DRIVERS OF COPING STRATEGIES TOWARDS EXTREME WEATHER INDUCED HOUSEHOLD FOOD INSECURITY IN ACHOLI SUB REGION OF NORTHERN UGANDA: CASE OF GULU DISTRICT



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DECLARATION

I, **Obwoya, George Mathew** do hereby declare that the content of this research dissertation is my original work and to the best of my knowledge, it has not been submitted to any higher institution of learning for an academic award before.

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DEDICATION

This work is dedicated to the people who are tackling food and nutrition, climate change challenges across the world.

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LIST OF ACRONYMS

CSI:	Coping Strategy Index
FAO:	Food and Agriculture Organization of the United Nations
FS:	Food Security
FI:	Food Insecurity
GDP:	Gross Domestic Product
GUREC:	Gulu University Research Ethics Committee
HCS:	Household Coping Strategy
HFIES:	Household Food Insecurity Experience Scale
IFAD:	The International Fund for Agricultural Development
IPC:	Integrated Food Security Phase Classification
MWE:	Ministry of Water and Environment
NDP:	National Development Plan
SDG:	Sustainable Development Goal
SOPs:	Standard Operating Procedures
SPSS:	Statistical Package for Social Science
UBOS:	Uganda Bureau of Statistics
UNCST	Uganda National Council for Science and Technology
UNDP:	United Nations Development Program
UNICEF:	The United Nations Children's Fund
WCSI:	Weighted Coping Strategy Index

ABSTRACT

Food insecurity exacerbated by extreme weather is a global hindrance to achieving the sustainable development goals of ending hunger by 2030 at all levels from global, regional, national and household levels. Evidence has shown that extreme weather events in Uganda have caused crop failure, human and animal mortality. With Uganda's hunger increasing from 26.4% in 2016 to 31.2% in 2018, the prevalence of food insecurity has remained a major concern in the country. The food insecurity situations have raised questions on the effectiveness of the coping strategies used among the households in Gulu district. This study determined the status of food security among households; assessed the household coping strategies; and determinants of choice of coping strategies to extreme weather induced food insecurity in Gulu district. Using a multistage sampling method, a cross sectional study survey of 204 participants who are engaged in farming was conducted. Descriptive statistics, coping strategy index and multiple linear regression were used to analyze the data. Result revealed that majority (65.59%) of the households were severely food insecure. As a result, households employed diverse coping strategies as a way of overcoming weather induced household food insecurity. The coping strategies commonly used among the households included feeding on less expensive foods, reduction on food consumption and expenses, reduction on number of meals per day, children being fed first, skipping meals at times. Furthermore, regression analysis showed that some socio-demographic factors such as education ($p< 0.018$), employment status ($p< 0.010$), monthly income ($p< 0.003$), and livestock ($p< 0.020$), and distance to the market ($p< 0.003$), influenced household choice of coping strategy. The study finding demonstrates that households relied on food smoothing coping strategies more than other mechanisms and that some social demographic factors influence the coping strategies among households. Therefore, to change the trend, future interventions should focus on the aforementioned factors to strengthen the capacity of households through diversification rather than

specialization, public education and awareness, strong local policy implementation and safe guarding of food security crops from totally being subjected to market demand.

Key words: *Food security, coping strategy, extreme weather, Gulu district, floods, drought*

CHAPTER ONE

1.0 Introduction

Household coping strategies towards extreme weather events in Uganda have raised a lot of concern from the different sectors/ stakeholders in Uganda due to the ever-increasing food insecurity challenges arising from the aftermath of floods or droughts. And this have caused an imbalance between the policy adoption and food insecurity reduction during this period of time when there is little or no agricultural production taking place and yet people depend on these activities to remain food secure. It is from this background that this study seeks to assess the relationship between coping strategies used and food security status of the households in Gulu district a case study. This chapter, therefore, presents the background to the study, statement of the problem, general objective, and the specific objective of the study, the research question, the scope of the study, the significance, and the justification.

1.1 Background

Globally, food insecurity and malnutrition have persisted as a big challenge in most of the developed and underdeveloped countries. According to Food and Agriculture Organization (FAO) of the United Nations, between 702million to 828million people are affected by hunger (FAO et al., 2022). As of 2021, it is estimated that 2.3billion people were moderately food insecure (FAO et al., 2022). In spite of the many food insecurity programs aimed at elevating peoples' welfare in different countries, food insecurity has still been seen as a major concern especially in the developing countries accounting for 20.2% annually. A study done by Food and Agriculture Organization (FAO) indicates a big variation of 9.1% in Asia, 8.6% in Latin America and Caribbean; 5.8% in Oceania and less than 2.5% in North America and Europe (FAO et al., 2022). The increasing food insecurity and malnutrition has been attributed by rising extreme weather and climate occurrences (FAO et al., 2022). Therefore, weather variability have been seen to originate

from the current climate change which is predicted to increase the magnitude of extreme weather events as the global temperature and sea level come up leading to potential influence on the food production around the world (Drunkenmiller H, 2023). Furthermore, the climate and weather extreme events have proven to be on top of other factors as a major disruptor of food supply chains. With the disruption of food supply chain and low productivity among communities, hunger is projected to continue increasing (FAO et al.,2017). Therefore, households are expected to be faced with increasing long food insecurity.

Climate variability and extreme weather induced food insecurity impacts have been believed to affect the human health which leads to low agriculture production hence increased hunger (Cunsolo & Ellis, 2018). The low agriculture productions have affected the smooth flow towards achieving zero hunger which is the first target of the sustainable development goal (SDG). Amidst all this weather induced food insecurity challenges, some coping strategies have been adopted. In central America, smallholder farmers were noted to use decrease the quantity of food per serving or reduce the number of meals per day, change the composition of their meals, for instance by removing meat from their diets while others used their savings, sought work outside of their farm, sold assets or livestock in the wake of an episodic food insecurity (Alpízar et al., 2020)

Similarly, in Africa, hunger has risen in almost all sub regions (FAO et al., 2019). Estimates show that 333.3 million people in Africa are severely food insecure accounting to 27.4% (FAO et al.,2017). Food insecurity highest level have been noted to come from East Africa with up to 62.7% followed by 53.6% in southern Africa, 47.9% in West Africa and 30% in North Africa (FAO et al., 2019). Among some East African Countries, study data collected have shown that Ethiopia, Kenya and Tanzania had a varied level of food insecurity with 40%, 50%, and 52% prevalence respectively (Gezimu & Bahadur, 2021). Weather and climate variability have affected the four dimensions of food security: food availability, food accessibility, food utilization and food system

stability hence causing a great impact on human health, livelihoods as well as influencing the purchasing ability and market setup (FAO et al., 2019).

The impacts of weather variations on food security in Africa and especially East Africa have brought the development of some coping strategies among the affected communities. In Ethiopia, coping strategies ranged from decreasing frequency and amount of meals, borrowing food and money, receiving food and money aid among others to enhanced food availability (Alpízar et al., 2020).

In Uganda, the national food insecurity average level stands at 20%. Amidst the national average level of 20%, the number of food poor households stands at more than a third (37%) with the majority in the rural area being twice poorer than those in the urban areas in Uganda (UBOS, 2018). Food insecurity in Uganda has been exacerbated by increasing drought, floods, storms and landslides. The nexus of extreme weather and food insecurity is a key connection in today's sustainability and development issues within the country. With the most recent weather extreme witnessed in some parts of the country like Tororo District, Agago, and around the Lake Victoria zones and drought in Karamoja and Teso sub region (Kakumirizi, 2020; MWE, 2015). These weather shocks have brought a lot of challenges on the affected population and at the same time increasing their vulnerability amidst food crisis (Berman et al., 2015; Mayega et al.,2015). It has further led to decline in agriculture production which have made many famers unable to buy enough food for consumption thus a vicious cycle of food and nutritional insecurity (Twongyirwe et al., 2019).

The rising food insecurity in the country has made some communities to use certain coping strategies which ranged from migrating to look for food, sells off other household assets to buy food among others to sustain a living (Berman et al.,(2015). The coping strategies further have been categorized into ex-ante and ex-post with some used after other alternatives have been tried (Twongyirwe et al., 2019). Although coping strategies have been developed and used, they have

greatly varied among the affected communities due to the limited resources, socioeconomic and agro-ecological conditions of the area (Twongyirwe et al., 2019). This is from the background that the strategy used comes amidst the diversified sources of income.

Northern Uganda is one of the most affected regions by floods, drought and food in the country. Food security situations have been subjected to numerous weather shocks and stress including floods, drought and storms. In the greater northern region, Acholi and Lango were in phase 2 level of food insecurity while Karamoja was the only province in phase 2 (IPC, 2017). According to the Integrated Food Insecurity Phase Classification (IPC), food insecurity in northern Uganda has been caused by erratic rainfall and prolonged dry spells (IPC, 2017).

Similarly, Gulu district is one of the relatively foods in secured and vulnerable districts in Northern Uganda which are prone to seasonal drought, floods, and storms suffer from food shortages. Farming households have relied more on rain fed agriculture. Amidst the over reliance on rain fed agriculture, production have decreased due to the impacts of storms, floods and drought. Further, food insecurity has affected household wellbeing like schooling (Ochola, 2020; Ojara, 2021). Therefore, solutions to food insecurity among households are constantly changing due to the social, economic and natural existing environment (Twongyirwe et al., 2019). Food insecurity has been found to be caused by extreme weather conditions which have made different communities to adopt varied coping strategies to sustain their wellbeing. Based on this, the researcher was motivated to assess the kinds of coping strategies adopted by households to mitigate weather induced food insecurity in Gulu District Northern Uganda.

1.2 Problem statement

Uganda's agriculture sector has remained the biggest employer with up to 65% of the population relying on farm production for the overall welfare through subsistence practices (UBOS, 2017). Like many other countries within the Sub-Saharan Africa, Uganda is faced with devastating food security challenges brought by extreme weather effects expressed in form of drought and floods at

household level. In the recent past, the frequency and severity of these extreme weather induced food insecurity have increased in the country making it even harder for the rural households to meet basic demands (Byakatonda et al., 2020; Ochola, 2020; Ojara, 2021). Although food insecurity, Drought and floods has been characterized as a disaster risk, food insecurity has for long been caused by these two elements of weather extremes in the country (Mubiru et al., 2018). According to the Global Hunger Index (GHI) of 2018, Uganda had registered an increase in hunger cases from 26.4% in 2016 to 31.2% in 2018 among its population despite being acclaimed as the food basket of East Africa (Grebmer et al., 2018). In northern Uganda particularly relating to Gulu district, food insecurity and temporal displacement has been caused by drought and floods among different households in the district (Ochola, 2020; Ojara, 2021). Although this has been taking place, the drivers that make the choice of a coping mechanism has not been well understood as to whether it can contribute to household food and nutritional security amidst recurrent extreme weather events (Akwango et al., 2017; Osbahr et al., 2011).These have been under studied in some regions of Uganda (Lunyolo et al., 2020). This study therefore intended to examine the drivers and coping strategies of the communities in Gulu district in sustainably overcoming food insecurity under the existence of the extreme weather conditions.

1.3.1General objective

To examine the drivers of household coping strategies to extreme weather-induced food insecurity in Gulu district

1.3.2 Specific objectives

i. To determine the status of food security among households that experienced extreme weather events in Gulu district

ii. To assess household coping strategies to extreme weather induced food insecurity in Gulu district

iii. To assess the determinants of choice of coping strategies to extreme weather induced food insecurity in Gulu district.

1.3.3 Research questions

i. What is the food security situation among households that experienced extreme weather events in Gulu District?

ii. What are the household coping strategies to extreme weather induced food insecurity in Gulu District?

iii. What are the determinants of choice of coping strategies to extreme weather induced food insecurity in Gulu district?

