MODELING PREDICTORS OF POVERTY IN AGRICULTURAL HOUSEHOLDS IN UGANDA: APPLICATION OF MULTILEVEL AND INTERACTION METHODS.

BY

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A DISSERTATION SUBMITTED TO DIRECTORATE OF RESEARCH AND GRADUATE TRAINING IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF ARTS IN ECONOMICS OF KYAMBOGO UNIVERSITY

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DECLARATION

I Habimana Robert, hereby declare that the work I have presented is solely the result of my efforts (except where quoted) and that it has never been submitted before by any one for the award of the degree at any university or institution of higher learning.

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APPROVAL

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DEDICATION

This work is dedicated to my lovely family especially my wife Ms. Daphine Mutesi and my children Mukiza Alvin, Mukiza Asharvin and Mukiza Austin for the efforts and words of encouragement towards my education. May the Lord God reward them with good health and life.

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LIST OF ABBREVIATIONS

EPRC	Economic Policy Research Centre
IMF	International Monetary Fund
MPI	Multidimensional Poverty Index
SDGs	Sustainable Development Goals
UBOS	Uganda Bureau of Statistics
UIA	Uganda Investment Authority
UN	United Nations
UNHS	Uganda National Household Surveys

ABSTRACT

This study aimed to model predictors of poverty in agricultural households in Uganda using a multilevel and interaction regression model. The research utilized data from the Uganda National Household survey (UNHS 2019/20) data from Uganda Bureau of Statistics. A logit model was used in the estimation and estimates were provided using Multilevel methods approach.

Key findings suggest that poverty in agricultural households was positively and significantly influenced by gender of the household head, marital status of the household head, income stability of the household, age of the household head and livestock ownership.

Additionally, regional differences accounted for 17.9 % of the variations in poverty levels in Uganda and understanding such regional differences and their influence on poverty levels can assist policymakers and organizations in designing targeted interventions and policies. Such measures can address the specific challenges faced by different regions and promote more equitable development across Uganda. However, poverty in agricultural households was negatively and significantly influenced by residence status, saving accounts ownership and household size.

Based on the study's findings, the key policy recommendations were; government should continue implementing gender-focused interventions to address gender disparities especially women empowerment programs such as access to resources including land, equal access to employment opportunities and equal access to education to reduce poverty among women. Regarding income instabilities in agricultural households due to price fluctuations, government should empower famers to form farmer groups where they can collectively increase their bargaining power to avoid price fluctuations.

CHAPTER ONE

INTRODUCTION

1.1 Study Background

Poverty is a global issue that requires significant attention from both local and international development partners, particularly in developing nations. There is a strong commitment to eradicating poverty by 2030, as outlined in one of the 17 Sustainable Development Goals (SDGs) (United Nations, 2019),moreover poverty is number one on the global agenda and all the nations including Uganda aim at ending extreme poverty in its all forms. Poverty encompasses various dimensions, including social, economic, and political aspects, but it is commonly understood in its socioeconomic context. It refers to the inability of households to access basic necessities such as food, clothing, and shelter, thus hindering their ability to lead a decent life within society(Ngestrini, 2019). Evaluating poverty involves measuring whether individuals or households possess the means to meet these essential needs. In summary, poverty is characterized by the lack of resources and capabilities required for a decent standard of living.(Ngestrini, 2019).

According to World Bank Poverty and Shared Prosperity 2022 report, the report highlighted that extreme poverty had been cut by at least half in 2015 globally, and, poverty increased with low rate of economic growth since then. The global agenda of eliminating extreme poverty by 2030 may not be smooth as it was expected. Given most recent trends, by 2030 there is a possibility that approximately 574 million citizens which is about seven percent of the global population will continue surviving below 2.15 dollars a day, and a big percentage will be in Africa. In 2020 alone, the number of people who are extremely poor raised beyond 70 million, it was the largest one-year increase since global poverty monitoring began in 1990. Analyzing poverty in broader terms, almost half the world population which is over 3 billion persons live on less than 6.85 dollars daily.

About 9 percent of the world population are extremely poor and surviving on less than 1.9 dollars, this is about 698 millions of citizens of the total world population who are in the state of in extreme poverty. The proportion of people who are extremely poor increased approximately by 50 million because of the outbreak of the pandemic that came along with world economic crisis in a space of 2019 to 2020(Elena Suckling, Zach Christensen, 2021a). The proportion of people who are extremely poor reduced in 2021 when the world economy began to bounce back, but currently still there are more who are in the state of poverty than

those who lived in poverty in 2019, approximately 8M more citizens (Elena Suckling, Zach Christensen, 2021b).

According to 2018 global MPI estimates from 105 countries, 1.3bn citizens are multidimensional poor which is a representation of 23% , this is almost quarter of the number of people of the one hundred five states for which the 2018 MPI was estimated , multidimensional poor keep increasing in low income countries around the globe , but Sub Saharan Africa and southern Asia has more people of multidimensional poor than any other region around the globe (83%) of the total population of the dimensional poor in the world (1.1bn) (Alkire, 2015). Rural areas has more people who are multidimensional poor compared to urban areas, and rural areas accounts for 1.1bn people who are multidimensional poor while urban areas account for only 0.2bn people and the differences between rural and urban multidimensional poor exists in Sub- Saharan African countries (Alkire, 2015).

According to EPRC report (2016), there was rising differences in poverty due to regional differences since 1990, the report further indicated that national poverty reduced since 1990's but the reduction rate was different across regions, there was a rise in poverty in Eastern Uganda from 24.3% in 2000 to 35.7% in 2017 though there was a reduction in poverty in Northern and western Uganda in 1990, eastern Uganda overtook became poorer compared to Northern Uganda than it had been before when Northern+3 Uganda used to be the poorest. Furthermore, the rate of poverty shoot to 12.7% 2017 from 10.7% in 2000. The report further found out that though there was reduction in the proportion of people who are extremely poor on average since 1990, there existed differences in reduction due to regional differences. There was a reduction in poverty rates in Northern Uganda in to 32.5% in 2017 from 43.7% in 2013, but poverty rates remained high in other regions between the same periods.

Ugandan government has tried in its fight to end poverty for the past 30 years, there was a big decline in proportion of people who are affected by monetary poverty to 21% from 56% from 1992 to 2017. Although this has been a progress, this was measured in monetary/ financial terms and deprivation may exist even with increase in income therefore the extent of the deprivation was not captured.

In the last 30 years, the Ugandan government has achieved significant strides in its efforts to eliminate poverty. Specifically, between 1992 and 2017, there was a substantial decline in the percentage of the population living in monetary poverty, dropping from 56% to 21%. However,

although the current approach to measuring monetary poverty accurately reflects households' financial capabilities, it fails to fully capture the scope and severity of deprivations faced by both children and adults in Uganda(Beyond & Poverty, n.d.). According to (Development Initiatives, 2020), the national poverty line suggests that there is a decline in general poverty trend although levels were found to be higher. The report also indicated a rise by 1.7 % in proportion of citizens who are poor from 2012 to 2016 and the rate is even higher where the portion of the population who were extremely poor was at approximately 41.7% by 2016 when 1.90 US dollars is considered as an international poverty line measure. The report further suggested that poverty had reduced over the period but the number of Ugandans who were at risk of being poor again had risen.

Almost big percentage of work force is in agriculture (about 70%) and the big percentage of this workforce (90%) is poor, therefore focusing on agriculture sector is important to increase income of the households as well as facilitating transformation and rapid economic growth (International Monetary Fund, 2012). With this reason, it is therefore critical for policy makers to understand the major drivers of poverty in agriculture households in Uganda and tackle it accordingly.

1.2 Problem Statement

According to EPRC report (2016), poverty in Uganda showed regional disparities since 1990. While national poverty levels decreased overall, the reduction rate varied across regions. Eastern Uganda experienced an increase in poverty from 24.3% in 2000 to 35.7% in 2017, while Northern and Western Uganda saw a decrease in poverty since 1990. This resulted in Eastern Uganda becoming poorer compared to Northern Uganda, which used to be the poorest region. Additionally, the poverty rate rose from 10.7% in 2000 to 12.7% in 2017.

The agricultural sector in Uganda employs about 70% of the workforce and nearly 90% of the working poor. Therefore, focusing on the agricultural sector is crucial for increasing household income and facilitating economic growth(“Closing Potential-Performance Divid. Ugandan Agric.,” 2018).

However, previous studies on poverty in Uganda have used conventional regression models that assume similar effects of poverty predictors across regions. This overlooks the regional variations in poverty caused by different predictors. Multilevel modeling, on the other hand, considers these variations and allows for the separation of regional-level effects from individual effects. Unfortunately, multilevel analysis has been rarely used in poverty analysis

in Uganda. Therefore, this study aimed at exploring the hierarchical data structure and analyze the data at different levels of analysis (individual and regional units) and examined the differences in agricultural poverty caused by regional characteristics. The study also identified high-risk subgroups based on the interaction analysis of associated factors in Uganda.

1.3 Objectives of the study

This study intended to model the predictors of poverty in agricultural households in Uganda using multilevel and interaction methods approach.

