and anthropogenic (44.1%) landslides occur in mountainous areas in tropical and temperate regions, which are also characterized by the highest casualty rates per group, 66.7% and 43.0%, respectively (Acosta, 2018). However, they significantly differ in terms of their morphometric footprint. Fatal landslides triggered by natural variables occur mostly in the highest portions of the topographic profile, where human disturbance is minimal. As for their anthropogenic counterpart, these failures cluster at much lower altitudes, where slopes are gentler, but socio-economic wellbeing of households is higher due to a higher population density.

Landslides have had several other costs to countries as well: increased service expenditures, demands on schools and losses in educational achievements and productivity. In Chile, lack of landslides cost households $1.5 billion in lost earnings in 2014 more than 2% of the country's GDP. In India, the World Bank survey (2016) found that landslides contribute to 56% of household poverty. Landslides constitute a single biggest risk to Australian households, resulting into 67% of reduced livelihoods and economic losses of $13.7 billion a year. The World Bank is addressing the challenge of landslides through precautionary means—for instance, by restricting or even removing populations from areas with a history of landslides, by restricting certain types of land use where slope stability is in question, and by installing early warning systems based on the monitoring of ground conditions such as strain in rocks and soils, slope displacement, and groundwater levels.

Landslides are responsible for considerably greater economic and casualty losses than is generally recognized; they represent a significant element of many major disasters in which the magnitude of their effects is overlooked by news media. For example, the tremendous destruction and loss of life caused by the 1970 Huascaran disaster in Peru, which killed some 20,000 people, is often referred to in publications that review disasters as an earthquake disaster, because the landslide was triggered by an earthquake; this is in spite of the fact that the actual damage, destruction, and casualties were directly caused by a huge, high-velocity debris avalanche (Bodenlos and Ericksen, 2022).

On the basis of their analysis of landslide loss data for Southern California and extrapolation of these data to the rest of the nation, Krohn and Slosson (1976) estimated the annual costs of landslides to private dwellings in the U.S. to be about $400 million in 1971 dollars ($1.2 billion). This estimate did not include indirect costs or costs to public property, forest or agricultural lands, mines, or transportation or communications facilities. In 1985 the U.S. National Research Council (Committee on Ground Failure Hazards, 2020), using these estimates, rough approximations of indirect costs, and inflationary trends, evaluated annual landslide losses in the U. S. at about $1 billion to $2 billion ($1.6-$3.2 billion). Landslide deaths in the U.S. have been estimated at 25-50 people per year. Obviously these estimated annual losses are *averages*, which will be exceeded in some years, but will not be approached in others.

A landslide is defined as the movement of a mass of rock, debris, or earth down a slope. Landslides are a type of "mass wasting," which denotes any down-slope movement of soil and rock under the direct influence of gravity. The term "landslide" encompasses five modes of slope movement: falls, topples, slides, spreads, and flows. These are further subdivided by the type of geologic material (bedrock, debris, or earth). Debris flows (commonly referred to as mudflows or mudslides) and rock falls are examples of common landslide types and can greatly impact socio-economic wellbeing of households (Acosta, 2022).

Almost every landslide has multiple causes. Slope movement occurs when forces acting down-slope (mainly due to gravity) exceed the strength of the earth materials that compose the slope. Causes include factors that increase the effects of down-slope forces and factors that contribute to low or reduced strength (Bodenlos and Ericksen, 2021). Landslides can be initiated in slopes already on the verge of movement by rainfall, snowmelt, changes in water level, stream erosion, and changes in ground water, earthquakes, volcanic activity, disturbance by human activities, or any combination of these factors. Earthquake shaking and other factors can also induce landslides underwater. These landslides are called submarine landslides. Submarine landslides sometimes cause tsunamis that damage coastal areas.

A depressingly high proportion of writing on landslides in Africa both in literature and elsewhere is based on wishful thinking. The most widespread risk from natural hazards is, with little doubt, that posed by ground instability; landslides and landslips; mudflows; rock avalanches and a range of other categories in which large volumes of surface material are set in motion. They can be triggered by earthquakes, volcanism or heavy rainfall that changes the physical properties of rock and soil. Not only steep slopes pose a risk, for some affect ground with quite gentle topography, as witness the terrible scenes from Sulawesi triggered by the 28 September 2018 magnitude 7.5 earthquakes beneath the horn of Africa. This set in motion mudflows on gently sloping ground when the seismic waves caused liquefaction of unconsolidated sediments that not only shattered dwellings by the lateral motion, but many households sank into the slurry with little trace, property and livelihoods destroyed, . The rapid events left a death toll confirmed at 2010 people with about 5000 missing, feared to have been swallowed by the earth. In the last 9 months mass movement has resulted in fatalities in many places, the most publicized being in Uganda, Malawi, Kenya, South Sudan and the list grows as it does every year.

Uganda is known as the “Pearl of Africa” because of its stunning natural beauty and biodiversity. Its lush vegetation is associated with regular tropical rainfall, but the East African nation is now struggling to deal with more frequent and intense rains that are causing landslides. Landslides can dump millions of tons of muddy debris in Uganda’s rivers and streams, said Mary Goretti Kitutu, Uganda’s minister of energy and mineral development and an expert on geology and landslides. Such debris can dam rivers, flood surrounding areas, and cause damage to infrastructure.

“The main landslide types [in Uganda] are debris slumps, which occur on concave slopes where water concentrates. Slopes facing northeast are most prone to landslides, which coincide with the dominant rainfall direction,” Kitutu said. The region’s soil profile is significant, she continued, explaining that “topsoils have a high infiltration rate, which allows fast flow of water into the deeper, clay-rich horizons promoting water stagnation and causing slope failure.” Although Uganda has always experienced some loss of life due to landslides, the number of casualties has increased this century. Over the past 25 years, catastrophic landslides have regularly hit the foothills of Mount Elgon, for instance, which straddles the border between eastern Uganda and Kenya. The region’s most devastating landslide swept the slopes in 2010. Although more than 300 people are thought to have perished, only about 100 bodies were recovered. Thousands of homes were damaged or destroyed.

Ugandan environmental specialist Mary Goretti Kitutu warns that despite traditional knowledge of how to avoid landslide risk, population pressures mean that people still cut terraces on slopes, till open land, cut down trees to create farmland and construction space. Community sensitization, encouraging family planning, relocating people from risk areas and creating alternative income-generating activities to lessen pressure on land are crucial to counter this, she argues. In Bududa district, following the adoption of the 15-year Sendai Framework of Disaster Risk Reduction by the international community in March last year, the Ugandan government has stepped up its drive for risk-informed development. That includes harnessing the wisdom of residents of Bududa and the other landslide-prone eastern districts of Manafwa, Bulambuli and Sironko, assigning officials to document, integrate and promote traditional, indigenous and local knowledge to protect the people and communities against disasters.

Mr. Martin Owor, Commissioner for Disaster Preparedness and Management at the Office of the Prime Minister, confirms that despite flooding and landslides during the 2015 El Nino-sparked rains, only three people are on record as having died. That was a significant drop from the 2007, 2010 and 2012 landslides when in total, over 300 lives were lost. Mr. Owor attributes this fall in numbers to adequate planning, application of traditional knowledge and strong partnerships between development partners, media houses and the local community, despite limited resources. “Our forefathers used to tell us about certain insects, birds, clouds and winds which act as early signs of rainy or dry seasons. People decided to ignore and abandon indigenous knowledge and then depended only on science. But today, we have come to the realization that indigenous knowledge works,” he says.

However, there has been no comprehensive single author survey on the impact of landslides on socio-economic wellbeing of households in Nametsi Sub County, Bududa District. Not that the subject has suffered from any lack of interests but many historical scholars and publications particularly in Uganda and Africa have often been drawn more to the international scene than to the potentially more hazardous subject of academic performance at home. Very few historical nodes have been made on the subject and the resulting literature has, however, almost exclusively taken the form of edited volumes, specialized monographs and polemical contributions to debates and this is the gap this study filled.

1.2 Problem statement

Despite of well-funded government programmes in Nametsi sub-county, socio-economic well-being of households is still very low. Low levels of socio-economic wellbeing has had far reaching consequences in terms of reduced productivity and community empowerment and significantly contributing to down ward socio-economic mobility of household members including low consumption, investments and saving thresholds and also affecting relationship Ojangole et al., (2022). Nametsi is one of the poorest and most mountainous areas in Bududa district. Of the sub-county's37, 687 people, 70% are economically marginalized and 40% living in poverty (UBOS, 2021, Ministry of Finance, Planning and Economic Development, 2020).