1.7 Conceptual framework

The conceptual framework of this study is presented in Figure 1.1. The Figure 1.1 shows the analytical relationship between social demographic factors and the coping strategies to either positively or negatively influence households' food security situation at a particular period of time. From these factors, households are either food secure or food insecure. According to Onunka, Ihemezie, Olumba, (2018), food insecure households are most likely to apply a wide range of coping techniques to respond to the situation. Therefore, this framework is hypothesised on the notion that choosing the right coping strategies can help to maintain the food security status at different households' level *vis-a-vis* the factors that may determine the choice of coping strategy. Furthermore, households with high coping strategies will have enough food with high income distribution in their household which will make them be food secure. In a nutshell, the moderating factors drove households to use some of the coping strategies to remain food secure and to those who were faced with food insecurity, it helped them to overcome the food insecurity. This conceptual framework is the researchers' own work with modification from a study in East Africa (Gezimu & Bahadur, 2021).

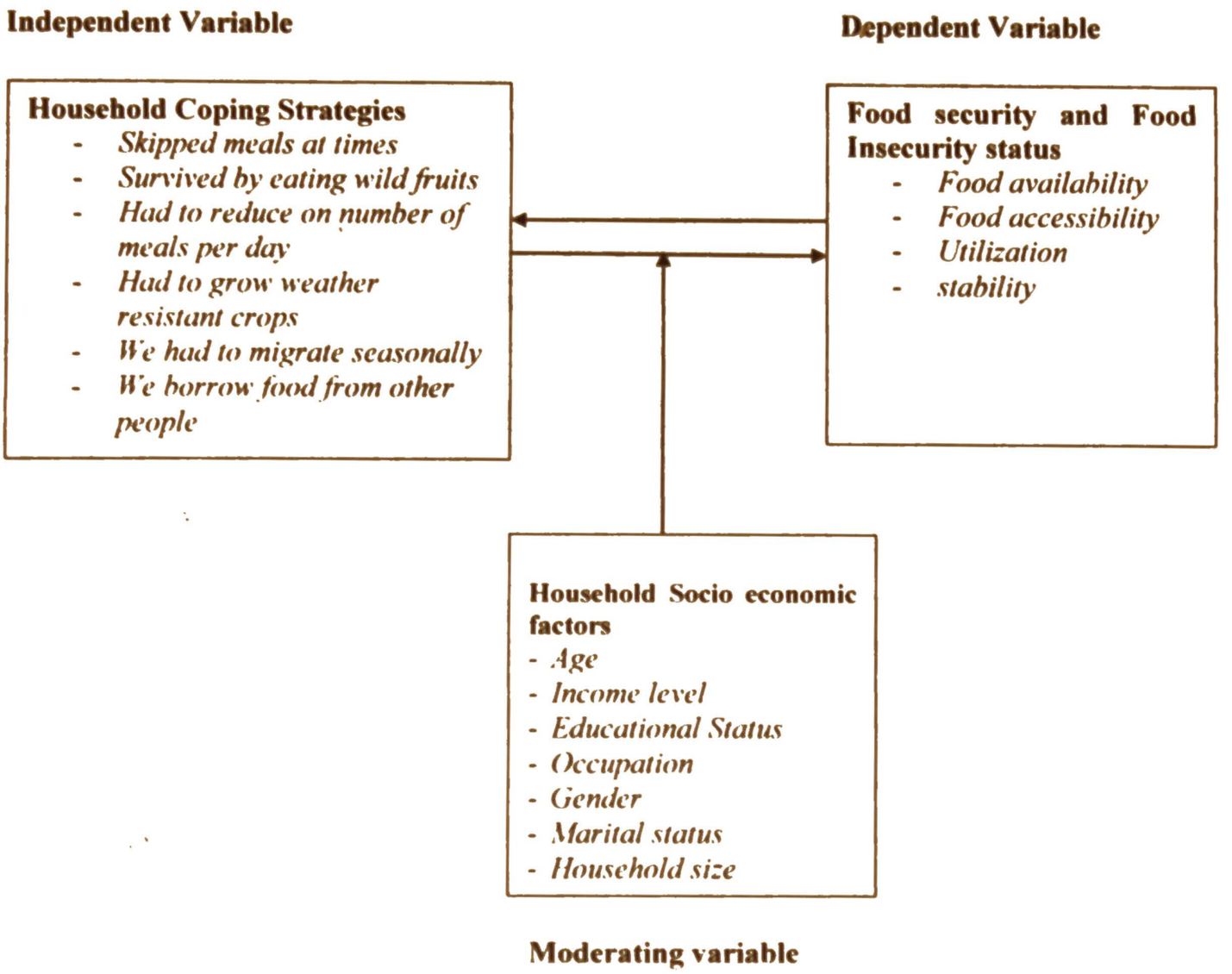


Figure 1.1: Conceptual framework of the study indicating factors that determine the choice of coping strategies to remain food secure.

1.5 Significance of the study

Flooding and drought have forced many community members to devise mechanisms to deal with the impacts of such weather extreme conditions although most communities have been slow at responding to these aftershocks. Suitable interventions for different activities from production to distribution and allocation of resources for use have been carried out. Adoption of favorable policy and institutional interventions have been seen to help in improving the status-quo of the poor and the most vulnerable (Ziervogel & Ericksen, 2010). Therefore, it is from this background that the finding of this study will be of useful to policy developers in a way that they can scale up programs

that are aimed at building capacity and strengthening resilience to weather shocks and stressors to prevent long term effect on food security, strengthen social policies and protection systems since it is sensitive and households own the coping strategies which tends to be reduced in the situation that extreme weather induced food insecurity arise. Secondly, determination of choice of coping strategies to extreme weather induced food insecurity would be beneficial to the community by informing them about the best coping strategies to adopt in order to overcome weather induced food insecurity. Lastly, the findings of this study are expected to provide insights to future researchers on areas and dimensions similar study in the nearby future.

CHAPTER TWO:

LITERATURE REVIEW

2.0 Introduction

This chapter reviews the literature related to the study and is organized according to the objectives in chapter one. It brings out the theoretical review and the literature reviewed in relation to the objectives. The literature reviewed was sourced from journals, websites and others.

2.1 Theoretical Framework

Unlike other theories such as the Malthusian and anti-Malthusian that centred mostly on food supply, the entitlement to food theory centred more on possession and distribution of wealth materials which is used in exchange for food or in getting food through other means (Kayunze, 2015). It is from this background that this study adopted the entitlement to food theory in understanding the nexus in achieving food security. This was from the logical context that entitlement to food can be directed towards food insecurity which is caused by food inaccessibility and unavailability and it is assumed that this challenge can be solved through purchase, increase production, exchange and transfer. Food availability, access is an important essential component of food security at household level. However, the study elucidates that extreme weather events in form of floods, drought and hailstorm among others have become an inescapable factor that increases food insecurity among communities.

The entitlement theory helps to explain the concept of food acquisition in four forms namely trade base means, produce base, own labor base and transfer base. In a household perspective of the study, these four concepts of food acquisition are looked at from the coping strategy view point of selling and buying something for food in the form of assets sale and exchange of the livestock for cereals (trade base); ability to grow drought resistant crops, carryout fishing (produce base); working for food and money (own labor base); receiving food aid, begging for food (transfer base)

2.2 The concept of food security and food insecurity

The concept of Food Security has been interpreted and defined differently by various scholars. According to Barrett, (2020), the most notable and agreed definition of food security is derived from the 1996 World Food Summit which encompasses the economic, physical and social availability, access to food and these focuses on the quality and quantity of food to meet the dietary needs of a person or a household. Therefore, people have been said to be food secure when they have unlimited physical and economic access to sufficient, safe and nutritious food at all times to meet their dietary needs and food choices for an active and healthy life (Peng & Berry, 2018). This definition of food security encompasses the four fundamental dimensions of food security namely: availability, access, utilization, stability.

While food security looks at the concept of almost everything for active and healthy life being available and accessible, food insecurity has been the reverse of the situation among some people. Therefore, food insecurity refers to conditions through which households, communities are faced with limited or uncertain physical, social and economic access to nutritiously safe food that can certify their body requiremems for a healthy and active living (Keino et al.,2014).

Food insecurity therefore has been categorized based on the time. According to the two forms of food insecurity categorization are: chronic, transitory food insecurity (Devereux, 2006). Chronic food insecurity at a household level occurs on long term or persistent basis when a household lacks resources to get right quantity of food for the normal healthy, active life, and households are not at higher risk of starvation (Devereux, 2006). On the other hand, communities and individuals have been noted to experience another form of food insecurity called the transitory food insecurity. According to Devereux, (2006), transitory food insecurity occurs on a short term or temporary basis where a household is faced with a sudden drop in the ability to produce or access enough food to meet their energy requirements. These has been caused by decrease in production and price changes which has brought about difficulty in food access and availability (Devereux, 2006).

2.2.1Global Food Security Status of Food Security

The global food insecurity situation has been deteriorating over the years. According to FAO et al.,(2022) it is estimated that between 702million and 828million people were affected by hunger in 2021 and the rising food insecurity has been attributed to the covid-19 pandemic which has forced nearly one in every three people to have lack of access to adequate food. As of 2021, around 2.3 billion people in the world were moderately or severely food insecure with 11.7 percent of the world population facing a severe level of food insecurity (FAO et al.,2022)

In the developing country perspective, Africa has been found to have the highest prevalence of moderate and severe food insecurity over the years (FAO et al., 2022). Food insecurity in Africa has been attributed to reduced production due to extreme weather effects, conflicts among others. According to (Onunka, Ihemezie, Olumba, 2018), in a study noted that 58.3 percent of the sampled households in Enugu state of Nigeria were food insecure and the food insecurity have been caused by market price shift and weather related events. Similarly, a study in Enugu state in Nigeria when food insecurity was assessed using the household analysis method, only 35.7% of the households were found to be food secure while 50 percent were food insecure.

Uganda as a country has been experiencing seasonal type of food insecurity among its citizens with the most affected areas being Karamoja and within the refugee settlements. According to UBOS, basing on data as of 2017, 37 percent of the households in the country are food poor with those in rural areas being nearly twice food poor than their urban counterparts. With the national food insecurity average level standing at 20%, a study conducted among the Batwa of Kanungu district found out that 97% of the households were severely food insecure (Patterson et al.,2016). This is not much different from similar food security study which was conducted among communities living around the wetlands of Pallisa district where 90% of the household where found to be food insecure mainly attributed to the poverty, and of recent extreme weather events (Yikii et al., 2017).

2.3 Household Coping Strategies to Weather Induced Food Insecurity

2.3.1 The concept of coping strategies

Coping strategies are measures for reducing the negative outcomes of events such as food insecurity situations. Coping strategies are ways through which individuals, households or community members overcome food shortages induced by disaster related risk before seeking and receiving outside support (Kurtz, 2012). According to Masahudu (2019), food insecurity coping strategies are sets of ways through which households uphold the food security situation or overcome the food insecurity occurrences that is being experienced within the household.

The intensity of food insecurity can bring about a whole range of increasing behaviour which is costly and damaging to the consumption related coping methods like borrowing, migration for employment, sale of valuable household assets among others (Guide & Field, 2010). According to Duale (2018), coping strategies vary by community, households, age, season, social and ethnic grouping, and severity of potential disruptive conditions while trying to uphold their livelihoods. People faced with food insecurity challenges make strategic decisions about how to meet their daily needs. Strategies ranged from use of savings to reducing consumption and eating cheaper meals, collecting fruits and seeds and seeking for financial help from friends and relatives or even more risky measures shifting in intensity from the selling off of the assets (Duale, 2018).With Sabates-wheeler & Hoddinott, (2011) cautioning that these strategies should be treated with care since the poorest do tend to change due to the current conditions to make ends meat. Within household set-up food insecurity are essentially problem, hence a number of coping strategies have been improvised. In general, the double burdens of coping lands heavily on the marginalized low-income households who have little resources to use.