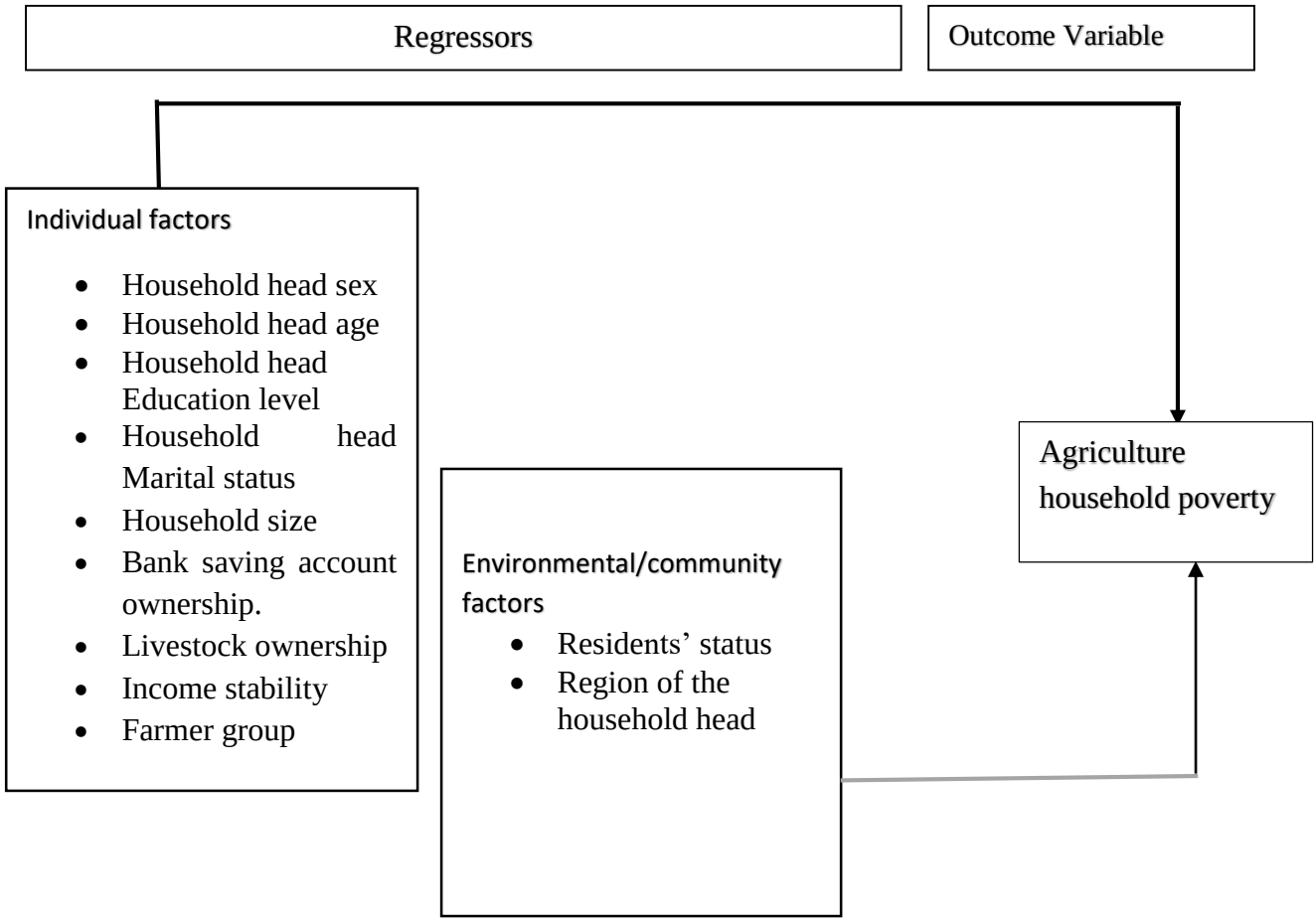
1.4 Specific objectives

i. Examine the effect of individual predictors of poverty in agricultural households in Uganda.
ii. Examine the contribution of community predictors of poverty in agricultural households in Uganda.

1.5 Hypotheses

i. The age of household head has no significant effect on poverty in agricultural households in Uganda.
ii. The household's head education level has no significant effect on poverty in agricultural households in Uganda.
iii. The household size has no significant effect on poverty in agricultural households in Uganda.
iv. The effect of education on poverty in agricultural households is not modified by region in Uganda.
v. The effect of education on poverty in agricultural households is not modified by resident status in Uganda.

1.6 Conceptual framework



1.7 Significance of the study

The knowledge from this study will enable policymakers and organizations to develop targeted interventions and policies that address the specific challenges faced by different regions. It will allow for the customization of strategies based on regional economic development, infrastructure, resource availability, social programs, and cultural factors.

The study will provide policymakers with evidence-based insights into the complex nature of poverty. By examining various socioeconomic and demographic factors, including gender disparities, income stability, residence status, education, and regional influences, the study will offer a comprehensive understanding of the factors that contribute to poverty levels. This information can be utilized to develop effective policies and interventions aimed at reducing poverty and promoting inclusive development in agricultural households in Uganda.

The study aims to expand on the current literature, potentially filling gaps in our understanding of poverty in Ugandan households. Therefore, the findings of the study could will offer new

insights and perspectives, enhancing more understanding of poverty and informing future interventions and policies to alleviate poverty in Uganda.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Predictors of household poverty have been looked at by number of scholars and researchers across the globe. However, the focus of this work was on some individual/household and environmental variables that may vary amongst individual households. For instance, Household head's level of education, Household head's age, family size, plot/land size and sex and many other variables Including marital status that were considered at this level, environmental/demographic factors like region of the household head and resident status were considered on this level at the later stage.

2.1 Theoretical Review

Classical and neoclassical theories of poverty.

According to (Davis & Sanchez-Martinez, 2014), In classical cultures, individuals are primarily held responsible for their own fate, and being in poverty is seen because of their own actions or choices. The idea of subcultures of poverty suggests that disadvantages can persist over time due to factors such as the absence of positive role models. According to this perspective, government assistance should be limited to promoting individual capacities and attitudes, following a laissez-faire approach. Additionally, proponents argue that neoclassical theories offer a more comprehensive understanding of poverty, recognizing that some causes are beyond the control of individuals or the poor. These include the lack of social and personal assets, market failures that prevent the poor from accessing loans and lead to seemingly rational yet detrimental decisions, barriers to education, immigrant status, poor health, old age, and obstacles to employment for single-parent families.

Keynesian/Liberal Theory

According to (Davis & Sanchez-Martinez, 2014) the core tenet of liberal philosophy is that poverty results not only from market distortions but also from widespread underdevelopment in all its manifestations. Meanwhile Keynesians argue that growth can spur economic development and alleviate poverty thus supporting the case for macroeconomic government involvement (by fiscal and monetary policies), particularly to address involuntary unemployment to reduce poverty levels in particular, provision of capital and public goods and reducing inflation can curb rising poverty levels.

Marxists Theory

Marxists assert that poverty is because of capitalism and other related political conditions based on class distinction. This theory contends that because of the threat of unemployment, capitalist's societies artificially keep the cost of labor below the value added and that poverty in the capitalist economy can only be reduced through strict market regulations eg through minimum wage setting. Several experts in the field of political economy contend that stratified labor markets, prejudice and corruption are among the structural elements that contribute to poverty.

2.2 Empirical Review

According to the study on theories of Poverty in Ghana by (Addae-korankye, 2019) , individual incapacities account for poverty status of individuals; distortions in cultural beliefs; economic, social and political setups, differences in geographical setups and cumulative and cyclical interdependencies. Furthermore, this study provided details on the specific variables that contribute to poverty which includes discrimination in jobs, limited schooling, inequalities, and discrimination in accessing employment, housing benefits, banks, skills, and joining politics, lack of investment in infrastructure especially water and waste disposal. All such variables proposed by Addae-korankye are grouped according to the theory of Individual incapacities, the theory of Cultural setups, distortions in Economic, Political, and social theory, Geographical differences theory and Cumulative and Cyclical Interdependencies theories ((Addae-korankye, 2019)

Also, according to the study on review of the economic theories of poverty by (Davis & Sanchez-martinez, 2014), in their study they highlighted the major determinants of poverty based on the review of the already existing economic theories of poverty that included the classical theory, theory of neo-classicals, theory of Keynesians, Marxists (radical theories) and social exclusion, social capital and eclectic theories of poverty. The study further described poverty to be associated by several factors including behavioral or decision factors, lack of access to assets, incentives and credit markets, limited human capital development, discrimination and demographics differences. In addition, the study also looks at macroeconomic and social factors as the drivers of poverty including unemployment, low savings, low investment, low aggregate demand and consumption, high levels of inflation, social exclusion and lack of social capital.

According to the study in Poverty theories using Comparative Analysis by (Sameti Majid;Rahim Dallali Esfahani;Hassan Karnameh Haghighi, 2012), the study highlighted major factors of poverty and grouped such theories into three categories; that is factors related to individuals, factors related to structures and factors related to neighborhood. They further suggest that poverty is related to individual's ability especially when they are provided with opportunities to help them achieve success, poverty is also on the other hand related to neighborhood factors in a sense that some people are motivated by what is happening in the environment they live. Farther more, poverty differs by differences in behaviors, beliefs and values of the society.

Literature reviewed on poverty and urban development indicators by (Hasan, 2002) indicated that poverty is attributed to lack of Provision of Basic Services especially water and sanitation, garbage removal systems, transport systems, lack of health care and hazardous living conditions, lack of education and vocational training and inadequate Law Enforcement on Bribes and Harassment. Hassan further urges that lack of good and decent jobs in the Labour markets, and this attributed to education and skills all results into poverty.

Poverty is also promoted by conditions that come along with capitalism and social and economically large structures also lead to poverty (Sameti Majid;Rahim Dallali Esfahani;Hassan Karnameh Haghighi, 2012). For example, in terms of employment and Labour market, if people cannot find employment, they are prone to poverty, on the other hand those who are excluded from employment are at risk of being poor because it makes it hard to have a decent standard of living. Furthermore such opportunities when denied especially jobs it limits citizens from having decent living (Sameti Majid;Rahim Dallali Esfahani;Hassan Karnameh Haghighi, 2012).

2.2.1 Individual/ Household factors

Gender and poverty

According to the study carried out on the determinants of poverty at household level in Kenya by (Studies, 2001), male headed households have higher likelihood of being poor compared to female headed households.

Gender is also a significant predictor of poverty where male headed households have less chances of being poor and the reason behind these findings is due to differences in access to land, credit, technology, and extension services which are not easily accessed by female(Campenhout et al., 2016).

Marital status and poverty

According to the study by Katharina et al (2001), marital status is a significant factor of poverty and the study highlights that that Consumer Units where both adults are married are approximately 8% less likely to be poor than households headed by an individual who are singles and have never been married. The study carried out on Poverty and its Dynamics in Uganda Using a New Set of Poverty Lines indicated by Campenhout et al (2016) indicated that maritral status has a significant effect on poverty among households , the study further urgues that househods whose head has never married were less poorer compared to households headed by widows , the study also urgues that divorced headed househods are also more likely to be successful compared to the households headed by widows.