The public has with great concern observed that landslides impend socio-economic well-being of households in Nametsi Sub-County. Despite the interventions in Bududa through wealth creations programmes such as NAADS, NUSAF, youth livelihood fund and more recently PDM, socio-economic well-being of households is poor and if nothing is done there would be a likelihood of high illiteracy, constant morbidity, death and low economic development, therefore strong and focused strategies are needed to reverse poor socio-economic well-being of households. Preliminary results further reveal that there is there is no single comprehensive author survey regarding the impact of landslides on socio-economic wellbeing of households in Nametsi Sub County, Bududa District leading to limitations and distortions in literature, a gap this study seeks to address

1.3 Purpose of the Study

The main purpose of this study is to establish the impact of landslides on socio-economic wellbeing of households in Nametsi Sub County, Bududa District

1.4 Objectives of the Study

I. To find out how human activities contributes to landslides in Nametsi Sub County, Bududa District

II. To assess prevalence of rainfall induced landslides in Nametsi Sub County, Bududa District

III. To identify landslide mitigation and prevention measures in Nametsi Sub County, Bududa District

1.5 Research questions

I. How does human activities contributes to landslides in Nametsi Sub County, Bududa District?

II. Explain the prevalence of rainfall induced landslides in Nametsi Sub County, Bududa District?

III. What landslide mitigation and prevention measures exist in Nametsi Sub County, Bududa District

1.6 Scope of the Study

The study scope is categorized into geographical, content and time scope as follows:

1.6.1 Geographical Scope

The study will be conducted in Nametsi Sub County, Bududa District. Bududa district is bordered by ---------------in the east, ---------in the west, -------in the north and ---------in the south. The district is dominated by Gisu speaking people and their major economic activity is farming. Others are involved in small scale grazing, businesses and bodas bodas. n Nametsi Sub County, Bududa District has been chosen because worsening levels of socio-economic wellbeing of households (Amuria District Situational Analysis Report, 2024).

1.6.3 Content scope

The study will contain information about the impact of landslides on socio-economic wellbeing of households in Nametsi Sub County, Bududa District. Specifically, the study will find out how human activities contributes to landslides and assess prevalence of rainfall induced landslides in Nametsi Sub County, Bududa District. The study will also identify landslide mitigation and prevention measures in Nametsi Sub County, Bududa District. Through this content scope, the researcher will be able to collect adequate and relevant information that helped to attain study objectives.

1.7.3 Time Scope

The research study will consider the period between 2021 and 2024. This period is considered because it is during this time that the decline in socio-economic wellbeing of households Nametsi Sub County was more pronounced (Nametsi Sub County Situational Report, 2024)

1.7 Significance of the study

The study findings may benefit the following categories of people:

The study may provide information for government and stakeholders on the primary determinants of socio-economic wellbeing of households

This study may provide data to inform policy thinking on how to address the problem of socio-economic wellbeing of households and its more often significant relationship to landslides

The study may in addition provide accorded opportunity of testing the validity and explanatory powers of the existing theories on socio-economic wellbeing and its more often significant relationship to landslides

The findings may benefit future researcher who intend to carry out similar a study by acting as a source of information.

1.10 Conceptual Frame work

Independent Variable **Dependent Variable**

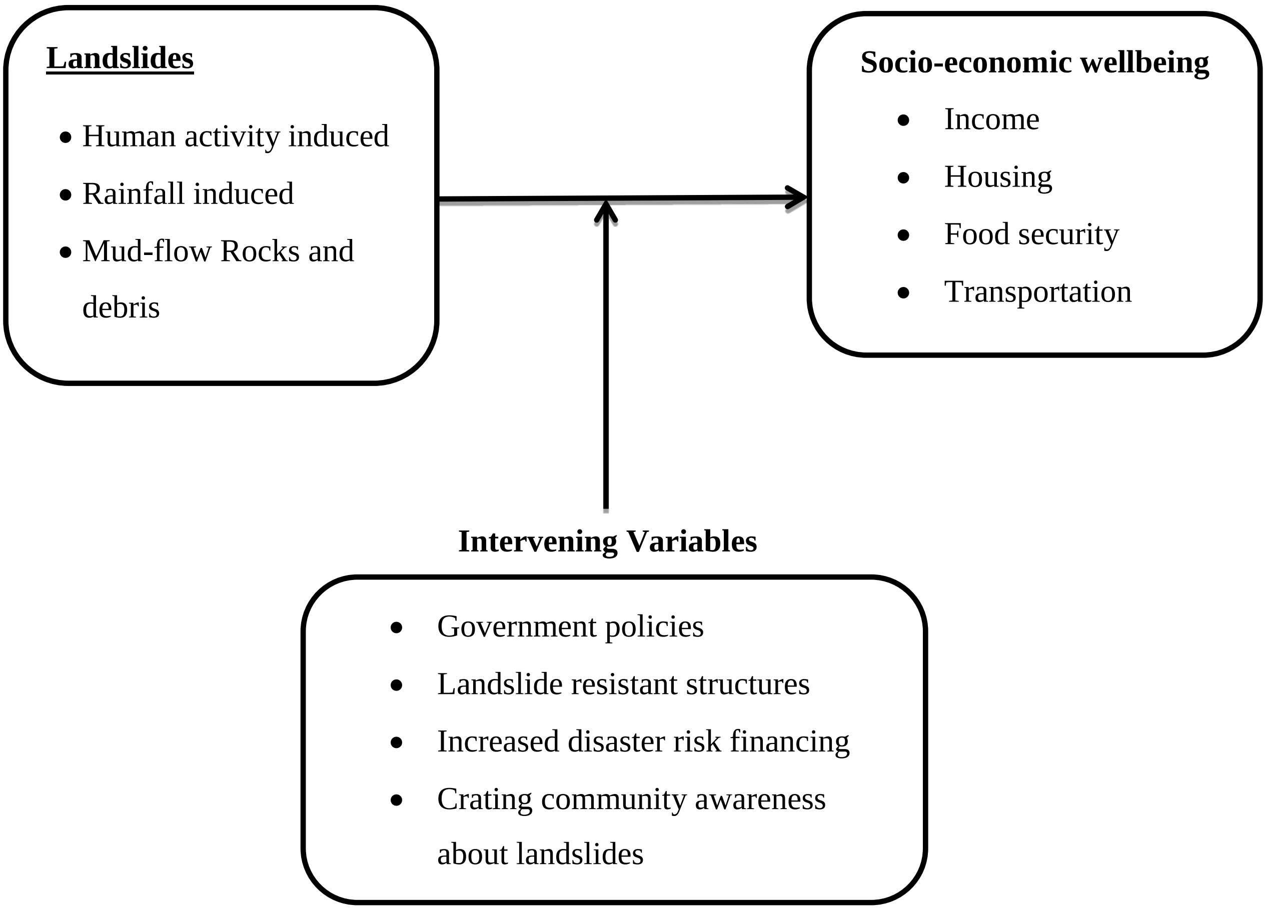


Figure 1.1: Conceptual framework

Source: Adapted from Mugenda and Muganda (2004): Conceptual Frameworks

The above conceptual framework shows the relationship between variables. Landslides

Human activity induced, rainfall induced, mud-flow and rocks and debris. While dependent variable is Socio-economic wellbeing with parameters of income, housing, food security, and transportation and trade. The conceptual framework has been drawn on the assumption that if landslides are prevented, socio-economic wellbeing will improve and the reverse is undoubtedly true. Nevertheless, this may not be automatic as other factors may come into play. These may include Landslide prediction, Landslide resistant structures, increased disaster risk financing and Crating community awareness about landslides.. These factors have been dully coined as intervening variables by the study and are being isolated to avoid making wrong conclusions.

1.9 Definition of key terms

a) **A landslide** is defined as the movement of a mass of rock, debris, or earth down a slope. Landslides are a type of "mass wasting," which denotes any down-slope movement of soil and rock under the direct influence of gravity (Davis, 2020)

b) **Socio-economic wellbeing**: this refers to the way people live ith regards to life fulfilling requirements (MoGLSD, 2021)

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter shows the various sources of related literature to the topic of the research. The sources include; review of scholarly journals, government documents, text books, Internet and Newspapers, it also presents theoretical review, actual review on the effect of drug abuse on increase in rates of crimes among the youths. This literature review has been done objective by objective.