2.3.2 Food Insecurity Coping Strategies

Therefore, achieving food security have seen many challenges which on many occasions led to the development of coping strategies which tends to vary from households to households or location to location in response to the situation such as shocks like floods, drought, famine and other calamities. According to Kyaw (2009), cited in Shakeel & Shazli (2020), coping strategies to food problems may be used as a means to overcome the food burden at a particular time they are faced with. Therefore, coping strategies can be assessed basing on two ways to solve the food insecurity challenges with some studies being carried out to differentiate them. According to Shakeel & Shazli (2020), this can be a food or non-food based strategies. Non-food based strategies are strategies like migration of workers and forceful mass migration have been seen in practice to cope with food insecurity among different households (Dessalegn, 2018; Quaye, 2008). However, it is unknown if the migration used as coping strategy is a temporary or permanent migration since majority of households rarely migrate due to food shortages unless it is conflict induced food insecurity.

Food has been an important element and will remain as it is for human sustainability and any alteration in the food system can change all aspect of human life. Therefore, households could be forced to start consuming immature food crops due to the increased demand for food and to cope with the hunger stress that they are faced with (Berlie, 2015). Notably, food insecurity can change household's behaviour and perception on what to consume when they are faced with food shortage, thus harvesting of food crops when it is not yet mature is a coping strategy they tend to embrace. However it is worth pointing out from the fact that these studies have said eating of immature crops are used, its is not well documented since some conditions may make crops not to be available totally say in the case of extreme weather in Gulu, Uganda.

Other notable coping strategies include consumption of wild fruits. Accordingly, the collection and consumption of wild fruits have been adopted as a coping strategy among some communities

who are faced with food insecurity (Egeru, 2012; Khatri-chhetri et al., 2018; Quaye, 2008). Opeyemi et al.,(2020), study in Ogun state of Nigeria recognizes that half of the households collected wild fruits for consumption at home and this lasted over 10days. Wild fruits have not only been seen to sustain the communities but also provided nutrients for maintaining energy requirements and fulfil food demand of the affected communities (Lolig et al., 2014). It is worth noting that although most studies focused on the consumption of wild fruits, there is need to take into account that this coping strategy can be location specific and these studies have not taken into consideration the time of the year at which fruits are available such as in the case of Uganda.

With food quantity and quality lowering among households, reduction in the portion and size of food consumed have been adopted as a mechanism to fight the food insecurity problem among some households (Kisi et al., 2018; Quaye, 2008). Furthermore, Tsegaye et al.,(2018)recognizes that most households reduces amount of food consumed as they are faced with food insecurity crisis since they have no other choices. Mojela et al. (2018) in a study in Tembisa Township, South Africa found out that 86% of the households affected by food insecurity relied on less preferred food with another 59% limiting portion of food size. Onunka, Ihemezie, Olumba, (2018), in a study recognizes that feeding on less preferred and less expensive food is a notable coping strategy used among households. Similarly, as food crisis intensify as a result of drought or floods, studies have shown that households would not only limit portion of food size or rely on less preferred food but goes another milestone in reducing the number of meals eaten in a day due to the food shortage (Kisi et al. 2018; Ndungu et al. 2021). Debesai et al. (2019) in a similar study argues that reduction on the consumption is far much better than other applied coping strategies in use. Although these have been seen as a behavioural mechanism used towards food shortage, it has positively helped a lot of communities to prolong the availability of food over a period of time. Therefore, the application of this coping mechanism to solve food shortfalls could only be applicable when there is enough food stored well under good condition henceforth there is need to bridge the gap that

may arise from quality concerned. Therefore, the studies ignored the assumption that under certain conditions some families could totally have nothing.

When faced with undefined ultimate decision to make about the food insecurity problem, households tend to resort to food borrowing, or even borrow money to buy food (Farzana et al.,2017). In a similar study, Quaye (2008) notes that in order to improve food security condition in Ghana, households had to seek for help from relatives and friends, this has ranged from food for consumption to financial support. Similar studies have also recognized that borrowing of food and money were commonly used among studied communities and it was attributed to the rural culture of community togetherness in the time of food insecurity (Tsegaye et al., 2018; Onunka, Ihemezie, Olumba, 2018). This cannot be the case with other families which may be faced with a similar condition since they may not have relatives or friends closer enough to seek for help from when faced with food insecurity challenge. Shakeel & Shazli (2020) argues that this form of coping strategy can expose the level of poverty of one household to the other hence some families will fear to borrow and become more food insecure overtime. Ramakrishna; Solomon & Daisy, (2014) also laments deeply that increase in borrowing as a coping tactic to floods or drought among households can increase food insecurity due to increase level of poverty among the affected victims. Despite consisting borrowing food as a coping strategy in many studies, they have ignored the fact that these can be influenced by location and culture like in the case of Uganda where some families tend not to borrow because they feels they have something and borrowing is not part of their nature of living.

Although there are many coping strategies to household food deficit, some households have been seen to engage in other activities to meet their food demand. According to a study in Nepal by Khatri-chhetri et al., (2018), employment have been noted to play a role in helping reduce the food deficit among households since they tend to use their earning from the work they do to bridge the gap that exist by buying food they do not have. In a similar study in Kitui county of Kenya by

Ndungu et al.,(2021), 85% of households were noted to rely on off farm activities as a form of employment and this had a positive impact on food security situation among the households who embraced this type of employment. Income generated from either full employment or part time farm work has made the household be able to buy food from the market and this has helped to improve on the food security. Never-the the less, it is worth recognising that previous studies were embedded on the fact that employment can be used to solve food insecurity as a coping strategy but it remains unclear and questionable. Therefore, there is need to assess the employment as a coping strategy among households in Gulu since when extreme weather occurs rural communities are left with nothing and they tend to have no other source of employment.

While food purchase has been seen as the most used coping strategy, it comes with financial implications on the households. Studies have shown that the presence of household assets such as livestock and poultry have been used as a coping strategy to get other food products. Previous studies by Masahudu, (2019); Negash & Alemu, (2013) reported that households have tried to improve their food security conditions through selling off their available household assets and divert the money to buy food for the members at home. Furthermore, Gebremariam et al., (2019) in a study in Lasta Wereda of Ethiopia established that selling of assets like livestock is meant purposely for income generation to be used in buying food. Study prediction shows that assets depletion can increase poverty among rural household community despite solving the short term food shortage (Shakeel & Shazli, 2020). This to some extend makes food availability questionable. Despite that, it is worth pointing out that the focus of the above mentioned studies was based on adaptation used and there use in determining the food security situation rather than finding out how frequent households used them.

While other studies have focused more on the use of available food and how they can be got through purchase, Opeyemi et al.(2020) recognize that as food insecurity crisis sets in, households with money saved tend to resort to using these savings as a coping mechanism to buy food and

make the households food secure, however they noted that this form of strategy reduces as the saving level is depleted. Although, use of savings have been noted as a coping strategy, Alpízar et al., (2020) observed this strategy to be less preferred among smallholders farmer households in central America. The use of savings have been noted to depend more on presence of food and income (Onunka, Ihemezie, Olumba, 2018). Although this coping strategy have been seen to help under certain conditions, it should be noted that previous studies did not take into account the household level of income and the fact that certain conditions like extreme weather can destroy a household only source of income. This study therefore sort to establish the indifference on the results since most farmers produce their agricultural products and sell while others have other sources of employment a part farming.

Furthermore, other notable coping strategy as stated by Berlie, (2015) may include among others eating of seeds stored for next season planting, to overcome the current challenge of food shortage. The seeds for following planting are often consumed by households who happen to have stored the seeds as a means to cope with the food. Although these strategies have been used, they have posed a greater risk to health conditions of communities. Therefore, it is worth noting that this strategy established by previous studies is to some extend not so much applicable among certain communities

While studies have focused more on food consumption, income equality, and others, coping strategies to drought driven food insecurity have also brought out other aspect of coping. Also according to study conducted in Kwale county by Makoti & Waswa (2015), 70% of the household where found to be growing drought resistant crops to cope with the situations of drought induced food insecurity. This form of coping strategies has been seen as a way to increase food availability among the affected communities for long run sustainability.

2.4 Determinants of choice of coping strategies

Although studies have been done on household food insecurity coping strategies and the choices that influence the methods used in particular among different communities, socio-economic factors have been seen to fundamentally determine victims' decisions to choose specific coping strategies among different communities and reduce the measure that can endanger their future survival. Twongyirwe et al. (2019), while conducting an assessment on drought induced food insecurity coping strategies in south western Uganda found out that coping strategies of households depended on a number of factors such as size of farmland, number of livestock and marital status. Mavhura et al., (2013), also in a similar study noted that traditional coping strategies at household levels is closely linked to the income level of the people and this is further linked to food availability during and after flood hence food is available to the high and middle-income groups, and as a result, the ability to cope with food shortage is greater among the high and middle-income groups than the low level. These factors have been seen to have positivity on the choice of coping strategies used during food insecurity. Assets like livestock and poultry availability have been used to determine the coping strategies to use. For example, (Deressa et al., 2010; Innocent et al., 2016) in their study noted that livestock and poultry where sold out to help buy other food products for consumption as a coping mechanism and these have a positive impact on the food security situation of the household. Although these findings tend to show some positivity, in a long run push the affected households into deep poverty and food insecurity if the condition persisted for much greater periods.

Coping strategy has been greatly influenced by the level of knowledge obtained by the community and the use of this indigenous knowledge has become a key in determining the type of coping strategy. This has influenced the size of the farm worked on, this in turn has a great impact on food production and its availability (Mardy et al., 2018; Piya & Lall, 2013). Furthermore, Paul & Routray, (2010) noted that as food insecurity increases among flood-affected community, they

esort to using indigenous earthen pot and polythene bags to store their food and this is from the nowledge they have gained in the use of this method in solving food crisis during this condition. Deressa et al., (2010) recognized the positivity influence brought about by education level of the ousehold on the coping strategies used by farmers in the Nile basin of Ethiopia. This means ouseholds with educated household head can use the level of education as a human capital to get mployment and use the acquired income to purchase food for the household members in the long un. Similarly, Ndungu et al., (2021) also noted that education level of the household can reduce he rate of selling of assets to buy food since they will rely more on savings and have a diversified ivelihoods which makes them cope easily than less educated who can only use the social support ervice to help them. (Berman et al.,2015; Helgeson et al.,2012; Mavhura et al.,2013; Shah et al.,2017) argued that as other household with educated household heads can resort to other forms of employment, the less educated have been seen to rely on less economic activities which later influence the coping strategies negatively.

Bryan et al., (2010) shares the view that an increase in food production can be achieved through irrigation; this has greatly influenced the crop type thus leading to high-value crops being cultivated among the households. In different communities, irrigation has helped to increase the availability of food when droughts occur and the use of irrigation has been seen for a specific type of crops which are of high value in the market and this has had a great impact on the coping strategy to be used with the present water dams available. This has had a positive impact of the coping strategy and food security situation among the frequently affected communities.

In related studies, age was greatly noted to have much influence on the coping strategies where older household heads were seen resorting to the sale of the livestock and poultry as a coping strategy (R. J. Berman et al., 2015; Deressa et al., 2010; Doris et al., 2018; Shah et al., 2017), but to some households which are older, the reliance on social support was a much better option. While among the young household heads the use of savings and other economic activities in Uganda

were seen to reduce the effects of weather extreme food security as they cope with the situation (Helgeson et al., 2012).

2.5 Summary and conclusion of literature review.

From the literature reviewed, many scholars and researchers had concentrated on the use of consumption over a week, 24 hours with daily calorie intake when determining food insecurity and yet this leaves a big gap under certain circumstances when a particular household have been eating in the past days prior to the study. Furthermore, the literatures on food security left out some critical food security scaling which could have been useful like the mild and moderate conditions. While literatures reviewed recognize some coping strategies used among households, it did not encompass the salient strategies commonly used among households. Studies conducted relied on short period of information like a season. This type of studies requires a grace period to completely come out with adequate information which is of great use.

Most studies conducted on the food security coping strategies did not consider the seasonal extreme weather events rather concentrated on the much more serious floods and droughts and yet seasonal drought and floods can also cause food insecurity among households. Other based studies reviewed also did not have adequate representation in terms of gender among the population.