Education and poverty

According to the study carried out on Poverty and its Dynamics in Uganda Using a New Set of Poverty Lines indicated by Campenhout et al (2016), it is highlited that, education there are differences in poverty levels of the households due to differences in education , it further suggest that households whose head completed primary and above are more likely to be non poor compared to those househollds headed by individuals whose education level donot exceed primary level.

The most important and significant factor of poverty was education according to study carried out at household level analysis in Kenya by Alemayehu et al (2001). Also, in terms of education status and in USA, household heads with at least a bachelor's degree are at least 12% less likely to be poor than households heads who have not completed high school(Studies, 2001).

According to the research on regional determinants of poverty in Uganda by Okurut et al (2002), in his study, education was a significant predictor of poverty and the odds of being poor for those with no education, completed primary and secondary higher compared to those with tertiary education.

Also, according to the study on Regional Characteristics and Causes of Rural Poverty in Northeast

The relationship between poverty and education according to the literature takes a center stage and has been studies comprehensively by different scholars, a significant impact of education on poverty levels existed in households and in our study, we will look at whether the impact of

education level exists and is the same a cross regions. According to the study to seek to expose the reasoning behind why people are poor across the world by Janjua and Kamal (2011), they found out that it's not only the direct sense to focusing on the effects of education on poverty but also in a more indirect manner, they highlighted that poverty can be reduced by greater incomes which are as a result of greater yields which comes from better farming methods that exists as a results of skills from education.

Education investment is fundamental to economic growth and its process, education can help in reducing poverty and upgrading individual's welfare by getting them out of poverty including the community in terms of both the social and economic status (Pervez, 2014).

For stance according to Raja (2005), countries cannot develop properly with no education and to him, education is the first step in the process of developmental path, he further suggested that it is a process of two steps where education leads to the growth of the economy and minimizes poverty and rises productivity. Education plays a very fundamental in capital accumulation and leads to the growth of the economy via knowledge and skills, in addition, Investors are more interested in the nation, where there exists sufficient human capital stock (Raja, 2005). Income inequalities also significantly reduces because of education (Dănăcică et al., 2010). Education is important and has got a potential as it lowers crimes, terrorism, and child Labour due to the role it plays, it makes people able to afford basic needs of life and therefore cannot engage in crimes and (Chevrier, 2017)

Education is related to poverty in inverse manner, and people with higher education levels have got low risk of people being poor due to direct increase in wages earned as a result of more knowledge and skills through schooling, the other indirect way education reduces poverty is through improving income which enables population afford basic needs in easier way that improves their standards of living (Pervez, 2014).

In indirect way education is important in that it makes household afford basic needs that range from medical equipment's clean water, food items, good housing and education has a great purpose in changing women's behaviors about family planning needs and other issues regarding fertility and childbearing. Education also helps the population in getting the basic needs of life like food, shelter, water and sanitation, health facilities utilization, it further facilitates family planning and impacts the behavior in making decisions regarding fertility among women (Awan et al., 2011)

Family size/Household size and poverty

According to the study by Katharina et al (2001), Family size has a significant effect on poverty levels and the study highlights that households with more children are at risk of being poor compared to households with less children especially among African American families and Hispanic families, however with time, there has been a reduction on the effects of race and ethnicity on poverty levels. Also, the study on regional determinants of poverty in Uganda by Okurut et al (2002) highlighted family size to be a significant predictor of poverty levels, the study showed that large households have higher risks of being poor.

Table 4.3 shows that household heads engaged in agriculture, who have obtained post-secondary education and reside in northern Uganda, face a 6% higher likelihood of experiencing poverty. Several reasons account for such risk of them falling into poverty; Firstly, the agricultural sector in northern Uganda may have limited opportunities for higher-income or value-added activities. Despite their education, these household heads may still rely on traditional farming methods or have limited access to modern agricultural techniques, technologies, and markets. This can result in lower productivity and income levels, contributing to the increased probability of poverty.

Additionally, the northern region may face specific challenges related to agricultural development, such as inadequate infrastructure, poor access to credit, limited extension services, or vulnerability to climate change and natural disasters. These factors can impede the ability of educated household heads to leverage their knowledge and skills effectively, hindering their economic advancement and increasing the risk of poverty. Moreover, there are disparities in the distribution of resources and development initiatives between northern Uganda and other regions. The lack of investment in education, agricultural infrastructure, and rural development programs can limit the opportunities available to post-secondary educated household heads in the agricultural sector, leading to a higher probability of poverty. Considering these underlying factors, it becomes evident why post-secondary educated agricultural household heads in northern Uganda face an increased risk of poverty despite their educational attainment.

According to Fusco & Islam (2017), poverty of a household may be affected differently due varying age groups from the number of children, that is to say that age of children in family has a significant effect on poverty status, they further argue that apparent might stop work as a result of taking care of young children and this affects the professional life in case government

support is not enough to take care of the children. Furthermore, having children positively affects poverty levels in case there are no social transfers to facilitate the additional costs as a result of having extra children (Fusco & Islam, 2017)

Lanjouw and Ravallion (1995) found out that household size has an effect on poverty especially where family size is large, people are at the risk of falling into poverty relative to small sized families, they clearly highlight the link between having children and poverty which indicates that extra children is associated with levels of poverty. the study by (Garza-Rodriguez et al., 2021) also shows that family size is a significant predictor of poverty, he further highlights that poverty is higher in families of above five members compared to the families with one member.

According to Orbeta (2005), the extent to which family size is related to poverty can be demonstrated through family size and incidence of poverty, the study also highlighted that the incidence of poverty increases with the increase in family size. He further found out that in the year 1985, poverty incidence for a household of size of four is 36.4 and the poverty incidence for the household of 9 is 59.9. He made analysis 25 years later and still found out that, poverty incidence for a household of size of four was 23.8 and the poverty incidence for the household of 9 was 57.3, and the correlation between poverty and family size had not changed (Orbeta, 2005).

Also, with demographic factors at play, larger families, which had a higher dependency ratio as a result of big number of aging member and a big number of children who are not productive had high likelihood of being poor in terms of income compared to small families with less aging members and children(*Northeast China*, 2022).

Age of the household head

Literature shows that Age has a significant relationship with poverty and studies like (Junfeng & Bin-, 2017) indicated that age has a significant impact on rural poverty, they further highlighted that elderly and middle aged people had low probability to be poor compared to their counterparts for those that are non-educated.

According to the study on Determinants of Poverty in Mexico using Quantile Regression Analysis by (Garza-Rodriguez et al., 2021), Age was found to be significant factor of poverty and poverty is higher at young age since at this stage, there is no productive activities being done, poverty reduces in the middle age and again increases at an old age. The study further

highlights that experience is very minimal and poverty reduces with the increase in the experience of working.

2.2.1 Community/environmental factors

Region and poverty

According to Alemayehu et al (2001), there is a significant difference in poverty due to regional differences in United States and households that are in the Midwest have high risks of falling into poverty. There is a significant difference in poverty due to regional differences and people from Central region, Eastern region and western region has less chances of being poor as compared to those from northern region(Okurut, 2002), the study further highlights that those from Central region were about 3.5 better off than those of northern region, those of eastern being 3.5 times better off than those of Northern region, those of western being 3.1 times better off than those of northern region

Literature on poverty and region shows a significant relationship between poverty and region, for instance a study by Campenhout et al (2016) on Poverty and its Dynamics in Uganda, the study highlights a clear relationship between region and poverty levels and futher states that Nothern region has a big number who are chronially poor compared to other regions like western and central regions. Also According to the study on Determinants of Poverty in Mexico using Quantile Regression Analysis by (Garza-Rodriguez et al., 2021), the region where people live have a significant impact on poverty levels.

Place of residents/location, distance to the market and poverty

According to Alemayehu et al (2001), the study carried out in Kenya found out that the likelihood of being poor is lower in urban places of Kenya than in rural places areas of Kenya. The study on Determinants of poverty in rural households by Eyasu (2020) in North-Western Ethiopia indicated that how long one takes to get to the market has a positive relationship with household with the average household spending for each person and how long one takes to get to the market can change poverty levels of rural households which is expected to improve rural households' living standards.

Poverty is higher in rural areas of Uganda than it is in urban areas where poverty levels are low and also location has an effect on access to social services especially safe water , where poor people were found to be spending more time fetching water compared to the non-poor who spent less time fetching water (Campenhout et al., 2016).

The study on Analysis of Spatial Determinants of Poverty in Rural Uganda by Muhumuza (2007) showed a significant negative correlation between population density and poverty. The study further highlights those whose distance to the nearest towns had low probability of being poor as compared to those whose distance to the nearest town was higher which implied that those in locations far from town were at higher risk of being poor.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter explained the sources of data, variables used, data processing, methods and levels of analysis that were used.

3.2 Data Source

Uganda National Household Survey Dataset (UNHS 2020) Dataset was used in this study. Dataset was requested for from Uganda Bureau of Statistics. The analysis was based on those households whose major economic activity was agriculture. An extract of the data for only those households who were involved in agriculture was used for the purpose of this study.

3.3 Study Population and Sample

This study based on the households whose household representatives were available in the households at the time UNHS 2020 data was collected and only those households whose major activity is agriculture were included in this study.

3.4 Diagnostic tests

3.4.1 Skewness/Kurtosis tests for Normality

The kurtosis and skewness test for normality for residuals was established to choose the best model between logit and probit model (see table 5.1).

3.4.2 Heteroscedasticity test

To provide estimates that are free from heteroscedasticity, robust commend was added to regression command in Stata; vce (robust). The analysis provided estimates with robust standard errors which were free from heteroscedasticity (see table 4.3 and table 4.4).

3.5 Model Specification

In this study, multilevel and interaction model approaches was used at Multivariate analysis, our response category was a binary outcome. This was dummy variable where 1 represented those that fall into category of Poor and 0 for Non-poor. Therefore, as we discussed in the section of reclassification of variables poverty status had two categories ie Poor and Non-poor. In understanding the predictors of poverty, a logistic model was applied since the outcome variable (poverty status) was binary.