2.2 How human activities contributes to landslides

Acosta (2018) found that excavation or cuts increase the slope angle if carried out without specialist advise. Mining, blasting rock or reclamation of land can also destabilize slopes. Farming activities on slopes involve removal of vegetation cover usually followed by terracing. Sometimes, farmers burn down vegetation as a convenient method of clearing land for cultivation. Commercial logging results in deforestation. These activities increase surface run-off of rainwater and expose the soil to erosion. Changes in water regime results in raising or lowering of ground water table. Alteration of surface drainage can also be a contributory factor.

Bodenlos and Ericksen (2018) argued that irrigation alters natural surface drainage. Surface run-off of irrigated water on slopes exposes soil under cultivation to erosion. Part of this water is absorbed by soil increasing its weight, which can put an additional load on the slope. Seepage and accumulation of irrigated water on slopes can raise the ground water table. This can also be a result of wastewater discharge, water pipe leakage from permanent and temporary storage facilities such as ponds and subsurface irrigation facilities.

Substantially different, however, is the situation in those sliding areas, where human activity is concentrated. It is so in the vicinity of towns and villages, in the main valleys and basins of the mountainous part of Slovakia, where industry, construction of residential quarters, communications, water reservoirs, etc., are concentrated. An important new stability factor, which did not act here before is beginning to appear. It is man’s activity. The intensity of this activity sometimes exceeds the influence of the present negatively acting natural factors (Davis et al., 2019). Landslides activated by negative intervention of man’s activity are of considerable dimensions, bring vast damage and evoke considerable attention from the general public. Based on the investigation of landslides in Slovakia it can be stated that 90 % of all landslides, which occurred in populated areas in the last 30 years and which caused the greatest damage, were brought about fully, or partly by man's intervention in the sensible stability regime of old landslides (Acosta, 2022).

The fact that inconsiderate human activity and the effects of construction work on old landslides are the most frequent cause of reactivation of movements in areas of intense economic use are also confirmed by several foreign studies. Thus Nilsen and Turner (2022) state that 80 % of the landslides, which have taken place since 1971 in California, were brought about by artificial interventions. Similarly, Ojangole (2023) prove that in Pensylvania artificially caused landslides amount to 90 % of newly occurred landslides.

The construction intervention in the slope environment according to Bodenlos and Ericksen (2022) causes in it several simultaneously and consequently acting forces and processes, which may end in various changes on the slopes. These may also reflect back on the state and behaviour of technical works. The changes may be not only of a varied type, but also of varied intensity and duration (temporary and permanent, slow and quick, reversible and irreversible, etc.) The changes may be mediated directly or indirectly.

The Yellow River originates from the Tibetan Plateau and flows through nine provinces and autonomous regions of China. The complex environment has led to many landslides in the Yellow River Basin (YRB, China), restricting socioeconomic development. Analyzing the effect of influencing factors on the spatial distribution of landslides is important for landslide risk management. The factors that induce landslides in the YRB include natural (mainly earthquakes, precipitation, river erosion, etc.) and human activities (mainly agricultural and construction activities) (Bodenlos, 2018). Earthquakes can damage the geotechnical structure, leading to many landslides distributed along fault zones. For example, landslides triggered by earthquake were concentrated 40–55 km west of the Haiyuan fault in the YRB.

The catastrophic modifications associated with human activities on the Earth's surface are no negligible (Ericksen, 2021). Human activities change the topography, surface and subsurface hydrology, becoming important factors in triggering landslides. Human activities that affect slope stability mainly include construction and agricultural activities. Agricultural irrigation raises the groundwater table, increases the self-weight of the soil and weakens its mechanical properties. Human activity-induced groundwater level rise is an important cause of landslide clusters in the South Jingyang Tableland of the YRB (Peterson, 2022). Human activities have long-term ongoing impacts; for example, “the rapid transition from forests into cultivated or bare land is associated with a surge in shallow landsliding that can persist for more than a decade

Researchers have highlighted the role of proactive land use and land cover management in reducing landslide hazards (Ericksen, 2023). Human activities can lead to variations in the spatial distribution of landslides. For example, the spatial distribution density of landslides on residential land was almost five times that on bare land. Although dozens of cases, show that human activities could be the triggering factor causing landslides, the degree to which human activities affect the spatial density distribution of landslides in the YRB is still unclear.

Hence, this study aims to explore this problem by conducting a quantitative analysis of the correlation between the spatial distributions of landslides and human activities in the YRB, a typical area with numerous landslides and a dense population (Ojangole et al., 2022). An analysis of the effect of human activity intensity on the spatial distribution of landslides requires the quantification of human activity intensity. Socioeconomic statistical data reflect human activities within the administrative unit. However, socioeconomic statistical data are not sufficient to reflect human activity intensity on a detailed raster scale.

Some researchers such as Bodenlos and Erickse (2023) calculated human activity intensity based on the sum of the construction land equivalent to different land-use types in a region [26]. Land cover change focuses on changes in type and area and is not sufficient to indicate human activity intensity. Currently, studies have used the weighted summation of indicators such as nighttime light, land use and land cover, distance to roads, distance to towns, and normalized difference vegetation index (NDVI) to calculate human activity intensity. It is difficult to obtain long time series (annually updated) road data, and it is difficult to determine whether vegetation changes in the NDVI are caused by human activities. Land cover change can reflect human-induced vegetation degradation. Moreover, land cover data can be used to detect areas of human activities that nighttime light data cannot, such as cropland and some poverty regions.

Related to increases in population is the continuing high rate of deforestation due to logging, burning, and development, a factor that increases landslide activity on the world’s slopes. In the early 1990’s, the World Resources Institute estimated that the world's tropical forests were disappearing at a rate of 16-20 million ha/yr (Collier's Encyclopedia, 2017), an area roughly the size of Surinam. In the Amazon River Basin of Brazil, alone, approximately 2.9 million ha of forest was destroyed during the 1994-95 burning season

2.2 The prevalence of rainfall induced landslides

Rainfall reduces the cohesion of rock and soil and increases the weight of rock and soil, increasing the susceptibility of slopes to landslides. The landslide frequency increased as the annual rainfall increased over a large spatial scale (Bodenlos and 2020). The topographic slope reflects the topographic steepness on a small spatial scale, while the topographic relief reflects the topographic steepness on a large spatial scale. Many steep slopes exist in the YRB. Steep terrain provides conditions for landslide initiation and movement. In addition, direct costs of small slope movements commonly are hidden in larger, routine budget items for maintenance and repairs. Undoubtedly, indirect costs for such items as traffic delays and economic disruption are a substantial part of the total costs of landslides

Landslide hazards pose a great threat to people's lives and the safety of their property all over the world, especially in mountainous areas. Rainfall is one of the main trigger factors of landslides, and the induced mechanism is complicated and affected by multiple environmental factors such as rainfall intensity, rainfall duration, landform and soil layer structure, and has a high degree of regional specificity and sudden occurrence (Acosta, 2018). Rainfall has a significant impact on the mechanical properties of slope soil and underground rock mass, which usually leads to soil softening and pore water pressure increase, and then leads to landslide instability, forming a large number of destructive debris flow or collapse

The occurrence process of landslides induced by rainfall includes soil and water loss and erosion on the surface, and also involves water infiltration into the underground, causing deep soil saturation, thus triggering a landslide. The migration and convergence patterns of water flow under different rainfall characteristics have a key influence on the triggering mechanism of a landslide (Opio, 2020). Extreme rainfall events caused by climate change have become more frequent in recent years, exacerbating the risk of landslides. Therefore, landslide prediction and risk management have received more and more attention from the scientific community. This Special Issue is devoted to cutting-edge research on the causes, mechanisms, modeling and disaster management methods of rain-induced landslides, with a view to providing new insights and effective mitigation strategies.

Rainfall-induced landslides: Based on a variety of methods, such as model tests, numerical simulation, artificial intelligence algorithms and theoretical deduction, past studies have not deeply analyzed how rainfall causes a landslide and its prediction methods, including the development and application of rainfall-induced landslide monitoring systems, the establishment of risk prediction models and the analysis of rainfall-induced landslide mechanisms and their influence on socio-economic wellbeing of households (Owino, 2023).

The correlative mechanism and prediction method of rainfall-induced landslides are studied by using physical models. Paswan et al. (2022) developed a rain-induced landslide monitoring system to solve the problem of limited landslide prediction in northern India during the rainy season which can record the real-time displacement and volumetric water content of the slope. Taking the Woda landslide in the upper reaches of the Jinsha River as the engineering background, Li et al. (2020) designed a model test to study the development of paleo-landslides with cracks under the action of rainfall infiltration and revealed the activation mechanism of rainfall and cracks on paleo-landslides. The depth of slope infiltration directly affects the depth of landslide failure and socio-economic recovery of households.