Lastly, from the literatures reviewed, many scholars and researchers had significantly identified that households are more likely to use various coping strategies to overcome food insecurity, however the factors that compels them to adopt these strategies have not been well brought out with others arguing that some factors are location specific. The literature reviewed had not gone further to propose strategic interventions that could help implementers resolve the existing challenges.

CHAPTER THREE:

METHODOLOGY

3.0 Introduction

This chapter describes the procedures through which the study was conducted. It focuses on the research design, study population, sampling design, data collection techniques, and instruments, quality control of instruments, ethical considerations, and data analysis methods.

3.1 Research Design

The study employed a household based retrospective cross-sectional survey design to identify the household food security status, coping strategies to the weather induced food insecurity among farming households in the previous 12months. This was chosen from the fact that the study wanted to collect data from a single point in time based on the past experience and was in correspondence to previous study (Nagappa et al., 2020). Therefore, this study collected quantitative data using semi-structured interview questionnaire schedule.

3.2 Study area

The study was carried out in the selected sub counties in Gulu district which is one of the districts in the Acholi sub region in Uganda. Gulu district constitutes of twelve (12) sub counties. Over the years Palaro, Bungatira and Paicho sub county have had similar experiences of floods, drought and food insecurity (Ocungi, 2020; Ochola, 2020; Ojara 2021). Therefore, the study considered the above stated sub counties because they have experienced extreme weather conditions and food insecurity conditions and hence deemed relevant in providing up to date information. The district is located in the Northern part of Uganda 340 kilometers away from Kampala the capital city and bordered by district such as Lamwo, Pader, Amurur, Omoro and Gulu city to the North, East, West and south respectively (UBOS, 2017).

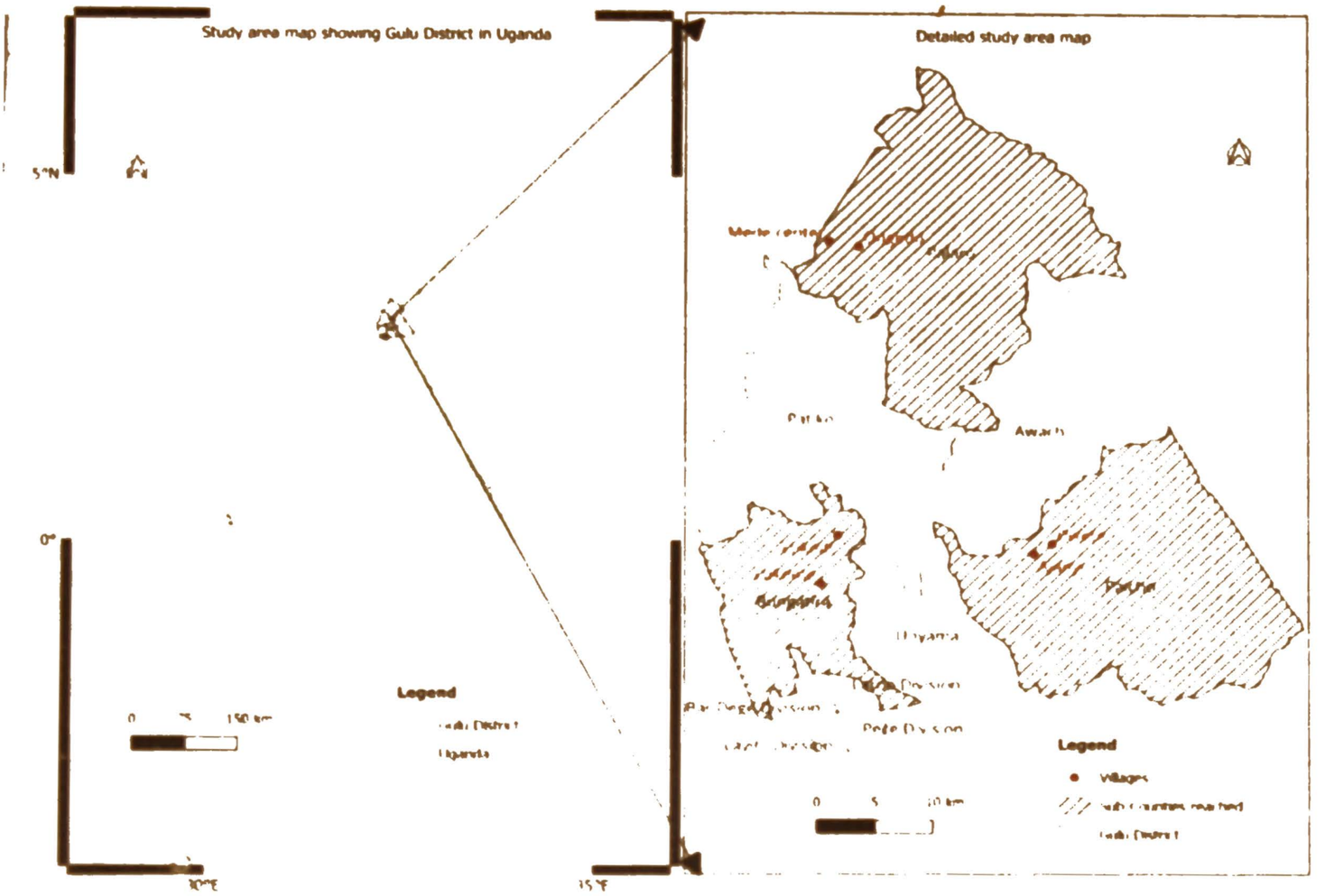


Figure 3.1: Map of the study area

3.3 Study Population

The study population constituted household community members who were engaged in farming and living in the selected sub counties in Gulu district, Acholi sub region of Uganda. The choice of the study was guided by the previous encounter and in line with the disaster occurrence like seasonal floods, drought, and food insecurity situation in the country. According to (UBOS, 2017) projection, Gulu district had a population size of 125,307, with majority habiting rural part of the district. Therefore, the study was carried out in Gulu district and the most affected sub-counties that experienced such extreme weather conditions as flooding or drought.

3.4 Sample Size determination

In Acholi sub-region, Gulu district has a population of 12,5307 occupants (UBOS, 2017). Considering such a population size and with a 7% rate for non-response, the sample for the study was estimated to be 204 households. This was considered appropriate for the population and this was calculated using the equation below, as previously used by (Melese et al., 2021; Sani, 2019)

$$n = \frac{N}{1+N(e)^2} \quad \text{..... Equation 1}$$

Where

n= the sample size

N= the population of the study area

e= non response

$$n = \left[\frac{125,307}{1+125,307(0.07)^2}\right] = 204 \quad \text{..... Equation 2}$$

From this sample size each sub county constituted seventy (68) households and lastly each village had between thirty to forty (30-40) households. The sub counties having equal sample allocated is justifiable from the fact that for an area to be gazette to a sub county level they must had a population of about ten thousand (10,000) and above (The Local Government Act, 1997). The sample households in the villages were not equal due to the difference in the population concentration.

3.5 Sampling Techniques

A multistage sampling with four phases was adopted to select households that participated in the study purposively. Gulu district has 8 sub counties and three sub counties were chosen for the study. Hence the three sub counties considered in the study were namely Palaro, Bungatira and Paicho in the first stage. In the second and third phase, one parish per Sub- County and two villages were considered. From stage one to stage three, purposive sampling was used because the researcher believes that these three sub counties, parishes and villages provided relevant

information since it had previously been documented to have experienced flood, drought and food insecurity (Ocungi, 2020; Ochola, 2020; Ojara, 2021). Lastly, households were selected for the study using a random sampling. According to Amin, (2005), sample obtained from the population using simple random sampling may have equal chances of being selected. Therefore, the farming households for the study were chosen using the random methods of study with each village comprising of thirty to forty (30-40) selected households until the required calculated number of 204 was obtained. For household heads, the researcher involved adults involved in decision making or cooking the food in the house for more than 5 days a week and belonging to that family for more than 2 months and any other directly involved in the food preparation in the event the household head is not around (Nagappa et al., 2020). In the case of a chosen household head being absent or declining to be part of the study, this was covered under the seven percentages (7%) of non-responses.

3.6 Study instrument

The Questionnaire consisted of semi- structured interview administered questions designed to collect information from the respondents in writing. The questionnaire comprised the socio-demographic section, weather related information section, a section measuring food security, and a section measuring coping strategies at a household level. This was developed to understand respondents' coping strategies and to find out how other factors have influenced these coping strategies and food security.

3.7 Data collection

The questionnaire was pretested in Otuke district. This was justifiable in a sense that the district experiences similar conditions just like Gulu district for this case. Therefore, the study data were collected between end of July and beginning of August 2022.

3.7.1 Determination of household food security status

This study adopted the use of Household Food Insecurity Experience Scale (HFIES) to measure the level of food insecurity among the targeted households. According to Coates et al.,(2007), food insecurity can be measured through the use of occurrence questions that follows each other with frequencies of their occurrences. This helped the study to determine the general level of severity of food insecurity and how often the condition occurred.

3.7.2 Assessing household coping strategies to extreme weather induced food insecurity

To measure coping strategies to extreme weather induced food insecurity for this study, households were asked to rate the measures used during weather induced food insecurity periods and these were selected based on the literature review. According to Mondal & Murayama, Nishikizawa, (2021), previous study literature on coping strategies could help in gathering of information on what households could have used when faced with different situations from drought, floods to food insecurity. The coping strategies were asked in a closed ended questionnaire manner where response categories were modified to include frequency of coping, rated on a five-point scale. The scale ranged from 'never' (1) to 'always' (5). The response categories were as follows: Never- strategy of coping not used at all, Seldom- strategy used 25% of the time, Sometimes- strategy used 50% of the time, Often- strategy used 75% of the time, and Always- strategy used 100% of the time. Further, this study adopted this assessment method from a similar study which was conducted Nigeria because it gave a quantitative score for each household with an accumulative measures of the different levels of coping strategies used (Onunka, Ihemezie, Olumba, 2018)

3.7.3 Assessing the determinants of choice of coping strategies to extreme weather induced food insecurity

This study adopted the use of structured questionnaire, which comprised of age, sex, household size, educational status, occupation, income, religious affiliation, employment status, and marital

status. Social demographic factors play a role in influencing food security and nutritional status among different groups of people in the society (Mavole et al., 2016).

3.8 Data Analysis

Data analysis was conducted in two main parts through the study process: data processing/ preparation (i.e., preparation of data for analysis) and actual data analysis: during the statistical analysis of the data. Data were collected and edited, categorized, coded, and then entered into a computer using the Statistical Package for Social Science (SPSS) version 25.0. This was used to analyse different variables through descriptive statistics such as frequency, percentage, mean and standard deviation. And this was done for all the data that was generated from the questionnaire.

3.8.1 Analysis of household food security status

Descriptive statistics was used to compute household food insecurity level and these was later categorized into food secure, mildly food insecure, moderately food insecure and lastly severely food insecure. Respondents were asked questions and based on the responses food secure households were those households who said no to all the questions asked, mildly food insecure households were those who said yes to at least one to 3 (1-3) questions, for those who responded by saying yes to four to five (4-6) questions were said to be moderately food insecure, and lastly those who said yes to questions seven to eight (7-8) where termed as severely food insecure. The food security categorization was done with the guidance from previous similar study which gave a clear statistical outlook of the result (Onunka, Ihemezie, Olumba, 2018; Padmaja et al., 2022)

Table 3.1: Category of Food Security/Insecurity

Affirmative responses to questions	Category of food security/insecurity
No	Food Secure
Yes (1-3) questions	Mildly Food Insecure
Yes (4-6) questions	Moderately Food Insecure
Yes (7-8) questions	Severely Food Insecure

3.8.2 Analysis of household coping strategies to extreme weather induced food insecurity.

In analyzing Coping Strategy Index (CSI), responses were further assigned weights on a 5-point scale where Never was denoted as zero (0), seldom was given a weight of (1), sometimes was assigned a weight of one (2), often was assigned weight of three (3), and always was given a weight of four (4) as adopted from a study in Nigeria with little modification (Onunka, Ihemezie, Olumba, 2018). The Coping Strategy Index used was adopted from as follows;

$$CSI=N_4X_4+N_3X_3+N_2X_2+N_1X_1+N_0X_0 \qquad \text{Equation 3}$$

Where:

CSI is the Coping Strategy Index.