In Logistic Regression Model P is the probability of success / probability of one being poor.

1 – P is the probability of not being poor.

The odd of poverty is given by,

Odds = $\frac{P}{1-P}$

……EQN 1

Let us take $P = \frac{e^M}{1+e^M}$……EQN 2

And M = linear predictor that includes all independent variables

Then $P(1 + e^M) = e^M$

$P + Pe^M = e^M$

$P = e^M - Pe^M$

$P = (1 - P)e^M$

$\frac{P}{1-P} = e^M$

In $\left(\frac{P_{ij}}{1-P_{ij}}\right) = M$……EQN 3

$$M = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + ---+ \beta_k X_{2k}$$

For a level 1 model then;

In $\left(\frac{P_{ij}}{1-P_{ij}}\right) = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + ---+ \beta_k X_{ki}$…….....EQN 4

$$\beta_0 = Constant$$

$$\beta_1, \beta_2 \text{ up to } \beta_k \text{ are the coefficients of the fixed effects model}$$

With interaction terms, the level 1 effect model becomes

In $\left(\frac{P_{ij}}{1-P_{ij}}\right) = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{ij} X_{2i} + ---+ \beta_k X_{ki} + \beta_j X_{ki} X_{kj}$…….EQN 5

$$X_{1i}X_{2i} --- X_{ki}X_{kj} \text{ are the interaction terms of the model.}$$

For a Random (level 2) effect model then.

The random effects model provides estimates and takes into account regional differences. This is also called level 2 estimates.

$$\text{In}\left(\frac{P_{ij}}{1-P_{ij}}\right) = X_{ij}\,\beta + Vj \quad \text{.....EQN 6}$$

With interaction then

$$\text{In}\left(\frac{P_{ij}}{1-P_{ij}}\right) = X_{ij}X_{ik}\,\beta + Vj \quad \text{.....EQN 7}$$

Where $X_{ij} = Matrix\ of\ Covariates$

$X_{ij}X_{ik}$ = interaction terms

$\beta =$ matrix of the Unknown regression coefficients

Vj is Random effect due to regional differences. This measures the difference in poverty due to differences in regions and it gives the total variations of poverty as a result of regional $differences$

It assumed there are many households from the same regions so it is important to understand the variations in poverty levels that can be accounted by regional differences. Additionally, according to study on testing for Interaction in Multiple Regression by (Allison, 1977). Suggested that in response to recent challenges, the practice of including product terms in multiple regression models to investigate the outcome variable is important. The study further suggested that while some statistical measures may be affected, suggesting limitations in testing certain hypotheses unless variables are measured on ratio scales, the inclusion of product terms remains a legitimate approach for probing interaction effects in sociological theories, where variables are often believed to interact in influencing dependent variable. Moreover, other literature suggests the same on interacting variables through non additive methods to assess their joint impact on the outcome variable of interest(Rogers, 2002) (Balli & Sørensen, 2013).

3.6 Study Variables

The outcome variable of this study was Poverty Status; this is a binary option variable that took on 1 to be a poor household and 0 to be non-poor household. The independent variables included household head sex, household head age, household head level of education, marital

status, household size, status of income, ownership of livestock and ownership of bank saving account as individual level factors; place of residence and region of birth as environmental or demographic factors (see table 3.1).

Table 3.1: Description of the study variables.

variable	Definition
Household head Sex	
Female headed	Dummy variable (1 for female headed household, 0 otherwise
Household head Marital status	
Married	Dummy variable (1 for married, 0 otherwise)
Divorced/widow/separated	Dummy variable (1 for divorced/widow/separated, 0 otherwise
Single	Reference category
Household head Education level	
Primary education	Dummy variable (1 for primary education, 0 otherwise
Secondary education	Dummy variable (1 for secondary education, 0 otherwise
Post-secondary education	Dummy variable (1 for post-secondary education , 0 otherwise
No formal education	Reference category
Region	
Eastern	Dummy variable (1 for eastern , 0 otherwise
Northern	Dummy variable (1 for northern , 0 otherwise
Western	Dummy variable(1 for western , 0 otherwise
Central	Reference category
Residence status	
Rural	Dummy variable(1 for rural household , 0 otherwise
Income stability	
Unstable income	Dummy variable(1 for unstable incomes , 0 otherwise
Bank saving accounts	
Own bank saving accounts	Dummy variable(1 for bank saving accounts ownership, 0 otherwise
Livestock ownership	
Own livestock	Dummy variable(1 for livestock ownership , 0 otherwise
Household size	
Household size	Continuous variable
Household head age group	
Age	Continuous variable
Education and region	
Primary education Central	Dummy variable(1 for primary education from central , 0 otherwise
Secondary education Central	Dummy variable(1 for secondary education from central , 0 otherwise

Post-secondary central	Dummy variable(1 for post-secondary education from central , 0 otherwise
No education East	Dummy variable(1 for no formal education from east , 0 otherwise
Primary education East	Dummy variable(1 for primary education from east , 0 otherwise
Secondary education East	Dummy variable(1 for secondary education from east , 0 otherwise
Post-Secondary East	Dummy variable(1 for post-secondary education from east , 0 otherwise
No education North	Dummy variable(1 for no formal education from north , 0 otherwise
Primary education North	Dummy variable(1 for primary education from north , 0 otherwise
Secondary education North	Dummy variable(1 for secondary education from north , 0 otherwise
Post-Secondary North	Dummy variable(1 for post-secondary education from north , 0 otherwise
No education west	Dummy variable(1 for no formal education from west , 0 otherwise
No education central	Reference category
Education and Residence Status	
No education & Rural	Dummy variable(1 for no formal education from rural , 0 otherwise
Primary education & Rural	Dummy variable(1 for primary education from rural , 0 otherwise
Secondary Education & Rural	Dummy variable(1 for secondary education from rural , 0 otherwise
Post-Secondary & Rural	Dummy variable(1 for post-secondary education from rural , 0 otherwise
No education & central	Reference category

3.7 Re-classification of variables

Poverty status was classified into five categories according the UNHS 2020 dataset: very poor, poor, neither poor nor rich, rich and very rich. However, we will re-categorized poverty status into two groups for the purposes of this study and for understanding the problem. Therefore, this study considered poverty status as the dependent variable and was coded 1 for Poor Households (for poor and very poor categories and 0 for Non-Poor Households (neither poor nor rich, rich, and very rich). It's however important to note that some other variables were re-classified along with data processing and analysis for better understanding of poverty and its predictors.

CHAPTER FOUR

PRESENTATION AND DISCUSSION OF FINDINGS

4.1 Introduction

In this chapter, the study's findings are presented at various levels of analysis, the distribution of household characteristics is examined based on poverty status and the associations between the independent poverty and independent variables are explored using cross tabulations in section 4.2. Finally, logit regression model estimates to determine the effects of each variable on the outcome variable is presented in section 4.3.

The analysis was based only on the individuals who were available in the households at the time UNHS 2020 data was collected and for only agricultural households or individuals whose major activity is agriculture. For National representative results, the data was weighted using survey sampling weights.

4.2 Cross tabulations of poverty by individual and community/environmental characteristics

This section presents the distribution of individuals in agricultural households by their social economic and demographic characteristics. For National representation, all the variables in this section were cross tabulated using weighted sample from Uganda Bureau of Statistics.

Table 4.1: Poverty by Sex of household head

Household head sex	Poverty		
	Not poor	Poor	Total
Female	6,992,099	1,693,513	8,685,612
	82.83%	58.88 %	76.74%
Male	1,449,832	1,182,755	2,632,588
	17.17%	41.12%	23.26%
Total	8,441,932	2,876,268	11,300,000
	100%	100%	100 %

Table 4.1 presents the distribution of poverty by sex of the household head, indicating that out of 2,876,268 of the poor, 1,82,755 (41.1%) are male, while 1,693,513(58.9%) are female. This study suggests that females experience higher levels of poverty compared to males. The results

are based on weighted sample and their interpretation is based on column percentage. The column that includes the percentage poor by sex of the household head was the basis of interpretation and this will be the same basis of interpretation in the subsequent cross tabulation tables.

These findings align with a study conducted by Campenhout et al (2016), which also identified gender as a significant predictor of poverty. The study highlighted that male-headed households have a lower likelihood of experiencing poverty. The researchers attributed these disparities to differences in access to resources such as land, credit, technology, and extension services, which are more readily available to males compared to females. Moreover, the research on Gender Land and Asset Survey by (Kes et al., 2011) suggests ownership and access land and other financial resources tend to be limited for females compared to males.

The issue of gender inequality and poverty in agricultural households in Uganda is a complex and multifaceted problem that can be attributed to several factors including Limited Access to Resources. Women often face challenges in accessing and controlling resources of production especially, credit, seeds, fertilizers, and modern agricultural technologies. In many traditional societies, land ownership is skewed towards men, leaving women with less control over agricultural resources. Limited access to resources hinders women's productivity and ultimately affects their economic status.

According to a study conducted by Amber et al. (2014), it is evident that men have higher levels of access to a range of inputs, including land and other resources, in comparison to women. Across various categories of inputs, men consistently demonstrate greater measures of access when compared to women. This disparity in access to inputs plays a big role to the observed differences in productivity between men and women.

In Uganda, the evidence from the study on Gender and Economic Growth in Uganda by (World Bank, 2016) suggests as in many other societies, women are primarily responsible for household chores, childcare, and other forms of unpaid care work. These responsibilities can constrain women’s ability to generate incomes from productive activities, including agricultural production. The unequal distribution of labor restricts women's opportunities to participate in higher-income activities and perpetuates the cycle of poverty. The report on Unpaid Care and missing link in the analysis of gender gaps in labour outcomes by (Ferrant et

al., 2014) suggests similar findings of women concentrating on unpaid family work including childcare and household chores.

Gender disparities in education and skills development also contribute to women's poverty in agricultural households. For instance, Gender in Uganda's tertiary educational distribution by (Odaga, 2020) suggests existence in education between men and women. Women often have lower levels of education compared to men, which can limit their access to information, technology, and markets. Lack of education and skills development restricts women's ability to adopt modern agricultural practices, access credit, and participate in decision-making processes.