At the same time, some papers systematically analyze the landslide disasters induced by rainfall through theoretical research, establishing a disaster analysis model and putting forward a landslide failure time prediction method. Tseng et al. (2017) took the landslide in Pingtung County, Taiwan Province, as the research object. By establishing the evaluation indexes, namely, the rainfall trigger index (I_{RT}) and an index of slope environmental strength potential (I_{SESP}), of landslide damage to land use after four heavy rainfall events, they could effectively estimate the damage of rainfall-induced landslides to land use.

Finally, in addition to rainfall-induced landslides, some scholars have focused their research on the causes of slope instability and the resolution of uncertainty in slope stability evaluation. Gui et al. [Contribution 13] took a large landslide-prone area in the Central Mountain Range of Taiwan as the research object and adopted multi-temporal satellite and aerial images, field investigations, geophysical tests and other technical means to propose the main trigger factors that induced sudden and local slope instability failure, namely, rainwater intrusion, the rising of river bed elevation and the erosion of large slope foot banks. Even though no data are readily available on casualties or damage costs in the lightly populated downstream valleys, Bodenlos and Ericksen (2018) reported that cattle ranches and farms along the 60-km canyon and valley of the Río Barrancas upstream from its junction with the Río Colorado completely disappeared; fields of wheat, corn, and alfalfa were buried by debris. In addition, two small towns in the valley were devastated

Heavy rainfall infiltration often leads to slope instability and poses a serious threat to the lives and property of local residents. At present, the stability evaluation of rainfall-induced landslides is mainly divided into two steps. The first is to select the appropriate rainfall infiltration model to analyze its infiltration mechanism and hydraulic effect. Then, based on this, the safety factor of the landslide is calculated after the stress analysis. In addition, satisfactory analysis (including artificial intelligence, etc.) of risk assessment constituted an active area of research in the field of slope stability and landslides[1,2]. And combining statistical analysis and physical modeling for risk assessment can better understand the conditions of landslide and slope stability in different environments.

2.3 Landslide mitigation and prevention measures

Landslides pose a recurrent hazard to human life and livelihood in most parts of the world, especially in some regions that have experienced rapid population and economic growth. Hazards are mitigated mainly through precautionary means for instance, by restricting or even removing populations from areas with a history of landslides, by restricting certain types of land use where slope stability is in question, and by installing early warning systems based on the monitoring of ground conditions such as strain in rocks and soils, slope displacement, and groundwater levels. There are also various direct methods of preventing landslides; these include modifying slope geometry, using chemical agents to reinforce slope material, installing structures such as piles and retaining walls, grouting rock joints and fissures, diverting debris pathways, and rerouting surface and underwater drainage. Such direct methods are constrained by cost, landslide magnitude and frequency, and the size of human settlements at risk.

Studies by Ericksen (2021) concluded that recognition and investigation of unstable areas and the design of preventive treatment should be considered as essential phases of the preliminary planning and design of any project on which the proposed construction might induce land movements. It must be remembered that landslides may be caused by two general types of construction activities: (a) the imposing of additional load, such as by embankments, dams, or other structures; and (b) the changing of existing ground slope by excavation, erosion, or other causes. It is true that landslides may occur where the existing ground is undisturbed by man; this is evidenced by the numerous landslides which occur in many areas remote from any construction activity (World Bank, 2021). The possibility of such landslides affecting proposed facilities should not be overlooked, particularly if the new facility is located on or crosses an old landslide. There have been many instances of residential developments on old quiescent landslides, where various conditions, perhaps unrelated to the residential construction, have caused the landslide to become active, resulting in damage to buildings and structures within the slide area. Development and construction over a large area may obliterate all evidence of the original landslide, leaving the purchaser blissfully unaware of any hazard.

In highway construction the proposed location may cross an old inactive landslide of such areal extent that it is overlooked in the usual routine soil survey. Or, the engineer may recognize and treat small local unstable areas without realizing that they are merely. manifestations of large-scale land movement. It is seldom that any large-scale landslide, however old, does not leave some telltale evidence which can be detected by an engineer trained to look for the proper features. Once the slide area is identified by this or other means, a detailed ground study will commonly reveal further evidence of previous land movement. Field methods for recognizing and identifying old landslides are described in Chapter Four. Having identified an existing landslide, active or latent, the engineer can then determine whether avoidance is economically practicable; if the slide cannot be avoided the necessary investigation can be made to determine the extent and nature of preventive treatment required.

In any area of inherently low stability, especially where slides are known to be prevalent, the design of any major structure should be preceded by thorough investigation. Particularly in the construction of embankments on steep slopes in localities of questionable stability, each such site should be viewed with suspicion and thoroughly explored during preliminary stages of the project. Similarly, the design of cut slopes in such areas should be carefully scrutinized; in regions where instability is evidenced by land movement on existing routes, exploration of all proposed major excavation may be required (Bodenlos and Ericksen, 2018). One error which is all too prevalent in the investigation of potential landslides is that of basing the analysis and design on data derived from shallow borings or test pits. All too often the material recorded in shallow borings as "solid formation" or "bedrock" may be merely float rock, boulders, or a thin layer of hard material underlain by a dangerously weak horizon. In excavation areas the borings should extend below the proposed grade; the foundation for embankments or other structures should be explored to whatever depth might be affected by the proposed loading.

The investigation aimed at slide prevention should be a cooperative project by the geologist and the soil engineer, or be made under the jurisdiction of an engineer who is thoroughly familiar with both of these phases of engineering. To be of greatest value, the geologic and soils studies should be both general and specific to household socio-economic culnaerabilities. That is, a general or regional knowledge of the soils and geology in the area under investigation will be helpful in estimating the landslide potentials on a specific project, but such knowledge cannot take the place of detailed studies along the proposed right of –way

Bodenlos and Ericksen (2018) found that prevention of all types of landslides may be accomplished by one or more of the following methods: (a) reduction of activating forces, (b) increasing the forces resisting movement, and (c) avoidance or elimination of the slide. Reduction in the activating forces can be accomplished by two general methods - removal of material from the portion of the slide which provides the driving force tending to cause movement, and sub-drainage to eliminate hydrostatic pressure and/or to diminish the weight of the soil mass by reducing moisture content. However, the stabilizing effect of sub-drainage is generally due primarily to increasing the shear resistance rather than by reduction of the motivating forces.

There are a great many methods for increasing the forces resisting slide movement, including the following: subdrainage, in order to increase the shear resistance of the soil; elimination of weak zones or potential surfaces of rupture by stripping or by breaking up or benching of smooth sloping surfaces; construction of restraining structures such as piles, walls, cribs, or toe support fills; and solidification of loose granular material by chemical treatment.

Although surface drainage alone will seldom correct an active landslide, any improvement in surface drainage will be beneficial. In the case of potential landslides, where no movement has occurred prior to construction, surface drainage may result in greater returns from the investment than any other type of preventive treatment, even though other preventive measures may be required in conjunction with the surface drainage (Bodenlos and Ericksen, 2018). Surface runoff or the water flowing from springs or seeps should never be allowed to drain into or across an unstable area or potential landslide. Methods of improving surface drainage include reshaping of slopes, construction of paved ditches, installation of flumes or conduits, and paving or bituminous treatment of slopes.

Acosta (2018) recommended that government agencies and other policy-making bodies in the Western Hemisphere need to develop a better understanding of the socioeconomic significance of landslides. Such understanding will allow rational allocation of funds needed for landslide research, for avoidance, prevention, control, and warning, and for post-failure repair and reconstruction

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter describes the methodology that was used by the researcher to carry out the research study and some of the areas that were covered are: Research design, area and population of the study, sample size, sampling techniques, research instruments, data quality control, data analysis and ethical issues in the study.

3.1 Research Design

The research study adopted a cross-sectional design using both qualitative and quantitative research approaches to analyze the Impact of landslides on social economic wellbeing of households in Nametsi sub county, Bududa district. This helped the researcher to generate more sufficient data and relevant information which supported the variables and objectives of the research study.

3.2 Sample size

The population was selected from two parishes of within Nametsi Sub County and it comprised of parish chiefs (2) residents of Nametsi Sub County (88), local leaders (10) and lastly. A sample size of 80 respondents will be reached using Krejcie and Morgan (1973) methods of determining sample size.