N_i is the number of households using a particular coping strategy.

X_i is the scoring order for the frequency.

While the Weighted Mean Score for the household response to coping strategies were calculated from the formula below:

$$WMS_i=\frac{CSI}{Z} \qquad \text{Equation 4}$$

Where:

WMS is referred to as the Weighted Mean Score.

CSI is the Coping Strategy used.

Z is the total number of households used in the study.

.8.3 Analysis of the determinants of choice of coping strategies to extreme weather induced ood insecurity.

'o identify the drivers/ factors influencing the choice of household coping strategy, a multiple inear regression was used to understand if there is any relationship between social demographic actors and the coping strategies. From a similar study, in Enugu State, Nigeria, multiple regression vas used to identify the influencing factors on coping strategies by subjecting these variables to he regression analysis (Onunka, Ihemezie, Olumba, 2018). The multiple linear regression model vas run using SPSS version 25. The multiple linear regression was used as below.

$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + e_i$ ..... Equation 5

Where;

Y= coping strategy index as the dependent variable

b_0 = is the intercept value

X_1 = is the independent variables like age, sex, marital status, education among others.

3.10 Ethical considerations

Ethically, determinations of the study if it meets all the ethical values were done by the Gulu University Ethics Committee (appendix 1). This was followed by authorization from the Chief Administrative Officer of Gulu district carry out the study in the designated areas. Lastly, consent from participants was sought for and they signed before administering the questionnaire. Participants were informed prior to participation in the study. According to Uganda National Council for Science and Technology (UNCST), (2014), participants should be informed and allowed to make choices to participate in the study and joining the study be voluntary. Participants' information is to be protected in line with the data protection policy. According to Data-Protection-and-Privacy-Act of 2019. n.d.), information or data collected from a research participant are vital

ınd protection is needed with no disclosure unless otherwise the participant accepts that his or her nformation be disclosed. In line with the current pandemic, this study observed the Standard)perating Procedures (SOPs) set out by the government to stop the spread of Covid 19 when :arrying out the data collection.

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CHAPTER FOUR:

RESULTS

4.1 Socio-demographic background of respondents

At the end of the data collection, 204 households participated in the survey. The descriptive statistics results in Table 4.1 indicated that from the gender perspective, 55% respondents were female while 45% were male. The average household size of participants was 6.5 members. Majority of the household respondents (73%) had attained primary level of education. With about 29% of the respondents being found to be in the age category of 41 and above while the lowest was in the age category of 36 to 40 years. Concerning the average monthly income, 32.4% of the respondents earned between 100,001 and 200,000 Uganda shillings with majority (54%) of them reporting self-employment as their main source of employment.

Table 4.1: Socio-demographic characteristics of the respondents

Variables	N	%	Variables	N	%
osition in a household			**Education Level**		
Household Head	162	79	No Formal Education	23	11.3
Household Caregiver	42	21	Primary	149	73
ender of the respondents			Secondary	27	13.2
Male	91	45	Tertiary and University	5	2.5
Female	113	55	**Employment Status**		
larital Status			Pensioned	2	1.0
Single	29	14.2	Self employed	110	54
Married	160	78.4	Civil servant	2	1.0
Divorced	8	4	Employed in the private sector	7	3
Widowed	7	3.4	Casual worker	83	41
Age			**Average monthly income**		
Below 25	51	25	Less 100,000	54	26.5
26-30	39	19	100,001-200,000	66	32.4
31-35	33	16	200,001-300,000	52	25.5
36-40	22	11	300,001-400,000	16	7.8
41 and above	59	29	400,001 and above	16	7.8
Other variables	**Mean**	**Std. Deviation**			
Household size	6.5	2.9 (2.87908)			
Number of employed people	2.6	1.6 (1.60453)			

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Other variables	**Mean**	**Std. Deviation**			
Household size	6.5	2.9 (2.87908)			
Number of employed people	2.6	1.6 (1.60453)			

4.2 Drought and rainfall experiences by the participants

From the appendix 3, when asked if they had experienced floods or drought(s) in the past years, 72% and 68% of the respondents said yes to have experienced floods and drought respectively. The respondents indicated that 2021 and 2022 were the worst year hit by flooding and drought while food shortage and decline in crop yield was noted also to be the major effect of the floods and drought respectively. When asked how they overcame the situation, 27.5% of the households resorted to selling the available assets during flooding period while 2.9% sought off farm employment. Although there were many short-term strategies to cope with the effects of floods, when it came to drought 23.5% of the respondents opted to changing the planting dates for crops while only 2% of them practised irrigation and relied on received food aid. The severity of the floods and drought events was such that 36.3% of the respondents reported that the floods affected all the households in the village while 54.4% of them reported that drought affected all the households in the village.

4.2.1 Experiences of the respondents on the occurrence of rainfall

Results on the rainfall occurrence in the study area prior to the survey are presented in Table 4.2. Concerning the rainfall incidents in the studied area, 72% of the respondents indicated that it has been coming too late while only 13% noticed rain coming on time. With the above information on rain coming on time, respondents further reported that at the beginning of the season rainfall amount was too little (75%) and also during the growing season (60.8%). In addition, 51.5% of the respondents reported that rain stopped too early in the season and that they have noticed a change on the rainfall (74.5%)

Table 4.2: Rainfall experiences of the respondents

Responses	N	%	Responses	N	%
)id the rainfall come on time			**Did it rain near harvest time**		
On time	26	13	Yes	123	60
Too early	31	15	No	81	40
Too late	147	72	**Have you noticed any change in the rainfall**		
Vas there enough rain on your field t the beginning			Yes	152	74.5
Enough	21	10	No	34	16.7
Too little	152	75	Don't know	18	8.8
Too much	31	15	**If yes, what changes have you noticed**		
Vas there enough rain on your field luring the growing season			Rains have become more erratic	79	39
Enough	34	16.7	Rain comes earlier	10	5
Too little	124	60.8	Rain comes late	52	25.5
Too much	46	22.5	Rains are heavier	17	8.3
)id the rain stop on time on your ield			Longer period of drought	25	12.2
On time	25	12.3	More floods	21	10
Too early	105	51.5			
Too late	74	36.3			

4.2.2 Extreme weather and food insecurity nexus

Extreme weather and food security-insecurity nexus is presented in Table 4.3. Based on the responses obtained on whether a household have experienced seasonal drought, floods and food security or insecurity, 204 households were asked if they had been affected by either drought or floods. Responses were segregated according to the food insecurity measurement scale and of the 204respondents asked, 146participants said they were affected by floods, and this account for about 74% of those severely food insecure while 138participants from the households said they had been affected by drought and this led to 73% of the households becoming severely food insecure.

Table 4.2: Rainfall experiences of the respondents

Responses	N	%	Responses	N	%
Did the rainfall come on time			**Did it rain near harvest time**		
On time	26	13	Yes	123	60
Too early	31	15	No	81	40
Too late	147	72	**Have you noticed any change in the rainfall**		
Was there enough rain on your field at the beginning			Yes	152	74.5
Enough	21	10	No	34	16.7
Too little	152	75	Don't know	18	8.8
Too much	31	15	**If yes, what changes have you noticed**		
Was there enough rain on your field during the growing season			Rains have become more erratic	79	39
Enough	34	16.7	Rain comes earlier	10	5
Too little	124	60.8	Rain comes late	52	25.5
Too much	46	22.5	Rains are heavier	17	8.3
Did the rain stop on time on your field			Longer period of drought	25	12.2
On time	25	12.3	More floods	21	10
Too early	105	51.5			
Too late	74	36.3			

4.2.2 Extreme weather and food insecurity nexus

Extreme weather and food security-insecurity nexus is presented in Table 4.3. Based on the responses obtained on whether a household have experienced seasonal drought, floods and food security or insecurity, 204 households were asked if they had been affected by either drought or floods. Responses were segregated according to the food insecurity measurement scale and of the 204respondents asked, 146participants said they were affected by floods, and this account for about 74% of those severely food insecure while 138participants from the households said they had been affected by drought and this led to 73% of the households becoming severely food insecure.

Table 4.2: Rainfall experiences of the respondents

Responses	N	%	Responses	N	%
Did the rainfall come on time			**Did it rain near harvest time**		
On time	26	13	Yes	123	60
Too early	31	15	No	81	40
Too late	147	72	**Have you noticed any change in the rainfall**		
Was there enough rain on your field at the beginning			Yes	152	74.5
Enough	21	10	No	34	16.7
Too little	152	75	Don't know	18	8.8
Too much	31	15	**If yes, what changes have you noticed**		
Was there enough rain on your field during the growing season			Rains have become more erratic	79	39
Enough	34	16.7	Rain comes earlier	10	5
Too little	124	60.8	Rain comes late	52	25.5
Too much	46	22.5	Rains are heavier	17	8.3
Did the rain stop on time on your field			Longer period of drought	25	12.2
On time	25	12.3	More floods	21	10
Too early	105	51.5			
Too late	74	36.3			

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Table 4.3: Relationship between extreme weather and food insecurity

Seasonal drought and flood checked	Food insecurity experience scale			
	Food secure	Mildly Food insecure	Moderately Food insecure	Severely Food insecure
Have you/your household been affected by any serious form of flood				
Yes (146)	4 (3%)	5 (3%)	29 (20%)	108 (74%)
No (58)	14 (24%)	7 (12%)	11 (19%)	26(45%)
Have you/your household been affected by any serious form of drought				
Yes (138)	6 (4%)	8 (6%)	23(17%)	101 (73%)
No (66)	12 (18%)	4 (6%)	17(26%)	33 (50%)

4.3 Food security status among households studied

According to the study categorization, food security situation had been grouped into four categories as in figure 4.1. As shown in Figure 4.1, about 65.69% of the households in the study area are severely food insecure while only 8.82% are food secure. Furthermore, households with moderate food insecurity accounted for 19.61% and 5.88% found to be mildly food insecure.

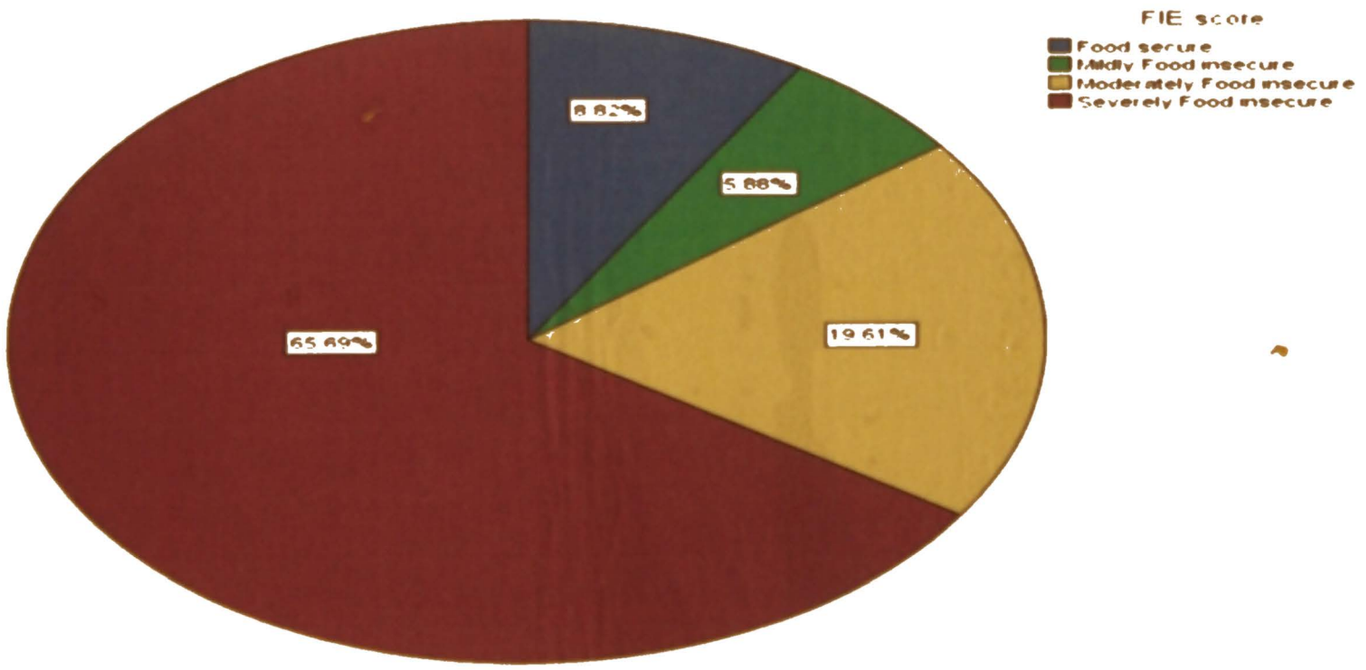


Figure 4.1: Proportions of households segregated by status of food insecurity

4.3.1 Characteristics of food security among households based on socio-demographic conditions

From Table 4.4a and Table 4.4b, it was found that Palaro Sub County had the highest number of severely food insecure households followed by Paicho Sub County. Furthermore, the study established that there are gender indifferences when it comes to food security situation with women being the most severely food insecure. At household level, the study also noted that those who are married are the most severely food insecure while those above 41years were moderately food insecure. While knowledge got from education could have helped, the study result in Table 4.4b indicated that those with primary education level are the most severely affected members while those who earned less than 100,000 Uganda shillings were also noted to be severely food insecure but as income level increased food insecurity level also reduced.