Women face challenges in accessing financial services such as loans, savings, and insurance. Financial institutions may require collateral, which women often lack due to limited land ownership. The report on analysis of status of financial inclusion for women and youth in Uganda by (Finscope, 2018) provides such evidence of women's limited access to credit compared to men. Also, Gender-based violence and discrimination against women are prevalent issues in many societies, including Uganda. Violence against women can limit their mobility, participation in economic activities, and overall well-being thus poverty tends to be higher in female population than it is in male populations, the report on National survey on violence in Uganda by (Uganda Bureau of Statistics, 2021) found out that violence against women and girls are higher than it is against men

Table 4.2: Poverty by Household Size

Household size	Poverty		
	Not poor	Poor	Total
0-3	1,050,516	926,783	1,977,299
	12.44%	32.22%	17.47%
4-6	3,726,909	1,337,827	5,064,736
	44.15%	46.51%	44.75%
7 and above	3,664,506	611,658	4,276,164
	43.41%	21.27%	37.78%
Total	8,441,932	2,876,268	11,300,000
	100%	100%	100%

The proportion of the households with 3 members and below who are poor stands at 32.2%, the proportion of poor in households of 4 members and above is 67.78%. The implication is

that poverty increases with increase in family size since the percentage of poor is small among those with smaller family size. This study is in agreement with the study on (Analysis of Spatial Determinants of Poverty in Rural Uganda in 2007 that found out that Household size is a significant predictor of poverty and Larger households had higher levels of poverty incidences given that with larger households there is a very higher dependency ratio and this in most cases strains resources. It is also in disagreement with the study by Fusco & Islam in 2017 that suggested that poverty of a household may be affected differently due varying age groups from the number of children, that is to say that age of children in family has a significant effect on poverty status, they further argue that apparent might stop work as a result of taking care of young children and this affects the professional life in case government support is not enough to take care of the children. Furthermore, having children positively affects poverty levels in case there are no social transfers to facilitate the additional costs as a result of having extra children

In this study especially with agricultural households in Uganda, poverty rises with increase in household size due to number of reasons. Firstly**,** larger families often have limited access to resources such as land, water, and capital. In agricultural households, where livelihoods depend on the productivity of their land, having more family members to support with limited resources can lead to reduce per capita income and increased poverty. Secondly, with a larger family, it becomes more challenging for parents to afford education for all their children. This lack of education can perpetuate the cycle of poverty, as children might not acquire the skills and knowledge necessary to escape poverty later in life.

Also, larger families naturally have greater consumption needs for food, clothing, education, and healthcare. In resource-constrained settings like many agricultural households in Uganda, meeting these needs can become increasingly difficult as the family size grows. Lastly Dependency burden where a larger family can place a heavier burden on the household's breadwinner(s), If the agricultural income is insufficient to support the family adequately, poverty can deepen.

Table 4.3: Poverty by Household head Age

Age of Household head	Poverty		
	Not poor	Poor	Total
15-24	95,234	158,802	254,036
	5.19%	7.66%	6.50%
25-34	368,759	438,432	807,191
	20.09%	21.16%	20.66%
35-44	474,837	482,609	957,445
	25.87%	23.29%	24.50%
45-54	411,783	426,620	838,403
	22.44%	20.59%	21.46%
Above55years	484,694	565,395	1,050,090
	26.41%	27.29%	26.88%
Total	1,835,306	2,071,858	3,907,165
	100%	100%	100%

According to the data provided, a breakdown of poverty levels based on age groups reveals that among the poor population, 7.7% are below the age of 25, 21.2% are between 25 and 35, 23.3% fall between 35 and 44, 20.6% are aged between 45 and 54, while the largest percentage (27.3%) comprises individuals above 55 years old. These results indicate that poverty levels are relatively low among the younger age group, increase at a certain age, and decrease during middle age, and then rise again beyond the age of 55.

Similar findings were obtained in a study conducted by Garza-Rodriguez et al. (2021) on the determinants of poverty in Mexico using quantile regression analysis. The study revealed that age plays a significant role in poverty, with higher poverty rates observed among the young population due to limited productive activities at that stage. Poverty reduces during middle age but increases again in old age. Furthermore, the study emphasized the importance of experience, highlighting that poverty decreases as work experience increases. There are some differences observed in the younger age group regarding poverty levels between Uganda and

Mexico. Specifically, young people in Uganda tend to have relatively lower poverty levels compared to their counterparts in Mexico.

The research results regarding age also align with the study conducted by (ADEOTI, 2014), which revealed that as individuals get older, poverty tends to increase. However, this effect is particularly pronounced in the higher age group where the likelihood of experiencing poverty rises significantly after the age of sixty. This can be attributed to factors such as being deemed unemployable and a decrease in physical energy, which hinders the ability to handle demanding agricultural tasks.

Nonetheless in agricultural households in Uganda, there are several reasons why poverty is higher in older age including declining physical abilities whereas individual's age, their physical abilities and energy levels often decline. In agricultural settings, where manual labor is frequently required, older household members may find it increasingly challenging to engage in demanding farm work which leads to reduction in productivity and income-generating opportunities, potentially contributing to an increased risk of poverty. Limited access to education and skills development: Older individuals in agricultural households may have limited access to education and skills development opportunities. This can result in a lack of knowledge about modern agricultural techniques, business management, and other relevant skills that could enhance productivity and income. Without access to education and training, older household members may struggle to adapt to changing market demands and remain competitive in the field of Agriculture.

In addition, older individuals in agricultural households may become increasingly dependent on the support of younger family members for their basic needs. This can be due to factors such as declining health, reduced income-earning capacity, or lack of social protection systems. If the younger generation is unable to provide adequate support, it can exacerbate the risk of poverty among older household members. In some cases, older individuals in agricultural households may have limited access to social safety nets, such as pensions, healthcare, or other forms of social assistance. The absence of these safety nets can expose older individuals to a higher risk of poverty, particularly when they are no longer able to engage in productive work or face unexpected expenses related to health or emergencies.

Table 4.4: Poverty by Income Stability

Income Stability	Poverty		
	Not poor	Poor	Total
Stable income	8,088,577	810,052	8,898,629
	95.81%	28.16%	78.62%
Unstable income	353,355	2,066,216	2,419,571
	4.19%	71.84%	21.38%
Total	8,441,932	2,876,268	11,300,000
	100%	100%	100%

According to the study, 71.8% of individuals who are poor do not have a stable income, while only 28.2% of poor individuals have a stable income. This suggests that poverty levels decrease when individuals have a stable source of income in agricultural households. As the incomes of individuals become stable, the likelihood of falling into poverty decreases. These findings align with a study conducted by Reardon et al. (1992), which also emphasized the significant impact of income stability on poverty levels. Their research revealed that individuals with stable incomes have a lower risk of experiencing poverty, highlighting the importance of income stability in mitigating poverty risks.

In agricultural households in Uganda, poverty increases more in households with unstable incomes compared to those with stable incomes due to many reasons including higher degree of vulnerability to various shocks, such as crop failures, pest infestations, extreme weather events, or fluctuations in market prices. When households heavily rely on agricultural activities for their income, these shocks can have a significant negative impact on their livelihoods. Unstable income households may lack the necessary financial buffers or resources to cope with such shocks, pushing them further into poverty. Also, households with stable incomes are often in a better position to access credit and financial services, allowing them to invest in productive assets, diversify their income sources, or mitigate risks. In contrast, households with unstable incomes may have limited access to credit due to the perceived higher risk associated with their income variability. This limited access can hinder their ability to invest in agricultural inputs, improve farming techniques, or engage in non-farm activities that could provide stable income sources and reduce poverty.

In addition, agricultural households with unstable incomes may struggle to invest in productive assets, such as land, livestock, machinery, or irrigation systems. These assets can enhance agricultural productivity and generate stable income streams. However, the unpredictable nature of their income makes it challenging for households to allocate resources towards such long-term investments. As a result, their income-generating capacity remains constrained, perpetuating the cycle of poverty. Also, Inability to plan and make long-term investments: Unstable incomes can make it difficult for households to plan for the future and make long-term investments. For example, they may struggle to invest in education, healthcare, or other income-generating activities that require a longer time horizon. This lack of long-term planning and investment can perpetuate the cycle of poverty and limit the opportunities for upward mobility.

Table 4.5: Poverty by Education Level of the household head

Education Level	Poverty		
	Not poor	Poor	Total
No Education	237,099	537,529	774,628
	12.97%	25.97%	19.87%
Primary Education	1,047,588	1,227,748	2,275,336
	57.32%	59.31%	58.38%
Secondary Education	455,013	273,282	728,295
	24.90%	13.20%	18.69%
Post-Secondary Education	87,769	31,610	119,379
	4.80%	1.53%	3.06%
Total	1,827,469	2,070,169	3,897,637
	100%	100%	100%

The proportion of the poor for agricultural household heads with no education stands at 26.0%, Primary education (59.3%), Secondary education (13.2%) and Higher Education (1.5%). Poverty reduces with rise in Education levels, as more people acquire extra education, they are in position to move out of poverty. Similarly, findings are in the study by (Pervez, 2014) and in his study, Education is related to poverty in inverse manner, and people with higher education levels have got low risk of being poor due to direct increase in wages earned as a result of more knowledge and skills through schooling, the other indirect way education reduces poverty is through improving income which enables population afford basic needs in easier way that improves their standards of living. In this study poverty reduced with rise in

levels of education and there are number of reasons why poverty reduces because of shifts in education levels

First, Education equips individuals with knowledge and skills that can improve agricultural productivity. With higher levels of education, household members may be more aware of modern farming techniques, improved crop varieties, and efficient farming practices. This can result in increased agricultural output, higher crop yields, and ultimately, higher incomes for the household. Secondly Individuals with higher education levels may be more likely to engage in non-farm income-generating activities, such as entrepreneurship, small businesses, or off-farm employment. Diversification of income sources reduces the household's dependence on agriculture alone, providing alternative avenues for earning income and reducing the risk of poverty.