Table 1: Sample Size and Sampling Technique

Summary of Sample Size and Sampling Technique

Participants	Study Population (N)	Sample Size (n)	Sampling Technique
Parish chiefs	2	2	Purposive sampling
Residents of Nametsi	88	70	Simple random sampling
local leaders	10	8	Purposive sampling
Total	**100**	**80**	

Source: primary data (2025)

3.3 Sample selection

The researcher used the listed sampling techniques to carry out the research study:

3.3.1 Simple random sampling

The researcher used simple random sampling to select Residents of Nametsi, this technique will involve giving a number to every subject or member of the accessible population, placing the numbers in the container and then picking any number at random. The subject corresponding to the numbers were included in the sample. Simple random sampling was used on Residents of Nametsi because they of this category and this enabled the researcher to get a representative sample for the research study and allow generalizability to a larger population with a margin error that is statistically determinable.

3.3.2. Purposive sampling

Purposive sampling was used on parish chiefs and local leaders because the researcher the researcher was able to move from one Parish Chief to another until the required sample is reached and these respondents can easily read and understand what is in the questionnaire making it the right sampling technique for this research study.

3.4 Research instruments

The researcher used both questionnaires and interview guide to carry out this research study.

3.4.1 Questionnaire

The researcher used a self-administered questionnaire as a research tool to collect data from the respondents. The questionnaire had three sections. Section A included respondents' demographic information, Section B, C and D focused on general and closed ended statements which were in accordance with the research topic.

A 5 Likert scale of measurement will be used on close ended questions based on a scale of strongly agree (5), agree (4), unsure (3), disagree (2), strongly disagree (1). Questionnaires will be used because they allowed respondents to provide firsthand information which was free of bias and was easy to use.

3.4.2 Interviews

Data was collected using interviews with the help of an interview guide. An interview guide is a research instrument that contains a set of questions on defined issues under study that are put to respondents on face to face basis (Saunders, et al, 2007). These instruments contained mostly open-ended questions. The interview guide was used on local leaders as respondents because this category of study respondents has more knowledge that could not fully be captured using questionnaires.

3.5 Data Processing and Analysis

3.5.1 Quantitative data analysis

Data processing was done through editing of the data which was coded for further data analysis. After data processing, quantitative data analysis will be carried out by simple frequency tabulation using a Statistical Package for Social Science (SPSS). Data was then presented using different methods such as simple frequency tables which ultimately will help to measure the Variables being interpreted in the study. This is because data presentation requires clear portrayal of the findings presented, and the listed method above clearly fulfills that purpose.

3.5.2 Pearson Correlations and Regression Analysis

Pearson Correlations and regression analysis was used to establish the effect of the study variables of the topic under study. This type of inferential statistics was easy to compute and interpret and help in making conclusions.

3.5.3 Qualitative data analysis

On the other hand, qualitative data gathered from open-ended questions in the interview guide will be summarized. A style called content analysis was used to test the validity and authenticity. Then, data was categorized according to the sub-themes identified earlier.

3.6 Research procedure

The researcher will select and present a research topic to the head of research which will be approved. Thereafter the researcher will develop a research proposal. After approval of the research proposal, the researcher obtained an introductory letter from the Head of department which was presented to the relevant authorities in the study area for data collection. Thereafter the researcher wrote a report which was presented to the department for further examination.

3.7 Ethical considerations

3.7.1 Consent

The researcher got approved consent from the respondents. Respondents willingly decided to participate in the study after the researcher explaining to them its purpose. The prepared instruments helped the researcher to collect objective information hence fears of personal views will be reduced.

3.7.2 Confidentiality

Respondents were assured of confidentiality by keeping information given confidential. And their identity was kept anonymous or pseudo names were used. This increased on disclosure of information.

3.7.3 Fraud and plagiarism

Mugenda and Mugenda (2007) argued that fraud involves faking data. It also includes false presentation of research methodologies. According to copy rights law, in many countries including Uganda, both fraud and plagiarism are crime punishable by panel code. To avoid fraud and plagiarism, the researcher personally collect, analyze and present data and endeavored to present exactly what the study subject reveal.

3.8 Validity and reliability

3.8.1 Validity

The validity of an instrument is defined as the ability of an instrument to measure what it is intended to measure. The validity of the questionnaire was tested using the content validity test (CVI). To arrive at the relevancy of the questionnaire, the researcher designed instruments that yielded content –valid data by first specifying the domain of indictors that were relevant to the concept being measured. A content-valid data measure which contained all possible items will be used.

$$CVI = \frac{R}{R + N + IR}$$

Where, Relevant (R), Neutral (N), to Irrelevant (IR).

3.8.2 Reliability

The reliability of the instruments was tested using the test re-test method of reliability and Cron-bach alpha tests to determine the reliability index with the help of SPSS. Data was collected from 5 residents not among those in the sample. The principle of reliability as far as research instruments is concerned is clearly put forward by Amin (2005) that an instrument is reliable if it produces the same results wherever it is repeatedly used to measure a trait or a concept from the same population and under similar circumstances.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.0 Introduction

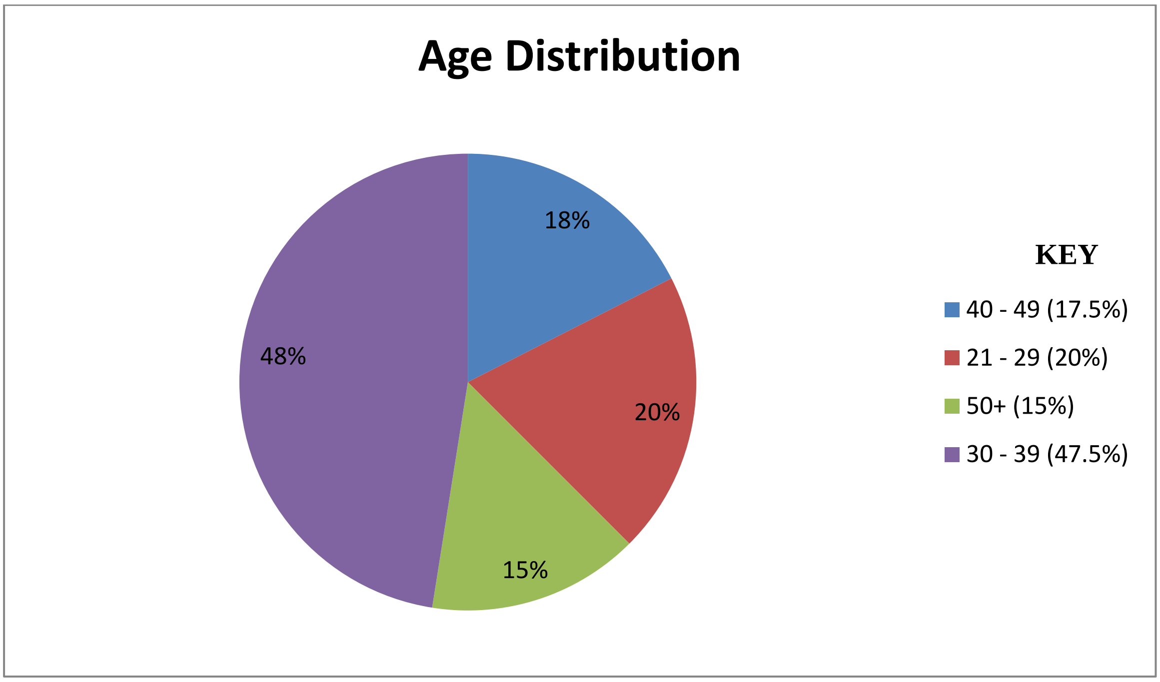
This chapter presents information about data analysis and interpretation and it consists bio-data of respondents, in accordance to the study objectives.

4.1 Respondent's Bio Data

4.1.1 Age Distribution

Under this section, respondents were asked to mention their age and their responses were recorded in the age brackets as seen below:

Figure 4.1 Showing Age distributions of respondents



Information given in figure 4.1 above shows that respondents who were aged between 30 – 39 years were represented by 47.5%. 20% were aged between 21-29 years, those aged between 40-49 were 17.5%, 15% were aged 50 (Fifty) years and above. This indicated that all the respondents were mature in age since most of them were aged between 30-39 as represented by 47.5% and therefore majority were able to express their opinions independently and freely in line with the topic under study.