Table 4.4a: Distribution of socio-demographic characteristics of food security experience among households

Socio-demographic factors	Food Insecurity Experience Scale			
	Food secure	Mildly Food insecure	Moderately Food insecure	Severely Food insecure
Sub county				
Palaro	0	1	8	59
Bungatira	18	7	13	30
Paicho	0	4	19	45
Gender				
Male	13	5	17	56
Female	5	7	23	78
Marital Status				
Single	6	1	4	18
Married	12	9	33	106
Divorced	0	1	2	5
Widowed	0	1	1	5
Age				
Below 25	7	2	4	38
26-30	3	4	7	25
31-35	3	1	8	21
36-40	2	2	4	14
41 and above	3	3	17	36

Table 4.4b: Distribution of socio-demographic characteristics of food security experience among households

ocio-demographic factors	Food Insecurity Experience Scale			
	Food secure	Mildly Food insecure	Moderately Food insecure	Severely Food insecure
Education Level				
No Formal Education	0	3	4	16
Primary	7	6	30	106
Secondary	9	2	5	11
Tertiary and University	2	1	1	1
Employment Status				
Pensioned	1	0	1	0
Self employed	6	6	23	75
Civil servant	1	0	1	0
Employed in the private sector	2	1	0	4
Casual worker	8	5	15	55
Average monthly income				
Less 100,000	5	2	2	45
100,001-200,000	4	5	18	39
200,001-300,000	3	1	14	34
300,001-400,000	3	0	4	9
400,001 and above	3	4	2	7

4.4 Household coping strategies to weather induced food insecurity.

Results from the study showed that households in the study area had adopted several strategies to cope with food shortages resulting from extreme events as shown in **Table 4.5.** From the results, it was noted that most households did not borrow food from other people and it came 11th in ranking while engaging in fishing activities came last at number 12 in the ranking. Although these two where ranked 11th and 12th, feeding on foods that are less expensive came 1st as the most used coping strategy followed by reduction in food consumption and expenses. Other coping strategies applied by the households included reducing number of meals per day coming, feeding children first and skipping meals.

Table 4.5: Coping strategies used by the households

ping strategies	Responses					CSI	WCSI	Rank
	Never (0)	Seldom (1)	Sometimes (2)	Often (3)	Always (4)			
· borrow food from er people	86(0)	25(25)	53(106)	23(69)	17(68)	**268**	**1.31**	**11**
d out assets and used money for buying food	51(0)	13(13)	93(186)	32(96)	15(60)	**355**	**1.74**	**9**
ipped meals at times	22(0)	15(15)	98(196)	50(150)	19(76)	**437**	**2.14**	**5**
: always reduce on our od consumption and penses	12(0)	5(5)	51(102)	91(273)	45(180)	**560**	**2.75**	**2**
rrowed money for ving food	71(0)	41(41)	60(120)	14(42)	18(72)	**275**	**1.35**	**10**
d to reduce on number meals per day	11(0)	6(6)	59(118)	85(255)	43(172)	**551**	**2.70**	**3**
ed our previous savings buy what is lacking like od	67(0)	21(21)	33(66)	52(156)	31(124)	**367**	**1.80**	**7**
orked for food	57(0)	29(29)	61(122)	14(42)	43(172)	**365**	**1.79**	**8**
rvived by eating wild its	24(0)	34(34)	91(182)	27(81)	28(112)	**409**	**2.0**	**6**
d to feed on foods that less expensive to buy	10(0)	5(5)	34(68)	97(291)	58(232)	**596**	**2.9**	**1**
ildren are fed first with od	26(0)	14(14)	88(176)	42(126)	34(136)	**452**	**2.22**	**4**
d to engage in fishing ivities to make food ailable	149(0)	20(20)	15(30)	6 (18)	14(56)	**124**	**0.61**	**12**

4.5 Determinants of choice of coping strategy to extreme weather induced food insecurity.

From the Table 4.6 below, coping strategy index have been run as a dependent variable while the socio-demographic factors are the predicting variables for choosing the coping strategy.

Table 4.6 presents results on the determinants of coping strategies applied by selected households in Gulu district when they experienced extreme weather induced household food insecurity. From the analysis, the level of significance were at 10%, 5% and 1% respectively. The most positively significant determinant in the choice of coping strategy for the study was at 5% which included

location in terms of sub-county, village, and education level while others which were positively significant but of less influence at 1% were distance to the nearest market, average monthly income, employment status and livestock owned. While some of the respondents, marital status did not show any influence on the coping strategies used by the households.

Table 4.6: Factors influencing the choice of coping strategy used by households who experienced extreme weather induced food insecurity in Gulu district

Explanatory variables	Coefficient	Std. Error	T value	Sig.
(Constant)	45.700	5.310	8.607	.000
Sub County	-2.421	.976	-2.482	.014***
Parish	-.133	.266	-.498	.619
Village	-.561	.259	-2.164	.032**
Position in the household	-1.933	1.522	-1.270	.206
Gender	.269	1.199	.224	.823
Marital Status	-.215	1.164	-.185	.854
Age of respondents	.020	.451	.044	.965
Education level	-2.539	1.064	-2.385	.018**
Employment status	-1.104	.425	-2.596	.010***
Livestock owned	-3.856	1.643	-2.346	.020**
Other assets owned	.414	.555	.746	.456
Household Size	.253	.272	.933	.352
People in your household earn some income	-.255	.470	-.543	.588
Average income per month	-1.635	.535	-3.054	.003***
Distance to the nearest market.	1.054	.348	3.025	.003***

*, ** and *** indicate 10%, 5% and 1% level of Significance respectively.

CHAPTER FIVE:

DISCUSSION

5.0 Introduction.

This chapter presents discussions of the study.

5.1. Food Security statuses among households

Food Insecurity Experience Scale (FIES) is one of the proven methodological ways of determining food security situation/ status owing from the fact that it can be used across different countries to monitor food security situation (Padmaja et al., 2022). According to the national food insecurity average level is stated to be at 20%. The finding of the current study in figure 4.1 showed that majority of the households were food insecure. And from the food insecurity breakdown, 65.69% of the households in Gulu district were in a severe food insecurity state. The high prevalence of food insecurity among the households are attributed to the low production due to the destruction in the production cycle (season), poor production planning within the households, coupled with increased sales of produced farm products. Further, Figure 4.1, indicated that floods and droughts influences food insecurity among the households. The findings from this study coincides with similar study within Uganda that both found that food insecurity was high among the households (Patterson et al., 2016; Yikii et al., 2017). Due to the high level of food insecurity, Table 4.3 indicated that majority of households who have been affected by floods or drought had been faced by serious food insecurity challenges. Therefore, food insecurity had been caused by floods and drought in Gulu district. And further these food insecurity induced by the extreme weather events had affected severely households with less than 100.000 Uganda shillings earning, married and lastly females (Table 4.4a and Table 4.4b). Therefore, there is need to continuously do quarterly research to help monitor the trend of the food security situation among the households not only affected by extreme weather but also other factors.

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5.2. Household coping strategies to extreme weather induced food insecurity

Both food insecure and food secure households had reported using at least one or more than four coping strategies to respond to the weather induced food insecurity than has triggered problem of food shortage (Table 4.5). Household coping strategies used among the studied communities included borrowing food, selling assets, skipping meals, reducing food expenses and consumption, borrowing money to buy food, reducing number of meals, use of previous savings to buy food, working for food, eating wild fruits, feeding on less expensive food, children eating first, and lastly engaging on fishing activities. From the study (Table 4.5), it indicates that feeding on food that is less expensive to buy was ranked first (1st) ahead of other available coping strategies among rural households in Gulu district. This study finding concurs with other studies done in countries like Nigeria, South Africa and central America (Alpizar et al., 2020; Mojela et al., 2018; Onunka, Ihemezie, Olumba, 2018), which states that feeding on less expensive foods can help prolong food security situation. The use of this strategy as the most applied strategy is justifiable from the economic perspective that there is an increase in the market price of basic commodities like food. With the indifference between the household incomes which is low and high market prices could have made them to resort to buying foods that are cheap relative to their household income no matter the quality. The consumption of low-quality food in the long run compromise the nutrient and health of such households if the condition over persisted.

The second ranked and used coping strategy among the households was reduction on food consumption and expenses in Gulu district (Table 4.5). The study findings is in consonance with other findings like (Kisi et al., 2018; Quaye, 2008; Tsegaye et al., 2018), who reported that pensioners in Jimma and households in Ghana engage in consumption and income smoothing as they are faced with food shortage. The coping strategy used were because it would prolong food availability among households as they approach and are faced with food shortage. Furthermore, reduction in number of meals per day was ranked third (3rd) and was followed by feeding children

first before adults. This study result is in agreement with similar studies conducted in (Debesai et al., 2019; Kisi et al., 2018; Ndungu et al., 2021), which found that at the start of food shortage crisis, within the households adults are the first to reduce their quantity of food eaten in favour of the children and when the condition further deteriorate they cut down the number of meals. This can be an appropriate coping strategy among households which have children but it can be rarely applicable among households who do not have children and it can be hard to apply under conditions where household members are all adults.

Furthermore, studies has indicated that use of previous savings is widely used among households (Opeyemi et al., 2020). This is further questionable from the fact that a study Central America noted a relatively low usage of savings among the smallholder farmers (Alpízar et al., 2020), and this have been argued to depend more on presence of food and income (Onunka, Ihemezie, Olumba, 2018). In Gulu district, the study finding reveals that out of the 12 coping strategies, use of previous savings was ranked 6th and this is in agreement with study in central America and Nigeria (Alpizar et al., 2020; Onunka, Ihemezie, Olumba, 2018), which found low usage of the strategy among household . The coping strategy in use is effective but for this case it relied on availability of food stored and money saved by households from previous earning for future use.

Furthermore, Table 4.5 in the study indicates that selling of assets as a coping strategy is ranked ninth (9th) among households in Gulu district. This study finding is in total disagreement with earlier studies conducted in countries like Ethiopia (Gebremariam et al., 2019; Masahudu, 2019; Negash & Alemu, 2013) which found out that selling of assets is widely used among households. But this study agrees with the statement by (Shakeel & Shazli, 2020) which states that selling of assets can in a long run lead to increased poverty which still puts the people on the blink of food insecurity. Further, this study is in line with a study conducted Guatemala which found out low selling of assets was lastly applied among households. The increasing cases of food insecurity

among households can be attributed to poverty which has been brought about by selling of assets therefore if households do not dispose their available assets, it can help them in a long run.