Lastly higher levels of education can enhance individuals' access to better employment opportunities, both within and outside the agricultural sector. Educated household members may have increased chances of securing formal employment, which often offers better wages, benefits, and job security compared to informal agricultural labor. This has a greater chance to households and leads to increment in incomes and a reduced risk of poverty. This study is also in line with the study by Raja (2005) who commuted those countries cannot develop properly with no education and to him, education is the first step in the process of developmental path, he further suggested that it is a process of two steps where education leads to the growth of the economy and minimizes poverty and rises productivity.

Table 4.6: Poverty by Region of the household

Region	Poverty		
	Not poor	**Poor**	Total
Central	1,669,124	629,076	2,298,200
	19.77%	21.87%	20.31%
Eastern	2,694,913	772,968	3,467,881
	31.92%	26.87%	30.64%
Northern	1,705,549	674,141	2,379,690
	20.20%	23.44%	21.03%
Western	2,372,346	800,084	3,172,429
	28.10%	27.82%	28.03%
Total	8,441,932	2,876,268	11,300,000
	100%	100%	100%

The proportion of the poor from central is 21.9%, those who are poor from Eastern is 26.9%, the proportion for those from northern stands at 23.4% while the proportion of those who are poor from western stands at 27.8%. The results are evidence that those from western Uganda are poorer than those from other regions.

This study is consistent with the study on Poverty and its Dynamics in Uganda by Campenhout et al (2016) where poverty and region showed a significant relationship, the study highlighted a clear relationship between region and poverty levels and futher stated that Nothern region has a big number who are chronially poor compared to other regions like western and central regions.

The higher prevalence of poverty in agricultural households in Eastern and western Uganda compared to other regions can be attributed to several factors including Vulnerability to climate-related risks where Eastern Uganda is prone to climate variability and extreme weather events, including droughts, floods, and pests. These climate-related risks can significantly impact agricultural production and increase the vulnerability of farming households. Subsistence farmers in the region heavily rely on rain fed agriculture, making them more susceptible to the adverse effects of climate change. Crop failures or losses due to weather-related factors can push households into poverty and perpetuate the cycle of vulnerability.

Eastern and western Uganda faces challenges in terms of inadequate rural infrastructure, including road networks, storage facilities, and market access and this hampers farmers' ability to transport their produce to markets, resulting in lower prices and income for their agricultural products. Historical factors such as conflicts, displacement, and land tenure issues have affected Eastern Uganda and have long-lasting impacts on poverty levels. Structural issues related to governance, policy implementation, and resource allocation can also contribute to higher poverty rates in the region.

Table 4.7: Poverty by Marital Status of household head

Marital Status	Poverty		
	Not poor	**Poor**	**Total**
Married/cohabiting	1,508,466	1,224,010	2,732,475
	82.19%	59.08%	69.93%
Divorced/Separated/lost partner	282,342	768,251	1,050,592
	15.38%	37.08%	26.89%
Never married	44,499	79,598	124,097
	2.42%	3.84%	3.18%
Total	1,835,306	2,071,858	3,907,165
	100%	100%	100%

The proportion of poverty for those that are married and or cohabiting stands at 59.1%, the proportion of poverty for the divorced / separated or widowed stands at 37.1% while the proportion of single poor stands at 3.8%. The marrieds are poorer compared to other groups. Similar and consistent findings are from study on Poverty and its Dynamics in Uganda Using a New Set of Poverty Lines indicated by Campenhout et al (2016) which reavealed that maritral status has a significant effect on poverty among households , the study further urgued that housheods whose head had never married were less poorer compared to families whose heads are widows and other groups which implied that marrieds and ever married were at higher risk of being poor.

In agricultural households in Uganda, poverty tends to be higher among married individuals compared to other groups due to number of reasons including financial obligations and responsibilities: Married individuals often have additional financial obligations and responsibilities, such as providing for their spouse, children, and extended family members. This can include expenses related to healthcare, education, and other household needs. The financial burden of meeting these obligations, combined with limited income-generating opportunities, can increase the likelihood of poverty among married individuals.

In addition, married individuals may have limited opportunities for education and skills development compared to unmarried individuals. Early marriage and family responsibilities can disrupt educational pursuits and limit access to training and skills enhancement programs.

The lack of education and skills can restrict employment opportunities and income potential, thereby contributing to higher poverty rates among married individuals. Also Married individuals may have limited access to social support networks outside their immediate household. This constrain their access information, resources, and opportunities that could help uplift them from poverty. Unmarried individuals, such as single adults or those living in extended family arrangements, may have stronger social support systems, enabling them to leverage collective resources and support for economic advancement.

Table 4.8: Poverty by Residence Status of the household

Residence status	Poverty		
	Not poor	**Poor**	**Total**
Rural	7,137,740	2,457,215	9,594,955
	84.55%	85.43%	84.77%
Urban	1,304,192	419,053	1,723,245
	15.45%	14.57%	15.23%
Total	8,441,932	2,876,268	11,300,000
	100%	100%	100%

The results show that the proportion of poverty differs by residence status, the proportion of Poverty is 85.4% for agricultural households from rural areas while the proportion poverty for urban households is 14.6 %. Agricultural household poverty is more in non-urban residence than it is in urban areas.

This study is consistent with the study (Campenhout et al., 2016) which indicated that poverty is higher in rural areas of Uganda than it is in urban areas where poverty levels are low , they suggested that location has an effect on access to social services especially safe water , where poor people were found to be spending more time fetching water compared to the non-poor who spent less time fetching water. Similar findings are from study on Analysis of Spatial Determinants of Poverty in Rural Uganda by Muhumuza (2007) which showed a significant negative correlation between population density and poverty, the study further highlighted those whose distance to the nearest towns had low probability of being poor as compared to those whose distance to the nearest town was higher which implied that those in locations far from town were at higher risk of being poor.

Poverty tends to be higher in rural agricultural households compared to urban agricultural households in Uganda due to number of factors including Limited access to productive resources, rural agricultural households often have limited access to productive resources such as land, modern farming technologies, and agricultural inputs. Land scarcity, insecure land tenure, and inadequate access to irrigation facilities constrain agricultural productivity and income generation in rural areas. In contrast, urban agricultural households may have better access to land, infrastructure, and support services, allowing for more efficient and profitable farming practices.

Also, rural agricultural households face challenges in accessing markets and face price volatility for their agricultural products. Limited transportation infrastructure, remote locations, and weak market linkages restrict rural farmers' ability to sell their produce at fair prices. Urban agricultural households, on the other hand, often have better market access, proximity to consumers, and potential for value addition and diversification, which can result in higher incomes and lower poverty rates.

Rural agricultural households typically rely heavily on agriculture as their primary source of income. However, agricultural activities in rural areas are often seasonal and subject to climate-related risks. Limited off-farm employment opportunities in rural areas contribute to income instability and poverty. Urban agricultural households, in contrast, may have access to a wider range of non-farm employment opportunities, including jobs in the formal sector, which can provide more stable incomes and reduce poverty.

Rural areas in Uganda often face disparities in access to social services, such as education, healthcare, and basic infrastructure. Limited access to quality education and healthcare impact human capital development and reduce opportunities for rural agricultural households to improve their livelihoods and escape poverty. Urban areas generally have better access to social services and infrastructure, which can contribute to higher living standards and lower poverty rates. Government policies and support for agriculture and rural development vary between rural and urban areas. Historically, urban areas have received more attention and investment in terms of infrastructure development, social services, and economic opportunities. Disparities in government support perpetuate poverty in rural agricultural households compared to their urban counterparts.

Table 4.9: Poverty by Livestock Ownership

Livestock Ownership	Poverty		
	Not poor	**Poor**	**Total**
Don't own livestock	7,461,523	1,182,482	8,644,005
	88.39%	41.11%	76.37%
Own livestock	980,409	1,693,786	2,674,195
	11.61%	58.89%	23.63%
Total	8,441,932	2,876,268	11,300,000
	100%	100%	100%

The proportion of poverty among agricultural households that own livestock stands at 58.9% while the proportion of poverty among those that don't own livestock stands at 41.1%. Those who own livestock alongside other agricultural activities have increased chances of being poor. This evidence is supported by the livestock profile report from the Uganda Investment Authority (2009), which highlights the heavy reliance on livestock in the Karamoja region of Uganda. Furthermore, this region is also identified as one of the poorest areas in Uganda, as reported by the Uganda Bureau of Statistics (UNHS, 2020).

Agricultural households with livestock tend to be poor due to some reasons including the fact that livestock ownership requires a significant initial investment, including the purchase or acquisition of animals, animal housing, and animal feed. The costs associated with acquiring and maintaining livestock can be a barrier for households with limited financial resources. Additionally, ongoing expenses for veterinary care, vaccinations, and feeding can further strain the household budget. The high costs and financial risks associated with livestock ownership can contribute to higher poverty rates among these households.

In addition, access to markets and value addition opportunities for livestock products can be challenging for agricultural households in rural areas. Limited infrastructure, poor transportation networks, and inadequate market information can restrict livestock farmers' ability to sell their products at fair prices leading to rise in poverty levels. Those engaged in livestock farming are more susceptible to poverty compared to those who do not practice it.

Table 4.10: Poverty by ownership of Bank Saving accounts

Bank Saving accounts	Poverty		
	Not poor	Poor	Total
Don't own saving accounts	8,260,944	2,834,459	11,100,000
	97.86%	98.55%	98.03%
Own saving accounts	180,988	41,809	222,797
	2.14%	1.45%	1.97%
Total	8,441,932	2,876,268	11,300,000
	100%	100%	100%

The study reveals that among individuals who own bank accounts and borrow from banks, only 1.5% are in poverty. On the other hand, among those who do not own bank accounts and do not borrow from banks, a significant proportion of 98.5% is in poverty. These findings highlight the benefits of owning a bank account and having access to bank borrowing, as they are associated with a reduced likelihood of experiencing poverty. These findings are consistent with a study conducted by Burgess and Pande (2005) on the importance of banks. The study demonstrated that owning bank accounts is directly linked to credit access in agricultural households and decreases the risk of falling into poverty.