4.1.2 Sex of respondents

Under this section, respondents were asked to identify their gender and their responses were tabulated in the table 4 as follows:

Table 4 showing Sex of respondents

Sex	Frequency (+)	Percentage (%)
Male	48	60
Female	32	40
Total	**80**	**100**

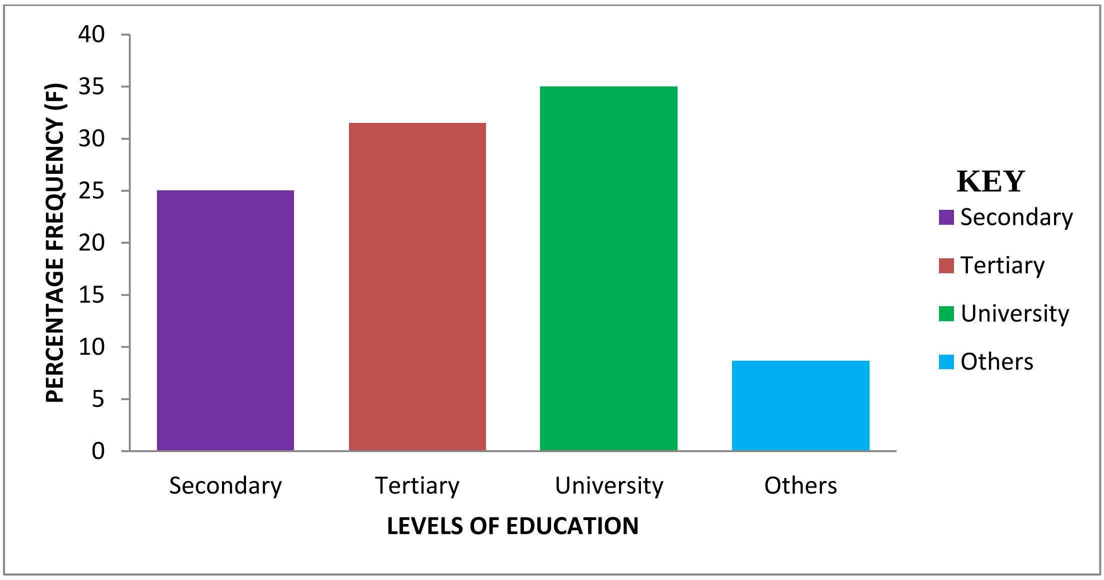
Source: Field data, 2025

Results presented in the table 4 above show that 60% of the respondents were males and 40% were Females. This indicates that female respondents were more than males.

4.1.3 Respondent level of Education

The level of education was considered because those who had attained higher levels of education had sufficient knowledge on different variables of the topic under study.

Figure 4.2 showing the levels of education attained by respondents



Source; Field Data 2025

Results from figure 4.2 above show that 25% of the respondents had reached secondary level while tertiary (Diplomas) were 31.5% University graduates with Bachelor's Degrees constituted 35% of the sampled population, 8.7% had other Qualifications (Post graduates). The levels of Education though they do not give a bright picture as far as the topic under study are concerned.

4.1.4 Marital Status

Respondents were asked to mention their marital status and results of their responses were tabulated in the table below.

Responses	**Frequency**	**Percentage (%)**
Married	48	60
Widowed	5	6.25
Single	25	31.25
Divorced	2	2.5
TOTAL	**80**	**100**

Source: Field Data 2025

Information presented in table 4.1 above indicates that married respondents constituted the largest majority of the sampled population as represented by 60% of the sample while

31.25% were single. Widowed respondents constituted 6.25% and Divorced were 2.5% of the sample.

Marital status as a variable in this study was an important determinant of work ethics and professionalism because of its teaching on moral standards and sanctify. The study found out that married men and women had sufficient knowledge about the topic under study.

4.2. How human activities contributes to landslides

Table 4.2.1: Descriptive Statistics

	N	1 (SD)	2 (D)	3 (U)	4 (A)	5 (SA)	Mean	Std. D	Comments
Excavation of cuts increase the slope angle if carried out without specialist advise	80	5 (3.6%)	5 (3.6%)	10 (15.8%)	40 (50%)	20 (27%)	3.82	1.022	***High***
Farming activities on slopes involve removal of vegetation cover contributing to landslides	80	0 (0%)	2 (3.5%)	3 (7%)	60 (63.4%)	15 (26.1%)	3.96	0.815	***High***
Human activities change the topography leading to landslides	80	5 (5%)	5 (5%)	0 (0%)	50 (67.0%)	20 (23%)	4.14	0.600	***Very High***
Artificial interventions are one of the causes of landslides	80	10 (12.5%)	5 (4%)	5 (4%)	48 (51.1%)	32 (28.4%)	4.01	0.905	***High***
Valid N (list wise)	80								
Overall Mean & Standard Deviation							**4.00**	**0.824**	***High***

0.00-1.0 Very Low, 1.10-2.00 Low, 2.10-3.00 Moderate, 3.10-4.00 High, 4.10-5.00 Very High

Respondents were asked to whether Excavation of cuts increases the slope angle if carried out without specialist advice and 27% of the respondents strongly agreed with this item, 50% of the respondents agreed, 15.8% of the respondents were undecided, 3.6% of the respondents disagreed and lastly 3.6% of the respondents strongly disagreed. A high mean of 3.82 indicated that excavation of cuts increases the slope angle if carried out without specialist advice Even Respondents CL1 and CL2 were in agreement with this statement. This research finding was in line that of Malemo (2022) who conducted a research study in South Africa and asserted that excavation is one of the leading causes of landslides.

Respondents were also asked to reveal if farming activities on slopes involve removal of vegetation cover contributing to landslides and 26.1% of the respondents strongly agreed, 63.4% of the respondents agreed, 7% of the respondents were undecided, 3.5% of the respondents disagreed, and lastly none of the respondents strongly disagreed. A high mean of 3.96 indicated that farming activities on slopes involve removal of vegetation cover contributing to landslides This was supported by respondent's ZZZ1and ZZZ2 who all accepted that different farming activities are a big danger that cause landslides. This study finding was similar to that of Akol (2022) who conducted a research study in Elgon region and noted most of the farming activities are poor not ment for mountainous places

Responses on if Human activities change the topography leading to landslides showed that 23% of the respondents strongly agreed, 67% of the respondents agreed, none of the respondents were un decided, 5% of the respondents disagreed and strongly disagreed. A very high mean of 4.01 indicated that Human activities change the topography leading to landslides even respondents KK2 also asserted that human activities change to topography leading to landslides.

Responses on if artificial interventions are one of the causes of landslides showed that 28.4% of the respondents strongly agreed, 51.1% of the respondents agreed, 4% of the respondents were undecided and disagreed, and lastly 12.5% of the respondents strongly disagreed. A high mean of 4.01 indicated that Artificial interventions are one of the causes of landslides.

A high overall mean of 4.00 indicated that human activities contributes to landslides in a number of ways

4.3. The prevalence of rainfall induced landslides

Table 4.3.1: Descriptive Statistics

	1 (SD	2 (D)	3 (U)	4 (A)	5 (SA)	Mean	Std.D	Comments
Rainfall reduces the cohesion of rock and soil and increases the weight of rock & soil increasing chances of landslides	1 (2%)	0 (0%)	4 (6%)	25 (30%)	50 (62%)	4.46	1.072	***Very High***
Rainfall has a significant impact on mechanical properties of slope soil & underground rock mass	0 (0%)	5 (3%)	10 (7%)	45 (54%)	20 (36%)	4.22	0.668	***Very High***
The migration and convergence of patterns of water flow have influence on triggering landslides	0 (0%)	0 (0%)	5 (10.2%)	55 (67.0%)	20 (22.7%)	4.14	0.600	***Very High***
Landslides pose a great thereat to people's lives and property	2 (1%)	3 (3%)	0 (0%)	25 (38%)	50 (58%)	4.50	0.684	***Very High***
Valid N (list wise)								
Overall Mean & Standard Deviation						**4.34**	**0.732**	***Very High***

0.00-1.00 Very Low, 1.10-2.00 Low, 2.10-3.00 Moderate, 3.10-4.00 High, 4.10-5.00 Very High

Respondents were asked to reveal if rainfall reduces the cohesion of rock and soil and increases the weight of rock & soil increasing chances of landslides and 62% of the respondents strongly agreed with this item, 30% agreed, 6% were undecided, none of the respondents disagreed and lastly 2% of the respondents strongly disagreed. A very high mean of 4.46 indicated that rainfall reduces the cohesion of rock and soil and increases the weight of rock & soil increasing chances of landslides. This study finding was in line with a study conducted by Galloway (2022) who conducted a research study Elgon region and noted that that cohesion of rock and soil increases chances of landslides.