Lastly, borrowing food, money and engaging in fishing activities were the least used coping strategies among households in Gulu district. According to (Onunka, Ihemezie, Olumba, 2018), borrowing of food and money can be attributed to by the presences of some few rich people/ money lenders and micro-finance among the community. Borrowing of money and food has further been seen as a last resort among households affected by food insecurity. The study findings of this study disagree with study findings in Nigeria, Bangladesh and Ethiopia by (Farzana et al., 2017; Onunka, Ihemezie, Olumba, 2018; Tsegaye et al., 2018) which noted that borrowing of money and food was highly used among households. This therefore shows that borrowing of food, money and fishing is location specific and relied more on other resources. While those other coping strategies might have had less applicability, there is an imperatively high need that they should not just be ignored and taken into better ways since once enhanced they can sensationally help the households also in the long run.

5.3. Determinants of choice of coping strategies to extreme weather induced food insecurity.

According to Mavole et al.,(2016), the choice of coping strategies can be influenced by different socio-demographic factors. Results in Table 4.6 of study indicated that different socio-demographic factors at household level have a varying degree of influence on determining the choice of coping strategy to be used. The result in Table 4.6 established that having livestock or birds influenced to a greater extend positively the choice of coping strategy to use. In agreement with this study finding, Twongyirwe et al.,(2019); Deressa et al.,(2010); Innocent et al.,(2016) reported that assets like livestock can be converted into cash for buying food at home. The presence and use of livestock as an alternative is justifiable from the fact that in rural areas majority of households do rear livestock and birds. Results of selling assets as a coping strategy have been

least ranked at position nine (9). According to Table 4.6, this is justifiable from the fact that almost all the households had livestock and the market have been rendered less effective due to low demand while for other assets which had negative influence was attributed from the fact that all households where thinking about keeping the little they had over selling or exchanging for food. Further, selling of assets can in a long run push the affected households into deep poverty and food insecurity if the condition persisted for much greater periods

Educational background or levels have interestingly been found to determine the choice of coping strategy a particular household takes. Results of the study showed that educational level had a positive influence on the choice of coping strategies among households (Table 4.6). With many studies establishing that education level positively influenced coping strategies, it is noted that apart from being human capital to getting employment, they can help in determining the size of production within the land and food storage mechanism (Mardy et al., 2018; Ndungu et al., 2021; Paul & Routray, 2010; Piya & Lall, 2013), therefore, it justify the need to improve better service delivery in the education sector and incorporation of basic educational knowledge that can help households to overcome the food insecurity challenges at all levels of education.

The results implied that households who earn monthly average income can buy food and this is linked to it being a good coping strategy and the findings of the study indicated that there is a positive relationship between average monthly income and coping strategy in Gulu district. The results of the findings agrees with a similar study by Mavhura et al.,(2013), who noted that traditional coping strategies at household levels is closely linked to the income level of the people and that food is always available among the high and middle income earners because they can use the income earned to buy what is not available. And this study findings evidence justifies the need for household income enhancement among different communities without any bias or political discrimination.

In terms of other social demographic factors influencing coping strategy, age was negatively noted not to have any influence on the choice of coping strategy (Table 4.6). This is in disagreement with other studies elsewhere who found that age have positive influence on coping strategy used by households (Berman et al., 2015; Deressa et al., 2010; Doris *et al.*, 2018; Shah et al., 201). This finding is justifiable from the view that majority of the participants are still youthful and energetic to ensure the continuous production of food and make it available.

Furthermore, contrary to the expectations, the results of the study findings showed that marital status of either the household head or caregiver had no possibility of influencing the choice coping strategies in overcoming the weather induced food insecurity (Table 4.6). The negative marital status influence on choice of coping strategy deviates from other study findings such as Twongyirwe et al.,(2019) who got a positive relationship between marital status and coping strategy. This could be because most of the respondents in the study area

In regards to gender among the study participants, the results indicated that whether the household is headed by a male or female, there is no likely influence on the choice of coping strategy adopted. The results disagree with studies elsewhere which found out that gender can influence or dictate the choice of coping strategy to be used. Therefore, there is need to investigate further the reasons as to why these socio-demographic factors and any other related factors that this study could have not used on how they could have had an influence on the coping strategies in Gulu district.

CHAPTER SIX:

CONCLUSIONS AND RECOMMENDATIONS

6.0 Introduction

This chapter draws conclusions from the study findings and then makes recommendations as per the objectives.

6.1Conclusions

6.1.1 Food Security statuses among households

As stated in figure 4.1, the study highlights a high prevalence of severely food insecure at 65.69% among the households in Gulu district, due to the negative impacts of extreme weather over the years. Therefore, the study came to a conclusion that food insecurity in Gulu District had been induced by weather extremes as also shown in Table 4.3. Thus this study provides a good benchmark for assessing the food security situation at household level and this can be used across the greater part of the country from the fact that the level of food insecurity is too high and can continue to rise as time goes on.

6.1.2 Household coping strategies to extreme weather induced food insecurity.

According to the study finding, the most used household coping strategies to fight against food insecurity were feeding on foods that are less expensive which ranked number one (1), reducing on food consumption and expenses at position one (2), reducing number of meals per day at position one (3), children being fed first with food at position one (4), skipping meals at times at position one (5), use of previous savings to buy what is lacking like food at position one (6). Therefore, the coping strategies to weather induced food insecurity in Gulu district have been short-termed because the food insecurity situation had major affected by seasonal drought and flooding. This study therefore provides evidence that although seasonal drought and flooding is

looked at as light causer of food insecurity, it should be taken into consideration that households should be strictly followed at after the occurrence of weather extreme events when coping with the weather induced food insecurity situations at home. Further, the study brought to light that there is need for continuous capacity building and scaling up through strengthening of the social policies and protection systems since its sensitive and the households own the coping strategies.

6.1.3 Determinants of choice of coping strategies to extreme weather induced food insecurity.

The study revealed that coping strategy among households in Gulu district was associated with factors such as educational level, presence of livestock and location, employment, average income per month, and distance to the market, . This indicates that despite seasonal drought and flooding affecting the four (4) dimensions of food security, household's choice of coping strategy is driven by socio-demographic factors mentioned above and this has made them to be in position of making food available for consumption at home. And it is from this background built with evidence that the study entails that other societies can also incorporate some of these factors into their ways of living while researchers can emulate and eliminate some factors based on the hypothetical reasoning they may have towards the considered factors.

6.2 Recommendations

6.2.1 General recommendations.

To increase food availability, it is recommended that non-farm activities inform of self-skills like motorcycle mechanical repair, agro-processing and storage, retail trading among households should be encouraged to increase level of income thus providing money for buying food in times of food shortage. Households should diversify in line of their production to avoid total loss of agricultural products due to the impact of the seasonal drought or floods.

i. Considering the decrease in production due to seasonal variability, households faced with drought should be trained and encouraged to practice small scale irrigation to increase agricultural production when faced with drought related challenges.

ii. From the study observation and interaction with respondents in the field despite the seasonal drought and flooding, there is also poor planning and over commercialization of food security crops. Therefore, it is advisable that government through the local leaders should emphasize on production of food security crops such as cassava, sweet potato, and fast maturing vegetables like amaranthus, spinach and vigna unguiculatus (boo), egg plants for consumption as people also grow other crops for the market. Although these can seem to bear fruit in the long run it needs thorough policy enforcement among households.

iii. Public education and awareness on food security causes and better coping strategies targeting the households should be publicized to ensure information reach every member of the community. The information could focus on environmental conservation, smarter agricultural farming and food storage at household level. To promote this, information should be integrated into community farmer's programs where pictures, videos are shown to farmer's groups to learn more on how to handle seasonal weather induced food insecurity

6.2.2 Recommendations for future research

Based on the findings of this study, it is recommended that similar study should be done among wider communities of different agro-ecological zone.

Also further studies should focus on linking the effect of weather extreme events and food security at the intense period of the weather occurrence and lastly they should try to find out if other weather related coping strategies can mitigate weather induced food insecurity at household.

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APPENDICES

Appendix 1: Ethical Clearance

GULU UNIVERSITY

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RESEARCH ETHICS COMMITTEE

15/07/2022

To. Obwoya Mathew

Gulu University
0789092428

Type: Initial Review

Re: GUREC-2022-238: DRIVERS OF COPPING STRATEGIES TOWARDS EXTREME WEATHER INDUCED HOUSEHOLD FOOD INSECURITY IN ACHOLI SUB REGION OF NORTHERN UGANDA: CASE OF GULU DISTRICT., Version 3.0, 2022-07-07

I am pleased to inform you that the Gulu University REC through expedited review held on **19/05/2022** approved the above referenced study
Approval of the research is for the period of **15/07/2022** to **15/07/2023.**

As Principal Investigator of the research, you are responsible for fulfilling the following requirements of approval

1. All co-investigators must be kept informed of the status of the research
2. Changes, amendments, and addenda to the protocol or the consent form must be submitted to the REC for re-review and approval **prior** to the activation of the changes
3. Reports of unanticipated problems involving risks to participants or any new information which could change the risk benefit ratio must be submitted to the REC
4. Only approved consent forms are to be used in the enrollment of participants. All consent forms signed by participants and or witnesses should be retained on file. The REC may conduct audits of all study records, and consent documentation may be part of such audits
5. Continuing review application must be submitted to the REC **eight weeks** prior to the expiration date of **15/07/2023** in order to continue the study beyond the approved period. Failure to submit a continuing review application in a timely fashion may result in suspension or termination of the study.
6. The REC application number assigned to the research should be cited in any correspondence with the REC of record
7. You are required to register the research protocol with the Uganda National Council for Science and Technology (UNCST) for final clearance to undertake the study in Uganda

The following is the list of all documents approved in this application by Gulu University REC

GULU UNIVERSITY
RESEARCH ETHICS COMMITTEE
APPROVED UNTIL
FACULTY OF MEDICINE
P.O. Box 166 Gulu

No.	Document Title	Language	Version Number	Version Date
1	[illegible] engagement plan	English	Version 3.0	2022-07-07
2	Informed [illegible] forms	Acholi	Version 3.0	2022-07-07
3	[illegible] forms	English	Version 3.0	2022-07-07
4	[illegible]	English	Version 3.0	2022-07-07
5	[illegible] tools	Acholi	Version 3.0	2022-07-07
6	[illegible]	English	Version 3.0	2022-07-07

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Appendix 2: Research introductory letter

GULU UNIVERSITY

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FACULTY OF AGRICULTURE & ENVIRONMENT

May 26th, 2022

The Chief Administrative Officer,
Gulu District

Dear Sir/Madam,

INTRODUCTION OF MR. OBWOYA GEORGE MATHEW

I would like to introduce to you the bearer of this letter (**Mr. Obwoya George Mathew**) who is a student of Gulu University, pursuing Master of Science in Food Security and Community Nutrition. His registration number is 19/U/2566/MFN/PS

Mr. Obwoya is researching on the topic **Drivers of coping strategies towards extreme weather induced household food insecurity in Acholi Sub Region of Northern Uganda: A Case of Gulu District."**

He will conduct a survey among selected households in Gulu district. The information obtained will help him to write his Master dissertation from which recommendations to improve extreme weather resilience will be drawn. George will adhere to the standard operating procedures in light of the Covid-19 pandemic during his field work.

Any assistance offered to him while conducting this study in the community will be highly appreciated.

Yours sincerely

Dr. Solomon Olum (PhD)
Head of Department of Food Science and Postharvest Technology
0779486193

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Appendix 4: Informed consent form (English version)

Title of the study: Drivers of Copping Strategies towards Extreme Weather Induced Household Food Insecurity, Case of Gulu District.

Investigator: OBWOYA George Mathew, BYAKATONDA Jimmy, OLUM Solomon

Institution: Gulu University

Introduction

My name is Obwoya George Mathew, a student pursuing a Master of science in Food Security and Community Nutrition in Gulu University. I am conducting a research study titled "Drivers of Copping Strategies towards Extreme Weather Induced Household Food Insecurity."The study is hereby explained to you in this informed consent, after which any questions you may have are answered. Having decided to participate in the study, you will be asked to sign a consent, which you will be given a copy to keep.