Poverty tends to be higher in agricultural households that do not own bank saving accounts due to number of reasons; Firstly, agricultural households without bank savings accounts often have limited access to formal financial services such as savings accounts, credit facilities, and insurance. Without access to these services, they may face challenges in managing their finances, saving money, and accessing credit for investment in productive activities. This lack of access to formal financial services can limit their ability to build assets, smooth consumption, and manage risks, thereby contributing to higher poverty rates.

Additionally, agricultural households face various risks, including weather-related events, market fluctuations, and health emergencies. Without bank savings accounts, these households may lack financial buffers to cope with unexpected events. In times of shocks or emergencies, they may resort to selling productive assets, borrowing from informal sources with high interest rates, or depleting their savings from other sources. This can further entrench them in poverty and perpetuate a cycle of vulnerability.

4.3 Diagnostic tests

Skewness/Kurtosis tests for Normality

The kurtosis and skewness test for normality for residuals was established to choose the best model between logit and probit model.

Table 4.11: Skewness/Kurtosis tests for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj_chi2(2)	Prob>chi2
Residuals	18,326	0.000	0.000	0.000	0.000

Table 5.1 shows that both the skewness and the kurtosis are not asymptotically normally distributed with respective probability values (0.000 and 0.000), the joint probability value is also 0.000 which indicates that the residuals are not normal. For this reason, the binary outcome variable, poverty status is a logistical distribution and logistic regression model was used in the analysis as was proposed in the methods section.

Heteroscedasticity test

To provide estimates that are free from heteroscedasticity, robust commend was added to regression command in Stata; vce (robust). The analysis provides estimates with robust standard errors which are homoscedastic (see table 4.3 and table 4.4).

4.4 Determinants of poverty

In order to establish the effect of each independent variable (factor) on poverty status in Uganda, both fixed (level 1 estimates) and random effects (level 2 estimates) regression models were fitted with interaction of some selected variables (See table 5.2 and table 5.4). In the analysis using logistic regression model, the use of robust standard errors was very important in order to provide estimates that are free from heteroscedasticity problem. The marginal effects of the logistic model were presented and the reported significance level of estimated parameters was 5% (0.05)

Table 4.12: Predictors of poverty: Level I estimates

variable	dy/dx	Robust Standard Error.	z-statistic	P-value
Farmer group				
In farmer group	0.022	0.007	2.92	0.004
Household head sex				
Female headed	0.041	0.009	4.39	0.000
Household head Marital status				
Married	0.093	0.008	11.28	0.000
Divorced/widow/separated	0.098	0.012	7.83	0.000
Household head Education level				
Primary education	-0.001	0.020	-0.05	0.960
Secondary education	-0.045	0.026	-1.71	0.087
Post-secondary education	-0.045	0.031	-1.42	0.155
Region				
Eastern	-0.010	0.016	-0.58	0.565
Northern	0.015	0.017	0.92	0.357
Western	-0.015	0.016	-1.02	0.307
Residence status				
Rural	-0.030	0.013	-2.28	0.022
Income stability				
Unstable income	0.246	0.003	80.07	0.000
Bank saving accounts				
Own bank saving accounts	-0.101	0.020	-4.98	0.000
Livestock ownership				
Own livestock	0.111	0.006	20.20	0.000
Household size				
Household size	-0.063	0.005	11.73	0.000
Household head age group				
Age	0.017	0.006	2.73	0.006
Education and region				
Primary education Central	-0.023	0.021	-1.13	0.259

Secondary education Central	-0.020	0.027	-0.75	0.454
Post-secondary central	0.047	0.030	1.56	0.118
No education East	0.023	0.025	0.92	0.357
Primary education East	-0.005	0.016	-0.27	0.786
Secondary education East	-0.004	0.022	-0.16	0.857
Post-Secondary East	0.011	0.027	0.43	0.669
No education North	0.048	0.025	1.89	0.059
Primary education North	-0.020	0.017	-1.17	0.241
Secondary education North	0.027	0.023	1.15	0.250
Post-Secondary North	0.061	0.026	2.39	0.017
No education west	0.041	0.025	1.59	0.112
Education and Residence Status				
No education & Rural	0.042	0.020	2.08	0.038
Primary education & Rural	0.034	0.018	1.90	0.057
Secondary Education & Rural	0.054	0.023	2.31	0.021
Post-Secondary & Rural	0.017	0.032	0.54	0.589

Table 5.2 shows that the effect of gender of household head who is in agriculture is significant at 5% level of significance. The probability of falling into poverty increases by 0.04 for female headed households. Females have higher probabilities of falling into poverty, Women are less employed in other sectors than man. Also, women don't have control over the ownership of household assets, in addition, women are more involved in unpaid domestic work compared to men and this explains why they are poor. The study as earlier discussed is consistent with study by (Campenhout et al., 2016) that found out that Gender is a significant predictor of poverty where male headed households have less chances of being poor compared to female headed households.

Marital status has a significant effect on poverty, the probability of falling into poverty increases by 0.09 for agricultural household heads who are married, those who divorced/widow

or separate poverty increases by 0.1. Similar findings are from study on Poverty and its Dynamics in Uganda Using a New Set of Poverty Lines indicated by Campenhout et al in 2016 that found out that maritral status has a significant effect on poverty among households , the study further found out that households whose head had never married were less poorer compared to households headed by widows and other groups. In both studies the probability of falling into poverty increases for those who are married and ever been married. With exception of statistical significance, this study disagrees with study by Katharina et al (2001) as it suggests that Consumer Units where both adults are married are approximately 8% less likely to be poor than households headed by an individuals who are singles and have never been married.

The information presented in Table 5.2 demonstrates that as the age of individuals in agricultural households in Uganda increases by one year, there is a corresponding increase in the likelihood of falling into poverty by 0.02. In other words, poverty levels rise as the age of the household head or members increases in agricultural households in Uganda. The research results regarding age align with the study conducted by (ADEOTI, 2014), which revealed that as individuals get older, poverty tends to increase. However, this effect is particularly pronounced in the higher age group where the likelihood of experiencing poverty rises significantly after the age of six. This can be attributed to factors such as being deemed unemployable and a decrease in physical energy, which hinders the ability to handle demanding agricultural tasks.

There is a positive effect of between incomes instability and poverty status, the probability of falling into poverty increases by 0.25 (25%) for those individuals whose incomes are unstable. The implication is that poverty reduces as incomes of individuals become more stable and from this study it is statistically significant at 5% level of significant. As seen from earlier discussions, the findings of this study align with a study conducted by Reardon et al. (1992) which found a significant impact of income stability on poverty levels it further revealed that individuals with stable incomes have a lower risk of experiencing poverty, highlighting the importance of income stability in mitigating poverty risks.

Table 5.2 also shows that poverty reduces by 0.1 (10%) for those individuals who own saving accounts and save in commercial banks. This is because individuals with accounts in banks are at disposal of obtaining loans from the commercial banks and they have higher chances of increasing their productivity. This is the case because they have high capacity to purchase

agricultural inputs to be used in the farms. Such findings are in line with the findings from study on whether banks matter by ((Burgess & Pande, 2005)) that found out that having bank accounts in the bank reduces the likelihood of falling into poverty since it's directly related to credit access in agricultural households.

The likelihood of experiencing poverty among individuals who own livestock rises by 0.1 (10%), and this increase is considered statistically significant at a 5% level of significance. This significance is indicated by the probability value being less than 0.05. Those engaged in livestock farming are more susceptible to poverty compared to those who do not practice it. As discussed previously from table 5.2, the evidence is supported by the livestock profile report from the Uganda Investment Authority (2009), which highlights the heavy reliance on livestock in the Karamoja region of Uganda. Furthermore, this region is also identified as one of the poorest areas in Uganda, as reported by the Uganda Bureau of Statistics (UNHS, 2020).

The size of agricultural households has an impact on the likelihood of experiencing poverty. Specifically, an increase in household size reduces the probability of being poor by 0.06, and this finding is statistically significant at a 5% level of significance, indicated by a probability value less than 0.05. This suggests that larger households have a lower risk of falling into poverty compared to smaller households. However, there are differing views on this matter. Some studies argue that household size is not a significant predictor of poverty. According to Muhumuza (2007), larger households tend to have higher levels of poverty incidence due to a higher dependency ratio, which strains available resources. Schultz (2006) also supports this view, as they found that families with many children have a greater likelihood of experiencing poverty due to a higher dependency ratio that depletes economic resources.

This is not the case especially in agricultural households of Uganda, larger households can benefit from economies of scale in agricultural production. When there are more people available to work on the farm, they can collectively engage in more efficient and productive farming practices. This can lead to increased agricultural output and, consequently, higher income for the household. In agricultural economies, labor is a crucial input for farming activities. With a larger household size, there is a greater availability of family labor. This means that more tasks are accomplished on the farm without the need to hire external labor, reducing labor costs and increasing the overall productivity of the household.

Residency status has a statistically significant effect on poverty at a 5% level of significance. In rural areas, the likelihood of agricultural households experiencing poverty decreases by 0.03. These findings are consistent with the study conducted by Campenhout et al. (2016), which revealed higher poverty rates in rural areas of Uganda compared to low poverty levels in urban areas. It is worth noting that although poverty may be more prevalent in rural areas than it is in urban areas, the probability of poverty risk reduction may be greater in rural areas compared to urban areas. This could be attributed to the recent urbanization in Uganda, which has limited the availability of farmland in urban areas. In contrast, rural people engaged in agriculture have ample land for farming, leading to a significant reduction in the risk of falling into poverty.

Table 5.2 shows that household heads engaged in agriculture, who have obtained post-secondary education and reside in northern Uganda, face a 6% higher likelihood of experiencing poverty. Several reasons account for such risk of them falling into poverty; Firstly, the agricultural sector in northern Uganda may have limited opportunities for higher-income or value-added activities. Despite their education, these household heads may still rely on traditional farming methods or have limited access to modern agricultural techniques, technologies, and markets. This can result in lower productivity and income levels, contributing to the increased probability of poverty.