Respondents were also asked to reveal if rainfall has a significant impact on mechanical properties of slope soil & underground rock mass and 36% of the respondents strongly agreed, 54% of the respondents agreed, 7% of the respondents were undecided and lastly none of the respondents strongly disagreed. A very high mean of 4.22 suggested that rainfall has a significant impact on mechanical properties of slope soil & underground rock mass. This study finding was similar to that of WHO (2022) which noted that rainfall has a significant impact on mechanical properties of slope soil & underground rock mass.

Reponses on if the migration and convergence of patterns of water flow have influence on triggering landslides showed that 22.7% of the respondents strongly agreed, 67% of the respondents agreed, none of the respondents were undecided, 3% of the respondents disagreed, and lastly 1% of the respondents strongly disagreed. A high mean of 4.14 indicated that the migration and convergence of patterns of water flow have influence on triggering landslides . This was in line with a study conducted in Uganda by Davidson (2023) who noted that the migration of patterns of water to highly contribute towards landslides

Responses in line with if Landslides pose a great thereat to people’s lives and property, showed that 38% of the respondents agreed, none of the respondents were undecided, 3% of the respondents disagreed and lastly 1% of the respondents strongly disagreed. Respondents QQQQQQI AND XXXX2 assured that Landslides pose a great thereat to people’s lives and property as they always cause death and property destruction.

A very high overall mean of 4.34 indicated that there is a relationship between prevalence of rainfall induced landslides

4.4. Landslide mitigation and prevention measures

Table 4.4.1

Responses	**N**	**SD**	**D**	**U**	**A**	**SA**	**Mean**	**Std. D**	**Comments**
Precautionary means by restricting populations from areas with history of landslides	80	0 (0%)	0 (0%)	7 (3%)	28 (36%)	45 (60%)	4.46	0.694	***Very High***
Installing structures such as piles and retaining walls and diverting debris can work as a direct method.	80	3 (5%)	5 (7%)	0 (0%)	40 (60%)	32 (28%)	4.12	0.731	***Very High***
Restricting developments in some areas prone to landslides may act as measure	80	0 (0%)	0 (0%)	9 (10.2%)	51 (67.0%)	20 (22.7%)	4.01	0.875	***High***
Afforestation and planting of other vegetation that can hold soils together can act as a strategy to prevent landslides.	80	0 (0%)	0 (0%)	8 (6.8%)	22 (35%)	50 (58.2%)	4.47	0.647	***Very High***
Valid N (list wise)	80								
Overall Mean & Standard Deviation							**4.34**	**0.677**	***Very High***

0.00-1.00 Very Low, 1.10-2.00 Low, 2.10-3.00 Moderate, 3.10-4.00 High, 4.10-5.00 Very High

Respondents were asked to reveal if precautionary means by restricting populations from areas with history of landslides, and 60% of the respondents strongly agreed, 36% of the respondents agreed, 3% of the respondents were undecided, none of the respondents neither disagreed nor strongly disagreed. A very high mean of 4.46 indicated that Precautionary means by restricting populations from areas with history of landslides is a measure that can prevent landslides. This finding was in line with a study conducted by Omaswa (2022) from Eastern Uganda and asserted that restricting of populations from such areas can help to reduce on landslides.

Respondents were asked if recruiting teachers with skills is foundation of increasing academic achievements in schools and 28% of the respondents strongly agreed, 60% of the respondents agreed, none of the respondents were undecided, 7% of the respondents disagreed and lastly 5% of the respondents strongly disagreed a very high mean of 4.12 indicated that recruiting teachers with skills is foundation of increasing academic achievements in schools. Respondent's qq2 and DD1 were in agreement with this item.

Respondents were asked to reveal if installing structures such as piles and retaining walls and diverting debris can work as a direct method for mitigation of landslides and 67% of the respondents agreed, 10.2% of the respondents were undecided, none of the respondents disagreed and lastly none of the respondents strongly disagreed a high mean of 4.01 indicated that Installing structures such as piles and retaining walls and diverting debris can work as a direct method that may help in landslide prevention. This was in line with that Ojangole (2021) who noted countries that have developed as of today install retaining walls to prevent soils from running off thus a prevent that can prevent slides .

Respondents were asked to reveal if and 58.2% of the respondents were in agreement with this, 35% of the respondents agreed, 6.8% of the respondents were undecided, none of the respondents strongly disagreed nor disagreed. A very high mean of 4.47 indicated identifying what students are lacking can help improve on their academic performance.

Respondents were asked to reveal if making afforestation and planting of other vegetation can hold soils together can and act as a strategy to prevent landslides and 69% of the respondents strongly agreed, 27% of the respondents agreed, 4% of the respondents were undecided, none of the respondents disagreed nor strongly disagreed a very high mean of 4.56 indicated that afforestation and planting of other vegetation to hold soils together hence can act as a strategy to prevent landslides. This study finding was in line with a study conducted by Madoi (2020) that afforestation with the right species of tress in different parts of the country can help in prevention of landslides.

A very high overall mean of 4.34 indicated that there are a number of interventions that can be employed to mitigate landslides in areas that are prone to them.

CHAPTER FIVE

DISCUSSION OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter presents the discussion of study findings' conclusions and recommendations revealed about the effect of poverty on academic performance of learners in Primary Schools in Bududa Town Council Bududa District

5.1 Discussion of Findings

5.1.1 How human activities contribute to landslides

Findings indicated that failure to draw the poor in to the design of development program is a determinant of poverty. This study finding was similar to that Goffmans (2021) who conducted a study in South Africa and found out that most poor people within this community have been as a result of failure to draw them in the design of development.

Additionally, findings also indicated that natural calamities such as drought and man – made disasters induce transitional poverty this was supported by respondent's llll2 and ddaaq2. This study finding was similar to that of Davis (2020) who conducted a research study in Tanzania and found out that natural calamities disorganize people's poverty and in return make them poor.

Lastly under this objective, findings of the study also indicated that lack of participation in decision making in civil social and cultural life is a determinant of poverty. This finding was in line Oburu (2017) who conducted a research study from Kenya and found out that non participation decision making has led to wrong investments contributing to high levels of poverty.

5.1.2. The prevalence of rainfall induced landslides

Findings indicated that there are many long term challenges such as chronic stress due to poverty that affect academic performance. This study finding was in line with Galloway (2019) who conducted a research study in Kenya and found out poverty results in to stress which in return affects academic performance.

Additionally, findings indicated that poverty leads to situations causing emotional and social struggles affecting academic performance. This study finding was similar to that of

WHO (2021) which noted that poverty brings about situations that are friendly to emotional and social struggles which in return affect academic performance.

Lastly findings indicated that poor emotional health is caused by lack of parental support may cause an increase in disruptive behavior affecting academic performance. This was in line with a study conducted in Uganda by Opio et al, (2017) who found out that that any disruptive behviour in family or communities negatively affects academic performance of learners.

5.1.3 Landslide mitigation and prevention measures

Findings indicated that correct assessment is critical to identification of student's weakness and strengths and can improve academic performance. This finding was in line with a study conducted by Caserta (2020) from Zimbabwe who found out that correct assessment in schools have helped students improve on performance.

Findings indicated that that recruiting teachers with skills is foundation of increasing academic achievements in schools. This finding was in line with a study conducted by Caserta (2020) from Zimbabwe who found out those teachers with skills give students these skills who in return improve academic performance.

Findings indicated that identifying what students are lacking can help improve on their academic performance. This finding was in line with that of James (2020) who conducted a research study and noted that identifying what students lack can help design for them better performance measures.

5.2 Conclusions

5.2.1. How human activities contributes to landslides

Findings concluded that failure to draw the poor in to the design of development program is a determinant of poverty, that natural calamities such as drought and man –made disasters induce transitional poverty and lastly that lack of participation in decision making in civil social and cultural life is a determinant of poverty.

5.2.2. The prevalence of rainfall induced landslides

Findings concluded that there are many long-term challenges such as chronic stress due to poverty that affect academic performance that poor emotional health is caused by lack of parental support may cause an increase in disruptive behavior affecting academic performance and lastly that correct assessment is critical to identification of student's weakness and strengths.

5.2.3. Landslide mitigation and prevention measures

Findings concluded that correct assessment is critical to identification of student's weakness and strengths and can improve academic performance, that that recruiting teachers with skills is foundation of increasing academic achievements in schools and lastly that identifying what students are lacking can help improve on their academic performance.

5.3 Recommendations

Basing on the discussion of the study findings and conclusions of this report, the study recommends the following to different stakeholders.

There should be more investments by different Governments in a number of strategies to ensure improved academic performance.

There is need for the to sensitize the community and people on causes of poverty

5.4 Suggested areas for further research

Basing on the study findings, the researcher recommends further research on the following research topics:

Role of Government in prevention of poverty

Impact of poverty on students' academic performance.