Sponsors of the research

This study is entirely sponsored privately by the student.

Purpose:

The study seeks to examine the drivers of household coping strategies to extreme weather induced food insecurity in Gulu District.

Procedures:

Your participation in this study will involve responding to questions administered from the questionnaire by the researcher.

Who will participate in the study?

Appendix 4: Informed consent form (English version)

Title of the study: Drivers of Copping Strategies towards Extreme Weather Induced Household Food Insecurity, Case of Gulu District.

Investigator: OBWOYA George Mathew, BYAKATONDA Jimmy, OLUM Solomon

Institution: Gulu University

Introduction

My name is Obwoya George Mathew, a student pursuing a Master of science in Food Security and Community Nutrition in Gulu University. I am conducting a research study titled "Drivers of Copping Strategies towards Extreme Weather Induced Household Food Insecurity."The study is hereby explained to you in this informed consent, after which any questions you may have are answered. Having decided to participate in the study, you will be asked to sign a consent, which you will be given a copy to keep.

Sponsors of the research

This study is entirely sponsored privately by the student.

Purpose:

The study seeks to examine the drivers of household coping strategies to extreme weather induced food insecurity in Gulu District.

Procedures:

Your participation in this study will involve responding to questions administered from the questionnaire by the researcher.

Who will participate in the study?

You have been chosen to participate in this study because you are among the target household groups this study seeks to investigate. The interview will last for approximately 25minutes and this study will attract 210 participants across different locations.

Risks/discomforts:

There is no foreseeable risk of harm or discomfort that will arise from your participation in this study. The only risk or discomfort will be the inconvenience in terms of time spent during the interview.

Benefits:

The findings of this study will help to contribute in understanding the what drives households to particular coping strategies and the current food security situation in Gulu District. This study will help the target population in improving their food security in respond to the coping strategies. It will also help the policy makers in designing rapid specific target policies that guides response which alines with the local coping strategies.

Confidentiality:

Your identity will not be revealed to any one as we shall only use codes to identify participants. Information obtained will only be accessible by the research team. Soft copies of the data will be protected by password and hard copy files will be kept under lock and key. Confidential information will only be accessed by the principal investigator.

Alternatives:

You do not have to participate in this study if you are not interested. You will not lose any benefit in case of no participation.

Cost:

There will not be any additional cost incurred as a result of participating in this study but rather build up of knowledge.

Questions:

If you have any questions related to the study, or your rights as a research participant, you can contact the principal investigator, OBWOYA George Mathew on telephone number +256777489124/+256789092428 or via email: georgeobwoya@gmail.com

Statement of voluntariness:

Participation in the research study is voluntary and you may join on your own free will and are also free to withdraw from the study at any time without penalty. For any concern issue pertaining to your rights and participation in the study, please contact the Chairperson, Gulu University Research Ethics Committee, Dr. Gerald Obai Tel: No., +256772305621; email: lekobai@yahoo.com/lekobai@gmail.com; or the Uganda National Council for Science and Technology, on plot 6 Kimera road, Ntinda, Kampala on Tel +256414705500.

Statement of consent

The research team has described to me what is going to be done, the risks, the benefits involved and my rights as a participant in this study. I understand that my decision to participate in this study is voluntary and will not affect me in any way. In the use of this information, my identity will be concealed. I am aware that I may withdraw at any time. I understand that by signing this form, I do not waive any of my legal rights but merely indicate that I have been informed about the research study in which I am voluntarily agreeing to participate. A copy of this form will be provided to me.

Name of participant.....Signature/Thumbprint.....Date.....

Name of witness.....Signature.....Date.....

Name of interviewer.....Signature.....Date.....

Appendix 5: Questionnaire (English version)

Title of the study: Drivers of Copping Strategies towards Extreme Weather Induced Household Food Insecurity, Case of Gulu District.

Questionnaire number .....

Name of enumerator _____	
date: ____/____/_____ **time:** _____ **Telephone number of the respondent**_____ ***(Optional)***	**Location:** **Subcounty/Division/** _____ **Parish/**_____ **Village**_____

Section A: Household Demographic information

I would like to ask you some few questions about your household demography. (Circle the right information corresponding to the codes section where applicable)

	Question	Responses	Codes
1	Position of the respondent in the household	Household head	A
		Household Caregiver	B
		Others specify,	.....
2	Place of residence	Urban	A
		Rural	B
3	Sex of the respondent	male	A
		Female	B
4.1	Marital status of Household Head	Single	A
		Married	B
		Divorced	C
		Widowed	D
		Others, specify	.....

4.2	Marital status of Household Caregiver	Single	A
		Married	B
		Divorced	C
		Widowed	D
		Others, specify	.....
5.1	Age of Household Head	below 25	A
		26-30	B
		31-35	C
		36- 40	D
		41 and above	E
5.2	Age of Household Caregiver	below 25	A
		26-30	B
		31-35	C
		36- 40	D
		41 and above	E
6.1	Educational level of Household Head	No formal Education	A
		Primary	B
		Secondary	C
		Tertiary and University	D
6.2	Educational level of Houser ld Caregiver	No formal Education	A
		Primary	B
		Secondary	C
		Tertiary and University	D
7.1	Employment status of Household Head (Non-farm Employment)	Pensioned	A
		self employed	B
		Civil servant	C
		Employed in the private sector	D
		Causal worker	E
		Others specify	.....
7.2	Employment status of Household caregiver (Non-farm Employment)	Pensioned	A
		self employed	B
		Civil servant	C
		Employed in the private sector	D

		Causal worker Others specify	E .....
8.1	How many of the following farm animals is owned by your household? (please indicate using numbers)	Poultry chicken Ducks Turkeys Livestock sheep goats cattle	....
8.2	Ownership of other Assets	Radios TV mobile phone others specify,	A B C .....
9	Household sizes (how many people live and eat with you on a daily basis)		.....
10	How many people in your household earn some income?		.....
11	What is the main source of income of your household?		.....
11	How much does your household earn on average in a month?	Less than 100,000 100.000-200,000 200,001-300.000 300,001-400,000 400,001 and above	A B C D E
12	How far do you move to reach the nearest market? (estimate in kilometer)	.....	

Section B: Flood and Drought information.

Floods and drought are brought about by changes in the weather. I am going to take you through some few questions, please tell me if you have experienced it or not. There is no wrong answer because we just need to understand your view.

	Questions	Responses	Codes
B1.1	Have you/your household been affected by any serious form of flood? (*skip to* ***B1.6*** *if the respondent says No*)	Yes No	1 2
B1.1.2	If Yes, in which year(s) did you/ your household had this flood condition?	.....	
B1.2	Were you displaced by this flood condition?(*skip to* ***B1.2.2*** *if the respondent says No*)	Yes No	1 2
B1.2.2	If Yes, how long did you stay away from where you were displaced from?	.....	
B1.3	What have been the effects of this flooding to your household?	Loss of assets Loss of income Decline in crop yield Food shortage Others specify.....	1 2 3 4 5
B1.4	What did you do to overcome the effects of this flooding?	Received food aid Migrated to other areas Kept children home from school Sold assets Sought off farm employment Sought cash handovers from relatives Others specify.....	1 2 3 4 5 6 7 8
B1.5	How widespread was the flooding?	Only my household was affected Some household in the village Most household in the village All the household in the village All the household in the district	1 2 3 4 5

Have your household been affected by any serious form of drought?(*skip to* ***B2.1*** *if the respondent says No*)	Yes No	1 2
If Yes, in which year(s) did you/ your household had this drought condition?	.....	
Were you displaced by this drought condition?(*skip to* ***B1.7.1*** *if the respondent says No*)	Yes No	1 2
If Yes, how long did you stay away from where you were displaced from?	.....	
What have been the effects of this drought to your household?	Loss of assets Loss of income Decline in crop yield Food shortage Others specify.....	1 2 3 4 5
What did you do to overcome the effects of this drought?	Sold assets Received food aid Migrated to other areas I had to do mulching of my gardens Sought off farm employment Changed crop variety Changed planting dates Change to mixed farming Practiced irrigation Others specify.....	1 2 3 4 5 6 7 8 9 10
How widespread was the drought?	Only my household was affected Some household in the village Most household in the village All the household in the village All the household in the district	1 2 3 4 5

Have your household been affected by any serious form of drought?(*skip to* ***B2.1*** *if the respondent says No*)	Yes No	1 2
If Yes, in which year(s) did you/ your household had this drought condition?	.....	
Were you displaced by this drought condition?(*skip to* ***B1.7.1*** *if the respondent says No*)	Yes No	1 2
If Yes, how long did you stay away from where you were displaced from?	.....	
What have been the effects of this drought to your household?	Loss of assets Loss of income Decline in crop yield Food shortage Others specify.....	1 2 3 4 5
What did you do to overcome the effects of this drought?	Sold assets Received food aid Migrated to other areas I had to do mulching of my gardens Sought off farm employment Changed crop variety Changed planting dates Change to mixed farming Practiced irrigation Others specify.....	1 2 3 4 5 6 7 8 9 10
How widespread was the drought?	Only my household was affected Some household in the village Most household in the village All the household in the village All the household in the district	1 2 3 4 5

1 Household views on rainfall adequacy in the preceding agricultural season. I would like to ask you about last main harvest from the preceding growing season.

	Questions	Responses	Codes
	Did the rainfall come on time?	On time	1
		Too early	2
		Too late	3
	Was there enough rain on your field at the beginning of the rainy season?	Enough	1
		Too little	2
		Too much	3
	Was there enough rain on your field during the growing season?	Enough	1
		Too little	2
		Too much	3
	Did the rain stop on time on your field?	On time	1
		Too early	2
		Too late	3
5	Did it rain near the harvest time	Yes	1
		No	2
6	Have you noticed any change in the number of rainfall days over the last 10years?	Yes	1
		No	2
		Don't know	3
6.2	If yes, what changes have you noticed	Rains have become more erratic	1
		Rain comes earlier	2
		Rain comes late	3
		Rains are heavier	4
		Longer period of drought	5
		More floods	6
		Others specify.....	7

Section C HOUSEHOLD FOOD INSECURITY STATUS

his section, I would like to ask you some few questions on your food security experience over the past months. **(Circle the codes corresponding to the response)**

	QUESTION	Response	Coding
	In the last 12month, were you or your household member worried about running out of food because of lack of money or other resources due to the extreme weather?	Yes No	1 2
	In the last 12month, were you or any member of your household unable to eat healthy and nutritious food because of extreme weather that created lack of money or other resources?	Yes No	1 2
3	In the last 12month, did you happen to eat only a few kinds of food because of lack of money or other resources?	Yes No	1 2
4	In the last 12month, did you or household member have to skip a meal because there was not enough money or other resources?	Yes No	1 2
5	In the last 12month, did you or any household member happen to eat less than you thought you should because of lack of money or other resources?	Yes No	1 2
6	Was there any time in the last 12month that your household ran out of food because of lack of money or other resources?	Yes No	1 2
7	Was there any time when you were hungry but did not eat because there was not enough money or other resources for food?	Yes No	1 2
8	In the last 12month, was there any time went without eating for a whole day because of lack of money or other resources?	Yes No	1 2

Section D: Household Food Insecurity coping strategies

this last section, I would like to ask you questions on the extent to which you or your household uses these ping strategies to food insecurity in the face of weather extreme conditions.(***Tick the Appropriate responding box***)

	Questions	Never	Seldom	Sometimes	Often	Always
	We borrow food from other people					
	Sold out assets and used the money for buying food					
	Skipped meals at times					
	We always reduce on our food consumption and expenses					
	Borrowed money for buying food					
	Had to reduce on number of meals per day					
	Used our previous savings to buy what is lacking like food					
	Worked for food					
	Survived by eating wild fruits					
0	Had to feed on foods that are less expensive to buy					
1	Children are fed first with food					
2	Had to engage in fishing activities to make food available					

Thanks