Additionally, the northern region may face specific challenges related to agricultural development, such as inadequate infrastructure, poor access to credit, limited extension services, or vulnerability to climate change and natural disasters. These factors can impede the ability of educated household heads to leverage their knowledge and skills effectively, hindering their economic advancement and increasing the risk of poverty. Moreover, there are disparities in the distribution of resources and development initiatives between northern Uganda and other regions. The lack of investment in education, agricultural infrastructure, and rural development programs can limit the opportunities available to post-secondary educated household heads in the agricultural sector, leading to a higher probability of poverty. Considering these underlying factors, it becomes evident why post-secondary educated agricultural household heads in northern Uganda face an increased risk of poverty despite their educational attainment.

The level of education has a notable impact on poverty within agricultural households residing in rural areas. This can be observed by examining the data presented in table 5.2. For instance, the probability of rural household heads without any formal education falling into poverty

increases by 0.04, equivalent to 4%. Furthermore, residing in a rural area amplifies the probability of falling into poverty for individuals who have attended primary education and secondary education, by 0.03 (3%) and 0.05 (5%) respectively. These findings strongly support the assertion that education level plays a significant role in determining the likelihood of poverty within rural agricultural households. The evidence suggests that higher education levels in rural areas are associated with a decreased probability of falling into poverty, as education opens up opportunities for employment, income generation, entrepreneurship, and access to resources and this is statistically significant at 5% level of significant.

Table 4.13: Predictors of poverty: Level II estimates.

Variable	dy/dx	Robust Standard Error.	z-statistic	P-value
Farmer group				
In farmer group	0.015	0.015	1.02	0.306
Household head sex				
Female headed	0.040	0.013	2.98	0.003
Household head Marital status				
Married	0.095	0.009	10.55	0.000
Divorced/widow/separated	0.097	0.012	8.10	0.000
Household head Education level				
Primary education	-0.002	0.011	-0.16	0.871
Secondary education	-0.018	0.012	-1.51	0.130
Post-secondary education	-0.042	0.030	-1.41	0.159
Residence status				
Rural	-0.031	0.015	-2.13	0.033
Income stability				
Unstable income	0.234	0.009	28.90	0.000
Bank account saving				
Own account and save	-0.085	0.025	-3.42	0.001
Livestock ownership				
Own livestock	0.121	0.011	10.90	0.000
Household size				
Household size	0.017	0.007	1.92	0.050
Household head age				
Age	-0.057	0.009	-7.73	0.000
Education and region				
Primary education Central	-0.034	0.020	-1.73	0.084
Secondary education Central	-0.042	0.012	-3.54	0.000
Post-secondary central	0.041	0.029	1.41	0.158
No education East	0.014	0.016	0.90	0.368
Primary education East	-0.010	0.012	-0.79	0.428
Secondary education East	-0.027	0.015	-1.72	0.085
Post-Secondary East	0.004	0.024	0.16	0.869
No education North	0.032	0.018	1.85	0.064
Primary education North	-0.009	0.009	-0.98	0.320

Secondary education North	0.022	0.013	-0.99	0.072
Post-Secondary North	0.042	0.025	1.80	0.087
No education west	0.032	0.017	1.86	0.063
Education and Residence Status				
No education & Rural	0.042	0.016	2.72	0.007
Primary education & Rural	0.041	0.014	2.96	0.003
Secondary Education & Rural	0.041	0.015	2.87	0.004
Post-Secondary & Rural	0.019	0.027	0.71	0.475
Sub region				
Var(_cons)	**0 .179142**	**0 .1061401**		

Note: Variable definitions (see table 3.1)

According to the information provided in table 5.4, it is worth noting that the level two estimates from the random model reveal that 17.9% of the variations in poverty levels in Uganda can be attributed to regional differences. Additionally, table 5.4 demonstrates a significant disparity between the level two estimates and level one estimates. This disparity can be attributed to clustering effects resulting from regional differences. As a result, certain socioeconomic and demographic variables lose their significance, as the differences in poverty are primarily influenced by regional disparities rather than population, socioeconomic, and demographic differences alone.

However, despite the impact of regional variations, other factors such as the sex of the household head, marital status, residence status, stability of household income, possession of bank savings accounts, ownership of livestock, household size, age of the household head, primary and secondary education from central, No education, primary education and secondary education attainment from rural areas are significant even after accounting for regional differences.

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CHAPTER FIVE
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The main objective of the study was to model predictors of poverty in agricultural households in Uganda using multilevel regression and interaction model.

5.2 Summary of the findings

The study examined the predictors of poverty in agricultural households in Uganda using multilevel regression and interaction methods. The study used Uganda National Household survey data (UNHS 2019/20) from Uganda Bureau of Statistics.

According to the findings presented at the bivariate level, females in agricultural households tend to experience higher poverty rates compared to males. The study also reveals that poverty levels in agricultural households decrease as family size increases, as a smaller percentage of people with larger families are considered poor. Additionally, poverty is more prevalent among individuals aged 55 years and above compared to other age groups.

The study aimed at finding out the individual related predictors of poverty in agricultural households in Uganda and results suggests that having a stable source of income in agricultural households is associated with lower poverty levels. With stable incomes, the likelihood of falling into poverty decreases. Moreover, poverty decreases with higher levels of education, as obtaining more education enables individuals to escape poverty. Married individuals, on the other hand, tend to have higher poverty rates compared to other groups. Owning livestock in conjunction with other agricultural activities increases the likelihood of experiencing poverty. The study highlights the benefits of owning a bank account and having access to bank borrowing, as they are associated with a reduced likelihood of experiencing poverty.

The study aimed at finding out the individual related predictors of poverty in agricultural households in Uganda and Poverty in agricultural households is also found to be more common in rural areas than in urban areas.

At the multivariate level, the study finds that certain variables have statistically significant effects on poverty levels in agricultural households. These variables include income stability, residence status, ownership of livestock, having bank savings accounts, gender, household size (specifically for females), age, the interaction between residence status (specifically rural

areas), and the interaction between education and region (specifically secondary education in the northern region).

Consequently, the null hypothesis stating that these variables have no significant effects on poverty status in agricultural households is rejected at a 5% level of significance. However, when controlling for regional factors, it is found that within-individual characteristics are highly significant, as regional-level characteristics only account for 17.9% of the variations in poverty in Uganda. Furthermore, the hypothesis that the effect of education level on agricultural household poverty is not modified by region and residence status is rejected at a 5% level of significance. Therefore, it can be concluded that the effects of education level on poverty are indeed modified by region and residence status.

5.3 Conclusions

Level II estimates were so critical especially with observations that are nested within the regions (hierarchical data structure). The study showed that 17.9% of the variations in the poverty level is accounted for by regional differences in Uganda implying that the differences between regions in Uganda have an impact on the poverty levels observed in the country.

When conducting a study on poverty levels, researchers often analyze various factors that contribute to poverty as social economic and demographic factors including regional disparities. In this case, the study has found that 17.9% of the variations in poverty levels can be attributed to regional differences in Uganda.

This means that nearly one-fifth of the differences in poverty rates across different areas in Uganda can be explained by the regional characteristics. These characteristics might include factors like economic development, infrastructure, availability of resources, social programs, or cultural and historical factors that vary from region to region.

By identifying and understanding these regional differences and their influence on poverty levels, policymakers and organizations can develop targeted interventions and policies to address the specific challenges faced by different regions. This information can help in designing effective strategies to alleviate poverty and promote more equitable development across Uganda.

On the other hand, the stability of an individual or household's income has been found to play a significant role in poverty levels. Fluctuations or lack of stability in income can contribute to a higher likelihood of experiencing poverty. Place of residence, whether rural or urban, has been identified as a significant factor influencing poverty levels. People living in rural areas may face different challenges and have fewer opportunities compared to those in urban areas, affecting their poverty status.

Owning bank savings accounts has been identified as a factor related to poverty levels. Access to formal financial services, such as savings accounts, can provide individuals with a safety net and opportunities for economic advancement.

Gender has been shown to have a statistically significant effect on poverty levels. Gender disparities and inequalities, such as limited access to resources, education, and employment opportunities, can contribute to higher poverty rates among certain gender groups especially women. Age has been identified as a variable with a statistically significant effect on poverty levels. Different age groups may have varying vulnerabilities and access to resources, impacting their poverty status.

Interaction between residence status and education: The interaction between residence status (rural and urban) and education has been found to be statistically significant. This suggests that the effect of education on poverty levels may differ based on whether an individual resides in a rural or urban area. Also, Interaction between education and region (especially secondary education in the north): The interaction between education, specifically secondary education, and region (particularly in the north) has a statistically significant effect on poverty levels. This indicates that the impact of secondary education on poverty may vary across different regions, with specific attention to the northern region.

These deductions provide insights into the complex and multidimensional nature of poverty and highlight the importance of considering various factors when analyzing and addressing poverty levels. Policymakers, researchers, and organizations can utilize these findings to develop targeted interventions and strategies aimed at reducing poverty and promoting inclusive development.

5.4 Policy Recommendations

Based on the findings of the study on predictors of poverty in agricultural households in Uganda, the following policy recommendations can be drawn and the researcher recommends.

Evidence suggests that being female headed household increases the probability of being poor. Government should continue implementing women empowerment programs such as access to resources including land, equal access to employment opportunities and equal access to education to reduce poverty.

Evidence from the study indicated that income instability in agricultural households increases the probability of being poor. Government should empower famers to form farmer groups where they can collectively increase their bargaining power to avoid price fluctuations. Additionally, Government should establish marketing platforms that enables farmers to get information on available prices in the market to reduce income instabilities due to locational price differences and fluctuations.

It is evident from this study suggests that Income stability has got potential in reducing poverty and government should implement programs that promote stable incomes for agricultural households. This may include providing support in terms of sourcing other income-generating activities to farmers.

Given that poverty in agricultural households is more common in rural areas, targeted rural development initiatives are necessary. These initiatives should focus on improving infrastructure, access to basic services, agricultural productivity, and market linkages in rural areas. Promoting diversification of income sources and providing training and support for rural entrepreneurs can also help reduce poverty in rural agricultural households.

5.5 Areas for Further Research

This study proposes conducting further research that specifically targets agricultural households in Uganda, using the National panel survey datasets provided by the Bureau of Statistics. By utilizing these datasets, it will be possible to examine poverty trends and dynamics over time and consider the specific poverty challenges faced by agricultural household's due to time differences.

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