Appendix 1: Consent form for respondents

Dear respondent I am, **Maliba Zadogi** a student of Uganda Christian University, pursuing a Bachelor's in social work and social administration. I am carrying out a research on" Impact of landslides on social economic wellbeing of households in Nametsi Sub County, Bududa District" You have been identified as one of the respondents whose input will be vital to the completion of this research study. You are kindly requested to respond to the following questions.

SECTION A: BIO DATA OF RESPONDENTS

1. Sex
   Male ☐ Female ☐
2. Working experience
   1- 5 Years ☐ 6-10 years ☐ 11-15 years ☐ 16 years above ☐
3. Level of education
   Diploma ☐ Bachelor's Degree ☐ Master's Degree ☐
4. Years of service in this Organization
   1-2 years ☐ 2-5 years ☐ 6-10 years ☐

SECTION B TO C

For each of the sections B to C you are required to tick (√) on a response option ranging from the levels below.

Levels: 1 = strongly disagree (SD), 2 = disagree (D), 3 = Not sure (N S), 4 = agree (A) and 5 = strongly agree (SA)

	How human activities contribute to landslides	**SD**	**D**	**N**	**A**	**SA**
1	Excavation of cuts increase the slope angle if carried out without specialist advise					
2	Farming activities on slopes involve removal of vegetation cover contributing to landslides					
3	Human activities change the topography leading to landslides					
4	Artificial interventions are one of the causes of landslides					
	Prevalence of rainfall induced landslides					
1	Rainfall reduces the cohesion of rock and soil and increases the weight of rock & soil increasing chances of landslides					
2	Rainfall has a significant impact on mechanical properties of slope soil & underground rock mass					
3	The migration and convergence of patterns of water flow have influence on triggering landslides					
4	Landslides pose a great thereat to people's lives and property					
	Land slide mitigation and prevention measures					
1	Precautionary means by restricting populations from areas with history of landslides					
2	Installing structures such as piles and retaining walls and diverting debris can work as a direct method.					
3	Restricting developments in some areas prone to landslides may act as measure					
4	Afforestation and planting of other vegetation that can hold soils together can act as a strategy to prevent landslides.					

Appendix 2. Interview Guide

Dear respondent I am, **Maliba Zadogi** a student of Uganda Christian University, pursuing a Bachelor's in social work and social administration. I am carrying out a research on" Impact of landslides on social economic wellbeing of households in Nametsi Sub County, Bududa District" You have been identified as one of the respondents whose input will be vital to the completion of this research study. You are kindly requested to respond to the following questions. 'The information you provide will only be used for the purpose of this study and will be treated with utmost confidentiality. Your participation in this study is highly valued and welcome

i . How human activities contributes to landslides

1. Human activities contribute to landslides
2. If yes how do human activities contribute to landslides?

ii . The prevalence of rainfall induced landslides

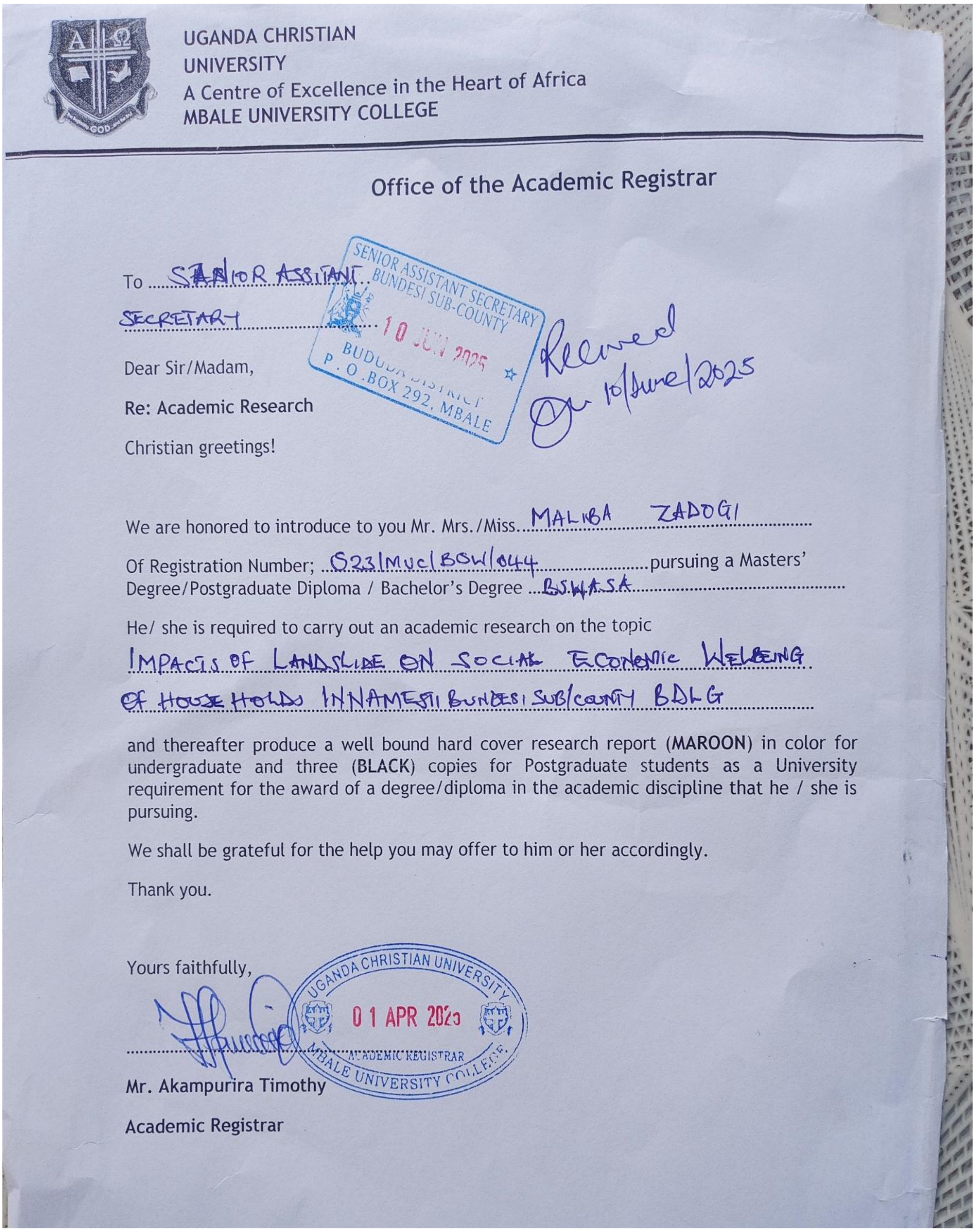
1. The prevalence of rainfall induces landslides?
2. If yes how the prevalence of rainfall induce landslides?

iii . Landslide mitigation and prevention measures

1. There are a number of migration and prevention measures for landslides
2. If yes, what are the different mitigation and prevention measures for landslides?

Thank you for your Participation

Appendix 3. Data collection letter



UGANDA CHRISTIAN UNIVERSITY
A Centre of Excellence in the Heart of Africa
MBALE UNIVERSITY COLLEGE

Office of the Academic Registrar

To ....SENIOR ASSISTANT SECRETARY....

SENIOR ASSISTANT SECRETARY BUNDESI SUB-COUNTY 10 JUN 2025 BUDUDA DISTRICT P. O. BOX 292, MBALE

Received On 10/June/2025

Dear Sir/Madam,

Re: Academic Research

Christian greetings!

We are honored to introduce to you Mr. Mrs./Miss....MALIBA ZADOGI....

Of Registration Number; ....S23/MUC/BSW/044....pursuing a Masters' Degree/Postgraduate Diploma / Bachelor's Degree ....BSWASA....

He/ she is required to carry out an academic research on the topic
IMPACTS OF LANDSLIDE ON SOCIAL ECONOMIC WELBEING
OF HOUSE HOLDS IN NAMESTI BUNDESI SUB/COUNTY BDLG

and thereafter produce a well bound hard cover research report (**MAROON**) in color for undergraduate and three (**BLACK**) copies for Postgraduate students as a University requirement for the award of a degree/diploma in the academic discipline that he / she is pursuing.

We shall be grateful for the help you may offer to him or her accordingly.

Thank you.

Yours faithfully,

UGANDA CHRISTIAN UNIVERSITY 01 APR 2025 ACADEMIC REGISTRAR MBALE UNIVERSITY COLLEGE

Mr. Akampurira Timothy

Academic Registrar